# 1NC

### TOPICALITY

#### Financial incentives are this list- the aff is not on it

Gouchoe 2k—North Carolina State University, National Renewable Energy Laboratory [Susan, December 2000, Local Government and Community Programs and Incentives for Renewable Energy— National Report, http://seg.fsu.edu/Library/casestudy%20of%20incentives.pdf]

EXECUTIVE SUMMARY

This report presents a summary of the renewable energy programs and incentives of 45¶ communities in 23 states as collected and catalogued by the Interstate Renewable Energy¶ Council’s (IREC) Database of State Incentives for Renewable Energy (DSIRE) project. Also included are summaries of state initiatives that impact implementation of renewable energy¶ technologies on the local level. Programs and incentives in this report include:

COMMUNITY INVESTMENT & AWARENESS PROGRAMS

v Renewable Energy Projects

v Education & Assistance

v Green Pricing Programs

v Green Power Purchasing

FINANCIAL INCENTIVES

v Rebates, Grants, & Loans

v Tax Incentives

v Green Building Incentives

v Industrial Recruitment

RULES, REGULATIONS & POLICIES

v Solar & Wind Access

v Net Metering

v Construction & Design

v Contractor Licensing

v Equipment Certification

v Public Benefits Funds

v Renewable Energy Portfolio Standards

v Disclosure & Certification

Established in 1995, DSIRE is an ongoing project to summarize incentives, programs, and¶ policies for renewable energy. The project is funded by the U.S. Department of Energy’s¶ Office of Power Technologies and is managed by the North Carolina Solar Center. DSIRE on¶ Line makes the DSIRE database accessible via the web at:¶ http://www.ncsc.ncsu.edu/dsire.htm. The website is updated daily and includes search¶ capabilities for all incentives. In addition to state and local programs, the website features¶ utility programs and a searchable bibliography.

#### VOTE NEGATIVE

#### PREDICTABLE LIMITS—the word incentives in the resolution is modified by financial to make it manageable. Going beyond makes the topic unpredictable.

#### GROUND—financial incentives insure the aff has links to market disads and counterplans which are the only core negative ground across bi-directional energies. Holding the line key

### IMMIGRATION REFORM

#### Will pass – capital key – issues will be worked out

CT POST 3 – 28 – 13 Connecticut Post <http://www.ctpost.com/local/article/Immigration-reform-gaining-support-in-Congress-4393187.php>

A Republican Party in desperate search for relevance to Latino voters. An expanded Democratic advantage in the Senate. A second-term President with his legacy on the line.

Does all that add up to enough to break decades of impasse and produce comprehensive immigration reform? As expectations -- and tensions -- rise, the answer won't be long in coming.

A bipartisan bill could be filed in the Senate as early as next week, followed in relatively short order by a House bill, also crafted by a bipartisan group, aiming at a compromise on the key issue of citizenship.

The efforts are being applauded by President Barack Obama, who is using every ounce of his political clout to try to get comprehensive reform.

Obama said the time has come "to work up the political courage to do what's required to be done."

"I expect a bill to be put forward. I expect a debate to begin next month. I want to sign that bill into law as soon as possible," Obama said at a White House naturalization ceremony.

In addition to the issue of eventual citizenship for 11 million undocumented immigrants, Congress is expected to address the need for temporary or guest worker programs.

Congress last passed comprehensive bipartisan reform legislation in 1986, when President Ronald Reagan signed a law that granted citizenship to several million undocumented immigrants and created a guest worker program.

Up until now, Republicans have opposed citizenship programs as an "amnesty" for lawbreakers who entered the country illegally, and labor has chafed at guest worker programs.

But Republican losses in the 2012 elections and increased public support for reform have many in the GOP talking compromise.

"If there is one issue that the two parties could produce something meaningful on in this Congress, it would be immigration," said Stephen Hess, a political expert at The Brookings Institution.

Hess said an eventual bill "will have lots of provisos, and it will go back and forth, but it would be hard not to produce something given the general feeling that something has to be produced."

More and more Republicans are moving toward immigration-reform measures as the party seeks to reach out to Latinos, the nation's largest -- and growing -- minority voting bloc.

Public opinion is behind them.

A recent poll showed 63 percent of Americans supported a path to citizenship for undocumented workers provided they meet certain requirements, according to a survey by the Public Religion Research Institute.

Notable Republicans who have recently spoken in favor of compromise on citizenship proposals include Sen. Rand Paul, R-Ky.; former Mississippi Gov. Haley Barbour; and Rep. Paul Ryan, R-Wis.

And a March report by the National Republican Committee, considered a "post mortem" on the 2012 elections, recommended the GOP embrace comprehensive immigration reform to shore up its shaky standing with minorities -- Latinos, in particular.

Roy Beck, executive director of Numbers USA, which advocates lower numerical numbers on immigration, predicted a majority of Republican senators would oppose citizenship.

Groups like Numbers USA are working to hold GOP senators in line. They sent 13,000 emails to Kentucky voters that claimed Paul's position was "more radical and pro-immigration than anything proposed by President Obama."

The group has targeted Sen. Lindsey Graham, R-S.C., one of the "Gang of Eight" senators writing the Senate bipartisan bill, as a lawmaker who favors foreign workers over unemployed South Carolinians.

Democrats from conservative-leaning states could also feel political heat.

Beck said if five to 10 Democrats in the Senate oppose a bill, proponents would need 10 to 15 Republicans to reach the 60 votes needed to cut off debate and vote on legislation.

"You do the math," Beck said.

In 2007, an effort to cut off debate on a Senate immigration reform bill died on a 46-53 vote.

But immigrant reform proponents, such as America's Voice, say there is a "tectonic shift" in the GOP, and the Democrats also have expanded their Senate majority to 53-45, plus two independents who caucus with them. They predict the Senate will muster the votes necessary to pass a reform bill.

Still, it won't be easy.

"We will have not only a few potholes, but a few near-death experiences along the way," said Frank Sharry, America's Voice executive director.

#### Plan’s unpopular.

Schmid 11— Sonja Schmid, Assistant professor in Science and Technology Studies at Virginia Tech [Ross Carper (rosscarper@gmail.com), a writer based in Washington state, is the founding editor of the creative nonfiction project BeyondtheBracelet.com. [“The Little Reactor That Could?” Issues in Science and Technology, http://www.issues.org/27.4/carper.html]

Historically, nuclear energy has been entangled in one of the most polarizing debates in this country. Promoters and adversaries of nuclear power alike have accused the other side of oversimplification and exaggeration. For today’s industry, reassuring a wary public and nervous government regulators that small reactors are completely safe might not be the most promising strategy. People may not remember much history, but they usually do remember who let them down before. It would make more sense to admit that nuclear power is an inherently risky technology, with enormous benefits that might justify taking these risks. So instead of framing small reactors as qualitatively different and “passively safe,” why not address the risks involved head-on? This would require that the industry not only invite the public to ask questions, but also that they respond, even—or perhaps especially—when these questions cross preestablished boundaries. Relevant historical experience with small compact reactors in military submarines, for example, should not be off limits, just because information about them has traditionally been classified.

#### India relations

Los Angeles Times, 11/9/2012 (Other countries eagerly await U.S. immigration reform, p. <http://latimesblogs.latimes.com/world_now/2012/11/us-immigration-reform-eagerly-awaited-by-source-countries.html>)

"Comprehensive immigration reform will see expansion of skilled labor visas," predicted B. Lindsay Lowell, director of policy studies for the Institute for the Study of International Migration at Georgetown University. A former research chief for the congressionally appointed Commission on Immigration Reform, Lowell said he expects to see at least a fivefold increase in the number of highly skilled labor visas that would provide "a significant shot in the arm for India and China." There is widespread consensus among economists and academics that skilled migration fosters new trade and business relationships between countries and enhances links to the global economy, Lowell said. "Countries like India and China weigh the opportunities of business abroad from their expats with the possibility of brain drain, and I think they still see the immigration opportunity as a bigger plus than not," he said.

#### Nuclear war

**Schaffer**, Spring **2002** (Teresita – Director of the South Asia Program at the Center for Strategic and International Security, Washington Quarterly, p. Lexis)

Washington's increased interest in India since the late 1990s reflects India's economic expansion and position as Asia's newest rising power. New Delhi, for its part, is adjusting to the end of the Cold War. As a result, both giant democracies see that they can benefit by closer cooperation. For Washington, the advantages include a wider network of friends in Asia at a time when the region is changing rapidly, as well as a stronger position from which to help calm possible future nuclear tensions in the region. Enhanced trade and investment benefit both countries and are a prerequisite for improved U.S. relations with India. For India, the country's ambition to assume a stronger leadership role in the world and to maintain an economy that lifts its people out of poverty depends critically on good relations with the United States.

### BUDGET DA

#### Budgets are tight – right now biofuels are winning

Peterka 1/22/2013 [Amanda Peterka, E&E reporter, Airlines piggyback on DOD's test flights, push for expanded production

http://www.eenews.net/Greenwire/2013/01/22/archive/5?terms=biofuels]

The military also depends on Congress for funding to test and purchase biofuels, said John Heimlich, vice president and chief economist at Airlines for America, a consortium of 11 airlines that has entered a strategic alliance with the Navy to advance aviation biofuels.

"That's one thing that makes the military effective," Heimlich said. "It's not just their know-how and commitment. It's their balance sheet."

But although the Pentagon could guarantee a market for aviation biofuels, the effort could be toppled by Washington budget battles.

So far, though, news from Washington has been encouraging for biofuel promoters. President Obama signed a defense authorization act last month that included funding for the military's biofuel programs. And early this month, Obama signed a "fiscal cliff" package that extended tax incentives for the cellulosic biofuel and biodiesel industries.

To keep momentum going in the industry, Holland said, the military needs to be aggressive about putting those biofuel programs in place. The commercial aviation industry also needs to get off the ground, he said.

#### They force a tradeoff with the fuel budget

**Eoyang 12** – National Security Director @ Third Way [Mieke Eoyang, Julie Zelnick (Policy Advisor for National Security @ Third Way), & Ryan Fitzpatrick (Senior Policy Advisor for the Third Way Clean Energy Program), “Fuel Costs Squeeze Defense Budget,” Third Way Digest, May 2012, pg. 1

In 2011, Congress passed the Budget Control Act, which put long-term limits on defense spending as part of a broader effort to curb the $15.7 trillion federal budget deficit. Though DOD’s budget will grow over the next 10 years, it will rise at a smaller rate than previously projected. This means DOD’s topline budget going forward will be more flat. Rising costs in one area will come at the expense of others.1

Given such constraints, DOD must carefully scrutinize every cost and find efficiencies where it can. One of those costs is fuel—a critical component of military operations, especially for ground vehicles, ships, and aircraft. DOD spends about $16 billion on fuel each year—more than double what UPS, FedEx, and DHL spend on global shipping operations, combined.3

#### Biofuels will lose out

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| **Erwin 12** - Editor of National Defense Magazine [Sandra I. Erwin, [‘Policy Uncertainty’ Could Choke Development of Military Biofuels](http://www.nationaldefensemagazine.org/blog/Lists/Posts/Post.aspx?ID=844),” National Defense, 7/26/2012, pg. http://tinyurl.com/d82e34n |

To outsiders, the NDAA debate is just one more partisan battle in Washington’s larger political wars. But anti-biofuel sentiments on Capitol Hill are raising serious alarm bells within the alternative-fuel industry and stirring concerns among Pentagon officials who support green energy because of the chilling effect that the political divide could have on private investment.  
“If there is a lot of uncertainty, we are going to lose private capital,” said Phyllis Cuttino, director of the Pew Project on National Security, Energy, and Climate.   
The Defense Department’s plan to become a consumer of alternative fuels is predicated on the ability of the private sector to scale up production and on commercial airlines transitioning to biofuels so prices become more competitive. All that requires substantial private investments that might be at risk if venture capitalists decide that the politics of biofuels pose too big a financial risk.  
Assistant Secretary of Defense for Operational Energy Plans and Programs Sharon Burke said she does have concerns that legislative restrictions could jeopardize the Defense Department’s goals to diversify its sources of energy.  
“For the future, our military will need alternatives to petroleum to keep our supplies diverse, especially for our legacy fleet of ships and planes, which will be with us for decades to come,” Burke said in a statement to National Defense. “The private sector will be the leaders in developing a commercially viable alternative fuels industry, and we have concerns that restrictions on the department's ability to obtain the milspec fuel we need to achieve our mission may reduce the development and availability of these alternatives over the long term.”  
The Defense Department began to step up its pursuit of alternative fuels in 2007, and over the past two years the [Navy and the Air Force have made headlines for their embrace of aviation biofuels](http://www.nationaldefensemagazine.org/blog/lists/posts/post.aspx?ID=832) as a future hedge against rising oil prices and unreliable foreign oil suppliers.   
In the wake of the House and Senate NDAA amendments, Pew has mobilized biofuels supporters and [released a letter this week that was signed by more than 350 veterans](http://www.nationaldefensemagazine.org/blog/Lists/Posts/energy-innovation-seen-as-needed-to-reduce-dependence-on-foreign-oil-save-money-85899406931), including retired generals and admirals, as well as former Senate and House Armed Services Committee chairmen Sen. John Warner and Rep. Ike Skelton, urging the president and Congress to support the Pentagon’s initiatives to diversify its energy sources. The letter echoes biofuel producers’ belief that the military is needed as an essential anchor customer.  
Lawmakers in the House and Senate have argued that biofuels are cost prohibitive at a time when the military’s budget is stretched. The Navy’s “great green fleet” effort was particularly criticized by members of the House Armed Services Committee as an example of misplaced priorities when the Navy is cutting back on new ship buys and other modernization programs.   
The Senate Armed Services Committee agreed to add anti-biofuel provisions to the NDAA. Biofuel supporters’ best hope now lies with Sens. Jeanne Shaheen, D-N.H., and Susan Collins, R-Maine, who vowed in a recent op-ed article that they would fight to protect the Defense Department’s biofuel funds, including a Navy commitment of more than $200 million as part of joint $500 million effort with the Departments of Energy and Agriculture.   
Cuttino said the green-energy community has been taken aback by the partisan tenor of an issue that has national security implications.   
“We’ve been dismayed by the politicization of these [military biofuel] efforts,” Cuttino said July 24 during a conference call with reporters. “These issues should not be politicized,” she said. “To have these innovations singled out is unfortunate.”  
The Pentagon’s financial commitment is being blown out of proportion, she said. Biofuel expenditures are a tiny fraction of what the Defense Department spends on fuel each year, Cuttino said. The Pentagon’s annual energy bill is about $15 billion, three-quarters of which is spent on liquid fuels. Pew estimated that Defense Department biofuel expenditures last year were $1.2 billion, up from $400 million two years ago. A Pew study projects military biofuel purchases will reach $10 billion annually by 2030.  
When Congress was fighting a year ago over the nation’s debt ceiling, investors were alarmed. The battle over biofuels creates a similar cloud of policy uncertainty that could be damaging to an industry that is just getting off the ground, Cuttino said.  
The trends in private investment in alternative energy in G-20 countries are cause for concern, she said, as they indicate that investors tend to flee when they see policy indecision. “What we know from all our research over several years is that if there is a question of uncertainty when it comes to policy, private investment will move on to another country where there is more policy certainty.”  
The United States currently is a world leader in attracting private capital to alternative energy, she said. The European economic crisis might keep the United States in the lead for some time, but venture capitalists also may be souring on U.S. biofuels investments, according to analysts.

Interest in capital-intensive industries such as energy is fading, said a July report by Dow Jones VentureSource. Investors are raising red flags about biofuel investment because of the large amounts of capital needed to build infrastructure. “The second quarter is the worst for investment in energy and utilities start-ups since the first quarter of 2009,” said VentureSource.  
The Commercial Aviation Alternative Fuels Initiative — a coalition of airlines, aircraft and engine manufacturers, energy producers and U.S. government agencies — cautions that project financing is still the “biggest remaining challenge to the deployment of alternative aviation fuels.” Nevertheless, CAAFI is “confident that environmentally friendly alternative jet fuel derived from several feedstocks will be available in the next two to five years,” the group said in a statement on its website. The barrier to deployment, said CAAFI, is the availability of capital, as production plants cost on the order of $100,000 per barrel per day.  
FlightGlobal.com reported that, since 2007, more than 1,500 passenger flights have been made using biofuels produced from feedstocks such as household waste and algae. “The major challenge now is to work out how to produce large quantities of sustainable biofuel at a cost that is commercially competitive to airlines,” FlightGlobal noted.  
Lufthansa, one of the world’s largest airlines, has projected that renewable jet fuel will replace up to 5 percent of the market in the next five to seven years.   
In the United States, the biofuel industry needs the military to commit to long-term purchases so it can secure investors, Pew said in a statement. “The military’s leadership, cooperation with the private sector, and early adoption have been critical to the commercialization of many technologies such as semiconductors, nuclear energy, the Internet, and the Global Positioning System,” Pew noted. “Maintaining energy innovation, inside and outside the Defense Department, is critical to our national security.”

#### Biofuels will end oil wars

**Ventura 12** – Essayist and cultural critic @ Austin Chronicle [[Michael Ventura](http://www.austinchronicle.com/authors/michael-ventura/), “Letters at 3AM: A Big Picture and a Long Game,” Austin Chronicle, [Fri., Oct. 19, 2012](http://www.austinchronicle.com/issues/2012-10-19/), pg. http://tinyurl.com/col9hvh

It's like Alice watching the Queen of Hearts play cards and croquet: "Three times so far this year, the Joint Chiefs of Staff and the regional war-fighting commanders have assembled at [Marine Corps Base Quantico, Va.], where a giant map of the world, larger than a basketball court, was laid out on the ground. ... The generals and admirals walked the world and worked their way through a series of potential national security crises. ... 'Strategic seminar' is the name Gen. Martin E. Dempsey, chairman of the Joint Chiefs of Staff, has chosen for these daylong sessions" (The New York Times online, Sept. 12).

Let's walk this immense map. We'll stroll roughly 5,500 miles from the Strait of Gibraltar eastward to the Afghan-Pakistani border. Then let's amble another 7,000 miles from Kazakhstan in Asia to Angola in Africa. In the area we've walked, alliances overlap and contradict one another – and are further complicated by trade routes, oil fields, rebels, pirates, and terrorists – and the United States has positioned itself in such a way that its chain can be yanked from almost any direction.

Focus on oil. According to the U.S. Energy Information Administration ([www.eia.gov](http://www.eia.gov/)), in 2011, 69% of U.S. oil originated in five countries, listed by volume: Canada, Saudi Arabia, Mexico, Venezuela, and Nigeria. Of the next 10 largest sources, six are in the area we've walked: three in the Persian Gulf – Iraq, Kuwait, and Oman; three in Africa – Angola, Algeria, and Chad.

Imagine some general scenarios: A destabilized Tunisia impacts bordering Algeria. A destabilized Libya impacts bordering Algeria and Chad. Chad, destabilized by a destabilized Libya, in turn destabilizes Nigeria.

Move west from Africa. A destabilized Yemen impacts neighboring Saudi Arabia and Oman. A belligerent Iran impacts Iraq, Kuwait, Saudi Arabia, and Oman.

Draw lines of possible crises this way and that, and the generals, admirals, and war commanders walking the big map must be bumping into one another with alarming frequency any way they turn. All for imported oil.

Oil dependence has put the United States in a strategically vulnerable and ultimately untenable position. There's no way we can cover all that turf indefinitely. We've neither the money nor the manpower.

One issue is clear: The cessation of our participation in Iraq and Afghanistan won't affect the overall situation.

"Large numbers of MRAPs [armored troop carriers] ... in Iraq and Afghanistan [will be] stored in Italy, where they could be transported for contingencies across Africa" (The New York Times online, July 27). "Contingencies" is a neutral word for war.

In 2008, President George W. Bush authorized "the newest regional headquarters, Africa Command" (The New York Times, Oct. 5, 2008, p.8). "Africom" is based in Stuttgart, Germany, "owing to local [African] sensitivities." Its commander, Gen. William E. Ward, "rejected criticisms that Africa Command would result in a militarization of foreign policy, and he said it was specifically structured for cooperative efforts," though he didn't define what that meant.

Whatever it meant, President Obama has appointed a new commander. Gen. David M. Rodriguez is an officer of "extensive combat experience. ... [He] served two tours in Iraq and two tours in Afghanistan ... and later [was] deputy commander of allied forces there with responsibility for day-to-day management of the war. ... [Rodriguez] was one of the architects" of Obama's Afghan surge (The New York Times online, Sept. 19).

Sounds like the Pentagon and the White House anticipate action in Africa.

The July 27 report cited above added that "MRAPs would be sent to warehouses in the western Pacific" and "significant numbers are stored in Southwest Asia."

The U.S. is building a base in Darwin, on the northwest tip of Australia, "as a new center of operations in Asia as it seeks to ... grapple with China's rise" (The New York Times, Nov. 15, 2011, p.6).

Recently, Secretary of State Hillary Rodham Clinton and Secretary of Defense Leon E. Panetta crisscrossed the western Pacific from China to New Zealand assuring everybody that we're not trying to "contain" China; we're merely, in Panetta's words, continuing "to be what we have been now for seven decades: the pivotal military power in the Asia-Pacific region" (The New York Times online, Sept. 13).

But something is true today that has not been true for most of those seven decades. According to the Central Intelligence Agency ([www.cia.gov](http://www.cia.gov/)), China is the No. 1 trading partner of Australia, Japan, South Korea, Malaysia, the Philippines, the Solomon Islands, Taiwan, and Thailand. And China is a major commercial player with everybody else in the region.

We're defending these Pacific countries against their major trading partner?

"'What worries us is having to choose [between the U.S. and China] – we don't want to be in that position,' said the foreign minister of Indonesia" (The New York Times online, June 1). You bet they don't.

China, Japan, and others are jockeying for some seemingly worthless (even uninhabited) islands in the South and East China seas.

"Quarrels over these hunks of volcanic rock wouldn't matter much except that China, Vietnam, and the Philippines are running into one another in the race for oil" (The New York Times, Nov. 13, 2011, p.SR4). It's about offshore drilling, that report says. "The South China Sea alone is estimated to have 61 billion barrels of petroleum – oil and gas – plus 54 billion yet to be discovered." Oil again.

In the long game, who wins influence over the area? The United States or China? Put it another way: Who wins? The depleted, financially struggling, politically deadlocked nation many thousands of miles away or the money- and manpower-rich rising nation playing in its own pool? (After all, the disputed areas are called the South and East China Seas.)

Again, the U.S. is setting itself up in a strategically untenable position.

Navy Secretary Ray Mabus said, "We buy too much fossil fuels from potentially or actually volatile places on earth" (NPR online, Sept. 26, 2011).

But the unexpected always happens, and that NPR report reveals something most unexpected: Of all U.S. federal institutions, the Navy and Air Force lead in seeking a nonviolent, eco-friendly path out of America's strategic morass. They "have been busy testing their aircraft ... on jet biofuel. ... [T]he Navy has launched a project to invest up to half a billion dollars in biofuel refineries. Mabus says he is committed to getting 50 percent of the Navy's fuel for aircraft and surface ships from renewable sources by 2020 because dependence on foreign oil makes the U.S. military vulnerable."

Predictably, "the biofuel program has struck a nerve among Republicans," who are trying to limit military biofuel use by law (The New York Times online, Aug. 27). Their Big Oil donors know that if a military market makes biofuels cheap, then America's airlines, railways, and truckers will want it too, and other oil-dependent nations will follow our lead.

Mostly for the sake of oil, the Obama administration's strategies extend U.S. military reach beyond practical limits – limits that Mitt Romney, if elected, plans to strain still further. But the military has come up with an elegant solution: Strategically and environmentally, a U.S. military powered by biofuels could be a 21st century game-changer that ends the oil wars and drains Big Oil's political dominance.

That is a real possibility. It is also possible that, walking a map bigger than a basketball court, our commanders will bump into one another indefinitely, attempting to defend an indefensible strategy.

#### AND, It reduces CO2

**Alic 12** [Jen Alic “4 Biofuels That Don't Take Food Off People's Tables,”  Oilprice.com Published: Wednesday, 12 Sep 2012 | 3:53 PM ET, pg. http://tinyurl.com/d4pmjqm

Algae: Growing on Us  
Algae produces some carbon dioxide when burned, but it takes the same carbon dioxide in to grow. So when algae farms grow massive quantities to be turned into biofuels, the end result is that they actually suck greenhouse gas out of the air. It also has other advantages over biofuels from corn or soybeans, in that it does not require soil or fresh water to grow. It also has the potential to produce more energy per hectare than any land crop.

### THORIUM PIC

#### Text: The United States federal government should obtain electricity from modular light water nuclear reactors with electrical output less than 300 megawatt electrical for military bases in the United States.

#### The CP only incentivizes light water reactors. The plan’s open-ended incentive would be available for other SMR designs. Companies are designing thorium SMRs for military installations.

Dan Yurman, 4/13/2012. Publishes a blog on nuclear energy titled 'Idaho Samizdat’ and is a frequent contributor to ANS Nuclear Café. “Nuclear start-ups have stretch goals,” The Energy Collective, http://theenergycollective.com/dan-yurman/82076/nuclear-start-ups-have-stretch-goals.

\*\*\*Kirk Sorensen = NASA aerospace engineer

On his website Kirk Sorensen writes that Flibe Energy is a new company that will develop small modular reactors based on liquid-fluoride thorium reactor (LFTR) technology. Liquid-fluoride reactors operate at high temperature but not at high pressure because they use a chemically stable medium as the fuel and the coolant, making them much safer to operate than conventional reactors. He says that "Thorium is the only abundant nuclear fuel that can be efficiently utilized in a thermal-spectrum reactor and is uniquely chemically suited for use in a fluoride reactor." The market for the design is based on an assessment that there are many remote sites where electrical power is generated by diesel fuel that is transported over great distances and over challenging or hostile terrain. A small modular power source has the potential to reduce the costs, hazards and vulnerability of power supply-lines, saving money and even lives in term of providing power to military bases. This blog caught up with Kirk Sorensen as he was getting ready for an international trip. He responded to questions via email. Here's what he said.   
Q: Why did you choose this specific technology? What is about it that helped you decide on it?  
A: Of the four coolant possibilities (water, liquid-metals, gas, and molten-salt) only molten salt has the desireable attributes of both high temperature operation yet low pressure operation. Halide molten-salts are also impervious to radiation damage due to their ionic structure. Fluoride molten-salt chemistry is a natural fit with the thorium fuel cycle, which leads to very high fuel utilization and minimizes waste generation and nearly eliminates transuranic waste generation. Molten-salt fuels can also reject xenon in normal operation, facilitating load-following characteristics in a small, high-power density core. The key to these plans is the use of liquid-fluoride-salt technology—and a special combination of fluoride salts which gives Flibe Energy its name. Lithium fluoride (LiF) and beryllium fluoride (BeF2) together form a solution often called “F-Li-Be”, that is the ideal medium for nuclear chemical processing and reactor operation. It is chemically stable, nearly invisible to neutrons, and impervious to radiation damage, unlike almost every other nuclear fuel. Flibe carries large amounts of heat at low pressures, leading to small, compact, and safe designs for nuclear reactors.  
Q: Why would a customer want to buy it?  
Our intent is not to sell our reactors but rather to build and operate them.  
Q: Who is your target market?  
A: Military facilities in the continental United States.  
Q: What is your time frame for developing the technology, e.g., major milestones such as; - prototype - completed design - NRC licensing - Construction at customer site  
A: Assuming the desired funding, we would be aiming for a prototype within five years of project initiation and five years of "shakedown" operation beyond that. Beyond that we would build units in a factory and deploy them to various military bases across the US. The US military has independent regulatory authority and we would not be pursuing NRC licensing.

#### Thorium would out-compete LWRs.

Megan Wait, 2/25/2011. “Thorium could trigger a nuclear renaissance, given its many advantages over uranium,” Mining Weekly, http://www.miningweekly.com/article/thorium-could-trigger-nuclear-renaissance-given-its-many-advantages-over-uranium-2011-02-25.

Mulder differs: “The cost of mining thorium and converting it to fuel is much cheaper than the mining and processing of uranium, in terms of less capital equipment requirements at start-up, as well as lower operating costs. Also, thorium is relatively abundant in most parts of the world, so, relative to uranium oxide mining and processing, the cost of potential energy for each unit of thorium is 25% to 33% lower,” he adds. The approximate cost of a single standalone Gen-3 light water reactor (LWR) for each megawatt of installed capacity is in the region of $5 400/kW. It is estimated that the first standalone Gen-4 thorium modular reactor will cost about $5 000/kW of installed capacity. As additional modules of the thorium modular reactors (TMRs) are built and standardisation allows the builders and the subsystem equipment suppliers to become more efficient, it is estimated that the cost will be reduced to $4 500/MW, or nearly 20% less. Mulder argues that TMRs have an advan- tage over LWRs, as the latter is characterised by infrequency of construction. Further, owing to the simplicity of the design of the thorium modular reactor, which scales up arithmetically rather than geometrically, larger modules of the TMR, ranging between 40 MW, 80 MW and 165 MW, can be built at similar cost for each unit of power delivered to the grid, without significant additional research and development (R&D). “The economics of the TMR are compelling. They are less expensive to build, commission, operate and decommission than a comparable LWR. An important part of the savings is that TMRs have a short construction period of about two years, compared to LWRs, which take 6 to 10 years to build,” Mulder comments. The estimated available thorium reserves within the earth’s crust are three or four times the world’s uranium reserves. Combined with its greater energy efficiency, as a high-temperature reactor, it can be shown that there are at least enough thorium reserves to last about 4 500 years.

#### Undermines global uranium demand.

I.B Lambert, 2012. Geoscience Australia, Secretary General 34th IGC. “Global Uranium And Thorium Resources: Are They Adequate To Satisfy Demand Over The Next Half Century?” Geophysical Research Abstracts, Vol 14, meetingorganizer.copernicus.org/EGU2012/EGU2012-2544.pdf.

