# 1AC

## plan

#### The United States Federal Government should substantially reduce its restrictions on energy production from direct drive fusion at the National Ignition Facility.

## solvency

#### Solvency

#### NNSA dictates what happens at Livermore

National Research Council 12

<http://lofgren.house.gov/images/stories/pdf/managing%20at%20nnsa%20natil%20sec%20%20labs%203.pdf>

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Managing for High-Quality Science and Engineering at the

NNSA National Security Laboratories

Erosion of trust on both sides of the relationship shapes the oversight and operation of the Laboratories, resulting in excessive bureaucracy governing Laboratory activities at a deep level of detail, including the conduct of S&E. The study committee observed widespread perception among Laboratory S&E staff and some managers that NNSA oversight activities were inconsistent with statements by NNSA that oversight is accomplished without being intrusive; i.e., “eyes on, hands off”. The study committee was repeatedly told that oversight officials frequently blur the line between oversight and evaluation and insert themselves in an operational role. This problem was reported to occur in many aspects of Laboratory activities. This erosion of the trust relationship is prominent with respect to LANL, where past failures in safety, security, and business practices attracted much national attention and public criticism. But it has also spilled over to LLNL and SNL. The loss of trust in the ability of the Laboratories to maintain operational goals such as safety, security, environmental responsibility and fiscal integrity has produced detailed scrutiny by NNSA HQ and site offices and increased aversion to risk. A major byproduct of this has been to create a bias against experimental work, because of the onerous processes sometimes required before running an experiment. The bias is problematic because experimental science is at the very heart of the scientific method. The FFRDC relationship is based on a partnership between the Federal government and a Laboratory in which the government decides what problems need to be addressed and the contractor determines how best to address those problems. There is a perception among S&E staff and managers at the three Laboratories that NNSA has moved from partnering with the Laboratories to solve scientific and engineering problems, to assigning tasks and specific S&E solutions with detailed implementation instructions. This approach precludes taking full advantage of the intellectual and management skills that taxpayer dollars have purchased. The study committee found similar issues in transactional oversight of safety, business, security and operations. Science and engineering quality is at risk when Laboratory scientists and engineers are not encouraged to bring forth their creative ideas in partnership with NNSA to solve problems vital to our national security.

#### That crushes lab effectiveness

Miller 2/16/12

House Armed Services Subcommittee on Strategic Forces Hearing;

governance, oversight, and management of the nuclear security enterprise to ensure high quality science, engineering, and mission effectiveness in an age of austerity.;

Testimony by George Miller, Director Emeritus, Lawrence Livermore National Laboratory

\* Presently, the NNSA laboratories are under severe stress in their ability to perform their vital missions because they are substantially and increasingly constrained by the manner in which federal management and oversight is implemented. I believe the impact is well in excess of hundreds of millions of dollars of work per year across the complex. The current governance model is one of "transactional oversight" and control rather than "process oversight" (ensuring that the right processes are in place). Transactional oversight entails setting precise steps to be followed and examining implementation of each step with more than 100 federal employees at each site and hundreds of external audits annually. By its very nature, this process is extremely conservative, risk-averse, and avoids appropriate cost-benefit considerations. In addition to these costs, the resultant detailed stovepiping of what and how work is to be done greatly diminishes the ability of laboratory directors to make day-to-day decisions and trade-offs to optimize efforts, increase productivity, and lower costs. \* The core issue is the loss of the sense of partnership and mutuality between the governing federal entity and the national security laboratories--the principal reason that Federally Funded Research and Development Centers (FFRDCs) and MandO contracts were created. In my view, the most appropriate partnership is one strongly focused on national service, with defined roles and responsibilities: the federal government decides "what" needs to be done and the laboratories decide "how" best to accomplish it. Currently such is not the case, and unless this issue is addressed, there is likely no or little benefit to be gained from revisiting choices about the overseeing federal governance structure. To ensure the long-term health of the laboratories, maximize productivity in addressing important national problems, and continue to recruit and retain the highly skilled workforce, the directors need to be able to run their laboratories and make timely, prudent, and integrated management decisions about program execution and operations consistent with federal government objectives and statutes. The new contracts to manage and operate LLNL and LANL were intended to bring best business practices to the management of these institutions. The federal government needs to let that happen.

#### Only direct drive works

Bodner 11

<http://fire.pppl.gov/IFE_NAS_Bodner_PlanB.pdf>

To: ! Members of the National Academy of Sciences Committee on the Prospects for Inertial Confinement Fusion Energy Systems, and the Panel on Fusion Target Physics From: ! Dr. Stephen E. Bodner, retired, former head of the laser fusion program at the Naval Research Laboratory Date: ! December 9, 2011 (revised)

When your committee was created, at the request of former Under Secretary Steven Koonin, it was told to assume that the NIF (National Ignition Facility) would reach ignition, and was asked for recommendations on how to develop fusion power after success on the NIF. That assumption has become increasingly tenuous. This memo outlines a path to fusion power that does not rely upon the NIF. Over the past year, Dr. Koonin periodically reviewed the progress towards ignition at the NIF. In his November 8, 2011 memo,1 he listed some of the remaining problems in the program, and he then noted that: Surprises encountered on the path to ignition make it impossible to predict confidently the rate of progress on those issues of greatest concern to the NIC [national ignition campaign] and so ignition by the end of FY-12 is not assured. It would be prudent therefore to devote some effort to understanding what might be the criteria for, and nature of, a “Plan B” post-FY12. At the November 2011 Annual Meeting of the American Physical Society’s Plasma Physics Division, there were many discussions in the hallways about “Plan B.” For some, it should be a continuation of the schedule-driven approach for another year or two, but using different indirect-drive target designs that could be quickly developed and tested. For others, Plan B would be a multiyear science-based program, first determining the causes of the problems, and then designing different versions of the indirect-drive concept that would have a better chance of succeeding. If ignition with the NIF is close to success, but for some unknown reason has not quite reached this goal, then of course the government should adopt either or both of the above approaches. However in this memo I will try to show that there is now experimental evidence that the NIF program is very far from success; in fact the indirect-drive approach to ignition is almost certain to fail. Switching to a science-based program will only delay the admission of failure. We all know that in science sometimes there are breakthroughs, and apparently impossible problems are solved, but I do not see any such breakthrough on the horizon. For some others, Plan B would be some new direction for the NIF: either a shift primarily to non-ignition nuclear weapons research (“high energy density physics”), or a change to a totally different type of target design, such as direct-drive. When the NIF contract was first signed, there was an agreement that the NIF “would not preclude” using direct-drive targets. In reality, it didn’t happen. The NIF has insufficient beam smoothing and insufficient laser bandwidth for a proper direct-drive test. Also, the chamber portholes that would be needed for direct-drive were covered up with concrete shielding or allocated to essential chamber functions. Unofficial and rumored estimates from LLNL say that the conversion to symmetric illumination for direct-drive would cost over $300 million and take at least two years. Since the paying customer is the weapons program, it won’t happen. There is a Plan B by the University of Rochester’s Laboratory for Laser Energetics (LLE) to test the direct-drive concept using the available chamber portholes, along with an upgrade of the laser beam smoothing and laser bandwidth.

#### Key to commercialization

Clery 11

<http://www.iter.org/doc/www/content/com/Lists/WebLinks/Attachments/750/Science-2011-Clery-445-8.pdf>

www.sciencemag.org SCIENCE VOL 334 28 OCTOBER 2011

Daniel joined Science in 1993 as one of the founding members of the magazine's first international office in Cambridge, U.K. When not stalking the corridors of power for policy stories, his beat mainly revolves around the big machines of science: fusion reactors, particle accelerators, neutron sources, space probes, telescopes, and power stations. Born in the United Kingdom and brought up in Canada, Daniel returned to the United Kingdom for high school and a degree in theoretical physics at York University. Fleeing academe, he worked his way from the former Electronics & Power magazine, via Physics World, to New Scientist before joining Science. Working from the rural idyll of Woodbridge in Suffolk, Daniel likes to run along the banks of the River Deben pursued by his dog.

Dunne estimates that an initial 400-megawatt plant would produce electricity at 12 cents per kilowatt-hour. That’s on the expensive side, but, Dunne says, “it’s not about the ultimate cost performance. We need to show availability and reliability.” Shooting for simplicity McCrory faults LIFE engineers’ decision to use NIF’s indirect drive technique. With indirect drive, the laser beams don’t hit the target directly. Instead, the target sits inside a small gold cylinder called a hohlraum. The beams shine in through the ends of the hohlraum and heat the inside of its walls so intensely that they emit x-rays; the x-rays cause the capsule coating to explode, forcing the fuel inward. The hohlraum helps smooth out unevenness in the laser beams, which could make a target implode asymmetrically, causing the core of the fuel to break up without igniting fusion (see diagram, p. 450 an indirect approach, however, inevitably leads to a loss of effi ciency. The peak energy of NIF’s beams is 1.8 MJ, but the hohlraum is only 25% efficient at converting the ultraviolet beams into x-rays, so at most 450 kJ reaches the target capsule. Since NIF’s experiments were designed, researchers have developed ways to overcome the unevenness in laser beams. McCrory believes that direct drive is a better bet for a power plant because the target is simpler— there is no need for a hohlraum, and without it there is a huge gain in efficiency. The team at the LLE in Rochester has been working on a direct drive scheme that could be used at NIF if the indirect drive fails to achieve ignition. “Having a robust alternative approach is fi scally prudent,” he says.

## adv 1

#### Adv 1—ignition

#### Peak energy collapses the global economy—unleashes multiple simultaneous crises that overwhelm resiliency—independently collapses food production

Morrigan ‘10

Tariel, Principal Research Associate, Global Climate Change, Human Security and Democracy, Global & International Studies, University of California, Santa Barbara, “PEAK ENERGY, CLIMATE CHANGE, AND THE COLLAPSE OF GLOBAL CIVILIZATION,” <http://www.global.ucsb.edu/climateproject/papers/pdf/Morrigan_2010_PECC2.pdf>, AM

Global peak energy will be delayed only if: (1) one or more major new primary energy sources are discovered or developed that are comparable in quantity, quality, and versatility to fossil fuels (especially oil and liquid fuels); (2) significant breakthroughs occur in the quantity, quality, and/or versatility associated with one or more existing primary energy sources; and/or (3) a substantial and sustained decrease in the level of human energy consumption occurs. If either or both of the first two caveats do not occur, then the third caveat must come true, either through a reduction of per capita energy consumption and/or by a decrease in human population. The conclusions of this analysis are supported by publications and statements made by several national governments, the George W. Bush and Obama administrations, the U.S. Department of Energy (see Figures 8a and 8b), the U.S. and German militaries, leading energy information reporting agencies, the oil industry, the private sector (see Figures 9a and 9b), science, and academia. Part of the reason why the general public are unaware of peak oil is because oil data in the public domain is often misreported, greatly inflated, and sometimes falsified. Contradictions and ambiguity in public data are mainly due to a lack of binding international standards to report oil reserve volume and grade; the conditions at which oil resources may be classified as commercially exploitable reserves; intentional misreporting and falsifying data to further financial and political agendas; lack of transparency and auditing; and uncertainty in technical assessments. The oil resource data and assessments of OPEC (see Figures 3, 4, and 5), information and reporting agencies that monitor the oil industry (including the International Energy Agency (IEA) and the Energy Information Agency (EIA)) (see Figures 8a and 8b), and private industry are also called into question. Buried in caveats and overly optimistic wording (see Figure 15), the estimates and figures of reporting agencies indicate that the global supply of oil will likely not be able to keep up with projected BAU demand, and that great oil supply shortages will likely start to occur within the next few years (see Figures 8a and 8b), if not sooner. The economic theory on which the economy is based assumes inexpensive and unlimited energy supplies. The global and industrialized economy is based on fractional reserve banking, compound interest, debt-based growth, and compound or unlimited growth. Credit forms the basis of the monetary system. In a growing economy debt and interest can be repaid; in a declining economy they cannot be repaid. Therefore, declining energy flows (i.e., oil) cannot maintain the economic production required to service debt. When outstanding debt cannot be repaid, new credit will become scarce; and economic growth will decline. Peak oil will have systemic effects throughout the entire global civilization. Global civilization is locked into a very complex and interrelated world economy. Any attempt to alter significantly the energy and transportation infrastructure and the global economy on which it is based would cause it to collapse – but without an increasing energy supply (i.e., oil), the infrastructure and economy on which our civilization is based cannot survive. The principle driving mechanisms for a global economic collapse are re-enforcing positive feedback cycles that are non-linear, mutually reinforcing, and not exclusive. A principle initial driver of the collapse process will be growing awareness and action about peak oil. Systemic collapse will evolve as a systemic crisis as the integrated infrastructure and economy of our global civilization breaks down. Most governments and societies – especially those that are developed and industrialized – will be unable to manage multiple simultaneous systemic crises. Systemic collapse will likely result in widespread confusion, fear, human security risks, social break down, changes in geopolitics, conflict, and war. With the collapse of the globalized economy, many communities will have to develop localized economies and food production. Oil shortages will lead to a collapse of the global economy, and the decline of globalized industrial civilization. Systemic collapse will evolve as a systemic crisis as the integrated infrastructure and economy of our global civilization breaks down. Most governments and societies – especially those that are developed and industrialized – will be unable to manage multiple simultaneous systemic crises. Consequently, systemic collapse will likely result in widespread confusion, fear, human security risks, and social break down. Economies worldwide are already unraveling and becoming insolvent as the global economic system can no longer support itself without cheap and abundant energy resources. This current transition of rapid economic decline was triggered by the oil price shock starting in 2007 and culminating in the summer of 2008. This transition will likely accelerate and become more volatile once oil prices exceed $80 – $90 per barrel for an extended time. Demand destruction for oil may be somewhere above $80 per barrel and below $141 per barrel. Economic recovery (i.e., business as usual) will likely exacerbate the global recession by driving up oil prices. A managed “de-growth” is impossible, because effective mitigation of peak oil will be dependent on the implementation of mega-projects and mega-changes at the maximum possible rate with at least 20 years lead time and trillions of dollars in investments. Peak oil and the events associated with it will be an unprecedented discontinuity in human and geologic history.

#### Nuclear war

Harris and Burrows ‘9

(Mathew, PhD European History at Cambridge, counselor in the National Intelligence Council (NIC) and Jennifer, member of the NIC’s Long Range Analysis Unit “Revisiting the Future: Geopolitical Effects of the Financial Crisis” <http://www.ciaonet.org/journals/twq/v32i2/f_0016178_13952.pdf>, AM)

Of course, the report encompasses more than economics and indeed believes the future is likely to be the result of a number of intersecting and interlocking forces. With so many possible permutations of outcomes, each with ample Revisiting the Future opportunity for unintended consequences, there is a growing sense of insecurity. Even so, history may be more instructive than ever. While we continue to believe that the Great Depression is not likely to be repeated, the lessons to be drawn from that period include the harmful effects on fledgling democracies and multiethnic societies (think Central Europe in 1920s and 1930s) and on the sustainability of multilateral institutions (think League of Nations in the same period). There is no reason to think that this would not be true in the twenty-first as much as in the twentieth century. For that reason, the ways in which the potential for greater conflict could grow would seem to be even more apt in a constantly volatile economic environment as they would be if change would be steadier. In surveying those risks, the report stressed the likelihood that terrorism and nonproliferation will remain priorities even as resource issues move up on the international agenda. Terrorism’s appeal will decline if economic growth continues in the Middle East and youth unemployment is reduced. For those terrorist groups that remain active in 2025, however, the diffusion of technologies and scientific knowledge will place some of the world’s most dangerous capabilities within their reach. Terrorist groups in 2025 will likely be a combination of descendants of long established groups\_inheriting organizational structures, command and control processes, and training procedures necessary to conduct sophisticated attacks\_and newly emergent collections of the angry and disenfranchised that become self-radicalized, particularly in the absence of economic outlets that would become narrower in an economic downturn. The most dangerous casualty of any economically-induced drawdown of U.S. military presence would almost certainly be the Middle East. Although Iran’s acquisition of nuclear weapons is not inevitable, worries about a nuclear-armed Iran could lead states in the region to develop new security arrangements with external powers, acquire additional weapons, and consider pursuing their own nuclear ambitions. It is not clear that the type of stable deterrent relationship that existed between the great powers for most of the Cold War would emerge naturally in the Middle East with a nuclear Iran. Episodes of low intensity conflict and terrorism taking place under a nuclear umbrella could lead to an unintended escalation and broader conflict if clear red lines between those states involved are not well established. The close proximity of potential nuclear rivals combined with underdeveloped surveillance capabilities and mobile dual-capable Iranian missile systems also will produce inherent difficulties in achieving reliable indications and warning of an impending nuclear attack. The lack of strategic depth in neighboring states like Israel, short warning and missile flight times, and uncertainty of Iranian intentions may place more focus on preemption rather than defense, potentially leading to escalating crises. 36 Types of conflict that the world continues to experience, such as over resources, could reemerge, particularly if protectionism grows and there is a resort to neo-mercantilist practices. Perceptions of renewed energy scarcity will drive countries to take actions to assure their future access to energy supplies. In the worst case, this could result in interstate conflicts if government leaders deem assured access to energy resources, for example, to be essential for maintaining domestic stability and the survival of their regime. Even actions short of war, however, will have important geopolitical implications. Maritime security concerns are providing a rationale for naval buildups and modernization efforts, such as China’s and India’s development of blue water naval capabilities. If the fiscal stimulus focus for these countries indeed turns inward, one of the most obvious funding targets may be military. Buildup of regional naval capabilities could lead to increased tensions, rivalries, and counterbalancing moves, but it also will create opportunities for multinational cooperation in protecting critical sea lanes. With water also becoming scarcer in Asia and the Middle East, cooperation to manage changing water resources is likely to be increasingly difficult both within and between states in a more dog-eat-dog world.

Food wars go nuclear

Brown ‘9

founder of the Worldwatch Institute and the Earth Policy Institute (Lester R, “Can Food Shortages Bring Down Civilization?” Scientific American, May)

The biggest threat to global stability is the potential for food crises in poor countries to cause government collapse. Those crises are brought on by ever worsening environmental degradation

One of the toughest things for people to do is to anticipate sudden change. Typically we project the future by extrapolating from trends in the past. Much of the time this approach works well. But sometimes it fails spectacularly, and people are simply blindsided by events such as today's economic crisis.

For most of us, the idea that civilization itself could disintegrate probably seems preposterous. Who would not find it hard to think seriously about such a complete departure from what we expect of ordinary life? What evidence could make us heed a warning so dire--and how would we go about responding to it? We are so inured to a long list of highly unlikely catastrophes that we are virtually programmed to dismiss them all with a wave of the hand: Sure, our civilization might devolve into chaos--and Earth might collide with an asteroid, too! For many years I have studied global agricultural, population, environmental and economic trends and their interactions. The combined effects of those trends and the political tensions they generate point to the breakdown of governments and societies. Yet I, too, have resisted the idea that food shortages could bring down not only individual governments but also our global civilization.

I can no longer ignore that risk. Our continuing failure to deal with the environmental declines that are undermining the world food economy--most important, falling water tables, eroding soils and rising temperatures--forces me to conclude that such a collapse is possible. The Problem of Failed States   Even a cursory look at the vital signs of our current world order lends unwelcome support to my conclusion. And those of us in the environmental field are well into our third decade of charting trends of environmental decline without seeing any significant effort to reverse a single one. In six of the past nine years world grain production has fallen short of consumption, forcing a steady drawdown in stocks. When the 2008 harvest began, world carryover stocks of grain (the amount in the bin when the new harvest begins) were at 62 days of consumption, a near record low. In response, world grain prices in the spring and summer of last year climbed to the highest level ever.As demand for food rises faster than supplies are growing, the resulting food-price inflation puts severe stress on the governments of countries already teetering on the edge of chaos. Unable to buy grain or grow their own, hungry people take to the streets. Indeed, even before the steep climb in grain prices in 2008, the number of failing states was expanding [see sidebar at left]. Many of their problem's stem from a failure to slow the growth of their populations. But if the food situation continues to deteriorate, entire nations will break down at an ever increasing rate. We have entered a new era in geopolitics. In the 20th century the main threat to international security was superpower conflict; today it is failing states. It is not the concentration of power but its absence that puts us at risk.States fail when national governments can no longer provide personal security, food security and basic social services such as education and health care. They often lose control of part or all of their territory. When governments lose their monopoly on power, law and order begin to disintegrate. After a point, countries can become so dangerous that food relief workers are no longer safe and their programs are halted; in Somalia and Afghanistan, deteriorating conditions have already put such programs in jeopardy.Failing states are of international concern because they are a source of terrorists, drugs, weapons and refugees, threatening political stability everywhere. Somalia, number one on the 2008 list of failing states, has become a base for piracy. Iraq, number five, is a hotbed for terrorist training. Afghanistan, number seven, is the world's leading supplier of heroin. Following the massive genocide of 1994 in Rwanda, refugees from that troubled state, thousands of armed soldiers among them, helped to destabilize neighboring Democratic Republic of the Congo (number six).Our global civilization depends on a functioning network of politically healthy nation-states to control the spread of infectious disease, to manage the international monetary system, to control international terrorism and to reach scores of other common goals. If the system for controlling infectious diseases--such as polio, SARS or avian flu--breaks down, humanity will be in trouble. Once states fail, no one assumes responsibility for their debt to outside lenders. If enough states disintegrate, their fall will threaten the stability of global civilization itself.

