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## 1

#### Financial incentives must be targeted at energy generation

O’Brien, Minister of State, Department for Energy and Climate Change, UK Parliament, 11/18/’8

(Mike, “Clause 20 — Terms and conditions,” <http://www.theyworkforyou.com/debate/?id=2008-11-18b.159.3>)

I have quite a lot still to say, so I shall try to give as full a reply, and as brief, as possible. Amendment (b) to Lords amendment No. 42 suggests we replace the term "financial incentives" in proposed new subsection (2)(a) with "payment". The use of the term "financial incentives" clarifies that the general purpose of the scheme is to incentivise low-carbon electricity generation through financial incentives, as opposed to other means such as a regulatory obligation or barrier-busting support, such as help with the planning system. We believe that such clarity is helpful in setting out beyond any doubt the primary purpose of the scheme. However, to give additional reassurances about our intentions, I would point to the powers under proposed new subsection (3) that specifies the term "payment" in all the key provisions that will establish the scheme. In others words, it is explicit that we are dealing with payments to small-scale generators. What is proposed will be a real feed-in tariff scheme.

#### R&D isn’t tied to energy production—plan is an indirect incentive

EIA, Energy Information Administration, Office of Energy Markets and End Use, U.S. DOE, ‘92

(“Federal Energy Subsidies: Direct and Indirect Interventions in Energy Markets,” ftp://tonto.eia.doe.gov/service/emeu9202.pdf)

Research and development. The budgetary cost of Government-funded research and development (R&D) is easy to measure. Determining the extent to which Government energy R&D is a subsidy is more problematic: often it takes the form of a direct payment to producers or consumers, but the payment is not tied to the production or consumption of energy in the present. If successful, Federal-applied R&D will affect future energy prices and costs, and so could be considered an indirect subsidy.

#### Vote Neg—tons of bidirectional mechanisms impact energy tech in ways that could increase production—only direct financial disbursements for increased production create a predictable and manageable topic

EIA, Energy Information Administration, Office of Energy Markets and End Use, U.S. DOE, ‘92

(“Federal Energy Subsidies: Direct and Indirect Interventions in Energy Markets,” ftp://tonto.eia.doe.gov/service/emeu9202.pdf)

In some sense, most Federal policies have the potential to affect energy markets. Policies supporting economic stability or economic growth have energy market consequences; so also do Government policies supporting highway development or affordable housing. The interaction between any of these policies and energy market outcomes may be worthy of study. However, energy impacts of such policies would be incidental to their primary purpose and are not examined here. Instead, this report focuses on Government actions whose prima facie purpose is to affect energy market outcomes, whether through financial incentives, regulation, public enterprise, or research and development.

## 2

**Plan trades off with ITER funding**

**Vastag** 6/25/**12**

Brian Vastag, Staff Writer, Washington Post, June 25, 2012, "Budget cuts threaten pursuit of nuclear fusion as a clean energy source", http://www.washingtonpost.com/national/health-science/budget-cuts-threaten-pursuit-of-nuclear-fusion-as-a-clean-energy-source/2012/06/25/gJQAKlpS2V\_story.html

President Obama’s budget request for next year cuts domestic fusion research by 16 percent, to $248 million. It would shutter a fusion lab at MIT, one of four funded by the Department of Energy. It would slash 50 to 100 jobs from the 450 at the Princeton lab. And it would use the $48 million in total savings to boost the U.S. contribution to an international fusion mega-project now under construction in the south of France, called ITER, a project whose estimated costs have grown to $23 billion and whose start date has been pushed back to the next decade. In a time of **flat federal spending**, the **president has made a choice** to fund the international project — whose costs to the United States will grow in coming years, according to Energy Department projections, to as much as $300 million a year — **at the expense** of the domestic program. (The United States pledged funding to ITER in 2003, joining the European Union, Russia, China, India, South Korea and Japan.)

**ITER funding is key to science diplomacy – key to global stability**

**Fedoroff 8** - Science and Technology Adviser to the Secretary of State and the Administrator of USAID (Nina, Testimony Before the House Science Subcommittee on Research and Science Education, 4/2, <http://www.state.gov/g/oes/rls/rm/102996.htm>)

**Science** by its nature **facilitates diplomacy because it strengthens political relationships, embodies powerful ideals, and creates opportunities** for all. The **global scientific community embraces** principles Americans cherish: **transparency, meritocracy, accountability, the objective evaluation of evidence, and broad and frequently democratic participation**. **Science is inherently democratic**, respecting evidence and truth above all. **Science is** also a common global language, **able to bridge deep political and religious divides.** **Scientists share a common language.** **Scientific interactions** serve to **keep open** lines of **communication and cultural understanding. As scientists everywhere have a common evidentiary external reference system, members of ideologically divergent societies can use the common language of science to cooperatively address both domestic and the increasingly trans- national and global problems confronting humanity in the 21st century. There is a growing recognition that** **science and technology will increasingly drive** the successful **economies** **of the 21st century. Science and technology provide an immeasurable benefit to the U.S. by bringing scientists and students here, especially from developing countries, where they see democracy in action, make friends in the international scientific community, become familiar with American technology, and contribute to the U.S. and global economy. For example, in 2005, over 50% of physical science and engineering graduate students and postdoctoral researchers trained in the U.S. have been foreign nationals. Moreover, many foreign-born scientists who were educated and have worked in the U.S. eventually progress in their careers to hold influential positions in ministries and institutions both in this country and in their home countries. They also contribute to U.S. scientific and technologic development: According to the National Science Board’s 2008 Science and Engineering Indicators, 47% of full-time doctoral science and engineering faculty in U.S. research institutions were foreign-born. Finally, some types of** **science** – particularly those **that address the grand challenges in science and technology – are** inherently **international** in scope **and collaborative** **by necessity. The ITER Project, an international fusion research and development collaboration, is a product of the thaw in superpower relations between Soviet President Mikhail Gorbachev and U.S. President Ronald Reagan. This reactor will harness the power of nuclear fusion as a possible new and viable energy source by bringing a star to earth.** **ITER serves as a symbol of international scientific cooperation among key scientific leaders in the developed and developing world** **– Japan, Korea, China, E.U., India, Russia, and United States – representing 70% of the world’s current population.. The recent elimination of funding** for FY08 U.S. contributions **to the ITER project comes at an inopportune time** **as the Agreement on the Establishment of the ITER International Fusion Energy Organization for the Joint Implementation of the ITER Project had entered into force only on October 2007.** **The elimination of the promised U.S. contribution drew our allies to question our commitment and credibility in international cooperative ventures**. More problematically, it jeopardizes **a platform for reaffirming** U.S. relations with key states**. It should be noted that even at the height of the cold war, the United States used science diplomacy as a means to maintain communications and avoid misunderstanding between the world’s two nuclear powers – the Soviet Union and the United States.** **In a complex multi-polar world**, relations are more challenging, the threats perhaps greater, and **the need for engagement more paramount**. **Using Science Diplomacy to Achieve National Security Objectives The** **welfare and stability of countries** and **regions in many parts of the globe require a concerted effort by the developed world** **to address the causal factors that render countries fragile and cause states to fail. Countries that are unable to defend their people against starvation, or fail to provide economic opportunity, are susceptible to extremist ideologies, autocratic rule, and abuses of human rights. As well, the world faces common threats, among them climate change, energy and water shortages, public health emergencies, environmental degradation, poverty, food insecurity, and religious extremism. These threats can undermine the national security of the United States, both directly and indirectly. Many are blind to political boundaries, becoming regional or global threats. The United States has no monopoly on knowledge in a globalizing world and the scientific challenges facing humankind are enormous. Addressing these common challenges demands common solutions and necessitates scientific cooperation, common standards, and common goals.** **We must** increasingly **harness the power of American ingenuity in science and technology** **through strong partnerships with the science community in both academia and the private sector, in the U.S. and abroad among our allies, to advance U.S**. interests in **foreign policy**. **There are also important challenges to the ability of states to supply their populations with sufficient food. The still-growing human population, rising affluence in emerging economies, and other factors have combined to create unprecedented pressures on global prices of staples such as edible oils and grains. Encouraging and promoting the use of contemporary molecular techniques in crop improvement is an essential goal for US science diplomacy.** **An essential part of the war on terrorism is a war of ideas. The creation of economic opportunity can do much more to combat the rise of fanaticism than** can **any weapon**. The war of ideas is a war about rationalism as opposed to irrationalism. **Science and technology put us firmly on the side of rationalism by providing ideas and opportunities that improve people’s lives**. **We may use** the **recognition and the goodwill that science still generates** for the United States **to achieve our diplomatic and developmental goals**. Additionally**, the Department continues to use science as a means to reduce the proliferation of the weapons’ of mass destruction and prevent** what has been dubbed ‘**brain drain’. Through cooperative threat reduction activities, former** **weapons scientists redirect their skills to participate in peaceful, collaborative international research** **in a large variety of scientific fields. In addition,** **new global efforts focus on improving biological, chemical, and nuclear security by promoting and implementing best scientific practices as a means to enhance security, increase global partnerships, and create sustainability**.

## 3

#### Hagel will get confirmed thanks entirely to Obama political capital – but it could still come undone

Washington Times 1/8/2013

(http://www.washingtontimes.com/news/2013/jan/8/little-enthusiasm-on-capitol-hill-for-hagel-nomina/#ixzz2HUcSjUfS)

Even before it became official Monday, Mr. Hagel’s nomination had kicked up a cloud of consternation from those on the right who questioned his commitment to Israel and his willingness to get tough with sanctions on Iran over its nuclear program.

Those on the left aren’t overjoyed, either. They would rather have worked with one of their own at the Pentagon, and have questions about criticism in 1998 of a Clinton administration nominee for an ambassadorship for being “openly, aggressively gay.” Mr. Hagel has since apologized, and Democrats appear to be giving him a pass — at least for now.

But Mr. Obama chose his former Senate colleague anyway, **putting the full weight of the presidency behind his selection and risking the political capital it takes to win confirmation battles in the world’s most exclusive club**.

The president “has his hands full at the moment — why would he take on one more chore in dealing with Congress?” said Stephen Hess, a veteran staffer of the Eisenhower and Nixon administrations and presidential scholar at the Brookings Institution. “I guess partly because he really wants this guy.”

Sources familiar with the confirmation process say the **White House would not have nominated Mr. Hagel if it were not certain the votes were there to confirm him**, **although recent history suggests that sometimes even the “safest” picks can unravel during the confirmation process**.

#### The plan is hugely controversial and recreates Solyndra – research is safe but development isn’t

Khimm, writer for the Washington Post, 6/4/2012

(Suzy, “Republicans want to take the ‘D’ out of government ‘R&D,’” http://www.washingtonpost.com/blogs/wonkblog/post/republicans-want-to-take-the-d-out-of-government-randd/2012/06/04/gJQAmOJ7DV\_blog.html)

Why have House Republicans soured on the program? **Many believe the government should only focus on basic scientific research and get out of the** “**development**” **phase altogether**. Last year, Rep. James Sensenbrenner (R-Wis.) criticized ARPA-E for focusing on “on later-stage technology development and commercialization efforts” for energy innovations. “I do not believe that the government ought to be in the business of picking winners and losers,” he told the New York Times. A House subcommittee also found that **firms that received government loans also received private investment**, which Republicans saw as proof of government waste.

**It’s the same rationale that Republicans have used in** recanting their support for clean-energy loan programs in **their attack on Solyndra**. Such government loans are aimed at helping new technologies overcome the second “Valley of Death” from prototype to full-scale commercialization.

Republican presidential candidate Mitt Romney, for example, supported such loans when he was governor of Massachusetts, personally delivering a $1.5 million check in 2003 to Konarka, a solar panel company that just went bankrupt. But on the campaign trail, he has attacked the $535 million Solyndra loan as “crony capitalism” that gambled with taxpayers’ money to enrich Obama’s allies. By contrast, he has shared Obama’s call for more government spending on basic scientific research.

In both cases — the attacks on Solyndra and the House ARPA-E budget-cutting — Republicans essentially want to narrow the role of government. **Basic research is still kosher**. **But aggressive government forays into development should be discouraged**.

#### Hagel confirmation breaks the Washington consensus on Iran

Gray and Miller, writers for Buzzfeed, 1/6/2013

(Rosie and Zeke, “Obama Upends Iran Debate By Picking Chuck Hagel,” http://www.buzzfeed.com/rosiegray/obama-updends-iran-debate-by-picking-chuck-hagel)

Their hope — and their foes’ fear — is that Hagel’s confirmation could mean that views outside what is considered the mainstream on Israel and Iran **begin to replace the more hawkish Washington consensus**. A Hagel confirmation could change the terms of the debate on the Middle East by challenging the Republican Party with the views of one of its own. And **Hagel**, a Republican whose views were altered by the Iraq war, **has the potential to affect the prospect of a war with Iran**, some argue.

Administration officials, in public and in private, do not make this case, though they say they’re eager to engage the debate.

“If the Republicans are going to look at Chuck Hagel, a decorated war hero and Republican who served two terms in the Senate, and vote no because he bucked the party line on Iraq, then they are so far in the wilderness that they’ll never get out,” said one administration official.

The official also contested the notion that the choice Hagel — who voted in the Senate against Iran sanctions — means anything in particular about the Administration’s policy on Iran.

“Senator Hagel supports the President's sanctions regime on Iran, and has always said that all options should be on the table, including military force as a last resort,” the official said, also saying that Hagel “will continue to carry out President Obama’s unprecedented security cooperation with Israel.”

**But the way in which the lines have been drawn means that** — **whatever Hagel’s role in making policy** — **the fight over his confirmation will shape it**. A bipartisan coalition of pro-Israel members of Congress and activists, as well as allies with other agendas, helped derail the nomination of a career diplomat with friendly relationship with Arab regimes, Chas Freeman, to an obscure intelligence advisory council.

If you aren't listening closely, it can be difficult to detect the gaps between Barack Obama's eagerness to avoid the use of force with Iran; the somewhat noisier concerns of Senate Democrats about Iran's nuclear program; and the sense among some Republicans and some Israeli leaders that **American bombs should start falling now**.

#### That avoids Middle East war and economic meltdown

Hussain, writer and analyst on Middle East politics, 9/12/2012

(Murtaza, “Why war with Iran would spell disaster,”

<http://www.aljazeera.com/indepth/opinion/2012/09/201291194236970294.html>)

After a decade of exhausting and demoralising conflict between the United States and two of the weakest, most impoverished countries in the world, Iraq and Afghanistan, many within the US political establishment are calling for the country to engage in yet another conflict; this time with a relatively powerful enemy in Iran.

In the past week alone, top Republican figures such as John McCain and Joseph Lieberman have called for increasing belligerence towards the Iranian regime, bringing the two countries closer to the **brink of armed conflict**.

The heightening standoff with Iran over its nuclear programme, curious in itself for its recent rapid escalation given that leading American and Israeli intelligence estimates have both concluded that Iran has neither developed nor is planning to develop nuclear weapons, is leading to increasingly belligerent rhetoric out of Washington calling for war with Iran.

Leading members of the House and Congress from both parties as well as the closest advisers to Republican presidential candidate Mitt Romney have called for attacking Iran, with some high-ranking GOP advisers even suggesting that the time is now for a Congressional resolution formally declaring war on the country.

Romney and many other leading Republican figures have called for pre-emptive war against Iran, and have continually upped the ante in terms of threats of military action throughout the election campaign. This alarming and potentially highly consequential rhetoric is occurring in a context where the American people are still recovering from the disastrous war in Iraq and winding down the US occupation of Afghanistan, while at the same time coping with the worst economic drought since the Great Depression.

Public statements claiming that the extent of the conflict would be limited to targeted airstrikes on Iranian nuclear facilities are utterly disingenuous, ignoring the escalating cycle of retribution that such "limited" conflicts necessarily breed. As did the war in Libya start off with calls only for a benign "no-fly zone" to protect civilians and seamlessly turned into an all-out aerial campaign to topple Muammar Gaddafi, any crossing of the military threshold with Iran would also likely result in a far bigger conflagration than the public has been prepared for by their leaders.

War with Iran would be no quick and clean affair, as many senior political and military figures have pointed out it would make the Iraq and Afghanistan wars, which cost trillions of dollars and the lives of thousands of soldiers and civilians, seem like "a cakewalk".

The fact that it is becoming increasingly likely, inevitable in the eyes of many, and that it is high on the agenda of so many leading political figures warrants exploration of what such a conflict would really entail.

Conflict on an unprecedented scale

Not a war of weeks or months, but a "generations-long war" is how no less a figure than former Mossad chief Efraim Halevy describes the consequences of open conflict with Iran. In comparison with Iraq and Afghanistan, both countries with relatively small populations which were already in a state of relative powerlessness before they were invaded, Iran commands the eighth largest active duty military in the world, as well as highly trained special forces and guerilla organisations which operate in countries throughout the region and beyond.

 Retired US General John Abizaid has previously described the Iranian military as "the most powerful in the Middle East" (exempting Israel), and its highly sophisticated and battle-hardened proxies in Lebanon and Iraq have twice succeeded in defeating far stronger and better funded Western military forces.

Any attack on Iran would assuredly lead to the activation of these proxies in neighbouring countries to attack American interests and would create a situation of **borderless war unprecedented in any past US conflicts in the Middle East**.

None of this is to suggest that the United States would not "win" a war with Iran, but given the incredibly painful costs of Iraq and Afghanistan; wars fought again weak, poorly organised enemies lacking broad influence, politicians campaigning for war with Iran are leading the American people into a battle which will be guaranteed to make the past decade of fighting look tame in comparison.

A recent study has shown that an initial US aerial assault on Iran would require hundreds of planes, ships and missiles in order to be completed; a military undertaking itself unprecedented since the first Gulf War and representative of only the first phase of what would likely be a long drawn-out war of attrition.

For a country already nursing the wounds from the casualties of far less intense conflicts and still reeling from their economic costs, the sheer battle fatigue inherent in a large-scale war with Iran would stand to greatly exacerbate these issues.

Oil shocks and the American economy

The **fragile American economic recovery would be completely upended** were Iran to target global energy supplies in the event of war, an act which would be both catastrophic and highly likely if US Iran hawks get their way. Not only does the country itself sit atop some of the largest oil and natural gas reserves on the planet, its close proximity to the shipping routes and oil resources of its neighbours means that in the event of war, its first response would likely be to choke off the global supply of crude; a tactic for which its military defences have in fact been specifically designed.

The Strait of Hormuz, located in the Persian Gulf is the shipping point for more than 20 per cent of the world's petroleum. Iran is known to have advanced Silkworm missile batteries buried at strategic points around the strait to make it impassable in the event of war, and has developed "swarming" naval tactics to neutralise larger, less mobile ships such as those used by the US Navy.

While Iran could never win in straightforward combat, it has developed tactics of asymmetrical warfare that can effectively inflict losses on a far stronger enemy and render the strait effectively closed to naval traffic.

The price of oil would immediately skyrocket, by some estimates upwards several hundred dollars a barrel, shattering the already tenuous steps the US and other Western economies are taking towards recovery. Former National Security Adviser Zbigniew Brzezinski has said a war with Iran could drag out years and would have economic consequences "devastating for the average American"; but these facts are conspicuously absent in public discussion of the war.

Every conflict has blowback, but if US politicians are attempting to maneouver the country into a conflict of such potentially devastating magnitude, potentially sacrificing ordinary Americans' economic well-being for years to come, it would behoove them to speak frankly about these costs and not attempt to obfuscate or downplay them in order to make their case.

Conflict across borders

Finally, a war with Iran would be not be like conflicts in Iraq, Afghanistan and Libya where the fighting was constrained to the borders of the country in question. Despite widespread resentment towards the country due to the perception of it as a regionally imperialist power as well sectarian animosity towards it as Shia Muslim theocracy, Iran maintains deep links throughout the Middle East and South Asia and can count on both popular support as well as assistance from its network of armed proxies in various countries.

In a report for Haaretz, Ahmed Rashid noted that an attack on Iran would likely inflame anti-American sentiment throughout the region, across both Shia and Sunni Muslim communities. Despite Iran's poor human rights record and bellicose leadership, polls have consistently shown that Iranian and Iranian-backed leaders such as Mahmoud Ahmadinejad and Hassan Nasrallah remain among the most popular figures throughout the Arab and Muslim world.

This popularity comes not necessarily out of respect for Iranian ideology, but from a perception that Iran is the only assertive power in the region and is the target of aggression from the United States and its allies.

In Rashid's analysis, **both the Middle East and South Asia** would become unsafe for American citizens and their interests for years to come; popular anger would reach a level which would render these area effectively off-limits and would cause grave and immediate danger to both American businesses and troops based in the region.

Again, this would be a situation quite different from the other wars of the past decade, fought against isolated regimes without the ability to call upon large and often well-funded numbers of regional sympathisers; a fact also rarely mentioned by war advocates.

Not a political game

Going to war with Iran would be an elective decision for the United States, but it is for too grave and consequential a choice to be left up to the whims of politicians seeking to win the approval of lobby groups and one-up each other to appeal to influential campaign donors who would like to see a war with Iran.

Make no mistake, **the possibility of war is very real** and has become eminently more so in recent months. Many of the same politicians and political advisers responsible for engineering the Iraq War have returned to public life and are at the forefront of pushing a new American conflict with Iran.

#### Nuclear war

James A. **Russell,** Senior Lecturer, National Security Affairs, Naval Postgraduate School, ‘9 (Spring) “Strategic Stability Reconsidered: Prospects for Escalation and Nuclear War in the Middle East” IFRI, Proliferation Papers, #26, http://www.ifri.org/downloads/PP26\_Russell\_2009.pdf

Strategic stability in the region is thus undermined by various factors: (1) asymmetric interests in the bargaining framework that can introduce unpredictable behavior from actors; (2) the presence of non-state actors that introduce unpredictability into relationships between the antagonists; (3) incompatible assumptions about the structure of the deterrent relationship that makes the bargaining framework strategically unstable; (4) perceptions by Israel and the United States that its window of opportunity for military action is closing, which could prompt a preventive attack; (5) the prospect that Iran’s response to pre-emptive attacks could involve unconventional weapons, which could prompt escalation by Israel and/or the United States; (6) the lack of a communications framework to build trust and cooperation among framework participants. These systemic weaknesses in the coercive bargaining framework all suggest that escalation by any the parties could happen either on purpose or as a result of miscalculation or the pressures of wartime circumstance. Given these factors, it is disturbingly easy to imagine scenarios under which a conflict could quickly escalate in which the regional antagonists would consider the use of chemical, biological, or nuclear weapons. It would be a mistake to believe the nuclear taboo can somehow magically keep nuclear weapons from being used in the context of an unstable strategic framework. Systemic asymmetries between actors in fact suggest a certain increase in the probability of war – a war in which escalation could happen quickly and from a variety of participants. Once such a war starts, events would likely develop a momentum all their own and decision-making would consequently be shaped in unpredictable ways. The international community must take this possibility seriously, and muster every tool at its disposal to prevent such an outcome, which would be an unprecedented disaster for the peoples of the region, with substantial risk for the entire world.

## 4

#### Tying research grants to production goals is antithetical to academic science

Ziman, emeritus professor of physics at the University of Bristol, 8/26/1996

(John, “Is science losing its objectivity?,” *Nature*, <http://libweb.surrey.ac.uk/library/skills/Science%20and%20Society/SS_1_Reading2.pdf>)

The peculiar feature of academic science is that it developed as an activity engaged in principally by ‘academics’, whose official employment is to teach rather than to do research. Everybody knows, of course, that university teachers usually owe their posts to their proven research competence and earn further promotion by their research achievements. Still, the convention is that this research is ‘their own work’, which they are free to carry out and benefit from as individuals.