This presentation will consider the adequacy of global uranium and thorium resources to meet realistic nuclear power demand scenarios over the next half century. It is presented on behalf of, and based on evaluations by, the Uranium Group - a joint initiative of the OECD Nuclear Energy Agency and the International Atomic Energy Agency, of which the author is a Vice Chair. The Uranium Group produces a biennial report on Uranium Resources, Production and Demand based on information from some 40 countries involved in the nuclear fuel cycle, which also briefly reviews thorium resources. Uranium: In 2008, world production of uranium amounted to almost 44,000 tonnes (tU). This supplied approxi- mately three-quarters of world reactor requirements (approx. 59,000 tU), the remainder being met by previously mined uranium (so-called secondary sources). Information on availability of secondary sources—which include uranium from excess inventories, dismantling nuclear warheads, tails and spent fuel reprocessing—is incomplete, but such sources are expected to decrease in market importance after 2013. In 2008, the total world Reasonably Assured plus Inferred Resources of uranium (recoverable at less than $130/kgU) amounted to 5.4 million tonnes. In addition, it is clear that there are vast amounts of uranium recoverable at higher costs in known deposits, plus many as yet undiscovered deposits. The Uranium Group has concluded that the uranium resource base is more than adequate to meet projected high-case requirements for nuclear power for at least half a century. This conclusion does not assume increasing replacement of uranium by fuels from reprocessing current reactor wastes, or by thorium, nor greater reactor efficiencies, which are likely to ameliorate future uranium demand. However, progressively increasing quantities of uranium will need to be mined, against a backdrop of the relatively small number of producing facilities around the world, geopolitical uncertainties and strong opposition to growth of nuclear power in a number of quarters—it is vital that the market provides incentives for exploration and development of environmentally sustainable mining operations. Thorium: World Reasonably Assured plus Inferred Resources of thorium are estimated at over 2.2 million tonnes, in hard rock and heavy mineral sand deposits. At least double this amount is considered to occur in as yet undiscovered thorium deposits. Currently, demand for thorium is insignificant, but even a major shift to thorium-fueled reactors would not make significant inroads into the huge resource base over the next half century.

#### That destroys Kazakh economic modernization.

Gregory Gleason, 12/14/2011. Professor at the University of New Mexico and the George C. Marshall European Center for Security Studies. “KAZATOMPROM LOOKS EAST,” Central Asia Caucasus Institute Analyst, http://cacianalyst.org/?q=node/5683/print.

BACKGROUND: Kazakhstan’s uranium industry is a key part of the country’s diversification and modernization strategy. Kazakhstan played an important role in the Soviet nuclear industry with major mining, processing, fabricating and industrial facilities. Kazakhstan was the home of the Soviet Union’s major experimenting and testing facilities. The end of the Soviet Union brought the Soviet-era nuclear complex to a standstill. The first decree signed by Nursultan Nazarbayev, Kazakhstan’s first president, was to immediately close the Soviet nuclear weapons test range. Kazakhstan’s government moved quickly to eliminate the Soviet-era nuclear weapons and weapons facilities, and the country signed on to the basic principles of the Nuclear Non-proliferation treaty by rejecting nuclear armaments while endorsing peaceful use of the atom. Due to Kazakhstan’s large uranium mineral reserves, the development of the uranium industry for peaceful uses became one of Kazakhstan’s economic policy priorities. Kazakhstan’s industrial privatization program in the mid-1990s gave rise to numerous industrial enterprises but the uranium industry, because of its dual role as a commercial as well as a strategic resource, was retained under government control. In 1997, the Kazakhstani government formed Kazatomprom, a state-run mineral and industrial complex with direct responsibility for the uranium industry as well as for some other specialized industrial metals such as beryllium and tantalum. In a very short period of time Kazatomprom brilliantly succeeded in cobbling together Kazakhstan’s remnants of the Soviet-era uranium complex to build an industrial juggernaut in the uranium business. Kazatomprom surpassed its competitors in 2009 by emerging as the world’s largest producer of uranium ore. Kazatomprom’s success was achieved through a business model which linked Kazakhstan’s upstream mineral extraction with the downstream industrial facilities located elsewhere. Kazatomprom turned first to the Russian uranium industry, drawing on long-standing relations with Russia’s state-run nuclear complex under the control of Rosatom and with Russia’s related nuclear industry commercial firms. Later Kazatomprom moved outside the connections of the former Soviet space to forge business connections with foreign partners, forming joint ventures with leading technological partners such as France’s Areva and Canada’s Cameco. But Russia’s nuclear industry remained the locomotive driving Kazakhstan’s nuclear sector as it moved from the role of primary commodity supplier to the role of an integrated transnational industrial enterprise. Working in parallel, driven by state-financed enterprises and focused on jointly gaining a position to capture the expanding nuclear services market, Russia’s Rosatom and Kazakhstan’s Kazatomprom made major investments in a coordinated effort to corner the future nuclear reactor fuel supply market in Asia, focusing on China, India, Japan and Korea.

#### Kazakh economic development is a key model for Central Asia—instability would spread and trigger Central Asian conflict.

Margarita Assenova et al, 2008. Director of Institute for New Democracies @ CSIS; with Natalie Zajicova, Program Officer (IND); Janusz Bugajski, CSIS NEDP Director; Ilona Teleki, Deputy Director and Fellow (CSIS); Besian Bocka, Program Coordinator and Research Assistant (CSIS). “Kazakhstan’s Strategic Significance,” CSIS Institute for New Democracies, http://eurodialogue.org/Kazakhstan-Strategic-Significance.

The decision by the Organization for Security and Cooperation in Europe (OSCE) to award Kazakhstan the chairmanship of the organization for 2010 underscores a growing recognition of the country’s regional and continental importance. Kazakhstan is a strategic linchpin in the vast Central Asian-Caspian Basin zone, a region rich in energy resources and a potential gateway for commerce and communications between Europe and Asia.

However, it is also an area that faces an assortment of troubling security challenges. Ensuring a stable and secure Central Asia is important for the international interests of the United States and its European allies for several prescient reasons:

• Asian Security: Because of its proximity to Russia, China, Iran, and the South Asian sub-continent, Kazakhstan’s security and stability is an increasingly vital interest to all major powers. Kazakhstan’s tenure as chair of the OSCE will become an opportunity for greater multilateral cooperation in achieving this objective while strengthening the role and prestige of the OSCE throughout Central Asia.

• Afghanistan: Central Asia is a key staging area for U.S. and NATO military operations in Afghanistan against Taliban insurgents and Al Qaeda militants. Central Asia is a crucial conduit for U.S. and NATO troops and supplies into Afghanistan. U.S. offi cials recently reached new agreements with Russia, Kazakhstan, and other Central Asian countries to allow Afghanbound non-military supplies through their territories.

• Trans-National Terrorism: The Taliban resurgence in Afghanistan stimulates cross-border terrorism that may endanger the stability of several Central Asian neighbors and undermine Western interests. Central Asian states have been the victims of Afghanistan-based transnational terrorism. These states, including Kazakhstan, can support international efforts to counter regional terrorist networks.

• Organized Crime and Drug Traffi cking: Central Asia is an important transit region for narcotics traffi cking between Afghanistan and the countries of Europe and Asia. Joint initiatives that will enable the Kazakh government to control and monitor borders more effectively, intercept smuggling operations, and eradicate criminal networks will buttress international security and curtail funding to cross-border terrorist groups.

• Energy Security: Central Asia has the potential to be a vital energy source for Europe. The region contains a vast storehouse of oil and natural gas, which Europe urgently needs in order to lessen its reliance on Russian and Middle Eastern energy supplies. Disputes between Russia and several energy transit states, such as Ukraine, have increased Europe’s interest in developing direct supply lines between Europe and the Caspian countries.  
Challenges to International Interests

Despite the strategic significance of Central Asia and the Caspian Basin, in recent years Western countries have not paid sufficient attention to the region. This is due to a combination of factors, including the absence of a shared strategic framework for helping to stabilize and develop the heartland of Asia; insufficient focus on consolidating close political ties with key countries in the region through ustained high-level engagement; and opposition on the part of other major powers competing for influence in Central Asia.

Many Western experts conclude that Russia’s leaders have sought to use multi-national organizations, Moscow’s political connections and its economic leverage to assert greater control over ex-Soviet neighbors. There are reports that the Central Asian governments were pressured to curtail Western security interests, including limiting its military presence in the region by, for example, urging Uzbekistan and Kyrgyzstan to evict the U.S. military from bases on their territory.

Kazakh leaders are supportive of a more effective American and European role in Central Asia to help promote the region’s security and development, but without undermining Astana’s cordial relations with Russia. Kazakhstan’s independent foreign policy helps provide Western access to the region and enhances its position as a vital transport corridor. Kazakhstan is also a stabilizing factor in the geopolitical competition of the regional powers for access and influence across Central Asia. With its reinvigorated commitment to securing Afghanistan and stabilizing the wider region, the Obama administration has an ideal opportunity to reach out to key partners such as Kazakhstan and to enhance Astana’s role as a regional stabilizer.  
Kazakhstan as a Regional Stabilizer

Despite having the largest territory and economy in Central Asia, Kazakhstan is not a source of insecurity or threat to any of its neighbors. It does not employ territorial, ethnic, economic, or energy instruments to target and undermine any government in the region. On the contrary, Astana has sought to establish a system of collective security in Eurasia that would avert the emergence of a single dominant power. Kazakhstan’s “multi-vector” foreign policy, which seeks to pursue cooperative relations with all major powers, leads Astana to resist any hegemonic ambitions by larger countries that would undercut Kazakhstan’s political or economic independence.

While it is a member of the Commonwealth of Independent States (CIS), the Collective Security Treaty Organization (CSTO), and the Shanghai Cooperation Organization (SCO), Kazakhstan has sought to diversify its security relations and keep its freedom to establish and maintain international partnerships. Indeed, Astana has developed productive contacts with NATO by participating in NATO’s Euro-Atlantic Partnership Council (EAPC) and its Partnership for Peace (PfP) program. It was the only Central Asian government to negotiate an Individual Partnership Action Plan (IPAP) with NATO in January 2006.

NATO’s June 2004 summit affirmed the growing importance of Central Asia by designating the region as an area of “special focus” and stationing a liaison officer in the Kazakh capital of Astana in order to develop NATO assistance programs to modernize national military structures. A NATO Secretary General Special Representative for the Caucasus and Central Asia was also appointed.

Astana has underscored that neither the CSTO nor the SCO should become exclusive military alliances or anti-Western blocs that would challenge NATO’s mission in the wider region. Kazakhstan supports NATO operations in Afghanistan and grants overflight rights to U.S. and other NATO warplanes transporting non-lethal cargo to Afghanistan, as well as emergency landing rights for U.S. military aircraft in the Kazakh city of Almaty. The Kazakh authorities are also developing a Peacekeeping Battalion (KAZBAT), which is slated to become fully operational by 2011 and potentially available for international peace stability missions.

Kazakhstan is the only Central Asian country to have an Action Plan to assist in the reconstruction process in Afghanistan, including granting more than $3 million in the 2007-2008 fiscal year for social and infrastructure projects, humanitarian aid, and training for Afghan law enforcement and border patrol officers. For 2009-2011, Kazakhstan has committed an additional $5 million to improve the water supply and distribution infrastructure for shipments of grain and other commodities.

Kazakhstan also provides funding to support U.S. objectives in the region. Astana is the only regional donor giving significant aid to Kyrgyzstan, Tajikistan, and Afghanistan. According to the U.S. State Department’s Background note on Kazakhstan, “in 2006, Kazakhstan became the first country to share directly in the cost of a U.S. Government’s foreign assistance program. Through 2009, the Government of Kazakhstan will contribute over $15 million of a $40 million USAID economic development project aimed at strengthening Kazakhstan’s capacity to achieve its development goals.”

Kazakhstan has initiated and championed the Conference on Interaction and Confidence-Building in Asia (CICA). Modeled after the OSCE, the CICA process aims to promote peace and security throughout Eurasia through confidence-building measures and other means. The first CICA summit, held in June 2002, was attended by leaders from 16 states who signed the “Almaty Act,” as well as a declaration to eliminate terrorism and promote inter-cultural dialogue. The second CICA summit (hosted by Kazakhstan in June 2006) adopted the Catalogue of Confidence Building Measures (CBM)—a road map for implementing the CBM on a bilateral and multilateral basis. At the last CICA working meeting in India in February 2009, the participating states selected Turkey to chair the conference and host the third CICA summit in 2010. The Turkish chairmanship will expand CICA geographically and move it closer to Europe.  
Multi-National Counter-Terrorism

Kazakhstan has been combating several potential threats to its own stability and that of its neighbors, including terrorism, drug smuggling, and organized crime. Although Kazakhstan is generally not a source of these maladies, it is a transit country for such illicit activities. Kazakh leaders have been especially concerned about possible terrorist strikes against their country’s energy infrastructure that could affect exports to European and other consumers. To counter terrorist threats, the Kazakh government has supported multilateral efforts in key multilateral organizations to make counter-terrorism an essential ingredient of their security focus. Astana has also assigned troops to the Central Asian Rapid Reaction Force (CARRF), which is designed to defend each country against major terrorist threats.  
Regional Non-Proliferation

KazakhstanwasthefirstformerSovietrepublictoabandon its nuclear arsenal. It closed the largest nuclear weapons test site and has spearheaded regional denuclearization. Kazakh leaders have also made major progress in downgrading nearly all of the country’s highly enriched uranium, thus lessening the opportunities for such material to fall into the hands of foreign governments or terrorist groups. Astana’s non-proliferation initiatives have earned it praise from a number of international leaders.

With impetus from Kazakhstan, the Central Asian states have agreed to coordinate their nonproliferation and export control policies, especially to prevent the smuggling of Weapons of Mass Destruction (WMD) and related materials from the former Soviet Union. In September 2006 in Semipalatinsk, a former Soviet nuclear testing site in Kazakhstan, representatives of the five Central Asian states signed a treaty to create a Central Asian Nuclear Weapon Free Zone, which entered into force on March 21, 2009. The signatories pledged not to develop, manufacture, or otherwise acquire nuclear devices or to assist third parties in developing nuclear weapons programs. The treaty further addressed environmental protection as each of the five states share common problems of environmental damage resulting from the production and testing of Soviet nuclear weapons.  
Counter-Narcotics Trafficking

Countering the trafficking of narcotics from Afghanistan through Central Asia is a major security challenge for all countries in the region, as well as an issue of concern for European and Asian states seeking to stabilize Afghanistan. Proceeds from large-scale smuggling finance organized crime and cross-border terrorism. Central Asian states, including Kazakhstan, have been active in joint operations to intercept drug shipments from Afghanistan and are expanding their counter-narcotics agencies to deal more effectively with the threat. The Central Asian Regional Information and Coordination Centre (CARICC), established in Almaty under UN auspices, serves as the main regional communication center for analysis and exchange of information on transnational crime and the coordination of joint operations. The OSCE, which Kazakhstan will chair in 2010, has established the priority of curbing drug and arms smuggling, strengthening border controls to curtail illegal migration, and countering the financing of terrorist and criminal organizations.  
Energy Security

Kazakhstan is a major producer and exporter of crude oil, projected to export three million barrels of oil per day, or 150 million tons per year, by 2015. Kazakhstan also possesses substantial natural gas reserves and some of the world’s largest reserves of uranium.

The three energy-rich states of Central Asia (Kazakhstan, Uzbekistan, and Turkmenistan) understand that their political independence and energy security requires diversifying their energy customers and avoiding reliance on any single power or transit route. Currently, Russia is the main transit route for energy exports from Central Asia. Kazakhstan supports building oil and gas pipelines that would channel its energy resources directly to Europe and China. The Kazakh energy industry favors a direct energy connection with Azerbaijan across the Caspian Sea that would help supply the European market.

Astana is seeking to diversify its economy and avoid over-dependence on natural resources and energy exports. Until recently, oil and gas revenues have been aggressively used to develop a stronger economic foundation for expansion into new markets. Kazakhstan seeks to attract advanced technologies and modern management practices into its priority economic sectors, including high technology, financial services, and agriculture. However, the current global financial crisis poses considerable challenges to this agenda, not least because of the weaknesses it has exposed in Kazakhstan’s banking and financial services sector.  
Economic Development

Sustained economic development is a major determinant of long-term regional stability. Kazakhstan has emerged as a successful model of economic development in Central Asia and the secular Muslim world. It has the largest economy in Central Asia with a Gross Domestic Product (GDP) exceeding the combined total of its four Central Asian neighbors. The government is in the process of negotiating its entry into the World Trade Organization (WTO) and is a leading proponent of deepening economic cooperation in Central Asia and the Caspian region.

Kazakh leaders have focused on developing the Euro-Asian Economic Community (EurAsEC), an organization that also involves Belarus, Kazakhstan, Kyrgyzstan, Russia, and Tajikistan. More generally, Kazakhstan has strongly supported deeper economic integration among these states. Nonetheless, Astana opposes over-reliance on any single country because this would undermine Kazakhstan’s independence and integration into the global economy.

In positioning Kazakhstan as a potential economic hub and the core of a “Eurasian transport corridor,” President Nursultan Nazarbayev has proposed creating a regional organization, styled as the Eurasian Economic Union (EEU), to harness and intensify trans-border cooperation in such areas as water resource management, transportation infrastructure, crisis-response, environmental protection, and region-wide economic development. Such a process, even without the support of all Central Asian countries, could be the first steps toward lowering barriers to trade, harmonizing customs, and building closer economic associations. Kazakh officials contend that closer economic integration would reduce regional tensions, attract greater levels of foreign direct investment, and increase the region’s leverage and competitiveness in the international arena. Integration has also been fostered by tangible investments and capital flows as Kazakhstan has played a major role in exporting capital to its neighbors.

#### Central Asia conflict will escalate to US-Russian nuclear war—network-centric warfare compresses decision-making times and triggers miscalculation.

McDermott 11—Roger McDermott, Honorary senior fellow, department of politics and international relations, university of Kent at Canterbury and senior fellow in Eurasian military studies, Jamestown Foundation [December 6, 2011, “General Makarov Highlights the “Risk” of Nuclear Conflict,” Eurasia Daily Monitor, http://www.jamestown.org/programs/edm/single/?tx\_ttnews%5Btt\_news%5D=38748&tx\_ttnews%5BbackPid%5D=27&cHash=dfb6e8da90b34a10f50382157e9bc117]

In the current election season the Russian media has speculated that the Defense Minister Anatoliy Serdyukov may be replaced, possibly by Dmitry Rogozin, Russia’s Ambassador to NATO, which masks deeper anxiety about the future direction of the Armed Forces. The latest rumors also partly reflect uncertainty surrounding how the switch in the ruling tandem may reshuffle the pack in the various ministries, as well as concern about managing complex processes in Russian defense planning. On November 17, Russia’s Chief of the General Staff, Army-General Nikolai Makarov, offered widely reported comments on the potential for nuclear conflict erupting close to the country’s borders. His key observation was controversial, based on estimating that thepotential for armed conflict along the entire Russian periphery had grown dramatically over the past twenty years (Profil, December 1; Moskovskiy Komsomolets, November 28; Interfax, November 17). During his speech to the Defense Ministry’s Public Council on the progress and challenges facing the effort to reform and modernize Russia’s conventional Armed Forces, Makarov linked the potential for local or regional conflict to escalate into large-scale warfare “possibly even with nuclear weapons.” Many Russian commentators were bewildered by this seemingly “alarmist” perspective. However, they appear to have misconstrued the general’s intention, since he was actually discussing conflict escalation (Interfax, ITAR-TASS, November 17; Moskovskiy Komsomolets, Krasnaya Zvezda, November 18). Makarov’s remarks, particularly in relation to the possible use of nuclear weapons in war, were quickly misinterpreted. Three specific aspects of the context in which Russia’s most senior military officer addressed the issue of a potential risk of nuclear conflict may serve to necessitate wider dialogue about the dangers of escalation. There is little in his actual assertion about the role of nuclear weapons in Russian security policy that would suggest Moscow has revised this; in fact, Makarov stated that this policy is outlined in the 2010 Military Doctrine, though he understandably made no mention of its classified addendum on nuclear issues (Kommersant, November 18). Russian media coverage was largely dismissive of Makarov’s observations, focusing on the idea that he may have represented the country as being surrounded by enemies. According to Kommersant, claiming to have seen the materials used during his presentation, armed confrontation with the West could occur partly based on the “anti-Russian policy” pursued by the Baltic States and Georgia, which may equally undermine Moscow’s future relations with NATO. Military conflict may erupt in Central Asia, caused by instability in Afghanistan or Pakistan; or western intervention against a nuclear Iran or North Korea; energy competition in the Arctic or foreign inspired “color revolutions” similar to the Arab Spring and the creation of a European Ballistic Missile Defense (BMD) system that could undermine Russia’s strategic nuclear deterrence also featured in this assessment of the strategic environment (Kommersant, November 18). Since the reform of Russia’s conventional Armed Forces began in late 2008, Makarov has consistently promoted adopting network-centric capabilities to facilitate the transformation of the military and develop modern approaches to warfare. Keen to displace traditional Russian approaches to warfare, and harness military assets in a fully integrated network, Makarov possibly more than any senior Russian officer appreciates that the means and methods of modern warfare have changed and are continuing to change (Zavtra, November 23; Interfax, November 17). The contours of this evolving and unpredictable strategic environment, with the distinctions between war and peace often blurred, interface precisely in the general’s expression of concern about nuclear conflict: highlighting the risk of escalation. However, such potential escalation is linked to the reduced time involved in other actors deciding to intervene in a local crisis as well as the presence of network-centric approaches among western militaries and being developed by China and Russia. From Moscow’s perspective, NATO “out of area operations” from Kosovo to Libya blur the traditional red lines in escalation; further complicated if any power wishes to pursue intervention in complex cases such as Syria. Potential escalation resulting from local conflict, following a series of unpredictable second and third order consequences, makes Makarov’s comments seem more understandable; it is not so much a portrayal of Russia surrounded by “enemies,” as a recognition that, with weak conventional Armed Forces, in certain crises Moscow may have few options at its disposal (Interfax, November 17). There is also the added complication of a possibly messy aftermath of the US and NATO drawdown from Afghanistan and signs that the Russian General Staff takes Central Asian security much more seriously in this regard. The General Staff cannot know whether the threat environment in the region may suddenly change. Makarov knows the rather limited conventional military power Russia currently possesses, which may compel early nuclear first use likely involving sub-strategic weapons, in an effort to “de-escalate” an escalating conflict close to Russia’s borders. Moscow no longer primarily fears a theoretical threat of facing large armies on its western or eastern strategic axes; instead the information-era reality is that smaller-scale intervention in areas vital to its strategic interests may bring the country face-to-face with a network-centric adversary capable of rapidly exploiting its conventional weaknesses. As Russia plays catch-up in this technological and revolutionary shift in modern warfare capabilities, the age-old problem confronts the General Staff: the fastest to act is the victor (See EDM, December 1). Consequently, Makarov once again criticized the domestic defense industry for offering the military inferior quality weapons systems. Yet, as speed and harnessing C4ISR (Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance) become increasingly decisive factors in modern warfare, the risks for conflict escalation demand careful attention—especially when the disparate actors possess varied capabilities. Unlike other nuclear powers, Russia has to consider the proximity of several nuclear actors close to its borders. In the coming decade and beyond, Moscow may pursue dialogue with other nuclear actors on the nature of conflict escalation and de-escalation. However, with a multitude of variables at play ranging from BMD, US Global Strike capabilities, uncertainty surrounding the “reset” and the emergence of an expanded nuclear club, and several potential sources of instability and conflict, any dialogue must consider escalation in its widest possible context. Makarov’s message during his presentation, as far as the nuclear issue is concerned, was therefore a much tougher bone than the old dogs of the Cold War would wish to chew on.

### ADVANTAGE CP

Text: The United States Federal Government should fully fund and expedite renewable energy generation, generator retrofits, and micro-grids for its installations based on the Smart Power Infrastructure Demonstration for Energy Reliability and Security program.

The United States federal government should adopt a policy that it will not retaliate with nuclear weapons in the event of a blackout.

#### The United States federal government should establish a nitrogen fertilizer tax of 16 cents per pound of nitrogen, and use the revenue from that tax to provide loan guarantees for farmers to procure biocharcoal technology.

The United States Department of Defense should engage private contractors to construct and continually deploy at least 1,500 satellite-guided sailing ships with spinning silicon wafers capable of spraying eight gallons of .8 micron water droplets per second deployed evenly across the ocean through split contracts of less than $50 million dollars each.

#### The United States federal government should research develop and deploy hydrogen based technologies produced from ash

Solves grid

Ackerman 2012 [Robert K. Ackerman has been the editor in chief of SIGNAL Magazine for more than a dozen years. A seasoned technology journalist, Ackerman also has served as a war correspondent covering the Iraq War embedded with the U.S. Army’s 101st Airborne Division. SIGNAL Magazine is the only international news magazine serving the critical information needs of government, military and industry decision makers active in the fields of C4ISR, information security, intelligence, research and development, electronics, and homeland security. http://www.afcea.org/content/?q=node/2877

“Cybersecurity and a power supply come together on local bases.”]

No man may be an island, but each U.S. military base may become an energy island if a joint project among the Department of Energy, the Department of Homeland Security and the Defense Department comes to fruition. The effort aims to develop a microgrid that would supply a base with internal power independent of any external source that might fail as a result of enemy action.

Network security would be a key element of this energy microgrid. Facing the possibility of a cyberattack on the nation’s power grid, military bases must be able to sustain internal power with a degree of immunity from the online tactics employed by cybermarauders.

This program also seeks to blend a host of conventional and alternative energy sources into a single entity that would respond seamlessly to internal base power demands. Complicating the endeavor to link these energy sources is the requirement to provide secure network control that could interoperate with the public power grid but still be immune to cyberthreats that menace the larger network.

Known as the Smart Power Infrastructure Demonstration for Energy Reliability and Security, or SPIDERS, the project is a Defense Department joint capability technology demonstration (JCTD). It already is underway at Joint Base Pearl Harbor-Hickam, Oahu, Hawaii, and later phases will evaluate progressively sophisticated systems at Fort Collins, Colorado, and Camp Smith, Hawaii.

Melanie Johnson, an electrical engineer with the Army Corps of Engineers Construction Engineering Research Laboratory, explains that SPIDERS is designed to develop a template for bringing microgrid technology to military installations in the United States. Its success would have implications for installations outside the United States, particularly in operational settings, she points out.

Part of the SPIDERS technical management team, Johnson explains that a key element in SPIDERS is to provide network security for the communications and control systems within that microgrid environment. That security would be vital if a base loses power because of a cyberattack on the local power grid.

What sets SPIDERS apart from other microgrid efforts is its emphasis on cybersecurity and network communications. Security is a primary SPIDERS objective, Johnson says, adding that this includes information assurance certification and implementing emerging standards from the National Institute of Standards and Technology (NIST), the North American Electric Reliability Corporation (NERC) and Department of Energy organizations.

Adding cybersecurity to the microgrid complicates the picture and requires “a little critical thinking,” Johnson observes. However, SPIDERS is not employing the traditional approach of first developing a control system and then overlaying security. Instead, security will be integrated into the system as it is developed. The result will be a comprehensive security solution that is tailored to the system, she offers.

The microgrid control system continually will monitor power quality and conditions in the regional power grid. If it detects instability or significant quality issues, it can alert monitors who would decide to disconnect the base from the external grid. The microgrid would continue to provide power to critical missions.

#### CP solves warming.

**Kunzig ‘8** (Robert, winner of the Walter Sullivan Award for Excellence in Science Journalism, Scientific American, “Geoengineering: How to Cool Earth—At a Price”, 10-20, https://sslaccess.elkresources.net/files/OTHER-MISC/Geoengineering\_How%20to%20Cool%20Earth-At%20a%20Price.pdf)

Stephen Salter, an emeritus engineering professor at the University of Edinburgh, has come up with a scheme that, on paper at least, looks ingenious. “It’s basically a watering can,” Latham says—but the nozzle would be a silicon wafer etched with billions of holes less than a micron across, and it would be mounted on an unmanned, satellite-guided sailing ship. More specifically, the vessel would be a Flettner ship, which has tall, spinning cylinders that resemble smokestacks but act as sails, generating lift because one side is moving with the wind and the other side against it. In Salter’s concept, turbines spun by water moving past the ship would generate the electricity to keep the cylinders spinning and also to spray seawater out the stacks in 0.8-micron droplets. Salter and Latham estimate that 1,500 ships, each spraying eight gallons a second—and each costing $2 million, for a total of $3 billion**— could offset the global warming caused by a doubling of CO 2** . Half the job could be done, according to modeling results from the Met Office Hadley Center for Climate Prediction and Research in Exeter, England**, by deploying ships over just 4 percent of the ocean.**

#### Solves through sequestration

Technology Review, 4/26/2007. “The Case for Burying Charcoal,” published by MIT, http://www.technologyreview.com/news/407754/the-case-for-burying-charcoal/.