#### NIF solves limitless energy

Donnelly ‘9

Rich, SPIE newsroom editor, SPIE is an international society advancing an interdisciplinary approach to the science and application of light. About the Society The Society advances emerging technologies through interdisciplinary information exchange, continuing education, publications, patent precedent, and career and professional growth, “Giant Lasers at NIF,” http://spie.org/x36025.xml

Perhaps NIF's greatest potential, however, is the possibility of verifying the potential for fusion-fission energy, from a concept called LIFE (laser inertial fusion engine). According to the NIF Web site, LIFE power plants could generate gigawatts of power 24 hours a day for as long as 50 years without refueling while avoiding carbon dioxide emissions, easing proliferation concerns, and minimizing the problems of long-term nuclear waste disposal. "The energy mission is extremely interesting to us; people have considered that the long pole in the tent for a long time," Moses says. "You make the fusion process easier, you take advantage of all the energy in the fission fuel, and you get rid of the waste. The remarkable thought is that you make your own fusion fuel, your own fission fuel, you get the maximum use of the energy that's available, and get rid of the waste products, all in situ, all in one space. "We've had this reviewed by a lot of people, both scientific and policy people," he adds, "and there's a lot of interest in the community about it." Moses credits the nearly 3000 partners in the construction of NIF with achieving the goal of completing the facility. From construction companies to lens manufacturers, they all played an important role in the project. "They deserve as much credit as we do for what we have here," Moses says. Fact File From the National Ignition Facility • NIF'S 192 giant lasers are housed in a 10-story building in Livermore, CA, the size of three U.S. football fields. • Experiments leading to controlled, self-sustaining nuclear fusion and energy gain will begin in 2010. • The energy of all 192 laser beams will be focused on a pea-sized target filled with deuterium and tritium fuel, creating temperatures and pressures found only in the core of stars and giant planets and inside nuclear weapons. • The resulting reaction will "ignite" the hydrogen atoms' nuclei in the same fusion energy process that provides the life-giving energy of the sun. • This fusion reaction will release many times more energy than the laser energy that was required to initiate the reaction, serving as the "proof of principle" of inertial confinement fusion. • Take a virtual tour of the facility at https://lasers.llnl.gov/ NIF Will Help With Global Energy Needs NIF will not itself be used to generate electricity. But NIF's laser experiments, with fusion ignition and burn and energy gain in the lab, should bring fusion energy a major step closer to becoming a viable source of virtually limitless energy. Fusion, nuclear fission, and solar-produced energy (including biofuels) are the only energy sources capable of satisfying the Earth's need for power for the next century and beyond without the negative environmental impacts of fossil fuels. Energy experts estimate that over the next 75 years, the demand for energy could grow to as much as three times what it is today, while affordable and accessible supplies of petroleum and natural gas will decline steadily and may well be exhausted by the turn of the century.

#### Ignition key to astrophysics advances

NNSA OSR 11

http://nnsa.energy.gov/sites/default/files/nnsa/inlinefiles/nif\_final\_%20draft\_100311\_js\_JH--high%20res.pdf BASIC RESEARCH DIRECTIONS FOR USER SCIENCE AT THE NATIONAL IGNITION FACILITY Report on the National Nuclear Security Administration (NNSA) – Office of Science (SC) Workshop on Basic Research Directions on User Science at the National Ignition Facility Chairs: John Sarrao, Los Alamos National Laboratory Kimberly Budil, Lawrence Livermore National Laboratory Michael Wiescher, University of Notre Dame Panel Chairs: Laboratory Astrophysics R. Paul Drake, University of Michigan Nuclear Physics William Goldstein, Lawrence Livermore National Laboratory Richard Petrasso, Massachusetts Institute of Technology Michael Wiescher, University of Notre Dame Materials in Extremes and Planetary Physics Russell Hemley, Carnegie Institution of Washington Beam and Plasma Physics Chan Joshi, University of California, Los Angeles Warren Mori, University of California, Los Angeles Margaret Murnane, University of Colorado, Boulder Alan Wootton, Vector Resources Cross-Cut/Facility-User Issues Roger Falcone, Lawrence Berkeley National Laboratory NNSA Contact: Michael Kreisler SC Contact: James Glownia Administrative: Kia Williams (NNSA), Tim Ledford (ORISE)

Astrophysical systems are frequently so hot that they produce copious x-rays and are so violent that they produce ionized, turbulent matter featuring strong magnetic fields or intense radiation. Qualitatively, NIF and other large lasers produce these same elements and so can be exploited in research that is relevant to astrophysics. Quantitatively, NIF opens up some novel areas of research and pushes other areas of research into significant new regimes. This panel report describes four research directions strongly connected to astrophysics and enabled by NIF. One cannot, however, narrowly confine the astrophysical applications of NIF. They arise in all areas of astrophysics, and other panels discuss them where appropriate. This specifically includes applications of NIF to nuclear astrophysics (Nuclear Physics Panel), planets (Materials in Extremes and Planetary Physics Panel), and relativistic shock waves (Beam and Plasma Physics Panel). Status of the Field The application of high-energy lasers to astrophysics began in the 1990s, with work aimed at hydrodynamics during explosions and the spectral absorption of x-rays by hot matter. This work led to the growth of ―high energy density laboratory astrophysics,‖ a field that now has two international conferences. The ability to probe properties and processes that are relevant to astrophysics is, in every case, limited by the available laser energy. By providing more than a 50-fold increase in available energy, NIF enables both novel experiments, such as the destruction of clumps of denser matter by radiative shocks, and the exploration of new regimes, such as the study of magnetic field generation in important novel regimes. Beyond this, NIF makes possible new science relevant to astrophysics that cannot be undertaken anywhere else. The examples here relate to the evolution and chemistry of condensed matter, beginning with small grains that form from the plasmas that flow out of stars and other objects. These grains are known as ―dust‖ and play an essential role in energy transport and chemical evolution during planet formation. Those dust grains that become covered by ice are likely locations for the photochemical interactions that produce the precursors for life. Only NIF can study dust from its inception in plasma to grain formation and to further processing by shocks or radiation. Only NIF can produce the type of x-ray bursts needed, across all relevant energies, to see the photochemistry.

#### Solves asteroids

NNSA OSR 11

http://nnsa.energy.gov/sites/default/files/nnsa/inlinefiles/nif\_final\_%20draft\_100311\_js\_JH--high%20res.pdf BASIC RESEARCH DIRECTIONS FOR USER SCIENCE AT THE NATIONAL IGNITION FACILITY Report on the National Nuclear Security Administration (NNSA) – Office of Science (SC) Workshop on Basic Research Directions on User Science at the National Ignition Facility Chairs: John Sarrao, Los Alamos National Laboratory Kimberly Budil, Lawrence Livermore National Laboratory Michael Wiescher, University of Notre Dame Panel Chairs: Laboratory Astrophysics R. Paul Drake, University of Michigan Nuclear Physics William Goldstein, Lawrence Livermore National Laboratory Richard Petrasso, Massachusetts Institute of Technology Michael Wiescher, University of Notre Dame Materials in Extremes and Planetary Physics Russell Hemley, Carnegie Institution of Washington Beam and Plasma Physics Chan Joshi, University of California, Los Angeles Warren Mori, University of California, Los Angeles Margaret Murnane, University of Colorado, Boulder Alan Wootton, Vector Resources Cross-Cut/Facility-User Issues Roger Falcone, Lawrence Berkeley National Laboratory NNSA Contact: Michael Kreisler SC Contact: James Glownia Administrative: Kia Williams (NNSA), Tim Ledford (ORISE)

bodies. NIF will provide the energy density needed for simulating the conditions associated with the giant impacts of planet formation, such as the one that led to creation of the Earth’s moon. In addition, NIF will allow x-ray impulse loading of asteroid-type materials to address the technical challenge of deflection of celestial bodies on Earth-crossing orbits and thus contribute to mitigation of rare but potentially catastrophic hazards of impacts.18

#### That comparatively outweighs

McGuire ‘2

(Bill, Professor of Geohazards at University College London and is one of Britain's leading volcanologists, A Guide to the End of the World, p. 173-174)

Probably the only piece of good news that can be taken away from my brief look at the end of the world as we know it is that although this is going to happen — and soon—the survival of our race seems to be assured, for now at least. Leaving aside the possibility of a major comet or asteroid impact on a scale of the dinosaur-killer 65 million years ago— which only happen every few hundred million years—it is highly unlikely that anything else is going to wipe out every single last one of us—all 6 billion plus—in the foreseeable future. Even the replacement of the world with which we have become so familiar with one of sweltering heat or bitter cold might not seem as scary for those of our descendants likely to be in the thick of things. After all, we are a remarkably adaptable species, and can change to match new circumstances with some aplomb. Familiar 'worlds' have certainly ended many times before, as no doubt a centenarian born and raised while Queen Victoria sat on the throne of the United Kingdom, and who lived to sec man land on the moon, would testify. The danger is, however, that the world of our children and those that follow will be a world of struggle and strife with little prospect of, and perhaps little enthusiasm for, progress as the Victorians viewed it. Indeed, it would not be entirely surprising if, at some future time, as the great coastal cities sink beneath the waves or below sheets of ice, the general consensus did not hold that there had been quite enough progress thank you—at least for a while. While I have tried in these pages to extrapolate current trends and ideas to tease out and examine somewhat depressing scenarios for the future of our planet and our race, I am sure that, to some extent at least, you would be justified in accusing me of a failure of the imagination. After all, I have rarely looked ahead beyond a few tens of thousands of years, and yet our Sun will still be bathing our planet in its life-giving warmth for another 5 billion years or more. Who knows, over that incomprehensible length of time, what Homo sapiens and the species that evolve from us will do and become. Our species and those that follow may be knocked back time and time again in the short term, but provided we learn to nurture our environment rather than exploit it, both here on Earth—before the Sun eventually swallows it up—and later, perhaps, in the solar system and the galaxy and beyond, then we have the time to do and be almost anything. Maybe now is the right time to start.

#### Key to finding habitable planets

NNSA OSR 11

http://nnsa.energy.gov/sites/default/files/nnsa/inlinefiles/nif\_final\_%20draft\_100311\_js\_JH--high%20res.pdf BASIC RESEARCH DIRECTIONS FOR USER SCIENCE AT THE NATIONAL IGNITION FACILITY Report on the National Nuclear Security Administration (NNSA) – Office of Science (SC) Workshop on Basic Research Directions on User Science at the National Ignition Facility Chairs: John Sarrao, Los Alamos National Laboratory Kimberly Budil, Lawrence Livermore National Laboratory Michael Wiescher, University of Notre Dame Panel Chairs: Laboratory Astrophysics R. Paul Drake, University of Michigan Nuclear Physics William Goldstein, Lawrence Livermore National Laboratory Richard Petrasso, Massachusetts Institute of Technology Michael Wiescher, University of Notre Dame Materials in Extremes and Planetary Physics Russell Hemley, Carnegie Institution of Washington Beam and Plasma Physics Chan Joshi, University of California, Los Angeles Warren Mori, University of California, Los Angeles Margaret Murnane, University of Colorado, Boulder Alan Wootton, Vector Resources Cross-Cut/Facility-User Issues Roger Falcone, Lawrence Berkeley National Laboratory NNSA Contact: Michael Kreisler SC Contact: James Glownia Administrative: Kia Williams (NNSA), Tim Ledford (ORISE)

Impact Using NIF to study the formation and evolution of dust and the radiative triggering of prebiotic molecules is truly transformational. This research will provide a unique diagnostic of dust from inception in plasma to grain formation and further processing by shocks and radiation bursts. This understanding will further allow the development of a holistic model of radiation-driven ice chemistry, which will ultimately allow the ability to predict the chemical composition during planet formation and, thus, identify the planetary systems that are the most likely to develop organic life.

#### Key to human survival in the long term

Science Ray 12

<http://scienceray.com/astronomy/exoplanet-lifeline-for-future-humans/> We publish articles on a wide variety of science-related subjects including Chemistry, Biology, Environmental Science and Physics.

The idea that humans should stay on Earth is just not realistic, when one considers the growing population and dwindling resources of our home planet. Dr Charley Lineweaver, along with Australian National University PhD student Aditya Chopra, claim that finding exo-planets capable of sustaining life should be top priority for humanity, because locating relatively nearby habitable worlds may be crucial for our species to survive in the long term. The pair have been reviewing current planetary research that has been examining both earth environments which support life as well as the possible environments on other planets, of which, since 1995, more than 750 have been discovered. Even though a few are supposedly Earth-like, knowing whether or not they could sustain life is for now just an ambition. Determining habitability of exo-planets is in truth the new holy grail of astronomy – one of the biggest, most confusing, and important issues planetary scientists need to to deal with as this century progresses, because planets on which to aim at placing future human colonies will become ever more important. The idea that humans should stay on Earth is just not realistic, when one considers the growing population and dwindling resources of our home planet. That being so, the review by Lineweaver and Chopra’s found both the two most important parameters for harbouring life are temperatures between -20°C and 122°C and the presence of water. Human exploration of Earth has revealed life adapted to all kinds of weird environments, even the most extraterrestrial of scenarios, leading to the very real notion that habitable planets will be found as time goes by, because of the innate adaptability of life itself. Not that the possibility of habitable planets without life is not there, because much depends upon whether the conditions for life to form – dubbed the abiogensis habitable zone – are far more narrow than those needed for life to sustain itself. Life has a way of managing environments to render planets habitable, adapting to whatever conditions exist, so the priority needs to be the development of a satellite capable of studying planetary atmospheres and sending information back to us about the possibility of life there. Once we find a suitable candidate world, we need to work out how to get there, because it could well be the only way to avoid the extinction of the human race.

#### Ignition key to plasma physics advances

Wiescher 3/7/12

<http://science.energy.gov/~/media/np/nsac/pdf/mtg%203912/Wiescher_nuclear-science-at-NIF2.pdf>

Freimann Professor Nuclear Physics Vordiplom in Physics Universität Münster, Physikalisches Institut, 1972 Diplom in Solid State Physics, ibid., 1975 Ph.D. in Nuclear Physics Universität Münster, (summa cum laude) Institut für Kernphysik, 1980

Nuclear physicists have made major advances in understanding the origin of the elements using a suite of accelerator facilities for cross-section measurements. Many gaps in that understanding will be addressed by future facilities, including the Facility for Rare Isotope Beams (PRIB) and Deep Underground Science and Engineering Laboratory (DUSEL), which are expected to be available in the ten-year time frame. But even with these new capabilities, a full, experimentally validated picture of nucleosynthesis will be missing, because critical elements of the phenomena—interaction between the nuclear processes and the plasma environment in which they take place—cannot be accessed. Experiments at the NIF will certainly manifest these interactions. Work underway now— including diagnostic development, experimental design, and preliminary measurements— suggests that NIF experiments can be designed to observe and measure this interaction and its effects. Such a program of nuclear physics at NIF would be complementaiy, and possibly equally important, to programs planned at FRIB and DUSEL in solving the problem of nucleosynthesis. Without such plasma-based experiments, our increased understanding from these future facilities will remain incomplete.

#### Solves extinction from global environmental collapse

Woskov 12

– Paul, Senior Research Engineer – MIT Plasma Science and Fusion Center and Ph.D. in Electrical Engineering – Rensselaer Polytechnic Institute, "About Plasmas – Cleaning the Environment", http://www.plasmacoalition.org/plasma\_writeups/environment.pdf

“Water and air, the two essential ﬂuids on which all life depends, have become global garbage cans.” – Jacques Cousteau To Cousteau’s list of global garbage cans we can add the earth beneath our feet. Soil, air and water have all suffered from the effects of industrial waste and pollution, making the quality of our environment a vital issue for our time. To help with problems of greenhouse gases, like carbon from factories and automobiles, and with concerns about “global warming,” researchers are developing new ways of aiding the environment by using plasmas. Plasmas are fundamentally different from other states of matter. While solids, liquids and gases have no electrical charge, plasmas contain lots of freely moving ions (positively charged particles) and electrons (negatively charged particles). This difference makes plasmas able to transform pollution into environmentally safer materials. The transformation can occur through heating or through interactions involving particles that are not available in regular gases. To process pollutants efﬁciently, plasmas generally operate at about atmospheric pressure. This is a relatively high pressure for plasmas, much higher than is used in plasma applications like fusion energy and computer chip manufacturing, which operate at low pressure – near vacuum conditions. Imagine trying to bottle a bolt of lightning – a naturally occurring plasma at atmospheric pressure – and you can get some idea of how difﬁcult it is to control and use man-made atmospheric-pressure plasmas. Mastering this difﬁculty can help lead to a cleaner environment. When operated in what is called 'thermal mode,' all the particles in the plasma (electrons, ions and neutral particles) get uniformly hot. In plasmas the temperature of the charged and neutral particles can become much higher than is possible with incineration, so they can destroy waste more thoroughly. Furthermore, creating a high temperature thermal plasma requires little gas ﬂow because no air or oxygen is required, while an incinerator requires large amounts of air to burn wastes. Consequently plasma furnaces could be used instead of incinerators to process municipal waste more thoroughly and with less combustion exhaust. Plasmas also reduce the need for expensive gas ﬁlters (commonly called “scrubbers”) designed to decrease the amount of pollutants released into the atmosphere. In addition, the plasma process eliminates ash, which in present municipal incinerators is considered hazardous enough to bar from interstate transport. Instead of ash, high-temperature plasmas in arc furnaces can convert materials into a glassy substance, separating out the molten metal, which can then be recycled. The stable glassy material can be used in landﬁlls with essentially no environmental impact, since it cannot leach into the soil. Plasma furnaces are being used in Honolulu and Japan to treat hospital and municipal wastes. When environmental laws require scrubbers to be used on smoke stacks, plasma processing of waste could become the least expensive alternative. There are also nonthermal atmospheric pressure plasmas, those in which only the electrons get hot. These plasmas are effective against other kinds of pollution. Since energy is not required to heat all the particles to a high temperature, nonthermal plasmas can selectively and efﬁciently destroy pollutants targeted by the hot electrons and by unique chemical species that the hot electrons create. Nonthermal plasmas can destroy pollutants such as volatile organic compounds (VOC) from cleaning ﬂuid or manufacturing solvent vapors, as well as nitrogen oxides in automobile exhaust. Plasmas (both thermal and nonthermal) can be used to monitor environmental pollution with high sensitivity in air and smoke stacks. A plasma generated in a smoke stack excites trace elements in the smoke to make those elements emit light. Using a spectrometer, an operator can identify the elements and determine quantities of the pollutants. Such pollution monitors have demonstrated sensitivity of better than one part per billion for lead, chromium, beryllium, mercury, and other pollutants, allowing better control of hazardous air pollution. The Environmental Protection Agency (EPA) and Department of Energy have been testing prototype plasma-aided emissions monitors for this application. Plasmas can also be used in vehicles to reduce pollution from conventional fossil fuel combustion by “reforming” the fuel before it is burned, breaking it down into compounds that burn more cleanly. Research is being done on a “plasmatron,” a miniature highvoltage thermal plasma that helps separate the hydrogen atoms from complex organic molecules. This device can be used to reform hydrocarbon fuels, such as gasoline, into cleaner burning hydrogen or syngas (a mixture of hydrogen and carbon monoxide). Superfund sites, the major soil contamination projects identiﬁed by the EPA, also beneﬁt from plasma processing. High temperature plasmas can process solid wastes and chemical spills in soil, destroying toxic compounds or converting them to safer forms. At the Hanford site in Washington, which the Department of Energy describes as “the world’s largest environmental cleanup project,” a plasma was used to target and destroy carbon tetrachloride pumped from the soil. Some low-pressure plasmas can emit large amounts of ultraviolet (UV) radiation, X-ray radiation or electron beams through windows into the atmosphere. These plasmas can be used for a variety of environmental needs. For example, intense UV radiation can disable the DNA of a microorganism in water, making it impossible for that microorganism to replicate. This plasma-based UV method takes only 12 seconds, has no effect on the taste or smell of the water, and is effective against all known water-born bacteria and viruses. It has been used in Bangladesh, where Waterhealth International and the U.S. Department of Energy have demonstrated that surface water (in ponds and shallow hand-pumped wells) could be used for drinking once it was decontaminated with UV radiation, eliminating microorganisms carrying water-born diseases such as cholera. Intense UV water puriﬁcation systems are especially important for developing countries since they can be easy to use and have low maintenance, high production and low cost. Plasma-based UV water treatment systems use several thousand times less energy than boiling water! Developing and implementing plasma technologies could help restore and protect our environment, providing new cleaning methods, preventing or reducing pollution, and helping countries comply with environmental regulations. They may provide the only solutions to many of our environmental challenges. Once fully developed, these technologies could make today’s “global garbage cans” a thing of the past.

#### Ignition at the NIF causes rapid commercialization

LLNL 12

<https://life.llnl.gov/delivering_life/index.php> For more than half a century, Lawrence Livermore National Laboratory (LLNL) has applied cutting-edge science and technology to enhance national security. In 1952, when renowned physicists Ernest O. Lawrence and Edward Teller opened a laboratory at the abandoned Naval Air Station east of Livermore, California, they wanted to accelerate work on the hydrogen bomb. They also realized that research on this fusion energy weapon might have an even more important application—providing a virtually limitless source of clean energy.