Paradoxically, **academic research** developed as the professional occupation of people not specifically paid for doing it. It **has always relied on the willingness of** universities and **other bodies to provide resources for an activity that they do not directly profit from or control**.

The key point is that academic science relies on public and private patronage‘, in the broadest sense of that old-fashioned word. **Society gains directly from the applicable results** and from the trained scientists who come out of universities. **It also benefits indirectly from the objectivity of basic science**. **A scientist** holding a permanent post as a university teacher **is in a position to do** ‘**pure**’ **research**, **uninfluenced by commercial**, **political or other external interests**.

Forces of change

Academic science is now changing rapidly. Some changes simply reflect scientific and technological progress. As always, the dedication of science to originality is drawing it into novel modes of activity’. Individual achievement is being merged into the collective action of multi~ disciplinary teams. Communication is being speeded up electronically until it becomes instantly global. Instrumental sophistication is making it easier, but more expensive, to do good science.

**More and more forces are pressing on academic science from society at large**". In effect, the whole enterprise has now become too large and expensive to be allowed to go its own way. The governments that mainly fund academic research are putting strict financial ceilings on their patronage. The US decision to stop work on the Superconducting Super Collider was the clearest possible signal that this is a worldwide phenomenon. **In every country**, **governments are trying to get better value for their money**.

Whatever the cause, there are widespread signs of a decisive break with the academic tradition. This applies to many of the practices associated with Merton’s norms, such as conditions of employment, problem choice, criteria of success and other important features. Transition to a ‘steady state’ regime is imposing on academic science several requirements incompatible with its traditional ethos. Academic science is undergoing a cultural revolution. It is giving way to ‘post-academic’ science, which **may be so different sociologically and philosophically that it will produce a different type of knowledge**.

This metamorphosis is still going on. A group of experts qn science policy has recently suggested” that the academic mode of knowledge production-—what they call ‘mode 1’ is being systematically replaced by ‘mode 2’, a very different

activity. If they are right, what would postacademic science be like?

Privatizing knowledge

The operating philosophy of research will surely stay unchanged. Scientists will go on theorizing and testing their theories by observation and experiment. Indeed, the norm of cornmunalism underlying this attitude will be reinforced by the increasing speed, size and complexity of electronic communication. Novel observations and theories can be discussed in detail with distant colleagues or even sceptical rivals. National frontiers become irrelevant. Researchers in industrial companies, government laboratories, charitable foundations and universities can work together in the same team. Even the tribal boundaries between disciplines can be disregarded.

But **the pressure to open up the interface between academic institutions and industry has an important philosophical effect**. Research results that an academic scientist would have published immediately are being identified as ‘intellectual property’, which may be kept secret for commercial reasons. In other words, postacademic science may no longer be so committed to the principle of ‘public knowledge’ - traditionally **the linchpin of academic science**7.

#### Only voting neg maintains the distinction between pure and applied science – we must strive for the ideals of science even if they cannot be fully achieved

Ziman, emeritus professor of physics at the University of Bristol, 8/26/1996

(John, “Is science losing its objectivity?,” *Nature*, <http://libweb.surrey.ac.uk/library/skills/Science%20and%20Society/SS_1_Reading2.pdf>)

Again, post-academic science will distrust the élitism of peer review and replace or bolster it with quality control of people, projects and performance. But this usually entails a much broader notion of ‘excellence’ than the traditional academic criteria for ‘good science’. So greater importance may be attached to entrepreneurial and managerial skills, such as the ability to oversee the larger cycles of action in the research system.

The trouble is that the **test of practical utility** does not operate in basic research, where organized skepticism is the only real protection against persistent error. **The gravest threat to the reliability of scientific knowledge could be obsessive monitoring of the accountability and performance of researchers at the expense of systematic intellectual criticism of their claims**. In any case, considerable intellectual uncertainty is inevitable in areas where postacademic science becomes entangled with ‘trans-epistemic’ issues, such as questions over

bovine spongiform encephalopathy where ‘nonscientific’ social,environmental and humanistic values are involved.

Who pays the pipers?

Mode 2 researchers, we are told, work in shifting teams, like small companies producing goods for a competitive market. Jobs are never secure. As teams reorganize to tackle new problems, some researchers have to move elsewhere to make room for new people with new skills. As a result, **few individuals have stable opportunities to establish or exercise their expertise**. The contrast tenured posts in academic institutions could not be greater.

But it is unrealistic to suppose that today’s system of multifunctional universities will give way to a genuine market system sustaining many small, commercially independent research enterprises. Researchers will mostly remain full-time employees of universities, government laboratories, charitable foundations or industrial companies. If not, they simply won’t be able to invest in the facilities they need.

Although post-academic science may look attractively unbureaucratic, it will really be heavily capital-intensive. **It will continue to be funded and managed by a complex of governmental bodies**, large public institutions and private corporations. The same questions will still be

asked: **who will pay the pipers and what tunes should they be called on to play?**

Industrial concerns

It seems to me, in fact, that many of the suggested differences between mode 1 and 2 are not changes from an old to a new mode of knowledge production. They typify the long-established distinction between ‘**pure**’ and ‘**applied**’ research, a distinction institutionalized nearly a century ago. There has always been a cultural gap between ‘academic’ science in universities and ‘industrial’ science in industrial laboratories? In reality, the former was never totally pure, nor the latter entirely utilitarian, but they were organized differently.

Mode 2 actually reads like a ‘post-industrial’ version of applied science. Industrial laboratories, like industrial companies, used to be large, monolithic organizations run from the top by a hierarchy of managers. In the post-industrial era (so many economists and business experts tell us) market competition will replace command management. Even in large multinational corporations, global networks, profit centres and independent contractors will replace management charts, directorates and service departments. Naturally enough, technological research and development in the private sector is being reorganized along similar lines. Yet it is still directed towards the same objectives - primarily, financial profit and is subject to the same socioeconomic imperatives.

What might really be happening is that the evolution of industrial science into post-industrial science is closing the gap between pure and applied research. Several factors are working towards a single post-academic culture. Scientific developments are blurring the distinction between fundamental and exploitable discoveries. Technological developments are generating heterogeneous hybrid teams that override institutional loyalties. Economic conditions are forcing the two cultures into the same organizational mould.

Indeed, **a deliberate effort at a high level of political and managerial authority would probably now be required to keep the two systems from coalescing in style and function**. **But such a merger not only raises many practical issues of funding**, **disciplinary identity**, **criteria of excellence**, career aspirations, intellectual property rights, **institutional management and so on**. It also brings face to face two very different sets of structural principles. In this confrontation, mode 2 seems already to be ousting mode 1. The academic ethos may well survive as an attractive but somewhat dated ideology; but the effective culture of postacademic science may well be predominantly post-industrial.

Who’s afraid of postmodernism? The philosophical background to science is often simply taken for granted. I have tried to show that it is closely connected with the way in which research is organized and carried out. **Changes in the social framework of science eventually lead to changes in its philosophical principles**. Indeed, a cultural theorist might argue that the transition to post-academic science, organized along post-industrial lines, is necessarily reflected in a transition from a ‘modem’ to a more ‘postmodern’ philosophical stance”.

I do not accept this necessity. I am not suggesting that science is abandoning all its norms and principles and ‘going postmodern’ in some fashionable pseudo— intellectual sense. It is nonsense, for example, to say that today ‘anything goes’. Most of the likely changes are mild, even benign. Some are much-needed corrections to the excesses of ‘scientism’. Others are welcome antidotes to the extreme rationalism that has long plagued the philosophy of science. It must be a good thing to help rescue the scientific imagination from entrenched specialization. And localized pragmatism will largely compensate for the fragmentation of theoretical standards of scientific validity. Some of these changes may be philosophical dynamite, but they scarcely affect work at the coalface of research, and I doubt whether scientists or their leaders will even notice them.

lncorpurating interests

**But there is a serious threat to one fundamental feature of academic science**~—**its objectivity**. Objectivity can never be absolute. Philosophers and sociologists agree that the notion of a truly objective disinterested ‘seeker after truth’ is incompatible with the realities of social existence. We all have personal interests and institutional values that we are bound to promote in our scientific work, however hard we try to suppress them. **The virtue of academic science was that it took a strong line in support of the norm of** ‘**disinterestedness**’ **and often managed in practice almost to live up to its ideals**.

#### Human survival and the value to life require embracing the scientific method

Asimov, Crick, et al, most qualified card in the debate, 1973

(“Humanist Manifesto II,” signatories: Lionel Able, Prof. of English, State Univ. of New York at Buffalo; Khoren Arisian, Board of Leaders, NY Soc. for Ethical Culture; Isaac Asimov, author; George Axtelle, Prof. Emeritus, Southern Illinois Univ.; Archie J. Bahm, Prof. of Philosophy Emeritus, Univ. of N.M.; Pual H. Beattie, Pres., Fellowship of Religious Humanists; Keith Beggs, Exec. Dir., American Humanist Association; Malcolm Bissell, Prof. Emeritus, Univ. of Southern California; H. J. Blackham, Chm., Social Morality Council, Great Britain; Brand Blanshard, Prof. Emeritus, Yale University; Paul Blanshard, author; Joseph L. Blau, Prof. of Religion, Columbia University; Sir Hermann Bondi, Prof. of Math., King's Coll., Univ. of London; Howard Box, Leader, Brooklyn Society for Ethical Culture; Raymond B. Bragg, Minister Emer., Unitarian Ch., Kansas City; Theodore Brameld, Visiting Prof., C.U.N.Y.; Brigid Brophy, author, Great Britain; Lester R. 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Secy., British Humanist Association; Erwin Gaede, Minister, Unitarian Church, Ann Arbor, Mich.; Richard S. Gilbert, Minister, First Unitarian Ch., Rochester, N.Y.; Charles Wesley Grady, Minister, Unit. Univ. Ch., Arlington, Ma.; Maxine Greene, Prof., Teachers College, Columbia University; Thomas C. Greening, Editor, Journal of Humanistic Psychology; Alan F. Guttmacher, Pres., Planned Parenthood Fed. of America; J. Harold Hadley, Min., Unit. Univ. Ch., Pt. Washington, N.Y.; Hector Hawton, Editor, Questions, Great Britain; Eustace Haydon, Prof. Emeritus of History of Religions; James Hemming, Psychologist, Great Britain; Palmer A. Hilty, Adm. Secy., Fellowship of Religious Humanists; Hudson Hoagland, Pres. Emeritus, Worcester Fdn. for Exper. Bio; Robert S. Hoagland, Editor, Religious Humanism; Sidney Hook, Prof. Emeritus of Philosophy, New York University; James F. Hornback, Leader, Ethical Society of St Louis; James M Hutchinson, Minister Emer., First Unit. Ch., Cincinnati; Mordecai M. Kaplan, Rabbi, Fndr. of Jewish Reconstr. Movement; John C. Kidneigh, Prof. of Social Work., Univ. of Minnesota; Lester A. Kirdendall, Prof. Emeritus, Oregon State Univ.; Margaret Knight, Univ. of Aberdeen, Scotland; Jean Kotkin, Exec. Secy., American Ethical Union; Richard Kostelanetz, poet; Paul Kurtz, Editor, The Humanist; Lawrence Lader, Chm., Natl. Assn. for Repeal of Abortion Laws; Edward Lamb, Pres., Lamb Communications, Inc.; Corliss Lamont, Chm., Natl. Emergency Civil Liberties Comm.; Chauncey D. Leake, Prof., Univ. of California, San Francisco; Alfred McC. Lee, Prof. Emeritus, Soc.-Anthropology, C.U.N.Y.; Elizabeth Briant Lee, author; Christopher Macy, Dir., Rationalist Press Assn., Great Britain; Clorinda Margolis, Jefferson Comm. Mental Health Cen., Phila.; Joseph Margolis, Prof. of Philosophy, Temple Univ.; Harold P. Marley, Ret. Unitarian Minister; Floyd W. 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Reiser, Prof. Emeritus, Univ. of Pittsburgh; Robert G. Risk, Pres., Leadville Corp.; Lord Ritchie-Calder, formerly Univ. of Edinburgh, Scotland; B. T. Rocca, Jr., Consultant, Intl. Trade and Commodities; Andre H. Sakharov, Academy of Sciences, Moscow, U.S.S.R.; Sidney H. Scheuer, Chm., Natl, Comm. for an Effective Congress; Herbert W. Schneider, Prof. Emeritus, Claremont Grad. School; Clinton Lee Scott, Universalist Minister, St Petersburgh, Fla.; Roy Wood Sellars, Prof. Emeritus, Univ. of Michigan; A. B. Shah, Pres., Indian Secular Society; B. F. Skinner, Prof. of Psychology, Harvard Univ.; Kenneth J. Smith, Leader, Philadelphia Ethical Society; Matthew Ies Spetter, Chm., Dept. Ethics, Ethical Culture Schools; Mark Starr, Chm., Esperanto Info. Center; Svetozar Stojanovic, Prof. Philosophy, Univ. Belgrade, Yugoslavia; Harold Taylor, Project Director, World University Student Project; V. T. Thayer, author; Herbert A. Tonne, Ed. Board, Journal of Business Education; Jack Tourin, Pres., American Ethical Union; E. C. Vanderlaan, lecturer; J. P. van Praag, Chm., Intl. Humanist and Ethical Union, Utrecht; Maurice B. Visscher, M.D., Prof. Emeritus, Univ. of Minnesota; Goodwin Watson, Assn. Coordinator, Union Graduate School; Gerald Wendt, author; Henry N. Wieman, Prof. Emeritus, Univ. of Chicago; Sherwin Wine, Rabbi, Soc. for Humanistic Judaism; Edwin H. Wilson, Ex. Dir. Emeritus, American Humanist Assn.; Bertram D. Wolfe, Hoover Institution; Alexander S. Yesenin-Volpin, mathematician; Marvin Zimmerman, Prof. of Philosophy, State Univ. NY at Bflo.; http://www.americanhumanist.org/Humanism/Humanist\_Manifesto\_II)

The next century can be and should be the humanistic century. Dramatic scientific, technological, and ever-accelerating social and political changes crowd our awareness. We have virtually conquered the planet, explored the moon, overcome the natural limits of travel and communication; we stand at the dawn of a new age, ready to move farther into space and perhaps inhabit other planets. Using technology wisely, we can control our environment, conquer poverty, markedly reduce disease, extend our life-span, significantly modify our behavior, alter the course of human evolution and cultural development, unlock vast new powers, and provide humankind with **unparalleled opportunity for achieving an abundant and meaningful life**.

The future is, however, filled with dangers. In learning to apply the scientific method to nature and human life, we have opened the door to **ecological damage**, **over-population**, **dehumanizing institutions**, **totalitarian repression**, **and nuclear and bio-chemical disaster**. Faced with apocalyptic prophesies and doomsday scenarios, many flee in despair from reason and embrace irrational cults and theologies of withdrawal and retreat.

Traditional moral codes and newer irrational cults both fail to meet the pressing needs of today and tomorrow. False "theologies of hope" and messianic ideologies, substituting new dogmas for old, cannot cope with existing world realities. They separate rather than unite peoples.

**Humanity**, **to survive**, **requires bold and daring measures**. **We need to extend the uses of scientific method**, **not renounce them**, to fuse reason with compassion in order to build constructive social and moral values. Confronted by many possible futures, we must decide which to pursue. The ultimate goal should be the fulfillment of the potential for growth in each human personality - not for the favored few, but for all of humankind. Only a shared world and global measures will suffice.

A humanist outlook will tap the creativity of each human being and provide the vision and courage for us to work together. This outlook emphasizes the role human beings can play in their own spheres of action. The decades ahead call for dedicated, **clear-minded men and women** able to marshal the will, intelligence, and cooperative skills for shaping a desirable future. Humanism can provide the purpose and inspiration that so many seek; **it can give personal meaning and significance to human life**.

## 5

#### The 50 United States should substantially increase funding for fusion energy generation at the National Ignition Facility.

States solve

Milford, 12

(Sr. Fellow-Brookings & President-Clean Energy Group, “Leveraging State Clean Energy Funds for Economic Development,”

http://www.brookings.edu/~/media/research/files/papers/2012/1/11%20states%20energy%20funds/0111\_states\_energy\_funds)

Washington is again paralyzed and pulling back on clean energy economic development. New funding solutions seem unlikely and existing financial supports appear tenuous, given that many of the federal tax incentives, subsidies, and loan guarantees made available through the 2009 stimulus law and elsewhere are set to expire. All of which raises a daunting question: If the country is to take advantage of the economic, environmental, and health benefits of clean energy, how will its development be financed, its emerging companies be supported, and its markets be structured—and who is in the best position to decide and act? And yet, there is actually a promising partial answer to that question. With federal clean energy activities largely on hold, U.S. states hold out **tremendous promise** for the continued design and implementation of clean energy solutions and economic development. State governments led the nation’s initial responses to the challenge of energy system transformation a decade ago and since then have developed a **broad array** of cleantech development tools, ranging from financial support tools and net metering to incubators, cluster supports, and workforce training. Among the states’ initiatives, meanwhile, the nearly two dozen state-side clean energy funds (**CEFs) stand as one of the most important clean energy forces** at work in the nation—yet they remain little-known. To date, over 20 states have created a varied array of these public investment vehicles to invest in clean energy pursuits with revenues often derived from small public-benefit surcharges on electric utility bills. Over the last decade, state CEFs have invested over $2.7 billion in state dollars to support renewable energy (RE) markets while leveraging another $9.7 billion in additional federal and private sector investment, with the resulting $12 billion flowing to the deployment of over 72,000 projects in the United States ranging from solar installations on homes and businesses to wind turbines in communities to large wind farms, hydrokinetic projects in rivers, and biomass generation plants on farms. State CEFs have played an equally important role in expanding opportunities in energy efficiency (EE). Ratepayer-funded energy efficiency spending has grown from $1.7 billion in 2004 to $4.4 billion in 2009 with approximately 55 percent (or $2.4 billion) of program budgets devoted to incentives for utility customers and the rest going towards program design and implementation, and evaluation, measurement, and verification. In terms of their focus, CEFs have tended to engage primarily on individual project financing and deployment through the use of rebates, grants and performance-based incentives that have directly subsidized the installation of clean energy technologies (Table 1). In addition, many state programs have also leveraged their CEFs for project financing and deployment through the use of leasing programs, project equity investments, revolving loans, on-bill financing programs, and credit enhancement tools such as loan loss reserves, interest-rate buy-downs, and loan and performance guarantees. In short, for most of the last decade, state clean energy funds have served the nation and its regional and state economies as a **critical and innovative source of much-needed public capital supporting the installation of clean energy technologies** in American regions.

## 6

#### The United States federal government should substantially increase funding for fusion energy research at the National Ignition Facitily.

#### The plan is government research and development – the CP is just research

National Science Foundation No Date

("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**.

#### Separating research from explicit production goals is key – the plan interferes with private investment by picking winners

Loris, Herbert and Joyce Morgan Fellow in the Thomas A. Roe Institute for Economic Policy Studies at The Heritage Foundation, 3/23/2012

(Nicolas, “Department of Energy Budget Cuts: Time to End the Hidden Green Stimulus,” http://www.heritage.org/research/reports/2012/03/department-of-energy-budget-cuts-time-to-end-the-hidden-green-stimulus)

The Department of Energy bases its mission on five core strategic themes: (1) energy security, (2) nuclear security, (3) scientific discovery and innovation, (4) environmental responsibility, and (5) management excellence. **This paper focuses on cuts that should be made to** applied research, **commercialization**, **technology deployment**, and basic research programs, with consequent reductions in overall DOE personnel. More specifically, **programmatic cuts focus on spending on energy** and related issues **rather than cuts to** Environmental Management or National Nuclear Security Administration (**NNSA**) **programs**.

Energy Security. President Obama’s FY 2013 budget discusses the importance of reducing America’s dependence on foreign oil and investing in clean energy and nonpetroleum fuels that will reduce America’s reliance on oil from terror-supporting countries. Typically, the ideas for improving energy security are either protectionist or attempt to deploy uncompetitive technologies. Improving energy security should not be an excuse for the DOE to invest in commercialization projects (biofuels, for instance) for which the private sector is much better equipped to determine whether they can compete in the market. The federal government’s role in improving energy security is to open access to America’s own energy supply, but that role falls under the purview of the Department of the Interior, not the Department of Energy.

Nuclear Security. A large part of **the** **D**epartment **o**f **E**nergy’s **nuclear security mission is nuclear deterrence** and keeping nuclear materials secure. Many of these national security needs fall under the purview of the NNSA. While reforms to NNSA may well be appropriate, traditional national security questions are beyond the scope of this paper.

Scientific Discovery and Innovation. Some argue that the DOE has a role to play in basic research—investing in ideas that can provide benefits but are too financially risky for the private sector to undertake. But an endeavor being too financially risky for a company to undertake does not mean it becomes something for which the government should pay. **It could be argued that government can have a role in basic research that ultimately may have commercial value**—**but that should not be the purpose of the research**. Government research programs should advance specific critical national interests that are not being met by the private sector. Defense programs often fall into this category. The DOE’s basic energy research for developing new commercial energy technologies application is not in this category.

This does not mean that no research should be conducted by the Department of Energy, but it is strongly questionable whether the government is best suited to oversee that research. **Energy production is a viable commercial enterprise**, so the U.S. does not need a government agency dedicated to advancing this activity. Nevertheless, the Department of Energy **has expanded its role beyond basic research to technology development**, **demonstration**, **and commercial application**, **which interferes with the marketplace**. At these stages of development, profits and losses are a better indicator of whether a project or an idea should move forward than continued use of taxpayer money to force products into the marketplace, or to offset investment that the private sector would have made without the government subsidy. Congress should make immediate cuts to the programs that fall under scientific discovery, innovation, and applied-research categories. Congress should then phase out federal funding for basic research.

## debris

#### Laser fusion will fail

Paine 10

Christopher Paine, Director

NRDC Nuclear Program

December 16, 2010

http://docs.nrdc.org/nuclear/files/nuc\_11010601b.pdf

None of the potentially crippling scientific uncertainties mentioned in Dr. Bodner’s report are new, and none were definitively resolved during the brief NIF development effort from 1993 until 1997, when a weakly supported (and highly politicized) DOE decision was taken in haste to construct the facility—at the time the Clinton Administration was anxious to placate the nuclear weapons design establishment in order to ratify the Comprehensive Test Ban Treaty (CTBT). In the event, the leaders of the DOE weapons labs damned the CTBT with faint praise, testifying that NIF and the other costly new “stockpile stewardship” tools could not ensure indefinitely their ability to certify the safety and reliability of the nuclear weapons stockpile The story of Inertial Confinement Fusion (ICF) research at the nation’s nuclear weapons laboratories stretches back to the early 1970’s. Livermore physicist John Nuckolls (who later became LLNL Director in the late 1980’s) first predicted fusion ignition in 1972 with just one kilojoule (kJ) of energy, sparking construction of what were then considered big lasers at both laboratories. When this prediction failed, the DOE weapons labs successively predicted ignition at 5 kJ, 10kJ, 100kJ, 200kJ, and finally 1.8 megajoules (MJ). They built a succession of lasers – Argus, Shiva, Nova, and the NIF Beamlet at Livermore, and Gemini, Helios, Antares, and Aurora at Los Alamos – with each machine’s failure to perform as predicted justifying the construction of the next (more powerful) machine.