Several states in this country and a number of Scandinavian countries are trying to supplant some coal-burning by burning biomass such as wood pellets and agricultural residue. Unlike coal, biomass is carbon-neutral, releasing only the carbon dioxide that the plants had absorbed in the first place. But a new research [paper](http://dx.doi.org/10.1016/j.biombioe.2007.01.012) published online in the journal Biomass and Bioenergy argues that the battle against global warming may be better served by instead heating the biomass in an oxygen-starved process called pyrolysis, extracting methane, hydrogen, and other byproducts for combustion, and burying the resulting carbon-rich char. Even if this approach would mean burning more coal--which emits more carbon dioxide than other fossil-fuel sources--it would yield a net reduction in carbon emissions, according to the analysis by [Malcolm Fowles](http://technology.open.ac.uk/tm/mf.htm), a professor of technology management at the Open University, in the United Kingdom. Burning one ton of wood pellets emits 357 kilograms less carbon than burning coal with the same energy content. But turning those wood pellets into char would save 372 kilograms of carbon emissions. That is because 300 kilograms of carbon could be buried as char, and the burning of byproducts would produce 72 kilograms less carbon emissions than burning an equivalent amount of coal. ¶ Such an approach could carry an extra benefit. Burying char--known as black-carbon sequestration--enhances soils, helping future crops and trees grow even faster, thus absorbing more carbon dioxide in the future. Researchers believe that the char, an inert and highly porous material, plays a key role in helping soil retain water and nutrients, and in sustaining microorganisms that maintain soil fertility. ¶ Johannes Lehmann, an associate professor of crops and soil sciences at Cornell University and an expert on char sequestration, agrees in principle with Fowles's analysis but believes that much more research in this relatively new area of study is needed. "It heads in the right direction," he says.¶ Interest in the approach is gathering momentum. On April 29, more than 100 corporate and academic researchers will gather in New South Wales, Australia, to attend the first international conference on black-carbon sequestration and the role pyrolysis can play to offset greenhouse-gas emissions. Lehmann estimates that as much as 9.5 billion tons of carbon--more than currently emitted globally through the burning of fossil fuels--could be sequestered annually by the end of this century through the sequestration of char. "Bioenergy through pyrolysis in combination with biochar sequestration is a technology to obtain energy and improve the environment in multiple ways at the same time," writes Lehmann in a research paper to be published soon in [Frontiers in Ecology and the Environment](http://www.frontiersinecology.org/). Fowles says that there would be an incentive for farmers, logging communities, and small towns to convert their own dedicated crops, agricultural and forest residues, and municipal biowaste into char if a high enough price emerged for the sale of carbon offsets. "Every community at any scale could pyrolyse its biowaste ... motivated by doing their bit against global warming," he says. Fowles believes that storing black carbon in soil carries less risk, would be quicker to implement, and could be done at much lower cost than burying carbon dioxide in old oil fields or aquifers. And he says the secondary benefits to agriculture could be substantial: "Biochar reduces the soil's requirement for irrigation and fertilizer, both of which emit carbon." Fowles adds that it has also been shown to reduce emissions of greenhouse gases from decay processes in soil. This would include nitrous oxide, a potent greenhouse gas. "Biochar has been observed to reduce nitrous-oxide emissions from cultivated soil by 40 percent."

#### Solves hydrogen

**R&D Magazine 3/26**/13 [“Ash from refuse could become hydrogen gas,” Tue, 03/26/2013 - 12:31pm , pg. http://www.rdmag.com/news/2013/03/ash-refuse-could-become-hydrogen-gas

Every year, millions of tons of environmentally harmful ash is produced worldwide, and is mostly dumped in landfill sites or, in some countries, used as construction material. The ash is what is left when rubbish has been burnt in thermal power stations. A researcher from Lund University in Sweden has now developed a technique to use the ash to produce hydrogen gas. The method is presented in a new thesis.

The technique has significant potential: 20 billion litres of hydrogen gas a year, or 56 gigawatt-hours (GWh). Calculated as electricity, the energy is the equivalent of the annual needs of around 11,000 detached houses. Hydrogen gas is valuable and is viewed by many as an increasingly important energy source, for example as a vehicle fuel.

“The ash can be used as a resource through recovery of hydrogen gas instead of being allowed to be released into the air as at present. Our ash deposits are like a goldmine”, said Aamir Ilyas, Doctor of Water Resources Engineering at Lund University and the developer of the technique. Refuse incineration is a widespread practice in Europe.

The technique involves placing the ash in an oxygen-free environment. The ash is dampened with water, whereupon it forms hydrogen gas. The gas is sucked up through pipes and stored in tanks.

It is the heavy, grit-like bottom ash that is used. In combustion, a lighter fly ash is also formed. The bottom ash remains in quarantine, in the open air, at the site for up to six months to prevent leaching of environmentally harmful metals and the risk of hydrogen gas being formed, since accumulation of hydrogen during indoor storage can result in explosion.

“A bonus is that this method removes the risk of hydrogen gas. It also reduces the strain on our landfill sites.”

### HYDROGEN ADVANTAGE

#### Squo solves – field testing

**Military & Aerospace Electronics 3/1**/13 [“Navy to field-test hydrogen fuel cell- and solar-powered military renewable energy system,” March 1, 2013, pg. http://www.militaryaerospace.com/articles/2013/03/Navy-renewable-energy.html

CHINA LAKE NAVAL AIR WEAPONS STATION, Calif., 1 March 2013. [Military renewable energy](http://www.militaryaerospace.com/articles/2011/04/military-renewable.html) experts in the U.S. Navy are testing a trailer-mounted regenerative [fuel cell](http://www.militaryaerospace.com/articles/2012/04/insitu-scaneagle-uav-completes-hydrogen-powered-fuel-cell-flight-test.html) system that could save money and warfighter lives, Navy officials say.

The Naval Air Warfare Center Weapons Division at China Lake Naval Air Weapons Station in Ridgecrest, Calif., are evaluating a system that consists of a fuel cell and an array of solar panels that can be towed behind ground vehicles and generate about 5,000 Watts of electricity.

The fuel cell is an energy producing device that takes hydrogen in as its fuel, and through an electrochemical reaction, makes electricity. The only by-product of the process is water and heat. Electrolysis, running a current through water, produces hydrogen and oxygen. This system stores the hydrogen and then feeds it back into the fuel cell.

“Fuel cells are not a new idea, but this system is one-of-a-kind in that all it needs to run is water and sunshine, then it powers itself,” says Matt Malone, an electronics engineer in the Naval Air Warfare Center Weapons Division Renewable Energy Office. “It is completely environmentally friendly and all of the fuel cell parts are recyclable. The system uses the water that it produces to refuel itself.”

Users of the system would pour in water and point the solar arrays at the sun. Through the solar panels the sun generates electricity, which flows into the water to produce hydrogen and oxygen. The oxygen vents into the atmosphere and the hydrogen is stored.

During the day, command centers and other military energy users would be powered by solar energy and excess energy would be used to generate hydrogen. At night, the stored hydrogen would be sent through the fuel cell to create electricity.

China Lake Naval Air Weapons Station is a particularly good place to test solar energy. The base is in the high Mojave desert, and has cloudy days only rarely.

“The only by-products are water, which goes into a tank for use the next day, and heat.” Malone says. “What you don’t have in this scenario is diesel fuel, battery storage, and toxic emissions into the air.”

Malone and the Renewable Energy team wrote the requirements for the system and coordinated with a contractor that produced the hardware. The team will test and evaluate the system in a lab at China Lake before sending it out with troops for field testing.

“Since this system only needs water to operate, one of its biggest benefits is reducing the logistics requirements associated with fuel convoys, which could save lives,” says Wayne Taylor, program manager for the Renewable Energy Office.

#### They can’t overcome the Hindenburg problem

**Matthews 3/17**/13 - Visiting reader in science @ Aston University [[Robert Matthews](http://www.thenational.ae/authors/robert-matthews) “Hydrogen still on the back burner,” Mar 17, 2013, The National, pg. <http://www.thenational.ae/news/uae-news/technology/hydrogen-still-on-the-back-burner#ixzz2OtSi9IKA>

The "hydrogen economy" is like the cure for the common cold: people have been talking about it for decades, but it never seems to get much closer.

The promise is well-known. In principle, hydrogen is a source of clean, carbon-free and plentiful energy. In practice, there are more than a few problems.

For a start, hydrogen may be the most plentiful element in the universe, but it isn't just lying around waiting to be extracted from the ground like fossil fuels. As the lightest of all gases, most of it zoomed back into space aeons ago, and what is left is hard to access or distribute.

Then there's the Hindenburg problem. The spectacular fire that brought the hydrogen-filled German airship crashing down in 1937 has scorched itself into the collective consciousness as a warning against using this highly flammable gas.

#### No regional rebalancing or security dilemmas—the only empirical data goes our way. [green]

Fettweis 11—Professor of Poli Sci @ Tulane University [Christopher J. Fettweis, “The Superpower as Superhero: Hubris in U.S. Foreign Policy,” Paper prepared for presentation at the 2011 meeting of the American Political Science Association, September 1-4, Seattle, WA, September 2011, pg. http://ssrn.com/abstract=1902154]

The final and in some ways most important pathological belief generated by hubris places the United States at the center of the current era of relative peace. “All that stands between civility and genocide, order and mayhem,” explain Kaplan and Kristol, “is American power.”68 This belief is a variant of what is known as the “hegemonic stability theory,” which proposes that international peace is only possible when there is one country strong enough to make and enforce a set of rules.69 Although it was first developed to describe economic behavior, the theory has been applied more broadly, to explain the current proliferation of peace. At the height of Pax Romana between roughly 27 BC and 180 AD, for example, Rome was able to bring an unprecedented level of peace and security to the Mediterranean. The Pax Britannica of the nineteenth century brought a level of stability to the high seas. Perhaps the current era is peaceful because the United States has established a de facto Pax Americana in which no power is strong enough to challenge its dominance, and because it has established a set of rules that are generally in the interests of all countries to follow. Without a benevolent hegemon, some strategists fear, instability may break out around the globe.70 Unchecked conflicts could bring humanitarian disaster and, in today’s interconnected world, economic turmoil that could ripple throughout global financial markets. There are good theoretical and empirical reasons, however, to doubt that U.S hegemony is the primary cause of the current stability.¶ First, the hegemonic-stability argument shows the classic symptom of hubris: It overestimates the capability of the United States, in this case to maintain global stability. No state, no matter how strong, can impose peace on determined belligerents. **The U.S. military** may be the most imposing in the history of the world, but it can only police the system if the other members generally cooperate. Self-policing must occur, in other words; if other states had not decided on their own that their interests are best served by peace, then no amount of international constabulary work by the United States could keep them from fighting. The five percent of the world’s population that lives in the United States simply cannot force peace upon an unwilling ninety-five percent. Stability and unipolarity may be simply coincidental.¶ In order for U.S. hegemony to be the explanation for global stability, the rest of the world would have to expect reward for good behavior and fear punishment for bad. Since the end of the Cold War, the United States has not been especially eager to enforce any particular rules. Even rather incontrovertible evidence of genocide has not been enough to inspire action. Hegemonic stability can only take credit for influencing those decisions that would have ended in war without the presence, whether physical or psychological, of the United States. Since most of the world today is free to fight without U.S. involvement, something else must be preventing them from doing so.71 Stability exists in many places where no hegemony is present. Ethiopia and Eritrea are hardly the only states that could go to war without the slightest threat of U.S. intervention, yet few choose to do so.¶ Second, it is worthwhile to repeat one of the most basic observations about misperception in international politics, one that is magnified by hubris: Rarely are our actions as consequential upon their behavior as we believe them to be. The ego-centric bias suggests that while it may be natural for U.S. policymakers to interpret their role as crucial in the maintenance of world peace, they are almost certainly overestimating their own importance. At the very least, the United States is probably not as central to the myriad decisions in foreign capitals that help maintain international stability as it thinks it is.¶ Third, if U.S. security guarantees were the primary cause of the restraint shown by the other great and potentially great powers, then those countries would be demonstrating an amount of **trust** in the intentions, judgment and wisdom of another that would be **without precedent in** international **history**. If the states of Europe and the Pacific Rim detected a good deal of danger in the system, relying entirely on the generosity and sagacity (or, perhaps the naiveté and gullibility) of Washington would be the height of strategic irresponsibility. Indeed it is hard to think of a similar choice: When have any capable members of an alliance virtually disarmed and allowed another member to protect their interests? It seems more logical to suggest that the other members of NATO and Japan just do not share the same perception of threat that the United States does. If there was danger out there, as so many in the U.S. national security community insist, then the grand strategies of the allies would be quite different. Even during the Cold War, U.S. allies were not always convinced that they could rely on U.S. security commitments. Extended deterrence was never entirely comforting; few Europeans could be sure that United States would indeed sacrifice New York for Hamburg. In the absence of the unifying Soviet threat, their trust in U.S. commitments for their defense would presumably be lower—if in fact that commitment was at all necessary outside of the most pessimistic works of fiction.¶ Furthermore, in order for hegemonic stability logic to be an adequate explanation for restrained behavior, allied states must not only be fully convinced of the intentions and capability of the hegemon to protect their interests; they must also trust that the hegemon can interpret those interests correctly and consistently. As discussed above, the allies do not feel that the United States consistently demonstrates the highest level of strategic wisdom. In fact, they often seem to look with confused eyes upon our behavior, and are unable to explain why we so often find it necessary to go abroad in search of monsters to destroy. They will participate at times in our adventures, but minimally and reluctantly.¶ Finally, while believers in hegemonic stability as the primary explanation for the long peace have articulated a logic that some find compelling, they are rarely able to cite much evidence to support their claims. In fact, the limited empirical data we have suggests that there is little connection between the relative level of U.S. activism and international stability. During the 1990s, the United States cut back on defense fairly substantially, spending $100 billion less in real terms in 1998 that it did in 1990, which was a twenty-five percent reduction.72 To defense hawks and other believers in hegemonic stability, this irresponsible “peace dividend” endangered both national and global security. “No serious analyst of American military capabilities doubts that the defense budget has been cut much too far to meet America’s responsibilities to itself and to world peace,” argued Kristol and Kagan.”73 If global stability were unrelated to U.S. hegemony, however, one would not have expected an increase in conflict and violence.¶ The verdict from the last two decades is fairly plain: The world grew more peaceful while the United States cut its forces.74 No state believed that its security was endangered by a less-capable U.S. military, or at least none took any action that would suggest such a belief. **No defense establishments were enhanced** to address power vacuums; **no security dilemmas drove insecurity or arms races; no regional balancing occurred** after the stabilizing presence of the U.S. military was diminished. The rest of the world acted as if the threat of international war was not a pressing concern, despite the reduction in U.S. capabilities. The incidence and magnitude of global conflict declined while the United States cut its military spending under President Clinton, and kept declining as the Bush Administration ramped that spending back up. The two phenomena are unrelated.¶ These figures will not be enough to convince skeptics. Military spending figures by themselves are insufficient to disprove a connection between overall U.S. actions and international stability, and one could also presumably argue that spending is not the only or even the best indication of hegemony, that it is instead U.S. foreign political and security commitments that maintain stability. Since neither was significantly altered during this period, instability should not be expected. Alternately, advocates of hegemonic stability could believe that relative rather than absolute spending is decisive in bringing peace. Although the United States cut back on its spending during the 1990s, its relative advantage never wavered.¶ However, two points deserve to be made. First, even if it were true that either U.S. commitments or relative spending account for global pacific trends, it would remain the case that stability can be maintained at drastically lower levels. In other words, even if one can be allowed to argue in the alternative for a moment and suppose that there is in fact a level of engagement below which the United States cannot drop without increasing international disorder, a rational grand strategist would still cut back on engagement and spending until that level is determined. Basic logic suggests that the United States ought to spend the minimum amount of its blood and treasure while seeking the maximum return on its investment. And if, as many suspect, this era of global peace proves to be inherently stable because normative evolution is typically unidirectional, then no increase in conflict would ever occur, irrespective of U.S. spending.75 Abandoning the mission to stabilize the world would save untold trillions for an increasingly debt-ridden nation.¶ Second, it is also worth noting that if opposite trends had unfolded, if other states had reacted to news of cuts in U.S. defense spending with more aggressive or insecure behavior, then surely hegemonists would note that their expectations had been justified. If increases in conflict would have been interpreted as evidence for the wisdom of internationalist strategies, then logical consistency demands that the lack thereof should at least pose a problem. As it stands, the only evidence we have regarding the relationship between U.S. power and international stability suggests that the two are unrelated. Evidently the rest of the world can operate quite effectively without the presence of a global policeman. Those who think otherwise base their view on faith alone.¶ It requires a good deal of hubris for any actor to consider itself indispensable to world peace. Far from collapsing into a whirlwind of chaos, the chances are high that the world would look much like it does now if the United States were to cease regarding itself as God’s gladiator on earth. The people of the United States would be a lot better off as well.

#### Decline facilitates US multilateralism—paves the way for a soft landing that prevents their transition impacts.

He 10—Professor of Political Science at Utah State University [Kai He (Postdoctoral fellow in the Princeton-Harvard China and the World Program at Princeton University (2009–2010) and a Bradley fellow of the Lynda and Harry Bradley Foundation (2009–2010), “The hegemon’s choice between power and security: explaining US policy toward Asia after the Cold War,” Review of International Studies (2010), 36, pg. 1121–1143]

When US policymakers perceive a rising or a stable hegemony, the anarchic nature of the international system is no longer valid in the mind of US policymakers because the preponderant power makes the US immune from military threats. In the self-perceived, hierarchic international system with the US on the top, power-maximisation becomes the strategic goal of the US in part because of the ‘lust for power’ driven by human nature and in part because of the disappearance of the security constraints imposed by anarchy. Therefore, selective engagement and hegemonic dominion become two possible strategies for the US to maximise its power in the world. The larger the power gap between the US and others, the more likely selective engagement expands to hegemonic dominion. When US policymakers perceive a declining hegemony in that the power gap between the hegemon and others is narrowed rather than widened, US policymakers begin to change their hierarchic view of the international system. The rapid decline of relative power causes US policymakers to worry about security imposed by anarchy even though the US may remain the most powerful state in the system during the process of decline. Offshore balancing and multilateralism, therefore, become two possible policy options for the US to maximise its security under anarchy. The possible budget constraints during US decline may lead to military withdrawals from overseas bases. In addition, the US becomes more willing to pay the initial ‘lock-in’ price of multilateral institutions in order to constrain other states’ behaviour for its own security.

US foreign policy towards Asia preliminarily supports the power-perception hegemonic model. When President George H. W. Bush came to power, the US faced ‘dual deficits’ even though the US won the Cold War and became the hegemon by default in the early 1990s. The domestic economic difficulty imposed a declining, or at least uncertain, hegemony to the Bush administration. Consequently, Bush had to withdraw troops from Asia and conducted a reluctant offshore balancing strategy in the early 1990s. Although the US still claimed to keep its commitments to Asian allies, the US words with the sword became unreliable at best.

During President Clinton’s first tenure, how to revive US economy became the first priority of the administration. The perception of a declining hegemon did not totally fade until the middle of the 1990s when the US economy gradually came out of the recession. Multilateral institutions, especially APEC, became Clinton’s diplomatic weapon to open Asia’s market and boost US economy. In addition, the US also endorsed the ARF initiated by the ASEAN states in order to retain its eroding political and military influence after the strategic retreats in the early 1990s.

However, the US ‘new economy’ based on information technology and computers revived policymakers’ confidence in US hegemony after the Asian miracle was terminated by the 1997 economic crisis. The second part of the 1990s witnessed a rising US hegemony and the George W. Bush administration reached the apex of US power by any measure in the early 21st century. Therefore, since Clinton’s second tenure in the White House, US foreign policy in general and towards Asia in particular has become more assertive and power-driven in nature. Besides reconfirming its traditional military alliances in Asia, the US deepened its military engagement in the region through extensive security cooperation with other Asian states.

The selective engagement policy of the US in the late 1990s was substantially expanded by the Bush administration to hegemonic dominion after 9/11. The unrivalled hegemony relieved US of concerns over security threats from any other states in the international system. The ‘lust for power’ without constraints from anarchy drove US policymakers to pursue a hegemonic dominion policy in the world. The ‘pre-emption strategy’ and proactive missile defence programs reflected the power-maximising nature of the hegemonic dominion strategy during the George W. Bush administration.

What will the US do in the future? The power-perception hegemonic model suggests that the US cannot escape the fate of other great powers in history. When US hegemony is still rising or at a stable stage, no one can stop US expansion for more power. When its economy can no longer afford its power-oriented strategy, the US will face the same strategic burden of ‘imperial overstretch’ that Great Britain suffered in the 19th century. However, the power-perception hegemonic model also argues that US foreign policy depends on how US policymakers perceive the rise and fall of US hegemony.

If historical learning can help US policymakers cultivate a prudent perception regarding US hegemony, the early implementation of offshore balancing and **multilateralism may facilitate the soft-landing** **of declining US hegemony**. More importantly, the real danger is whether the US can make a right choice between power and security when US hegemony begins to decline. If US policymakers cannot learn from history but insist on seeking more power instead of security even though US hegemony is in decline, the likelihood of hegemonic war will increase. However, if US policymakers choose security over power when US hegemony is in decline, offshore balancing and multilateralism can help the US maximise security in the future anarchic, multipolar world. Pg. 1141-1143

\*Heg encourages power maximization

\*Decline forces them to worry about security. Leads to multilateralism/OSB

\*US willing to pay lock-in price to constrain peer competitor

\*1990’s prove

\*Multilateralism creates a soft landing during decline

#### Multilat leads to global coop and power sharing [GREEN]

Pouliot 11—Professor of Poli Sci @ McGill University [Vincent Pouliot, “Multilateralism as an End in Itself,” International Studies Perspectives (2011) 12, 18–26]

Because it rests on open, nondiscriminatory debate, and the routine exchange of viewpoints, the multilateral procedure introduces three key advantages that are gained, regardless of the specific policies adopted, and tend to diffuse across all participants. Contrary to the standard viewpoint, according to which a rational preference or functional imperative lead to multilateral cooperation, here it is the systematic practice of multilateralism that creates the drive to cooperate. At the theoretical level, the premise is that it is not only what people think that explains what they do, but also what they do that determines what they think (Pouliot 2010). Everyday multilateralism is a self-fulfilling practice for at least three reasons.¶ First, the joint practice of multilateralism creates mutually recognizable patterns of action among global actors. This process owes to the fact that practices structure social interaction (Adler and Pouliot forthcoming).2 Because they are meaningful, organized, and repeated, practices generally convey a degree of mutual intelligibility that allows people to develop social relations over time. In the field of international security, for example, the practice of deterrence is premised on a limited number of gestures, signals, and linguistic devices that are meant, as Schelling (1966:113) put it, to ‘‘getting the right signal across.’’ The same goes with the practice of multilateralism, which rests on a set of political and social patterns that establish the boundaries of action in a mutually intelligible fashion. These structuring effects, in turn, allow for the development of common frameworks for appraising global events. Multilateral dialog serves not only to find joint solutions; it also makes it possible for various actors to zoom in on the definition of the issue at hand—a particularly important step on the global stage.¶ The point is certainly not that the multilateral procedure leads everybody to agree on everything—that would be as impossible as counterproductive. Theoretically speaking, there is room for skepticism that multilateralism may ever allow communicative rationality at the global level (see Risse 2000; Diez and Steans 2005). With such a diverse and uneven playing field, one can doubt that discursive engagement, in and of itself, can lead to common lifeworlds. Instead, what the practice of multilateralism fosters is the emergence of a **shared framework of interaction**—for example, a common linguistic repertoire—that allows global actors to make sense of world politics in mutually recognizable ways. Of course, they may not agree on the specific actions to be taken, but at least they can build on an established pattern of political interaction to deal with the problem at hand—sometimes even before it emerges in acute form. In today’s pluralistic world, that would already be a considerable achievement.¶ In that sense, multilateralism may well be a constitutive practice of what Lu (2009) calls ‘‘political friendship among peoples.’’ The axiomatic practice of principled and inclusive dialog is quite apparent in the way she describes this social structure: ‘‘**While conflicts**, especially over the distribution of goods and burdens, **will inevitably arise, under conditions of political friendship among peoples, they will be negotiated within** a global background context of norms and **institutions based on mutual recognition**, equity in the distribution of burdens and benefits **of global cooperation**, **and power-sharing** in the institutions of global governance rather than domination by any group’’ (2009:54–55). In a world where multilateralism becomes an end in itself, this ideal pattern emerges out of the structuring effects of axiomatic practice: take the case of NATO, for instance, which has recently had to manage, through the multilateral practice, fairly strong internal dissent (Pouliot 2006). While clashing views and interests will never go away in our particularly diverse world, as pessimists are quick to emphasize (for example, Dahl 1999), the management of discord is certainly made easier by shared patterns of dialog based on mutually recognizable frameworks.¶ Second, the multilateral procedure typically ensures a remarkable level of moderation in the global policies adopted. In fact, a quick historical tour d’horizon suggests that actors engaged in multilateralism tend to avoid radical solutions in their joint decision making. Of course, the very process of uniting disparate voices helps explain why multilateralism tends to produce median consensus. This is not to say that the multilateral practice inevitably leads to lowest common denominators. To repeat, because it entails complex and often painstaking debate before any actions are taken, the multilateral procedure forces involved actors to devise and potentially share similar analytical lenses that, in hindsight, make the policies adopted seem inherently, and seemingly ‘‘naturally,’’ moderate. This is because the debate about what a given policy means takes place before its implementation, which makes for a much smoother ride when decisions hit the ground. This joint interpretive work, which constitutes a crucial aspect of multilateralism, creates outcomes that are generally perceived as inherently reasonable. Participation brings inherent benefits to politics, as Bachrach (1975) argued in the context of democratic theory. Going after the conventional liberal view according to which actors enter politics with an already fixed set of preferences, Bachrach observes that most of the time people define their interests in the very process of participation. The argument is not that interests formed in the course of social interaction are in any sense more altruistic. It rather is that the nature and process of political practices, in this case multilateralism, matter a great deal in shaping participants’ preferences (Wendt 1999). In this sense, not only does the multilateral practice have structuring effects on global governance, but it is also constitutive of what actors say, want, and do (Adler and Pouliot forthcoming).¶ Third and related, multilateralism lends legitimacy to the policies that it generates by virtue of the debate that the process necessarily entails. There is no need here to explain at length how deliberative processes that are inclusive of all stakeholders tend to produce outcomes that are generally considered more socially and politically acceptable. In the long run, the large ownership also leads to more efficient implementation, because actors feel invested in the enactment of solutions on the ground. Even episodes of political failure, such as the lack of UN reaction to the Rwandan genocide, can generate useful lessons when re-appropriated multilaterally—think of the Responsibility to Protect, for instance.3 From this outlook, there is no contradiction between efficiency and the axiomatic practice of multilateralism, quite the contrary. The more multilateralism becomes the normal or self-evident practice of global governance, the more benefits it yields for the many stakeholders of global governance. In fact, multilateralism as an end in and of itself could generate even more diffuse reciprocity than Ruggie had originally envisioned. Not only do its distributional consequences tend to even out, **multilateralism as a global governance routine** also **creates** self-reinforcing dynamics and new focal points for strategic interaction**. The axiomatic practice of multilateralism helps define problems in commensurable ways and craft moderate solutions** with wide-ranging ownership—three processual benefits that further strengthen the impetus for multilateral dialog. Pg. 21-23

#### That cooperation is key to planetary survival—weak regulations risk extinction. [GREEN]

Masciulli 11—Professor of Political Science @ St Thomas University [Joseph Masciulli, “The Governance Challenge for Global Political and Technoscientific Leaders in an Era of Globalization and Globalizing Technologies,” Bulletin of Science, Technology & Society February 2011 vol. 31 no. 1 pg. 3-5]

What is most to be feared is enhanced global disorder resulting from the combination of weak global regulations; the unforeseen destructive consequences of converging technologies and economic globalization; military competition among the great powers; and the prevalent biases of short-term thinking held by most leaders and elites. But no practical person would wish that such a disorder scenario come true, given all the weapons of mass destruction (WMDs) available now or which will surely become available in the foreseeable future. As converging technologies united by IT, cognitive science, nanotechnology, and robotics advance synergistically in monitored and unmonitored laboratories, we may be blindsided by these future developments brought about by technoscientists with a variety of good or destructive or mercenary motives. The current laudable but problematic openness about publishing scientific results on the Internet would contribute greatly to such negative outcomes.

To be sure, if the global disorder-emergency scenario occurred because of postmodern terrorism or rogue states using biological, chemical, or nuclear WMDs, or a regional war with nuclear weapons in the Middle East or South Asia, there might well be a positive result for global governance. Such a global emergency might unite the global great and major powers in the conviction that a global concert was necessary for their survival and planetary survival as well. In such a global great power concert, basic rules of economic, security, and legal order would be uncompromisingly enforced both globally and in the particular regions where they held hegemonic status. That concert scenario, however, is flawed by the limited legitimacy of its structure based on the members having the greatest hard and soft power on planet Earth.

At the base of our concerns, I would argue, are human proclivities for narrow, short-term thinking tied to individual self-interest or corporate and national interests in decision making. For globalization, though propelled by technologies of various kinds, “remains an essentially human phenomenon . . . and the main drivers for the establishment and uses of disseminative systems are hardy perennials: profit, convenience, greed, relative advantage, curiosity, demonstrations of prowess, ideological fervor, malign destructiveness.” These human drives and capacities will not disappear. Their “manifestations now extend considerably beyond more familiarly empowered governmental, technoscientific and corporate actors to include even individuals: terrorists, computer hackers and rogue market traders” (Whitman, 2005, p. 104).

In this dangerous world, if people are to have their human dignity recognized and enjoy their human rights, above all, to life, security, a healthy environment, and freedom, we need new forms of comprehensive global regulation and control. Such **effective global leadership** **and governance** with robust enforcement powers **alone can adequately respond to destructive current global problems, and prevent new ones**. However, successful human adaptation and innovation to our current complex environment through the social construction of effective global governance will be a daunting collective task for global political and technoscientific leaders and citizens. For our global society is caught in “the whirlpool of an accelerating process of modernization” that has for the most part “been left to its own devices” (Habermas, 2001, p. 112). We need to progress in human adaptation to and innovation for our complex and problematical global social and natural planetary environments through global governance. I suggest we need to begin by ending the prevalent biases of short-termism in thinking and acting and the false values attached to the narrow self-interest of individuals, corporations, and states.