Despite fusion's potential benefits for a low-carbon energy economy, the long timescales typically associated with fusion development have excluded it from mainstream energy policy considerations. The laser inertial fusion energy (LIFE) concept is intended to change this paradigm, and deliver laser fusion power stations on a timescale that matters. The LIFE approach is based on the demonstration of fusion ignition at the National Ignition Facility (NIF), and uses a modular approach to ensure high plant availability and to allow evolution to more advanced technologies and materials as they become available. Use of NIF's proven physics platform for the ignition scheme is an essential component of an acceptably low-risk solution. After ignition on NIF, the “next step” would be a power plant generating hundreds of megawatts of thermal power. Estimates of the technology development program requirements, along with manufacturing and construction timescales, indicate that this plant could be commissioned and operational by the mid 2020s. This first plant is designed to demonstrate all the required technologies and materials certification needed for the subsequent rollout of electric power at commercial power plant levels from the 2030s and onward. The timeliness requirements for commercial delivery are compelling. Rollout from the 2030s would remove 90 to 140 gigatons of CO2-equivalent carbon emissions by the end of the century (assuming U.S. coal plants are displaced and the doubling time for roll-out is between 5 and 10 years). Delaying rollout by just 10 years removes 30 to 35% of the carbon emission avoidance, which at $100/megaton translates to a net present value of $140 to $260 billion dollars. For inertial fusion energy to achieve its full potential in solving our energy/climate challenges, a focused delivery program is urgently needed. Based on many decades of development and investment, the option of LIFE is now sufficiently mature to allow progression to power plant construction. This offers profound new solutions to meeting the demand for safe, secure, low-carbon, non-geopolitical electricity generation. It also provides new options for process heat applications, being able to be operated at high temperatures. A delivery-focused, evidence-based approach has been proposed to allow LIFE power plant rollout on a timescale that meets these policy imperatives and is consistent with industry planning horizons. The system-level development path makes full use of the distributed capability in laser and semiconductor technology, manufacturing and construction industries, nuclear engineering and existing grid infrastructure. The LIFE design adopts a scheme that is being tested directly on the NIF, and uses a factory-built, modular approach to construction, operations, and maintenance. This provides for high plant availability and reliability, reduced construction costs and timescales, and compatibility with accepted models for power plant operations. The nature of fusion provides for inherent plant safety and a simplified licensing regime, consistent with performance-based, risk-managed regulation. Material choices provide robust security of supply and allow widespread rollout for global market penetration. Plant design, delivery planning, and vendor engagement are now at a stage that calls for transition to full-scale project delivery (in anticipation of ignition on the NIF by the end of 2012). Successful execution of the LIFE project strengthens American economic competitiveness and allows the United States to regain a leading position in new energy technology development.

#### Provides limitless clean energy globally—no other energy solves

LLNL 12

<https://life.llnl.gov/why_life/index.php> For more than half a century, Lawrence Livermore National Laboratory (LLNL) has applied cutting-edge science and technology to enhance national security. In 1952, when renowned physicists Ernest O. Lawrence and Edward Teller opened a laboratory at the abandoned Naval Air Station east of Livermore, California, they wanted to accelerate work on the hydrogen bomb. They also realized that research on this fusion energy weapon might have an even more important application—providing a virtually limitless source of clean energy.

LIFE will deliver a safe and secure, carbon-free, affordable, sustainable, and enduring supply of baseload electricity to people throughout the world, soon enough to make a difference to our shared future. Providing for the world's energy demands is one of the most urgent—and difficult—challenges facing our society. Even with likely improvements in efficiency and energy conservation, there is a critical need to rebalance electricity supply away from fossil fuels to ensure long-term sustainability of natural resources, reduce carbon emissions over the next half-century, and stabilize greenhouse gas concentrations thereafter. The projected electrification of transport further increases this need, as does our increasing reliance on products fabricated from the very same natural resources that are currently being burned to create electricity. Renewable sources such as solar, photovoltaic, wind, and hydro will play an essential role in meeting this challenge, but do not have the storage capacity or available land to meet the majority baseload power requirements of most countries. Nuclear energy offers many attractions, but requires addressing the safety and proliferation problems associated with enrichment, reprocessing, and high-level waste storage. While all these solutions could and should be pursued, the need to replace the current fleet of power plants provides a clear window of opportunity to transform the energy landscape from 2030 onwards. Fueling the Future with LIFE For 50 years, it has been recognized that fusion energy provides a highly attractive solution to society's demand for safe, secure, environmentally sustainable energy—at a scale that meets our long-term needs. But despite fusion's tantalizing benefits, it has been largely ignored in energy policy discussions because it is viewed as a technology too immature to affect energy production over the next few decades, when it is most needed. Drawing on huge prior investment by the U.S. Department of Energy, and linking with recent innovations in the semiconductor industry, we are now at a stage to change this paradigm and offer a deliverable way forward. Scientific demonstrations by the end of 2012 on the National Ignition Facility will provide the basis for a fleet of LIFE (laser inertial fusion energy) power plants that are being designed to deliver gigawatt-scale electricity—equivalent to the largest coal or nuclear power stations. "Energy is central to poverty reduction efforts. It is also central to the transition to a sustainable green economy. It affects all the social, economic and environmental aspects of development, including gender inequality, climate change, food security, health and education and overall economic growth." —United Nations Industrial Development Organization

## adv 2

#### Adv 2—stockpile

#### The NIF’s key to stockpile stewardship, but more experiments are needed

E. Moses 12, NIF director, “Stockpile Stewardship and the National Ignition Facility”, January 18, <https://e-reports-ext.llnl.gov/pdf/552709.pdf>

The first experiments in support of SSP on NIF have been remarkably successful. Throughout these experimental campaigns, NIF laser drive has proved to be extraordinarily reproducible, giving high confidence in the results obtained, as well as enabling high-accuracy quantitative comparisons between consecutive target shots with a single controlled design variable. The NIF HEDSS experiments have already provided valuable data and have demonstrated its value to help the U.S. from having to return to underground testing to overcome a stockpile challenge. Future classified experiments, dependent on achieving the energy densities available with ignition, will be able to address fundamental physics surrounding nuclear weapon boost. Creating a predictive, physics-based capability to enable the assessment of the safety, reliability, and performance of the U.S. nuclear stockpile in an era without nuclear testing requires removing all of the major uncertainties associated with nuclear weapons performance including boost.

#### Shot allocations prevent those experiments

Optics 12/19/12

Optics industry news source, <http://optics.org/news/3/12/26>

Ignition “critical” for stewardship While the NNSA report emphasizes that achieving ignition remains one of NIF’s key goals – it is regarded as critical for accurate simulation of the behaviour of nuclear weapons – the lab’s priorities will shift noticeably. As a result, only 40% of shot allocations in 2013 are expected to be for ignition, while 50% will be dedicated to high-energy density/stockpile stewardship work. The remaining 10% of shots will be used for “non-ignition” fundamental science, and the new report makes no mention of potential future applications in energy generation. “Developing and utilizing NIF’s unique capabilities for weapons physics applications remain important objectives for the weapons programs, regardless of whether ignition is achieved in the near future,” it states. While the mismatch between experimental evidence and model calculations is not seen as a problem for current weapons understanding, if ignition is to remain elusive, it would have a serious impact on the weapons science envisaged for the site: “Weapons scientists will be unable to explore experimentally the potential impacts of ageing on thermonuclear ignition and burn for some warhead life extension design or component options,” NNSA adds. “Therefore, the resulting weapon analyses may have associated uncertainties [that are] larger than they would be otherwise.”

#### Only direct drive solves high quality hydrodynamics

Paine et al 2K

Christopher E. Paine Senior Research Associate Thomas B. Cochran Director, Nuclear Program Wade Greene Chair for Nuclear Policy Matthew G. McKinzie Senior Scientist <http://www.nrdc.org/nuclear/nif/nrdc0112.asp>

The Draft Interim Report states (p. 3) that NIF was designed to produce, for the first time in a laboratory setting, "conditions of matter close to those that exist at the center of stars and inside detonating nuclear weapons. DOE plans to use this facility for physics experiments to increase understanding of the performance of nuclear weapons without further need for nuclear testing." Not only is this statement misleading (or at best, incomplete), but issues relating to the justification of NIF and the physics of planned research were supposed to be excluded from the scope of the SEAB NIF Task Force’s study. While the NIF team has made much of its plot of temperature versus pressure phase space that shows the NIF significantly overlapping the weapons regime, in fact the relevant parameter is not temperature (T) but radiation flux, which is proportional to T4. So a NIF hohlraum driven to 300 eV may look like it’s a factor of 4-7 away from weapons, when in reality it is a factor of 250-2400 away from the weapons regime -- three orders of magnitude! Then one must consider that NIF hohlraums are probably unsuitable for well-characterized equation-of-state (EOS), opacity, and most hydrodynamic experiments because of a significant non-local-thermodynamic (non-LTE) component to their x-ray spectra (i.e., line radiation above 1 keV in energy). This indicates that such weapons experiments are more likely to be performed in a high-power, short-pulse, direct-drive regime, calling into question the entire rationale for NIF if ignition has receded as the principle objective of the project.

#### That’s key

Holloway 10

<http://edocs.nps.edu/npspubs/scholarly/theses/2010/Jun/10Jun_Holloway_Brian.pdf>

TITLE AND SUBTITLE: Numerical Simulation of Ground Coupling of Low Yield Nuclear Detonation 6. AUTHOR(S) Holloway, Brian C. 5. FUNDING NUMBERS 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000 8. PERFORMING ORGANIZATION REPORT NUMBER 9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES) Lawrence Livermore National Laboratory 7000 East Avenue Livermore, CA 94550 10. SPONSORING/MONITORING AGENCY REPORT NUMBER 11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government. IRB Protocol number \_\_\_\_\_\_\_\_\_\_\_\_\_.

During the era of nuclear weapons testing, there were many experiments conducted that measured the hydrodynamic properties and shock response of materials above and below ground. There is a wealth of knowledge documented from the nuclear tests that were conducted, but the majority of these nuclear tests took place either at altitudes well above ground level or at depths of burial well below the ground surface. Consequently, there is little data of the hydrodynamic response of materials to a nuclear detonation at or near the earth’s surface. Given the current ban on nuclear testing, large-scale testing of weapons cannot fill such data gaps; however, LLNL’s National Ignition Facility offers a unique capability to generate data in this region of interest that cannot be duplicated by any other conventional means. Employing the laser technology of NIF, along with advanced numerical computation methods, data can be produced that give insight to both the hydrodynamic response of materials, and the shock physics that takes place during and after a nuclear detonation at or near the earth’s surface. The data generated will serve particular interests in the fields of nuclear detonation detection and verification, nuclear forensics, and structural survivability.

#### Weak stockpile stewardship causes miscalc and collapses deterrence—escalates to WMD warfare

John P. Caves 10, Senior Research Fellow in the Center for the Study of Weapons of Mass Destruction at the National Defense University, “Avoiding a Crisis of Confidence in the U.S. Nuclear Deterrent”, <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ada514285>

Perceptions of a compromised U.S. nuclear deterrent as described above would have profound policy implications, particularly if they emerge at a time when a nucleararmed great power is pursuing a more aggressive strategy toward U.S. allies and partners in its region in a bid to enhance its regional and global clout. ■ A dangerous period of vulnerability would open for the United States and those nations that depend on U.S. protection while the United States attempted to rectify the problems with its nuclear forces. As it would take more than a decade for the United States to produce new nuclear weapons, ensuing events could preclude a return to anything like the status quo ante. ■ The assertive, nuclear-armed great power, and other major adversaries, could be willing to challenge U.S. interests more directly in the expectation that the United States would be less prepared to threaten or deliver a military response that could lead to direct conflict. They will want to keep the United States from reclaiming its earlier power position. ■ Allies and partners who have relied upon explicit or implicit assurances of U.S. nuclear protection as a foundation of their security could lose faith in those assurances. They could compensate by accommodating U.S. rivals, especially in the short term, or acquiring their own nuclear deterrents, which in most cases could be accomplished only over the mid- to long term. A more nuclear world would likely ensue over a period of years. ■ Important U.S. interests could be compromised or abandoned, or a major war could occur as adversaries and/or the United States miscalculate new boundaries of deterrence and provocation. At worst, war could lead to state-on-state employment of weapons of mass destruction (WMD) on a scale far more catastrophic than what nuclear-armed terrorists alone could inflict. Continuing Salience of Nuclear Weapons Nuclear weapons, like all instruments of national security, are a means to an end— national security—rather than an end in themselves. Because of the catastrophic destruction they can inflict, resort to nuclear weapons should be contemplated only when necessary to defend the Nation’s vital interests, to include the security of our allies, and/or in response to comparable destruction inflicted upon the Nation or our allies, almost certainly by WMD. The retention, reduction, or elimination of nuclear weapons must be evaluated in terms of their contribution to national security, and in particular the extent to which they contribute to the avoidance of circumstances that would lead to their employment. Avoiding the circumstances that could lead to the employment of nuclear weapons involves many efforts across a broad front, many outside the military arena. Among such efforts are reducing the number of nuclear weapons to the level needed for national security; maintaining a nuclear weapons posture that minimizes the likelihood of inadvertent, unauthorized, or illconsidered use; improving the security of existing nuclear weapons and related capabilities; reducing incentives and closing off avenues for the proliferation of nuclear and other WMD to state and nonstate actors, including with regard to fissile material production and nuclear testing; enhancing the means to detect and interdict the transfer of nuclear and other WMD and related materials and capabilities; and strength ening our capacity to defend against nuclear and other WMD use. For as long as the United States will depend upon nuclear weapons for its national security, those forces will need to be reliable, adequate, and credible. Today, the United States fields the most capable strategic nuclear forces in the world and possesses globally recognized superiority in any conventional military battlespace. No state, even a nuclear-armed near peer, rationally would directly challenge vital U.S. interests today for fear of inviting decisive defeat of its conventional forces and risking nuclear escalation from which it could not hope to claim anything resembling victory. But power relationships are never static, and current realities and trends make the scenario described above conceivable unless corrective steps are taken by the current administration and Congress. Consider the challenge posed by China. It is transforming its conventional military forces to be able to project power and compete militarily with the United States in East Asia, 1 and is the only recognized nuclear weapons state today that is both modernizing and expanding its nuclear forces. 2 It weathered the 2008 financial crisis relatively well, avoiding a recession and already resuming robust economic growth. 3 Most economists expect that factors such as openness to foreign investment, high savings rates, infrastructure investments, rising productivity, and the ability to leverage access to a large and growing market in commercial diplomacy are likely to sustain robust economic growth for many years to come, affording China increasing resources to devote to a continued, broadbased modernization and expansion of its military capabilities. In contrast, the 2008 financial crisis was the most severe for the United States since the Great Depression, 4 and it led in 2009 to the largest Federal budget deficit—by far—since the Second World War 5 (much of which is financed by borrowing from China). Continuing U.S. military operations in Iraq and Afghanistan are expensive, as will be the necessary refurbishment of U.S. forces when those con flicts end. Those military expenses, however, are expected to be eclipsed by the burgeoning entitlement costs of the aging U.S. “baby boomer” generation. 6 As The Economist recently observed: China’s military build-up in the past decade has been as spectacular as its economic growth. . . . There are growing worries in Washington, DC, that China’s military power could challenge America’s wider military dominance in the region. China insists there is nothing to worry about. But even if its leadership has no plans to displace American power in Asia . . . America is right to fret this could change. 7 As an emerging nuclear-armed near peer like China narrows the wide military power gap that currently separates it from the United States, Washington could find itself more, rather than less, reliant upon its nuclear forces to deter and contain potential challenges from great power competitors. The resulting security dynamics may resemble the Cold War more than the U.S. “unipolar moment” of the 1990s and early 2000s. Concerns about Longterm Reliability With continuing U.S. dependence upon nuclear forces to deter conflict and contain challenges from (re-)emerging great power(s), perceptions of the reliability, adequacy, and credibility of those forces will determine how well they serve those purposes. Perception is all important when it comes to nuclear weapons, which have not been operationally employed since 1945 and not tested (by the United States) since 1992, and, hopefully, will never have to be employed or tested again. If U.S. nuclear forces are to deter other nuclear-armed great powers, the individual weapons must be perceived to work as intended (reliability), the overall forces must be perceived as adequate to deny the adversary the achievement of his goals regardless of his actions (adequacy), and U.S. leadership must be perceived as prepared to employ the forces under conditions that it has communicated via its declaratory policy (credibility) These perceptions must be, of course, those of the leadership of adversaries that we seek to deter (as well as of the allies that we seek to assure), but they also need to be those of the U.S. leadership lest our leaders fail to convey the confidence and resolve necessary to shape adversaries’ perceptions to achieve deterrence. Weapons reliability is the essential foundation for deterrence since there can be no adequacy or credibility without it. Reliability is a serious emerging issue for U.S. nuclear weapons. As Secretary of Defense Robert Gates observed, “No one has designed a nuclear weapon in the United States since the 1980s, and no one has built a new one since the early 1990s.” 8 Indeed, the United States is the only nuclear weapons state party to the Nuclear Nonproliferation Treaty (NPT) that does not have the capability to produce a new nuclear warhead. 9 Russia, China, and France currently are modernizing their nuclear weapons systems, and the United Kingdom has decided to replace its current Vanguard-class ballistic missile submarines and is investing in the sustainment of its nuclear warhead maintenance and replacement capabilities. 10 In lieu of a nuclear weapons production infrastructure and nuclear testing, the United States relies upon its Stockpile Stewardship Program (utilizing computer simulation and component testing) to evaluate and validate the continued viability of existing warheads; service life extension programs to prolong the operational life of warheads (and delivery vehicles); and a stockpile of nonoperationally deployed warheads to provide spares for destructive component testing under the Stockpile Stewardship Program and a reserve to be pressed back into service to augment operationally deployed warheads, if deemed necessary. The Achilles’ heel of this current approach to ensuring the reliability of U.S. nuclear forces is the possible advent of critical systemic failure(s) in entire classes of aging warheads. That such failures could occur can be anticipated as a general matter for any aging system, particularly one that is no longer physically tested as a complete assembly. Specific failures, however, cannot be accurately forecast since the United States has no prior experience with warheads of this age. The potential for such failures emerging is increased by the relatively narrow performance margins to which the warheads were engineered by Cold War nuclear weapons designers tasked with maximizing the number and explosive power of warheads that could be delivered by a ballistic missile. 11 U.S. nuclear weapons scientists have warned of this problem for years. 12 The preceding administration proposed to address this problem by reconstituting and exercising the infrastructure needed to develop and produce nuclear weapons. The proposal involved both facilities (consolidation, refurbishment, and replacement), work force (maintenance of highly specialized nuclear weapons skills), and nuclear weapons design, development, and production work (for refurbishment and replacement of existing warheads). The Department of Energy’s National Nuclear Security Administration, which is responsible for the nuclear weapons infrastructure, expected that the infrastructure transformation plan could be implemented within its existing budget projections if the savings realized from the plan were allowed to be reinvested into the infrastructure. 13 While some aspects of the proposed new infrastructure have moved forward (for example, the National Ignition Facility), much of the plan has not because Congress has declined to provide the requisite funding.

#### Key to prevent great power wars

Morgan and Paul 9

Patrick Morgan, UC Irvine Peace Research Professor, Global Peace and Conflict Studies Center Director, and Paul, McGill University IR Professor, 2009, Complex Deterrence: Strategy in the global age p 9-11

Among the great powers (the five permanent members of the United Nations Security Council), nuclear weapons are largely seen as a hedge against the emergence of great-power conflict in the future. The great-power relationships in the post-cold war era are characterized by "recessed general deterrence," or dissuasion, in which states do not expect immediate militarized conflict, but weapons are kept in the background as insurance given the inherent uncertainties of world politics. The end of the cold war witnessed substantial changes in the deterrence dynamics involving great powers, and, as a result, general deterrence and dissuasion became operational concepts. Although they do maintain large arsenals, neither the United States nor Russia is presumed to hold automatic launch-on-warning attack plans anymore, although some of the elements of the previous era are continuing. In addition, they have reduced the number of weapons they possess, although the numbers still exceed a minimum nuclear deterrence posture. The three other old nuclear powers - China, the United Kingdom, and France - also have been maintaining their smaller arsenals, but this might change as Chinese nuclear force modernization plans come to fruition in the coming decades. The logic behind the maintenance of nuclear capabilities is that the great powers want to be prepared in case their relations deteriorate in the future. Nuclear capability can also be construed as an assurance against the expansionist pathologies of great powers as described in perspectives such as offensive realism. Moreover, uncertainties in Russia and China give pause to western nuclear powers, while, for Moscow, the fear of American influence in its former spheres in Eastern Europe and Central Asia is the cardinal source of anxiety. For the rising power, China, nuclear weapons offer a major insurance against direct assault on its strategic sphere, allowing it to rise peacefully. Nuclear weapons also offer a limited but crucial deterrent against potential conflict escalation between the United states and China involving Taiwan. The great-power deterrence calculations are thus based on "recessed general deterrence" as well as "existential deterrence": no immediate expectations of war exist among them. However, as Patrick Morgan states, "if serious conflicts emerge again, then deterrence will be in vogue-if not, at least for a lengthy period, then deterrence will operate offstage, held in reserve, and will not be the cornerstone of security management for the system." this does not mean that the relations in the US-Russia and US-China dyads would remain the same in the long run. Power transition has invariably been turbulent in the international system, and herein lies the role that nuclear weapons may play in deterring a transition war. US-Russia relations could deteriorate, and deterrence could become more relevant if tensions build up over the establishment of missile defense in Eastern Europe and over Russian efforts to repudiate major arms-control agreements in its effort to regain its lost superpower status. As discussed in Morgan and Paul's chapter in this volume, nuclear deterrence in this context has offered the major powers greater maneuverability. It has allowed the major power states to sustain the credentials as system managers and has prevented the emergence of active security dilemmas among them that can be caused by conventional arms races and technological breakthroughs. Absent the fear of existential wars, the potentially rival states have engaged in greater economic interactions. The increasing trade relations between the United States and China and China and India, an emerging power, suggest that general nuclear deterrence may offer economic spin-off benefits. To some extent, the stability in relations among the great powers, with no war in sight between them, points to the pacifying role that nuclear weapons may be playing, although other causes are present as well. In that sense, nuclear weapons may act as crucial factors in preventing a power-transition war akin to those that the world experienced in the nineteenth and twentieth centuries. For Russia, the superpower that declined, nuclear deterrence offers an opportunity not to be excessively alarmed by the expansion of the North Atlantic Treaty Organization.