Livermore concentrated on the development of shorter wavelength glass lasers, while Los Alamos focused initially on longer wavelength CO2 lasers. However, when the advantage of short–wavelength lasers in coupling laser energy to the target was established in the early 1980’s by scientists at the Ecole-Polytechnique in France, Livermore, and other laboratories, Los Alamos panicked and abruptly changed course, secretly siphoning funds from the large “multiline” Antares project in an ultimately abortive attempt to develop a short-wavelength krypton-fluoride (KrF) "target shooter" (Aurora) that could compete with Livermore's glass laser technology.

Livermore's reputed success with the Nova Laser, as well as the disarray in the LANL ICF program, influenced the critical 1990 NAS Review that led directly to NIF. Nova, which went into operation in 1984, was originally planned as a 20 beam, 200 kJ laser that Nuckolls had calculated could create the conditions for ignition. Both the short wavelength Nova and LANL's longer-wavelength multi-line Antares carbon-dioxide laser were sold to Congress as fusion “ignition” lasers. After Nuckolls detected an error in his calculations, an October 1979 review chaired by John Foster of TRW confirmed that there was no way Nova would reach ignition. A "deal" was worked out in which Livermore received the full funding -- $186 million -- that had been requested for the original 20-beam facility, but agreed to scale it back to a "scienceoriented" 10-beam facility operating with frequency tripled (blue) light.

Livermore also agreed to drop its claim that Nova could ignite a target; a task that the lab was soon projecting would be within range of the next big machine – “Nova Upgrade” – which soon morphed into NIF. After Nova construction was under way, Livermore backpedaled to 50-70 kJ of laser light at the third harmonic, while LANL promised 100 kJ with multiline Antares. In actual routine operation, however, even after extensive and expensive upgrades, Nova remained in the range of 20 -- 30 kilojoules, constrained by optical coating damage and nonlinear optical effects that were never overcome. This may be contrasted with the 1.8 megajoule design requirement for NIF, not yet achieved in the ultraviolet spectrum used for ignition experiments, which represents a huge 60-fold leap from Nova's beam energy after conversion to the shorter wavelength UV light. Then as now, the only empirical confirmation that fusion via indirect drive might be feasible at laboratory scale came in the 1980’s, from a secret DOE weapons lab ICF project called Halite- Centurion, which used the x-rays from underground nuclear test explosions to implode fusion capsules that were small in relation to nuclear weapons, but still quite large in comparison to what might be practically pursued in a fully-contained laboratory setting. It can be deduced from the fragmentary information in the public domain about these experiments that targets designed to absorb less than about 20 MJ in the underground tests failed to achieve “ignition,” (i.e. an energy gain of at least one), and that the coupling efficiency of the incident x-ray energy to the target was perhaps on the order of 20-25%, indicating a “driver” pulse as large as 100 MJ might be needed.

#### NIF not cut now—that’s the key to spin-offs—their Barty card.

#### Spinoffs inevitable

David Malakoff, Science Magazine, 3/21/12, Proposed U.S. Fusion Cuts Ignite Debate, news.sciencemag.org/scienceinsider/2012/03/proposed-us-fusion-cuts-ignite.html

Members of the panel repeatedly asked Brinkman about the implications of a plan, outlined in the Obama Administration's 2013 budget request released in February, to trim DOE's fusion energy sciences budget by 0.8%, to $398 million. At the same time, the budget would increase the U.S. contribution to ITER, a $23 billion fusion reactor being built in Cadarache, France, to $150 million, up from $105 million this year. To help pay for the ITER increase, DOE is proposing to shut down a fusion experiment known as the Alcator C-Mod at the Massachusetts Institute of Technology (MIT) in Cambridge. Cutting C-Mod, which is one of three major fusion devices in the United States, would save $18 million in the next fiscal year, which begins in October.

That plan, Brinkman told committee members, partly reflected an effort to avoid duplication, since C-Mod does research that could also be done elsewhere in the United States and abroad. "I don't want to belittle the MIT work, [they have] done some very fine work," he said. But the other two U.S. fusion projects—particularly the DIII-D tokamak operated by General Atomics in San Diego, California—are now more scientifically productive, he said.

#### No space col

Launius 10 – (2010, Roger, PhD, Curator, Planetary Exploration Programs, National Air and Space Museum, expert on Aerospace history, fellow and board member of the American Astronautical Society, “Can we colonize the solar system? Human biology and survival in the extreme space environment,” Endeavour Volume 34, Issue 3, September 2010, Pages 122-129, science direct, )

Although microbial life might survive the extreme conditions of space, for Homo sapien sapiens the space environment remains remarkably dangerous to life. One space life scientist, Vadim Rygalov, remarked that ensuring human life during spaceflight was largely about providing the basics of human physiological needs. From the most critical – meaning that its absence would cause immediate death, to the least critical – these include such constants available here on Earth of atmospheric pressure, breathable oxygen, temperature, drinking water, food, gravitational pull on physical systems, radiation mitigation, and others of a less immediate nature. As technologies, and knowledge about them, stand at this time, humans are able to venture into space for short periods of less than a year only by supplying all of these needs either by taking everything with them (oxygen, food, air, etc.) or creating them artificially (pressurized vehicles, centrifugal force to substitute for gravity, etc.).10 Spaceflight would be much easier if humans could go into hibernation during the extremes of spaceflight, as did the Streptococcus mitis bacteria. Resolving these issues has proven difficult but not insurmountable for such basic spaceflight activities as those undertaken during the heroic age of space exploration when the United States and the Soviet Union raced to the Moon. Overcoming the technological hurdles encountered during the Mercury, Gemini, and Apollo programs were child's play in comparison to the threat to human life posed by long duration, deep space missions to such places as Mars. Even the most sophisticated of those, the lunar landings of Project Apollo, were relatively short camping trips on an exceptionally close body in the solar system, and like many camping trips undertaken by Americans the astronauts took with them everything they would need to use while there. This approach will continue to work well until the destination is so far away that resupply from Earth becomes highly problematic if not impossible if the length of time to be gone is so great that resupply proves infeasible. There is no question that the U.S. could return to the Moon in a more dynamic and robust version of Apollo; it could also build a research station there and resupply it from Earth while rotating crews and resupplying from Earth on a regular basis. In this instance, the lunar research station might look something like a more sophisticated and difficult to support version of the Antarctic research stations. A difficult challenge, yes; but certainly it is something that could be accomplished with presently envisioned technologies.11 The real difficulty is that at the point a lunar research station becomes a colony profound changes to the manner in which humans interact with the environment beyond Earth must take place. Countermeasures for core challenges – gravity, radiation, particulates, and ancillary effects – provide serious challenges for humans engaged in space colonization (Figure 4).

**No environment impact**

Easterbrook 3(Gregg, senior fellow at the New Republic, “We're All Gonna Die!”, <http://www.wired.com/wired/archive/11.07/doomsday.html?pg=1&topic=&topic_set>=)

If we're talking about doomsday - the end of human civilization - many scenarios simply don't measure up. A single nuclear bomb ignited by terrorists, for example, would be awful beyond words, but life would go on. People and machines might converge in ways that you and I would find ghastly, but from the standpoint of the future, they would probably represent an adaptation. Environmental collapse might make parts of the globe unpleasant, but considering that the biosphere has survived ice ages, it wouldn't be the final curtain. Depression, which has become 10 times more prevalent in Western nations in the postwar era, might grow so widespread that vast numbers of people would refuse to get out of bed, a possibility that Petranek suggested in a doomsday talk at the Technology Entertainment Design conference in 2002. But Marcel Proust, as miserable as he was, wrote *Remembrance of Things Past* while lying in bed.

**No accidental launch**

**Williscroft 10** (Six patrols on the *John Marshall* as a Sonar Technician, and four on the *Von Steuben* as an officer – a total of twenty-two submerged months. Navigator and Ops Officer on *Ortolan* & *Pigeon* – Submarine Rescue & Saturation Diving ships. Watch and Diving Officer on *Oceanographer* and *Surveyor*. “Accidental Nuclear War” http://www.argee.net/Thrawn%20Rickle/Thrawn%20Rickle%2032.htm)

Is there a realistic chance that we could have a nuclear war by accident? Could a ballistic submarine commander launch his missiles without specific presidential authorization? Could a few men conspire and successfully bypass built-in safety systems to launch nuclear weapons? The key word here is “realistic.” In the strictest sense, yes, these things are possible. But are they realistically possible? This question can best be answered by examining two interrelated questions. Is there a way to launch a nuclear weapon by accident? Can a specific accidental series of events take place—no matter how remote—that will result in the inevitable launch or detonation of a nuclear weapon? Can one individual working by himself or several individuals working in collusion bring about the deliberate launch or detonation of a nuclear weapon? We are protected from accidental launching of nuclear weapons by mechanical safeguards, and by carefully structured and controlled mandatory procedures that are always employed when working around nuclear weapons. Launching a nuclear weapon takes the specific simultaneous action of several designated individuals. System designers ensured that conditions necessary for a launch could not happen accidentally. For example, to launch a missile from a ballistic missile submarine, two individuals must insert keys into separate slots on separate decks within a few seconds of each other. Barring this, the system cannot physically launch a missile. There are additional safeguards built into the system that control computer hardware and software, and personnel controls that we will discuss later, but—in the final analysis—without the keys inserted as described, there can be no launch—it’s not physically possible. Because the time window for key insertion is less than that required for one individual to accomplish, it is physically impossible for a missile to be launched accidentally by one individual. Any launch must be deliberate. One can postulate a scenario wherein a technician bypasses these safeguards in order to effect a launch by himself. Technically, this is possible, but such a launch would be deliberate, not accidental. We will examine measures designed to prevent this in a later column. Maintenance procedures on nuclear weapons are very tightly controlled. In effect always is the “two-man rule.” This rule prohibits any individual from accessing nuclear weapons or their launch vehicles alone. Aside from obvious qualification requirements, two individuals must be present. No matter how familiar the two technicians may be with a specific system, each step in a maintenance procedure is first read by one technician, repeated by the second, acknowledged by the first (or corrected, if necessary), performed by the second, examined by the first, checked off by the first, and acknowledged by the second. This makes maintenance slow, but absolutely assures that no errors happen. Exactly the same procedure is followed every time an access cover is removed, a screw is turned, a weapon is moved, or a controlling publication is updated. Nothing, absolutely nothing is done without following the written guides exactly, always under two-man control. This even applies to guards. Where nuclear weapons are concerned, a minimum of two guards—always fully in sight of each other—stand duty. There is no realistic scenario wherein a nuclear missile can be accidentally launched...ever...under any circumstances...period!

#### No food scarcity

**Jalsevac 4** (Paul, Life site news a division of Interim Publishing, “The Inherent Racism of Population Control”, <http://www.lifesite.net/waronfamily/Population_Control/Inherentracism.pdf>)

The pattern continues today. Economist Dennis Avery explained in 1995 that, food production was more than keeping pace with population growth since the world had, “more than doubled world food output in the past 30 years. We have raised food supplies per person by 25 percent in the populous Third World.”4 The United Nations Food and Agriculture Organization (UNFAO) also dispelled fears of shortages in the food supply when, in preparation for the World Food Summit in Rome in November of 1995 it reported that, “Globally food supplies have more than doubled in the last 40 years…at a global level, there is probably no obstacle to food production rising to meet demand.”5 The UNFAO also later estimated that, simply with the present available technologies fully employed, the world could feed 30 to 35 billion people, i.e. roughly six times the present world population.6 It also reported that the number of people considered malnourished has declined from 36 percent in 1961-1970 to 20 percent in 1988-90 and later proclaimed that “earlier fears of chronic food shortages over much of the world proved unfounded.”7 The World Bank joined in to predict in 1993 that the improvement in the world food supply would continue, while pointing out that in developing countries grain production has grown at a faster rate than population since 1985. Grain production has slowed in the United States, but that is because stocks have grown so large that additional production could not be stored.8 A further wealth of evidence is available to remove any concerns about resource shortage in the modern world.

#### No meltdowns

Rod **Adams 12**, Former submarine Engineer Officer, Founder, Adams Atomic Engines, Inc., “Has Apocalyptic Portrayal of Climate Change Risk Backfired?”, May 2, <http://atomicinsights.com/2012/05/has-apocalyptic-portrayal-of-climate-change-risk-backfired.html?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+AtomicInsights+%28Atomic+Insights%29>

Not only was the discussion enlightening about the reasons why different people end up with different opinions about climate change responses when presented with essentially the same body of information, but it also got me thinking about a possible way to fight back against the Gundersens, Caldicotts, Riccios, Grossmans and Wassermans of the world. That group of five tend to use apocalyptic rhetoric to describe what will happen to the world if we do not immediately start turning our collective backs on all of the benefits that abundant atomic energy can provide. They spin tall tales of deformed children, massive numbers of cancers as a result of minor radioactive material releases, swaths of land made “uninhabitable” for thousands of years, countries “cut in half”, and clouds of “hot particles” raining death and destruction ten thousand miles from the release point. Every one of those clowns have been repeating similar stories for at least two solid decades, and continue to repeat their stories even after supposedly catastrophic failures at Fukushima have not resulted in a single radiation related injury or death. According to eminent scientists – like Dr. Robert Gale – Fukushima is unlikely to EVER result in any measurable increase in radiation related illness. One important element that we have to consider to assess cancer risks associated with an accident like Fukushima is our baseline risk for developing cancer. All of us, unfortunately, have a substantial risk of developing cancer in our lifetime. For example, a 50-year-old male has a 42% risk of developing cancer during his remaining life; it’s almost the same for a 10-year-old. This risk only decreases when we get much older and only because we are dying of other causes. It’s true that excess radiation exposure can increase our cancer risk above baseline levels; it’s clear from studies of the survivors of the 1945 atomic bombings of Hiroshima and Nagasaki, of people exposed to radiation in medical and occupational settings, and of people exposed to radon decay products in mines and home basements. When it comes to exposures like that of Fukushima, the question is: What is the relative magnitude of the increased risk from Fukushima compared to our baseline cancer risk? Despite our fears, it is quite small. If the nuclear industry – as small and unfocused as it is – really wanted to take action to isolate the apocalyptic antinuclear activists, it could take a page from the effective campaign of the fossil fuel lobby. It could start an integrated campaign to help the rest of us to remember that, despite the dire predictions, the sky never fell, the predicted unnatural deaths never occurred, the deformations were figments of imagination, and the land is not really irreversibly uninhabitable for generations. The industry would effectively share the story of Ukraine’s recent decision to begin repopulating the vast majority of the “dead zone” that was forcibly evacuated after the Chernobyl accident. It would put some context into the discussion about radiation health effects; even if leaders shy away from directly challenging the Linear No Threshold (LNT) dose assumption, they can still show that even that pessimistic model says that a tiny dose leads to a tiny risk. Aside: My personal opinion is that the LNT is scientifically unsupportable and should be replaced with a much better model. We deserve far less onerous regulations; there is evidence that existing regulations actually cause harm. I hear a rumor that there is a group of mostly retired, but solidly credentialed professionals who are organizing a special session at the annual ANS meeting to talk about effective ways to influence policy changes. End Aside. Most of us recognize that there is no such thing as a zero risk; repeated assertions of “there is no safe level” should be addressed by accepting “close enough” to zero so that even the most fearful person can stop worrying. The sky has not fallen, even though we have experienced complete core meltdowns and secondary explosions that did some visible damage. Nuclear plants are not perfect, there will be accidents and there will be radioactive material releases. History is telling me that the risks are acceptable, especially in the context of the real world where there is always some potential for harm. The benefits of accepting a little nuclear risk are immense and must not be marginalized by the people who market fear and trembling.

Weaponization not inevitable.

Krepon et al ‘11

(Michael, President of the Henry L. Stimson Center, also Theresa Hitchens, Director of the United Nations Institute for Disarmament Research and Michael Katz-Hyman, Research Associate at the Henry L. Stimson Center on the Space Security and South Asia Projects, Toward a Theory of Space Power: Selected Essays, February, http://www.ndu.edu/press/lib/pdf/spacepower/spacepower.pdf)

These dilemmas are widely, but not universally, recognized. Together with the widespread public antipathy to elevating humankind's worst practices into space, they help explain why the flight-testing and deployment of dedicated space weapons have not become commonplace. These capabilities are certainly not difficult to acquire, as they are decades old. Indeed, tests of dedicated ASAT weapons have periodically occurred, and such systems were deployed for short periods during the Cold War. If the weaponization of space were inevitable, it surely would have occurred when the United States and the Soviet Union went to extraordinary lengths to compete in so many other realms. The weaponization of space has not occurred to date and is not inevitable in the future **because of strong public resistence to the idea of weapons in space**, and because most national leaders have long recognized that this would open a Pandora's box that would be difficult to close.

US is specifically pursuing peaceful uses of space now—creates international consensus for a space code of conduct.

Huntley ‘11

(Wade, senior lecturer in the National Security Affairs department at the Naval Postgraduate School in Monterey, California, “The 2011 U.S. National Space Security Policy: Engagement as a Work in Progress”, Disarmament Times, Spring, http://disarm.igc.org/index.php?option=com\_content&view=article&id=429:the-2011-us-national-space-security-policy-engagement-as-a-work-in-progress&catid=154:disarmament-times-spring-2011&Itemid=2)

As is well understood, the space policies of the Bush administration were decidedly oriented toward military security concerns and independent action. The 2006 National Space Policy unabashedly proclaimed the U.S. intention to maintain a dominant position in space indefinitely. This policy orientation dismissed multilateral cooperation as impinging on U.S. “freedom of action,” throwing weight instead behind a wide range of technology development initiatives founded on the assumption that deployment of weapons in space was, if not already factual, certainly inevitable.2 U.S. commercial and civil engagement was overshadowed by these security concerns, expressed through the tightening of export control restrictions inhibiting a broad range of technology sharing. Once again, U.S. space policy was subsumed by other national priorities, in this case dominated by military security concerns. This background is essential for appreciating how the space policies of the Obama administration are beginning **to genuinely break new trails.** The U.S. National Space Policy issued in June 2010 has been **widely recognized** for its cooperative and multilateral tone, including as explicit near-term goals the expansion of international cooperation on all activities and pursuing international as well as national measures to enhance space stability. Particularly notable are the document’s emphasis on orienting U.S. “leadership” toward fostering international cooperation, and its references, in its concluding section, to cooperation with other states and non-state actors in the pursuit of national security space objectives.3 Less broadly noticed was this policy’s clarity and coherence in articulating a vision for U.S. space activities on its own terms. The document is organized around core principles, subsidiary goals and implementing guidelines that exceed its predecessors in delineating a longer-term direction for U.S. space policy that is integrated with, rather than derivative of, broader U.S. global aims.4 The policy also was generated and issued far earlier in the tenure of the administration than either of its predecessors, indicating an increased prioritization of attention to space policy at higher levels of policy-making. To some degree, a turn toward multilateral cooperation in U.S. space policy was to be expected. China’s 2007 anti-satellite weapon (ASAT) test and the 2009 Iridium-Cosmos collision increased awareness of the challenge of space debris and the need for better global information sharing on space situational awareness (SSA).5 Also, new budget realities and unpromising technological developments have scaled back ambitions in some quarters for solving U.S. space security concerns with new independent capabilities. Finally, the Obama administration has pursued a more cooperative disposition across a wide range of global policy challenges, from Iranian nuclear ambitions to global climate change. But the improved clarity of vision in the 2010 Space Policy suggests that the emphasis on fostering global cooperation on space-related activities is more grounded in deliberate foresight than sailing the prevailing political winds. The 2011 National Security Space Strategy, released February 4, is best interpreted against this background of the Obama administration’s turn toward both greater international space cooperation and greater attention to space policy in general. This first-of-its-kind strategic statement culminates a congressionally mandated space posture review.6 The initial section portraying the strategic environment to which U.S. security policy must be responsive highlights the growing problems of space debris, orbital congestion and coordination among a growing number of space actors — not state-based security threats per se. The Security Space Strategy features the objective of a “stable space environment in which nations exercise shared responsibility.”7 Specific provisions intended to implement this strategy, relevant to the preceding observations, include:8 • The strategy presents a full section on “Partnering with Responsible Nations, International Organizations, and Commercial Firms.” This category is not wholly multilateral in the traditional sense, displaying a symbiosis of alliance-building and collective cooperation not always carefully distinguished; i.e., “The United States will lead in building coalitions of like-minded space-faring nations and, where appropriate, work with international institutions to do so.” • The strategy intends to “encourage responsible behavior in space and lead by the power of example,” a significant observation given the tendency of U.S. policy-makers (as noted above) not to expect quid pro quo responses to cooperative gestures. Also, the strategy states the U.S. “will support development of data standards, best practices, **t**ransparency and **c**onfidence-**b**uilding **m**easure**s**, and *norms of behavior for responsible space operations*.” [italics added] In the context of the section on “Preventing and Deterring Aggression,” the strategy similarly intends to “support diplomatic efforts to promote norms of responsible behavior in space” as well as “pursue international partnerships that encourage potential adversary restraint,” along with other measures. **This emphasis on norm-building and the role of example suggests a near-term endorsement of the development of “codes of conduct” for space activities** (such as the recently revised European Union Code of Conduct, discussed below), whether or not such concord leads to more formal arms control arrangements in the longer-term. • The Department of Defense is directed to “foster cooperative SSA relationships,” and to “expand provision of safety of flight services to U.S. Government agencies, other nations, and commercial firms.” Greater SSA information sharing has been a key suggestion for fostering international cooperation; the U.S. possesses globally superior SSA capabilities, but restricts the sharing of this information on the basis of national security concerns.9 Hence, this nominal commitment is significant in its own right. • The strategy commits to reforming export controls. “In particular, as new opportunities arise for international collaboration, a revised export control system will better enable the domestic firms competing for these contracts.” As noted above, the oppressive impact of current U.S. export controls not only impinges on U.S. commercial space actors but also epitomizes the high degree to which U.S. policy has subsumed commercial and civil interests to national security concerns. The strategy appears to acknowledge this connection and commit to remedy it. • The most assertive passages of the statement are moderated with community-building intent. For example, the strategy’s section on “Preventing and Deterring Aggression” concludes that the U.S. “will retain the right and capabilities to respond in self-defense, should deterrence fail,” but immediately adds that the U.S. “will use force in a manner that is consistent with longstanding principles of international law, treaties to which the United States is a party, and the inherent right of self defense.” • The concluding and most conflict-oriented section of the strategy opens by noting that “some actors may still believe counterspace actions could provide military advantage.” Counterspace capabilities, unarticulated in the document, include ASATs, ground-based directed energy weapons and satellite transmission jamming. Deputy Assistant Secretary of Defense for Space Policy Gregory Schulte explained at the strategy’s rollout that China is a principal concern in this regard, but so is the proliferation of these technologies: “If Ethiopia can jam a commercial satellite, you have to worry what others can do.”10 This section of the strategy does not, however, call for maintaining options to develop complementary space conflict capabilities. Rather, the strategy asserts that the U.S. “must be prepared to ‘fight through’ a degraded environment,” and identifies “resilience” and “space protection” as the key criteria. The preceding survey of elements of the 2011 National Security Space Strategy is deliberately selective, highlighting those elements expressing consistency with the 2010 National Space Policy’s bend toward fostering greater international collaboration. Perhaps as striking as the prevalence of such passages, however, is the absence of expressed intention — even couched in hedging language — to sustain or expand the kind of independent space-based military capabilities that were the centerpiece of the prior administration’s aims (if not its accomplishments). Again, to some extent this turn in tone is overdetermined by extenuating global circumstances. But one must still be struck by the degree to which developments such as the Chinese ASAT test have not ignited the kind of response one might have anticipated only a few short years after Donald Rumsfeld’s notorious warning of a “space Pearl Harbor.”11 The most immediate significance of the National Security Space Strategy is likely the signals its sends concerning U.S. policy toward the recently revised European Union Code of Conduct.12 The strategy did not explicitly endorse this EU initiative, but Mr. Schulte, at the February 4 presentation of the strategy, highlighted the initiative “as a potential way” to promote “transparency and confidence-building measures, which tend to be voluntary as opposed to legally binding.” A week earlier, Rose Gottemoeller, Assistant Secretary of State for Arms Control, Verification and Compliance, stated at the Conference on Disarmament that the administration was nearing a decision on whether the U.S. would sign on to the code, and what modifications might be required in order to do so.13 As U.S. interest in the Code of Conduct has increased, debates over its provisions and its relationship to the Outer Space Treaty have intensified. These policy movements toward multilateral engagement and commitment to behavioral standards (even if non-binding) mark a sharp departure from the stiff resistance to curtailing U.S. “freedom of action” in the previous administration, and have accordingly generated resistance from congressional opponents on just those terms. Prior to the release of the National Security Space Strategy, a group of 37 Republican senators led by Arizona Senator Jon Kyl issued a letter to Secretary of State Hillary Rodham Clinton expressing concern over a potential multilateral commitment that might limit development and/or deployment of space-based missile defense interceptors and ASAT-defeating systems.14 Critics also decried the strategy’s emphasis on “the old fallacious assumption that the power of example will prevent adversaries from doing the United States harm,” and endorsed maintaining the goal of U.S. retention of a “dominant position in military and intelligence space capabilities.”15 In fact, the administration’s warming toward normative commitments in general — and the EU Code of Conduct in particular — are in part intended to forestall pressure for more formal and binding measures that would definitively cut off the “hedge” of unilateral U.S. weapons development options.16 The balance of U.S. debate may have shifted toward greater international cooperation, but the terms of the debate remain the same. In sum, the National Security Space Strategy appears to mark not only a swing in U.S. policy toward greater global engagement but also, and more importantly, a step toward greater long-term coherence in thinking concerning the core goals of U.S. space activities. Even supporters of the general directions of the strategy noted its more-than-expected breadth of thought.17 But if this reading is sound, the strategy is still but one step on a long road, and ongoing debates over the role of U.S. space policy vis-à-vis broader national security interests will insure that road is bumpy. Suggesting such limitations, Mr. Schulte acknowledged that the classified version of the strategy is only four pages longer than the released version, indicating that more specific guidelines for military implementation of the strategy remain to be developed.18 Many devils may lurk in these details.