I agree with Stephen Hawking that the long-term future of the human race must be in space. It will be difficult enough to avoid disaster on planet Earth in the next hundred years, let alone the next thousand, or million. . . . There have been a number of times in the past when its survival has been a question of touch and go. The Cuban missile crisis in 1962 was one of these. The frequency of such occasions is likely to increase in the future. We shall need great care and judgment to negotiate them all successfully. But I’m an optimist. If we can avoid disaster for the next two centuries, our species should be safe, as we spread into space. . . . But we are entering an increasingly dangerous period of our history. Our population and our use of the finite resources of planet Earth, are growing exponentially, along with our technical ability to change the environment for good or ill. But our genetic code still carries the selfish and aggressive instincts that were of survival advantage in the past. . . . Our only chance of long term survival is not to remain inward looking on planet Earth, but to spread out into space. We have made remarkable progress in the last hundred years. But if we want to continue beyond the next hundred years, our future is in space.” (Hawking, 2010)

Nonetheless, to reinvent humanity pluralistically in outer space and beyond will require securing our one and only global society and planet Earth through effective global governance in the foreseeable future. And **our dilemma is that** the enforcement powers of multilateral institutions **are not likely to be strengthened because** of the competition for greater (relative, not absolute) hard and soft power by the **great** and major **powers**. They **seek** their **national** or alliance **superiority**, or at least, parity, for the sake of their state’s survival and security now. Unless the global disorder-emergency scenario was to occur soon—God forbid—the great powers will most likely, recklessly and tragically, leave global survival and security to their longer term agendas. Pg. 4-5

### WARMING ADVANTAGE

#### SMR funding now

**Lyons 3-14** [Peter, Assistant Secretary for Nuclear Energy in the US Dept of Energy, Statement before the Subcommittee on Energy and Water Development, and Related Agencies Committee on Appropriations, http://appropriations.house.gov/uploadedfiles/hhrg-113-ap10-wstate-lyonsp-20130314.pdf]

The Office of Nuclear Energy (NE) has achieved several major milestones since I've last been in front of this Committee. In November of last year, the Department selected a small modular reactor (SMR) vendor and utility partnership to support development of the licensing documentation that would enable SMR deployment by 2022. Just this week, the Department issued a second solicitation that will support industry’s development of additional innovative and competitive SMR technology options that improve safety profiles and further reduce regulatory risk for these reactors.

#### Warming inevitable and not anthropogenic.

**Bell 3-19** [Larry, climate, energy, and environmental writer for Forbes, University of Houston full/tenured Professor of Architecture; Endowed Professor of Space Architecture; Director of the Sasakawa International Center for Space Architecture; Head of the Graduate Program in Space Architecture; former full Professor/ Head of the University of Illinois Industrial Design Graduate Program; Associate Fellow, American Institute for Aeronautics and Astronautics, “The Feverish Hunt For Evidence Of A Man-Made Global Warming Crisis” http://www.forbes.com/sites/larrybell/2013/03/19/the-feverish-hunt-for-evidence-of-a-man-made-global-warming-crisis/2/]

Indeed, climate really does change without any help from us, and we can be very grateful that it does. Over the past 800,000 years, much of the Northern Hemisphere has been covered by ice up to miles thick at regular intervals lasting about 100,000 years each. Much shorter interglacial cycles like our current one lasting 10,000 to 15,000 years have offered reprieves from bitter cold.¶ And yes, from this perspective, current temperatures are abnormally warm. By about 12,000 to 15,000 years ago Earth had warmed enough to halt the advance of glaciers and cause sea levels to rise, and the average temperature has held fairly constant ever since, with brief intermissions.¶ Although temperatures have been generally mild over the past 500 years, we should remember that significant fluctuations are still normal. The past century has witnessed two distinct periods of warming. The first occurred between 1900 and 1945, and the second, following a slight cool-down, began quite abruptly in 1975. That second period rose at quite a constant rate until 1998, and then stopped and began falling again after reaching a high of 1.16ºF above the average global mean.¶ But What About Those “Observed” Human Greenhouse Influences?¶ The IPCC stated in its last 2007 Summary for Policymaker’s Report that “Most of the observed increase in globally averaged temperature since the mid-20th century [which is very small] is very likely due to the observed increase in anthropogenic [human-caused] greenhouse gas concentrations.” And there can be no doubt here that they are referring to CO2, not water vapor, which constitutes the most important greenhouse gas of all. That’s because the climate models don’t know how to “observe” it, plus there aren’t any good historic records to enable trends to be revealed.¶ Besides, unlike carbon, there is little incentive to attach much attention to anthropogenic water vapor. After all, no one has yet figured out a way to regulate or tax it.¶ A key problem in determining changes and influences of water vapor concentrations in the Earth’s atmosphere is that they are extremely variable. Differences range by orders of magnitude in various places. Instead, alarmists sweep the problem to one side by simply calling it a CO2 “feedback” amplification effect, always assuming that the dominant feedback is “positive” (warming) rather than “negative” (cooling). In reality, due to clouds and other factors, those feedbacks could go both ways, and no one knows for sure which direction dominates climate over the long run.¶ Treating water vapor as a known feedback revolves around an assumption that relative humidity is a constant, which it isn’t. Since it is known to vary nearly as widely as actual water vapor concentrations, no observational evidence exists to support a CO2 warming amplification conclusion.¶ But let’s imagine that CO2 is the big greenhouse culprit rather than a bit-player, and that its influences are predominately warming. **Even if CO2 levels were to double, it would make little difference. While the first CO2 molecules matter a lot, successive ones have less and less effect**. That’s because the carbon that exists in the atmosphere now has already “soaked up” its favorite wavelengths of light, and is close to a saturation point. Those carbon molecules that follow manage to grab a bit more light from wavelengths close to favorite bands, but can’t do much more…there simply aren’t many left-over photons at the right wavelengths. For those of you who are mathematically inclined, that diminishing absorption rate follows a logarithmic curve.¶ Who Hid the Carbon Prosecuting Evidence?¶ Since water vapor and clouds are so complex and difficult to model, their influences are neglected in IPCC reports. What about other evidence to support an IPCC claim that “most” mid-century warming can “very likely” be attributed to human greenhouse emissions? Well, if it’s there, it must me very well hidden, since direct measurements seem not to know where it is.¶ For example, virtually all climate models have predicted that if greenhouse gases caused warming, there is supposed to be a telltale “hot spot” in the atmosphere about 10 km above the tropics. Weather balloons (radiosondes) and satellites have scanned these regions for years, and there is no such pattern. It wasn’t even there during the recent warming spell between 1979 (when satellites were first available) and 1999.¶ How have the committed greenhouse zealots explained this? They claim that it’s there, but simply hidden by “fog in the data”…lost in the statistical “noise”. Yet although radiosondes and satellites each have special limitations, their measurements show very good agreement that the “human signature” doesn’t exist. Suggestions to the contrary are based upon climate model data outputs which yield a wide range of divergence and uncertainty…an example of garbage in, gospel out.

#### CO2 boosts plant performance and prevents mass starvation—avoids extinction

Singer, PhD physics – Princeton University and professor of environmental science – UVA, consultant – NASA, GAO, DOE, NASA, Carter, PhD paleontology – University of Cambridge, adjunct research professor – Marine Geophysical Laboratory @ James Cook University, and Idso, PhD Geography – ASU, ‘11

Regarding the first of these requirements, Tilman et al. note that in many parts of the world the historical rate of increase in crop yields is declining, as the genetic ceiling for maximal yield potential is being approached. This observation, in their words, ―highlights the need for efforts to steadily increase the yield potential ceiling.‖ With respect to the second requirement, they indicate, ―without the use of synthetic fertilizers, world food production could not have increased at the rate it did [in the past] and more natural ecosystems would have been converted to agriculture.‖ Hence, they state the solution ―will require significant increases in nutrient use efficiency, that is, in cereal production per unit of added nitrogen, phosphorus,‖ and so forth. Finally, as to the third requirement, Tilman et al. remind us ―water is regionally scarce,‖ and ―many countries in a band from China through India and Pakistan, and the Middle East to North Africa either currently or will soon fail to have adequate water to maintain per capita food production from irrigated land.‖ Increasing crop water use efficiency, therefore, is also a must. Although the impending biological crisis and several important elements of its potential solution are thus well defined, Tilman et al. (2001) noted ―even the best available technologies, fully deployed, cannot prevent many of the forecasted problems.‖ This was also the conclusion of Idso and Idso (2000), who stated that although ―expected advances in agricultural technology and expertise will significantly increase the food production potential of many countries and regions,‖ these advances ―will not increase production fast enough to meet the demands of the even faster-growing human population of the planet.‖ Fortunately, we have a powerful ally in the ongoing rise in the air‘s CO2 content that can provide what we can‘t. Since atmospheric CO2 is the basic ―food of essentially all plants, the more of it there is in the air, the bigger and better they grow. For a nominal doubling of the air‘s CO2 concentration, for example, the productivity of Earth‘s herbaceous plants rises by 30 to 50 percent (Kimball, 1983; Idso and Idso, 1994), and the productivity of its woody plants rises by 50 to 80 percent or more (Saxe et al. 1998; Idso and Kimball, 2001). Hence, as the air‘s CO2 content continues to rise, the land use efficiency of the planet will rise right along with it. In addition, atmospheric CO2 enrichment typically increases plant nutrient use efficiency and plant water use efficiency. Thus, with respect to all three of the major needs identified by Tilman et al. (2002), increases in the air‘s CO2 content pay huge dividends, helping to increase agricultural output without the taking of new land and water from nature. Many other researchers have broached this subject. In a paper recently published in the Annual Review of Plant Biology, three scientists associated with the Institute of Genomic Biology at the University of Illinois at Urbana-Champaign (USA) write that meeting the global increase in agricultural demand during this century ―is predicted to require a doubling of global production,‖ but ―the world has limited capacity to sustainably expand cropland,‖ and this capacity is actually ―shrinking in many developed countries.‖ Thus, Zhu et al. (2010) state, ―meeting future increases in demand will have to come from a near doubling of productivity on a land area basis,‖ and they conclude ―a large contribution will have to come from improved photosynthetic conversion efficiency,‖ estimating ―at least a 50% improvement will be required to double global production.‖ The researchers‘ reason for focusing on photosynthetic conversion efficiency derives from the experimentally observed facts that increases in the atmosphere‘s CO2 concentration increase the photosynthetic rates of nearly all plants, and those rate increases generally lead to equivalent—or only slightly smaller—increases in plant productivity on a land area basis. That provides a solid foundation for their enthusiasm in this regard. In their review of the matter, however, they examine the prospects for boosting photosynthetic conversion efficiency in an entirely different way: genetically, without increasing the air‘s CO2 content. ―Improving photosynthetic conversion efficiency will require,‖ the three scientists state, ―a full suite of tools including breeding, gene transfer, and synthetic biology in bringing about the designed alteration to photosynthesis.‖ For some of these ―near-term‖ endeavors, they indicate ―implementation is limited by technical issues that can be overcome by sufficient investment,‖ meaning they can ―be bought.‖ But several ―mid-term‖ goals could take 20 years or more to achieve; and they state ―even when these improvements are achieved, it may take an additional 10–20 years to bring such innovations to farms in commercial cultivars at adequate scale.‖ And if that is not bad enough, they say of still longer-term goals that ―too little of the science has been undertaken to identify what needs to be altered to effect an increase in yield,‖ while in some cases they acknowledge that what they envision may not even be possible, as in developing a form of RuBisCO that exhibits a significant decrease in oxygenation activity, or in designing C3 crops to utilize the C4 form of photosynthetic metabolism. Clearly, we do not have the time to gamble on our ability to accomplish what needs to be done in order to forestall massive human starvation of global dimensions within the current century. Therefore—in addition to trying what Zhu et al. suggest—we must rely on the ―tested and true: the CO2-induced stimulation of plant photosynthesis and crop yield production. And all we need to do in this regard is to refrain from interfering with the natural evolution of the Industrial Revolution, which is destined to be carried for some time yet on the backs of fossil-fuel-driven enterprises that can provide the atmosphere with the extra carbon dioxide that will be needed to provide the extra increase in crop growth that may mean the difference between global food sufficiency and human starvation on a massive scale a mere few decades from now. Another take on the matter has been provided by Hanjra and Qureshi (2010). They begin their treatment of the subject by quoting Benjamin Franklin‘s well-known homily, ―When the well is dry, we know the worth of water,‖ and they write we ―must not lose sight of surging water scarcity.‖ Noting ―population and income growth will increase the demand for food and water,‖ they contend ―irrigation will be the first sector to lose water, as water competition by non-agricultural uses increases and water scarcity intensifies.‖ As ―increasing water scarcity will have implications for food security, hunger, poverty, and ecosystem health and services,‖ they report ―feeding the 2050 population will require some 12,400 km3 of water, up from 6800 km3 used today.‖ This huge increase, they continue, ―will leave a water gap of about 3300 km3 even after improving efficiency in irrigated agriculture, improving water management, and upgrading of rainfed agriculture,‖ as per the findings of de Fraiture et al. (2007), Molden (2007), and Molden et al. (2010). This water deficiency, according to Hanjra and Qureshi, ―will lead to a food gap unless concerted actions are taken today.‖ Some of the measures they propose are to conserve water and energy resources, develop and adopt climate-resilient crop varieties, modernize irrigation, shore up domestic food supplies, reengage in agriculture for further development, and reform the global food and trade markets. To achieve these goals, they write, ―unprecedented global cooperation is required,‖ which by the looks of today‘s world is an exceedingly remote possibility. What, then, can we do to defuse the ticking time-bomb of this looming food and water crisis? One option is to do nothing: don‘t mess with the normal, unforced evolution of civilization‘s means of acquiring energy. This is because on top of everything else we may try to do to conserve both land and freshwater resources, we will still fall short of what is needed to be achieved unless the air‘s CO2 content rises significantly and thereby boosts the water use efficiency of Earth‘s crop plants and that of the plants that provide food and habitat for what could be called ―wild nature,‖ enabling both sets of plants to produce more biomass per unit of water used. To ensure this happens, we will need all of the CO2 that will be produced by the burning of fossil fuels, until other forms of energy truly become more cost-efficient than coal, gas, and oil. In fact, these other energy sources will have to become much more cost-efficient before fossil fuels are phased out, because the positive externality of the CO2-induced increase in plant water use efficiency provided by the steady rise in the atmosphere‘s CO2 concentration due to the burning of fossil fuels will be providing a most important service in helping us feed and sustain our own species without totally decimating what yet remains of wild nature. In yet another paper to address this important issue—this one published in the Journal of Proteome Research—Sarkar et al. (2010) write, ―increasing population and unsustainable exploitation of nature and natural resources have made ‗food security‘ a burning issue in the 21st century,‖ echoing the sentiments expressed by Farrell (2009), who noted ―the alarming increase in biofuel production, the projected demand for livestock products, and the estimated food to feed the additional 700 million people who will arrive here by 2016, will have unprecedented consequences,‖ among which are likely to be that ―arable land, the environment, water supply and sustainability of the agricultural system will all be affected,‖ and not in a positive way. Furthermore, when the human population of the globe reaches 8.7–11.3 billion by the year 2050 (Bengtsson et al., 2006), the situation will become truly intolerable, unless something is done, far in advance of that date, to mitigate the situation dramatically. Thus, as Sarkar et al. suggest, ―a normal approach for any nation/region is to strengthen its agricultural production for meeting future demands and provide food security.‖ But a major difficulty, which could spoil mankind‘s ability to do so, is the ongoing rise in the atmosphere‘s ozone concentration. This is the subject of Sarkar et al.‘s new paper. In a study designed to elucidate the many ways in which ozone (O3) is harmful to plants, the eight researchers grew two high-yielding cultivars (Sonalika and HUW 510) of wheat (Triticum aestivum L.) outdoors at the Agriculture Research Farm of India‘s Banaras Hindu University. This was done within open-top chambers maintained at the ambient O3 concentration and at elevated O3 concentrations of 25 percent and 50 percent above ambient during the peak O3 period of the day (10:00 to 15:00 hours local time) for a total of 50 days, during which time they measured numerous responses of the plants to the two levels of ozone enrichment. Sarkar et al. determined, among several other things, that the moderate increases in the air‘s O3 concentration resulted in higher foliar injury, a reduction in photosynthetic efficiency, induced inhibition in photochemical efficacy of photosystem II, lowered concentrations of photosynthetic pigments and proteins, and what they describe as ―drastic reductions‖ in RuBisCO large and small subunits, while noting major leaf photosynthetic proteins and important energy metabolism proteins were also ―drastically reduced.‖ Discussing the results, the scientists from India, Japan, and Nepal remark that anthropogenic activities have made ozone a ―major environmental pollutant of our time,‖ while noting some are predicting it to be an even ―greater problem for the future.‖ Adding this dilemma to the problem of feeding the world over the next few decades and beyond makes humanity‘s future look incredibly bleak. Thus, Sarkar et al. suggest we focus on ―engineering crops for future high O3,‖ concentrating on maintaining ―effective stomatal conductance of plants which can avoid O3 entry but not hamper their productivity.‖ We agree. But not knowing to what extent we will be successful in this endeavor, we also need to do something we know will work: allowing the air‘s CO2 content to rise, unimpeded by the misguided efforts of those who would curtail anthropogenic CO2 emissions in the guise of fighting what they claim is anthropogenic-induced global warming. This contention is largely theoretical and wholly unproven, but we know, as a result of literally hundreds, if not thousands, of real-world experiments, that atmospheric CO2 enrichment increases both the productivity and water-use efficiency of nearly all plants, and that it often more than compensates for the negative effects of O3 pollution. Introducing another review of food security studies pertinent to the challenge of feeding 9 billion people just four decades from now, Godfray et al. (2010) note ―more than one in seven people today still do not have access to sufficient protein and energy from their diet and even more suffer some form of micronutrient malnourishment,‖ citing the FAO (2009). Although ―increases in production will have an important part to play‖ in correcting this problem and keeping it from worsening in the future, mankind ―will be constrained by the finite resources provided by the earth‘s lands, oceans and atmosphere,‖ This set of difficulties they describe at the end of their review as constituting a ―perfect storm.‖ In considering ways to mitigate these problems, the first question they ask is: ―How can more food be produced sustainably?‖ They state the primary solution to food shortages of the past was ―to bring more land into agriculture and to exploit new fish stocks,‖ but they note there is precious little remaining of either of these pristine resources. Thus, they conclude ―the most likely scenario is that more food will need to be produced from the same or less land.‖ As they suggest, ―we must avoid the temptation to sacrifice further the earth‘s already hugely depleted biodiversity for easy gains in food production, not only because biodiversity provides many of the public goods upon which mankind relies, but also because we do not have the right to deprive future generations of its economic and cultural benefits.‖ And, we might add, because we should be enlightened enough to realize we have a moral responsibility to drive no more species to extinction than we already have sent to that sorry state. So how can these diverse requirements all be met simultaneously? A clue comes from Godfray et al.‘s statement that ―greater water and nutrient use efficiency, as well as tolerance of abiotic stress, are likely to become of increasing importance.‖ And what is there that can bring about these changes in mankind‘s crops? You guessed it: carbon dioxide. Rising concentrations of atmospheric CO2 increase the photosynthetic prowess of essentially all of the Earth‘s plants, while generally reducing the rate at which they transfer water from the soil to the air. In addition, more CO2 in the air tends to enhance the efficiency with which plants utilize nutrients in constructing their tissues and producing the edible portions that we and all of Earth‘s animals depend upon for our very existence. Focusing on the water scarcity aspect of the food shortage problem, Kummu et al. (2010) write, ―due to the rapidly increasing population and water use per capita in many areas of the world, around one third of the world‘s population currently lives under physical water scarcity (e.g. Vorosmarty et al., 2000; Alcamo et al., 2003; Oki and Kanae, 2006).‖ But despite the large number of water scarcity studies conducted over the years, ―no global assessment is available of how this trend has evolved over the past several centuries to millennia.‖ Thus they conducted a study covering AD 0 to 2005. This analysis was carried out for ten different time slices, defined as those times at which the human population of the globe was approximately double the population of the previous time slice. Global population data for these analyses were derived from the 5‘ latitude x 5‘ longitude-resolution global HYDE dataset of Klein Goldewijk (2005) and Klein Goldewijk et al. (2010), while evaluation of water resources availability over the same period was based on monthly temperature and precipitation output from the climate model ECBilt-CLIO-VECODE, as calculated by Renssen et al. (2005). After completing these assessments, the four researchers found ―moderate water shortage first appeared around 1800, but it commenced in earnest from about 1900, when 9% of the world population experienced water shortage, of which 2% was under chronic water shortage (<1000 m3/capita/year).‖ Thereafter, from 1960 onwards, they write, ―water shortage increased extremely rapidly, with the proportion of global population living under chronic water shortage increasing from 9% (280 million people) in 1960 to 35% (2300 million) in 2005.‖ And currently, they continue, ―the most widespread water shortage is in South Asia, where 91% of the population experiences some form of water shortage,‖ while ―the most severe shortage is in North Africa and the Middle East, where 77% and 52% of the total population lives under extreme water shortage (<500 m3/capita/year), respectively.‖ To alleviate these freshwater shortages, Kummu et al. state measures generally have been taken to increase water availability, such as building dams and extracting groundwater. But they note ―there are already several regions in which such measures are no longer sufficient, as there is simply not enough water available in some regions.‖ In addition, they observe, ―this problem is expected to increase in the future due to increasing population pressure (e.g. United Nations, 2009), higher welfare (e.g. Grubler et al., 2007) [and] production of water intensive biofuels (e.g. Varis, 2007, Berndes, 2008).‖ Hence, they conclude there will be an increasing need for many nonstructural measures, the first and foremost of which they indicate to be ―increasing the efficiency of water use.‖ This characteristic of nearly all of Earth‘s plants is almost universally promoted by atmospheric CO2 enrichment.

#### Warming is slowing because of sulfur aerosols.

[Louise Gray](http://www.telegraph.co.uk/journalists/louise-gray/), 11/26/2010. Environment Correspondent for the Telegraph. “Global warming has slowed because of pollution,” The Telegraph, http://www.telegraph.co.uk/earth/environment/climatechange/8159991/Global-warming-has-slowed-because-of-pollution.html.

The latest figures from more than 20 scientific institutions around the world show that global temperatures are higher than ever. ¶ However the gradual rise in temperatures over the last 30 years is slowing slightly. Global warming since the 1970s has been 0.16C (0.3F) but the rise in the last decade was just 0.05C (0.09F), according to the Met Office. ¶ Sceptics claim this as evidence man made global warming is a myth. ¶ But in a new report the Met Office said the reduced rate of warming can be easily explained by a number of factors. And indeed the true rate of warming caused by man made greenhouse gases could be greater than ever. ¶ One of the major factors is pollution over Asia, where the huge growth in coal-fired power stations mean aerosols like sulphur are being pumped into the air. This reflects sunlight, cooling the land surface temperature. ¶ Dr Vicky Pope, Head of Climate Change Advice, said pollution may be causing a cooling effect. ¶ “A possible increase in aerosol emissions from Asia in the last decade may have contributed to substantially to the recent slowdown,” she said. “Aerosols cool the climate by reflecting the sunlight.”

#### Reducing coal emissions would trigger rapid warming due to reduced aerosol cooling.

N. Chalmers et al, 1,2 E. J. Highwood,1 E. Hawkins,1,2 R. Sutton,1,2 L. J. Wilcox1, 8/21/2012. 1Department of Meteorology, University of Reading, Reading, U.K.; 2NCAS-Climate, University of Reading, Reading, U.K. “Aerosol contribution to the rapid warming of 2 near-term climate under RCP 2.6,” Manuscript, accepted for publication in Geophysical Research Letters, www.met.reading.ac.uk/~ed/home/chalmers\_etal\_2012\_accepted.pdf.

\*\*\*RCP="Representative Concentration Pathways." These are IPCC scenarios designed for use in climate models, that essentially project different scenarios for changes (or lack thereof) in global emissions. RCP2.6 is a scenario of significant emissions reductions. RCP4.5 is the baseline "business as usual" scenario.

\*\*\*CDNC=cloud droplet number concentration

The period during which global mean surface temperature in RCP2.6 is higher than in 130 RCP4.5, discussed in the previous section, is directly related to a rapid increase in global 131 mean surface temperature in RCP2.6, between around 2010 and around 2025 (Figure 1a). 132 In this section we investigate the causes of this rapid warming, and relate this event to 133 the comparison with RCP4.5. Figure 3 shows maps of the differences between the 10 year 134 means before and after the rapid warming. In this case a positive value indicates a larger 135 value after the sudden warming identified in Figure 1.¶ 136 As expected, there is a large reduction in sulphate load, and corresponding decrease 137 in CDNC over most of the northern hemisphere, consistent with a change in the indirect 138 aerosol effect. An increase in the effective radius is also seen (not shown). This reduces 139 the optical depth of the clouds when they are present, meaning more downward shortwave 140 flux is transmitted to the surface. There is also a prominent decrease in cloud fraction over 141 the subtropical northeastern Pacific Ocean which could be a consequence of the impact 142 of reduced sulphate aerosol on cloud lifetime. Lu et al. [2009] show that drizzle rate from 143 clouds in this region is indeed inversely related to aerosol concentration. Kloster et al. 144 [2010] also suggested that a change in cloud water path in their simulations with aggres-¶ 145 sive aerosol reductions resulted from enhanced drizzle formation. We hypothesise that 146 the localised nature of this feature by comparison with the sulphate and CDNC change 147 is due to the cloud in this region being particularly sensitive to a change in aerosol. Cli- 148 matologically, this region is a transition zone between open and closed mesoscale cellular 149 convection [Rosenfeld et al., 2011], aerosol concentrations being lower in the open celled 150 regions [Woods et al., 2011]. Although the details of these processes are unlikely to be 151 represented explicitly in global models, the localised strong decrease in cloud fraction in 152 the northeastern Pacific ocean would be consistent with a change in cloud regime driven 153 by decreased aerosol. Other regions show increases in cloud fraction, which cannot readily 154 be explained as a direct response to the decrease in sulphate load. It is likely that instead 155 these reflect non-local adjustments of the coupled ocean-atmosphere system in response 156 to the change in forcing.¶ 157 Figure 3 also shows the difference in surface shortwave flux (panel d), surface air tem- 158 perature (panel e), and global energy balance (panel f). The predicted increase in surface 159 downward shortwave radiation is seen in the global mean and particularly in the regions 160 of decreased cloud fraction and sulphate load. A negative anomaly in surface SW is co- 161 located with the positive cloud fraction changes. The pattern of surface air temperature 162 change shows large warming over the northern continents and the Arctic, and also a local 163 maximum over the subtropical northeastern Pacific coincident with the region of reduced 164 cloud fraction. The same localised pattern appears in all the simulations of Kloster et al. 165 [2010] that include aerosol reductions, but is absent from their simulations considering 166 only future changes in greenhouse gases.¶ 167 The surface energy budget shows the expected increases in downward shortwave radia- 168 tion. In addition there is an increase in downward longwave radiation in response to the 169 increase in GHG concentrations between the two periods, and also reflecting changes in 170 clouds. The warming due to increases in net surface downward radiation is balanced by 171 increases in latent and (over land) sensible heat fluxes.¶ 4. Discussion and Conclusions¶ 172 In this study we have compared projections of near term climate in the HadGEM2-ES 173 model under RCP4.5 and RCP2.6. GHG forcing under these scenarios is almost identical 174 until 2020, and then declines in RCP2.6 relative to RCP4.5. However, between 2018 and 175 2037 global annual mean surface air temperature is warmer under RCP2.6. The start of 176 this period is characterised by a period of particularly rapid warming.¶ 177 Our results provide compelling evidence that the warming in RCP2.6 is a result of a 178 rapid decrease in sulphate aerosol load. This decrease is caused by a decrease in sulphur 179 emissions in RCP2.6, as a result of the rapid decrease in coal use needed to reduce GHG 180 emissions. Thus our results highlight the difficulty of reducing the rate of global warming 181 in the near term in this model, even under extreme scenarios for reducing GHG emissions, 182 and is consistent with previous simulations by Wigley [1991] and Johns et al. [2011].

#### That would double warming and quickly take us above the “2-degree threshold.”

Dr Andrew Glikson, 6/6/2011. Earth and paleoclimate science, Australian National University. “Global warming above 2° so far mitigated by accidental geo-engineering,” Crikey, http://www.crikey.com.au/2011/06/06/global-warming-above-2%C2%B0-so-far-mitigated-by-accidental-geo-engineering/.

According to NASA’s Goddard Institute of Space Science climate reports, global warming is already committed to a rise above two degrees. The magical two degrees ceiling determined by governments is only holding thanks to effective, if unintended, geo-engineering by sulphur dioxide emitted from industry, holding global warming to about half of what it would be otherwise. Recent publications by Hansen and his [research](http://www.columbia.edu/%7Ejeh1/mailings/2011/20110415_EnergyImbalancePaper.pdf) [group](http://arxiv.org/ftp/arxiv/papers/1105/1105.0968.pdf) indicate the rise of atmospheric energy (heat) level due to greenhouse gases and land clearing are committed to +2.3 degrees (+3.1 Watt/m2), currently mitigated by the transient effect of sulphur aerosols and the cooling effect of the oceans. Sulphur dioxide is emanated from coal, oil and the processing of minerals (breakdown of sulphides to produce copper, zinc, lead and so on), and from other chemical industries. It combines with water in the atmosphere to produce sulphuric acid, which (being heavier than air) condenses and settles to the ground within a few years. Aerosols stay in the atmosphere and stratosphere on time scales ranging from hours to days and to years, depending on their grain size, chemistry and height in the atmosphere and on the physical state and temperature of the atmosphere at different altitudes and latitudes. The aerosols are short-lived, i.e. on time scales of up to a few years, but since they are continuously emitted from industry the overall level is increasing as burning of fossil fuels is rising. The continuing emission of sulphur aerosols in effect constitute a global geo-engineering process without which the atmosphere would warm by another 1.2 degrees (1.6 Watt/m2) above the present level, resulting in near-doubling of global warming ([Figure 1](http://www.columbia.edu/%7Ejeh1/mailings/2011/20110415_EnergyImbalancePaper.pdf)).