#### Solves escalation of impacts

Robinson 1

Paul Robinson, Sandia National Lab President and Director, 2001, "Pursuing a New Nuclear Weapons Policy for the 21st Century," <http://www.nukewatch.org/importantdocs/resources/pursuing_a_new_nuclear_weapons_p.html>

Let me first stress that nuclear arms must never be thought of as a single “cure-all” for security concerns. For the past 20 years, only 10 percent of the U.S. defense budget has been spent on nuclear forces. The other 90 percent is for “war fighting” capabilities. Indeed, conflicts have continued to break out every few years in various regions of the globe, and these nonnuclear capabilities have been regularly employed. By contrast, we have not used nuclear weapons in conflict since World War II. This is an important distinction for us to emphasize as an element of U.S. defense policy, and one not well understood by the public at large. Nuclear weapons must never be considered as war fighting tools. Rather we should rely on the catastrophic nature of nuclear weapons to achieve war prevention, to prevent a conflict from escalating (e.g., to the use of weapons of mass destruction), or to help achieve war termination when it cannot be achieved by other means, e.g., if the enemy has already escalated the conflict through the use of weapons of mass destruction. Conventional armaments and forces will remain the backbone of U.S. defense forces, but the inherent threat to escalate to nuclear use can help to prevent conflicts from ever starting, can prevent their escalation, as well as bring these conflicts to a swift and certain end. In contrast to the situation facing Russia, I believe we cannot place an over-reliance on nuclear weapons, but that we must maintain adequate conventional capabilities to manage regional conflicts in any part of the world. Noting that the U.S. has always considered nuclear weapons as “weapons of last resort,” we need to give constant attention to improving conventional munitions in order to raise the threshold for which we would ever consider nuclear use. It is just as important for our policy makers to understand these interfaces as it is for our commanders. Defenses Although it is beyond the scope of this paper to strictly consider “defensive” tactics and armaments, I believe it is important for the United States to consider a continuum of defensive capabilities, from boost phase intercept to terminal defenses. Defenses have always been an important element of war fighting, and are likely to be so when defending against missiles. Defenses will also provide value in deterring conflicts or limiting escalations. Moreover, the existence of a credible defense to blunt attacks by armaments emanating from a rogue state could well eliminate that rogue nation’s ability to dissuade the U.S. from taking military actions. If any attack against the U.S., its allies, or its forces should be undertaken with nuclear weapons or other weapons of mass destruction, there should be no doubt in the attacker’s mind that the United States might retaliate for such an attack with nuclear weapons; but the choice would be in our hands. If high effectiveness defenses can be achieved, they will enhance deterrence by eliminating an aggressor’s confidence in attacking the U.S. homeland with long-range missiles, and thus make our use of nuclear weapons more credible (if the conflict could not be terminated otherwise.) Whereas, nuclear weapons should always remain weapons of last resort, defensive systems would likely be our weapons of first resort. Nuclear Weapons: An Enduring Strategic Tool? Throughout my career, I have had the opportunity to participate in a number of “war games” in which the roles and uses of nuclear weapons had to be faced in scenarios that imagined military conflicts developing between the U.S. and other potential adversaries. The totality of those games brought new realizations as to the role and purpose of nuclear weapons, in particular, how essential it is that deterrence be tailored in a different way for each potential aggressor nation. It also seemed abundantly clear that any use of nuclear weapons is, and always will be, strategic. Thus, I would propose we ban the term “nonstrategic nuclear weapons” as a non sequitur. The intensity of the environment of any war game also demonstrates just how critical it is for the U.S. to have thought through in advance exactly what messages we would want to send to other nations (combatants and noncombatants) and to “history,” should there be any future use of nuclear weapons—including threatened use—in conflicts. Similarly, it is obvious that we must have policies that are well thought through in advance as to the role of nuclear weapons in deterring the use of, or retaliating for the use of, all weapons of mass destruction. Let me then state my most important conclusion directly: I believe nuclear weapons must have an abiding place in the international scene for the foreseeable future. I believe that the world, in fact, would become more dangerous, not less dangerous, were U.S. nuclear weapons to be absent. The most important role for our nuclear weapons is to serve as a “sobering force,” one that can cap the level of destruction of military conflicts and thus force all sides to come to their senses. This is the enduring purpose of U.S. nuclear weapons in the post-Cold War world. I regret that we have not yet captured such thinking in our public statements as to why the U.S. will retain nuclear deterrence as a cornerstone of our defense policy, and urge that we do so in the upcoming Nuclear Posture Review. Nuclear deterrence becomes in my view a “countervailing” force and, in fact, a potent antidote to military aggression on the part of nations. But to succeed in harnessing this power, effective nuclear weapons strategies and policies are necessary ingredients to help shape and maintain a stable and peaceful world.

#### Lousy stewardship causes inevitable testing

GSN 8, Global Security Newswire, “Air Force Official Sees Return to Nuclear Testing”, <http://www.nti.org/gsn/article/air-force-official-sees-return-to-nuclear-testing/>

The United States will need to resume nuclear testing in the future, a key Air Force official said last month, arguing that such a step is an inevitable part of modernizing the U.S. nuclear arsenal, the Albuquerque Journal reported (see GSN, Oct. 29). “Right now, I don’t think we need testing,” said Brig. Gen. Everett Thomas, head of the Air Force Nuclear Weapons Center at Kirtland Air Force Base, N.M. “But, eventually, we will because, no matter what you do, a 1957 Chevy is not going to drive right in 2030. I don’t care how many pieces and parts you replace, you will eventually have to replace that 1957 Chevy — unless you just want it as a historic relic where people can come by and see it. That’s the analogy, absent testing.” The Bush administration has sought to develop a new nuclear warhead design, but has twice been rebuffed by U.S. lawmakers who have rejected the idea in part because of fears that Washington would have to end its 16-year nuclear testing moratorium (see GSN, Nov. 10).

#### Testing causes rapid arms races and global nuclear use—also causes an arms race in space

Rebecca Johnson 1, Executive Director – Acronym Institute for Disarmament Diplomacy, “Bush Has Been Ditching Treaties Since He Came To Power He Must Be Stopped Before It's Too Late”, The Guardian, <http://www.georgewalkerbush.net/ditchingtreaties.htm>

Then they put private, commercial interests above implementing and verifying the treaties banning chemical, biological and toxin weapons, but I did not speak out because such weapons are too complicated for media coverage. Then they threatened the nuclear test ban treaty, and I did not speak out, because the United States is a major ally that I did not want to offend. Then the international arms control and non-proliferation regimes collapsed. Americans weren't bothered at first, for hadn't the government promised a super-sophisticated force field round the whole nation that no terrorist or missile would ever penetrate? So nuclear testing resumed in Nevada for new warheads to improve the kill prospects of missile interceptors and to penetrate deep into enemies' bunkers. India had been waiting for just such a go-ahead, and Pakistan soon followed; both raced to test warheads to fit on to missiles, upping the tension in Kashmir and along the borders with China. Free now to resume its own testing, China boosted its programme to modernise and increase the size of its small nuclear arsenal. Somewhat reluctantly, Russia followed. Moscow suspended all further reductions and cooperative security and safety programmes for its still-large nuclear arsenal and facilities. Within a few short years, the nuclear non-proliferation treaty was just another discarded agreement. Many governments with nuclear power programmes developed nuclear weapons as well, while others fitted anthrax or sarin on to weapons, just in case. Most hadn't wanted to, but fearful that their neighbours would, all felt compelled. Regional rivalries grew quickly into major international problems. Alliances collapsed amid suspicion and recriminations. The burgeoning arms races even spread into outer space, threatening military surveillance, as well as public communication, entertainment and navigation. No one knew who had what. Deterrence was empty, as defence analysts calculated the advantages of the pre-emptive strike. In that terrified atmosphere of insecurity and mistrust, someone launched first. And then it was too late to speak out. The Republicans hadn't yet managed to get missile defence to work. Such a doomsday scenario is not so fanciful. On July 7, the New York Times announced that President Bush wants to ditch the comprehensive test ban treaty. A week before, the administration asked nuclear laboratories to work out how quickly the US could resume testing after its nine-year moratorium. If Bush were to back out of the test ban treaty or break the moratorium on nuclear testing - undertaken with China, Russia, Britain and France - he would also explicitly breach agreements made last May, when 187 countries negotiated measures to strengthen and implement the non-proliferation treaty.

#### Space arms races independently go nuclear.

Mitchell et al ‘1

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(Dr. Gordon, ISIS Briefing on Ballistic Missile Defence, “Missile Defence: Trans-Atlantic Diplomacy at a Crossroads”, No. 6 July, http://www.isisuk.demon.co.uk/0811/isis/uk/bmd/no6.html)

A buildup of space weapons might begin with noble intentions of 'peace through strength' deterrence, but this rationale glosses over the tendency that '… the presence of space weapons…will result in the increased likelihood of their use'.33 This drift toward usage is strengthened by a strategic fact elucidated by Frank Barnaby: when it comes to arming the heavens, 'anti-ballistic missiles and anti-satellite warfare technologies go hand-in-hand'.34 The interlocking nature of offense and defense in military space technology stems from the inherent 'dual capability' of spaceborne weapon components. As Marc Vidricaire, Delegation of Canada to the UN Conference on Disarmament, explains: 'If you want to intercept something in space, you could use the same capability to target something on land'. 35 To the extent that ballistic missile interceptors based in space can knock out enemy missiles in mid-flight, such interceptors can also be used as orbiting 'Death Stars', capable of sending munitions hurtling through the Earth's atmosphere. The dizzying speed of space warfare would introduce intense 'use or lose' pressure into strategic calculations, with the spectre of split-second attacks creating incentives to rig orbiting Death Stars with automated 'hair trigger' devices. In theory, this automation would enhance survivability of vulnerable space weapon platforms. However, by taking the decision to commit violence out of human hands and endowing computers with authority to make war, military planners could sow insidious seeds of accidental conflict. Yale sociologist Charles Perrow has analyzed 'complexly interactive, tightly coupled' industrial systems such as space weapons, which have many sophisticated components that all depend on each other's flawless performance. According to Perrow, this interlocking complexity makes it impossible to foresee all the different ways such systems could fail. As Perrow explains, '[t]he odd term "normal accident" is meant to signal that, given the system characteristics, multiple and unexpected interactions of failures are inevitable'.36 Deployment of space weapons with pre-delegated authority to fire death rays or unleash killer projectiles would likely make war itself inevitable, given the susceptibility of such systems to 'normal accidents'. It is chilling to contemplate the possible effects of a space war. According to retired Lt. Col. Robert M. Bowman, 'even a tiny projectile reentering from space strikes the earth with such high velocity that it can do enormous damage — even more than would be done by a nuclear weapon of the same size!'. 37 In the same Star Wars technology touted as a quintessential tool of peace, defence analyst David Langford sees one of the most destabilizing offensive weapons ever conceived: 'One imagines dead cities of microwave-grilled people'.38 Given this unique potential for destruction, it is not hard to imagine that any nation subjected to space weapon attack would retaliate with maximum force, including use of nuclear, biological, and/or chemical weapons. An accidental war sparked by a computer glitch in space could plunge the world into the most destructive military conflict ever seen.

#### Only engagement with technocracy allows citizen influence in energy futures

Nordhaus 11, chairman – Breakthrough Instiute, and Shellenberger, president – Breakthrough Insitute, MA cultural anthropology – University of California, Santa Cruz, 2/25/‘11

(Ted and Michael, <http://thebreakthrough.org/archive/the_long_death_of_environmenta>)

Tenth, we are going to have to get over our suspicion of technology, especially nuclear power. There is **no credible path** to reducing global carbon emissions without an enormous expansion of nuclear power. It is the only low carbon technology we have today with the demonstrated capability to generate large quantities of centrally generated electrtic power. It is the low carbon of technology of choice for much of the rest of the world. Even uber-green nations, like Germany and Sweden, have reversed plans to phase out nuclear power as they have begun to reconcile their energy needs with their climate commitments. Eleventh, we will need to embrace again the role of the state as a direct provider of public goods. The modern environmental movement, borne of the new left rejection of social authority of all sorts, has embraced the notion of state regulation and even creation of private markets while largely rejecting the generative role of the state. In the modern environmental imagination, government promotion of technology - whether nuclear power, the green revolution, synfuels, or ethanol - almost always ends badly. Never mind that virtually the entire history of American industrialization and technological innovation is the story of government investments in the development and commercialization of new technologies. Think of a transformative technology over the last century - computers, the Internet, pharmaceutical drugs, jet turbines, cellular telephones, nuclear power - and what you will find is government investing in those technologies at a scale that private firms simply cannot replicate. Twelveth, big is beautiful. The rising economies of the developing world will continue to develop whether we want them to or not. The solution to the ecological crises wrought by modernity, technology, and progress will be more modernity, technology, and progress. The solutions to the ecological challenges faced by a planet of 6 billion going on 9 billion will not be decentralized energy technologies like solar panels, small scale organic agriculture, and a drawing of unenforceable boundaries around what remains of our ecological inheritance, be it the rainforests of the Amazon or the chemical composition of the atmosphere. Rather, these solutions will be: large central station power technologies that can meet the energy needs of billions of people increasingly living in the dense mega-cities of the global south without emitting carbon dioxide, further intensification of industrial scale agriculture to meet the nutritional needs of a population that is not only growing but eating higher up the food chain, and a whole suite of new agricultural, desalinization and other technologies for gardening planet Earth that might allow us not only to pull back from forests and other threatened ecosystems but also to create new ones. The New Ecological Politics The great ecological challenges that our generation faces demands an ecological politics that is **generative, not restrictive.** An ecological politics capable of addressing global warming will require us to reexamine virtually every prominent strand of post-war green ideology. From Paul Erlich's warnings of a population bomb to The Club of Rome's "Limits to Growth," contemporary ecological politics have consistently embraced green Malthusianism despite the fact that the Malthusian premise has persistently failed for the better part of three centuries. Indeed, the green revolution was exponentially increasing agricultural yields at the very moment that Erlich was predicting mass starvation and the serial predictions of peak oil and various others resource collapses that have followed have continue to fail. This does not mean that Malthusian outcomes are impossible, but neither are they inevitable. **We do have a choice** in the matter, but it is not the choice that greens have long imagined. The choice that humanity faces is not whether to constrain our growth, development, and aspirations or die. It is whether we will continue to innovate and accelerate technological progress in order to thrive. Human technology and ingenuity have repeatedly confounded Malthusian predictions yet green ideology continues to cast a suspect eye towards the very technologies that have allowed us to avoid resource and ecological catastrophes. But such solutions will require environmentalists to abandon the "small is beautiful" ethic that has also characterized environmental thought since the 1960's. We, the most secure, affluent, and thoroughly modern human beings to have ever lived upon the planet, must abandon both the dark, zero-sum Malthusian visions and the idealized and nostalgic fantasies for a simpler, more bucolic past in which humans lived in harmony with Nature.

#### Role of the ballot’s to simulate enactment of the plan – key to decisionmaking and fairness

Hager, professor of political science – Bryn Mawr College, ‘92

(Carol J., “Democratizing Technology: Citizen & State in West German Energy Politics, 1974-1990” *Polity*, Vol. 25, No. 1, p. 45-70)

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

# 2AC

## ssp

#### Restrictions on labs tank recruitment

Miller 2/16/12

House Armed Services Subcommittee on Strategic Forces Hearing;

governance, oversight, and management of the nuclear security enterprise to ensure high quality science, engineering, and mission effectiveness in an age of austerity.;

Testimony by George Miller, Director Emeritus, Lawrence Livermore National Laboratory

As FFRDCs, the NNSA laboratories have been able to attract the best and brightest, and they have provided international scientific and technological leadership. However, the special relationship between the government and the laboratories has continually deteriorated over a long period of time, and it is increasingly difficult for laboratory directors to make the necessary day-to-day management decisions at their institutions in timely manner. In making trade-offs that weigh benefits vs. risks and integrate conflicting objectives, the laboratory directors often have to get federal approval from one or more of the organizational "stovepipes" even if the decision has no ostensible impact on costs. Mission delivery is not as efficient as it could be, and excessive "red tape" can be expected to have long-term ramifications on the health of the laboratories and their ability to attract and retain quality personnel. This is not news. Independent study after independent study has come to similar conclusions. America's Strategic Posture, issued in 2009 as the final report of the Congressional Commission on the Strategic Posture of the United States (chaired by Dr. William Perry and Dr. James Schlesinger), is illustrative. One of the main concerns expressed by the commission is that "the governance structure of NNSA is not delivering the needed results. This governance structure should be changed." The report adds that "... the NNSA has failed to meet the hopes of its founders. Indeed, it may have become part of the problem, adopting the same micromanagement and unnecessary and obtrusive oversight that it was created to eliminate. ...Outside assessments have concluded that the heavily bureaucratic approach of DOE/NNSA is inconsistent with the effective operation of a research and development organization."

#### Labs’ workforce is all that matters

Miller 2/16/12

House Armed Services Subcommittee on Strategic Forces Hearing;

governance, oversight, and management of the nuclear security enterprise to ensure high quality science, engineering, and mission effectiveness in an age of austerity.;

Testimony by George Miller, Director Emeritus, Lawrence Livermore National Laboratory

The first and foremost mission of the NNSA laboratories is nuclear security. With the nation committed to sustaining "a safe, secure, and effective nuclear arsenal as long as nuclear weapons exist," LLNL has vital responsibilities to assess the condition of stockpile weapons, develop modifications as needed, and certify weapon performance after changes are made. Nuclear security in the 21st century also requires vigorous programs to prevent the proliferation of nuclear weapons and counter nuclear terrorism. As I have reported to congressional committees over the years, we are achieving many technical successes in this challenging mission, but the nation could be getting much more value out of the exceptional capabilities at the NNSA laboratories, which is particularly important in austere times. The nuclear security mission of the laboratory has always required the best of science, technology, and engineering. To sustain the nuclear stockpile over the long term, the laboratories strive diligently to attract and retain an outstanding workforce. Scientists must have the skills and experimental and computational tools necessary to understand in detail the effects on aging materials on weapons materials and weapons performance. They must be able to identify and resolve issues as they arise, work with skilled engineers to develop necessary changes to weapon systems, and ensure production quality. Laboratory researchers also devise innovative "game changing" ways to improve scientific understanding of weapons physics, develop methods to improve weapon surveillance and lower production costs, and detect clandestine nuclear activities worldwide.