Nuclear CBW war—comparatively outweighs the aff.

Mitchell et al ‘1

(Dr. Gordon, Associate Professor of Communication and Director of Debate at the University of Pittsburgh, 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.

#### Zero risk of an EMP attack

STRATFOR, 10

[ September 9, 2010 “ Gauging the Threat of an Electromagnetic Pulse (EMP) Attack,” <http://www.stratfor.com/weekly/20100908_gauging_threat_electromagnetic_pulse_emp_attack>]

In order to have the best chance of causing the type of immediate and certain EMP damage to the United States on a continent-wide scale, as discussed in many media reports, a nuclear weapon (probably in the megaton range) would need to be detonated well above 30 kilometers somewhere over the American Midwest. Modern commercial aircraft cruise at a third of this altitude. Only the United States, United Kingdom, France, Russia and China possess both the mature warhead design and intercontinental ballistic missile (ICBM) capability to conduct such an attack from their own territory, and these same countries have possessed that capability for decades. (Shorter range missiles can achieve this altitude, but the center of the United States is still 1,000 kilometers from the Eastern Seaboard and more than 3,000 kilometers from the Western Seaboard — so just any old Scud missile won’t do.) The HEMP threat is nothing new. It has existed since the early 1960s, when nuclear weapons were first mated with ballistic missiles, and grew to be an important component of nuclear strategy. Despite the necessarily limited understanding of its effects, both the United States and Soviet Union almost certainly included the use of weapons to create HEMPs in both defensive and especially offensive scenarios, and both post-Soviet Russia and China are still thought to include HEMP in some attack scenarios against the United States. However, there are significant deterrents to the use of nuclear weapons in a HEMP attack against the United States, and nuclear weapons have not been used in an attack anywhere since 1945. Despite some theorizing that a HEMP attack might be somehow less destructive and therefore less likely to provoke a devastating retaliatory response, such an attack against the United States would inherently and necessarily represent a nuclear attack on the U.S. homeland and the idea that the United States would not respond in kind is absurd. The United States continues to maintain the most credible and survivable nuclear deterrent in the world, and any actor contemplating a HEMP attack would have to assume not that they might experience some limited reprisal but that the U.S. reprisal would be full, swift and devastating. Countries that build nuclear weapons do so at great expense. This is not a minor point. Even today, a successful nuclear weapons program is the product of years — if not a decade or more — and the focused investment of a broad spectrum of national resources. Nuclear weapons also are developed as a deterrent to attack, not with the intention of immediately using them offensively. Once a design has achieved an initial capability, the focus shifts to establishing a survivable deterrent that can withstand first a conventional and then a nuclear first strike so that the nuclear arsenal can serve its primary purpose as a deterrent to attack. The coherency, skill and focus this requires are difficult to overstate and come at immense cost — including opportunity cost — to the developing country. The idea that Washington will interpret the use of a nuclear weapon to create a HEMP as somehow less hostile than the use of a nuclear weapon to physically destroy an American city is not something a country is likely to gamble on. In other words, for the countries capable of carrying out a HEMP attack, the principles of nuclear deterrence and the threat of a full-scale retaliatory strike continue to hold and govern, just as they did during the most tension-filled days of the Cold War.

## nif

#### No fusion

Geoff Brumfiel, Scientific American, June 2012, Fusion's Missing Pieces, EBSCO

Scientists such as Lee have been seduced by fusion for half a century. Many before him have promised its impending arrival. Although some of those researchers were charlatans, the vast majority of them turned out to be plain wrong. Fusion is tough, and nature breaks promises.

Here is the core challenge: because hydrogen ions repel one another, scientists must slam them together to make them fuse. ITER's strategy is to heat the hydrogen inside a magnetic cage. The particular type of magnetic cage it employs is called a tokamak -- a metal doughnut circled by loops of coil that generate magnetic fields. These magnetic cuffs squeeze a charged plasma of hydrogen ions as it warms to hundreds of millions of degrees -- temperatures no solid material can withstand.

In the 1970s tokamaks looked so promising that some researchers predicted they could build fusion electricity plants by the mid-1990s. The only challenge was scaling research reactors up to sufficient size -- in general, the bigger the tokamak, the hotter the plasma can get, and the more efficient fusion becomes.

Then problems arose. Plasma conducts electricity and so can suffer from self-generated currents that make it buck and writhe. Violent turbulence snaps the plasma out of its cage, firing it toward the machine's wall. As the temperature rises, the tokamak grows to give the plasma space, and the magnetic fields need to be stronger to hold it. Extra room and stronger magnetic fields require higher electric current in the doughnut's copper coils. And higher current requires more power. Put simply: the larger and more powerful a machine becomes, the more energy it consumes trying to hold everything together.

This feedback meant that conventional tokamaks would never produce more energy than they consumed. Lee and others knew of only one solution: superconductors -- special materials that, at very low temperatures, can carry extremely high current with no resistance. If a tokamak's magnets were superconducting, they could be pumped up with current and left to run indefinitely. It would solve the energy problem but would not be cheap. Superconductors are exotic, expensive materials. And to work, they need to be constantly cooled with liquid helium to just four kelvins above absolute zero.

#### Err neg—this is nonsense

Chris Rhodes, Sussex University, Physical Chemistry Professor, 6/10/12, The Progress made in the Different Fields of Nuclear Fusion, oilprice.com/Alternative-Energy/Nuclear-Power/The-Progress-made-in-the-Different-Fields-of-Nuclear-Fusion.html

When I was about 10, I recall hearing that nuclear fusion power would become a reality "in about thirty years". The estimate has increased steadily since then, and now, forty odd years on, we hear that fusion power will come on-stream "in about fifty years". So, what is the real likelihood of fusion-based power stations coming to our aid in averting the imminent energy crisis? Getting two nuclei to fuse is not easy, since both carry a positive charge and hence their natural propensity is to repel one another. Therefore, a lot of energy is required to force them together so that they can fuse. To achieve this, suitable conditions of extremely high temperature, comparable to those found in stars, must be met. A specific temperature must be reached in order for particular nuclei to fuse with one another. This is termed the "critical ignition temperature", and is around 400 million degrees centigrade for two deuterium nuclei to fuse, while a more modest 100 million degrees is sufficient for a deuterium nucleus to fuse with a tritium nucleus. For this reason, it is deuterium-tritium fusion that is most sought after, since it should be most easily achieved and sustained.

One disadvantage of tritium is that it is radioactive and decays with a half-life of about 12 years, and consequently, it exists naturally in only negligible amounts. However, tritium may be "bred" from lithium using neutrons produced in an initial deuterium-tritium fusion. Ideally, the process would become self-sustaining, with lithium fuel being burned via conversion to tritium, which then fuses with deuterium, releasing more neutrons. While not unlimited, there are sufficient known resources of lithium to fire a global fusion programme for about a thousand years, mindful that there are many other uses for lithium, ranging for various types of battery to medication for schizophrenics. The supply would be effectively limitless if lithium could be extracted from the oceans.

In a working scenario, some of the energy produced by fusion would be required to maintain the high temperature of the fuel such that the fusion process becomes continuous. At the temperature of around 100 - 300 million degrees, the deuterium/lithium/tritium mixture will exist in the form of a plasma, in which the nuclei are naked (having lost their initial atomic electron clouds) and are hence exposed to fuse with one another.

The main difficulty which bedevils maintaining a working fusion reactor which might be used to fire a power station is containing the plasma, a process usually referred to as "confinement" and the process overall as “magnetic confinement fusion” (MCF). Essentially, the plasma is confined in a magnetic bottle, since its component charged nuclei and electrons tend to follow the field of magnetic force, which can be so arranged that the lines of force occupy a prescribed region and are thus centralised to a particular volume. However, the plasma is a "complex" system that readily becomes unstable and leaks away. Unlike a star, the plasma is highly rarefied (a low pressure gas), so that the proton-proton cycle that powers the sun could not be thus achieved on earth, as it is only the intensely high density of nuclei in the sun's core that allows the process to occur sustainably, and that the plasma is contained within its own gravitational mass, and isolated within the cold vacuum of space.

In June 2005, the EU, France, Japan, South Korea, China and the U.S. agreed to spend $12 billion to build an experimental fusion apparatus (called ITER) by 2014. It is planned that ITER will function as a research instrument for the following 20 years, and the knowledge gained will provide the basis for building a more advanced research machine. After another 30 years, if all goes well, the first commercial fusion powered electricity might come on-stream.

The Joint European Torus (JET)

I attended a fascinating event recently - a Cafe' Scientifique meeting held in the town of Reading in South East England. I have also performed in this arena, talking about "What Happens When the Oil Runs Out?", which remains a pertinent question. This time it was the turn of Dr Chris Warrick from the Culham Centre for Fusion Energy based near Abingdon in Oxfordshire, which hosts both the MAST (Mega Amp Spherical Tokamak) and the better known JET (Joint European Torus) experiments. In the audience was a veteran engineer/physicist who had worked on the pioneering ZETA4 experiment in the late 1950s, from which neutrons were detected leading to what proved later to be false claims that fusion had occurred, their true source being different versions of the same instability processes that had beset earlier machines.

Nonetheless, his comment was salient: "In the late 50s, we were told that fusion power was 20 years away and now, 50-odd years later it is maybe 60 years away." Indeed, JET has yet to produce a positive ratio of output power/input energy, and instability of the plasma is still a problem. Dr Warrick explained that while much of the plasma physics is now sorted-out, minor aberrations in the magnetic field allow some of the plasma to leak out, and if it touches the far colder walls of the confinement chamber, it simply "dies". In JET it is fusion of nuclei of the two hydrogen isotopes, deuterium and tritium that is being undertaken, a process that as noted earlier, requires a "temperature" of 100 million degrees.

I say "temperature" because the plasma is a rarefied (very low pressure) gas, and hence the collisions between particles are not sufficiently rapid that the term means the same distribution of energy as occurs under conditions of thermal equilibrium. It is much the same as the temperatures that may be quoted for molecules in the atmospheric region known as the thermosphere which lies some 80 kilometres above the surface of the Earth. Here too, the atmosphere is highly rarefied and thus derived temperatures refer to translational motion of molecules and are more usefully expressed as velocities. However expressed, at 100 million degrees centigrade, the nuclei of tritium and deuterium have sufficient translational velocity (have enough energy) that they can overcome the mutual repulsion arising from their positive charges and come close enough that they are drawn together by attractive nuclear forces and fuse, releasing vast amounts of energy in the process.

JET is not a small device, at 18 metres high, but bigger machines will be necessary before the technology is likely to give out more energy than it consumes. Despite the considerable volume of the chamber, it contains perhaps only one hundredth of a gram of gas, hence its very low pressure. There is another matter and that is how long the plasma and hence energy emission can be sustained. Presently it is fractions of a second but a serious "power station" would need to run for some hours. There is also the problem of getting useful energy from the plasma to convert into electricity even if the aforementioned and considerable problems can be overcome and a sustainable, large-scale plasma maintained.

The plan is to surround the chamber with a "blanket" of lithium with pipes running through it and some heat-exchanger fluid passing through them. The heated fluid would then pass on its heat to water and drive a steam-turbine, in the time-honoured fashion used for fossil fuel fired and nuclear power plants. Now my understanding is that this would not be lithium metal but some oxide material. The heat would be delivered in the form of very high energy neutrons that would be slowed-down as they encounter lithium nuclei on passing through the blanket. In principle this is a very neat trick, since absorption of a neutron by a lithium nucleus converts it to tritium, which could be fed back into the plasma as a fuel. Unlike deuterium, tritium does not exist is nature, being radioactive with a half-life of about 12 years. However produced, either separately or in the blanket, lithium is the ultimate fuel source, not tritium per se. Deuterium does exist in nature but only to the extent of one part in about two thousand of ordinary hydrogen (protium) and hence the energy costs of its separation are not inconsiderable.

The neutron flux produced by the plasma is very high, and to enhance the overall breeding efficiency of lithium to tritium the reactor would be surrounded with a “lithium” blanket about three feet thick. The intense neutron flux will render the material used to construct the reactor highly radioactive, to the extent that it would not be feasible for operators to enter its vicinity for routine maintenance. The radioactive material will need to be disposed of similarly to the requirements for nuclear waste generated by nuclear fission, and hence fusion is not as "clean" as is often claimed. Exposure to radiation of many potential materials necessary to make the reactor, blanket, and other components such as the heat-exchanger pipes would render them brittle, and so compromise their structural integrity. There is also the possibility that the lithium blanket around the reactor might be replaced by uranium, so enabling the option of breeding plutonium for use in nuclear weapons.

Providing a fairly intense magnetic field to confine the plasma (maybe Tesla - similar to that in a hospital MRI scanner) needs power (dc not ac as switching the polarity of the field would cause the plasma to collapse) and large power-supply units containing a lot of metals including rare earths which are mined and processed using fossil fuels. The issue of rare earths is troublesome already, and whether enough of them can be recovered to meet existing planned wind and electric car projects is debatable, let alone that additional pressure should be placed upon an already fragile resource to build a first generation of fusion power stations.

World supplies of lithium are also already stressed, and hence getting enough of it not only to make blankets for fusion reactors and tritium production but also for the millions-scale fleet of electric vehicles needed to divert our transportation energy demand away from oil is probably a bridge too far, unless we try getting it from seawater, which takes far more energy than mining lithium minerals. The engineering requirements too will be formidable, however, most likely forcing the need to confront problems as yet unknown, and even according to the most favourable predictions of the experts, fusion power is still 60 years away, if it will arrive at all. Given that the energy crisis will hit hard long before then, I suggest we look to more immediate solutions, mainly in terms of energy efficiency, for which there is ample scope.

To quote again the ZETA veteran, "I wonder if maybe man is not intended to have nuclear fusion," and all in all, other than from solar energy I wonder if he is right. At any rate, garnering real electrical power from fusion is so far distant as to have no impact on the more immediately pressing fossil fuels crisis, particularly for oil and natural gas. Fusion Power is a long-range "holy grail" and part of the illusion that humankind can continue in perpetuity to use energy on the scale that it presently does. Efficiency and conservation are the only real means to attenuate the impending crisis in energy and resources.

#### Russia econ collapse inevitable – they can’t solve alt causes

Hao **Li 10**, International Business Times, “Russian economy struggles, while budget deficit soars”, September 9, <http://www.ibtimes.com/articles/61065/20100909/russian-economy-struggles-budget-deficit-may-become-a-problem.htm>

A new paradigm so far in 2010 is the emerging markets economies performing better than their developed counterparts. A notable exception, however, is Russia, which is actually underperforming most advanced economies. In fact, according to data compiled by the CIA, Russia was the 8th worst performing economy in the world in 2009. More than two years into Dmitri Medvedev's presidency -- which began about four months before the Lehman Brothers' collapse -- Russia faces "a steep budget deficit and the prospect of sluggish growth at best and stagnation at worst," said Leon Aron, a scholar at the American Enterprise Institute. Russia's real GDP declined 8 percent last year, compared to growths of 2.4 percent for the U.S. and over 8 percent for China. Going forward, Russia's economy is predicted to grow 1 to 2 percent "at most for a number of years" or stagnate entirely, said Aron. ("Optimistic" World Bank projections, however, puts growth at 4.5 percent this year and 4.8 percent in 2011.) One problem is that Russia's economy and government revenues depends heavily on oil and oil prices. About 80 percent of the country's exports are commodity-related and 45 percent of its government revenues derives from oil, according to Timothy Ash, head of emerging markets research at Royal Bank of Scotland. Ash said Russia's budget balances at oil prices of $90 per barrel. During the financial crisis, oil prices plunged. This, combined with the global economic turmoil, caused Russia to have a budget deficit in 2009, its first in a decade. In 2010, its deficit is estimated at 5 percent of GDP. To cover the deficits, Russia will tap into its Stabilization Fund, which was set up in 2004 to collect excess tax revenues from oil. The fund currently has $450 billion, said Aron. However, "nobody knows what will happen once this money runs out," he warned. The deficit-to-GDP ratio in Russia is actually lower than that of the U.S. and several European Union (EU) countries -- however, these countries have certain advantages -- e.g. the maturity of their capital markets and reserve status of their currencies -- that enable them finance deficits through borrowing. For Russia, it is unclear if the market will be willing to finance its deficit at reasonable rates. If the oil money runs out and the budget deficit remains persistent, Russia may be in trouble unless oil prices rally. Russia's struggles with its budget deficit and dreary economic outlook do not bode well for the need to "rebuild its crumbling infrastructure, salvage the collapsing state-pension system at a time of unprecedented population aging, and develop new gas and oil fields to replace the rapidly depleting current ones," said Aron. Foreigners are also wary of investing in Russia. Foreign direct investment (FDI) in the first quarter of 2010 is down 18 percent from the same period in 2009 and 53 percent from the same period in 2008. By contrast, China's FDI grew 11 percent in the first quarter compared to 2009. This wariness reflects the "precarious state of the Russian economy" and a "profound deficit of trust, especially in the energy sector," said Aron. Questionable activity with Yukos in 2004 and Sakhalin Energy Investment Company in 2007 exacerbated this "deficit of trust."

#### Putin’s already unbeatable

Roxburgh 3-14-12

Angus, Author of The Strongman, a book about Vladmir Putin

http://www.foreignaffairs.com/features/letters-from/how-the-anti-putin-movement-missed-the-point?page=show#

 I could not help but recall the great stirrings of democracy in Russia that I witnessed in the late 1980s and early 1990s, when, without the help of the Internet or Twitter, hundreds of thousands of Russians spilled into the streets to hear Boris Yeltsin, the future president, and Andrei Sakharov, a nuclear physicist and human rights activist, condemn the communist system and the excesses of its rulers. In those days, the crowd waited with mounting excitement for the appearance of the boldfaced speakers, who commanded almost universal respect. Today's opposition lacks the top talent that could perform Yeltsin and Sakharov's unifying and rallying role. Indeed, some of the movement's leaders did not even turn up on Saturday. Nemtsov was at home with a cold. Kasyanov said he was happy to leave the proceedings to the election observers to tell their stories, and Navalny -- perhaps the most promising of the younger generation of opposition heavyweights -- was milling in the crowd but did not appear on the stage. Besides their lack of inspiration, the speeches on Saturday were perhaps chasing the wrong message. Of course, they were right to highlight the alleged impropriety at the polls. There were credible reports of "carousel" voting, in which loyal voters were bussed from polling station to polling station to vote for Putin, and evidence of ballot stuffing and miscounting. But the fraud was much less significant than during the December elections to the State Duma. More important, the ballot tampering was far less damaging than the monumental lopsidedness of the media coverage that preceded the election. The central television stations not only devoted far more time to Putin than to the other candidates (the channels chose to designate coverage of his activities as news about the prime minister rather than as electioneering), but they also aired whole documentaries portraying Putin as a hero who saved Russia from the chaos of the Yeltsin years and from the allegedly meddling hands of the West. Putin's allegations that Western governments were "paying" the protesters and plotting an Orange Revolution like Ukraine's in 2004 went without challenge. Securing access to state television should now be the immediate concern of the opposition. It is the total control of the country's most powerful media -- not vote-rigging -- that makes Putin all but invincible. Nemtsov has claimed that just one hour of live televised debate with Putin would ensure that the latter would never win another election. That may be wishful thinking, but if the main channels were allowed to debate and investigate freely, it would certainly dramatically alter the political scene here. There is another reason, too, why Russia's winter of protests did not develop into an Orange Revolution. In Ukraine in 2004, a rigged election actually changed the result: It handed victory to the loser, the pro-Russian, "official" candidate, Viktor Yanukovych, and robbed the pro-Western Viktor Yushchenko of his rightful victory. Hundreds of thousands protested, forcing the authorities to rerun the election, which Yushchenko won. Not so in Russia. In the March 4 election, no other candidate was robbed of victory. Opposition leaders concede that Putin would have won even if there had been no fraud. True, the election might have gone to a runoff between Putin and his nearest rival. But few imagine that any of the other contenders could have matched Putin's popularity. That is a problem that has dogged Russian politics since the collapse of communism. For more than 20 years, democratically minded politicians have vied against one another rather than work out a common platform. So many new, separate parties have formed and then crumbled that Russia has almost run out of original names for them. Today, a good dozen of Russia's top democrats are scattered across several different parties, whose differences are much less than the similarities that should unite them against Putin. Even when they try to come together -- as Kasyanov, Nemtsov, Vladimir Ryzhkov, and others have in PARNAS -- they cannot agree which of them should be the figurehead. Until they are able to do so, Putin will continue to reign as a giant among squabbling political rivals. Still, it would have been hard to find a single protester on Saturday who felt that the battle was over -- even if it must now change form. An opinion poll conducted by the Ekho Moskvy radio station found that 80 percent of respondents believed the protests were worthwhile. In an interview with the same station, Kasyanov said that the most pressing task was to ensure that some small reforms promised by President Dmitry Medvedev in response to the December protests become a reality. He said that protesters must continue to insist that a new law easing the registration of political parties, for example, should be passed before Putin is inaugurated in May. The next step, he said, would be to achieve a rerun of the flawed parliamentary election that provoked the protests in the first place. It is implausible, though, that Putin, now comfortable in his belief that he has taken the steam out of the opposition, will make such a huge concession. The fact is that Putin's Kremlin has everything under control, and the opposition -- without effective leadership and no access to national television -- faces a long and uphill struggle.