#### Negative feedbacks solve

Singer et al. 11 [S Fred, PhD, a distinguished atmospheric physicist and first director of the U.S. Weather Satellite Service, Craig Idso, editor of the online magazine CO2 Science and author of several books and scholarly articles on the effects of carbon dioxide on plant and animal life, Robert M Carter, marine geologist and research professor at James Cook University in Queensland, Australia Climate Change Reconsidered: 2011 Interim Report]

In the 2009 NIPCC report, Idso and Singer (2009) discussed the plausibility of a multistage negative feedback process whereby warming-induced increases in the emission of dimethyl sulfide (DMS) from the world‘s oceans tend to counteract any initial impetus for warming. The basic tenet of this hypothesis is that the global radiation balance is significantly influenced by the albedo of marine stratus clouds (the greater the cloud albedo, the less the input of solar radiation to the Earth‘s surface). The albedo of these clouds, in turn, is known to be a function of cloud droplet concentration (the more and smaller the cloud droplets, the greater the cloud albedo and the reflection of solar radiation), which is dependent upon the availability of cloud condensation nuclei on which the droplets form (the more cloud condensation nuclei, the more and smaller the cloud droplets). And in completing the negative feedback loop, the cloud condensation nuclei concentration often depends upon the flux of biologically produced DMS from the world‘s oceans (the higher the sea surface temperature, the greater the sea-to-air flux of DMS).

Since the publication of the 2009 NIPCC report, additional empirical evidence has been found to support the several tenets of the DMS feedback process. Qu and Gabric (2010), for example, introduce their contribution to the subject by stating, ―dimethylsulfide (DMS) is the main volatile sulfur [species] released during the formation and decay of microbial ocean biota and ―aerosols formed from the atmospheric conversion of DMS to sulfate and methanesulfonic acid can exert a climate cooling effect directly by scattering and absorbing solar radiation and indirectly by promoting the formation of cloud condensation nuclei and increasing the albedo of clouds, thus reflecting more solar radiation back into space.

Working with climate and DMS production data from the region of the Barents Sea (70–80°N, 30– 35°E) obtained over the period 1998 to 2002, Qu and Gabric employed a genetic algorithm to calibrate chlorophyll-a measurements (obtained from SeaWiFS satellite data) for use in a regional DMS production model. Then, using GCM temperature outputs for the periods 1960–1970 (pre-industry CO2 level) and 2078–2086 (triple the pre-industry CO2 level), they calculated the warming-induced enhancement of the DMS flux from the Barents Sea region. The two researchers report, ―significantly decreasing ice coverage, increasing sea surface temperature and decreasing mixed-layer depth could lead to annual DMS flux increases of more than 100% by the time of equivalent CO2 tripling (the year 2080). In commenting on their findings, they state, ―such a large change would have a great impact on the Arctic energy budget and may offset the effects of anthropogenic warming that are amplified at polar latitudes. What is more, they write, ―many of these physical changes will also promote similar perturbations for other biogenic species (Leck et al., 2004), some of which are now thought to be equally influential to the aerosol climate of the Arctic Ocean. Thus it can be appreciated that DMS production in a warming world—especially when augmented by analogous biogenic phenomena—may provide a large moderating influence on the primary impetus for warming that is produced by mankind‘s emissions of CO2 and other greenhouse gases.

Kim et al. (2010) write that DMS ―represents 95% of the natural marine flux of sulfur gases to the atmosphere (Bates et al., 1992; Liss et al., 1997), and they say it ―may be oxidized to form non sea-salt sulfate aerosols, which are known to act as cloud condensation nuclei and thereby exert a cooling effect by absorbing or scattering solar radiation. They cite Charlson et al. (1987), who first described the intriguing and important chain of events. They also note ―DMS is generated by intracellular or extracellular enzymatic cleavage of DMSP [dimethylsulfoniopropionate] by DMSP-lyase, which is synthesized by algae and bacteria, following DMSP secretion from producer cells or release following autolysis or viral attack, while noting that ―grazing activity can also result in DMSP conversion to DMS if DMSP and DMSP-lyase are physically mixed following grazing, citing Stefels et al., 2007, and Wolfe and Steinke, 1996.

Working in the coastal waters of Korea from 21 November to 11 December 2008, the 14 Korean scientists utilized 2,400-liter mesocosm enclosures to simulate, in triplicate, three sets of environmental conditions—an ambient control (~400 ppm CO2 and ambient temperature), an acidification treatment (~900 ppm CO2 and ambient temperature), and a greenhouse treatment (~900 ppm CO2 and ~3°C warmer-than-ambient temperature)—and within these mesocosms they initiated phytoplankton blooms by adding equal quantities of nutrients to each mesocosm on day 0. For 20 days thereafter they measured numerous pertinent parameters within each mesocosm. This work revealed, as they describe it, that ―total accumulated DMS concentrations (integrated over the experimental period) in the acidification and greenhouse mesocosms were approximately 80% and 60% higher than the values measured in the control mesocosms, respectively, which they attribute to the fact that, in their experiment, ―autotrophic nanoflagellates (which are known to be significant DMSP producers) showed increased growth in response to elevated CO2 and ―grazing rates [of microzooplankton] were significantly higher in the treatment mesocosms than in the control mesocosms. In the concluding paragraph of their paper, they write, ―the key implication of our results is that DMS production resulting from CO2-induced grazing activity may increase under future high CO2 conditions, concluding that ―DMS production in the ocean may act to counter the effects of global warming in the future.

### GRID ADVANTAGE

#### Status quo solves grid cyber vulnerability

Paul Clark 12, MA Candidate, Intelligence/Terrorism Studies, American Military University; Senior Analyst, Chenega Federal Systems, 4/28/12, “The Risk of Disruption or Destruction of Critical U.S. Infrastructure by an Offensive Cyber Attack,” http://blog.havagan.com/wp-content/uploads/2012/05/The-Risk-of-Disruption-or-Destruction-of-Critical-U.S.-Infrastructure-by-an-Offensive-Cyber-Attack.pdf

An attack against the electrical grid is a reasonable threat scenario since power systems are "a high priority target for military and insurgents" and there has been a trend towards utilizing commercial software and integrating utilities into the public Internet that has "increased vulnerability across the board" (Lewis 2010). Yet the increased vulnerabilities are mitigated by an increased detection and deterrent capability that has been "honed over many years of practical application" now that power systems are using standard, rather than proprietary and specialized, applications and components (Leita and Dacier 2012). The security of the electrical grid is also enhanced by increased awareness after a smart-grid hacking demonstration in 2009 and the identification of the Stuxnet malware in 2010: as a result the public and private sector are working together in an "unprecedented effort" to establish robust security guidelines and cyber security measures (Gohn and Wheelock 2010).

#### No cyber terrorism—capability or motivaiton.

Conway 11 — Maura Conway, Lecturer in International Security in the School of Law and Government at Dublin City University, 2011 (“Against Cyberterrorism: Why cyber-based terrorist attacks are unlikely to occur,” *Communications of the ACM*, Volume 54, Number 2, February, Available Online to Subscribing Institutions via ACM Online)

Three Arguments Against Cyberterrorism

In my opinion, the three most compelling arguments against cyberterrorism are:

The argument of Technological Complexity;

The argument regarding 9/11 and the Image Factor; and

The argument regarding 9/11 and the Accident Issue.

The first argument is treated in the academic literature; the second and third arguments are not, but ought to be. None of these are angles to which journalists appear to have devoted a lot of thought or given adequate consideration.

In the speech mentioned earlier, FBI Director Mueller observed "Terrorists have shown a clear interest in pursuing hacking skills. And they will either train their own recruits or hire outsiders, with an eye toward combining physical attacks with cyber attacks." That may very well be true, but the argument from Technological Complexity underlines that 'wanting' to do something is quite different from having the ability to do the same. Here's why:

Violent jihadis' IT knowledge is not superior. For example, in research carried out in 2007, it was found that of a random sampling of 404 members of violent Islamist groups, 196 (48.5%) had a higher education, with information about subject areas available for 178 individuals. Of these 178, some 8 (4.5%) had trained in computing, which means that out of the entire sample, less than 2% of the jihadis came from a computing background.3 And not even these few could be assumed to have mastery of the complex systems necessary to carry out a successful cyberterrorist attack.

Real-world attacks are difficult enough. What are often viewed as relatively unsophisticated real-world attacks undertaken by highly educated individuals are routinely unsuccessful. One only has to consider the failed car bomb attacks planned and carried out by medical doctors in central London and at Glasgow airport in June 2007.

Hiring hackers would compromise operational security. The only remaining option is to retain "outsiders" to undertake such an attack. This is very operationally risky. It would force the terrorists to operate outside their own circles and thus leave them ripe for infiltration. Even if they successfully got in contact with "real" hackers, they would be in no position to gauge their competency accurately; they would simply have to trust in same. This would be very risky.

So on the basis of technical know-how alone cyberterror attack is not imminent, but this is not the only factor one must take into account. The events of Sept. 11, 2001 underscore that for a true terrorist event spectacular moving images are crucial. The attacks on the World Trade Center were a fantastic piece of performance violence; look back on any recent roundup of the decade and mention of 9/11 will not just be prominent, but pictures will always be provided.

The problem with respect to cyber-terrorism is that many of the attack scenarios put forward, from shutting down the electric power grid to contaminating a major water supply, fail on this account: they are unlikely to have easily captured, spectacular (live, moving) images associated with them, something we—as an audience—have been primed for by the attack on the World Trade Center on 9/11.

The only cyberterrorism scenario that would fall into this category is interfering with air traffic control systems to crash planes, but haven't we seen that planes can much more easily be employed in spectacular "real-world" terrorism? And besides, aren't all the infrastructures just mentioned much easier and more spectacular to simply blow up? It doesn't end there, however. For me, the third argument against cyberterrorism is perhaps the most compelling; yet it is very rarely mentioned.

In 2004, Howard Schmidt, former White House Cybersecurity Coordinator, remarked to the U.S. Senate Committee on the Judiciary regarding Nimda and Code Red that "we to this day don't know the source of that. It could have very easily been a terrorist."4 This observation betrays a fundamental misunderstanding of the nature and purposes of terrorism, particularly its attention-getting and communicative functions.

A terrorist attack with the potential to be hidden, portrayed as an accident, or otherwise remain unknown is unlikely to be viewed positively by any terrorist group. In fact, one of the most important aspects of the 9/11 attacks in New York from the perpetrators viewpoint was surely the fact that while the first plane to crash into the World Trade Center could have been accidental, the appearance of the second plane confirmed the incident as a terrorist attack in real time. Moreover, the crash of the first plane ensured a large audience for the second plane as it hit the second tower.

Alternatively, think about the massive electric failure that took place in the northeastern U.S. in August 2003: if it was a terrorist attack—and I'm not suggesting that it was—but if it was, it would have been a spectacular failure.

Conclusion

Given the high cost—not just in terms of money, but also time, commitment, and effort—and the high possibility of failure on the basis of manpower issues, timing, and complexity of a potential cyberterrorist attack, the costs appear to me to still very largely outweigh the potential publicity benefits. The publicity aspect is crucial for potential perpetrators of terrorism and so the possibility that an attack may be apprehended or portrayed as an accident, which would be highly likely with regard to cyberterrorism, is detrimental. Add the lack of spectacular moving images and it is my belief that cyberterrorism, regardless of what you may read in newspapers, see on television, or obtain via other media sources, is not in our near future.

So why then the persistent treatment of cyberterrorism on the part of journalists? Well, in this instance, science fiction-type fears appear to trump rational calculation almost every time. And I haven't even begun to discuss how the media discourse has clearly influenced the pronouncements of policymakers.

#### The plan causes space weaponization

Maybury 12 Chief Scientist-USAF, “Energy Horizons: United States Air Force Energy S&T Vision 2011-2026,” 1/31, http://www.fas.org/irp/doddir/usaf/energy.pdf

Space is the ―ultimate high ground, providing access to every part of the globe, including denied areas. Space also has the unique characteristic that once space assets reach space, they require comparatively small amounts of energy to perform their mission, much of which is renewable. This simple characterization belies the complexity of the broader space enterprise. The bigger space energy picture must encompass the energy required to maintain and operate the launch ranges, the energy consumed during the launch of space assets, the energy generated and used in space, the energy consumed in satellite control stations, and the energy consumed in data ingest and processing centers. A comprehensive space energy strategy that addresses this full spectrum promises to enhance the resiliency, sustainability, and affordability of future space systems and operations through reduced consumption, increased energy supply, and cultural change. In the near-term, there should be an emphasis on lowering ground facilities and systems energy consumption, while continuing S&T investments for long-term assured energy advantage. The focus on ground facilities should include launch ranges, world-wide satellite control facilities, as well as the substantial data centers required to process and disseminate data to warfighters. In the longer term it may be possible to broaden the set of missions to be performed from space in an energy-efficient manner. This would require significant advances in S&T related to space-borne energy generation and storage technologies. In the mid- and long-term, substantial energy savings may be achieved through commonality in ground systems, efficient operations of those ground systems, as well as expanding the use of renewable energy resources. 3.1 Space Domain Strategic Context **On-orbit assets continue to be among the highest demand** and lowest density assets in the Air Force inventory. They consistently and effectively provide unique capability to the community. These assets are constrained, not just by the size of the payloads they carry, but also by their capability. Their austere operational environment coupled with current technology constraints means these systems regularly are required to operate long past their projected life. S&T that increases energy production, storage, and utilization of on-orbit assets can both provide longer life systems or increase capability value for the Air Force. In contrast to the air domain, assets in the space portfolio do not use traditional aviation fuels for mobility (airlift and air refueling). Indeed, once space assets are placed in orbit, with the very small exception of on-board consumables (to include propulsion for satellite maneuverability), only energy for the associated ground facilities and systems is required to maintain and operate them. Although there is an energy cost in getting systems to space, it is relatively small compared to the energy costs of the ground infrastructure. Therefore, in the near-term, investments in S&T that reduce the energy costs of space systems should focus primarily on reducing the energy costs of the associated ground facilities and systems. Nonetheless, there are promising S&T projects, such as the Reusable Booster System (RBS) and revolutionary small launch vehicles, that may substantially reduce the cost to orbit by applying lessons learned from the commercial aircraft industry to the RBS. For example, reuse may dramatically reduce manufacturing costs while simultaneously permitting much faster turnaround times. However, the full implications of reusable launch vehicles on energy consumption are not yet fully understood. The reusable components of RBS must be rocketed or jetted back to the launch base, resulting in greater use of energy for every launch. The energy impact of RBS requires detailed study. Additional potentially large energy cost savings could be achieved by employing other technologies emphasized in Technology Horizons, including fractionated, composable, and networked space systems. Much smaller systems that may perform the same functions as larger systems offer the possibility of substantially lowering launch costs and reducing on-orbit energy use. On the other hand, launching larger constellations of smaller satellites in low earth orbit may require more energy and use less efficient small launch vehicles. The total energy picture associated with the use of small, fractionated satellites requires careful analysis. Technology Horizons also advocated autonomous real-time, cross-domain, assured and trusted Space Situational Awareness (SSA). While autonomy can be used to save energy and cost for virtually any space mission, automating heavily human-directed SSA can potentially save large energy costs by reducing the presence of human interaction and, at the same time, increasing responsiveness. Figure 3.1 visually emphasizes that the overwhelming share of energy use for space domain operations is in terrestrial facilities and systems. Of the energy consumed for Air Force Space Command (AFSPC) missions, 97.2% is used by terrestrial facilities, 1.8% is used for ground vehicle transportation, and an estimated 1% is used for rocket launches. The commercial space sector has taken significantly different approaches on the ground infrastructure. Commercial space systems are operated with smaller facilities, small crews, and even autonomously. AFSPC has considered base closures to save significant costs; another solution, either in concert with base closures or by itself, is to establish an aggressive program to replace local power generation with renewable technologies. This would directly support the Air Force Energy Plan goals in the near-term, while also supporting assured sources of supply and cost reduction goals. Efforts are already underway to create more energy efficient ground assets using information from the cyber and infrastructure elements of Energy Horizons. A key opportunity is energy cost reduction for terrestrial radar and heating, ventilation, and air conditioning (HVAC) systems, but so far little work has been done on this. 3.2 Space Energy Technologies Leading edge technologies for energy performance of on-orbit space systems can transition to terrestrial facilities and systems to lower their energy intensity and consumption. These technologies fall into three categories which are addressed in turn: energy generation, storage, and transmission. 3.2.1 Energy Generation Table 3.1 illustrates the near-, mid- and far-term opportunities in energy generation. Today, there is an emphasis on continuing to evolve Inverted Meta-Morphic (IMM) solar cell arrays that are exceeding 34% efficiency in demonstration programs. In contrast, current terrestrial solar cell arrays for energy generation are far less efficient, below 20%. If packaging and production issues could be overcome, the improved efficiency offered by IMM would dramatically improve the output capabilities of ground facility solar array systems and, in turn, lower the use of non-renewable energy sources. There may also be spinoff to the air and ground domains through programs such as DARPA‘s Vulture program, a long-endurance unmanned vehicle powered by solar cells, which is taking advantage of the same kinds of efficiency improvements in terrestrial systems. The importance of these S&T efforts lies in the fact that every 1% increase in solar cell energy generation efficiency translates to a 3.5% increase in power (or decrease in mass) for the system. The downside is that as the efficiency improves, the relative benefit is not as great, so there is a point of diminishing returns with the evolutionary approach. In addition, amorphous-Silicon (a-Si) for flexible arrays has achieved 10% efficiency. While a-Si has not been fully space qualified, it could be transitioned to terrestrial systems such as Remotely Piloted Aircraft (RPA) and powered tents. There are other breakthrough space energy generation component technologies with the potential of achieving up to 70% efficiency. Examples include quantum dots and dilute nitrides in solar cells. But there are also entirely new technologies such as tethers to attempt to harvest energy from the geomagnetic field, and energy harvesting from system heat waste. These ideas, as well as **new developments in** nuclear energy, including **small modular reactors, can potentially fuel** local **facilities.** Recently, there has been progress in developing large systems for energy generation, including very large deployable panels as developed by the Air Force Research Lab (AFRL), DARPA, and industry. For example, we are currently limited to 27 kW arrays for satellite power, whereas more power is required for some future space missions by the AF, National Security Space (NSS), and NASA. **Employing larger and more efficient arrays will enable missions that require very high power, such as** space-based radar or **space-based laser missions**. An example of a system that is almost ready for a flight demonstration is the AFRL-Boeing 30 kW Integrated Blanket Interconnect System (IBIS). Figure 3.2 shows the technology and implementation concept for such a High Power Solar Array (HPSA). In the long term, increased solar cell efficiencies and revolutionary materials foreshadow the potential of 500 kW on-orbit power generation technologies, which would be transformational for performing missions from space-based systems. In addition to improving photovoltaic efficiencies, other potential energy production is possible in the mid- to far-term. In addition to modern designs for autosafing, **small modular nuclear reactors** for ground operations energy, nuclear energy has been demonstrated on several satellite systems (e.g., Radioisotope Thermoelectric Generators (RTG)). **This source provides consistent power regardless of harvestable resources** (i.e. solar) at a much higher energy and power density than current technologies. While the implementation of such a technology should be weighed heavily against potential catastrophic outcomes, **many investments into small modular reactors can be leveraged for space based systems. As these nuclear power plants decrease in size, their utility on board space based assets increases.**

#### Causes arms racing and war

Bruce Gagnon (Coordinator of the Global Network Against Weapons & Nuclear Power in Space) 2001 “STATEMENT OF CONCERN “ http://www.space4peace.org/mission.htm

Another obstacle exists though. If the U.S. can "control" space, so might another nation. Thus we have the early stages of an arms race in space. How will France, Russia, China or any other nation respond as the U.S. consolidates its "control" of space? In order to ensure that the Pentagon maintains its current space military superiority the U.S. Space Command is now developing new war fighting technologies like the Ballistic Missile Defense (BMD) and Anti-satellite weapons (ASATS) as well as space based laser weapons. Star Wars is alive and well. Recent efforts to move toward early deployment of the BMD system, which could easily be used for offensive purposes, is expected to break the 1972 ABM Treaty as well as the Outer Space Treaty. Nuclear power in space becomes a key ingredient in the plans for space colonization and domination. Nuclear power is seen by NASA as an appropriate power source for interplanetary missions. Nuclear rockets are envisioned for trips to Mars and nuclear powered mining colonies are planned for the moon and Mars. At the same time the U.S. Space Command sees nuclear power as the primary source for the enormous amounts of power generation that will be required for space weapons. The Department of Energy (DoE) laboratories throughout the U.S., casting about for a new role as the need for more nuclear weapons diminishes, views space as a great new opportunity for their on-going nuclear production work. Labs like Hanford (Washington state); Savannah River Plant (South Carolina); Los Alamos (New Mexico); Lawrence Livermore (California); and INEL (Idaho) are already heavily involved in space nuclear power production efforts.

#### No Asia wars -- international organizations and stability.

#### Desker, ‘8

[Barry, Dean of the S Rajaratnam School of International Studies, At the IISS-JIIA Conference 2-4 June 2008, “Why War is Unlikely in Asia: Facing the Challenge from China”, <http://www.iiss.org/conferences/asias-strategic-challenges-in-search-of-a-common-agenda/conference-papers/why-war-in-asia-remains-unlikely-barry-desker/>]

War in Asia is thinkable but it is unlikely. The Asia-Pacific region can, paradoxically, be regarded as a zone both of relative insecurity and of relative strategic stability**.** On the one hand, the region contains some of the world’s most significant flashpoints – the Korean peninsula, the Taiwan Strait, the Siachen glacier – where **tensions** between nations could escalateto the point of resulting in a major war. The region is replete with border issues, the site of acts of terrorism (the Bali bombings, Manila superferry bombing, Kashmir, etc.), and it is an area of overlapping maritime claims (the Spratly Islands, Diaoyutai islands, etc). Finally, the Asia-Pacific is an area of strategic significance, sitting astride key sea lines of communication (SLOCS) and important chokepoints. Nevertheless, the Asia-Pacific region ismore stablethan one might believe. Separatism remains a challenge but the break-up of states is unlikely. Terrorism is a nuisance but its impact is contained. The North Korean nuclear issue, while not fully resolved, is at least moving toward a conclusionwith the likely denuclearization of the peninsula. Tensions between China and Taiwan, while always just beneath the surface, seem unlikely to erupt in open conflict (especially after the KMT victories in Taiwan). The region also possesses significant multilateral structures such as the Asia-Pacific Economic Cooperation (APEC) forum, the Shanghai Cooperation Organization (SCO), the nascent Six Party Talks forum and, in particular, ASEAN, and institutions such as the EAs, ASEAN + 3, ARF which ASEAN has conceived. Although the United States has been the hegemon in the Asia-Pacific since the end of World War II, it will probably not remain the dominant presence in the region over the next 25 years. A rising China will pose the critical foreign policy challenge, probably more difficult than the challenge posed by the Soviet Union during the Cold War. This development will lead to the most profound change in the strategic environment of the Asia-Pacific. On the other hand, the rise of China does not automatically mean that conflict is more likely. First, the emergence of a more assertive China does not mean a more aggressive China. Beijing appears content to press its claims peacefully (if forcefully), through existing avenues and institutions of international relations. Second, when we look more closely at the Chinese military buildup, we find that there may be less than some might have us believe, and thatthe Chinese war machine is not quite as threatening – as some might argue. Instead of Washington perspectives shaping Asia-Pacific affairs, the rise of China is likely to see a new paradigm in international affairs – the “Beijing Consensus” – founded on the leadership role of the authoritarian party state, a technocratic approach to governance, the significance of social rights and obligations, a reassertion of the principles of national sovereignty and non-interference, coupled with support for freer markets and stronger regional and international institutions. The emphasis is on good governance. Japan fits easily in this paradigm. Just as Western dominance in the past century led to Western ideas shaping international institutions and global values, Asian leaders and Asian thinkers will increasingly participate in and shape the global discourse, whether it is on the role of international institutions, the rules governing international trade or the doctrines which under-gird responses to humanitarian crises. An emerging Beijing Consensus is not premised on the rise of the ‘East’ and decline of the ‘West’, as sometimes seemed to be the sub-text of the earlier Asian values debate. I do not share the triumphalism of my friends Kishore Mahbubani and Tommy Koh. However, like the Asian values debate, this new debate reflects alternative philosophical traditions. The issue is the appropriate balance between the rights of the individual and those of the state. This debate will highlight the shared identity and shared values between China and the states in the region. I do not agree with those in the US who argue that Sino-US competition will result in “intense security competition with considerable potential for war” in which most of China’s neighbours “will join with the United States to contain China’s power.”[1] These shared values are likely to reduce the risk of conflict and result in regional pressure for an accommodation with China and the adoption of policies of engagement with China, rather than confrontation with an emerging China. China is increasingly economically inter-dependent, part of a network of over-lapping cooperative regional institutions. In Asia, the focus is on economic growth and facilitating China’s integration into regional and global affairs. An interesting feature is that in China’s interactions with states in the region, China is beginning to be interested in issues of proper governance, the development of domestic institutions and the strengthening of regional institutional mechanisms. Chinese policy is not unchanging, even on the issue of sovereignty. For example, there has been an evolution in Chinese thinking on the question of freedom of passage through the Straits of Malacca and Singapore. While China supported the claims of the littoral states to sovereign control over the Straits when the Law of the Sea Convention was concluded in 1982, China’s increasing dependence on imported oil shipped through the Straits has led to a shift in favour of burden-sharing, the recognition of the rights of user states and the need for cooperation between littoral states and user states. Engagement as part of global and regional institutions has resulted in revisions to China’s earlier advocacy of strict non-intervention and non-interference. Recent Chinese support for global initiatives in peace-keeping, disaster relief, counter-terrorism, nuclear non-proliferation and anti-drug trafficking, its lack of resort to the use of its veto as a permanent member of the UN Security Council and its active role within the World Trade Organisation participation in global institutions can be influential in shaping perceptions of a rising China. Beijing has greatly lowered the tone and rhetoric of its strategic competition with the United States**,** actions which have gone a long way toward reassuring the countries of Southeast Asia of China’s sincerity in pursuing a non-confrontational foreign and security strategy. Beijing’s approach is significant as most Southeast Asian states prefer not to have to choose between alignment with the US and alignment with China and have adopted ‘hedging’ strategies in their relationships with the two powers. Beijing now adopts a more subtle approach towards the United States: not directly challenging US leadership in Asia, partnering with Washington where the two countries have shared interests, and, above all, promoting multilateral security processes that, in turn, constrain US power, influence and hegemony in the Asia-Pacific. The People’s Liberation Army (PLA) is certainly in the midst of perhaps the most ambitious upgrading of its combat capabilities since the early 1960s, and it is adding both quantitatively and qualitatively to its arsenal of military equipment. Its current national defence doctrine is centered on the ability to fight “Limited Local Wars”. PLA operations emphasize preemption, surprise, and shock value, given that the earliest stages of conflict may be crucial to the outcome of a war. The PLA has increasingly pursued the acquisition of weapons for asymmetric warfare. The PLA mimics the United States in terms of the ambition and scope of its transformational efforts – and therefore challenges the U.S. military at its own game. Nevertheless, we should note that China, despite **a “deliberate and focused course** of military modernization,” is still at least two decades behind the United States in terms of defence capabilities and technology. There is very little evidence that the Chinese military is engaged in an RMA-like overhaul of its organizational or institutional structures. While the Chinese military is certainly acquiring new and better equipment, its RMA-related activities are embryonic and equipment upgrades by themselves do not constitute an RMA. China’s current military buildup is still more indicative of a process of evolutionary, steady-state, and sustaining – rather than disruptive or revolutionary – innovation and change. In conclusion, war in the Asia-Pacific is unlikely but the emergence of East Asia, especially China, will require adjustments by the West, just as Asian societies have had to adjust to Western norms and values during the American century. The challenge for liberal democracies like the United States will be to embark on a course of self-restraint.

#### No escalation.

#### Berry, ‘1

[Nicholas, Center for Defense Information Senior Analyst, Defense Monitor, “Disputes don't escalate”, XXX:4, May, <http://www.cdi.org/dm/2001/issue4/asiansecurity.html>]

What emerges from this historical memory is an environment loaded with latent hostility that makes the region's international security relations a fragmented array of bilateral ties. In effect, the widespread latent hostility in the region inhibits multilateral initiatives, security coalitions, and cooperative ventures which the United States sought under President Bill Clinton. "Peace is in pieces," as one academic phrased it in a different context. China, as the most assertive, rising power in this fractured environment, will play an ever-increasing role in determining the level of tension in the region. China is challenging American pre-eminence in Asia. It is not an overstatement to say that how well Beijing and Washington handle this competition will be the big story in the early decades of the 21st century. Much of the latent hostility remains in the background, only occasionally bursting forth into public disputes. Thus, major war remains unlikely. Nevertheless, security cooperation in this setting will be difficult.

# BLOCK

## Advantage cp

### Grid solvency

It also solves their lashout impact

The counterplan solves the grid advantage—it implements a system called SPIDERS which creates islanded micro-grids on bases using renewable power, diesel generations, and fuel cell batteries. These hybrid systems solve islanding without intermittency—advanced computer systems manage which fuel sources to use and conserve energy where necessary. They are also resistant to cyber-attack—the military has designed and demonstrated the program with cyberwar in mind

And, more evidence--SPIDERS uses the best available context-specific renewable technology and distributed generation to provide a secure microgrid.

Ackerman 2012 [Robert K. Ackerman has been the editor in chief of SIGNAL Magazine for more than a dozen years. A seasoned technology journalist, Ackerman also has served as a war correspondent covering the Iraq War embedded with the U.S. Army’s 101st Airborne Division. SIGNAL Magazine is the only international news magazine serving the critical information needs of government, military and industry decision makers active in the fields of C4ISR, information security, intelligence, research and development, electronics, and homeland security. http://www.afcea.org/content/?q=node/2877

“Cybersecurity and a power supply come together on local bases.”]

Johnson shares that planners are examining the relationship between the interface with the microgrid control system and the base’s enterprise network. Of particular interest is how that relationship would open the microgrid to vulnerabilities from outside the installation. Issues include the types of communications traffic that would be allowed in and out of the microgrid control system network.