#### And nuclear forensics

Mtingwa, 9

(Chair of the POPA study on the Readiness of the U.S. Nuclear Workforce for 21st Century Challenges. He is an accelerator physicist and Senior Lecturer at MIT. “Readiness of the U.S. Nuclear Workforce for 21st Century Challenges,” January, http://www.aps.org/units/fps/newsletters/200901/mtingwa.cfm)

On another front, the tragedy of September 11, 2001, has brought an intense focus on the issue of national preparedness against terrorism. For emergencies involving a terrorist action or an accident at a nuclear reactor, experts must be ready to respond. Thus it is important to attend to the nuclear workforce needs of the Department of Homeland Security, the Department of Defense, the NRC, and specialized areas of the Department of Energy. An important example of the latter is the Nuclear Emergency Support Team from DOE’s National Nuclear Security Administration that travels to the site of a suspected nuclear or radiological weapon to mitigate the situation. Thus, the nation will need to expand its nuclear workforce to initiate new efforts in nuclear forensics and other parts of the Homeland Security portfolio, and to replace many retiring members of the weapons workforce. For many years, funding for U.S. university nuclear science and engineering research and education has been heavily dependent upon a single source: previously DOE and now the NRC. Therefore, it is no accident that the vitality of the nation’s university nuclear science and engineering education and infrastructure program closely tracked funding support provided by DOE over the last 15 years. As shown in Fig. 1, as DOE’s funding increased in the decade 1997 through 2007, undergraduate student enrollment in nuclear engineering increased – from a low of 480 students in 1999 to a high of 1,933 in 2007. For nuclear engineering students at minority-serving institutions, DOE support created new opportunities. While other factors also contributed to the dramatic increase in undergraduate enrollments, university administrators indicate that increases in Federal funding were indeed an important factor. In the aftermath of the accidents at Three Mile Island in 1979 and Chernobyl in 1986, DOE support for nuclear science and engineering education declined precipitously as industry construction of new plants ceased and student interest and career opportunities declined. In 1997, the President’s Committee of Advisors on Science and Technology issued a report that urged President Clinton to reinvest in university nuclear science and engineering research and education . PCAST also urged him to establish the Nuclear Energy Research Advisory Committee to provide advice to DOE on this reinvestment. In the mid-1990s, the Clinton Administration recognized the potential for a resurgence in nuclear technology, and constituted NERAC in 1998 to advise DOE as it began reinvesting both funds and management attention to rebuilding the educational infrastructure for nuclear science and engineering. This support was implemented by creating a suite of eleven targeted programs, among which perhaps the most influential was the Innovations in Nuclear Infrastructure and Education (INIE) program, which encouraged the development of strategic consortia among universities, DOE national laboratories, and industry. When DOE released its FY2007 budget request, it announced that it had completed its mission in the area of nuclear science and engineering education and made plans to terminate the program. DOE proposed essentially zero funding for nuclear science and engineering education for both FY2007 and FY2008. This signaled a significant reversal of fortune not seen since the early 1990s. DOE proposed to return to the practice of those years by providing only basic fuel services for university research reactors under a new infrastructure program. In FY2007, Congress rejected DOE’s proposal to terminate the program and instead provided $16.5 million – far less than the $27 million the program received in FY2006. In FY2008, Congress again rejected ending the program and allocated $17.9 million in the FY2008 Consolidated Appropriations Act. Of this amount, $2.9 million remained at DOE for university reactor fuel services, and Congress transferred to the NRC $15 million for the rest of the programs. While these funds would defer to some extent the erosion of nuclear science and engineering education in the U.S., they are not sufficient to maintain vital elements of the nation’s programs, particularly the highly successful INIE program. It was last funded in FY2006. As for nuclear chemistry and radiochemistry, these are two fields that overlap in many ways. Simply put, radiochemistry is the study of radioactive elements using chemical techniques, focusing on their radioactive characteristics. Nuclear chemistry is the study of the fundamental properties of nuclei, both radioactive and non-radioactive, using chemical techniques. It is quite close to the field of nuclear physics. There has been a continuing dramatic decrease in the number of Ph.D.s earned annually in nuclear chemistry, as shown in Fig. 2. It reflects the fact that only a handful of U.S. university chemistry departments currently have professors with active research programs in nuclear chemistry. Thus, advanced education in nuclear chemistry education is all but extinct in the United States. If nuclear chemistry and radiochemistry education programs are not reinvigorated, the U.S. will lack the expertise required to pursue promising advanced R&D in a myriad of disciplines. In addition to processing both fresh and spent fuel for nuclear reactors, including basic research on spent fuel separations and transmutation technologies, nuclear chemistry and radiochemistry are also extremely important to the nation’s security and health in the following cross-cutting roles: (1) **nuclear weapons stockpile stewardship**, (2) **nuclear forensics and surveillance of clandestine nuclear activities**, (3) monitoring of radioactive elements in the environment, (4) production of radioisotopes, and (5) **preparation of radiopharmaceuticals for therapeutic and diagnostic medical applications.** When considering the nuclear enterprise, the status of the health physics workforce and its training facilities must be considered. For occupational safety and the protection of the public, health physics professionals are employed in many sectors, including the commercial nuclear power industry, DOE’s national laboratories, homeland security, the NRC, the military and medical facilities. The nation’s health physics capabilities will be impacted negatively over the next decade due to the number of expected retirements, coupled with inadequate numbers of graduates entering the field. Fig. 3 provides data on health physics graduates. Considering that the retirement rate of health physicists in the U.S. is roughly 200 per year , the number of health physics graduates does not allow for much increase in the demand for their services. Turning to university research and training reactors, their number has decreased from 63 in the late 1970’s to 25 today. Recently a number of them have been decommissioned, including those at Cornell University and the University of Michigan. During FY2006, DOE’s INIE Program provided $9.41 million to six consortia consisting of both the higher power (usually 1 MW and above) research reactors as well as the lower power (usually less than 1 MW) training reactors. Research reactors mainly perform state-of-the-art experiments and provide irradiation services for private industry and other researchers. Training reactors mainly provide hands-on experiences for students. The INIE program had numerous significant successes, including helping to increase the number of students studying nuclear science and engineering, stimulating the hiring of new tenure-track faculty, providing seed money for a number of major infrastructure and instrumentation purchases and upgrades, fostering collaborations among members of each consortium and with national laboratories, freeing a number of university reactors from threats of decommissioning, assisting with the establishment of a nuclear technology Associate’s degree program at Linn State Technical College in Missouri, and helping to establish a new undergraduate nuclear engineering program at South Carolina State University, one of the Historically Black Colleges and Universities . That program is the first to be created in over a quarter-century at any U.S. university and is the only undergraduate nuclear engineering program located at an HBCU . Nuclear physicists are an indispensable part of the workforce, since a wealth of high precision actinide fission and neutron capture cross section data is needed to support the design of future nuclear reactors, including advanced light water reactors and Generation IV systems . Without such data, simulation studies would not be accurate enough to lead to reliable designs and conclusions . From their systems analyses, DOE researchers have identified the cross sections of particular importance. The U.S. has neutron source facilities, such as the Los Alamos Neutron Science Center, that can be used for many of the cross section measurements, and capabilities not present in the U.S. usually can be found elsewhere . Many of the cross section measurements are extremely challenging and entirely new techniques need to be developed. Moreover, much more fundamental work is needed to understand the basic physics of nuclear isotopes and their various cross sections. A better theoretical understanding would reduce the uncertainties in many applications. All of these issues are fertile ground for Ph.D. research. Next, to evaluate the supply of nuclear engineers with at least a Bachelor’s degree that is needed for nuclear power generation between now and 2050, it is useful to consider three scenarios: (1) maintaining the current number of nuclear reactors (about 100) without reprocessing, (2) doubling the number of reactors without reprocessing fuel, and (3) doubling the number of reactors while closing the fuel cycle by reprocessing and recycling spent fuel. Due to the shortage of nuclear engineers over recent decades, reactor vendors have resorted to hiring far more mechanical engineers than nuclear engineers and providing them with nuclear-related training. With approximately 35% of nuclear workers reaching retirement age in the next five years , industry will likely see some increase in engineering hiring across the board. This will heighten demands for nuclear engineering education, whether supplied by university programs or by the employers themselves. Scenario 1 has a chance of being sustainable. On the other hand, **doubling the number of nuclear reactors to about 200 by 2050 will require a significant augmentation of the nuclear workforce**. Vendors, utilities, and the NRC will need to increase their ranks by about 300 engineers with some nuclear training per year, plus replace retirees. This **growth in manpower is a direct result of what would be an increasing demand for significantly improved reactor designs, increased reactor operations at the utilities**, and a much greater oversight burden at the NRC. On the other hand, the number of new nuclear engineering graduates at all degree levels entering nuclear employment is about 160. Hence, assuming that the supply of nuclear engineers coming from university training programs follows recent trends, employers will need to train significantly more non-nuclear engineers to do nuclear engineering tasks than they do now. It is doubtful that the massive reactor building campaigns necessary to double the number of reactors by 2050 could thrive under such a burden. The clear message is that **our capability for university-based training of nuclear scientists and engineers cannot be allowed to diminish further.** Scenario 3 is the most problematic. This scenario has all the workforce challenges of Scenario 2, plus the need for highly trained nuclear chemists and radiochemists who are indispensable for reprocessing. Unlike France, the U.S. has no governmental agency charged with educating nuclear chemists and radiochemists. Those wanting to pursue these fields are educated under faculty mentors at universities. The growing scarcity of such mentors has thus led to a crisis in the U.S. In the long haul, **the U.S. will lose ground in its R&D on many fronts,** including devising more efficient and safer methods of processing both fresh and spent fuels for all future nuclear energy scenarios. Nuclear chemists and radiochemists with Ph.D.s would be needed to train the large cadre of radiochemical technicians who would carry out most of this work, and they would be needed at universities and national laboratories to spearhead the research that leads to breakthrough radiochemical technologies. Thus, any venture into spent fuel reprocessing, and fulfilling nuclear chemists’ and radiochemists’ many other cross-cutting roles in such areas as homeland security and public health, **will not be possible unless expertise is imported from abroad**. This modality is made much more difficult by the requirement that **many of these workers must be U.S. citizens**. In the U.S., market-driven forces will not be able to produce additional domestically trained nuclear chemists and radiochemists if the educational infrastructure continues to disappear.Aside from nuclear power, the nation will continue to need a significant number of talented, well-trained nuclear scientists and engineers to maintain the strength of its homeland security and nuclear weapons programs. These complexes must be safeguarded, and this is a clear responsibility of the Federal government. To satisfy these and nuclear power’s demands on the nuclear workforce, the Federal government should stabilize the long-term funding and management of nuclear science and engineering education programs, in particular for the university research and training reactor facilities. The number of nuclear engineering departments and university reactors should not be allowed to diminish further. Also, existing reactors could be utilized more optimally by expanding distance-learning opportunities. As for nuclear chemistry and radiochemistry, there is a huge need for the Federal government to establish a cross-cutting workforce initiative that includes fellowships and scholarships for students, support for postdoctoral researchers, incentives that stimulate industrial support of faculty positions, effective means of outreach to the general public, and increased support for summer schools in these disciplines. For health physics, the Federal government should ensure that there is a sufficient number of faculty with nuclear reactor-related experience to train the necessary numbers of health physicists for the nuclear power and other industries. Finally, the Federal government should increase support for research on the fundamental physics and chemistry of actinide fission and neutron capture. There is also an educational role for private industry. Nuclear vendors and utilities should expand undergraduate student internships, graduate student traineeships, cooperative education opportunities, and training on reactor simulators at their facilities. To conclude, creating new reactor designs, revolutionary medical applications of radiation, and many other nuclear endeavors present exciting challenges. As such, the nuclear science and engineering community should develop programs to **encourage the general public to view these fields as exciting areas of research** that present intellectually and financially rewarding career paths.

#### Effective nuclear forensics deters terrorism

Talmadge 7

(IR & Government Prof-George Washington, PhD-MIT, “Deterring a Nuclear 9/11, Spring, www.twq.com/07spring/docs/07spring\_talmadge.pdf)

Because terrorists lack return addresses, analysts have dismissed even more firmly the possibility of deterrence by punishment, or the threat to impose un­bearable costs on those who would do the United States harm. This disheart­ening conclusion stems from a failure to appreciate the many steps terrorists must take before committing an actual attack. Many of these steps depend on assistance from people and organizations that may not be as impervious to deterrence by punishment as individual terrorists are. If the United States can broaden the range of actors it seeks to deter and convince these other actors that cooperating with terrorists is not in their interests, it may be able to re­duce the likelihood of a terrorist attack substantially.13 Nowhere is this approach more plausible than in the case of nuclear terror­ism.14 Unlike other forms of terrorism in which terrorists are more or less self-sufficient, it is virtually impossible for terrorists to create their own nuclear material, regardless of which ingredient they use. Producing plutonium requires sophisticated, expensive reactors, as well as reprocessing facili­ties. Enriching uranium to a weapons-grade lev­el can be done through several techniques; all require relatively large buildings and advanced technologies.15 Both paths to nuclear material require a sizable and scientifically knowledge­able labor force, significant industrial resources, and time. Weapons design and delivery pose additional obstacles. States such as Argentina, Iran, Iraq, and Libya have tried to produce nuclear weapons and failed. Aum Shinrikyo, one of the best-funded terrorists groups in history and instigator of the 1995 sarin gas attacks in Tokyo, was also unable to create its own nuclear material and had to attempt to buy it from Russia.16 As such, it is extremely likely that states or substate military organizations would have to be involved in the tacit or overt provision of nuclear material to terrorists. A state could directly and deliberately transfer a weapon or materi­als to terrorists. It could refuse to halt or punish those in the military or sci­entific community who sell material or weapons to terrorists. It could willfully neglect nuclear security or choose not to alert the international community to suspected thefts of material or weapons. It could turn a blind eye to terrorist activities occurring on its territory. In all of these cases, the United States does have a target against which it can direct threats of retaliation: the governments or military and scientific establishments that actively or passively assist aspiring nuclear terrorists. Even if the United States cannot deter individual terrorists, it can create strong incentives for these other actors to block terrorist acquisition of the ingredi­ents required for a nuclear attack. They have addresses, lives, and property that the United States can hold hostage to their wholehearted cooperation. As Paul Davis and Brian Jenkins of RAND have argued, “The United States could announce credibly that … it would punish not only active supporters, but even those states and factions that merely tolerate the terrorists or indi­rectly facilitate their acquisition of [weapons of mass destruction (WMD)]. The purpose would be to so alarm heads of state and heads of substate organi zations that they would work actively to get rid of elements that might bring destruction down upon them.”17 Bush threatened as much after the North Korean test, warning that the Unit­ed States would hold the regime “fully accountable” if it passed nuclear materi­als or weapons to terrorists.18 The 2006 version of the U.S. National Security Strategy reflects a similar logic, suggesting a subtle shift from the 2002 docu­ment. In describing “a new deterrence calculus,” the current strategy declares, “States that harbor and assist terrorists are as guilty as the terrorists, and they will be held to account.” That document, along with analysts such as Gallucci who argue that a form of “expanded deterrence” against nuclear terrorism is possible, points to the crucial importance of being able to “define the nature and source of a terrorist-employed WMD. Should a WMD terrorist attack occur, the rapid identification of the source and perpetrator of an attack will enable our response efforts and may be critical in disrupting follow-on attacks.”19 In other words, nuclear forensics is the linchpin of any attempt at a deter­rence-by-punishment strategy against governments, militaries, or other orga­nizations that might actively or passively assist terrorists in a nuclear attack on the United States.20

## t – restrictions v reg

#### NNSA dictates the NIF laser shot schedule

Anderson 7/3/12

<http://www.universityofcalifornia.edu/senate/reports/RA2Pattiz_NNSANIF_070312.pdf>

Chair of the Assembly and the Academic Council

Telephone: (510) 987-9303 Faculty Representative to the Board of Regents

I wish to bring your attention to a May 30, 2012 letter from the Jeffrey P. Quintenz, Director of the Office of Inertial Confinement Fusion and High Yield Campaign at the National Nuclear Security Administration (NNSA), to Edward I. Moses, Director of the National Ignition Facility (NIF) at the Lawrence Livermore National Lab (LLNL), which specifies and directs the shot schedule for the missions of the NIF in FY 2013. In short, this letter prescribes explicitly the number of shots that should be taken to support the non-ignition Stockpile Stewardship Program and the number of shots that should be taken to support the remaining missions in FY 2013. ACSCOLI feels strongly that this type of micro-management is not only detrimental to the National Ignition Campaign (NIC) missions, but also jeopardizes the quality of basic science research being conducted at the NIF. Academic Council recently endorsed ACSCOLI’s letter, which recommends that the NNSA letter be rescinded. Subsequently, I am formally transmitting ACSCOLI’s letter to you in your capacity as Chair of the LLNS LLC Board, and ask for your support in seeking the rescission of the NNSA letter.

#### This isn’t the government deciding not to pursue direct drive: labs are independent of the USFG

Utt 99

<http://www.heritage.org/research/reports/1999/09/improving-security-at-the-dept-of-energys-weapons-labs>

Heritage Foundation, Herbert and Joyce Morgan Senior Research Fellow

The 17 national laboratories are not formally part of the federal government. Although they are managed by the Department of Energy and play an integral role in national security, they are administratively and organizationally independent of DOE, and their employees are not part of the federal civil service.

#### But their activity is entirely controlled by the government—that means if NIF isn’t doing direct drive now it’s factually a restriction

Department of Defense 11

<http://www.acq.osd.mil/docs/FFRDC%20Mgmt%20Plan%20May%202%202011.pdf>

FFRDCs have access, beyond that which is common to the normal contractual relationship, to Government and contractor information, including sensitive and proprietary information, and to employees and facilities. In most cases, FFRDC organizations or employees shall be required to arrange for special access and sign non-disclosure agreements. Access to information will be in conformance with statute, regulations and DoD information policies. FFRDC Parent Organizations are required to conduct business in a manner befitting their special relationship with the Government, to operate in the public interest with objectivity and independence, and to be free from organizational conflict of interest. FFRDCs and their Parent Organizations must avoid actual or perceived conflicts of interest and accept stringent restrictions on their scope, method of operations, customer base, and the kinds of efforts they can undertake either for their Sponsors or for other Users.

#### Restrictions on production are statutory hurdles – that’s most precise

LVM ‘96

Ludwig Von Mises Institute Original Book by Ludwig Von Mises, Austrian Economist in 1940, fourth edition copyright Bettina B. Greaves, Human Action, http://mises.org/pdf/humanaction/pdf/ha\_29.pdf

Restriction of production means that the government either forbids or makes more difficult or more expensive the production, transportation, or distribution of definite articles, or the application of definite modes of production, transportation, or distribution. The authority thus eliminates some of the means available for the satisfaction of human wants. The effect of its interference is that people are prevented from using their knowledge and abilities, their labor and their material means of production in the way in which they would earn the highest returns and satisfy their needs as much as possible. Such interference makes people poorer and less satisfied. This is the crux of the matter. All the subtlety and hair-splitting wasted in the effort to invalidate this fundamental thesis are vain. On the unhampered market there prevails an irresistible tendency to employ every factor of production for the best possible satisfaction of the most urgent needs of the consumers. If the government interferes with this process, it can only impair satisfaction; it can never improve it. The correctness of this thesis has been proved in an excellent and irrefutable manner with regard to the historically most important class of government interference with production, the barriers to international trade. In this field the teaching of the classical economists, especially those of Ricardo, are final and settle the issue forever. All that a tariff can achieve is to divert production from those locations in which the output per unit of input is higher to locations in which it is lower. It does not increase production; it curtails it.

#### They overlimit – there are no outright unconditional prohibitions

#### No limits da – “on production” means directly attached

Dictionary.com no date, http://dictionary.reference.com/browse/on

On

preposition 1.so as to be or remain supported by or suspended from: Put your package down on the table; Hang your coat on the hook. 2.so as to be attached to or unified with: Hang the picture on the wall. Paste the label on the package.

#### The laser itself produces energy

Silbert 6/15/12

<http://www.engadget.com/2012/07/15/nif-sets-record-500-tw-laser-shot/>

Reviews Editor New York Sarah's Google Profile email sarah@engadget.com twitter @ssilbert Long before the winding road of journalism led her to Engadget, Sarah spotted a deconstructed PC in elementary-school computer lab and thought it just looked so cool. Since then, she's had the goal to build one herself, and though that keeps getting put off, she's more than made up for it by tinkering with and writing about gadgets of all kinds. Sarah has some other skills, too -- such as speaking four languages and creating mixtapes for car rides of any and every length -- but these don't come in handy nearly as often.

In an effort to recreate the fusion reaction that occurs in start formation, the National Ignition Facility in Livermore, CA has been building up to some extremely powerful laser shots. Back in March, researchers fired off 411 terawatts, and we know that kind of power doesn't come cheap. NIF's latest test shot, fired July 5th, set a new record with 192 lasers producing more than 500 trillion watts of peak power and 1.85 MJ of ultraviolet laser light. Mind you, that's more than a thousand times more energy than the United States uses at any given moment, not to mention a hundred times more power than other lasers can fire consistently. More record-setting shots are sure to come, and in addition to enabling research on harnessing nuclear fusion, NIF's mega-lasers are helping inform the design of new laser facilities being built in China, Japan, Russia, France and the UK.

#### 103-104 distinction was eliminated in the 70’s

McGowan 79

 606 F.2d 986 196 U.S.App.D.C. 79, 1979-1 Trade Cases 62,526 FT. PIERCE UTILITIES AUTHORITY OF the CITY OF FT. PIERCE, et al., Petitioners, v. UNITED STATES of America, and the Nuclear Regulatory Commission, Respondents, Florida Power & Light Co., City of Mount Dora, Florida, City of Lake Helen, Florida, Intervenors. FT. PIERCE UTILITIES AUTHORITY OF the CITY OF FT. PIERCE, et al., Petitioners, v. NUCLEAR REGULATORY COMMISSION and United States of America, Respondents, City of Mount Dora, Florida, Florida Power and Light Co., City of Lake Helen, Florida, Intervenors. Nos. 77-1925, 77-2101. United States Court of Appeals, District of Columbia Circuit. Argued Nov. 16, 1978. Decided March 23, 1979. As Amended March 23, 1979. Certiorari Denied Oct. 1, 1979. See 100 S.Ct. 83.

 The Atomic Energy Act provides for two types of construction permits and operating licenses for nuclear facilities: (1) those issued under section 104(b), known as "research and development" licenses, which are subject only to "the minimum amount of such regulations and terms of license as will permit the Commission to fulfill its (licensing) obligations," and (2) those issued under section 103, known as "commercial" licenses, which are subject to full-scale Commission regulation.2 Atomic Energy Act §§ 102-104, 42 U.S.C. §§ 2132-2134 (1976). This licensing scheme, enacted in an era when the practical value of nuclear energy was in doubt, was designed to promote the development of nuclear energy by minimizing the extent of government regulation until such time as its practical value was established. Accordingly, the Act, prior to 1970 when it was amended, authorized the Commission to issue "commercial" licenses under section 103 only upon a finding that "any type of utilization or production facility ha(d) been sufficiently developed to be of practical value for industrial or commercial purposes." Atomic Energy Act, ch. 1073, § 102, 68 Stat. 936 (1954) (amended 1970). Section 104(b), by contrast, authorized the Commission, absent a finding of "practical value," to issue "research and development" licenses, subject to minimum regulation, for "utilization and production facilities involved in the conduct of research and development activities leading to the demonstration of the practical value of such facilities for industrial or commercial purposes." It was pursuant to section 104(b) prior to the 1970 amendments that FP&L received its construction permits for Turkey Point Nos. 3 and 4 on April 29, 1967, and for St. Lucie No. 1 on July 1, 1970.

In late 1970, Congress amended the Act, abolishing the requirement that the Commission make a finding of "practical value" before issuing "commercial" licenses. Atomic Energy Act § 102(a), 42 U.S.C. § 2132(a) (1976). Thereafter, the Commission, when licensing "utilization or production facilit(ies) for industrial or commercial purposes," was required to issue "commercial" licenses under section 103, rather than "research and development" licenses under section 104(b). The Act as amended, however, contained a provision authorizing the Commission to issue operating licenses under section 104(b) for nuclear plants that previously had been licensed for construction as "research and development" facilities. Id. § 102(b), 42 U.S.C. § 2132(b). Acting pursuant to this grandfather clause, the Commission, on July 19, 1972, April 10, 1973, and March 1, 1976, issued operating licenses under section 104(b) to FP&L for Turkey Point Nos. 3 and 4 and St. Lucie No. 1, respectively.