#### Testing’s impact’s empirically denied

#### No war – deterrence checks escalation

Ganguly, 8

[Sumit Ganguly is a professor of political science and holds the Rabindranath Tagore Chair at Indiana University, Bloomington. “Nuclear Stability in South Asia,” International Security, Vol. 33, No. 2 (Fall 2008), pp. 45–70]

As the outcomes of the 1999 and 2001–02 crises show, nuclear deterrence is robust in South Asia. Both crises were contained at levels considerably short of full-scale war. That said, as Paul Kapur has argued, Pakistan’s acquisition of a nuclear weapons capability may well have emboldened its leadership, secure in the belief that India had no good options to respond. India, in turn, has been grappling with an effort to forge a new military doctrine and strategy to enable it to respond to Pakistani needling while containing the possibilities of conflict escalation, especially to the nuclear level.78 Whether Indian military planners can fashion such a calibrated strategy to cope with Pakistani probes remains an open question. This article’s analysis of the 1999 and 2001–02 crises does suggest, however, that nuclear deterrence in South Asia is far from parlous, contrary to what the critics have suggested. Three specific forms of evidence can be adduced to argue the case for the strength of nuclear deterrence. First, there is a serious problem of conflation in the arguments of both Hoyt and Kapur. Undeniably, Pakistan’s willingness to provoke India has increased commensurate with its steady acquisition of a nuclear arsenal. This period from the late 1980s to the late 1990s, however, also coincided with two parallel developments that equipped Pakistan with the motives, opportunities, and means to meddle in India’s internal affairs—particularly in Jammu and Kashmir. The most important change that occurred was the end of the conflict with the Soviet Union, which freed up military resources for use in a new jihad in Kashmir. This jihad, in turn, was made possible by the emergence of an indigenous uprising within the state as a result of Indian political malfeasance.79 Once the jihadis were organized, trained, armed, and unleashed, it is far from clear whether Pakistan could control the behavior and actions of every resulting jihadist organization.80 Consequently, although the number of attacks on India did multiply during the 1990s, it is difficult to establish a firm causal connection between the growth of Pakistani boldness and its gradual acquisition of a full-fledged nuclear weapons capability.

Second, India did respond with considerable force once its military planners realized the full scope and extent of the intrusions across the Line of Control. Despite the vigor of this response, India did exhibit restraint. For example, Indian pilots were under strict instructions not to cross the Line of Control in pursuit of their bombing objectives.81 They adhered to these guidelines even though they left them more vulnerable to Pakistani ground ªre.82 The Indian military exercised such restraint to avoid provoking Pakistani fears of a wider attack into Pakistan-controlled Kashmir and then into Pakistan itself. Indian restraint was also evident at another level. During the last war in Kashmir in 1965, within a week of its onset, the Indian Army horizontally escalated with an attack into Pakistani Punjab. In fact, in the Punjab, Indian forces successfully breached the international border and reached the outskirts of the regional capital, Lahore. The Indian military resorted to this strategy under conditions that were not especially propitious for the country. Prime Minister Jawaharlal Nehru, India’s first prime minister, had died in late 1964. His successor, Lal Bahadur Shastri, was a relatively unknown politician of uncertain stature and standing, and the Indian military was still recovering from the trauma of the 1962 border war with the People’s Republic of China.83 Finally, because of its role in the Cold War, the Pakistani military was armed with more sophisticated, U.S.-supplied weaponry, including the F-86 Sabre and the F-104 Starfighter aircraft. India, on the other hand, had few supersonic aircraft in its inventory, barring a small number of Soviet-supplied MiG-21s and the indigenously built HF-24.84 Furthermore, the Indian military remained concerned that China might open a second front along the Himalayan border. Such concerns were not entirely chimerical, because a Sino-Pakistani entente was under way. Despite these limitations, the Indian political leadership responded to Pakistani aggression with vigor and granted the Indian military the necessary authority to expand the scope of the war. In marked contrast to the politico-military context of 1965, in 1999 India had a self-confident (if belligerent) political leadership and a substantially more powerful military apparatus. Moreover, the country had overcome most of its Nehruvian inhibitions about the use of force to resolve disputes.85 Furthermore, unlike in 1965, India had at least two reserve strike corps in the Punjab in a state of military readiness and poised to attack across the border if given the political nod.86 Despite these significant differences and advantages, the Indian political leadership chose to scrupulously limit the scope of the conflict to the Kargil region. As K. Subrahmanyam, a prominent Indian defense analyst and political commentator, wrote in 1993:.

The awareness on both sides of a nuclear capability that can enable either country to assemble nuclear weapons at short notice induces mutual caution. This caution is already evident on the part of India. In 1965, when Pakistan carried out its “Operation Gibraltar” and sent in infiltrators, India sent its army across the cease-fire line to destroy the assembly points of the infiltrators. That escalated into a full-scale war. In 1990, when Pakistan once again carried out a massive infiltration of terrorists trained in Pakistan, India tried to deal with the problem on Indian territory and did not send its army into Pakistan-occupied Kashmir.87

#### No CCP collapse—the government represses instability

Pei 9(Minxin, Senior Associate in the China Program at the Carnegie Endowment for International Peace, 3/12. “Will the Chinese Communist Party Survive the Crisis?” Foreign Affairs. http://www.foreignaffairs.com/articles/64862/minxin-pei/will-the-chinese-communist-party-survive-the-crisis)

It might seem reasonable to expect that challenges from the disaffected urban middle class, frustrated college graduates, and unemployed migrants will constitute the principal threat to the party's rule. If those groups were in fact to band together in a powerful coalition, then the world's longest-ruling party would indeed be in deep trouble. But that is not going to happen. Such a revolutionary scenario overlooks two critical forces blocking political change in China and similar authoritarian political systems: the regime's capacity for repression and the unity among the elite. Economic crisis and social unrest may make it tougher for the CCP to govern, but they will not loosen the party's hold on power. A glance at countries such as Zimbabwe, North Korea, Cuba, and Burma shows that a relatively unified elite in control of the military and police can cling to power through brutal force, even in the face of abysmal economic failure. Disunity within the ruling elite, on the other hand, weakens the regime's repressive capacity and usually spells the rulers' doom. The CCP has already demonstrated its remarkable ability to contain and suppress chronic social protest and small-scale dissident movements. The regime maintains the People's Armed Police, a well-trained and well-equipped anti-riot force of 250,000. In addition, China's secret police are among the most capable in the world and are augmented by a vast network of informers. And although the Internet may have made control of information more difficult, Chinese censors can still react quickly and thoroughly to end the dissemination of dangerous news. Since the Tiananmen crackdown, the Chinese government has greatly refined its repressive capabilities. Responding to tens of thousands of riots each year has made Chinese law enforcement the most experienced in the world at crowd control and dispersion. Chinese state security services have applied the tactic of "political decapitation" to great effect, quickly arresting protest leaders and leaving their followers disorganized, demoralized, and impotent. If worsening economic conditions lead to a potentially explosive political situation, the party will stick to these tried-and-true practices to ward off any organized movement against the regime.

#### No war

Shuo 9/12/12 (Wang Shuo, managing editor of Caixin Media: the top English-language magazine covering business and finance in China, "Closer Look: Why War Is Not an Option", english.caixin.com/2012-09-12/100436770.html)

It is highly unlikely that China will fight a hot war with any of its neighbors over territorial disputes, but it should still reexamine who its friends really are

There won't be a war in East Asia.

The United States has five military alliances in the western Pacific: with South Korea, Japan, Thailand, the Philippines and Singapore, and American battleships are busy patrolling the seas. Without a go-ahead from Washington, there is no possibility of a hot war between battleships of sovereign countries here. As to conflicts between fishing boats and patrol boats, that's not really a big deal.

The Chinese have to ponder several questions: If the country has battleship wars with Japan, can it win without using ground-based missiles? Will the war escalate if missiles are deployed? What will happen if the war continues with no victory in sight?

In the last few days, one country bought islands, and the other announced the base points and the baselines of its territorial waters. But look closely, China and Japan have at least two things in common in this hostile exchange: At home they fan up nationalism, and in the international arena no activities have exceeded the scope of previous, respective claims on sovereignty.

This means there is no possibility of a war in East Asia, not even remotely.

From the East Sea to the South Sea, China has reached a new low in relations with Asian neighbors. It's hard to remove the flashpoints in territorial disputes, but the country can surely reduce their impacts. And the key is relations with the United States.

# 2NC

## K

## Turns the Case – 2NC

#### This turns the case – the institutional setting of science determines the knowledge produced

Ziman, emeritus professor of physics at the University of Bristol, 8/26/1996

(John, “Is science losing its objectivity?,” *Nature*, http://libweb.surrey.ac.uk/library/skills/Science%20and%20Society/SS\_1\_Reading2.pdf)

**The close link between social norms and philosophical principles is no accident**. It is not even clear which set comes first. It could be argued that the philosophical principles are primary and that the norms sum up the social practices that have naturally developed as scientists have tried to apply these principles in their research. But a sociologist might say that **the institutional setting of academic science generates certain practices and that** **these practices determine the principles regulating the type of knowledge that is produced**. **The norms and principles are** clearly **complementary aspects of an ethos whose social and psychological parts are inseparable**.

It does not follow, however, that all truth is ‘relative’ or that scientific knowledge is ‘constructed’ entirely to suit certain social ‘interests’. **All it means is that** the progressive unveiling of nature is not a very systematic process. How far we have get in that process — that is, **what counts as scientific knowledge at any given moment** — **is obviously influenced by the way in which research is organized**.

## Framework – 2NC

#### Science policy is different – its outcomes are based on knowledge, which changes depending on its philosophical underpinnings –the way we orient ourselves toward science has tangible effects on policy outcomes

Ziman, emeritus professor of physics at the University of Bristol, 8/26/1996

(John, “Is science losing its objectivity?,” *Nature*, http://libweb.surrey.ac.uk/library/skills/Science%20and%20Society/SS\_1\_Reading2.pdf)

SCIENTISTS know philosophy and sociology as fish know water. They understand instinctively how to live in it without being aware that they are doing so. That is, until the fish bowl is stirred or (horror!) even turned. We seem to be living in just such a time. Science is being shaken up and forced to abandon many of its cherished customs. We need to think hard about what is happening and what we should do, **not merely to survive but to serve** and delight **humanity**.

The initial impulse is to defend ‘science’ against its proclaimed enemies. **But much of the pressure comes from equally demanding friends**. And what is being defended? Science has already changed a great deal in just a few years. What is the essence that must at all costs be preserved‘? The bowl is not a black box, but it is filled with an invisible compound of philosophy and sociology. **To understand its life-giving properties**, this medium needs to be broken down into its component parts, perhaps to be resynthesized in new and more up-to-date forms.

Defining science

The fundamental question is simple: what is the framework that holds scientists together and keeps their personal rivalries within bounds? The conventional answer is that scientists are united in ‘the pursuit of truth’. But some philosophers say that ‘truth’ is an illusion, whereas others say that it takes many forms, of which only a few are pursued scientifically. Even philosophers of science disagree on just what distinguishes science from other forms of organized knowledge.

**What is clear**, **though**, **is that the type of knowledge produced by science seems to satisfy certain general principles**, **such as** reliance on observation, explanatory power, universality and **objectivity**. These principles are abstract and impersonal. They do not tell us what this knowledge is good for, what motivates scientists to seek it or how they should work together in the process. Yet scientists doing basic research have a strong sense of belonging to a community and of being guided in their scientific work by just such principles. How is this achieved?

The answer lies in the fact that what we mean by basic or ‘pure’ science can be defined only sociologically. The social institution that has customarily fostered undirected research, without regard for its practical use, is academia. In effect, what we call basic research is almost synonymous with the type of research traditionally carried out in universities‘.

CP

## Perm – 2NC

#### This is a key distinction – the perm severs production (and only the CP solves)

Congressional Budget Office June 2007

(“Federal Support for Research and Development,” http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/82xx/doc8221/06-18-research.pdf)

**Distinguishing between research and development is important in evaluating the effectiveness of the government’s R&D spending and the benefits it may provide**. Research (particularly basic research) may be conducted without a specific commercial purpose in mind, but it may nevertheless **have large “spillovers” in the economy** because the knowledge it produces may be useful not only to researchers in other fields but also to businesses **seeking to develop new** products and **production processes**. Development occurs closer to a product’s introduction so that its benefits go more directly to innovating firms and their customers. The federal government funds about half of all research in the United States but only 17 percent of development. Since the early 1980s, federal spending for research has grown more steadily and more quickly than federal spending for development. B Federal funding of research—particularly of basic research—is generally viewed favorably because of its large potential for spillovers and the corresponding economic benefits. Nonetheless, the economic returns to basic research are difficult to measure because the progress that results from research may be hard to identify or to value and the interval between the research and its application to a product or process is sometimes long. B Studies of federal spending for basic research in the past, particularly studies of research conducted at academic institutions, have estimated that the average returns from that spending exceed the returns that might have been gained had those resources been put to other uses. Additional federal spending could generate comparable benefits, although the returns to individual projects are likely to vary. Also, the gains from large increases in spending might be constrained if sufficient scientific and technical workers and facilities were not available.

#### Plan is development – CP isn’t

Congressional Budget Office June 2007

(“Federal Support for Research and Development,” http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/82xx/doc8221/06-18-research.pdf)

Basic research is meant to expand scientific knowledge without regard to commercial applications. Applied research seeks to connect scientific knowledge to some practical end. **Development applies scientific knowledge to the creation of specific marketable products**.

#### Important distinctions for policymakers – only the CP solves

Congressional Budget Office June 2007

(“Federal Support for Research and Development,” http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/82xx/doc8221/06-18-research.pdf)

**In addition to distinguishing between research and development**, **it may be important for policymakers setting funding priorities and analysts studying the impact of that funding** to be able to differentiate between basic and applied research. Although NSF and the Organisation for Economic Co-operation and Development (OECD) have published consistent definitions of the two kinds of research, a study has shown that neither scientists nor policymakers have a uniform understanding of the concept of basic research. 35 Yet despite their lack of agreement on definitions, many of those scientists note that funders of R&D are paying increasing attention to the applicability of research. 36 **An earlier study warns that such an emphasis on applied work at the expense of research in pursuit of new knowledge and concepts could slow the pace of both scientific advancement and its application**. 37 That blurring of the line between basic and applied research might present another obstacle to obtaining estimates of the returns to federal spending for research.

## Solvency & Case Turn – 2NC

#### CP key to viability

Loris, Herbert and Joyce Morgan Fellow in the Thomas A. Roe Institute for Economic Policy Studies at The Heritage Foundation, 3/23/2012

(Nicolas, “Department of Energy Budget Cuts: Time to End the Hidden Green Stimulus,” http://www.heritage.org/research/reports/2012/03/department-of-energy-budget-cuts-time-to-end-the-hidden-green-stimulus)

**The government programs that have become commercial successes**—**the Internet**, **computer chips**, the global positioning system (**GPS**)—**were not intended to meet a commercial demand**. They were each the result of defense-related programs that were created to meet national security requirements. Entrepreneurs saw an opportunity in these defense technologies and created the commercially viable products available today.

The reality is that when it comes to energy policy, the free market works. Indeed, the business environment for energy is robust despite seemingly endless forays by policymakers and bureaucrats into the energy industry. But those attempts to control energy markets do have an effect: They result in higher prices, fewer available energy sources, reduced competition, and stifled innovation. As federal interventions increase, so do the—almost always negative—effects. As a result, the U.S. is now dangerously close to a point where meddling by Washington could have a long-term negative impact on the standard of living of every American.

By attempting to force government-developed technologies into the market, **the government diminishes the role of the entrepreneur and crowds out private-sector investment**. **This practice of the government picking winners and losers denies energy technologies the opportunity to compete in the marketplace**, **which is the only proven way to develop market-viable products**. When the government attempts to drive technological commercialization, it circumvents this critical process. Thus, almost without exception, it fails in some way.

**The DOE may not be explicitly involved in commercialization**, **but the agency has intervened through** applied research, technology **development**, **and demonstration activities**, such as carbon capture and sequestration and biomass infrastructure. With respect to the DOE budget, necessary reforms generally fall into two major categories: (1) programs that the DOE should eliminate or privatize, and (2) programs for which the DOE should scale funding back significantly because they evolved well beyond the scope of basic research.

#### CP leads to better private sector adoption

Thorning, chief economist for the American Council for Capital Formation, 9/29/2011

(Margo, “Stop DOE's Double Down on Risky Energy Ventures,” http://energy.nationaljournal.com/2011/09/what-role-should-government-pl.php)

DOE's race against the clock to approve more guaranteed loans for energy projects that haven't been properly vetted is completely reckless after the Solyndra fiasco. **The government should limit its involvement and funding to basic research** on alternative energy sources and should not be funding risky “start-ups."

If a renewable technology makes economic sense, **the private sector will adopt it and it will succeed without mandates and subsidies**. Federal and state governments should not mandate renewable energy, it’s cost is usually at least twice that of conventional energy and places an economic burden on households and industry (see Energy Information Administration data on cost of renewable electricity at http://www.eia.gov/oiaf/aeo/electricity\_generation.html).

#### No risk of a solvency deficit – the private sector will cover development. Only research is a problem—

Congressional Budget Office June 2007

(“Federal Support for Research and Development,” http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/82xx/doc8221/06-18-research.pdf)

**Research**—especially basic research—generally **produces larger** external effects, or **spillovers, than development does**, suggesting that the government’s involvement in such research may lead to more spillovers than those generated by its support of development activities. The purpose of basic research (for example, physics research on the properties of elementary particles) is to make discoveries that expand scientific knowledge, even though commercial applications of that knowledge may be far in the future and not readily identifiable. Applied research (for example, the discovery of new materials for drug delivery) is a step closer to commercialization because it seeks to connect scientific knowledge to some practical purpose. Development applies scientific knowledge to the creation of specific marketable products. **The private sector has more of an incentive to invest in development activities than in basic or applied research**, for several reasons: the uncertainty surrounding the results of research, the long time horizon needed to commercialize research findings, the lack of connection of research in many instances to the current demand for products, or some combination of those factors. 15 And even if all of those problems could be addressed, underinvestment in research by the private sector might still occur, because the returns to research for private firms, unlike the social returns, do not encompass the benefits that research might bring to others who could also put that knowledge to use.

#### BUT the plan ensures boom-bust cycles that hollow out commercialization

Jenkins et al 12

Jesse Jenkins, Director of Energy and Climate Policy, Breakthrough Institute, Mark Muro, Senior Fellow, Metropolitan Policy Program, Brookings Institution, Ted Nordhaus and Michael Shellenberger, Cofounders, Breakthrough Institute, Letha Tawney, Senior Associate, World Resources Institute, Alex Trembath, Policy Associate, Breakthrough Institute, Beyond Boom & Bust: Putting Clean Tech on a Path to Subsidy Independence, www.brookings.edu/~/media/Research/Files/Papers/2012/4/18 clean investments muro/0418\_clean\_investments\_final paper\_PDF.PDF

Still, the reality is that until technological innovation and cost declines can secure independence from ongoing subsidy, clean tech segments will remain continually imperiled by the threat of subsidy expiration and political uncertainty. Meanwhile, public tolerance for significant energy subsidies or the internalization of higher prices for energy is limited.87 If clean energy technologies scale up without corresponding declines in price, this limited tolerance will eventually be expended, leading to another market bust. This means that the simple, perpetual extension of today’s clean energy subsidies and policies , with its somewhat passive approach to innovation, offers no sustainable path beyond a cycle of clean tech boom and bust.

#### Can't go commercial—no tritium breeding chain

Dittmar 11

Michael Dittmar, physicist at ETH, Zurich, and working at CERN, Energy, June 22, 2011, "Nuclear energy: Status and future limitations", http://ac.els-cdn.com/S0360544211003653/1-s2.0-S0360544211003653-main.pdf?\_tid=cd580cbad1ef14965a5b5b68b0addf14&acdnat=1345598387\_4b965c5d5e26b87ec64657ec1470d5c2

The distribution of the knowledge that the ITER project has absolutely nothing to do with commercial energy production and that, even if realized according to plans, not even some of the most basic tests required for a future even bigger fusion project can be performed. Among these required missing tests one ﬁnds that (1) the absolutely essential “tritium breeding chain” does not even function under ideal simulation conditions and (2) that a neutron radiation resisting material, which at the same time can survive the always occurring plasma eruptions, can be found. These and other fundamental problems have been presented in detail in the article “Fusion Illusions” [18] and in Chapter IV [9]. As explained, enough knowledge about the imagined tritium breeding process, required for a future commercial power plant, has already been accumulated and it is obvious that nobody within the fusion community has even the slightest idea on how this problem can be solved. One can be sure that once this still-well-hidden problem becomes common knowledge, the enthusiasm from the entire scientiﬁc community will disappear quickly.

#### Commercialization impossible

Keith Yost, MIT engineering student, 3/6/12, Opinion: Good riddance, Alcator C-Mod, tech.mit.edu/V132/N9/yost.html]

No one likes to hear that their work is a waste of time and money. But the job of government is not to assuage the egos of research scientists — the public welfare, writ large, comes first. In a guest column last week, Derek Sutherland ’12 bemoaned a proposed cut to state funding of the Alcator C-Mod reactor at MIT. I’m sorry Derek, but it needed to be said: your research was not worthy of the public’s money, and to be frank, was also not worth your time and attention as a researcher.

The reason why is simple: there is no future in magnetically confined fusion power. It will never be economical. We know how large the various layers of a commercial fusion reactor would have to be, and we can estimate the construction materials one would need to create such a reactor. Even if the very sizable technical hurdles were surmounted — magnetics, plasma physics, materials, and tritium availability to name a few — the capital cost of fusion’s heat island (the reactor sans turbines and other accouterments), would still be two to three times greater than that of a conventional fission reactor, on a per-MW basis. There is no pot of gold at the end of the long, long fusion research tunnel, and accordingly, little rational motivation to expend the time of Sutherland and his colleagues (and the money of the public) on such a fruitless venture.

One could argue that the other features of fusion power — its lack of a waste product, its sustainability, its steady energy generation rate, its relative safety — are compelling enough features to warrant a roll of the dice. I suppose that if one thought the safety issues of nuclear waste could never be resolved, or that the peakiness of wind power might never find an answer, such arguments could be justified. These assumptions, however, are overly pessimistic — if Derek were to ask his colleagues in Course 22 whether the kinks in fission power (safety, waste, uranium availability) could ever be solved, I think he would hear a chorus of resounding “Yes.” Nuclear reactors are already quite safe, and next generation plants are even safer. The waste is more a political issue than a technological one. And uranium is exceedingly abundant — if supplies seem short, that’s only because the price has not gone high enough to motivate fresh exploration. Certainly, the prospects of mending our existing technologies seem much brighter than the “just give us another 30 years” hope of fusion power.