According to its guidance, SPIDERS’ primary objectives are to protect task-critical assets from power loss due to cyberattack; integrate renewable and other distributed generational electricity to power task-critical assets in times of emergency; sustain critical operations during prolonged power outages; and manage installation electrical power consumption to reduce petroleum demand and carbon footprint.

SPIDERS will exploit existing energy assets such as solar arrays, wind generators and other renewable technologies as well as diesel generators to provide electricity more efficiently than if backup diesel generators alone were used. Renewable energy generators remain online constantly, providing electricity from alternate sources during opportune conditions such as windy or sunny days. Johnson points out, however, that most renewable energy resources trip offline when the main grid crashes. The microgrid allows the renewable power to stay online while maintaining necessary safety measures.

The program might tweak the bases’ energy sources by upgrading a legacy generator that lacks the necessary capacity, for example. Otherwise, it will focus on existing assets. Johnson emphasizes that SPIDERS will be energy-source agnostic.

And—Prefer our evidence—the *Pentagon Official* IN CHARGE OF BASES supports the CP and think it solves—prefer that to their random studies and industry hacks

Karol, 2012 [Writer and Editor for TakePart.com, a website devoted to socially relevant news. August. <http://news.yahoo.com/u-militarys-secret-weapon-going-green-181348275.html>]

“The White House announced Tuesday it is inviting contract proposals from green energy firms to boost the Army’s use of renewable energy,” said [The Hill](http://thehill.com/blogs/e2-wire/e2-wire/242593-army-announces-renewable-energy-contracts-as-white-house-continues-green-push). “The administration is making $7 billion available for the U.S. Army Corps of Engineers to spend on locally-generated biomass, geothermal, solar or [wind energy](http://www.takepart.com/article/2012/08/02/mitt-romney-will-end-tax-credit-clean-wind-energy) for up to 30 years.”

“The move is part of a broader White House-led push to green the armed forces, over GOP opposition, which claims the efforts are a waste of taxpayer dollars. The Defense Department has set ambitious targets, aiming for [renewable sources](http://www.takepart.com/article/2012/07/18/americans-dont-know-squat-about-energy-issues) to account for 25 percent of its energy by 2025, with the Army working toward getting 1 gigawatt of power from green sources by that year.”

This follows on the heels of a report from [Forbes](http://www.forbes.com/sites/uciliawang/2012/08/06/u-s-military-opens-up-16m-acres-for-renewable-energy-projects/) that, “The U.S. Department of Defense plans to open up 16 million acres of its land for renewable energy development, which it hopes will create a boom of solar, wind and geothermal projects and provide clean power to military bases, the department announced Monday.”

“Defense Secretary Leon Panetta and the Interior Secretary Ken Salazar signed a memorandum of understanding to work together on promoting renewable energy generation projects on public land that has historically been restricted for military uses. About 13 million of those 16 million acres are located in western U.S., where a lot of solar, wind and geothermal power development already has been taking place on private and other types of public land.”

The article also notes that a majority of our military bases rely on traditional power grids and need to utilize backup generators during blackouts. This is one reason “The military has been vocal about its support of renewable energy, from electricity to transportation fuels, that it says will help it become more self-sufficient and reduce its vulnerabilities in the battle fields.”

“Renewable energy will allow a military base to maintain critical operations for weeks or months if an electric power grid goes down,” said [Dorothy Robyn](http://www.icfi.com/about/our-people/non-icf/r/robyn-dorothy), deputy under secretary of defense for installations and environment.

While all this sounds great, not everyone is in agreement.

[NPR](http://www.npr.org/2012/07/05/156325905/militarys-green-energy-criticized-by-congress) reported that, “The military says it's dangerous to depend exclusively on fossil fuels, and has launched a program to develop alternative fuels for use by military vehicles. Energy consumption is a big expense for the Pentagon. But some members of Congress don't think the military should be a laboratory for finding energy alternatives, and say the military should not be spending money on this kind of research at a time when defense dollars are shrinking.”

The [National Journal](http://www.nationaljournal.com/energy/insiders-gop-won-t-stop-pentagon-s-green-energy-push-20120725) made this observation more explicit last month, saying, “Republicans in both the House and Senate this year have proposed cutting funds for alternative-energy programs in the defense authorization bill. But these efforts won’t gain much traction . . . In particular, arguing in favor of cutting military biofuels spending becomes an uphill battle when Pentagon officials, military veterans, and former lawmakers are saying that the spending is needed to save lives in war zones . . . Pentagon officials have long argued that alternative energy can save both money—by reducing dependence on oil—and lives, because American fuel convoys are often targeted in attacks.”

And the naysayers may be too late anyway.

The [Department of Defense](http://www.defense.gov/home/features/2010/1010_energy/) website has a landing page dedicated to over a dozen articles (plus a link to a couple hundred more in its digital archive) with topics such as “Naval Station Opens Green Training Facility,” DOD Must Have Petroleum Fuel Alternatives,” “Air Force Moves Forward With Green Energy.”

It appears that the convoys, planes, and ships are already well on their way to a green future.

#### And, none of their solvency deficits apply—SPIDERS are a new innovation of microgrids that solve islanding—this cites a survey of over 75 military and energy officials

SERDP and ESTCP, 2012[SERDP and ESTCP are the Department of Defense's environmental research programs, harnessing the latest science and technology to improve DoD’s environmental performance, reduce costs, and enhance and sustain mission capabilities.¶ DoD Study Finds Microgrids Offer Improved Energy Security for DoD Installations¶ 07/10/2012¶ <http://serdp-estcp.org/News-and-Events/News-Announcements/Program-News/DoD-study-finds-microgrids-offer-improved-energy-security-for-DoD-installations>]

Advanced microgrids offer a cost-effective solution to military installations' growing vulnerability to the fragile electric grid, according to a study released today by DoD’s Office of Installations and Environment. The study performed by MIT Lincoln Laboratory looked at different microgrid architectures and characteristics and compared their relative cost-effectiveness. The report provides insight into increasing energy security and reducing energy costs through the incorporation of renewable energy resources into microgrids, as well as new market opportunities for DoD in the area of demand response and ancillary services.

The study highlights the extent of ongoing microgrid work across DoD. It identified 44 installations that either had existing microgrids, planned installation of microgrids, or conducted microgrid studies or demonstrations at their facilities. The authors interviewed more than 75 people from the military Services, the Office of the Secretary of Defense, and the Department of Energy. The analysis categorized the ongoing microgrid efforts based on several key attributes including size, maturity, the inclusion of renewable resources, and the ability to operate in a grid-tied manner.

The analysis confirms the value of microgrids to DoD. The combination of on-site energy generation and storage, together with the microgrid’s ability to manage local energy supply and demand, allow installations to shed non-essential loads and maintain mission-critical loads if the electric grid is disrupted.

The report illustrates the largely untapped potential of moving to smarter, next generation microgrids that would accommodate far greater penetration of renewable energy sources, as well as tighter integration with the electrical grid. If solar resources that are increasingly being installed on DoD installations were available during islanded operation of a microgrid, they could significantly extend the islanding time. Moreover, a microgrid that could operate when tied to the grid would offer new opportunities for the DoD to generate cost savings by using backup generation assets during normal operation and generate financial revenue by using advanced ancillary services.

One important finding is that there will be no “one size fits all” solution. The location of a military installation influences the options available for energy generation sources, the options available for interaction with the local utility, the characteristics of the local electricity market, and the regulatory environment. The most effective microgrids will be those that take into account the needs of the local commercial electric grid and are configured so that they can earn value helping to meet those needs.

### 2NC Solves Warming

#### The CP solves warming through carbon sequestration and the prevention of NO2 and methane emissions from agriculture—biochar would be able to sequester more CO2 than the totality of fossil fuel emissions by the end of the century without displacing coal—that’s the MIT Tech Review. Prefer our evidence—it cites professors of soil and crop sciences at Cornell. The counterplan is a complex scientific science—defer to experts.

#### It’s the closest we’ve got to a silver bullet.

Alok Jha, 3/13/2009. Green technology correspondent for the Guardian (UK). “'Biochar' goes industrial with giant microwaves to lock carbon in charcoal,” The Guardian, <http://www.guardian.co.uk/environment/2009/mar/13/charcoal-carbon>.

Giant microwave ovens that can "cook" wood into charcoal could become our best tool in the fight against global warming, according to a leading British climate scientist. Chris Turney, a professor of geography at the University of Exeter, said that by burying the charcoal produced from microwaved wood, the carbon dioxide absorbed by a tree as it grows can remain safely locked away for thousands of years. The technique could take out billions of tonnes of CO2 from the atmosphere every year. Fast-growing trees such as pine could be "farmed" to act specifically as carbon traps — microwaved, buried and replaced with a fresh crop to do the same thing again. Turney has built a 5m-long prototype of his microwave, which produces a tonne of CO2 for $65. He plans to launch his company, Carbonscape, in the UK this month to build the next generation of the machine, which he hopes will process more wood and cut costs further. He is not alone in touting the benefits of this type of charcoal, known as biochar or biocharcoal. The Gaia theorist, James Lovelock, and Nasa's James Hansen have both been outspoken about the potential benefits of biochar, arguing that it is one of the most powerful potential solutions to climate change. In a recent paper, Hansen calculated that producing biocharcoal by current methods of burning waste organic materials could reduce global carbon dioxide levels in the atmosphere by 8ppm (parts per million) over the next 50 years. That is the equivalent of three years of emissions at current levels. **Turney said biochar was the closest thing scientists had to a silver-bullet solution to climate change**. Processing facilities could be built right next to forests grown specifically to soak up CO2. "You can cut trees down, carbonise them, then plant more trees. The forest could act on an industrial scale to suck carbon out of the atmosphere." The biochar could be placed in disused coal mines or tilled into the ground to make soil more fertile. Its porous structure is ideal for trapping nutrients and beneficial micro-organisms that help plants grow. It also improves drainage and can prevent up to 80% of greenhouse gases such as nitrous oxides and methane from escaping from the soil. In a recent analysis of geo-engineering techniques published in the journal Atmospheric Chemistry, Tim Lenton, a climate scientist at the University of East Anglia, **rated producing charcoal as the best technological solution to reducing CO2 levels**. He compared it to other geo-engineering techniques such as dumping iron in oceans or seeding clouds to reflect the sun's radiation and calculated that by 2100 a quarter of the effect of human-induced emissions of CO2 could be sequestered with biochar production from waste organic matter, giving a net reduction of 40ppm in CO2 concentration. Johannes Lehmann of Cornell university has calculated that it is realistically possible to fix 9.5bn tonnes of carbon per year using biochar. The global production of carbon from fossil fuels stands at 8.5bn tonnes.

#### Solves quickly—we’d be out of the danger zone by the middle of the century.

Tim Flannery, 1/11/2008. Division of Environmental and Life Sciences Macquarie Uni. “Australian of the Year 2007, Tim Flannery talks bio char and why we need to move into the renewable age,” Beyond Zero Emissions, <http://www.beyondzeroemissions.org/2008/03/19/tim-flannery-australian-of-the-year-2007-talks-bio-char-why-we-need-to-move-into-the-renewable-age>.

Matthew Wright: In a recent address to the American Geophysical Union, Dr. James Hanson from NASA said that we need to go below 350 parts per million to have a stable atmosphere that we are used to experiencing for our agricultural needs, and our biodiversity and ecological systems. In terms of your call about trying to aim for say 5% sequestration per year over 20 years in order to remove that carbon debt, if we can get that going, how do you see, where do you see us going for a stable climate, a safe climate that can continue and maintain the huge populations that we've got around the world now?

Tim Flannery: Well that's a very good question. I mean I suppose implicit in James Hansons' comments is the reality that we are living right now with unacceptable climate risk, very high levels of unacceptable risk, and we need to draw that down as quickly as we can. Now if you used these agri-char based technologies and you have your aggressive reaforestation projects for the worlds tropics, you could conceivably be drawing down in the order of 10 to 15 tonnes, gigatonnes sorry, of carbon per annum by about 2030. **At that rate we could bring ourselves down below the dangerous threshold as early as the middle of this century**, but whether the world can actually get its act together and do that is another matter. This is the first real directed experiment at planetary engineering that we are talking about here, and we don't really have the political structures in place to enable us to implement the technology that we already have. So I would see the change basically as a political one. Its a global political change and the Kyoto process that rolls out now from Potsdam this year and then Copenhagen next year will be the key factors in the success or failure of us humans to do that.

#### Sequestration through ag can offset a third of emissions—equivalent in magnitude to shifting to low-carbon energy.

Claire Schaffnit-Chatterjee, 9/19/2011. Deutsche Bank Research. “Mitigating climate change through agriculture,” [www.dbresearch.com/PROD/DBR\_INTERNET\_EN-PROD/PROD0000000000278568/Mitigating+climate+change+through+agriculture%3A+An+untapped+potential.pdf](http://www.dbresearch.com/PROD/DBR_INTERNET_EN-PROD/PROD0000000000278568/Mitigating+climate+change+through+agriculture%3A+An+untapped+potential.pdf).

The IPCC estimates the global technical potential for GHG mitigation in agriculture production at 5.5 to 6 Gt of CO2 equivalent per year by 2030. These figures do not include improved energy efficiency, biofuels or other changes in demand. This theoretical reduction in emissions, assuming adoption of all technical options is derived mostly (89%) from carbon sequestration in soil, 9% from methane reduction in rice production and livestock/manure management and 2% from nitrous oxide reduction through better cropland management40. It does not take into account fossil fuel offsets from biomass use.¶ The economic potential, taking into account the costs involved, is naturally much lower and depends on carbon prices. For a range of USD 50 to 60 per ton of CO2 eq mitigated, agriculture has a mitigation potential of over 4 billion tons CO2 eq. Even at prices below USD 20 per ton of CO2 eq mitigated, the mitigation potential in agriculture is still substantial at over 1.5 billion tons of CO2 eq. The current price for carbon is 13 EUR per ton.¶ McKinsey identifies terrestrial carbon in agriculture/forestry as one of the three major areas of GHG abatement opportunities (at 12 billion tons of CO2 eq per year in 2030) next to energy efficiency (14 billion) and low-carbon energy supply (also 12 billion). This means that the agriculture/forestry sector accounts for one-third of the total economic abatement potential, while agriculture alone accounts for 12%. In comparison, most of the promising solutions for reducing emissions in the energy sector are still in development and unlikely to be widely used in the next years or maybe decades. Curbing GHG emissions caused by farming practices and deforestation should be cheaper41. Alternative energy systems have the important advantage of lowering GHG emissions by replacing fossil fuels. Many options in the energy sector are subsidized and benefit from high oil prices.¶ The agriculture and forestry sectors provide the crucial possibility of sequestering the carbon already in the atmosphere. Carbon capture and storage from energy-related emissions is technically possible but not doable on a large-scale until 2020 or so42. Most importantly, it is not designed to capture GHGs already present in the atmosphere, which only terrestrial carbon sequestration can do.

#### Also, we have two internal links to solving warming independent of sequestration.

#### First, nitrous oxide—we decrease emissions both because biochar reduces nitrate leakage from soil, and because the fertilizer tax itself decreases nitrogen usage—that’s Merel, Konrad, and MIT Tech Review. That outweigh’s the aff internal link ---

#### a. NOx traps heat at different wavelengths, reductions cause a disproportionate drop in GHG effects.

Science Newsline, 4/2/2012. “Fertilizer Use Responsible for Increase in Nitrous Oxide in Atmosphere,” <http://www.sciencenewsline.com/articles/2012040219260050.html>.

Limiting nitrous oxide emissions could be part of a first step toward reducing all greenhouse gases and lessening global warming, Boering said, especially since immediately reducing global carbon dioxide emissions is proving difficult from a political standpoint. In particular, **reducing nitrous oxide emissions can initially offset more than its fair share of greenhouse gas emissions overall**, since N2O traps heat at a different wavelength than CO2 and clogs a "window" that allows Earth to cool off independent of CO2 levels.¶ "On a pound for pound basis, it is really worthwhile to figure how to limit our emissions of N2O and methane," she said. "Limiting N2O emissions can buy us a little more time in figuring out how to reduce CO2 emissions."

#### b. Inevitable increases in ag production mean NO2 will swamp CO2 in the coming century.

Dave S. Reay et al, 5/13/2012. School of GeoSciences, University of Edinburgh. “Global agriculture and nitrous oxide emissions,” Nature, <http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#/affil-auth>.

Projected N2O emissions associated with agriculture are sensitive to drivers such as human population, per capita caloric intake, and consumption of livestock products. Alongside continuing growth in global population27, per capita food consumption is projected to increase in the next few decades[28](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref28), with demand for meat and dairy products being especially strong28, 29, 30 (Fig. 2). These projections represent changes in global average per capita intake, much of the expected increase being driven by greater per capita cereal, meat and dairy consumption in developing-world nations[29](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref29). As a result of the necessary expansion in crop and livestock production to meet this demand, a substantial increase in N2O emissions from agricultural soils is projected through to 2030[10](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref10), [31](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref31).¶ Overall, N2O emissions associated with agriculture (including human sewage) are projected to rise from around 6.4 Tg N2O-N yr−1 in 2010 to 7.6 Tg N2O-N yr−1 by 2030[10](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref10) ([Fig. 1](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#f1)), with much of this growth resulting from increased nitrogen-fertilizer use in non-OECD Asia, Latin America and Africa. Although these projections provide a useful indicator of future emissions, uncertainties around agricultural demand, interactions with climate change, and the extent of mitigation efforts remain significant.¶ Agricultural demand and bioenergy. As discussed previously, future changes in human population and diet are a central determinant of global food demand, and so of agricultural N2O emissions. In addition to the challenge of developing robust scenarios for food-related emissions, projections must also take account of potential increases in demand for bioenergy.¶ Several recent studies have shown that an outcome of imposing mitigation regimes that value only carbon from energy and industrial sources is that they can create incentives to increase bioenergy production and use[32](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref32), [33](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref33). Global production of wheat, coarse grains and vegetable oils for biofuels use, for example, is projected to rise from around 160 million tonnes in 2010 to over 200 million tonnes by 2020[29](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref29). Expanded bioenergy programmes can, in turn, increase terrestrial carbon emissions globally by increasing the conversion of forests and unmanaged ecosystems to agricultural use — a perverse result of curbing fossil-fuel-related emissions[34](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref34). Increased production of first-generation energy crops (for liquid transport fuels — bioethanol and biodiesel) may also increase N2O emissions, as large areas of these crops are fertilized to maximize production. However, many second-generation energy crops do not require large nitrogen-fertilizer additions, and their impact on N2O emissions is likely to be much lower[35](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref35). A central question therefore, is the degree to which global biofuel crop production will transition to second-generation energy crops, and the extent to which any expansion in production will be confined to existing managed land.¶ A recent analysis of global biofuels programmes that employ advanced cellulosic (second generation) technologies estimates that, over the twenty-first century, N2O emissions will be larger than the carbon losses associated with land-use change and land clearing[36](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref36). Cumulative projected N2O emissions in the analysis by Melillo et al.[36](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref36) range between 510 and 620 Tg N2O-N for the period 2000–2100, depending on how much of the new biofuels production is confined to already managed land, and so minimizes new forest clearing. Whereas cumulative N2O losses continually grow over the twenty-first century, net carbon flux influenced by biofuels production exhibits one of two distinct patterns: a substantial flux to the atmosphere (a land source) if the increase in biofuels production involves extensive forest clearing to establish biofuels crops (deforestation case); or a small flux to the land from the atmosphere (a land sink) as carbon slowly accumulates in the soil fertilized in the biofuels areas (intensification case). A global greenhouse-gas emissions policy that both protects forests and encourages best practices for nitrogen-fertilizer use[37](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref37) may therefore dramatically reduce emissions associated with biofuels production.¶ Feedbacks and interactions. Further increases in anthropogenic Nr inputs to both managed and natural ecosystems are predicted[38](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref38). Agriculture accounts for about 75–85% of projected global NH3 emissions throughout 2000–2050 and it is likely that regions with soils and ecosystems where Nr loads are already high are more prone to Nr deposition-induced N2O emissions[39](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref39), [40](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref40). Indeed, significant enhancements (50–60%) in the proportion of new Nr input emitted as N2O have been reported for riparian forest soils exposed to a decade of NO3-rich runoff[41](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref41). Insufficient field data exist to confidently include a positive feedback response in regional or global-scale projections of indirect N2O emissions from agriculture, but it is possible that an expansion in the area of nitrogen-saturated natural ecosystems globally will serve to increase N2O emissions per unit of Nr deposition in the future. As the microbial processes of nitrification and denitrification are responsible for the bulk of agricultural N2O emissions[42](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref42), [43](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref43), [44](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref44), a greater understanding of the microbiological basis of N2O fluxes may also help to improve such feedback projections[45](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref45).¶ Likewise, the impacts of future climate change on soil nitrogen cycling and net N2O emissions from agriculture are potentially significant[46](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref46), yet remain difficult to quantify at a global scale. A recent examination of modelled N2O emissions from Australian pasture-based dairy systems under future climate change scenarios indicated an increase in emissions of up to 40% (ref. [47](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref47)). Here, warmer soil temperatures coupled with wet, but unsaturated, soils during cooler months resulted in an increased opportunity for N2O production. Enhanced N2O emissions from upland agricultural soils under increased atmospheric CO2 concentrations have also been reported[48](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref48). Conversely, modelling of N2O emissions from a humid pasture in Ireland under future climate change indicated that a significant increase in above-ground biomass and associated nitrogen demand would serve to avoid significant increases in N2O emissions[49](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref49). Although direct studies of agricultural N2O fluxes under simulated future climates do suggest increased emissions in response to warming[50](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref50) or increased CO2[48](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref48), examination of the combined effects of warming, summer drought and increased CO2 indicate that temperature change may be of most importance in temperate, extensively managed grasslands[51](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref51). Overall, it is likely that changes in food demand, land management and nitrogen-use efficiency will be much more important determinants of global N2O emissions than climate change in the twenty-first century. However, significant indirect effects of climate change on agricultural N2O fluxes, such as reduced crop productivity[52](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref52), altered nitrogen leaching rates[53](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref53), and enhanced ammonia volatilization[54](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref54), [55](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref55) require further investigation and quantification.¶ Agriculture accounted for approximately 60% (~6 Tg N2O-N) of total global anthropogenic emissions of N2O in 2005, largely through emissions from agricultural soils after application of nitrogen fertilizer, meaning that the agricultural sector offers the greatest potential for N2O mitigation[31](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref31).¶ Nitrogen-use efficiency. On average, of every 100 units of nitrogen used in global agriculture, only 17 are consumed by humans as crop, dairy or meat products[56](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref56). Global nitrogen-use efficiency of crops, as measured by recovery efficiency in the first year (that is, fertilized crop nitrogen uptake — unfertilized crop N uptake/N applied), is generally considered to be less than 50% under most on-farm conditions[57](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref57), [58](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref58), [59](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref59), [60](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref60).¶ In the agricultural mitigation (Working Group III) chapter of the IPCC's fourth assessment report[31](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref31), the global mitigation potential for N2O reduction in agriculture was quantified using outputs from the DAYCENT model[61](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref61). Projections in demand for food were considered to require an overall increase in fertilizer nitrogen requirements, and large improvements in nitrogen-use efficiency by 2030 (for agronomic rather than climate change mitigation reasons) were assumed in the baseline, leading to a limited potential for mitigation[31](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref31), [62](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref62). However, given significant over-fertilization in some regions such as China and India[63](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref63), [64](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref64), the mitigation potential may be larger than reported by the IPCC in 2007[65](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref65). Potential mitigation options for N2O reduction rely on improving nitrogen-use efficiency, which could be increased by up to 50%[66](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref66), [67](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref67) by practices such as changing the source of N, using fertilizers stabilized with urease or nitrification inhibitors or slow- or controlled-release fertilizers, reducing rates of nitrogen application in over-fertilized regions, and optimizing nitrogen fertilizer placement and timing[65](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref65), [68](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref68), [69](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref69), [70](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref70). In some under-fertilized regions (such as Africa[71](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref71), [72](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref72)) more fertilizer nitrogen may be needed to increase yields. Although the N2O emissions would be expected to increase, the N2O emissions per unit of agricultural product may be significantly decreased.¶ Given the increased demand for fertilizer nitrogen to feed >9 billion people by 2050 (for example, from ~100 Tg to 135 Tg N by 2030[67](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref67)) and the potentially very large expansion in biofuel production discussed earlier, N2O emissions from agriculture are likely to rise in absolute terms. The risk is that **large increases in anthropogenic N2O emissions from the agricultural sector will partly offset efforts to reduce CO2 emissions from the energy supply sector and others — undermining global efforts to avoid 2 °C of post-industrial warming**. A key mitigation challenge, therefore, is to reduce N2O emissions per unit of fertilizer nitrogen applied, and per unit of agricultural product[73](http://www.nature.com/nclimate/journal/v2/n6/full/nclimate1458.html#ref73).

#### Second, methane—biochar increases soil efficiency, which decreases emissions.

John Gaunt and Johannes Lehmann, 2008. College of Agriculture and Life Sciences, Cornell University. “Energy Balance and Emissions Associated with Biochar Sequestration and Pyrolysis Bioenergy Production,” Environ. Sci. Technol. 2008, 42, 4152–4158, http://pubs.acs.org/doi/abs/10.1021/es071361i.

Preliminary research (12) suggests that nitrous oxide (N2O) and **methane** (CH4) **emissions from soil may be significantly reduced by biochar application**. Rondon et al. (12) found that CH4 emissions were completely suppressed and N2O emissions were reduced by 50% when biochar was applied to soil. Yanai et al. (13) also found suppression of N2O when biochar was added to soil. The mechanisms by which N2O and CH4 emissions are reduced are not clear. However, the reduction in N2O emissions observed by these authors is consistent with the more widespread observation that fertilizer is used more efficiently by crops in situations where biochar is applied to soil.

#### Methane outweighs CO2—consensus of experts agree

Noam Mohr, August 2005. Research Scientist @ PETA with a physic degrees from University of Pennsylvania. “A New Global Warming Strategy: How Environmentalists are Overlooking Vegetarianism as the Most Effective Tool Against Climate Change in Our Lifetimes,” An EarthSave International Report.

This is a serious miscalculation. Data published by Dr. James Hansen and others5 show that CO2 emissions are not the main cause of observed atmospheric warming. Though this may sound like the work of global warming skeptics, it isn’t: Hansen is Director of NASA’s Goddard Institute for Space Studies who has been called “a grandfather of the global warming theory.”6 He is a longtime supporter of action against global warming, cited by Al Gore7 and often quoted by environmental organizations, who has argued against skeptics for subverting the scientific process.8 His results are generally accepted by global warming experts, including bigwigs like Dr. James McCarthy, co-chair of the International Panel on Climate Change’s Working Group II.9 The focus solely on CO2 is fueled in part by misconceptions. It’s true that human activity produces vastly more CO2 than all other greenhouse gases put together. However, this does not mean it is responsible for most of the earth’s warming. Many other greenhouse gases trap heat far more powerfully than CO2, some of them tens of thousands of times more powerfully.10 When taking into account various gases’ global warming potential—defined as the amount of actual warming a gas will produce over the next one hundred years—it turns out that gases other than CO2 make up most of the global warming problem.11 **Even this overstates the effect of CO2, because the primary sources of these emissions**—cars and **power plants—also produce aerosols**. Aerosols actually have a cooling effect on global temperatures, and the magnitude of this cooling approximately cancels out the warming effect of CO2.12 The surprising result is that sources of CO2 emissions are having roughly zero effect on global temperatures in the near-term! 13 This result is not widely known in the environmental community, due to a fear that polluting industries will use it to excuse their greenhouse gas emissions. For example, the Union of Concerned Scientists had the data reviewed by other climate experts, who affirmed Hansen’s conclusions.14 However, the organization also cited climate contrarians’ misuse of the data to argue against curbs in CO2.15 This contrarian spin cannot be justified. While CO2 may have little influence in the near-term, reductions remains critical for containing climate change in the long run. Aerosols are short-lived, settling out of the air after a few months, while CO2 continues to heat the atmosphere for decades to centuries. Moreover, we cannot assume that aerosol emissions will keep pace with increases in CO2 emissions.16 If we fail start dealing with CO2 today, it will be too late down the road when the emissions catch up with us. Nevertheless, the fact remains that sources of non-CO2 greenhouse gases are responsible for virtually all the global warming we’re seeing, and all the global warming we are going to see for the next fifty years. If we wish to curb global warming over the coming half century, we must look at strategies to address non-CO2 emissions. The strategy with the most impact is vegetarianism. Methane and Vegetarianism **By far the most important non-CO2** g**reen**h**ouse** g**as is methane**, and the number one source of methane worldwide is animal agriculture.17 Methane is responsible for nearly as much global warming as all other non-CO2 greenhouse gases put together.18 Methane is 21 times more powerful a greenhouse gas than CO2.19 While atmospheric concentrations of CO2 have risen by about 31% since pre-industrial times, methane concentrations have more than doubled.20 Whereas human sources of CO2 amount to just 3% of natural emissions, human sources produce one and a half times as much methane as all natural sources.21 In fact, the effect of our methane emissions may be compounded as methane-induced warming in turn stimulates microbial decay of organic matter in wetlands—the primary natural source of methane.22 pg. 2

## Heg

### 2NC Fettweis—Empirics

#### Hegemonic stability theory is wrong, that’s Fettweis—

1. Global stability exists because of self-policing, not unipolarity. The coexistence of unipolarity and a decrease in global wars is a coincidence. The US can’t force peace on the world if the majority is not politically vested in sustaining the current order.

2. They misread allied threat perception—no country has ever completely contracted out their national security. Their rearm scenarios assume that US allies have made a decision to disarm in the face of an impending military threat. Such a decision is unprecedented in international history. The fact is they do not share the threat perceptions of US neocons and the fact that they are not currently militarizing only proves they don’t perceive Russia, China or any “rogue states” to be a threat.