## iter

Relations resilient – conflicts are inevitable but won’t escalate

Weitz 11 (Richard, senior fellow at the Hudson Institute and a World Politics Review senior editor 9/27/2011, “Global Insights: Putin not a Game-Changer for U.S.-Russia Ties,” <http://www.scribd.com/doc/66579517/Global-Insights-Putin-not-a-Game-Changer-for-U-S-Russia-Ties>)

Fifth, there will inevitably be areas of conflict between Russia and the United States regardless of who is in the Kremlin. Putin and his entourage can never be happy with having NATO be Europe's most powerful security institution, since Moscow is not a member and cannot become one. Similarly, the Russians will always object to NATO's missile defense efforts since they can neither match them nor join them in any meaningful way. In the case of Iran, Russian officials genuinely perceive less of a threat from Tehran than do most Americans, and Russia has more to lose from a cessation of economic ties with Iran -- as well as from an Iranian-Western reconciliation. On the other hand, these conflicts can be managed, since they will likely **remain limited and compartmentalized**. Russia and the West **do not have fundamentally conflicting vital interests of the kind countries would go to war over**. And as the Cold War demonstrated, nuclear weapons are a great pacifier under such conditions. Another novel development is that Russia is much more integrated into the international economy and global society than the Soviet Union was, and Putin's popularity depends heavily on his economic track record. Beyond that, there are objective criteria, such as the smaller size of the Russian population and economy as well as the difficulty of controlling modern means of social communication, that will constrain whoever is in charge of Russia.

#### No link

Stephen Chu 12, secretary of energy, Hearing on FY 2013 Budget Request for the Dept. of Energy, Committee on Appropriations, Subcommittee on Energy and Water Development, 3-14, http://www.fusionfuture.org/wp-content/uploads/2012/03/Feinstein-Tester-Reed\_Chu\_testimony\_Senate\_Energy\_Water\_14\_03\_2012\_v3.pdf

Feinstein: ...Let’s go to fusion and ITER and the 150 million this year with the United States’ contribution to ITER subject to grow to 300 million. Now, this is going to take money away from domestic fusion programs. They’re already concerned at NIF and also other scientific priorities, such as materials and biology research. Here’s the question. Should the United States consider withdrawing from ITER, or at least reducing the United States’ contribution and if we continue to fund it, where will $300M come from? Chu: Well, Senator, you’re asking a very important question that we ask ourselves, but first, let me assure you that the program at NIF is not actually competing with ITER. NIF is supported by the NNSA budget and we want to make sure that that new program goes forward.

#### Strong domestic fusion helps ITER

Ian H. Hutchinson 5, Head of the Nuclear Science Department – MIT, "Fusion Research: What About the U.S.?", Technology Review, http://www.technologyreview.com/article/404616/fusion-research-what-about-the-us/2/

The United States still has two world-renowned tokamaks – one at MIT, the other at General Atomics in San Diego – whose research will be crucial in helping to resolve and prepare for challenges that ITER faces. But U.S. leadership in fusion plasma science cannot be sustained without a renewed commitment of resources. The United States’ present 10 percent share of ITER will call for peak expenditures of perhaps $150 million per year – mostly for industrial procurements, not for research.

If that money were taken from the existing federal fusion research budget, it would decimate U.S. fusion research. That is why the U.S. fusion community’s overwhelming enthusiasm for ITER is predicated on strong domestic support for fusion and plasma physics research, plus additional funds for ITER construction. Even if the U.S. increased its funding for fusion research to $500 million per year, that would still be substantially less than it spends separately on high-energy physics, fossil energy research, and basic energy sciences, not to mention the recent budgets of the Missile Defense Agency ($9 billion) and NASA ($16 billion).

Ultimately, fusion could prove to be one of the most environmentally attractive energy options. The United States should seize the opportunity to play a strong role in ITER’s success and demonstrate its commitment and long-term vision as a scientific collaborator by revitalizing its overall fusion program.

#### The turn’s unique – ITER support will collapse absent domestic revitalization

Eric Hand 12, Knight Science Journalism Fellow – Massachusetts Institute of Technology and Reporter – Nature, "US Fusion in Budget Vice", Nature, 7-24, http://www.nature.com/news/us-fusion-in-budget-vice-1.11061

For years, US researchers have been steadfast in their support of ITER, the world’s largest fusion-energy experiment, which is under construction near Cadarache, France. But with funding commitments to ITER now putting the squeeze on three existing facilities in the United States, enthusiasm for the international project is becoming as difficult to sustain as a fusion reaction.

“I think we should ask whether this is the right path,” Earl Marmar, head of the Alcator C-Mod fusion experiment run by the Massachusetts Institute of Technology in Cambridge, told colleagues on 18 July. The venue was a meeting of a US Department of Energy (DOE) group tasked with setting priorities for the non-ITER portion of the US fusion programme. At the meeting, in Bethesda, Maryland, Marmar pointed out that when US fusion researchers signed on to ITER in 2003, the project’s total construction cost was projected to be about US$5 billion, of which the United States would provide 9% over ten years. Now, the construction costs are projected to be roughly four times as much. Furthermore, the funds to support ITER were not supposed to be siphoned from existing facilities — yet if the total budget for US fusion science remains flat, as is expected, that is precisely what will happen (see ‘Death by ITER’).

Marmar’s facility houses one of three US tokamaks — doughnut-shaped vessels in which physicists magnetically confine hydrogen nuclei in a plasma and heat them until they fuse and liberate energy. Alcator received $29 million in federal funding this year. But as ITER payments increase, US President Barack Obama’s 2013 budget proposal for the DOE would chop Alcator’s allocation back to $16 million, shutting down operations and forcing the experiment to lay off more than half of its 120 staff members.

Stephen Dean, president of Fusion Power Associates, an advocacy group in Gaithersburg, Maryland, says that DOE officials have little choice but to cut Alcator, the smallest of the three US experiments, to afford an overall US ITER commitment that has grown to about $2.2 billion. “Why can’t we get by with two?” asks Dean. “It’s not an insubstantial argument.”

Yet leaders at the three experiments insist that all provide unique science (see ‘Tokamaks under pressure’). Marmar says that Alcator, for example, can operate at extremely high magnetic-field strengths that mimic those planned at ITER. And whereas most tokamaks have inner walls made of graphite, Alcator researchers have pioneered the use of tungsten — a more durable material that ITER is planning to adopt. Current experiments at Alcator also explore the use of special radio-wave antennas to heat the plasma in ways that reduce erosion of the walls.

Stewart Prager, director of the Princeton Plasma Physics Laboratory in New Jersey, has a different argument for keeping all three experimental facilities running. If the United States is to spend all this money on ITER, he says, then it must maintain domestic plasma-science expertise that can take advantage of what is learned there. “Otherwise, the results from ITER will only benefit the rest of the world.”

It seems that some members of the US Congress are listening. On 6 June, the House of Representatives voted to boost ITER funding and to support the domestic programme at almost 2012 levels. The Senate’s version of the bill, which has not yet been voted on, currently agrees with the cuts in the Obama administration’s budget request — but directs the DOE to explore the impact of simply withdrawing from ITER.

US fusion researchers do not want that — yet. But if the 2014 budget looks at all like the 2013 one, Dean predicts, the knives will be out for ITER. “They’re not trying to kill ITER just yet,” he says. “If this happens again in 2014, I’m not so sure.”

## productionism

#### Technocracy’s good in this context

Doug Lorimer 92, Professor Emeritus – Tri University and Member – National Executive of the Democratic Socialist Party, "Should We Oppose Fusion Technology?", Green Left Weekly, 2-19, http://www.greenleft.org.au/node/2210

While he points out that with "more human and financial resources" the technical problems involved in fusion technology might be overcome, Shannon argues that Marxists should oppose its development on sociopolitical grounds.

Fusion, he writes, is "an undemocratic technology, the domain of a scientific elite". By contrast, "People can easily have control over renewable energy technology — you only need know how to tell one end of a hammer from another to be able to maintain a windmill, but mastering the theory and practice of fusion requires a lifetime of nuclear physics and engineering".

But isn't the theory and practice of renewable energy technologies — e.g., the generation of electricity using photovoltaic cells — also the "domain of a scientific elite"? Even the technology of generating electricity from modern windmills requires specialised scientific training in electrical engineering and aerodynamics.

The apparent assumption behind Shannon's argument is an idealist one — that knowledge equals power equals oppression. But the fact that fusion technology requires specialised knowledge does not mean that those who have this knowledge exercise power over those who don't.

If someone knows how to do something that you don't, does that give them power over you? Not unless there is a material advantage, a volved, one that is institutionalised and perpetuated by forms of private property. For example, Kerry Packer has power over other people because he is the private owner of television stations, not because he has specialised knowledge of the theory and practice of television technology (quantum physics and radio engineering), which he doesn't.

Shannon believes that those on the left who are attracted to nuclear fusion are caught up in the "orthodox, 19th century Marxist goal of the conquest of nature", a goal he argues present-day Marxist should reject:

"Rather than conquering nature, turning it into a super-factory powered by nuclear fusion, would it not be better to have a more human-scale world where we use but don't abuse nature?"

Mastery of nature

Shannon seems to assume that when Marxists speak about humanity's "conquest", "domination" or "mastery" of nature, they believe in "abusing" (destroying) rather than simply "using" it. But if I say a violinist has mastered her/his instrument, this does not imply s/he has abused or destroyed it, but learned to control it to obtain what s/he wants. Similarly, mastering, nature simply means that we have learned to control nature in order to meet humanity's material purpose. As Frederick Engels noted in his 1876 essay "The Part Played by Labor in the Transition from Ape to Man":

"... we by no means rule over nature like a conqueror over a foreign people, like someone standing outside nature — but that we, with flesh, blood and brain, belong to nature, and exist in its midst, and that all our mastery of it consists in the fact that we have the advantage over all other creatures of being able to learn its laws and apply them correctly."

In order to master nature, we have to obey its laws. Capitalism, however, does this only in a partial and limited way because it subordinates technology to the immediate enrichment of a tiny minority and disregards the longer term effects of its productive activities on nature. This is why Engels pointed out that mere knowledge was insufficient to regulate our productive activities so as to avoid environmental destruction: "It requires a complete revolution in our hitherto existing mode of production, and simultaneously a revolution in our whole contemporary social order".

This revolution involves the replacement of anarchistic production for private profit with the subordination of production, through collective ownership and democratic control, to social needs, i.e., the "domination of technology by planning".

Abundance

Shannon poses the question: "Do we want, or need, an abundance of energy powering an abundance of gadgets for an abundance of people, driven by nuclear fusion and a destructively exploitative attitude to

The question has been loaded by implying that anyone who supports the exploration of nuclear fusion as a possible technological solution to the world's need for clean, sustainable energy sources is guilty of a "destructively exploitative attitude to nature".

If we drop this unnecessary addition to the question, we can examine the real issue: does a classless society require abundance of energy powering an abundance of "gadgets" for an abundance of people?

If the word "abundance" is taken in its literal meaning of "fully sufficient" and not as meaning an unlimited amount, as it is sometimes abused, then the answer from a Marxist (and an ecological) viewpoint has to be, yes. A fully sufficient amount of energy to power a fully sufficient amount of "gadgets" would be an amount adequate to meet humanity's rational needs, including its need to preserve a livable global environment.

The DSP's Socialism and Human Survival points out that there is an environmental limit to the production of energy on Earth, determined by the amount of heat that can be safely dissipated into the atmosphere. Development of the practical large-scale conversion of solar energy into electricity would eliminate this problem. While the development of practical deuterium fusion would not eliminate the problem of thermal pollution, it would enable an increase in energy production of between 300 and 700 times what we have now without adversely affecting the planet's heat balance.

Maybe the development of renewable energy sources will make fusion technology unnecessary. But we shouldn't oppose research into it because it may be difficult to achieve. And Marxists certainly shouldn't oppose it because it requires scientific knowledge.

#### Perm

#### Perm do the plan and reject fission – swamps the link

#### Solvency contention no links tech-optimism and solves the impact

James Krier, University of Michigan Law Professor, 1985, ESSAY: THE UN-EASY CASE FOR TECHNOLOGICAL OPTIMISM, 84 Mich. L. Rev. 405, Lexis

A technological optimist is not simply a person with unqualified enthusiasm about technological promise. Saint-Simon (1760-1825) was an enthusiast, but he was not a technological optimist as the term is currently used. Saint-Simon, rather, was a utopian who happened to attach his vision to technocratic expertise. n4 He was the forefather of Technocracy, an active utopian movement in the 1930s and one not entirely dead even today. n5 Technological optimists are not utopians, but something less -- let us say quasi-utopians, after a recent usage (applied to himself) of Robert Dahl's. n6 Unlike any self-respecting pure utopian, quasi-utopians (and technological optimists) seek not perfection but tolerable imperfection, tolerable because it is better than anything else they consider attainable though not nearly as good as lots of alternatives that can be imagined.

But technological optimists are also something more than mere believers, or faddists, or techniks. n7 **Their views are rigorously formulated, grounded in an apparent reality, based on knowledge and experience, and artfully defended**. There are no crazies among the best of the optimists; they are conservative, respected experts who command enormous authority. They have a very specific position -- namely, "that exponential technological growth will allow us to expand resources ahead of exponentially increasing demands." n8 This is the precise meaning of technological optimism as a term of art.

Some commonplace examples of the optimistic view suggest its range of applications: If the world is running short of food, we can count on technological innovation to increase the productivity of agricultural land and the acreage of arable land itself, through better seeds, better fertilizers, herbicides and pesticides, and better irrigation techniques. If environmental quality is threatened, more effective pollution-control technology and be developed to deal with the problem. If fossil fuels are growing short, technology can reduce the costs of discovery and extraction. It can also provide fuel substitutes, natural or synthetic. n9

As these examples might suggest, technological growth means technological advance; it means breakthroughs -- new techniques that get more output per unit input -- rather than simply more of an old technology. Exponential technological growth means continuously compounding technological capacity, a growing accumulation of breakthroughs.

Technological optimism took on its precise meaning, its exponential character, as a direct consequence of The Limits to Growth, n10 an extraordinarily controversial book published in 1972 and distributed in millions of copies, worldwide, in its first two years. n11 The tie between the book and the notion of exponential technological growth is immediately apparent. The authors of Limits constructed a simulation model of the world (World 3) and fed into it data based on the assumption that population, industrial production, and pollution would continue to grow exponentially into the future, as they have in the past. n12 The conclusions of this exercise were obviously foregone. Since the world in its physical aspects is finite, exponential growth must eventually hit a limit. The limit was said to be only about a generation away (as of 1972) and would be reached not through a smooth transition but by a crash from good to very bad (poor, crowded, hungry, polluted) conditions. Measures to avert the projected catastrophe would involve (or reflect) radical "value changes" -- policies, for example, to reduce birth rates to the point of death rates, to hold capital investment equal to depreciation, to reduce consumption and change its emphasis from material goods to services, to recycle resources n13 -- and require substantial lead times. They had to be implemented quickly in order to escape an otherwise inevitable disaster.

As critics were quick to point out, the authors of Limits, for all the attention they gave to exponential growth, neglected in the case of technology. n14 Take that growth into account, and suddenly the future [\*409] looks more promising. Many if not most of the alleged ills of increasing population, production, and consumption, and of apparently diminishing natural resources, can be remedied without drastic measures. Malthusian prospects can be avoided without the basic alterations in social values, organization, and behavior urged by the pessimists. The ultimate problem of "running out" is not really a foreseeable problem at all. It can be forestalled by exponential technological advance.

#### Climate impacts inev

Savory 8

Allan Savory, Savory Center for Holistic Management Founder, received the Australian International Banksia Award for the person or organization doing the most for the environment on a global scale, 2008, A Global Strategy for Addressing Global Climate Change, holisticmanagement.org.au/PDF/A+Global+Strategy+for+Addressing+Climate+Change+2%5B1%5D.pdf

Simplistic and counter intuitive as it may be the fate of civilization today hangs on two slender threads – the correct management of livestock and the rapid development of benign energy to sustain cities and mass transport. Excessive emissions of carbon and other gases from fossil fuels are not the only causes of global climate change, nor are they the greatest cause of climate change, as popularly espoused. Humans began to change climate in ancient times through their actions that began to disrupt complex living communities. Diminishing biodiversity and replacing the role of large herbivores and predators in the world's savannas with fire. Ancient practices, continued to this day, ensured land degradation (desertification) and increased atmospheric carbon dioxide and other gases from fires and soil. This process of environment destruction had destroyed many civilizations before coal and oil were discovered or widely used. Essential as it is, stopping carbon emissions entirely will not alone solve the potential catastrophe facing humanity because a great part of what amounts to global environmental malfunction cannot be attributed to carbon emissions. If tomorrow we somehow achieved zero emissions from fossil fuels we still would not avert major catastrophe. Grassland and savanna burning would continue,desertification would continue to accelerate with soils increasingly unable to store either carbon or water and the climate continued to change.

**Otherwise, the system’s resilient and the alt fails**

Gideon **Rose 12**, Editor of Foreign Affairs, “Making Modernity Work”, Foreign Affairs, January/February

The central question of modernity has been how to reconcile capitalism and mass democracy, and since the postwar order came up with a good answer, it has managed to weather all subsequent challenges. The upheavals of the late 1960s seemed poised to disrupt it. But despite what activists at the time thought, they had little to offer in terms of politics or economics, and so their lasting impact was on social life instead. This had the ironic effect of stabilizing the system rather than overturning it, helping it live up to its full potential by bringing previously subordinated or disenfranchised groups inside the castle walls. The neoliberal revolutionaries of the 1980s also had little luck, never managing to turn the clock back all that far. **All potential alternatives** in the developing world, meanwhile, **have proved to be either dead ends or temporary detours from the beaten path**. The much-ballyhooed "rise of the rest" has involved not the discrediting of the postwar order of Western political economy but its reinforcement: the countries that have risen have done so by embracing global capitalism while keeping some of its destabilizing attributes in check, and have liberalized their polities and societies along the way (and will founder unless they continue to do so). Although the structure still stands, however, it has seen better days. Poor management of public spending and fiscal policy has resulted in unsustainable levels of debt across the advanced industrial world, even as mature economies have found it difficult to generate dynamic growth and full employment in an ever more globalized environment. Lax regulation and oversight allowed reckless and predatory financial practices to drive leading economies to the brink of collapse. Economic inequality has increased as social mobility has declined. And a loss of broad-based social solidarity on both sides of the Atlantic has eroded public support for the active remedies needed to address these and other problems. Renovating the structure will be a slow and difficult project, the cost and duration of which remain unclear, as do the contractors involved. Still, at root, **this is not an ideological issue**. The question is not what to do but how to do it--how, under twenty-first-century conditions, to rise to the challenge Laski described, making the modern political economy provide enough solid benefit to the mass of men that they see its continuation as a matter of urgency to themselves. The old and new articles that follow trace this story from the totalitarian challenge of the interwar years, through the crisis of liberalism and the emergence of the postwar order, to that order's present difficulties and future prospects. Some of our authors are distinctly gloomy, and one need only glance at a newspaper to see why. But remembering the far greater obstacles that have been overcome in the past, **optimism would seem the better long-term bet**.

## gun control

#### No threat – weak leadership and no recent attacks

**Zenko and Cohen 12**, \*Fellow in the Center for Preventive Action at the Council on Foreign Relations, \*Fellow at the Century Foundation, (Micah and Michael, "Clear and Present Safety," March/April, Foreign Affairs, www.foreignaffairs.com/articles/137279/micah-zenko-and-michael-a-cohen/clear-and-present-safety

 NONE OF this is meant to suggest that the United States faces no major challenges today. Rather, the point is that the problems confronting the country are manageable and pose minimal risks to the lives of the overwhelming majority of Americans. None of them -- separately or in combination -- justifies the alarmist rhetoric of policymakers and politicians or should lead to the conclusion that Americans live in a dangerous world.

Take terrorism. Since 9/11, no security threat has been hyped more. Considering the horrors of that day, that is not surprising. But the result has been a level of fear that is completely out of proportion to both the capabilities of terrorist organizations and the United States' vulnerability. On 9/11, al Qaeda got tragically lucky. Since then, the United States has been preparing for the one percent chance (and likely even less) that it might get lucky again. But al Qaeda lost its safe haven after the U.S.-led invasion of Afghanistan in 2001, and further military, diplomatic, intelligence, and law enforcement efforts have decimated the organization, which has essentially lost whatever ability it once had to seriously threaten the United States.

According to U.S. officials, al Qaeda's leadership has been reduced to two top lieutenants: Ayman al-Zawahiri and his second-in-command, Abu Yahya al-Libi. Panetta has even said that the defeat of al Qaeda is "within reach." The near collapse of the original al Qaeda organization is one reason why, in the decade since 9/11, the U.S. homeland has not suffered any large-scale terrorist assaults. All subsequent attempts have failed or been thwarted, owing in part to the incompetence of their perpetrators. Although there are undoubtedly still some terrorists who wish to kill Americans, their dreams will likely continue to be frustrated by their own limitations and by the intelligence and law enforcement agencies of the United States and its allies.