Research like Derek’s is regularly billed as an investment in our future, but the more apt analogy is buying a Powerball ticket. This is not a sound roll of the dice, this is a move born out of frustration, desperation, and self-deception. It stems from a lack of political will to tackle the policy problems of today’s technology. Instead of bringing disparate stakeholders together to settle energy policy issues, we’d much rather cross our fingers and hope for a technological savior to deliver us from the need for political courage.

#### Wouldn’t be cost-competitive, even if tech was perfect

Robert Hirsch, Ph.D., directed the country’s fusion energy program in the 1970s through the Atomic Energy Commission, 10/16/12, A Veteran of Fusion Science Proposes Narrowing the Field, webcache.googleusercontent.com/search?q=cache:d7LiKtPi9zAJ:dotearth.blogs.nytimes.com/2012/10/19/a-veteran-of-fusion-science-proposes-narrowing-the-field/+&cd=1&hl=en&ct=clnk&gl=us&client=firefox-a

After decades of effort, a great deal has been learned and accomplished, but a practical fusion power concept has not been forthcoming. Note that I said ”practical fusion power.” Unlike fire, fusion power has to compete against a number of other options. The word “practical” means that a fusion power system must be desirable, based on the realities of the society into which it will be introduced. An unfortunate problem today is that many people in fusion research believe that producing a fusion-something that simply works is the goal, but that is definitely wrong! Fusion power and fire are distinctly different. Let’s consider some specific criteria for practical fusion power. In 1994, the U.S. Electric Power Research Institute – EPRI – convened a panel of utility technologists to develop “Criteria for Practical Fusion Power Systems.” The result was a four-page folder that outlined “Three principal types of criteria:” Economics, Public Acceptance, and Regulatory Simplicity. The criteria are almost self-explanatory, but let me quote from the Economics Criteria: “To compensate for the higher economic risks associated with new technologies, fusion plants must have lower lifecycle costs than competing technologies available at the time of commercialization.” Details for the criteria are given in the report, which I commend to anyone motivated to help develop fusion power. Against these criteria, let’s consider tokamak fusion, the centerpiece of which is ITER – the International Thermonuclear Experimental Reactor – under construction in France. As we know, it’s an enormously large machine, which is generally considered to be a prototype of a practical fusion power plant. Comparing the ITER and the core of a comparable commercial fission reactor shows an enormous difference in size – a factor of 5-10 — ITER being huge by comparison to a fission reactor core. It is known in engineering and technology development that the cost of a finished machine or product is roughly proportional to the mass of the device. Eyeballing ITER compared to a fission reactor core, it’s obvious that an ITER-like machine is many times more massive. Yes, you can argue details, like the hollow bore of a tokamak, but the size of the huge superconducting magnets and their heavy support structures provides no relief. Bottom line – On the face of it, an ITER-like power system will be much more expensive than a comparable fission reactor, so I believe that tokamak fusion loses big-time on cost, independent of details. Next, consider the fact that deuterium-tritium fusion inherently emits copious neutrons, which will induce significant radioactivity in adjacent tokamak structural and moderating materials. Accordingly, a tokamak power system will become highly radioactive as soon as it begins to operate and, over time, radiation damage will render those same materials structurally weak, requiring replacement. In the U.S., as elsewhere in the world, we have a Nuclear Regulatory Commission, which will almost certainly be given the task of ensuring that the public is safe from mishaps associated with tokamak power system failures. Expected regulation will require all kinds of safety features, which will add further costs to tokamak power. While the character of the plasma in a tokamak power reactor will not likely represent a large energy-release safety issue, the superconducting magnets would contain a huge amount of stored energy. If those magnets were to go normal – lose their superconducting properties – the energy release would be very large. It can be argued that the probability of that happening will be small, but it will nevertheless not be zero, so the regulators will require safety features that will protect the public in a situation where the magnets go normal, releasing very large amounts of energy. Accordingly, it is virtually certain that the regulators will demand a containment building for a commercial tokamak reactor that will likely resemble what is currently required for fission reactors, so as to protect the public from normal-going superconducting magnet energy release. Because an ITER-like tokamak reactor is inherently so large, such a building will be extremely expensive, further increasing the costs of something that is already too expensive. Next, there’s the induced radioactivity in the structure and moderator of a tokamak power reactor. Some tokamak proponents contend that structure might be made out of an exotic material that will have low induced radioactivity. Maybe, but last I looked, such materials were very expensive and not in common use in the electric power industry. So if one were to decide to use such materials, there would be another boost to cost, along with an added difficulty for industry to deal with. No matter what materials are chosen, there will still be neutron-induced materials damage and large amounts of induced radioactivity. There will thus be remote operations required and large amounts of radioactive waste that will have to be handled and sent off site for cooling and maybe burial. That will be expensive and the public is not likely to be happy with large volumes of fusion-based radioactivity materials being transported around the country. Remember the criteria of public acceptance. I could go on with other downsides and showstoppers associated with tokamak fusion power, but I won’t. It is enough to say that tokamak fusion power has what I believe are insurmountable barriers to practicability and acceptability. By the way, my arguments assume that tokamak physics and technology works well and is reasonably simple, meaning that not many more components will have to be added to the system to allow it to operate on a steady basis for very long periods of time between the long shutdowns needed to change out radiation-damaged, radioactive materials. What I’ve just described is not a happy story. At some point, probably in a matter of years, a group of pragmatic power industry engineers will be convened to seriously scrutinize tokamak fusion, and they are virtually certain to declare that it cannot become a practical power system. That will certainly be a calamity for the people involved and for the cause of fusion power. Let’s review what I’ve said. First, we have to recognize that practical fusion power must measure up to or be superior to the competition in the electric power industry. Second, it is virtually certain that tokamak fusion as represented by ITER will not be practical.

## AT: Valley of Death

#### Plus, “valley of death” doesn’t exist –it’s just an excuse to explain failed ideas

Glenn, writer for Med City News, 2/10/2012

(Brandon, “Is the early stage funding valley of death a myth?,” http://medcitynews.com/2012/02/is-the-early-stage-funding-valley-of-death-a-myth/#ixzz2GxtiPq53)

You can’t read much about the venture capital industry before you start hearing about the so-called “valley of death” for early stage companies.

Conventional wisdom holds that young companies enter that valley, in which attracting investment capital becomes extremely difficult, at an early stage, typically between an initial round of angel funding and the company’s first institutional series A round.

But is the whole valley of death concept just **media-fueled hype**? Maybe so.

“From my perspective, there is no valley of death,” said Tim Moran, CEO of PediaWorks, speaking on an Ohio Venture Association panel on the topic.

As Moran pointed out, if you subscribe to the theory of efficient markets, then it’s tough to say there are tons of investment-worthy deals floating around that aren’t drawing cash.

When it comes to capital funding, the continuum typically looks like a funnel: In the early stages, lots of companies can get an investment, but as time goes on, more and more companies encounter problems and drop off. (Think of companies failing as the narrowing of the funnel.)

That’s essentially nothing more than a culling of the herd, a Darwinian means of separating the companies that can prosper from those that can’t.

Plus**, angel investors**, to some extent, and the government, to a lesser extent, have stepped up to **fill the void** created by a thinning of the ranks of venture capital firms in funding young companies.

Unfortunately, **the hard truth** for many hungry and hardworking entrepreneurs **is that if you fail at fundraising**, **there’s probably a** good **reason** for it.

“Maybe your idea just isn’t good enough, or you’re not a good enough entrepreneur,” Moran said.

## navy

No money means no new modernization

Murdoch, senior advisor, Sayler, and Crotty, research associates – CSIS, 10/18/’12

(Clark, Kelley, and Ryan, “The Defense Budget’s Double Whammy: Drawing Down While Hollowing Out from Within,” <http://csis.org/files/publication/121018_Murdoch_DefenseBudget_Commentary.pdf>)

Thus, this drawdown will be **much more serious** than those of years past. Why? Because the aggregate impact of inflation in the cost of personnel, health care, operations and maintenance (O&M), and acquisitions results in a defense dollar that “buys” less and less capability.

This internal cost inflation is driving DoD toward a **zero-sum trade-off between personnel end-strength and modernization** (see Figure 2).

Among the largest contributors to internal cost inflation is the military personnel (including health care) account. As DoD’s own “Defense Budget Priorities and Choices: January 2012” has noted, “the cost of military personnel has grown at an unsustainable rate over the last decade…Within the base budget alone…personnel costs increased by nearly 90 percent or about 30 percent above inflation [since 2001], while the number of military personnel has increased by only about 3 percent.”

Operations and maintenance (O&M) costs have similarly ballooned over the past few decades. The Congressional Budget Office (CBO) reports in “Long-Term Implications of the 2012 Future Years Defense Program” that O&M costs per active-duty service member doubled from $55,000 to $105,000 (in constant 2012 dollars) between 1980 and 2001. These costs rose to $147,000 in DoD’s 2012 base-budget request and were projected to “grow at more than one and one-half times the historical (pre-2001) rate through the Future Years Defense Program (FYDP) period, reaching $161,000 in 2016.” While the rate of growth is expected to slow beyond 2016, CBO expects per capita O&M costs to reach $209,000 by 2030.

In combination, **inflation in these accounts will squeeze out** all funding **for** modernization (**procurement** and **research**, **development, test, and evaluation** [RDT&E]) in 2020, as depicted in Figure 2, if current trends are allowed to continue. This will, in the absence of extensive reform, force DoD to choose between sustaining end-strength and sustaining modernization. It cannot do both.

The Zero-Sum Trade-Off

The CSIS study team calculates that restoring modernization’s share of the FY2021 defense budget to 32 percent (the level of effort in the FY2001 budget) would require cutting end-strength by 455,000 active-duty service members, leaving the services with an end-strength of 845,000 (see Figure 3). This zero-sum trade-off will produce far more severe and disruptive consequences than is generally recognized by the department, requiring, at the very least, a wholesale recalibration of U.S. defense strategy and force posture.

The Squeeze on Discretionary Spending

This choice between modernization and end-strength will almost certainly remain even if sequestration is averted by congressional action. This is because discretionary spending tradespace (for both defense and nondefense accounts) is being squeezed out by mandatory spending—which includes spending on veteran benefits, income security, social security, Medicare, and Medicaid—and interest payments. And given Democratic aversion to entitlement cuts and Republican antipathy to tax increases, the defense budget, which constitutes 54 percent of discretionary spending, will likely be forced to absorb additional reductions under any scenario. (Estimates of the scale of alternatives to sequestration range from a total of $1 trillion to $1.5 trillion. Senate Armed Services Committee chairman Carl Levin has suggested that an additional $100 billion reduction over 10 years would be “realistic”.)

Regardless of the distribution of any cuts, however, mandatory spending and interest payments are expected to consume the entirety of the U.S. budget by 2036, leaving no discretionary tradespace for either defense or nondefense accounts (see Figure 4).

Military will run out of cash—means zero new platforms or programs

Spring, research fellow in national security – Heritage, 12/21/’11

(Baker, “An Unacceptable Squeeze on Defense Modernization”)

Following the enactment of the Budget Control Act earlier this year, the budget for the core defense program is already operating under stringent spending caps. At the same time, per capita expenditures for paying military personnel and operating the force are high and growing rapidly. Under these circumstances, funding for the procurement of new weapons and equipment and for research and development on new defense technologies will be squeezed to a dangerous degree.

A Looming Disaster for the Military and U.S. Security

Both the Obama Administration and Congress will be tempted to leave the defense spending caps in place—if not to go to even lower caps—now that the sequestration process could be applied to the defense budget under the Budget Control Act. This is a result of the failure of the Joint Select Committee on Deficit Reduction (“super committee”) to agree on an alternative deficit-reduction plan and adopt a policy of “people over platforms” in slicing up the defense budget pie. Given the uncertainties in the application of the sequestration process, it is impossible to calculate precisely how much more the modernization accounts will be squeezed if that process kicks in. Suffice it to say that the problem is likely to become dramatically worse.

The implications of the coming squeeze on defense modernization under the existing spending caps should cause **great alarm** for all concerned, particularly since it comes on the heels of the “procurement holiday” of the 1990s. The result will be a military that lacks the modern weapons and equipment it needs, loses its technological edge over future enemies, and finds itself dependent on a seriously eroded defense industrial base.

Congress will have to take two essential steps to avoid a disastrous outcome for the military and U.S. security. First, it will have to increase the existing caps on spending for the core defense program and find savings elsewhere in the federal budget to offset this change, in accordance with Heritage’s December 5 recommendations.[1] Second, it will have to take steps to constrain per capita growth in the cost of compensating military personnel.

The Sources of the Modernization Squeeze

There are two sources of the squeeze on military modernization. First, the Budget Control Act has established caps on spending for national security and discretionary spending over the next 10 years that translate into inadequate defense budgets under any circumstance. These caps will constitute top-down pressure on the modernization accounts (procurement and research and development) within the defense budget.

This top-down pressure will be accompanied by significant pressure from underneath by growth in both the overall and per capita costs of compensating military personnel. These increasing costs are largely driven by the array of defined benefits offered by the Department of Defense to military service members and their dependents, which fall mostly in the areas of military retirement and health care. These would be more effective and efficient if they were converted to defined-contribution plans.

According to the Department of Defense (DOD), its overall military manpower costs will rise from roughly $148 billion today to more than $160 billion in fiscal year (FY) 2016. This increase will come in spite of proposed reductions in the number of people serving in the active-duty military. Although the number of active-duty military personnel is projected to drop by about 5 percent from FY 2012 through FY 2016, military personnel spending will rise, thanks to growing per capita compensation costs. Per capita compensation for active-duty personnel is projected to rise by more than 13 percent during the same five-year period.

The reduction in the number of active-duty military personnel, as currently projected by the Obama Administration, will create a force that is too small to defend the vital interests of the United States. The Heritage Foundation has recommended that this reduction not be imposed. Accordingly, DOD’s projection of total military manpower costs is well below what is prudent. It is also appropriate to point out that while, according to the Congressional Budget Office, the overall per capita costs for operation and maintenance will come down with the withdrawal of U.S. forces from Iraq and Afghanistan, the per capita costs for operations and maintenance within the core defense program will continue to rise as well.

The Scope of the Modernization Squeeze

As a result of the twin pressures of the estimated spending caps on the core defense program derived from the Budget Control Act—which still excludes the more stringent caps that would result from the imposition of a partial or full sequestration under the Act—and the rising cost of military compensation, the level of funding for military modernization will necessarily fall to unacceptably low levels. (See chart.) Under this scenario, funding for defense modernization within the core defense program (defined as the sum of DOD’s procurement account and research, development, test, and evaluation account) could fall to roughly $145 billion in current dollars in FY 2016.

By way of comparison, $188.4 billion was to go to these accounts under President Obama’s original budget request for FY 2012. Thus, the level of modernization funding is estimated to decline by about $43 billion in current dollars, or 23 percent, over the four-year period. In terms of inflation-adjusted dollars, the decline will be roughly $54 billion (in FY 2012 dollars), or about 29 percent. In other words, President Obama’s original request for the core DOD budget would have devoted roughly 34 percent of that budget to modernization. By 2016, modernization funding could fall to about 26 percent of total DOD funding for its core program.

When these comparisons are expanded to provide a broader perspective, the situation becomes even more alarming. For example, the Department of Defense spent more than $226 billion on modernization in FY 1985 (in FY 2012 dollars). This was 39 percent of the total DOD budget. That means DOD could be on a path to cutting modernization’s share of its total budget to little more than one-half of what it was in FY 1985.

Any new modernization will be upgrades, not new tech

Garcia, North American communications department – Frost & Sullivan, 10/3/’12

(Jeannette, “United States Defense Budget Cuts Threaten "New Start" Ground Combat Vehicles, Finds Frost & Sullivan,” <http://www.frost.com/prod/servlet/press-release.pag?docid=267315751>)

MOUNTAIN VIEW, Calif. - October 3, 2012 - The Budget Control Act (BCA) of 2011 could force the Department of Defense (DoD) to cut approximately $1 trillion in spending over the next 10 years, **as well as** significantly reduce military expenditures for new weapons systems. This is expected to drive the development of cost-effective, modern, multi-purpose ground combat vehicles (GCV) that can be deployed in urban, rural and coastal terrain.

New analysis from Frost & Sullivan (http://www.defense.frost.com), Analysis of the DoD Ground Combat Vehicle Market, finds that the GCV market generated revenues of over $3.67 billion in 2011 and estimates that revenues will decrease to $3.19 billion by 2017. The DoD has earmarked a budget of $2.61 billion for GCVs, with the Army accounting for $2.18 billion of the total purse.

If you are interested in more information on this research, please send an email to Jeannette Garcia, Corporate Communications, at jeannette.garcia@frost.com, with your full name, company name, title, telephone number, company email address, company website, city, state and country.

The February 2011 report on defense intelligence from the Defense Science Board Task Force identified 24 countries that could pose counterinsurgency (COIN) challenges to the United States, revealing that traditional combat is giving way to irregular warfare (IW). COIN operations usually involve long, sustained ground engagements and current COIN as well as nation-building activities in countries such as Iraq, Afghanistan, Libya and Yemen drive the continued need for GCVs.

"Mandated budget cuts, reductions in ground troops and the shift in military strategy to the Asia Pacific will force armed services to make tough decisions on the type of programs they need to cut, reduce, maintain or increase," said Frost & Sullivan Senior Industry Analyst Michael Blades. "If sequestration occurs, all GCV modernization programs are likely to be terminated."

To maintain a balanced force, services need networked vehicles for full-spectrum operations. Future combat vehicles must give soldiers the option of off-road maneuvering, greater protection against improvised explosive devices (IEDs) on established roads, better mobility in urban areas and enhanced on-the-move communication and networking capabilities.

"Next-generation platforms are also likely to be based on existing commercial or government off-the-shelf vehicles," said Blades. "Upgrades will be preferred over building vehicles from-the-ground-up."

Specifically crushes new vehicles

CSBA, Center for Strategic and Budgetary Assessments, 3/12/’12

(<http://www.csbaonline.org/2012/03/12/analysis-dod-budget-will-severely-constrain-army-marine-vehicle-modernization/>)

The Army and Marine Corps will be in the market for a new generation of ground vehicles soon. But acquisition officials there should think hard before they buy, according to Dr. Andrew Krepinevich, the president of the Center for Strategic and Budgetary Assessments (listen to interview)

The modernization of Army and Marine Corps ground vehicles is the subject of a recent CSBA report, “The Road Ahead: Future Challenges and Their Implications for Ground Vehicle Modernization.”

Krepinevich and his co-author, Eric Lindsey, wrote that the while both services are in the early stages of vehicle modernization, those efforts “will be severely constrained by the budget cuts looming over the Department of Defense.”

) Bureaucratic reluctance to deploy, delayed response

Watts 12

Robert, graduate of the Coast Guard Academy, Captain Watts has served six sea tours with the Navy and Coast Guard, most recently commanding USCGC Steadfast (WMEC 623). A qualified Surface Warfare Officer and Cutterman, he holds advanced degrees from the Naval War College, Old Dominion University, American Military University, and the Naval Postgraduate School, and he is currently a doctoral candidate at the Royal Military College of Canada (War Studies). The New Normalcy-Sea Power and Contingency Operations in the Twenty-First Century

http://www.usnwc.edu/getattachment/87e866a1-24dd-4e91-9ffa-cb0f64f15144/The-New-Normalcy--Sea-Power-and-Contingency-Operat.aspx

The inherent mobility of sea power means largely what it does in the traditional role—modern technology allows global reach in three dimensions and almost instant operational coordination worldwide. But the primary barrier to mobility in crisis-contingency operations is not technological. If mobility is to be exercised, ships must actually sail, and it is here—in the commitment of resources to a crisis —that things become culturally problematic. Despite the need, the answer to a crisis contingency is not always to employ sea power immediately. This cultural hesitancy has two aspects. The first is so deeply ingrained in the American psyche that it is more a matter of legend than of practical discussion. The United States has a long-standing tradition of rejecting the use of military forces in the domestic context, a rejection that dates back to the Revolution. It was codified in law with the passing of the Posse Comitatus Act of 1878, which directs that military forces (specifically the U.S. Army) cannot engage in domestic law enforcement.18 The legislation is often misinterpreted as meaning that any domestic use of military forces is illegal; that is not the case, but it is nevertheless widely believed in both civilian and military 56 NAVAL WAR COLLEGE REVIEW circles.19 Thus before naval forces can be committed to a crisis, a comprehensive legal review is often demanded, something that takes time—time that is usually not available. Another cultural barrier arises from service ethos. Bluntly, warships are designed and train to fight. In the modern high-tech era, naval warfare is a very specific (and expensive) proposition. It demands very sophisticated and specialized equipment. The radar on an Aegis cruiser, for example, is exceptionally good at tracking and destroying enemy aircraft—but only that. In a crisis contingency that marginalizes that purpose of a platform’s defining systems, the purpose of the platform itself could be called into question. According to this logic, if a vessel is employed (albeit successfully) for a purpose for which it is not designed, the door is opened for its increasing use for that purpose and not its proper one. In the grand scheme of things, warships used for other purposes are not training for war; in the short term this leads to a loss of readiness for combat, while in the longer term it could mean the elimination of platforms altogether in favor of others more suitable for noncombat missions. Although this seems to be a largely philosophical argument, in a shrinking budget environment it is not without a certain politically compelling logic. The effects of these factors are not insignificant. In recent crisis contingencies (the mass migration operations of 1994 and Katrina) the arrival of naval vessels was delayed while legal and operational impact issues were addressed, in the Katrina case so long as to become a national embarrassment.20 Bureaucratic reasons, not materiel, were the culprits, ultimately to the detriment of the response. Hesitancy can be fatal in an operation requiring rapid response, and culture and bureaucracy can conspire to encourage just that.

## Debris

## AT: Laser Fusion / NIF

#### Laser fusion fails—slew of technical issues their ev glosses over

Paine 10

Christopher Paine, Director

NRDC Nuclear Program

December 16, 2010

http://docs.nrdc.org/nuclear/files/nuc\_11010601b.pdf

Obviously, a lot can and historically has gone wrong with a scheme as complex and uncertain as indirect-drive ignition in the NIF:

• The intense ultraviolet light from the lasers can damage their costly final focusing optics, forcing reductions in the amount of laser energy that is available for focusing on the inside walls the hohlraum.

• The hot plasma created by the first arriving light beams can interfere with the light arriving in the later portion of the pulse, a partially understood process called “laserplasma instability,” avoidance of which has shaped many of the basic NIF design decisions

• The 48 individual beam “quads” (groups of 4 laser beams) that share frequency conversion crystals and final focusing optics must simultaneously be very tightly focused but also nearly uniform in their distribution of the light’s intensity across the beam in order to control precisely the deposition of energy within the hohlraum. Techniques used to “smooth” the beam trade off a larger focal spot size – which can be a problem in its own right -- for reduced fluctuation in the intensity of the light striking the inner walls of the hohlraum.

• Without a form of smoothing called “spectral dispersion” – i.e. deliberately dispersing the beam energy across a wider band of frequencies around the light’s central frequency -- hot spots can form in the beam that push the plasma in the hohlraum out of the way, via photon pressure. The resulting lower plasma density has a higher index of refraction, thus acting like a miniature lens. These plasma lenses focus the laser hot spots, increasing their intensity, and thus aggravate the problem of “laser-plasma instability,” which in turn reduces the conversion of light energy into x-rays and thus the amount and distribution of energy available to compress and heat the target.

Multiple inner and outer “cones “of laser beams streaming in from both ends of the holhraum can interact in ways that transfer energy from one beam to another, redistributing it in unpredictable ways.