3. The only empirical data sides with us—the US made massive military cuts in the 90s without triggering regional arm races or security dilemmas. US military posture has empirically had no impact on regional security dynamics.

Empirics trump neocon insanity—you can’t make accurate IR predictions without some grounding in the past. Their impact is based on hubris.

#### Their defense of unipolarity is plagued by conceptual confusion and methodological laziness.

Yang 10—Ph.D Candidate in the Politics & International Relations Program @ University of Southern California [Xiangfeng Yang, The Unipolar Challenge: Power, Culture and Authority and the Advent of War, March 25, 2010, pg. <http://www.stockholm.sgir.eu/uploads/The%20Unipolar%20Challenge,%203rd%20Draft.pdf>]

Turning the conventional wisdom on its head, the positivist intellectual enterprise on unipolarity is seriously impeded by not just conceptual confusion but also the lack of methodological rigor. Conceptually, most researchers, many realists included, are slow to realize that the character of unipolarity is fundamentally different phenomenon from bipolarity and multipolarity and that the study of unipolarity presupposes a new set of analytical assumptions most of the time, if not always. Methodologically and theoretically, the obsession with contemporary US hegemony gives the impression that unipolarity is historically unprecedented, such that scholars use the evidence based on which their hypotheses are developed to test their theoretical propositions, a huge taboo in positivist research (King, Keohane, & Verba, 1994). The upshot is often that their policy projections leap far ahead of their theoretical and empirical analyses: the same evidence can be interpreted in rather divergent ways, or that the falsification of their theory still awaits what China or the United States will do in the future.8 pg. 13

#### US restraint is risk free—interdependence and institutions will keep the peace.

Fettweis 10—Professor of Political Science at Tulane University [Christopher J. Fettweis, Dangerous Times?: The International Politics of Great Power Peace, 2010]

If the only thing standing between the world and chaos is U.S. the military presence, then an adjustment in grand strategy would be exceptionally counter-productive. But it is worth recalling that **none of the other explanations for the decline of war—**nuclear weapons, complex economic **interdependence**, international and domestic **institutions, evolutions in** ideas and **norms**—**necessitate an activist America to maintain their validity**. Were America to become more restrained, nuclear weapons would still affect the calculations of the would-be aggressor; the process of globalization would continue, deepening the complexity of economic interdependence; the United Nations could still deploy peacekeepers where necessary; and democracy would not shrivel where it currently exists. Most importantly, the idea that war is a worthwhile way to resolve conflict would have no reason to return. As was argued in chapter 2, normative evolution is typically unidirectional. Strategic restraint in such a world would bevirtually risk free**.** pg. 175-176

#### Retrenchment solves the impact—theory and the empirical record prove.

MacDonald & Parent 11—Professor of Political Science at Williams College & Professor of Political Science at University of Miami [Paul K. MacDonald & Joseph M. Parent, “Graceful Decline? The Surprising Success of Great Power Retrenchment,” International Security, Vol. 35, No. 4 (Spring 2011), pp. 7–44]

Our findings are directly relevant to what appears to be an impending great power transition between China and the United States. Estimates of economic performance vary, but most observers expect Chinese GDP to surpass U.S. GDP sometime in the next decade or two. 91 This prospect has generated considerable concern. Many scholars foresee major conflict during a Sino-U.S. ordinal transition. Echoing Gilpin and Copeland, John Mearsheimer sees the crux of the issue as irreconcilable goals: China wants to be America’s superior and the United States wants no peer competitors. In his words, “[N]o amount of goodwill can ameliorate the intense security competition that sets in when an aspiring hegemon appears in Eurasia.” 92

Contrary to these predictions, our analysis suggests some grounds for optimism. Based on the historical track record of great powers facing acute relative decline, the United States should be able to retrench in the coming decades. In the next few years, the United States is ripe to overhaul its military, shift burdens to its allies, and work to decrease costly international commitments. It is likely to initiate and become embroiled in fewer militarized disputes than the average great power and to settle these disputes more amicably. Some might view this prospect with apprehension, fearing the steady erosion of U.S. credibility. Yet our analysis suggests that retrenchment need not signal weakness. Holding on to exposed and expensive commitments simply for the sake of one’s reputation is a greater geopolitical gamble than withdrawing to cheaper, more defensible frontiers.

Some observers might dispute our conclusions, arguing that hegemonic transitions are more conflict prone than other moments of acute relative decline. We counter that there are deductive and empirical reasons to doubt this argument. Theoretically, hegemonic powers should actually find it easier to manage acute relative decline. Fallen hegemons still have formidable capability, which threatens grave harm to any state that tries to cross them. Further, they are no longer the top target for balancing coalitions, and recovering hegemons may be influential because they can play a pivotal role in alliance formation. In addition, hegemonic powers, almost by definition, possess more extensive overseas commitments; they should be able to more readily identify and eliminate extraneous burdens without exposing vulnerabilities or exciting domestic populations.

We believe the empirical record supports these conclusions. In particular, periods of hegemonic transition do not appear more conflict prone than those of acute decline. The last reversal at the pinnacle of power was the AngloAmerican transition, which took place around 1872 and was resolved without armed confrontation. The tenor of that transition may have been influenced by a number of factors: both states were democratic maritime empires, the United States was slowly emerging from the Civil War, and Great Britain could likely coast on a large lead in domestic capital stock. Although China and the United States differ in regime type, similar factors may work to cushion the impending Sino-American transition. Both are large, relatively secure continental great powers, a fact that mitigates potential geopolitical competition. 93 China faces a variety of domestic political challenges, including strains among rival regions, which may complicate its ability to sustain its economic performance or engage in foreign policy adventurism. 94

Most important, the United States is not in free fall. Extrapolating the data into the future, we anticipate the United States will experience a “moderate” decline, losing from 2 to 4 percent of its share of great power GDP in the five years after being surpassed by China sometime in the next decade or two. 95 Given the relatively gradual rate of U.S. decline relative to China, the incentives for either side to run risks by courting conflict are minimal. The United States would still possess upwards of a third of the share of great power GDP, and would have little to gain from provoking a crisis over a peripheral issue. Conversely, China has few incentives to exploit U.S. weakness. 96 Given the importance of the U.S. market to the Chinese economy, in addition to the critical role played by the dollar as a global reserve currency, it is unclear how Beijing could hope to consolidate or expand its increasingly advantageous position through direct confrontation. In short, the United States should be able to reduce its foreign policy commitments in East Asia in the coming decades without inviting Chinese expansionism. Indeed, there is evidence that a policy of retrenchment could reap potential benefits. The drawdown and repositioning of U.S. troops in South Korea, for example, rather than fostering instability, has resulted in an improvement in the occasionally strained relationship between Washington and Seoul. 97 U.S. moderation on Taiwan, rather than encouraging hard-liners in Beijing, resulted in an improvement in cross-strait relations and reassured U.S. allies that Washington would not inadvertently drag them into a Sino-U.S. conflict. 98 Moreover, Washington’s support for the development of multilateral security institutions, rather than harming bilateral alliances, could work to enhance U.S. prestige while embedding China within a more transparent regional order. 99 A policy of gradual retrenchment need not undermine the credibility of U.S. alliance commitments or unleash destabilizing regional security dilemmas. Indeed, even if Beijing harbored revisionist intent, it is unclear that China will have the force projection capabilities necessary to take and hold additional territory. 100 By incrementally shifting burdens to regional allies and multilateral institutions, the United States can strengthen the credibility of its core commitments while accommodating the interests of a rising China. Not least among the benefits of retrenchment is that it helps alleviate an unsustainable financial position. Immense forward deployments will only exacerbate U.S. grand strategic problems and risk unnecessary clashes. 101

[STOP HERE IF SHORT ON TIME]

#### Restraint increases our leverage over alliances—economic and diplomatic tools preserve our influence.

Fettweis 10—Professor of Political Science at Tulane University [Christopher J. Fettweis, Dangerous Times?: The International Politics of Great Power Peace, 2010]

Finally, formal alliances are hardly necessary to influence other countries. If there comes a time when the United States needs to restrain the actions of friendly states, it will always have substantial diplomatic and economic tools at its disposal. If those fail, then Washington can decide whether any potential conflict is actually worth a greater expenditure of U.S. treasure. The United States need not enter into formal security relationships in order to be able to affect the decision of other states. Ronald Steel argued some time ago that "unlike Rome, we have not exploited our empire. On the contrary, our empire has exploited us, making enormous drains on our resources and energies."10 The current alliance structure allows minor powers to manipulate U.S. decisions, making their problems ours. A restrained grand strategy would force minor powers to demonstrate the value of their relationship. Small states with whom the United States is unequally allied would not be able to rely on its unquestioned support; they would instead have to demonstrate their strategic value to Washington and earn its friendship. No longer should the United States cede control over its own foreign policy decisions to weak friends on the periphery. Pg. 186

#### No allied freak out—they have a different threat perception.

Fettweis 11—Professor of Political Science @ Tulane University [Christopher J. Fettweis, “Free Riding or Restraint? Examining European Grand Strategy,” Comparative Strategy, Volume 30 Issue 4, pg. 2011, pg. 316–332]

If U.S. security guarantees are really the primary explanation for European restraint, then these countries are showing a degree of trust in the intentions, judgment, and wisdom of an ally that would be without precedent in international history. If these states detected a good deal of danger in the system, relying entirely on the generosity and sagacity (or, perhaps the naivet´e and gullibility) of Washington would be the height of irresponsibility. Indeed it is hard to think of another time when similar choices were made. When have any capable members of an alliance virtually disarmed and allowed another member to protect their interests? It seems more logical to suggest that the other members of NATO just do not share the U.S. perception of threat. Whether the issue is Islamic fundamentalist terrorism or rogue actors like Saddam Hussein and Hugo Chavez, the United States detects higher levels of danger than any other state. During the Col dWar, the pattern was the same: United States feared an attack by the Warsaw Pact far more than did theWest European allies, who presumably had more to lose if such an event occurred; it worried about the influence of communist China more than South Korea, Japan and the ASEAN states; and it obsessed over the potential pernicious influence of Castro and the Sandinistas more than did the smaller states of the region.49 Despite the fact that the other states in the system are all demonstrably weaker than the United States, and are therefore presumably more vulnerable to a variety of threats, they do not seem to worry about their safety nearly as much as does Uncle Sam.50 If there was danger out there, as much danger as Secretary Gates and so many in the U.S. national security community insist, then the grand strategies of the allies would be quite different. It is hard to imagine that they would allow Washington to be their only protector in a dangerous world. Pg. 324

### 2NC Multilat – solves impact

The multilateralism turn solves their terminal impacts for three reasons –

1. Cooperation – it generates self-perpetuating cooperation and confidence that obviates the need for imposed solutions – even if conflicts emerge they can be managed through consensus and legitimate bargaining – that’s Pouillot.

2. Security lock-in – multilateral commitments create constraints that lock great powers into policies that preserve the status quo – creates a soft landing for heg – that’s He.

3. Leadership – unipolarity causes policymakers to maximize power rather than responsibly managing global institutions and creating frameworks of cooperation – irresponsible unilateralism prompts backlash but leading from behind gives everybody a stake in the global system. That’s Ikenberry.

This solves their terminal impacts – their evidence asserts a need for US leadership – this is not a defense of material increases in power.

### 2NC Overview—Tech

#### Weak global regulations risk the accidental release and weaponization of convergence technologies like nanotech, AI, robotics, and biotechnology. We must shift our decision calculus away from short-term thinking to guarantee planetary survival. That’s Masciulli.

#### AND, our impact is 100 million times greater than nuclear war—You should vote neg even if 99% of humanity will perish.

Ćirković 8—Professor of Physics @ University of Novi Sad in Serbia and Senior Research Associate at the Astronomical Observatory of Belgrade [Milan M. Ćirković Ph.D. (Fellow of the Institute for Ethics and Emerging Technologies), “How can we reduce the risk of human extinction?,” Institute for Ethics and Emerging Technologies, September 17, 2008, pg. http://ieet.org/index.php/IEET/print/2606]

The risks from anthropogenic hazards appear at present larger than those from natural ones. Although great progress has been made in reducing the number of nuclear weapons in the world, humanity is still threatened by the possibility of a global thermonuclear war and a resulting nuclear winter. We may face evengreater risks from emerging technologies. Advances in synthetic biology might make it possible to engineer pathogens capable of extinction-level pandemics. The knowledge, equipment, and materials needed to engineer pathogens are more accessible than those needed to build nuclear weapons. And unlike other weapons, pathogens are self-replicating, allowing a small arsenal to become exponentially destructive. Pathogens have been implicated in the extinctions of many wild species. Although most pandemics “fade out” by reducing the density of susceptible populations, pathogens with wide host ranges in multiple species can reach even isolated individuals. The intentional or unintentional release of engineered pathogens with high transmissibility, latency, and lethality might be capable of causing human extinction. While such an event seems unlikely today, the likelihood may increase as biotechnologies continue to improve at a rate rivaling Moore’s Law.

Farther out in time are technologies that remain theoretical but might be developed this century. Molecular nanotechnology could allow the creation of self-replicating machines capable of destroying the ecosystem. And advances in neuroscience and computation might enable improvements in cognition that accelerate the invention of new weapons. A survey at the Oxford conference found that concerns about human extinction were dominated by fears that new technologies would be misused. These emerging threats are especially challenging as they could become dangerous more quickly than past technologies, outpacing society’s ability to control them. As H.G. Wells noted, “Human history becomes more and more a race between education and catastrophe.”

Such remote risks may seem academic in a world plagued by immediate problems, such as global poverty, HIV, and climate change. But as intimidating as these problems are, they do not threaten human existence. In discussing the risk of nuclear winter, Carl Sagan emphasized the astronomical toll of human extinction:

A nuclear war imperils all of our descendants, for as long as there will be humans. Even if the population remains static, with an average lifetime of the order of 100 years, over a typical time period for the biological evolution of a successful species (roughly ten million years), we are talking about some 500 trillion people yet to come. By this criterion, **the stakes are** one million times greater **for extinction than for** the more modest **nuclear wars that kill “only” hundreds of millions** of people. There are many other possible measures of the potential loss—including culture and science, the evolutionary history of the planet, and the significance of the lives of all of our ancestors who contributed to the future of their descendants. Extinction is the undoing of the human enterprise.

There is a discontinuity between risks that threaten 10 percent or even 99 percent of humanity and those that threaten 100 percent. For disasters killing less than all humanity, there is a good chance that the species could recover. If we value future human generations, then reducing extinction risks should dominate our considerations. Fortunately, most measures to reduce these risks also improve global security against a range of lesser catastrophes, and thus deserve support regardless of how much one worries about extinction.

### 2NC AT: N/U—Reintervene/Latch-on

#### They have to win this arg to win the debate—

**1. This is pure conjecture**—it is counter-intuitive to think the US would use its declining material power by going to war instead of finding ways to shore up remaining power. We challenge them to provide ONE HISORICAL EXAMPLE that supports their claim.

**2. The alternative is multilat**—the 90s prove that the US decline will cause it to latch on to multilateral institutions as a way to lock-in the current order. That’s our He ev. History should be your guide—it is a superior predictor because it is not tainted by ideology.

**3. Unipolarity causes the impact**—unipolarity and the political polarization that it produces are the primary cause of Bush-style unilateralism. Decline will force Congress to shift to the center and support multilateralism. Their lashout scenario will only occur in world of US unipolarity. That’s Kupchan & Trubowitz.

#### The only comprehensive study proves no transition impact.

MacDonald & Parent 11—Professor of Political Science at Williams College & Professor of Political Science at University of Miami [Paul K. MacDonald & Joseph M. Parent, “Graceful Decline? The Surprising Success of Great Power Retrenchment,” International Security, Vol. 35, No. 4 (Spring 2011), pp. 7–44]

In this article, we question the logic and evidence of the retrenchment pessimists. To date there has been neither a comprehensive study of great power retrenchment nor a study that lays out the case for retrenchment as a practical or probable policy. This article fills these gaps by systematically examining the relationship between acute relative decline and the responses of great powers. We examine eighteen cases of acute relative decline since 1870 and advance three main arguments.

First, we challenge the retrenchment pessimists’ claim that domestic or international constraints inhibit the ability of declining great powers to retrench. In fact, when states fall in the hierarchy of great powers, peaceful retrenchment is the most common response, even over short time spans. Based on the empirical record, we find that great powers retrenched in no less than eleven and no more than fifteen of the eighteen cases, a range of 61–83 percent. When international conditions demand it, states renounce risky ties, increase reliance on allies or adversaries, draw down their military obligations, and impose adjustments on domestic populations.

Second, we find that the magnitude of relative decline helps explain the extent of great power retrenchment. Following the dictates of neorealist theory, great powers retrench for the same reason they expand: the rigors of great power politics compel them to do so.12 Retrenchment is by no means easy, but necessity is the mother of invention, and declining great powers face powerful incentives to contract their interests in a prompt and proportionate manner. Knowing only a state’s rate of relative economic decline explains its corresponding degree of retrenchment in as much as 61 percent of the cases we examined.

Third, we argue that the rate of decline helps explain what forms great power retrenchment will take. How fast great powers fall contributes to whether these retrenching states will internally reform, seek new allies or rely more heavily on old ones, and make diplomatic overtures to enemies. Further, our analysis suggests that great powers facing acute decline are less likely to initiate or escalate militarized interstate disputes. Faced with diminishing resources, great powers moderate their foreign policy ambitions and offer concessions in areas of lesser strategic value. Contrary to the pessimistic conclusions of critics, retrenchment neither requires aggression nor invites predation. Great powers are able to rebalance their commitments through compromise, rather than conflict. In these ways, states respond to penury the same way they do to plenty: they seek to adopt policies that maximize security given available means. Far from being a hazardous policy, retrenchment can be successful. States that retrench often regain their position in the hierarchy of great powers. Of the fifteen great powers that adopted retrenchment in response to acute relative decline, 40 percent managed to recover their ordinal rank. In contrast, none of the declining powers that failed to retrench recovered their relative position. Pg. 9-10

## Warming d

### 2NC AT: Ocean Acidification

#### No risk of catastrophic acidification.

Christopher Monckton, 2010. Chief Policy Advisor—Science and Public Policy Institute, former Special Advisor to UK Prime Minister Thatcher. “ANSWERS TO A FISHERMAN’S TESTIMONY ABOUT OCEAN ACIDIFICATION”, 4-28, <http://scienceandpublicpolicy.org/images/stories/papers/originals/answers_to_fishermans_testimony.pdf>.

Ocean acidification is real. It has been documented by researchers all over the world and there is no doubt that the pH of the ocean is dropping, becoming more acidic. There is no evidence whatsoever that the oceans have become “more acidic”. The oceans are in fact pronouncedly alkaline, and will remain so however much CO2 we add to the atmosphere. The pH or acid-base index is neutral at a value of 7; acid below 7; alkaline (also known as “base”) above The oceans are currently at a pH of 7.9-8.No serious scientist suggests that the oceans will become acid: at worst, they will come a little closer to neutrality. To put this in context, ordinary rainwater is acid, with a pH of 5.There is not the slightest danger that the oceans will become acid at all, yet alone as acid as harmless rainwater. The reason is that the oceans run over rocks, which react chemically with seawater to keep it firmly alkaline. Nor is it at all clear that “the pH of the ocean is dropping”. At most, the pH may have fallen by 0.1 acid-base units over the past century, but we do not know for sure because no comprehensive, worldwide measurements have ever been taken by a single research project, and there were certainly far too few measurements a century ago to provide a reliable baseline from which any such conclusion can be drawn. What is certain is that even a shift of as little as 0.1 acid-base units cannot have been caused by the change in CO2 concentration, because in the past 250 years we have added only 0.19% to the partial pressure of CO2 already pre-existing in the oceans. This is too little to make any measurable difference to the acid-base balance of the oceans.

#### Meta-analysis confirms acidification has only minor effects. And experiments OVERESTIMATE the effects by ignoring adaptation and community effects.

Iris Hendriks et al, 2010. C.M. Duarte, and M. Alvarez, Department of Global Change Research—Mediterranean Institute of Advanced Studies, “Vulnerability of marine biodiversity to ocean acidification: A meta-analysis,” Estuarine, Coastal and Shelf Science 86(2), January.

The meta-analysis of our database, **which includes 372 published experimental evaluations with control values** assembled from literature (Supplementary information Table S1), confirmed that acidification effects differed considerably across taxonomic groups and functions, but that **the magnitude of the changes were, overall, modest for acidification levels within ranges expected during this century**. Acidification does not occur in isolation, but in concert with other challenges such as warming, eutrophication, and increased UV radiation. There are, however, few studies examining the interactive effect of acidification and other direct or indirect results of global change, which may aggravate the effect of ocean acidification on marine organisms. This analysis suggests that marine biota do not respond uniformly to ocean acidification. Some experiments report significant impacts for vulnerable taxa at pCO2 values expected within the 21st century, **but there was no consistent evidence that suggests biological rates,** apart from calcification for one functional group, the bivalves**, might be significantly suppressed** across the range of pCO2 anticipated for the 21st century. Some organisms, particularly autotrophs, even showed enhanced growth under elevated pCO The data do suggest that calcification rate, the most sensitive process responding directly to ocean acidification (Gattuso et al., 1998 J.P. Gattuso, M. Frankignoulle, I. Bourrge, S. Romaine and R.W. Buddemeier, Effect of calcium carbonate saturation of seawater on coral calcification, Global and Planetary Change 18 (1998), pp. 37–4Article | PDF (107 K) | View Record in Scopus | Cited By in Scopus (153)[Gattuso et al., 1998], [Gazeau et al., 2007], [Leclercq et al., 2000] and [Riebesell et al., 2000]), will decline by, on average, 25% at elevated pCO2 values of 731–759 ppmv. These values will be reached within the 21st century (IPCC, 2007). However, the 25% decline in biological calcification rates at elevated pCO2 values of approximately 750 ppmv is likely to be an upper limit, considering that all experiments involve the abrupt exposure of organisms to elevated pCO2 values, while the gradual increase in pCO2 that is occurring in nature may allow **adaptive and selective processes to operate** (Widdicombe et al., 2008). These gradual changes take place on the scale of decades, permitting adaptation of organisms even including genetic selection. Short-term experimental results are likely to overestimate the impacts of acidification rates on marine organisms. The ambition and sophistication of experimental approaches need be expanded, to assess complex communities, rather than single species, and to assess responses to enhanced CO2 over long terms. Such long-term experiments to observe community responses to long-term exposure to enhanced CO2 have been successfully conducted for terrestrial systems. Experiments comparable to those conducted on land (e.g. Hättenschwiler et al., 2003), should be planned and conducted. The only such experiment so far available is the Biosphere 2 experiment, where responses of coral-reef communities included in the “ocean” biome of the Biosphere 2 facility were assessed (Atkinson et al., 1999). Also important, most experiments assessed organisms in isolation, rather than whole communities, whereas **the responses within the community may buffer the impacts.** For instance, seagrass photosynthetic rates may increase by 50% with increased CO2, which may deplete the CO2 pool, maintaining an elevated pH that may protect associated calcifying organisms from the impacts of ocean acidification.

### Hydrogen Sulfide

#### No increases in UV from ozone depletion. And any consequence is miniscule.

Singer and Crandall 91 [S. Fred, Prof Env Sci—UVA and former Dir. US Weather Satellite Program, and Candace, Editorial Dir.—Science and Environmental Policy Project, San Diego Union-Tribune, “Is the ozone doomsday scenerio based on hype?”, 7-7, L/N]

If the amount of ozone is reduced, more UV reaches the earth's surface.) Quite the contrary: Ground measurements of UV radiation taken at eight U.S. locations since 1974, and published in the journal Science in 1988 by Joseph Scotto and colleagues, show a slight decrease at most locations. 2. All skin-cancer estimates are based on the observation that these cancers occur more frequently as one moves south toward the equator, presumably because of increases in UV radiation due to the higher angle of the sun. It's actually a bit more complex than that. In warmer climates people also spend more time out-of-door and expose more of their skin to the sun. These factors -- rather than UV intensity -- may account for a large part of the observed increased increase in skin-cancer rates. 3. Behavioral factors aside, the increased risk of skin cancer from a 5 percent depeletion of stratospheric ozone, causing (theoretically) a 10 percent increase in UV intensity, is equivalent to moving 60 miles to the south, say from Los Angeles to San Diego. These facts are rarely revealed to the public, and certainly not by the EPA. The ozone hype suggests that the issue of CFC control is now based on politics rather than science.

### No Warming 2NC

#### CO2 and temperature leveling out – plus, not anthropogenic

**Bell 3-19** [Larry, climate, energy, and environmental writer for Forbes, University of Houston full/tenured Professor of Architecture; Endowed Professor of Space Architecture; Director of the Sasakawa International Center for Space Architecture; Head of the Graduate Program in Space Architecture; former full Professor/ Head of the University of Illinois Industrial Design Graduate Program; Associate Fellow, American Institute for Aeronautics and Astronautics, “The Feverish Hunt For Evidence Of A Man-Made Global Warming Crisis” http://www.forbes.com/sites/larrybell/2013/03/19/the-feverish-hunt-for-evidence-of-a-man-made-global-warming-crisis/2/]

A recent study conducted by researchers at Grenoble University in France and published in Science magazine suggests that atmospheric carbon dioxide levels produced from natural factors contributed to the sharp warming that ended the last Ice Age about 15,000 years ago. Scientists have long recognized that Ice Ages and brief interglacial interludes (like our current one) are caused by variations in the Earth’s orbit around the sun. It is also well known that when oceans warm (in this instance due to intensification of sunlight energy), huge amounts of absorbed CO2 are released, exactly like the off-gassing of a carbonated drink when warmed. The bottom line is that **past atmospheric CO2 is wholly controlled by the Earth’s temperature and climate, not the other way around**.¶ The Grenoble study authors did not factor in influences the warming oceans would have had upon evaporated water vapor, that primary atmospheric greenhouse gas. Rather, it focused upon analyzing air bubbles trapped in Antarctic ice cores to determine the trace CO2 concentrations at different times over thousands of years, concluding that the last Ice Age ended within 200 years or less after CO2 levels rose…and possibly that there was no time lag at all. This finding challenges previous research indicating that CO2 levels rose some 600-800 years or so after temperatures increased.¶ There is another possibility warranting consideration as well, one involving slight differences in Arctic and Antarctic deglaciation time cycles. Since atmospheric CO2 is a global condition, and the solar “Milankovich” mechanism of deglaciation begins with warming in the high North, it is plausible to imagine that Arctic warming would have preceded and subsequently influenced Antarctic deglaciation through the release of both water vapor and CO2. This, in turn, might help to explain different temperature lag conclusions.¶ Still, if true, might this “lock-step” relationship between CO2 and temperature increases be interpreted to suggest that a CO2 greenhouse effect may have accelerated (amplified) the warming? That’s not smoking gun evidence, but it is certainly possible, and even quite probable. So if this truly is the case, then by how much? Determining that is the big rub, because the findings can be interpreted in different ways.¶ Consider, for example, that atmospheric CO2 concentrations at the end of the last Ice Age, when rapid deglaciation occurred were less than half of today’s levels. At the same time, the influence of that lower concentration would also have been much greater than today due to the logarithmic absorption pattern. Therefore, the CO2 amplification factor might have contributed proportionately much more influence than today, causing it to be less relevant to current circumstances.¶ Accurate dating of samples is very difficult and subject to large unknowns. And while carbon dioxide levels have been constantly increasing, most of all estimated warming since 1900 occurred before the mid-1940s. Despite those continuously rising CO2 levels, global mean temperatures have been flat over at least the past decade.¶ Regarding That Confidence That We Are Changing the Climate.¶ While even IPCC admits that correlation between different occurrences, however convincing, doesn’t prove cause and effect, this uncertainty principle is often given little priority in summary conclusions they convey to the public. In their first 1990 report, IPCC played on this confusion, claiming: “The size of this warming is broadly consistent with the predictions of climate models, but is also of the same magnitude as natural climate variability.” They could have just as easily said that the greenhouse theory didn’t explain climate, but natural variability did.¶ Later, the IPCC artfully changed the term “correlation” to “attribution”, meaning that even if observations couldn’t be objectively correlated, they could be subjectively attributed if those who wrote the “consensus” conclusions wished to do so. That consensus is what anonymous, politically-determined representatives who approve the entire reports decide fits their preferred narrative.¶ The final draft of IPCC’s second report for example, contained a passage which was removed which said: “None of these studies cited has shown clear evidence that we can attribute the observed changes [in global temperature] to the specific cause of increases in greenhouse gases.” Yet, the final, printed 1996 report claimed: “…there is evidence of an emerging pattern of climate response to forcings by greenhouse gases and sulphate aerosols…from geographical, seasonal and vertical patterns of temperature change…These results point towards human influence on climate.” The IPCC Summary concludes that “the balance of evidence” suggests a discernible human influence on climate.¶ Remarkably, another 1996 publication “The Holocene”, written by some of the same Summary authors said: “Estimates of…natural variability are critical to the problem of detecting an anthropogenic [human] signal…We have estimated the spectrum…from paleo-temperature proxies and compared it with…general [climate] circulation models…none of the three estimates of the natural variability spectrum agree with each other…Until…resolved, it will be hard to say, with confidence, that an anthropogenic climate signal has or has not been detected.”¶ The True Nature of Climate Change…It Ain’t a New Thing.¶ Keep in mind that cyclical, abrupt and dramatic global and regional temperature fluctuations have occurred since long before humans invented agriculture, industries, internal combustion engines and carbon-trading schemes. Yet atmospheric CO2 levels have remained relatively low over the past 650,000 years, even during the six previous interglacial periods when global temperatures were as much as 9ºF warmer than temperatures we currently enjoy.¶ Many natural factors are known to contribute to these changes, although even the most sophisticated climate models and theories they are based on cannot predict the timing, scale (either up or down), or future impacts- much less the marginal influences we humans might contribute. So let’s be very thankful for the good times that global warming affords as long as we are fortunate to have it. The real climate crisis will arrive when our planet’s warm Ice Age vacation ends.