#### Deregulating the shot schedule is popular—all their links are about funding

Lofgren, D-CA, House of Reps, 8/3/’12

(Zoe, <http://lofgren.house.gov/index.php?option=com_content&view=article&id=755&Itemid=130>)

100 Members of Congress Tell Energy Secretary Chu They Are Concerned U.S. Fusion Efforts Are Being Undermined by Bureaucratic Turf War

Washington, DC –Rep. Zoe Lofgren (D-CA) today released a bipartisan letter signed by 100 Members of Congress to Department of Energy (DOE) Secretary Steven Chu, calling upon the Secretary to address DOE and National Nuclear Security Administration (NNSA) management issues they believe could hinder U.S. research on fusion at the National Ignition Facility (NIF) at Lawrence Livermore National Laboratory. A recent report by the National Academies of Science [hyperlink] has raised questions about whether scientific research efforts like fusion are being undermined by significant governance and management problems from the NNSA.

Signaling their concern that vital research at NIF is being undermined by the bureaucratic micromanagement, the Members of Congress told Secretary Chu, "Given the tremendous progress to date, we are concerned that—rather than technical and scientific challenges—administrative, managerial and budgetary hurdles threaten to impede this promising research."

Last month NIF made significant progress in their fusion research, firing a record breaking 500 trillion watt laser shot building up to its efforts to kickstart a sustained fusion reaction from a frozen hydrogen fuel target pellet. Unlike current nuclear-fission power, which produces radioactive waste, fusion harnesses the same reaction driving the core of the Sun's power generating energy in the sun and stars. By using lasers to trigger a fusion reaction in very small amounts of saltwater hydrogen fuel, fusion may ultimately promise a new clean power source that could end our dependency on other power sources.

The lawmakers also touted the 500 trillion watt laser shot, saying "this milestone demonstrates major progress and...technical reviews by independent experts indicate that there are no fundamental technical reasons that would preclude eventually achieving ignition."

In the letter, Representatives from both parties urged Secretary Chu to act: "It would be severely disappointing to get so close to a tremendous scientific breakthrough – fusion ignition at NIF – only to see it prevented by bureaucracy. We must not let science be stifled by bureaucracy."

#### GOCO agency setup avoids politics

Miller 2/16/12

House Armed Services Subcommittee on Strategic Forces Hearing;

governance, oversight, and management of the nuclear security enterprise to ensure high quality science, engineering, and mission effectiveness in an age of austerity.;

Testimony by George Miller, Director Emeritus, Lawrence Livermore National Laboratory

The establishment of (what are now) the NNSA laboratories pioneered the concept of government-owned, contractor-operated (GOCO) research facilities, later to be included in policy guidelines established in 1967 (and superseded in 1984) for Federally-Funded Research and Development Centers (FFRDCs). At the time, the Atomic Energy Commission established long-term relationships for the operation of government-owned facilities to conduct research and manufacturing functions. The contracts (with the University of California for Livermore and Los Alamos) placed the day-to-day responsibility for nuclear research in the hands of non-federal employees in order to ensure the highest quality staff were dedicated to these important tasks. In this unique relationship, the government decided "what" needed to be done and provided the funding and the Laboratories decided "how" to best accomplish those tasks within the federally defined constraints.

For long-range basic and applied research, this partnership approach was believed to be essential for creating the special work environment required--responsive to national needs but freed of the ordinary bureaucratic burdens placed on federal agencies and buffered from politics.

#### Their author concludes that the entire gun control package is insufficient to solve violence—let alone one of the less significant provisions

Carlsen, 1-24

Center for International Policy Americas Program director

[Laura, Foreign Policy in Focus columnist, "Can Obama's Gun Control Plan Reduce Violence in Mexico?," Huff Post, 1-24-13, www.huffingtonpost.com/laura-carlsen/obama-gun-control-plan-mexico\_b\_2492578.html, accessed 1-25-13, mss]

\* Increased background checks can effectively reduce smuggling. There is no question that greater vigilance over who is allowed to purchase guns, as Obama stated both from licensed dealers and gun-show sellers, will make it more difficult for straw purchasers to buy for smugglers. These measures must be fully and actively supported.

<<<Their evidence ends here>>>

\* The most impact by far would be the ban on sale and possession of assault weapons. Cutting off the free circulation of these weapons in the United States would help dry up U.S. supply for smugglers. This measure will be vigorously opposed by gun proponents.

None of the demands put forward by a group of U.S. and Mexican non-governmental organizations made it into the presidential actions. A petition signed by more than 12,000 people called to:

Immediately detain and prohibit the importation of assault weapons to the United States, because many of them are sent as contraband to Mexico.

Order dealers to report to the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) the sale of multiple assault rifles to the same person over a period of five days.

Increase the regulatory capacity of the ATF in those regions of the United States that supply the weapons contraband to Mexico, especially in border states.

The petition actually fell short of what Obama did in calling for Congress to restore the ban. Now, with Obama's backing, Congress could and should include the import ban in the restoration of the assault weapon ban.

As to the demand for increased functions for the ATF, giving the agency more powers must be predicated on a thorough review and clean-up within. It makes sense politically at this point to first consolidate the agency and its leadership and then take on issues of giving it greater powers, since it has become a lightening rod for right-wing criticism based on the Fast and Furious scandal.

After the ATF has a confirmed director, it should immediately begin an overhaul of rules and practices, including more reporting and regulation. This is particularly needed following the famously failed and illegal operation "Fast and Furious," which allowed guns to be smuggled to Mexican cartels.

The Right to Live Without Violence

The president knows what he's up against now. He laid it out in the speech (a speech worth listening to, by the way): "Ask (your representatives) to do this and if they say no, ask them why not..." and added pointedly, "What's more important? Getting an A grade from the gun lobby that helps fund their campaigns or giving parents some peace of mind when they drop their child off for first grade?"

The National Rifle Association's influence in Congress remains strong and extends into international policy as well. The NRA issued an ad calling Obama a "hypocrite" for accepting armed guards for his daughters, implying that the best way to keep children safe is to arm them (or adults around them). This fight won't be pretty.

Obama tried to preempt the criticisms by warning viewers that opponents would attack his plan on the grounds of violations of civil liberties. He reiterated his support for the Second Amendment.

Just before signing the actions, Obama noted that mass shootings enabled in part by a lack of regulation, are not only a tragedy but a violation of basic human rights. The right to assemble peacefully (for those shot in the theaters), the right to freedom of worship (for the Sikhs in Wisconsin) and basic rights to life and happiness are violated by violence.

A rights framework that recognizes and moves beyond the human tragedy, is a good model for understanding violence in both the U.S. and Mexico, because it lends a greater sense of urgency to the issue. The right to live without violence places responsibility for ending the killings squarely within the realm of the government.

Mexico prohibits most gun ownership, but as always enforcement is the problem. If fewer guns come over the border, the nation could have a small, but important, aid in reducing the bloodshed that has become a hallmark of daily life since the drug war began.

In the United States, citizens are mobilizing to support the measures. The politics have shifted, especially since among the rising demographic group of latinos only 29 percent think "gun owndership rights" are more important than gun control.

Obama's plan comes as welcome news in Mexico. It's a step forward, despite the fact that the black market for arms is international and "legitimate" arms in the hands of authorities are just as deadly when turned against the population as arms in the hands of criminals.

But especially in Mexico where violence is caused by organized crime and its accomplices, the dynamics of violence are far more causal than the tools. These killers will always find a way to kill. The U.S. government's support for Mexico's disastrous drug war embodied in the Merida Initiative foreign aid package feeds the dynamics of violence in Mexican border cities and throughout the country.

Obama's arms control plan could reduce gun smuggling over the border. But until the logic of militarization and defense through fire power -- whether on the personal or national level -- is replaced with real attempts at preventing and resolving conflict, violence will continue to claim lives on both sides of the border.

#### Won’t pass—Dems

The Examiner 1/24

(“Senate unveils proposal for sweeping gun ban” Washington Examiner)

The Senate's second- and third-ranking Democrats spoke at the event and are co-sponsors of the bill, but noticeably absent was Majority Leader Harry Reid, who hails from Nevada, one of the nation's most pro-gun states. Reid, a Democrat, has struggled to dodge the gun control debate that has dominated Congress since the Newtown, Conn., elementary school shootings last month. With Thursday's much-publicized introduction of the bill, however, Reid can't duck the issue any longer. "He is very much in a tough spot," said Ted Jelen, a political science professor at the University of Nevada, Las Vegas. "And not necessarily for himself but for other Democrats facing re-election who he might want to provide political coverage." Reid won't face re-election for another four years, if he decides to run. But his slim Senate majority could easily slip away in 2014, when 21 seats are up for re-election. Nearly half of those are considered by political analysts to be vulnerable to a GOP takeover. The Republican-dominated House is unlikely to take up a gun ban bill, but Senate passage has the potential to hurt gun-state senators like Al Franken of Minnesota, who narrowly won his first term, Sen. Mark Pryor of Arkansas and Sen. Max Baucus of Montana, among others.

#### And the NRA

Gandelman 1/24

(Joe – editor in chief & MA in journalism, “Sen. Feinstein introduces Assault Weapons Ban (Unlikely to Pass)” The Moderate Voice)

It sounds like the kind of bill those who want to regulate the use and sale of guns want. And it does have support from important groups: The lawmakers introduced the bill at a press conference with law-enforcement groups supporting the legislation. Groups endorsing the bill include the U.S. Conference of Mayors, the Major Cities Chiefs Association, the Police Foundation, and the International Association of Campus Law Enforcement Administrators. The co-sponsors include Democratic Sens. Richard Blumenthal and Chris Murphy, whose home state of Connecticut last month witnessed one of the nation’s worst episodes of gun violence when an assailant killed 20 children at Sandy Hook Elementary School with an M-4 Bushmaster assault rifle. But realistically speaking: the NRA still has considerable support in Congress, partially on philsophical grounds but not un-incidentally because many politicians fear them coming into a district and working against them or giving money to their opponent’s campaign. Feinstein acknowledged the bill would face stiff opposition in Congress. “Getting this bill signed into law will be an uphill battle, and I recognize that — but it’s a battle worth having,” she said. “We must balance the desire of a few to own military-style assault weapons with the growing threat to lives across America.” The bill would ban the sale, transfer, manufacture and import of all semi-automatic rifles and pistols that can accept detachable magazines and have at least one military feature. It would also ban semi-automatic rifles and handguns that have fixed magazines capable of carrying more than 10 rounds and all semi-automatic shotguns that have folding or detachable stocks, pistol grips, forward grips, or fixed magazines with room for more than five rounds. Look for it not to pass in this Congress. And look for there to be more ringing words about how its time for an assault weapons ban when the next instance of carnage of innocents occurs. But, as noted here, if many politicians have to choose between acting on laws that might prevent deaths and being given fig-leap spin to support the NRA and get campaign donations, guess which one they’ll choose? The one they have chosen — and are choosing.

#### Immigration pounds

Julie Pace, AP, 1/26/13, White House, senators launching immigration push, Lexis

President Barack **Obama will launch a campaign** next week **aimed at overhauling** the nation's flawed **immigration** system and creating legal status for millions, as a bipartisan Senate group nears agreement on achieving the same goals. The proposals from Obama and lawmakers will mark the start of what is expected to be a contentious and emotional process with deep political implications. Latino voters overwhelmingly backed Obama in the 2012 election, leaving Republicans grappling for a way to regain their standing with an increasingly powerful pool of voters. The president will press his case for immigration changes during a trip to Las Vegas Tuesday. The Senate working group is also aiming to outline its proposals next week, according to a Senate aide. Administration officials say Obama's second-term immigration push will be a continuation of the principles he outlined during his first four years in office but failed to act on. He is expected to revive his little-noticed 2011 immigration "blueprint," which calls for a pathway to citizenship for illegal immigrants that includes paying fines and back taxes; increased border security; mandatory penalties for businesses that employ unauthorized immigrants; and improvements to the legal immigration system, including giving green cards to high-skilled workers and lifting caps on legal immigration for the immediate family members of U.S. citizens. "What has been absent in the time since he put those principles forward has been a willingness by Republicans, generally speaking, to move forward with comprehensive immigration reform," White House press secretary Jay Carney said. "What he hopes is that that dynamic has changed." The political dynamic does appear to have shifted following the November election. Despite making little progress on immigration in his first term, Obama won more than 70 percent of the Latino vote, in part because of the conservative positions on immigration that Republican nominee Mitt Romney staked out during the GOP primary. Latino voters accounted for 10 percent of the electorate in November. The president met privately Friday morning with the Congressional Hispanic Caucus to discuss his next steps on immigration. Among those in the meeting was Rep. Linda Sanchez, D-Calif., who said Obama told lawmakers "immigration reform is his number one legislative priority." That could bump back the president's efforts to seek legislation enacting stricter gun laws, another issue he has vowed to make a top second term priority. The Senate immigration group is also pressing for quick action, aiming to draft a bill by March and pass legislation in their chamber by August, said the aide, who requested anonymity in order to discuss private deliberations. The Republican-controlled House would also need to pass the legislation before it went to the White House for the president's signature.

#### Past fights spill-over—kills capital and agenda

Rosalind Helderman, 1/20/13, Despite inaugural respite, more fights lay ahead for Obama and Congress, articles.washingtonpost.com/2013-01-20/national/36473714\_1\_fiscal-cliff-immigration-laws-house-republicans

As President Obama begins his second term, he faces a difficult, if familiar, conundrum: Much of the ambitious agenda he has laid out for the next four years requires action from a sometimes hostile Congress. Rarely have a president and a Congress been as intractably at odds as Obama has been with the Republicans who control the House and hold the power to block his agenda with the filibuster in the Senate. Rather than a moment of renewal, Monday’s public presidential swearing-in is likely to serve as only a brief cease-fire in the fights that have consumed the White House and Capitol Hill since Republicans swept the House two years ago. At the core of Obama’s fractious relationship with Congress has been a running battle with Republicans over taxes and spending, and the pomp and circumstance of the inauguration will probably do little to ease the tensions that fuel that struggle. The last dispute in that fight — the year-end clash over how to avoid the “fiscal cliff” — will bleed seamlessly into the next fight over whether to raise the nation’s $16.4 trillion borrowing limit. A new proposal unveiled Friday by House Republican leaders to extend the nation’s borrowing authority for the next three months could offer both sides a bit of breathing room. But their goal was not to disengage from the spending battle but to boost GOP leverage as discussions roll into the spring. What happens in the next 90 days on that front could prove critical to the fate of the rest of Obama’s legislative agenda, including attempts to reform the nation’s immigration system and institute sweeping new gun-control laws. Second-term presidents usually enjoy a post-election glow of up to eight months, said James A. Thurber, a professor who studies Congress and the presidency at American University. “He’ll have barely a month,” Thurber said of Obama, arguing that the debate over **the fiscal cliff,** in which Republicans unhappily agreed to allow taxes to rise on those making more than $450,000 a year, has **left Washington with a** toxic hangover. “I don’t like the cliff analogy. I think it’s been more of an avalanche,” he said. “We’ve had an avalanche of work that really undermines his political capital and undermines the capacity to come together.” The fights over spending could swamp Obama’s call last week for new background checks for gun buyers, a reinstituted ban on assault weapons and a restriction on high-capacity magazines.

# 1AR

## 1ar nuclear energy

#### We meet

Ontario 10, Ontario Society of Professional Engineers, Energy Guide, 2-20, http://c.ymcdn.com/sites/www.ospe.on.ca/resource/resmgr/doc\_advocacy/2011\_doc\_20feb\_energyguide.pdf

Nuclear fusion energy is produced by combining light atoms (deuturium or tritium - heavy isotopes of hydrogen) in a fusion reactor. Unfortunately, this form of energy is still in the research and development stage and is at least 50 years away from becoming a practical energy source. Its advantage lies in the vast amounts of hydrogen that lie in the Earth's oceans, which can supply anticipated global energy needs for centuries to come.

#### Their interp relies on an imprecise understanding of ‘power’

Nick Touran 12, Ph.D. in Nuclear Engineering – University of Michigan, "Power Basics (Terminology)", http://www.whatisnuclear.com/physics/power\_basics.html

Before embarking on a meaningful discussion of nuclear power, we should touch base on the difference between power and energy, and some other terminology.

Power and Energy

A classic analogy used to describe power and energy is based on water towers. Water in the tower is energy and the flow of water out of the tower is power. Energy can be stored, like water. It can also flow. When energy flows, it can do work like moving stuff or lighting a house. The speed at which energy flows is called power. The same amount of energy can be released at high power (which will occur quickly) or at low power (which will take more time).

Energy is measured in Joules. A ton of wood might have 18 billion Joules of energy stored in it. Power is measured in Watts, which are just Joules per second. So if you burned that ton of wood in a week, your furnace would be putting out 18 GJ/week, which converts to 29.7 thousand Watts. If you burned it in a month, the furnace would be running at 6.8 thousand Watts. In the end, no matter how quickly you did it, you still used 18 GJ of energy. By the way, the amount of energy required to lift an apple 1 meter is about 1 Joule.

Power lingo in the electric industry

Rather than the standard units of Joules, electric companies bill by the kilowatt-hour, as you can see by looking at your most recent utility bill. This is just another measure of energy, akin to the Joule. 1 kW-hr is the amount of energy used if it is pulled at 1000 Watts for 1 hour. If you convert hours to seconds, you’ll find that this is equivalent to 3.6 million Joules.

Burnup

There is a specific amount of energy in each Uranium atom that can be released in a nuclear reactor. Thus, any kilogram of the same kind of Uranium has about the same amount of energy in it. In the nuclear industry, we use the term burnup to describe how much of this energy has been used up. It’s often discussed in units of Gigawatt-days (units of energy) per metric tonne (units of mass), or GWd/MT. The maximum theoretical burnup of Uranium is about 940 GWd/MT, with typical reactors reaching about 45 GWd/MT and fast reactors pushing 200GWd/MT.

#### Fusion power produces huge output

Fusion Power Associates 12

<http://fpa.ucsd.edu/fpn12-20.shtml>

FUSION POWER ASSOCIATES is a non-profit, tax-exempt research and educational foundation, providing timely information on the status of fusion development and other applications of plasma science and fusion research. We do this primarily through the issuance of email Fusion Program Notes and sponsorship of annual management-level technical symposia. The Association assists students, media, the public and others by providing lay-level materials, brochures, commentary, expert advice and referrals to experts for specialized information and provides editorial assistance to the Journal of Fusion Energy (Springer Publishers) in soliciting, translating, editing and publishing technical papers on plasma physics and fusion energy. The Association presents Awards annually to individuals, recognizing Leadership, Distinguished Career, and Excellence in Fusion Engineering. The Association occasionally also presents Special Awards, e.g., for Outstanding Public Service and for Education and Outreach.The Association also has available, by subscription, a bi-monthly newsletter, Fusion Power Report. The Association is managed by a Board of Directors and is guided by a Policy Statement. Institutions are encouraged to participate in Fusion Power Associates by becoming voting Members or Affiliates. The Association also has Individual Affiliates.

NIF's 192 lasers fired in perfect unison, delivering a record 1.875 million joules (MJ) of ultraviolet laser light to the facility's target chamber center. The ultraviolet energy produced by NIF (after conversion from the original infrared laser pulse to the final ultraviolet light) was 2.03 MJ before passing through diagnostic instruments and other optics on the way to the target chamber.

#### Massive energy OUTPUT

Garberson 7/20/12

Science writer, staff

<http://www.independentnews.com/news/article_2910e78a-d1db-11e1-9f5b-0019bb2963f4.html>

At 500 trillion watts, the laser delivered 1,000 times more power than the United States uses at any instant. At 1.85 million joules, its energy output is now 100 times higher than any other laser can produce on a regular basis. More subtle features of the experiment revealed the kinds of precise control that creates a firm foundation for future research. For example, total laser energy was within one percent of intended. Energy was distributed uniformly, to within one percent, among the laser’s 192 beams. Praise for the accomplishment came in from experts in the field. Richard Petrasso, senior research scientist and division head of high energy density physics at MIT, called it an “extraordinary accomplishment.” Raymond Jeanloz of UC-Berkeley declared it a “breakthrough” that will create “incredible new opportunities in studying materials at extreme conditions.”

## at: no r & d

#### Applied R & D is for production

NSF, No Date (National Science Foundation, "Definitions of Research and Development: An Annotated Compilation of Official Sources," http://www.nsf.gov/statistics/randdef/fedgov.cfm-http://www.nsf.gov/statistics/randdef/fedgov.cfm)

Definitions of basic and applied research and development are provided below...

Basic research is defined as systematic study directed toward fuller knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications towards processes or products in mind.

Applied research is defined as systematic study to gain knowledge or understanding necessary to determine the means by which a recognized and specific need may be met.

Development is defined as systematic application of knowledge or understanding, directed toward the production of useful materials, devices, and systems or methods, including design, development, and improvement of prototypes and new processes to meet specific requirements.

## at: net increase

#### Grid standard bad

#### This is silly: excludes solar and shale

Prosperous Way Down 12

<http://prosperouswaydown.com/net-energy-captain-cook/>

We are a group of advocates for a prosperous way down. Our website evolved out of discussions from a pre-conference session on the Prosperous Way Down (organized by Dr. Tom Abel) that occurred in conjunction with the 7th Emergy Conference in January 2012.

It is essential to calculate all costs of energy sources to avoid undue optimism about potential renewable alternatives. Because there is a range of reported energy yields reported, we need to consider the source of reports. If we do not include nature’s contributions to net energy/empower calculations, we will try to use energy sources that damage the environment, as is now shown with market failures with ethanol, solar PV, oil shale and gas, tar sands, and nuclear. Odum calculated almost 40 years ago that solar PVs and oil-shale were net negative–history has borne that out, with failing industries littering the landscape. The fact that tar sands, ethanol, and solar PVs (as opposed to solar thermal or passive solar) exist doesn’t make them net positive. Subsidies and favorable government policies allow short-term profits from net negative projects.