• The x-ray flux from the hot plasma produced by the laser beams striking the gold walls at designated points on the inner surface of the hohlraum may not have the specific spatial and temporal distribution of energy needed to compress the capsule uniformly (via rocket ablation of its plastic outer surface) thereby preventing the central “hotspot” from achieving the required temperature for fusion.

• The process of plasma formation can give rise to unpredictable streams of hot electrons that penetrate the target, “pre-heating” it and preventing the necessary degree of compression.

• Inertial confinement of the fleeting central “hotspot” long enough to ensure its propagation into the colder surrounding fuel may not occur at achievable levels of energy deposition in the target, or may be undermined by the growth of “hydrodynamic instabilities” in the imploding shell material that destroy the uniformity of the implosion and curtail hot spot formation.

• To prevent or compensate for all these different effects, the NIF scientists must not only be able to diagnose and quantify them-- itself a major technical challenge—but also understand their interdependence.

Dr. Bodner’s assessment suggests strongly that the problems of light-scattering laser-plasma instabilities, and unpredictable beams of high-energy electrons preheating the tiny target, remain potential showstoppers for indirect-drive ICF, 13 years after an earlier biased and conflicted NAS Review Committee had deemed them vanquished. And he notes that for decades, NIF target designers have been neglecting a fundamental physical effect – dielectronic recombination -- in their computer modeling, despite the billions of dollars the nation has expended on giving them the most advanced computational facilities in the world. (For more on the history and problems of the NIF Project, see the “Comments of Christopher Paine to the NAS Committee on Prospects for Inertial Fusion Energy,” also posted on the Nuclear Program web page)

#### Not happening

Clery 9/21/12

<http://fire.pppl.gov/NIF_Science_Clery_092112.pdf>

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.

The most recent internal NNSA review of NIF, dated 19 July—aggregating the views of 10 experts from other labs and universities— concluded that the probability of achieving ignition before the end of December is “extremely low.” Even the lesser target of observing helium nuclei from fusion reactions heating the surrounding fuel was deemed “challenging.” The reviewers highlighted several problems, but their most pressing concern was that Livermore’s computer simulations were not accurately predicting what the researchers were seeing. The simulations say that the shots NIF is doing now should be igniting, but the ITFX values show they are far from it. This mismatch means the simulations “are of limited utility in choosing the next set of experiments to perform,” the reviewers said.

#### Energy from lasers is a pipe dream

Mick 10/9/12

<http://www.dailytech.com/article.aspx?newsid=27875>

techDaily staff

But according to IEEE Spectrum editor Bill Sweet, a veteran of India's nuclear power development project, most physicists view laser-contained (aka. "inertial confinement") fusion ignition as a pipe dream. He argues that most agree that magnetic confinement fusion is far more likely to be realized, though still a difficult problem.

William Broad, chief nuclear issues reporter for The New York Times, agrees. He writes that the National Nuclear Security Administration's project overseer, Donald L. Cook, has serious concerns. He quotes Mr. Cook as saying, that even with the latest power milestone considered, the project simply "has not worked", and that the NNSA is "going to settle into a serious investigation" of the NIF's sliding ignition deadline.

#### All our fusion fails warrants apply even more to laser fusion

Cookson 10

live Cookson, FT's science editor, Financial Times, January 15, 2010, "R&D: Nuclear fusion may be worth the long wait", http://search.proquest.com.ezproxy.usd.edu/docview/229309469/138B079FC5D421F7BD/88?accountid=14750

While Iter will eventually produce a "burning plasma", with a self-sustaining fusion reaction lasting at least 10 minutes and generating 500MW of energy, it is not designed to be a power station. The task of demonstrating sustained large-scale power generation from fusion will fall to Iter's successor, called Demo. On the most optimistic timescale, Demo would come into operation in the 2030s and feed power into the grid around 2040. But widespread commercialisation would take much longer. Iter itself talks of the world entering the age of fusion "when mankind covers a significant part of its energy needs with an inexhaustible, environmentally benign and universally available resource" by the last quarter of this century. The alternative approach, laser fusion, is unlikely to be any quicker. Its showcase is the National Ignition Facility at the Lawrence Livermore National Laboratory in California. NIF has been built by the US government during the past 10 years at a cost of about $4bn. It is a dual-purpose facility, offering a means of testing nuclear weapons without actually detonating a bomb, as well as energy generation. The world's most powerful laser system will have 192 X-ray beams focusing all of their energy on a small pellet of frozen hydrogen which - if all goes well - will burn for a short while like a miniature star. Laser testing at NIF is going well and the first hydrogen targets may be introduced later this year. A European fusion experiment called High Power Laser Energy Research facility or HiPER, operating on similar principles but not designed for weapons testing - and therefore less costly than NIF - has been proposed, with construction due to start in the middle of this decade and operation in the early 2020s. But it will be a long engineering step from igniting miniature stars in a laser facility to building a commercial fusion power station. There is no good reason to assume that lasers would be any quicker than magnets to come to fruition, although it seems reasonable for the world not to put all its fusion eggs in one basket

#### Laser fusion doesn’t work and not key to SSP

New York Times, 10/7/12, A Big Laser Runs Into Trouble, Lexis

After spending more than $5 billion to build and operate a giant laser installation the size of a football stadium, the Energy Department has not achieved its goal of igniting a fusion reaction that could produce energy to generate power or simulate what happens in a nuclear weapon. The latest deadline for achieving ignition was last Sunday, Sept. 30, the end of fiscal year 2012, but it passed amid mounting concerns that the technical challenges were too great to be mastered on a tight time schedule. Congress will need to look hard at whether the project should be continued, or scrapped or slowed to help reduce federal spending. The idea of using lasers to trigger fusion reactions to produce energy dates back many decades, but the idea of using laser fusion for weapons research became more important when underground nuclear testing was curtailed by treaty in the 1990s. The new laser facility, built between 1997 and 2009 and known as the National Ignition Facility, uses 192 lasers to fire light beams at tiny targets, smaller than peppercorns, filled with hydrogen atoms. The resulting compression and heat are supposed to fuse the atoms into helium, releasing bursts of thermonuclear energy. But technical reviews this year of the experiments conducted so far have made it clear that the scientists in charge do not fully understand how the process is working and may not be able to achieve ignition quickly. Scientists at the Lawrence Livermore National Laboratory, in Livermore, Calif., which operates the facility, cite numerous technical advances gained in more than 1,000 experiments, including firing the world's most powerful laser bursts and developing unsurpassed diagnostic instruments to measure what happens under intense heat and pressure. The review panels cite scientific and technological progress but also say that progress has been slower than anticipated. As William Broad reported in The Times last Sunday, there is a sharp split among experts on whether the project -- one of the most expensive federally financed projects ever -- is worth the money. Just operating it costs roughly $290 million a year. The laboratory's supporters say the facility deserves continued funding because it conducts advanced research and will play an important role in assessing whether fusion will someday become a feasible energy source. They also say that it keeps highly talented weapons designers at work on important national security issues. If the main goal is to achieve a power source that could replace fossil fuels, we suspect the money would be better spent on renewable sources of energy that are likely to be cheaper and quicker to put into wide use. Even if ignition is achieved in the laboratory in the next several years, scaling up to a demonstration plant will cost billions and may ultimately show that fusion is not a practical source of power. The fallback argument -- that laser fusion allows scientists to simulate conditions at the core of a nuclear explosion and verify the reliability of the nation's nuclear stockpile without having to test a weapon -- is disputed by some experts who think the stockpile will be reliable for decades.

#### Even more unlikely that magnetic fusion

Mick 10/9/12

<http://www.dailytech.com/article.aspx?newsid=27875>

techDaily staff

He adds, "For decades the joke about magnetic confinement fusion--much the more plausible approach to harnessing the energy of the sun--is that the technology is always 20 years away. So when will inertial confinement fusion be delivering commercial electricity? That one is easy. Never."

It sounds like there's some serious credibility question regarding the project's security and energy claims. That said, there might be some merit to the project, even if Mr. Sweet is at least partially right.

#### Their ev is biased—Livermore reports failures as success stories

Bodner 10

http://docs.nrdc.org/nuclear/files/nuc\_11010601a.pdf

Dr. Bodner received his Ph.D. in physics from Princeton University. From 1964 to

1974 He worked at the Department of Energy’s Lawrence Livermore National

Laboratory in Livermore, CA, first in the magnetic fusion program and then in the laser

fusion program. In 1974 he joined the laser fusion program at the Naval Research

Laboratory (NRL), and in 1975 was appointed the head of that program. The NRL laser

fusion program, funded by DOE, then grew into a large team effort in all aspects of

laser fusion: fusion target design, laser design and construction, and laser-target

experiments and theory. He is the author or co-author of numerous papers in referred

journals, and has been a Fellow of the American Physical Society since 1980. He retired

from NRL in 1999, and was a member of the congressionally-mandated 2005 review of

the NIF ignition target design.

In large organizations of any type, sometimes, but not always, there is a dichotomy between what the senior management says and what is seen at the worker level. The management will say: “Yes, there were some problems before, but everything is under control now, and success seems assured.” Meanwhile the workers are facing big problems with no clear solution. Sometimes one should believe the management. They have a better overview of the situation, better judgment, and more experience. Things do work themselves out sometimes, in spite of apparent disasters. At other times the management is arrogant, or disconnected from reality, or too deeply committed to be able to recognize defeat, or too desirous of keeping the money flowing in from investors and sponsors, and the program eventually fails. At the Chicago meeting I saw this management reassurance and worker uncertainty, and the question is, should one buy the optimistic story?

Claim of successful NIF implosions has been overstated In the Fall of 2009 Livermore Lab began attempts at target implosions using the NIF facility. The first implosions had more pressure on the poles of the capsule than the equator, and the implosions pancaked. However by use of a novel “plasma optical mixing” near the entrance holes of the hohlraum, they were able to shift some of the laser energy from one set of laser beams to another. This rebalanced the pressure around the capsule and produced a roughly symmetric implosion, with total light reflection in the range of 10–15% (their previous claims of lower reflection have been retracted). In the Fall of 2010 the NIF energy was successfully increased to 1.3 MJ, and the hohlraum wall generated an x-ray radiation temperature of 300 eV. This is the laser energy and temperature that they plan to use for their attempts at ignition.

One of the 2009 implosion experiments produced a symmetric-looking implosion when viewed from the equator. 1 However all of the other laser shots, including ones that they claimed were symmetric, show a very blotchy appearance which indicates to me that the capsule is breaking apart during the implosion. What they claimed was a success looks to me like a failure.

Their claim of 10–15% total reflection also understates the problem of light scattering. Two-thirds of the NIF laser beams have negligible reflection; for the other third the reflections are in the range of 25–40%, or even higher. This is a big problem.

## impacts

## AT: Korean War

#### Zero risk of Korean conflict

Ashley **Rowland**, 12/3/20**10**. Stars and Stripes. “Despite threats, war not likely in Korea, experts say,” http://www.stripes.com/news/despite-threats-war-not-likely-in-korea-experts-say-1.127344?localLinksEnabled=false.

Despite increasingly belligerent threats to respond swiftly and strongly to military attacks, analysts say there is one thing both North Korea and South Korea want to avoid: an escalation into war. The latest promise to retaliate with violence came Friday, when South Korea’s defense minister-to-be said during a confirmation hearing that he supports airstrikes against North Korea in the case of future provocations from the communist country. “In case the enemy attacks our territory and people again, we will thoroughly retaliate to ensure that the enemy cannot provoke again,” Kim Kwan-jin said, according to The Associated Press. The hearing was a formality because South Korea’s National Assembly does not have the power to reject South Korean president Lee Myung-bak’s appointment. Kim’s comments came 10 days after North Korea bombarded South Korea’s Yeonpyeong island near the maritime border, killing two marines and two civilians — the first North Korean attack against civilians since the Korean War. South Korea responded by firing 80 rounds, less than half of the 170 fired by North Korea. It was the second deadly provocation from the North this year. In March, a North Korean torpedo sank the South Korean warship Cheonan, killing 46 sailors, although North Korea has denied involvement in the incident. The South launched a series of military exercises, some with U.S. participation, intended to show its military strength following the attack. John Delury, a professor at Yonsei University in Seoul, said South Korea is using “textbook posturing” to deter another attack by emphasizing that it is tough and firm. But it’s hard to predict how the South would respond to another attack. The country usually errs on the side of restraint, he said. “I think they’re trying to send a very clear signal to North Korea: Don’t push us again,” Delury said. “For all of the criticism of the initial South Korean response that it was too weak, in the end I think people don’t want another hot conflict. I think the strategy is to rattle the sabers a bit to prevent another incident.” Meanwhile, Yonhap News reported Friday that North Korea recently added multiple-launch rockets that are capable of hitting Seoul, located about 31 miles from the border. The report was based on comments from an unnamed South Korean military source who said the North now has 5,200 multiple-launch rockets. A spokesman for South Korea’s Joint Chiefs of Staff would not comment on the accuracy of the report because of the sensitivity of the information. Experts say it is a question of when — not if — North Korea will launch another attack. But those experts doubt the situation will escalate into full-scale war. “I think that it’s certainly possible, but I think that what North Korea wants, as well as South Korea, is to contain this,” said Bruce Bechtol, author of “Defiant Failed State: The North Korean Threat to International Security” and an associate professor of political science at Angelo State University in Texas. He said North Korea typically launches small, surprise attacks that can be contained — not ones that are likely to escalate. Delury said both Koreas want to avoid war, and North Korea’s leaders have a particular interest in avoiding conflict — they know the first people to be hit in a full-scale fight would be the elites.

## AT: Iran Prolif

#### No iran prolif and the timeframe is huge

Colin H. **Kahl 12**, security studies prof at Georgetown, senior fellow at the Center for a New American Security, was Deputy Assistant Secretary of Defense for the Middle East, “Not Time to Attack Iran”, January 17, <http://www.foreignaffairs.com/articles/137031/colin-h-kahl/not-time-to-attack-iran?page=show>

Kroenig argues that there is an urgent need to attack Iran's nuclear infrastructure soon, since Tehran could "produce its first nuclear weapon within six months of deciding to do so." Yet that last phrase is crucial. The International Atomic Energy Agency (IAEA) has documented Iranian efforts to achieve the capacity to develop nuclear weapons at some point, but there is no hard evidence that Supreme Leader Ayatollah Ali Khamenei has yet made the final decision to develop them. In arguing for a six-month horizon, Kroenig also misleadingly conflates hypothetical timelines to produce weapons-grade uranium with the time actually required to construct a bomb. According to 2010 Senate testimony by James Cartwright, then vice chairman of the U.S. Joint Chiefs of Staff, and recent statements by the former heads of Israel's national intelligence and defense intelligence agencies, even if Iran could produce enough weapons-grade uranium for a bomb in six months, it would take it at least a year to produce a testable nuclear device and considerably longer to make a deliverable weapon. And David Albright, president of the Institute for Science and International Security (and the source of Kroenig's six-month estimate), recently told Agence France-Presse that there is a "low probability" that the Iranians would actually develop a bomb over the next year even if they had the capability to do so. Because there is no evidence that Iran has built additional covert enrichment plants since the Natanz and Qom sites were outed in 2002 and 2009, respectively, any near-term move by Tehran to produce weapons-grade uranium would have to rely on its declared facilities. The IAEA would thus detect such activity with sufficient time for the international community to mount a forceful response. As a result, the Iranians are unlikely to commit to building nuclear weapons until they can do so much more quickly or out of sight, which could be years off.

# 1NR

## ice age

No scientific basis for cooling

**Nuccitelli 11** (Dana Nuccitelli is an environmental scientist at a private environmental consulting firm in the Sacramento, California area. He has a Bachelor's Degree in astrophysics from the University of California at Berkeley, and a Master's Degree in physics from the University of California at Davis. He has been researching climate science, economics, and solutions as a hobby since 2006, and has contributed to Skeptical Science since September, 2010., 1/4/2011, "Are We Heading Into Global Cooling?", www.skepticalscience.com/future-global-cooling.htm)

Claims have recently surfaced in the blogosphere that an increasing number of scientists are warning of an imminent global cooling, some even going so far as to call it a "growing consensus". There are two major flaws in these blog articles, (i) there is no scientific basis for claims that the planet will begin to cool in the near future, and (ii) many of the listed scientists are not predicting global cooling. In the face of the immense amount of evidence that the anthropogenic warming signal is driving the long-term temperature trend, it's hard to believe that any scientists would be predicting that this trend will suddenly reverse despite ever-increasing human greenhouse gas emissions. For example, according to NASA GISS, 2009 was tied for the second-hottest year on record, and 2010 will likely be the hottest in the past 130+ years. The first decade of the 21st century was the hottest decade on record, the evidence is overwhelming that humans are the dominant cause of the warming trend, climate scientists have even quantified the anthropogenic warming, and heat continues to accumulate in the planetary system: With all of this evidence that humans are causing rapid global warming with no end in sight, one has to wonder how on Earth any scientists would suddenly predict imminent global cooling. Who Are these Scientists Predicting Cooling? Some of the names on the lists of 'scientists predicting global cooling' have been predicting imminent cooling for years now, like Don Easterbrook, Syun Akasofu, Habibullo Abdussamatov, Joe D'Aleo, and Nicola Scafetta. Many of these and other names on these lists are not climate scientists, which is no doubt why the claims specify that an increasing number of scientists as opposed to climate scientists are predicting imminent cooling. One also has to wonder how long the planet must continue to warm while these individuals predict imminent cooling before they lose credibility. Don Easterbrook, for example, has predicted that we should see a global cooling of 2 to 5°F (1.1 to 2.8°C) from 2000 to 2030 based on a shift in the Pacific Decadal Oscillation. We're now one-third of the way into this supposed cooling period and the planet has warmed approximately 0.1°C. The accuracy of this prediction is not looking good. Several other listed scientists have predicted that we should expect global cooling due to solar effects, like Scafetta, Abdussamatov, Landscheidt, Archibald, and D'Aleo. However, consider the fact that the longest solar cycle minimum in a nearly century just ended, and as mentioned above, the past two years have been among the hottest in the instrumental temperature record. Solar activity has been flat for the past 50 years, and yet the planet warmed approximately 0.6°C during that period. And now we're expected to believe that solar activity is not only going to significantly dampen the anthropogenic warming signal, but cause substantial cooling? These claims strain credulity. Perhaps the worst part of these lists of 'scientists predicting global cooling' is that they attribute global cooling predictions to numerous scientists who have not made such claims. Let's look at some of the names on these lists. Mojib Latif Dr. Latif predicted that between 2010 and 2020, the planet would warm approximately 0.4°C, and has said we risk "an unprecedented warming in the history of mankind if no measures are taken to cut global carbon dioxide emissions." Noel Keenlyside Dr. Keenlyside is the lead author on the Latif study referenced above which predicted 0.4°C warming from 2010 to 2020. Anastasios Tsonis and Kyle Swanson Regarding the supposed global cooling prediction in their study, Swanson has written "If this hypothesis is correct, the era of consistent record-breaking global mean temperatures will not resume until roughly 2020....What do our results have to do with Global Warming, i.e., the century-scale response to greenhouse gas emissions? VERY LITTLE, contrary to claims that others have made on our behalf....humanity is poking a complex, nonlinear system with GHG forcing – and that there are no guarantees to how the climate may respond." Mike Lockwood The Lockwood quote supposedly about global cooling simply discusses that decreased solar activity may impact winter weather in Europe, and has nothing to do with global temperatures whatsoever. Lockwood has performed numerous studies concluding that the Sun is not responsible for a significant amount of the recent global warming, and has not predicted global cooling. James Overland As with Mike Lockwood, the James Overland quote supposedly about global cooling refers to winter weather, in Europe and the USA. Dr. Overland has neither predicted global cooling, nor disputes anthropogenic global warming. In fact, in the article linked above, Overland discusses how rapidly the Arctic is warming due to anthropogenic global warming, and that this will cause shifting weather patterns, leading to the snowy and cold winters in Europe and the USA. Not only is Overland not predicting global cooling in this article, he is explicitly talking about global warming. There are likely many other examples of supposed global cooling predictions being misattributed to climate scientists Most of the other 'scientists' on these lists are not climate scientists, but rather meteorologists, engineers, astronomers, etc. And many of the other supposed 'global cooling' quotes refer to local weather rather than global temperatures. Summary There appear to be very few examples of climate scientists predicting imminent global cooling on this list. Perhaps that's because climate scientists understand that humans are and will continue to be causing rapid global warming for the foreseeable future. The few scientists who are predicting cooling have generally been doing so for several years, and are going against a very large body of scientific evidence that the planet will continue to warm rapidly.

## manufacturing

#### He says manufacturing – energy’s not key

Levi 12 (Michael A. Levi David M. Rubenstein Senior Fellow for Energy and the Environment, 5/7/2012, "Oil and Gas Euphoria Is Getting Out of Hand", blogs.cfr.org/levi/2012/05/07/oil-and-gas-euphoria-is-getting-out-of-hand/)

But there is more. Ignatius’s column isn’t just about energy; it’s also about the resurgence of U.S. manufacturing. Here’s how he links the two: “Energy security would be one building block of a new prosperity. The other would be the revival of U.S. manufacturing and other industries. This would be driven in part by the low cost of electricity in the United States, which West forecasts will be relatively flat through the rest of this decade, and one-half to one-third that of economic competitors such as Spain, France or Germany.” Once again, these sorts of claims have become increasingly common. Indeed the quantitative assertions are perfectly plausible. But the big picture implications don’t make sense. As of 2010, total sales of U.S. manufactured goods were about five trillion dollars. At the same time, the sector spent about 100 billion dollars on energy. That’s a mere two percent of total sales. You could slash energy costs to zero, and it would barely move the needle for most U.S. manufacturers. There are, of course, exceptions, like some iron, steel, cement, and paper makers. But even these industries care about much more than their electricity prices. Will lower energy costs move things at the margin? Of course they will, and that’s good news. But they are nowhere close to what’s needed for U.S. manufacturing to broadly thrive.

## pc key

#### Pc’s the make it or break it – opposition exists but the question is which way they vote

Stirewalt, writer for Fox News, 1/7/2013

(Chris, “Obama Antagonizes with Hagel Pick,” http://www.foxnews.com/politics/2013/01/07/obama-antagonizes-with-hagel-pick/#ixzz2HIw1d0GW)

With Republicans still resentful of Hagel’s ostentatious opposition of Bush-era policies and support for Obama’s two presidential runs, confirmation would have been tricky enough. But the queasy feelings of pro-Israel Democrats on the tough-talking Vietnam vet will make it so much worse.

Maryland Sen. Ben Cardin, a dutiful Democrat if ever there was one, told the soon-to-be-former cable news network Current TV on Sunday that there are “some statements that [Hagel] needs to clarify” and called the nomination “controversial.”

Coming from Cardin, ranked in the 10 most liberal senators by National Journal, that’s the equivalent of a cannon shot across Obama’s bow.

**It will take lots of time and effort to drag Hagel**, **opinionated and confrontational**, **across the finish line**. **The president can get it done**, **but the ordeal will be frightful and expend plenty of political capital**.

#### This window is key

Linda Feldman, Christian Science Monitor, 1/7/13, www.csmonitor.com/USA/Politics/2013/0107/Chuck-Hagel-why-Obama-is-using-political-capital-on-Pentagon-pick-video

Chuck Hagel: why Obama is using political capital on Pentagon pick (+video) President Obama just made it by one 'fiscal cliff,' with more to come. But he has shown he won't shy away from a fight in nominating former Republican Sen. Chuck Hagel to run the Pentagon. At first blush, former Sen. Chuck Hagel of Nebraska seems an odd pick for secretary of Defense. He is a Republican, a point that frustrates Democrats who would rather see one of their own in this key Cabinet slot. But, to many Republicans, he’s a RINO – a Republican in Name Only – owing in part to his opposition to the Iraq war and to his general wariness toward foreign entanglements. Mr. Hagel has also irritated Democrats with past anti-gay comments (for which he has since apologized). And he has riled members of both parties with his criticism of pro-Israel groups and his stance toward Iran, including opposition to some sanctions. In a way, Mr. Hagel is a man without a party. Many Washington analysts predict a tough confirmation fight in the Senate. But to President Obama, who announced Hagel’s selection Monday, he is someone worth fighting for. “Chuck Hagel is the leader that our troops deserve,” Mr. Obama said. “He is an American patriot.” Hagel would be the first enlisted man, and the first Vietnam veteran, to head the Pentagon. He “bears the scars and the shrapnel” from his military service, Obama noted. The president takes the “man without a party” argument and turns it on its head, returning to his first-term promise to rise above party politics. “Chuck represents the bipartisan tradition that we need more of in Washington,” Obama said. “For his independence and commitment to consensus, he's earned the respect of national security and military leaders, Republicans and Democrats, including me.” Some Senate Democrats have endorsed Hagel, and at least three Republican senators have come out against him, while others of both parties have expressed skepticism. Democrats have a 55-45 majority in the Senate, but Republicans could decide to filibuster – which would require 60 votes to overcome. And there’s no guarantee that all the Democrats vote with the president. So why is Obama willing to have this fight, after watching one of his top prospects for secretary of State – UN Ambassador Susan Rice – remove her name from contention over what would have been a contentious confirmation battle, had she been nominated? (Her combative style and in particular misstatements about the Sept. 11 attack on the US mission in Benghazi, Libya, riled Republicans.) Administration officials say Obama had not necessarily settled on Ambassador Rice for State, but her withdrawal left the impression that the president’s choice had been preemptively defeated. So it may, in fact, be partly because of Rice that Obama is proceeding with Hagel. The president does not want to look weak again. He also expressed clear personal affection for Hagel in his statement Monday. As Senate colleagues, the two had traveled together in Iraq and Afghanistan. Hagel is also close to Vice President Biden, a longtime Senate colleague. Hagel has already served the Obama administration in other capacities, including as co-chair of the president's Intelligence Advisory Board. Now that Hagel has been nominated for the Pentagon, it is crucial that the next stage – courtesy calls to key Senate members – goes well. It is especially imperative that he reassure senators on his commitment to Israel.

## at: impact d

#### All alternatives to Hagel support war with Iran

Greenwald, columnist for the Guardian, 1/5/2013

(Glenn, “Chuck Hagel and liberals,” <http://www.guardian.co.uk/commentisfree/2013/jan/05/hagel-liberals-gays-israel-democrats>)

**All of the** Democratic **alternatives to Hagel** who have been seriously mentioned are nothing more than standard foreign policy technocrats, **fully on-board with the DC consensus regarding war**, militarism, Israel, **Iran**, **and the Middle East**. That's why Kristol, the Washington Post and other neocons were urging Obama to select them rather than Hagel: because those neocons know that, unlike Hagel, these Democratic technocrats **pose no challenge whatsoever to their agenda of sustaining destructive US policy in the Middle East and commitment to endless war**.

Do progressives even pretend any longer to care about any of these issues: about war, militarism, lockstep support for Israel, belligerence toward Iran, a refusal to negotiate with America's "enemies"? Even if you disagree with my views on whether Hagel's record on gays and his partisan affiliation are problematic, shouldn't you have to weigh those concerns against the issues that the Pentagon principally affects: the record of Hagel - as opposed to Michele Flournoy, Ashton Carter, or the other plausible nominees - on issues of war. foreign policy and militarism?

## uq

#### Nomination will be successful – the warrant in their card is just a reason there’s no margin for error

Todd, NBC News, 1/8/2013

(Chuck, http://firstread.nbcnews.com/\_news/2013/01/08/16412788-first-thoughts-no-margin-for-error-in-hagel-nomination?lite)

\*\*\* No margin for error in Hagel nomination: Yesterday’s official rollout of Chuck Hagel for defense secretary went about as well as it could have for the Obama White House. Statements of praise for Hagel by folks like Colin Powell and Robert Gates? Check. A statement of past praise from John McCain (who said in 2006 Hagel would make a “great secretary of state”), even though McCain is now taking a skeptical look at the nominee? Check. And getting Chuck Schumer, perhaps the Democratic senator with the most reservations about Hagel, to issue a non-committal statement? Check. So the White House feels pretty good about where things stand, although this won’t be an easy fight. Yet what Team Obama can’t afford is any new negative information, any other shoe to drop. Bottom line: There is no margin for error from this point onward. Hagel’s support, at best, in the Senate is an inch deep and that “inch” would get him the votes he needs. But it wouldn’t take much for the bottom to, well, fall out. This is going to be a precarious few weeks. Very few senators are in D.C. right now, so the interest groups will be front and center. Hagel needs his confirmation hearing sooner, rather than later, but right now, it’s unclear when those hearings will be scheduled. Hagel also needs FACE time with senators, and he won’t have that opportunity for a good week or so.

## schumer

#### But uq doesn’t outweigh and the GOP actually does matter

Mark Halperin 1-7, Time, “Team Hagel Versus Team Anti-Hagel”, <http://thepage.time.com/2013/01/07/team-hagel-versus-team-anti-hagel/>

The potential swing point in this fight would be if a Democratic senator came out in opposition to Hagel. The current post-Thomas dynamic in most nominations is for senators, regardless of party, to keep their powder dry until confirmation hearings are underway. If that pattern holds, both sides are likely to be fighting a meta-war until February.

The two most important senators in this nomination right now are McConnell and McCain. If Hagel has their support, he should be home free. If he loses one or both of them, and even a single Democrat, the dynamics become more challenging for the White House.

## at: pounders

#### Hearing is later this month

CNN, 1-9

“Pentagon readies fight for Hagel nomination,” <http://www.theskanner.com/article/Pentagon-Readies-Hagel-For-Confirmation-Fight-2013-01-09>

He also took issue with votes Hagel cast in the Senate blocking a set of sanctions against Iran, which other Republicans have homed in on as Hagel prepares for confirmation hearings that are set to begin **later this month**.

## at: sandy

#### Their ev says there will be a bill, not that it’ll be controversial

#### The fight’s within the GOP and it’s been resolved

CNN 1-3, “Furor over dropped vote for Sandy aid defused”, http://www.cnn.com/2013/01/02/politics/house-sandy-aid-vote/index.html

The promise of $60 billion can do a lot to calm outrage.

That point was underscored Wednesday, when House leaders met with irate representatives from New York and New Jersey who felt they had been ignored by House Speaker John Boehner when he scrapped a planned vote late Tuesday on a massive aid package for Superstorm Sandy victims.

"We're getting what New York and New Jersey need, and that's all that counts," Rep. Peter King, R-New York, told reporters after emerging from a 20-minute meeting with Boehner and House Majority Leader Eric Cantor. "We're all big boys; we understand that all that counts is the bottom line."

A vote on $9 billion for immediate aid is now set for Friday, with the balance of $51 billion due for consideration January 15.

For its part, the Senate plans to vote by unanimous consent on Friday on the $9 billion but is waiting to see what is in the larger package before announcing a plan for that, a Senate Democratic leadership aide said.

"On the second tranche, we will need to see more details before we decide how to proceed," the aide said. "As the Senate has shown by passing our bipartisan bill, we consider getting aid to the victims of Sandy a superlative priority, but we need to know more about the contents of the bill before deciding on a path forward."

Democrats were less mollified.

"While it would have been far better had they passed the Senate's bill today, at least this provides a path to produce the needed $60 billion for New York and New Jersey by the end of the month," said Sen. Charles Schumer, D-New York, in a statement.

"It's really unbelievable how Speaker Boehner and his party could just walk away," said Christine Quinn, speaker of the New York City Council. "To promise us a vote weeks from now? Why should we believe him at all? It's just shocking."

 Photos: Aftermath of Superstorm Sandy

In a statement, Boehner and Cantor said "critical aid" to storm victims should be the first priority of the new Congress, which convenes Thursday.

The comity contrasted sharply with the outrage that had exploded earlier in the day over Congress' inaction on the package, pitting even fellow Republicans against Boehner.

It was "disappointing and disgusting to watch," said New Jersey Gov. Chris Christie, blaming "the toxic internal politics of the House majority."

"New Jersey deserves better than the duplicity we saw on display," he said, adding, "shame on Congress."

Christie, a Republican, said he had tried to reach Boehner on Tuesday night after the latter canceled a vote on the aid bill, which had already been approved by the Senate. "He did not take my calls," said Christie.

In a news conference, Christie said he joined people of his state in feeling "betrayed" and added that the move summarizes "why the American people hate Congress."

In a statement, Christie and New York Gov. Andrew Cuomo wrote: "This failure to come to the aid of Americans following a severe and devastating natural disaster is unprecedented. The fact that days continue to go by while people suffer, families are out of their homes, and men and women remain jobless and struggling during these harsh winter months is a dereliction of duty. "

Republicans reverse earlier outrage, pledge to back Boehner

Boehner did not make public remarks and did not post about the issue on social media.

GOP leadership sources said Boehner was worried it would be a bad political move for him to allow a vote on the new federal spending after a long day of getting pummeled by his own House Republicans for not demanding enough spending cuts in the fiscal cliff bill.

Civility was restored late in the afternoon. "As far as I'm concerned, that was a lifetime ago," King said. "I know it was last night, but the bottom line is we're going forward getting what we believe is necessary."

Earlier, King had slammed his own party. "The Republican Party has said it's the party of 'family values.' Last night, it turned its back on the most essential value of all, and that's to provide food, shelter, clothing and relief for people who have been hit by a natural disaster," King told CNN.

King said he chased Boehner "all over the House last night" and that Boehner had said everything would be taken care of after the vote on the fiscal cliff. But Boehner left.

King called the House leadership's move a "knife in the back."

"Anyone from New York or New Jersey who contributes one penny to the Republican Congressional Campaign Committee should have their head examined," King said. It's very rare for a lawmaker to call on anyone not to support his own party.

New Congress tackles old leftovers

But on Wednesday afternoon, King said he would vote for Boehner in leadership elections scheduled for Thursday.

A senior GOP leadership aide said Boehner will make a Sandy aid package "his first priority in the new Congress," which begins its term Thursday.

When a new Congress begins, both chambers have to begin from scratch with legislation, so the Senate's passage of a previous bill will be moot.

Michael Steel, Boehner's spokesman, said the speaker is "committed to getting this bill passed this month."

## link

#### Development risks cost overruns, which cause massive backlash

LaMonica, contributing editor at MIT Technology Review, 9/10/2012

(Martin, “Should the government support applied research?” <http://www.technologyreview.com/news/428985/should-the-government-support-applied-research/>)

The presidential campaign has revived **the long-running policy debate over what role government should play in funding the development of new technologies**. While almost **everyone believes that it has a role in supporting basic research**, **the consensus breaks down at later and more expensive stages of development**, such as demonstration projects. Historically, some Republicans have picked fights to keep agencies from giving grants for early-stage product research, a line that ARPA-E crossed intentionally when it was created in 2007.

ARPA-E has funded around 200 projects, all of them meant to be “transformative” ways to either help replace foreign oil or reduce emissions. The notion is that such projects are too speculative and risky to gain large investments from companies. “I think it’s hard to argue the types of investments that ARPA-E is making would be made by the private sector if ARPA-E did not exist,” says Greg Nemet, an assistant professor of public affairs and environmental studies at the University of Wisconsin.

The agency, which had a modest budget of $180 million in 2011, has many fans in Congress, including among Republicans. That means it could avoid cuts and may see its budget increase. However, last year some House members said the agency should be defunded because its projects are too commercial and sometimes replicate work already paid for by the private sector.

Critics claim one problem is that ARPA-E isn’t able to find enough research that is truly transformative. Eric Toone, the agency’s principal deputy director, calls the debate over spending a “worthy” one, but says most people agree ARPA-E is funding technologies at stages where there is a “legitimate role for public investment.”

“Are we going to run out of great ideas?” he asks. “If we keep collecting the best and brightest people of America, there’s lots to do here and there’s lots of good ideas.”

ARPA-E grants are meant to help move research ideas to the prototype or demonstration stage. Projects are given specific performance goals—such as increasing how much energy can be stored in a battery—that, if achieved, would take technology a few steps beyond the best commercial products. It has financed projects such as making liquid “electrofuels” directly from microörganisms fed electricity, chemicals, and carbon dioxide, as well as a flying wind turbine (see “Flying Windmills”) and new materials to capture carbon from coal plants.

At the agency a team of scientists actively manage research programs. It’s not uncommon for them to pull the plug if technical milestones aren’t met. Such failures are partly by design. Grants are kept small (on average, about $3 or $4 million each)—part of an approach designed to pull a few winners out of a large pool of attempts.

While ARPA-E has generated a share of exciting projects, it does have one clear flaw: a lack of end customers. “The big problem that makes energy different from most other startup enterprises is that even if you have something that works great, you probably never amass enough money to commercialize it,” says Donald Paul, executive director of the University of Southern California’s Energy Institute and former chief technology officer at Chevron.

That’s where the Obama administration ran into trouble. The DOE tried to help some technologies toward large-scale commercialization, but after the bankruptcy of solar-panel maker Solyndra (recipient of a $535 million DOE loan guarantee), **Republicans jumped in**, **accusing Obama of playing politics with technology**. It’s become a campaign talking point: Ryan’s website calls for “getting Washington out of the business of picking winners and losers in the economy,” including the energy sector. Although Romney has praised ARPA-E, he’s echoed the Republican concerns by saying the agency should step back and concentrate on “basic research.”

#### Specifically true with fusion

Geoff Brumfiel, Scientific American, June 2012, Fusion's Missing Pieces, EBSCO

Supporters argue that ITER is the only hope, in the long term, of meeting the world's unquenchable demand for power. But even they have been forced to recalibrate their Utopian expectations. The project now seems to be propelled by institutional inertia -- it is easier for individual governments to stay the course rather than be the lone pariah who pulls out early. Critics, meanwhile, have more ammunition with each delay and cost overrun. ITER, they say, is a colossal waste of money at a time when funding is desperately needed in other areas of energy research. Both sides agree: when the project is finally completed, it had better work.

#### The distinction empirically makes all the difference

Khimm, writer for the Washington Post, 6/4/2012

(Suzy, “Republicans want to take the ‘D’ out of government ‘R&D,’” http://www.washingtonpost.com/blogs/wonkblog/post/republicans-want-to-take-the-d-out-of-government-randd/2012/06/04/gJQAmOJ7DV\_blog.html)

By and large, both parties have been able to agree on that much: Congress has largely spared basic research and development from the chopping block during recent budgets; both houses are even pushing for more funding for agencies such as the National Science Foundation in 2013.

But there are cracks emerging in that bipartisan consensus: **House Republicans are** becoming **increasingly wary of** funding energy innovation that support **the second half of** “**R&D**”--the development necessary to transform scientific research into technological innovation that ultimately would be used and commercialized outside of the lab. Earlier this spring, the House Appropriations Energy and Water Subcommittee passed a bill for 2013 that would cut funding for energy R&D by 27 percent.

#### Energy will come up in hearings

Snider, writer for E&E News, 1/7/2013

(Annie, “As Hagel faces confirmation battle, new and old energy issues likely to arise,” http://www.eenews.net/public/Greenwire/2013/01/07/1)

Energy will "absolutely" come up during the confirmation hearings, one Democratic Senate aide said. Indeed, Sen. Mark Udall (D-Colo.) has in recent years made a point of raising the issue during nearly every committee hearing with top officials and officers.

But although **the issue** may get top political billing this time around, many in the defense world are skeptical that energy programs will make their way onto the crowded desk of the next Defense secretary -- whoever that might be.

The Pentagon's current energy programs grew out of the country's two long ground wars, as troops and commanders saw firsthand the dangers of a massive fuel dependence. Convoys trucking fuel to military outposts in Iraq and Afghanistan became favorite targets for insurgents, and spikes in the price of oil forced military brass to scramble to rejigger budgets midyear in order to cover higher-than-expected fuel costs.

But with the U.S. involvement in Afghanistan winding down, energy programs could slip in priority. Now, most defense experts agree, the Pentagon's top concerns will be dealing with punted spending cuts and restructuring to prepare for future missions that are likely to look very different from those of the past.

"Those are very heavy, weighty issues, and my concern is that energy is going to be so far down the list of issues that **the Defense secretary may not even speak about it**," said Dan Nolan, a retired Army colonel who now runs the energy security firm Sabot 6 Inc.

#### It’s a direct tradeoff in negotiations – only we have an internal link

David Unger, Christian Science Monitor, 11/8/12, US energy future back in Obama's hands, www.csmonitor.com/Environment/Energy-Voices/2012/1108/US-energy-future-back-in-Obama-s-hands

President Obama talks to the media on the Heil Family Wind Farm in Haverhill, Iowa, in this August file photo. With the reelection of Mr. Obama, energy experts have begun to speculate how his "all-of-the-above" energy strategy will play out. In his victory speech early Wednesday morning, the newly-reelected President Obama offered a glimpse of an America "that isn't threatened by the destructive power of a warming planet," served by elected officials who work across the aisle to "[free] ourselves from foreign oil." It was as close as Mr. Obama got to broaching global warming in his speech, but it gives analysts and industry insiders enough to speculate over what the 44th president's second term holds for oil, gas and renewables. The passing expression of environmental concern relieved some climate-change activists frustrated with the candidates' sidestepping of an issue they say deserves foremost attention. “During his first term, President Obama articulated a vision of America leading the world with a clean energy future that meets the challenge of climate disruption head-on," said Sierra Club Executive Director Michael Brune in a statement Tuesday. "Today, American voters chose to give President Obama both an opportunity and a challenge of huge proportions." Bolstered by the memory of hurricane Sandy's fury and free from the burden of reelection, some hope Obama's second term offers an unprecedented chance to make serious inroads on energy independence and climate change. Obama has said he wants to extend the wind industry tax credits set to expire at the end of the year and continue to invest in new green technologies. But not everyone is convinced. "There must be a real risk that action on climate change becomes a bargaining chip that Obama trades for GOP support on economic issues, particularly given the widespread judgement that he has spectacularly failed to win over opponents in the past," writes Damian Carrington in The Guardian.

# 2NR

#### Hagel changes the conversation on Iran -- avoids war

Beinart, writer for the Daily Beast, 1/7/2013

(Peter, “Hagel: A New Era In Foreign Policy?,” http://www.thedailybeast.com/articles/2013/01/07/hagel-a-new-era-in-american-foreign-policy.html)

The final reason for the resiliency of this Republican foreign-policy cocoon is the American media, especially the television media, which take an entirely à la carte view of foreign-policy debates. Rarely is anything a commentator or legislator said yesterday about war with Iraq or Afghanistan deemed relevant to his or her credibility today on the subject of war with Iran. On cable, you shake an Etch a Sketch every time you go on air. Thus, the same Republican commentators and politicians who pushed a hawkish line on Iraq moved seamlessly to pushing a hawkish line on Afghanistan, and once that too became a lost cause, to **pushing a hawkish line on Iran** and everything else.

That hawkish line consists of hostility to any diplomatic solution to the Iranian nuclear standoff that involves meaningful American compromise and **cautious optimism about the impact of an American military strike**. More generally, it means supporting as large a defense budget as possible, irrespective of its impact on America’s fiscal health. This is the perspective that Republican foreign-policy pundits call “mainstream” and from which they say Hagel diverges. And they are right. Taking a hawkish line on Iran and military spending is as mainstream in today’s GOP as was taking a hawkish line on Iraq and Afghanistan between 2001 and 2003, because Republican Washington has created an ecosystem in which the wisdom of that prior hawkishness is irrelevant to contemporary debates.

What makes Hagel so important, and so threatening to the Republican foreign-policy elite, is that he is one of the few prominent Republican-aligned politicians and commentators (George Will and Francis Fukuyama are others, but such voices are rare) who was intellectually changed by Iraq. And Hagel was changed, in large measure, because he bore within him intellectual (and physical) scar tissue from Vietnam. As my former colleague John Judis captured brilliantly in a 2007 New Republic profile, the Iraq War sparked something visceral in Hagel, as the former Vietnam rifleman realized that, once again, detached and self-interested elites were sending working-class kids like himself to die in a war they couldn’t honestly defend. It is certainly true that some politicians who served in Vietnam—for instance, John McCain—did not react to Iraq that way. But it is also true that the fact that so few American politicians and pundits lived the kind of wartime hell Hagel endured made it easier for them to pass through the Iraq years unscathed. It’s no coincidence that the other senator most deeply enraged by Iraq was ex-Marine James Webb, another former hawkish Republican who saw the war through his own personal Vietnam prism.

At the heart of the opposition to Hagel is the fear that he will do what Republicans have thus far largely prevented: bring America’s experiences in Iraq and Afghanistan into the Iran debate. Much of the Republican and establishment Jewish criticism of Hagel centers on his comments about the “Jewish lobby.” Some critics genuinely consider those comments offensive (though I don’t). But ultimately, Hagel’s “Jewish lobby” remarks are a sideshow. Were he as hawkish on Iran as McCain is, Republican senators, conservative journalists, and American Jewish officials would almost certainly have overlooked them, as they largely overlooked (or outright defended) the more problematic recent comments about Jewish media ownership by Rupert Murdoch. The bald truth is that for many conservatives today, the key test of how someone feels about Jews is whether they support Israel’s security needs, as conservatives define them. Had Hagel passed that test, conservative Republicans and Jewish “leaders” would be as bothered by his use of the term “Jewish lobby” in 2005 as they were when Conference of Presidents of Major American Jewish Organizations executive vice chairman Malcolm Hoenleinused the phrase last month. Which is to say, not at all.

My point is not that because the wars in Afghanistan and Iraq have proved disastrous, war with Iran would too. Every war is different, and I wrote a whole book about how difficult it is to predict, on the basis of one conflict, how the next will turn out. But **a Hagel nomination will ensure that when Obama officials discuss a third Middle Eastern war**, t**he ghosts of Iraq and Afghanistan sit at the table**. And while that won’t make American military action impossible, it will raise the bar.

What the Republican foreign-policy establishment fears is that **with Hagel as secretary of defense**, **it will be impossible for Obama to minimize the dangers of war with Iran**, as George W. Bush minimized the dangers of war with Iraq. Hagel would be to the Obama administration what Dwight Eisenhower was in the 1950s, what Colin Powell was in the 1990s, and what, to some degree, ex-Mossad head Meir Dagan was in the Netanyahu government, the military man who bluntly reminds his colleagues that war, once unleashed, cannot be easily controlled. “Once you start” a war with Iran, Hagel told the Atlantic Council in 2010, “you’d better be prepared to find 100,000 troops, because it may take that.” You can’t say “it’ll be a limited warfare. I don’t think any nation can ever go into it that way.” For Hagel’s ex-friends in the Republican foreign-policy class, **such a statement is kryptonite**, because they know that given the American public’s weariness of war, a president who outlined the risks that way would have trouble gaining popular support. It’s also likely that Hagel’s position would be reinforced by the leaders of the uniformed military, some of whom have already expressed skepticism about bombing Iran.