#### No Renewables

Western Institute for Study of the Environment 12/22/10

<http://westinstenv.org/sosf/2010/12/22/wind-solar-ethanol-net-energy-balance-negative/>

he Western Institute for Study of the Environment is a 501(c)(3) non-profit corporation and a collaboration of environmental scientists, resource professionals and practitioners, and the interested public. Our mission is to further advancements in knowledge and environmental stewardship across a spectrum of related environmental disciplines and professions. We are ready, willing, and able to teach good stewardship and caring for the land. W.I.S.E. provides a free, on-line set of post-graduate courses in environmental studies, currently fifty Topics in eight Colloquia, each containing book and article reviews, original papers, and essays. In addition, we present three Commentary sub-sites, a news clipping sub-site, and a fire tracking sub-site. Reviews and original articles are archived in our Library.

It takes more BTU’s of natural gas, petroleum and/or coal to manufacture so-called “renewable” energy than the BTU’s produced by windmills, solar cells, or ethanol farms. The equation is negative. It requires more fossil fuel to produce a BTU of “renewable” energy than if the fossil fuel was burned directly in power plants or cars. Renewables do not save oil; they waste oil.

#### No solar

Fulks 12/10/10

<http://westinstenv.org/sosf/2010/12/22/wind-solar-ethanol-net-energy-balance-negative/>

He received a BS in Physics in 1967 and went on to get an MS and Ph.D. in Physics, all from the University of Chicago. He worked initially for the Laboratory for Astrophysics and Space Research at the Enrico Fermi Institute of the University of Chicago studying the solar modulation of galactic cosmic rays, using a large charged-particle spectrometer flown in the Arctic. One crucial question at the time was the size of the heliosphere filled by the solar wind blowing from the surface of the sun. The prevailing view was that it was relatively small. In a paper published in 1975, Dr. Fulks argued that it had to be huge, stretching beyond our solar system. Twenty years later, two NASA spacecraft finally reached interstellar space, 8 billion miles from the sun and far beyond Pluto. Dr. Fulks later worked for a think-tank in Santa Barbara, California, supporting the US Defense Nuclear Agency on nuclear weapon effects. When that agency faded away at the end of the Cold War, he supported the Department of State designing new embassies and working at the US Embassy in Moscow. More recently, he has consulted for business and government clients seeking to better understand electromagnetic phenomena, related scientific scares, and the concept of ‘acceptable risk.’

Solar cells are a similar boondoggle, but [perhaps] without the horrendous social consequences. It takes about as much electrical energy to manufacture silicon solar cells as will ever be returned by them over their typical twenty year lifespan.

## 103/104

#### End of card is us

McGowan 79

 606 F.2d 986 196 U.S.App.D.C. 79, 1979-1 Trade Cases 62,526 FT. PIERCE UTILITIES AUTHORITY OF the CITY OF FT. PIERCE, et al., Petitioners, v. UNITED STATES of America, and the Nuclear Regulatory Commission, Respondents, Florida Power & Light Co., City of Mount Dora, Florida, City of Lake Helen, Florida, Intervenors. FT. PIERCE UTILITIES AUTHORITY OF the CITY OF FT. PIERCE, et al., Petitioners, v. NUCLEAR REGULATORY COMMISSION and United States of America, Respondents, City of Mount Dora, Florida, Florida Power and Light Co., City of Lake Helen, Florida, Intervenors. Nos. 77-1925, 77-2101. United States Court of Appeals, District of Columbia Circuit. Argued Nov. 16, 1978. Decided March 23, 1979. As Amended March 23, 1979. Certiorari Denied Oct. 1, 1979. See 100 S.Ct. 83.

 The Atomic Energy Act provides for two types of construction permits and operating licenses for nuclear facilities: (1) those issued under section 104(b), known as "research and development" licenses, which are subject only to "the minimum amount of such regulations and terms of license as will permit the Commission to fulfill its (licensing) obligations," and (2) those issued under section 103, known as "commercial" licenses, which are subject to full-scale Commission regulation.2 Atomic Energy Act §§ 102-104, 42 U.S.C. §§ 2132-2134 (1976). This licensing scheme, enacted in an era when the practical value of nuclear energy was in doubt, was designed to promote the development of nuclear energy by minimizing the extent of government regulation until such time as its practical value was established. Accordingly, the Act, prior to 1970 when it was amended, authorized the Commission to issue "commercial" licenses under section 103 only upon a finding that "any type of utilization or production facility ha(d) been sufficiently developed to be of practical value for industrial or commercial purposes." Atomic Energy Act, ch. 1073, § 102, 68 Stat. 936 (1954) (amended 1970). Section 104(b), by contrast, authorized the Commission, absent a finding of "practical value," to issue "research and development" licenses, subject to minimum regulation, for "utilization and production facilities involved in the conduct of research and development activities leading to the demonstration of the practical value of such facilities for industrial or commercial purposes." It was pursuant to section 104(b) prior to the 1970 amendments that FP&L received its construction permits for Turkey Point Nos. 3 and 4 on April 29, 1967, and for St. Lucie No. 1 on July 1, 1970.

In late 1970, Congress amended the Act, abolishing the requirement that the Commission make a finding of "practical value" before issuing "commercial" licenses. Atomic Energy Act § 102(a), 42 U.S.C. § 2132(a) (1976). Thereafter, the Commission, when licensing "utilization or production facilit(ies) for industrial or commercial purposes," was required to issue "commercial" licenses under section 103, rather than "research and development" licenses under section 104(b). The Act as amended, however, contained a provision authorizing the Commission to issue operating licenses under section 104(b) for nuclear plants that previously had been licensed for construction as "research and development" facilities. Id. § 102(b), 42 U.S.C. § 2132(b). Acting pursuant to this grandfather clause, the Commission, on July 19, 1972, April 10, 1973, and March 1, 1976, issued operating licenses under section 104(b) to FP&L for Turkey Point Nos. 3 and 4 and St. Lucie No. 1, respectively

## 2ac no root cause

#### Violence is proximately caused – root cause logic is poor scholarship

**Sharpe**, lecturer, philosophy and psychoanalytic studies, and Goucher, senior lecturer, literary and psychoanalytic studies – Deakin University, **‘10**

(Matthew and Geoff, Žižek and Politics: An Introduction, p. 231 – 233)

We realise that this argument, which we propose as a new ‘quilting’ framework to explain Žižek’s theoretical oscillations and political prescriptions, raises some large issues of its own. While this is not the place to further that discussion, we think its analytic force leads into a much wider critique of ‘Theory’ in parts of the latertwentieth- century academy, which emerged following the ‘cultural turn’ of the 1960s and 1970s in the wake of the collapse of Marxism. Žižek’s paradigm to try to generate all his theory of culture, subjectivity, ideology, politics and religion is psychoanalysis. But a similar criticism would apply, for instance, to theorists who feel that the method Jacques Derrida developed for criticising philosophical texts can meaningfully supplant the methodologies of political science, philosophy, economics, sociology and so forth, when it comes to thinking about ‘the political’. Or, differently, thinkers who opt for Deleuze (or Deleuze’s and Guattari’s) Nietzschean Spinozism as a new metaphysics to explain ethics, politics, aesthetics, ontology and so forth, seem to us candidates for the same type of **criticism, as a reductive passing over** the **empirical and analytic distinctness of** the **different** object **fields in complex societies.**

In truth, we feel that Theory, and the continuing line of ‘master thinkers’ who regularly appear particularly in the English- speaking world, is the last gasp of what used to be called First Philosophy. The philosopher ascends out of the city, Plato tells us, from whence she can espie the Higher Truth, which she must then bring back down to political earth. From outside the city, we can well imagine that she can see much more widely than her benighted political contemporaries. But from these philosophical heights, we can equally suspect that the ‘master thinker’ is also **always in danger of passing over** the **salient differences** and features of political life – differences only too evident to people ‘on the ground’. Political life, after all, is always a more complex affair than a bunch of ideologically duped fools staring at and enacting a wall (or ‘politically correct screen’) of ideologically produced illusions, from Plato’s timeless cave allegory to Žižek’s theory of ideology.

We know that Theory largely understands itself as avowedly ‘post- metaphysical’. It aims to erect its new claims on the gravestone of First Philosophy as the West has known it. But it also tells us that people very often do not know what they do. And so it seems to us that too many of its proponents and their followers are mourners who remain in the graveyard, propping up the gravestone of Western philosophy under the sign of some totalising account of absolutely everything – enjoyment, différance, biopower . . . Perhaps the time has come, we would argue, less for one more would- be global, allpurpose existential and political Theory than for a **multi- dimensional and interdisciplinary** critical **theory** that would challenge the chaotic specialisation neoliberalism speeds up in academe, which mirrors and accelerates the splintering of the Left over the last four decades. This would mean that we would have to shun the hope that one method, one perspective, or one master thinker could single- handedly decipher all the complexity of socio- political life, the concerns of really existing social movements – which specifi cally does not mean mindlessly celebrating difference, marginalisation and multiplicity as if they could be suffi cient ends for a new politics. **It would be to reopen critical theory and non- analytic philosophy to the other intellectual disciplines**, most of **whom** today **pointedly reject Theory’s legitimacy,** neither reading it nor taking it seriously.

## 2ac epistemology

#### Method focus causes scholarly paralysis

**Jackson**, associate professor of IR – School of International Service @ American University, **‘11**

(Patrick Thadeus, The Conduct of Inquiry in International Relations, p. 57-59)

Perhaps the greatest irony of this instrumental, decontextualized importation of “falsification” and its critics into IR is the way that an entire line of thought that privileged disconfirmation and refutation—no matter how complicated that disconfirmation and refutation was in practice—has been transformed into a license to **worry endlessly about foundational assumptions.** At the very beginning of the effort to bring terms such as “paradigm” to bear on the study of politics, Albert O. **Hirschman** (1970b, 338) **noted this very danger**, suggesting that without “a little more ‘reverence for life’ and a little less straightjacketing of the future,” the **focus on** producing internally **consistent** packages of **assumptions instead of** actually examining **complex empirical situations would result in scholarly paralysis.** Here as elsewhere, Hirschman appears to have been quite prescient, inasmuch as the major effect of paradigm and research programme language in IR seems to have been a series of debates and discussions about whether the fundamentals of a given school of thought were sufficiently “scientific” in their construction. Thus **we have debates about how to evaluate scientific progress**, and attempts to propose one or another set of research design principles **as uniquely scientific**, and inventive, “reconstructions” of IR schools, such as Patrick James’ “elaborated structural realism,” supposedly for the purpose of placing them on a **firmer scientific footing** by making sure that they have all of the required elements of a basically Lakatosian19 model of science (James 2002, 67, 98–103).

The bet with all of this scholarly activity seems to be that if we can just get the fundamentals right, then scientific progress will inevitably ensue . . . even though this is the precise opposite of what Popper and Kuhn and Lakatos argued! In fact, all of this obsessive interest in foundations and starting-points is, in form if not in content, a lot closer to logical positivism than it is to the concerns of the falsificationist philosophers, despite the prominence of language about “hypothesis testing” and the concern to formulate testable hypotheses among IR scholars engaged in these endeavors. That, above all, is why I have labeled this methodology of scholarship neopositivist. While it takes much of its self justification as a science from criticisms of logical positivism, in overall sensibility it still operates in a visibly positivist way, attempting to construct knowledge from the ground up by getting its foundations in logical order before concentrating on how claims encounter the world in terms of their theoretical implications. This is by no means to say that neopositivism is not interested in hypothesis testing; on the contrary, neopositivists are extremely concerned with testing hypotheses, but **only after the fundamentals have been** soundly **established.** Certainty, not conjectural provisionality, seems to be the goal—a goal that, ironically, Popper and Kuhn and Lakatos would all reject.

## technocracy

#### Their impact is wrong – debate over even the most technical issues improves decision-making and advocacy

**Hager**, professor of political science – Bryn Mawr College, **‘92**

(Carol J., “Democratizing Technology: Citizen & State in West German Energy Politics, 1974-1990” *Polity*, Vol. 25, No. 1, p. 45-70)

What is the role of the citizen in the modern technological state? As political decisions increasingly involve complex technological choices, does a citizen's ability to participate in **decision making** diminish? These questions, long a part of theoretical discourse, gained new salience with the rise of **grassroots environmental protest in advanced industrial states.** In West Germany, where a strong environmental movement arose in the 1970s, protest has centered as much on questions of democracy as it has on public policy. Grassroots groups challenged not only the construction of large technological projects, especially power plants, but also the **legitimacy of the bureaucratic institutions** which produced those projects. Policy studies generally ignore the legitimation aspects of public policy making.2 A discussion of both dimensions, however, is crucial for understanding the significance of grassroots protest for West German political development in the technological age and for assessing the likely direction of citizen politics in united Germany. In the field of energy politics, West German citizen initiative groups tried to politicize and ultimately to democratize policy making.3 The **technicality** **of the issue** **was not a barrier** to their participation. On the contrary, **grassroots groups proved to be able participants in technical energy debate, often proposing innovative solutions to technological problems.** Ultimately, however, they wanted not to become an elite of "counterexperts," but **to create a political discourse between policy makers and citizens** through which the **goals of energy policy could be recast** and its legitimacy restored. Only a deliberative, expressly democratic form of policy making, they argued, could enjoy the support of the populace. To this end, protest groups developed new, grassroots democratic forms of decision making within their own organizations, which they then tried to transfer to the political system at large. The legacy of grassroots **energy protest in West Germany** is twofold. First, it **produced major substantive changes in public policy.** Informed citizen pressure was largely responsible for the introduction of new plant and pollution control technologies. Second, grassroots protest **undermined** the **legitimacy** of bureaucratic experts. Yet, an acceptable forum for a broadened political discussion of energy issues has not been found; the energy debate has taken place largely outside the established political institutions. Thus, the legitimation issue remains unresolved. It is likely to reemerge as Germany deals with the problems of the former German Democratic Republic. Nevertheless, an evolving ideology of citizen participationa vision of "technological democracy"-is an important outcome of grassroots action.

## deter k

#### Deterrence solves war and violence—it’s a critical source of ontological security and solves drive for aggressive lashout

Amir Lupovici, Post-Doctoral Fellow Munk Centre for International Studies University of Toronto, 2008, Why the Cold War Practices of Deterrence are Still Prevalent: Physical Security, Ontological Security and Strategic Discourse, [http://webcache.googleusercontent.com/search?hl=en&q=cache:cpsa-acsp.ca/papers-2008/Lupovici.pdf](http://webcache.googleusercontent.com/search?hl=en&q=cache:cpsa-acsp.ca/papers-2008/Lupovici.pdf //)

Since deterrence can become part of the actors’ identity, it is also involved in the actors’ will to achieve ontological security, securing the actors’ identity and routines. As McSweeney explains, ontological security is “the acquisition of confidence in the routines of daily life—the essential predictability of interaction through which we feel confident in knowing what is going on and that we have the practical skill to go on in this context.” These routines become part of the social structure that enables and constrains the actors’ possibilities (McSweeney, 1999: 50-1, 154-5; Wendt, 1999: 131, 229-30). Thus, through the emergence of the deterrence norm and the construction of deterrence identities, the actors create an intersubjective context and intersubjective understandings that in turn affect their interests and routines. In this context, deterrence strategy and deterrence practices are better understood by the actors, and therefore the continuous avoidance of violence is more easily achieved. Furthermore, within such a context of deterrence relations, rationality is (re)defined, clarifying the appropriate practices for a rational actor, and this, in turn, reproduces this context and the actors’ identities. Therefore, the internalization of deterrence ideas helps to explain how actors may create more cooperative practices and break away from the spiral of hostility that is forced and maintained by the identities that are attached to the security dilemma, and which lead to mutual perception of the other as an aggressive enemy. As Wendt for example suggests, in situations where states are restrained from using violence—such as MAD (mutual assured destruction)—states not only avoid violence, but “ironically, may be willing to trust each other enough to take on collective identity”. In such cases if actors believe that others have no desire to engulf them, then it will be easier to trust them and to identify with their own needs (Wendt, 1999: 358-9). In this respect, the norm of deterrence, the trust that is being built between the opponents, and the (mutual) constitution of their role identities may all lead to the creation of long term influences that preserve the practices of deterrence as well as the avoidance of violence. Since a basic level of trust is needed to attain ontological security, the existence of it may further strengthen the practices of deterrence and the actors’ identities of deterrer and deterred actors. In this respect, I argue that for the reasons mentioned earlier, the practices of deterrence should be understood as providing both physical and ontological security, thus refuting that there is necessarily tension between them. Exactly for this reason I argue that Rasmussen’s (2002: 331-2) assertion—according to which MAD was about enhancing ontological over physical security—is only partly correct. Certainly, MAD should be understood as providing ontological security; but it also allowed for physical security, since, compared to previous strategies and doctrines, it was all about decreasing the physical threat of nuclear weapons. Furthermore, the ability to increase one dimension of security helped to enhance the other, since it strengthened the actors’ identities and created more stable expectations of avoiding violence.

## oil

#### Cap hates oil war

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(Ismael, “The Political Economy of US Wars of Choice,” Perspectives on Global Development and Technology 8.2-3)

A most widely-cited factor behind the recent US wars of choice is said to be oil. “No Blood for Oil” has been a rallying cry for most of the opponents of the war. While some of these opponents argue that the war is driven by the US desire for cheap oil, others claim that it is prompted by Big Oil’s wish for high oil prices and profi ts. Interestingly, most antiwar forces use both claims interchangeably without paying attention to the fact that they are diametrically- opposed assertions.

Not only do the two arguments contradict each other, but each argument is also wanting and unconvincing on its own grounds; not because the US does not wish for cheap oil, or because Big Oil does not desire higher oil prices, but because war is no longer the way to control or gain access to energy resources. Colonial-type occupation or direct control of energy resources is no longer effi cient or economical and has, therefore, **been abandoned for more than four decades**.

Th e view that recent US military adventures in the Middle East and the broader Central Asia are driven by energy considerations is further reinforced by the dubious theory of Peak Oil , which maintains that world production of conventional oil will soon reach—if it has not already reached—a maximum, or peak, and decline thereafter. It follows that, therefore, war power and military strength are key to access or control of the stagnant, shrinking, or soonto- be-shrinking oil.

In this study I will fi rst argue that while, prima facie, Peak Oil sounds like a reasonable thesis, it is dubious on both theoretical and empirical grounds. I will then show that war and military force are no longer the necessary or appropriate means to gain access to sources of energy, and that resorting to military measures can, indeed, lead to costly, not cheap, oil. Next, I will demonstrate that, **despite** the lucrative spoils of war resulting from high oil prices and profi ts, **Big Oil prefers** **peace** and stability, not war and geopolitical turbulence, in global energy markets. Finally, I will argue a case that behind the drive to war and military adventures in the Middle East lie some powerful special interests (vested in war, militarism, and geopolitical concerns of Israel ) that use oil as an issue of “national interest”—as a façade or pretext—in order to justify military adventures to derive high dividends, both economic and geopolitical, from war.

## neocleous

**Capitalism solves war**

**Gartzke 7** (Eric, associate professor of political science and a member of the Saltzman Institute of War and Peace Studies at Columbia University, “The Capitalist Peace”, American Journal of Political Science, Vol. 51, No. 1, January 2007, Pp. 166–191)

If war is a product of incompatible interests and failed or abortive bargaining, peace ensues when states lack differences worthy of costly conflict, or when circumstances favor successful diplomacy. Realists and others argue that state interests are inherently incompatible, but this need be so only if state interests are narrowly defined or when conquest promises tangible benefits. Peace can result from at least three attributes of mature capitalist economies. First, the historic impetus to territorial expansion is tempered by the rising importance of intellectual and financial capital, factors that are more expediently enticed than conquered. Land does little to increase the worth of the advanced economies while resource competition is more cheaply pursued through markets than by means of military occupation. At the same time, development actually increases the ability of states to project power when incompatible policy objectives exist. Development affects who states fight (and what they fight over) more than the overall frequency of warfare. Second, substantial overlap in the foreign policy goals of developed nations in the post–World War II period further limits the scope and scale of conflict. Lacking territorial tensions, consensus about how to order the international system has allowed liberal states to cooperate and to accommodate minor differences. Whether this affinity among liberal states will persist in the next century is a question open to debate. Finally, the rise of global capital markets creates a new mechanism for competition and communication for states that might otherwise be forced to fight. Separately, these processes influence patterns of warfare in the modern world. Together, they explain the absence of war among states in the developed world and account for the dyadic observation of the democratic peace.

#### No impact – threat construction isn’t sufficient to cause wars

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(Stuart J, “Narratives and Symbols in Violent Mobilization: The Palestinian-Israeli Case,” *Security Studies* 18:3, 400 – 434)

Even when hostile narratives, group fears, and opportunity are strongly present, war occurs **only if these factors are harnessed.** Ethnic narratives and fears must combine to create significant ethnic hostility among mass publics. Politicians must also seize the opportunity to manipulate that hostility, evoking hostile narratives and symbols to gain or hold power by riding a wave of chauvinist mobilization. Such mobilization is often spurred by prominent events (for example, episodes of violence) that increase feelings of hostility and make chauvinist appeals seem timely. If the other group also mobilizes and if each side's felt security needs threaten the security of the other side, the result is a security dilemma spiral of rising fear, hostility, and mutual threat that results in violence. **A virtue of** this **symbolist theory is that symbolist logic explains why** ethnic **peace is more common than ethnonationalist war.** Even if hostile narratives, fears, and opportunity exist, severe violence usually can still be avoided if ethnic elites skillfully define group needs in moderate ways and collaborate across group lines to prevent violence: this is consociationalism.17 War is likely only if hostile narratives, fears, and opportunity spur hostile attitudes, chauvinist mobilization, and a security dilemma.