### No Warming – AT: “Tipping Point”

#### Newest study shows “tipping points” are overblown – warming will be slow and predictable

**Zeller 3-2** [Tom Zeller Jr, senior writer for Huffington Post, Tipping Points: Can Humanity Break The Planet?, http://www.huffingtonpost.com/tom-zeller-jr/global-tipping-points\_b\_2793154.html]

As for Planet Earth, a paper published Thursday in the journal Trends in Ecology and Evolution suggests that while human society does a very thorough job of modifying and, often enough, permanently and abruptly changing the dynamics of local and regional ecosystems, the collective impact of all this on a planetary scale is too often overstated.¶ Dire warnings that our localized impacts could trigger global-scale "tipping points," after which the spinning cogs and gears that underpin our entire terrestrial biosphere are thrown abruptly and permanently out of whack, have no scientific basis, the authors argue. Global-scale changes, such that they are, come about smoothly and slowly, they say.¶ "This is good news because it says that we might avoid the doom-and-gloom scenario of abrupt, irreversible change," Professor Barry Brook, lead author of the paper and director of Climate Science at the University of Adelaide in Australia, said in a statement accompanying the study's release. "A focus on planetary tipping points may both distract from the vast ecological transformations that have already occurred, and lead to unjustified fatalism about the catastrophic effects of tipping points."

### 2NC—No Impact

#### Reject their try or die impact framing—they cherry-pick the worst case scenarios and assume they are likely—every scientific study concludes that the likelihood of such devastation is virtually zero

Eastin et al. 11 [Josh, Professor of Political Science at the University of Washington, Reiner Grundmann and Aseem Prakash, “The two limits debates: “Limits to Growth” and climate change,” Futures, February, Vol 43, Issue 1, pp. 16-26, ScienceDirect]

And Hjerpe and Linnér point out, ‘The IPCC ‘describes scenarios as ‘alternative images of how the future might unfold … to analyze how driving forces may influence future emission outcomes’ (…), i.e., they are not designed to provide blueprints for the future. The IPCC … emphasizes that neither probability nor desirability is attached to the various scenario families … The future evolution of society is recognized as an uncertain process of interaction between, for example, demographic development, socio-economic development, and technological change.’ [[50]](http://www.sciencedirect.com/science/article/pii/S0016328710000352#bib47)

There is no probability assigned to the various scenarios which opens the way for decision makers to pick the one that aligns with their preconceptions. In this sense, both LtG and IPCC have used scenarios in order to communicate the possibility of a dystopian future, not as a prediction, but as a reminder that something needs to be done urgently if we are to prevent the worst.

### 2NC—No Extinction

#### Adaptation means no catastrophic impact to warming

Kenny 12 [April 9, 2012, Charles, senior fellow at the Center for Global Development, a Schwartz fellow at the New America Foundation, and author, most recently, of Getting Better: Why Global Development Is Succeeding and How We Can Improve the World Even More., “Not Too Hot to Handle,” http://www.foreignpolicy.com/articles/2012/04/09/not\_too\_hot\_to\_handle?print=yes&hidecomments=yes&page=full]

But for all international diplomats appear desperate to affirm the self-worth of pessimists and doomsayers worldwide, it is important to put climate change in a broader context. It is a vital global issue -- one that threatens to slow the worldwide march toward improved quality of life. Climate change is already responsible for more extreme weather and an accelerating rate of species extinction -- and may ultimately kill off as many as 40 percent of all living species. But it is also a problem that we know how to tackle, and one to which we have some time to respond before it is likely to completely derail progress. And that's good news, because the fact that it's manageable is the best reason to try to tackle it rather than abandon all hope like a steerage class passenger in the bowels of the Titanic.

Start with the economy. The Stern Review, led by the distinguished British economist Nicholas Stern, is the most comprehensive look to date at the economics of climate change. It suggests that, in terms of income, greenhouse gasses are a threat to global growth, but hardly an immediate or catastrophic one. Take the impact of climate change on the developing world. The most depressing forecast in terms of developing country growth in Stern's paper is the "A2 scenario" -- one of a series of economic and greenhouse gas emissions forecasts created for the U.N.'s Intergovernmental Panel on Climate Change (IPCC). It's a model that predicts slow global growth and income convergence (poor countries catching up to rich countries). But even under this model, Afghanistan's GDP per capita climbs sixfold over the next 90 years, India and China ninefold, and Ethiopia's income increases by a factor of 10. Knock off a third for the most pessimistic simulation of the economic impact of climate change suggested by the Stern report, and people in those countries are still markedly better off -- four times as rich for Afghanistan, a little more than six times as rich for Ethiopia.

It's worth emphasizing that the Stern report suggests that the costs of dramatically reducing greenhouse-gas emissions is closer to 1 (or maybe 2) percent of world GDP -- in the region of $600 billion to $1.2 trillion today. The economic case for responding to climate change by pricing carbon and investing in alternate energy sources is a slam dunk. But for all the likelihood that the world will be a poorer, denuded place than it would be if we responded rapidly to reduce greenhouse gases, the global economy is probably not going to collapse over the next century even if we are idiotic enough to delay our response to climate change by a few years. For all the flooding, the drought, and the skyrocketing bills for air conditioning, the economy would keep on expanding, according to the data that Stern uses.

And what about the impact on global health? Suggestions that malaria has already spread as a result of climate change and that malaria deaths will expand dramatically as a result of warming in the future don't fit the evidence of declining deaths and reduced malarial spread over the last century. The authors of a recent study published in the journal Nature conclude that the forecasted future effects of rising temperatures on malaria "are at least one order of magnitude smaller than the changes observed since about 1900 and about two orders of magnitude smaller than those that can be achieved by the effective scale-up of key control measures." In other words, climate change is and will likely remain a small factor in the toll of malaria deaths into the foreseeable future.

What about other diseases? Christian Zimmermann at the University of Connecticut and Douglas Gollin at Williams evaluate the likely impact of a 3-degree rise in temperatures on tropical diseases like dengue fever, which causes half a million cases of hemorrhagic fever and 22,000 deaths each year. Most of the vectors for such diseases -- mosquitoes, biting flies, and so on -- do poorly in frost. So if the weather stays warmer, these diseases are likely to spread. At the same time, there are existing tools to prevent or treat most tropical diseases, and Zimmerman and Gollin suggest "rather modest improvements in protection efficacy could compensate for the consequences of climate change." We can deal with this one.

It's the same with agriculture. Global warming will have many negative (and a few positive) impacts on food supply, but it is likely that other impacts -- both positive, including technological change, and negative, like the exhaustion of aquifers-- will have far bigger effects. The 2001 IPCC report suggested that climate change over the long term could reduce agricultural yields by as much as 30 percent. Compare that with the 90 percent increase in rice yields in Indonesia between 1970 and 2006, for example.

Again, while climate change will make extreme weather events and natural disasters like flooding and hurricanes more common, the negative effect on global quality of life will be reduced if economies continue to grow. That's because, as Matthew Kahn from Tufts University has shown, the safest place to suffer a natural disaster is in a rich country. The more money that people and governments have, the more they can both afford and enforce building codes, land use regulations, and public infrastructure like flood defenses that lower death tolls.

Let's also not forget how human psychology works. Too many environmentalists suggest that dealing with climate change will take immediate and radical retooling of the global economy. It won't. It is affordable, practical, and wouldn't take a revolution. Giving out the message that the only path to sustainability will require medieval standards of living only puts everyone else off. And once you've convinced yourself the world is on an inevitable course to disaster if some corner of the U.S. Midwest is fracked once more or India builds another three coal-fueled power plants, the only logical thing to do when the fracking or the building occurs is to sit back, put your Toms shoes on the couch, and drink micro-brewed herbal tea until civilization collapses. Climate change isn't like that -- or at the very least, isn't like that yet.

So, if you're really just looking for a reason to strap on the "end of the world is nigh" placards and go for a walk, you can find better excuses -- like, say, the threat of global thermonuclear war or a rogue asteroid. The fight to curb greenhouse gas emissions is one for the hard-nosed optimist.

## Grid

#### No escalation.

#### Berry, ‘1

[Nicholas, Center for Defense Information Senior Analyst, Defense Monitor, “Disputes don't escalate”, XXX:4, May, <http://www.cdi.org/dm/2001/issue4/asiansecurity.html>]

What emerges from this historical memory is an environment loaded with latent hostility that makes the region's international security relations a fragmented array of bilateral ties

. In effect, the widespread latent hostility in the region inhibits multilateral initiatives, security coalitions, and cooperative ventures which the United States sought under President Bill Clinton. "Peace is in pieces," as one academic phrased it in a different context. China, as the most assertive, rising power in this fractured environment, will play an ever-increasing role in determining the level of tension in the region. China is challenging American pre-eminence in Asia. It is not an overstatement to say that how well Beijing and Washington handle this competition will be the big story in the early decades of the 21st century. Much of the latent hostility remains in the background, only occasionally bursting forth into public disputes. Thus, major war remains unlikely. Nevertheless, security cooperation in this setting will be difficult.

## Space war

### Impact

#### Causes accidental wars that outweigh and turn every nuclear war scenario

Mitchell**, et al** 01 -Associate Professor of Communication and Director of Debate at the University of Pittsburgh

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

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.

#### And, preemption means it’s a larger internal link to great power war

**Englehart, 8** – patent litigation attorney (Alex, “COMMON GROUND IN THE SKY: EXTENDING THE 1967 OUTER SPACE TREATY TO RECONCILE U.S. AND CHINESE SECURITY INTERESTS,” 17 Pac. Rim L. & Pol'y J. 133, lexis)

D. An Effective U.S. Space Weapons Deployment Would Neutralize the Effectiveness of ICBMs and Create a Powerful Incentive for Nuclear Preemptive Strikes

In addition to the strategic interplay between space-based weapons and ASATs discussed above, n54 space-based weapons would have a major impact on the effectiveness of ICBMs, n55 the mainstay weapons of the second half of the twentieth century. ICBMs armed with nuclear warheads have been the primary guarantor of mutually assured destruction since their inception in the 1960s--any use of ICBMs against another country also equipped with them would lead to massive retaliation in kind. n56 The threat of mutual annihilation kept the peace between the superpowers during the Cold War and has continued to preserve stability among powerful nations up to the present day. n57 Even in today's so-called "uni-polar" world, Russia and China maintain vast quantities of weapons of mass destruction that serve as  [\*140] a strong deterrent to any potential adversary considering an attack. n58 Unfortunately, with the development of space-based weapons, especially missile interceptors, this stability would be eviscerated. n59Space-based interceptors would be accurate and fast enough to reliably shoot down ICBMs in flight. n60 If one country possessed space-based interceptors, it would effectively neutralize the ICBMs of all other countries, allowing it to use its own ICBMs with relative impunity. n61

If the United States starts to deploy space-based interceptors that can shoot down ICBMs, China will face enormous internal pressure to at least consider the idea of launching a massive nuclear first strike. n62This is because once a robust space-based interceptor system is deployed, the United States would have essentially unlimited power to dictate terms to China on any matter it chooses--China would be at the absolute mercy of the United States. n63 China would have a limited window of time in which to use its ICBMs before they became worthless in the face of orbiting interceptors, and it could very well feel compelled to do so in order to avoid the total collapse of its strategic nuclear deterrent. n64

E. Beyond the Inevitable Direct Harm to Sino-American Relations, the Deployment of Space Weapons Would Inflame Russia and Drive It into a Closer Relationship with China  
Even though Russia is now much weaker than the Soviet Union of the Cold War era, n65 it still has thousands of ICBMs, n66 and the United States should carefully consider the ramifications of its planned space weapons deployment in light of that reality. n67 Russia's opinion cannot be ignored. n68 While it may not be capable of effectively deploying space-based weapons in the near to mid-term, it may well have an operational ASAT capability n69 and, in any case, its ICBMs demand respect. n70 Like China, Russia depends  [\*141]  on its ICBM capability to maintain its international respect. By being able to threaten any potential adversary with nuclear annihilation, Russia maintains its strength and independence in a changing world. n71 Also like China, Russia is understandably worried about the American pursuit of space weapons, which have the potential to undermine the effectiveness of ICBMs. n72

Russia has long been a strategic player in the space weapons arena. In the late 1970s, the United States and the Soviet Union entered into negotiations on an ASAT ban, but the discussions fell apart before any agreement was reached. n73 Ever since, the Soviet Union (later Russia) has been wary of American plans to deploy any kind of weapon in space or further pursue ASAT capabilities. n74 The Strategic Defense Initiative under the Reagan administration--a predecessor to twenty-first century American space weapons programs--arguably hastened the collapse of the Iron Curtain. n75 The actual deployment of satellite-based weapons in the coming decades is sure to inflame Russia and drive it further away from the United States.

#### Turns warming – cooperation

Star 9, University of Sydney, 8/2/09, (Stephen Starr and Peter King, , “Nuclear suicide”, Sunday, 02 August 2009, http://www.sciencealert.com.au/opinions/20090208-19496.html)

##### But there is little evidence yet that either the government or the Commission is fully alert to the most momentous truth of the present era: Our best science now predicts that nuclear arsenals are fundamentally incompatible with continued human existence. It is imperative that the message coming from scientists in the US, Russia and elsewhere about the environmental consequences of nuclear war be included in the general debate about the control and abolition of nuclear weapons. Unfortunately, the nuclear weapon states apparently remain oblivious to the climatic, ecological and biological consequences of nuclear war. No "environmental impact statement" has ever been created for the US or Russian nuclear weaponry, which is one of the reasons why there still are 22,000 intact nuclear weapons in their deployed and reserve arsenals. However, new peer-reviewed studies done at several US universities predict the detonation of even a tiny fraction of the global nuclear arsenal will result in major changes in the global climate and massive destruction of the stratospheric ozone layer (which protects the Earth from deadly UV light). Even a "regional" nuclear conflict between India and Pakistan, fought with 100 Hiroshima-size weapons, is predicted to loft five million tons of smoke above cloud level; there it would block about 10 per cent of warming sunlight from reaching the surface of the Northern Hemisphere. This would produce average surface temperatures colder than any experienced for the last 1000 years. The smoke would remain in the stratosphere for more than a decade and seriously impact global climate. It would probably be too cold to grow wheat in Canada for several years; grain exports would likely cease from grain-exporting nations .and global nuclear famine would result, Within a few years, most of the already-hungry human populations could perish, and the populations of any nation dependent upon grain imports would be at risk.

### Link

#### SMRs massively reduce the cost of space based nuclear – the military wants to adopt it because it’s perceived as the high ground – that’s Maybury from 2012

#### Their ev is from 2004 doesn’t assume the plan, and is about commercial SBN

#### It will be deployed—Air Force wants to, they just need small reactor tech

Puiu 12 Tibi Puiu – Studies Mechanical Engineering, Feb 23, 2012 “Air Force plans buildings a solar power station in space and nuclear-powered spacecraft”

http://billionyearplan.blogspot.com/2012/08/air-force-plans-buildings-solar-power.html

Last week, the U.S. Air Force released a report in which it outlines its technological and energy plans for the forthcoming 15 years. Among others, the Air Force means to deploy a space-based solar power station, which would serve energy wirelessly to both Earth and space satellites, as well as a new generation of spacecraft powered by sm**all nuclear** r**eactor**s.¶ This solar power satellite design features sets of lightweight, inflatable fresnel reflectors to focus the Sun's energy on small arrays of high-efficiency photovoltaic cells. (c) NASA¶ The 72-page long report, titled “Energy Horizons: United States Air Force Energy S&T Vision 2011-2026″, can be read in its entirety for thus curious enough here. It discusses measures the institution plans to meet in order to reach its energy goals, reduce demand and change military culture in sight of rapidly developing missions.¶ “Energy is a center of gravity in war and an assured energy advantage can enable victory,” said Mark Maybury, chief scientist for the United States Air Force. He spearheaded the report.¶ “While energy is already an essential enabler,” Maybury said. “Global competition, environmental objectives and economic imperatives will only increase its importance.”¶ Of great interest, is a solar-based power station, which would harness solar energy and then beam it to Earth using lasers. The technology necessary to effectively transfer energy between space and Earth isn’t available at the moment, however, so my guess is the Air Force has in mind distributing it towards satellites, whether they belong to the Air Force, NASA or other national security agencies. Air Force is currently limited to 27 kilowatt (kW) arrays for satellite power. In the future, it intends to massively increase its space energy array, which would also allow them to build smaller spacecraft, as they wouldn’t need to generate power for themselves. Also, sensors, communications equipment and on-board processing devices generally require a lot of energy, and if you want to have a very powerful satellite, destined for space-based radar or space-based laser missions, you need to provide it somehow. It would all be wireless transmitted from the neighboring space power station.¶ Nuclear-powered spacecraft¶ When nuclear energy is concerned, there are already some satellites powered by Radioisotope Thermoelectric Generators (RTG), which provide steady and reliable power, at a much greater output than other technologies currently in place. However, the Air Force wants to take it up a notch and employ satellites powered by small nuclear reactors. We’ve discussed about nuclear fission power plants, small enough to fit in a briefcase, in one of our past posts – I’m guessing the Air Force is going for something similar. Of course, safety is a major concern, as outlined in the report.

#### Their author says civilian SNP is unpopular but concludes DoD SMRs change the game

Downey, 4 (Lt. Col.-USAF, April, “Flying Reactors: The Political Feasibility of Nuclear Power in Space,” http://www.dtic.mil/dtic/tr/fulltext/u2/a425874.pdf)

The report also emphasizes the necessity for superior United States space based intelligence, surveillance and reconnaissance (ISR), and for space control. While missions envisioned under these drivers do not absolutely need SNP, any simple analysis demonstrates that they would benefit by using nuclear power because of its intrinsic advantages. Direct costs would fall, and mission effectiveness would be enhanced by a small, light, compact, long lived system that provided both ample electrical power and thrust for on-orbit maneuver. If DOD enters the SNP business, though, a major shift will occur. Instead of the few, rare SNP system launches that NASA would execute primarily for deep space missions, DOD missions would necessitate that SNP operations become commonplace. It is easy to envision constellations of nuclear powered satellites in orbit. One candidate system would be advanced space based radar, or perhaps a system with a mix of active and passive hyper-spectral sensors. Regular SNP operations in low earth orbit would add a new dimension to the public’s perception of risk. They would also require a different imperative to establish an effective public engagement process about the political feasibility of SNP before there is a need to increase the number of operational SNP platforms. In addition, SNP systems in orbit around the Earth will certainly be of concern to numerous international stakeholders.

#### Air force plans prove

Leonard David (columnist for Space Insider) February 2012 “Air Force Eyes Nuclear Reactors, Beamed Power for Spacecraft” http://www.space.com/14643-air-force-space-nuclear-reactors-power-beaming.html

The U.S. Air Force has laid out a new vision for its energy science and technology needs over the next 15 years – a forecast that includes plans for space-based power stations and the prospective use of small nuclear reactors for new spacecraft. The report, entitled "Energy Horizons: United States Air ForceEnergy S&T Vision 2011-2026," focuses on core Air Force missions in space, air, cyberspace and infrastructure. A series of Air Force mission-focused workshops and summits were held to shape the new strategy. The report was released Feb. 9 and details how the Air Force plans to increase energy supply, reduce demand and change military culture to meet mission requirements "Energy is a center of gravity in war and an assured energy advantage can enable victory," said Mark Maybury, chief scientist for the United States Air Force. He spearheaded the report. "While energy is already an essential enabler," Maybury said. "Global competition, environmental objectives and economic imperatives will only increase its importance." Space is the "ultimate high ground," providing access to every part of the globe, including denied areas, the report explains. "Space also has the unique characteristic that once space assets reach space, they require comparatively small amounts of energy to perform their mission, much of which is renewable," it states. [Top 10 Space Weapons] Solar cell efficiencies In the sweeping report a number of desirable high-tech advances are mentioned. For example, the Air Force is currently limited to 27 kilowatt (kW) arrays for satellite power. But more power is required for some future space missions, the report states, such as flights currently being eyed by the Air Force, national security organizations and NASA. "Employing larger and more efficient arrays will enable missions that require very high power, such as space-based radar or space-based laser missions," the report states. In the long term, the report says, increased solar cell efficiencies and revolutionary materials foreshadow the potential of 500 kW on-orbit power generation technologies, "which would be transformational for performing missions from space-based systems." Furthermore, there are other breakthrough space energy technologies that have the potential of achieving up to 70 percent efficiency, the report adds. Examples include quantum dots and dilute nitrides in solar cells. But there are also totally new technologies such as space tethers that could harvest energy from the Earth's geomagnetic field. [Top 10 Alternative Energy Technologies] Space nuclear power In terms of nuclear power in space, several satellite systems have been energized by Radioisotope Thermoelectric Generators (RTG). This source provides consistent power, and at a much higher energy and power density than current technologies. Work on small modular nuclear reactors on Earth is highlighted in the Air Force report: "While the implementation of such a technology should be weighed heavily against potential catastrophic outcomes, many investments into small modular reactors can be leveraged for space-based systems. As these nuclear power plants decrease in size, their utility on board space-based assets increases**."** The report explains that the Air Force space systems portfolio should consider piloting small modular nuclear systems, a view previously recommended by the Air Force Scientific Advisory Board. Power beaming The Air Force report also delves into the wireless transfer of power, a technology that continues to offer big promises despite the daunting challenges involved in making it a reality. While there are many challenges in "space-to-earth" power beaming, "space-to-space power beaming" could be transformational, the report stresses. An energy-beaming benefit for the military is powering sets of fractionated, distributed satellite systems, the report explains. Doing so would enable spacecraft to be smaller, more survivable, and more capable than current systems. A power paradigm change In orbit, many spacecraft systems — sensors, communications equipment and on-board processing — can require intense amounts of power. Like all computing architectures, these systems are currently composed exclusively of silicon- based technology. However, decades of work has begun to change this paradigm, the report points out. Newer systems require less energy and offer a reduced thermal load in comparison to their silicon counterparts, the report adds. Advances in satellite propulsion are also spotlighted in the newly issued report. Today, the ability of space-based systems to alter their orbits is based on blasts of on-board fuel. The possibility of on-orbit refueling for these systems is now being studied.

#### The plan enables space weaponization

McCall 6 Chair, USAF Scientific Advisory Board, “Spacecraft Bus Technoligies,” http://www.au.af.mil/au/awc/awcgate/vistas/stechch3.pdf

All current spacecraft are either power limited or restricted in some measure by inadequate electrical power. Power limitations impose restrictions on the communications and propulsion subsystems and currently make large space-based radars and space-based weapons **relatively** unfeasible. A revolutionary change in capabilities will result from power technologies capable of providing large amounts of power onboard satellites. Large amounts of power will be enabling on spacecraft in the same sense that large amounts of random access memory have been enabling in personal computers. If power is not an issue, then previously hard applications become easy and new applications become possible. Evolutionary development of solar-array-based power technologies will see improvements to tens of kilowatts on satellites over the next decades. However, all solar collection systems in Earth orbit are limited by the solar constant of 1.4 kiloWatts per square meter. Large powers from solar collectors require large collection areas. For substantially larger powers (> 100 kW), several different types of technologies will have to be explored. Powers of this level will make large space-based radars, space-based directed energy weapons, and the use of high-performance electrically driven maneuvering technologies possible. **A natural technology to enable high power is nuclear power in space**; however, this technology has to date been considered unacceptable due to political and environmental limitations. Thus it is desirable to develop other technologies that may provide large power levels in space. In addition to continued development of safe **nuclear systems**, two other sources of continuous power in space that should be explored are the concepts of electrodynamic power-generating tethers and power beaming from one location to another (e.g., from space to space). The development of these and other technologies for high continuous power **will have a revolutionary effect** and the Air Force should invest in these areas as well as continuing to invest in solar collection technologies. Over the years, there have been several programs in nuclear powered spacecraft. NASA has been using Radioisotope Thermoelectric Generators (RTGs) for the interplanetary missions that generate a few tens of watts of power. Russia has flown nuclear reactors in space and BMDO has a joint program with the Russians (TOPAZ), under which the Defense department bought three of the reactors to do laboratory experiments. DoE had a program (SP 100) to use nuclear power in space and the Air Force had a nuclear propulsion program; these programs have been canceled. Nuclear power, however, remains one of the attractive alternatives in generating large amounts of power in space. To build a reactor for space applications has many challenging technical aspects including development of high-temperature lightweight materials, active cooling technologies, extremely radiation-hard and high-temperature electronics, and fail-safe system architectures. Setting the emotional issues of nuclear power aside, this technology offers a viable alternative for large amount of power in space. The Air Force should continue efforts towards making a safe nuclear reactor in space a viable option. Existing joint programs with Russia offer a low cost alternative and should be pursued. To build a reactor for space applications has many challenging technical aspects including development of high-temperature lightweight materials, active cooling technologies, extremely radiation-hard and high-temperature electronics, and fail-safe system architectures. Setting the emotional issues of nuclear power aside, this technology offers a viable alternative for large amount of power in space. The Air Force should continue efforts towards making a safe nuclear reactor in space a viable option. Existing joint programs with Russia offer a low cost alternative and should be pursued.

### Water

#### No water wars—their ev is hype.

Katz 11—Lecturer of Geography and Environmental Studies @ University of Haifa [Dr. David Katz (PhD in Natural Resource Policy & MA in Applied Economics @ University of Michigan), “Hydro-Political Hyperbole: Examining Incentives for Overemphasizing the Risks of Water Wars,” Global Environmental Politics, Volume 11, Number 1, February 2011, pp. 12-35]

Evidence and Perception

In sum, despite some instances of violent conflict over water, there is little systematic evidence of war over water resources. Evidence for a deterministic relationship between water scarcity and the outbreak of armed conflict is particularly weak. Less ambitious claims that water shortages will contribute to insecurity, which can, in turn, lead to violent conflict, have more empirical support. Even here, however, the importance of water as a causal variable is questionable. Several studies have found that variables such as regime type and institutional capacity are much more important indicators of conflict potential, 43 and may have mitigating effects on any water-conflict link.

As a consequence of accumulated research, many scholars have concluded that risks of water wars are low, 44 and others have toned down or qualified their statements about the likelihood of future water wars.45 Some governmental reports have limited their contentions to highlighting that water scarcity can aggravate conflicts and increase insecurity,46 and many studies now emphasize water as a tool for cooperation.47 Warnings and predictions of imminent water wars continue to be commonplace, however. In a review of published academic literature, Gupta and van der Zaag find that articles on water conflict outnumber those on cooperation by nearly three to one, and are five times more likely to be cited.48

This article will now turn to offering possible explanations for the persistence and popularity of such declarations despite the bulk of expert opinion downplaying the risks of water wars.

Incentives to Stress a Water War Scenario

Incentives Presented in Existing Literature

Observers have noted that various actors may have incentives to stress or even exaggerate the risks of water wars. Lonergan notes, for instance, that in “many cases, the comments are little more than media hype; in others, statements have been made for political reasons.”49 Beyond mere acknowledgement of the possibility of such incentives, however, little research has attempted to understand what these incentives are and how they may differ between actors. An understanding of the different motivations of various groups of actors to stress the possibility of imminent water wars can help explain the continued seemingly disproportionate popularity of such messages and help to evaluate such warnings more critically.pg. 17-18 //1nc

#### AND, Scarcity encourages cooperation that will spillover to other issues

Hammoud 11—MA in International Affairs @ Lebanese American University [Rayan Amine Hammoud, Water Scarcity As A Window of Opportunity For A Peaceful Settlement In The Middle East, A thesis Submitted in partial fulfillment of the requirements for the degree of Master of Arts in International Affairs, Lebanese American University, January 2011]

While water war scenarios in the Middle East are by all means viable and legitimate, not only based on past experiences but also on the basis of the current hardliner positions of the different parties, other perspectives may also be possible. Despite the history of violence in the region over the past century, it is evident that these manifestations have not brought us any closer to resolving the water dispute, and it is unlikely that future wars will carry any of the conflicting parties to a final and permanent cooperation. Additionally, unlike other elements of conflict, water emerges as the only major factor that accords no respect or consideration to the political, strategic, military or geographic characteristics or interests of the involved parties. Not only does the issue of water impose its presence and realities on the political and strategic agendas of the nations in the region, but it is also, more often than not the only issue with which political leaders cannot practice the game of patience or the adopt a of “wait-and-see”. Syria, for example, has adopted a posture of patience for over three decades in its negotiations with Israel, and Israel maintained a similar position during its occupation of South Lebanon for over two decades; but while questions pertaining to territory and borders can wait for as long as politicians find an interest in playing the waiting game, water imposes its own rules.

Severe water shortages cannot and do not wait, especially in times of severe droughts that may last for years. Additionally, the deterioration of water quality, a problem facing all nations in the region, is also another serious issue that can only be resolved through measures taken in coordination by the different conflicting players that share water sources and pathways (Khalifa, 2001; Priscoli & Wolf, 2009). Political players in the region may be convinced for ideological or other reasons that they may be able to win water conflicts in the long term, but severe water issues often have their own schedule and are unlikely to offer hawkish political leaders and war-oriented ideologists the leeway they hope to have to resolve the conflict by violent means. Ultimately, peaceful alternatives must be considered.

It is out of these considerations that the perspective and rationale of this dissertation evolved. While the conflict in the Middle East may be among the most complicated on the international level, Aytemiz (2001) points out that 40% of the world population share international rivers and basins and that on various occasions, enemies have had to pursue alternative peaceful solutions as the only viable means possible to deal with their water needs and pressures. This has even been the case among some nations that have fought multiple wars over historic, religious and ideological causes as is the case in the Middle East and other parts of the world, such as Pakistan, Bangladesh and India.

The main aim of this paper is not to explore the potential solutions for water crisis solutions in the Middle East. Rather, the main objective is to explore the possibility of utilizing the problems and issues associated with water resources, as a potential window of opportunity to bring the conflicting parties in the Middle East together toward a peaceful resolution. This approach differs from previous approaches to the Middle East conflict in at least two ways.

First of all, it does not assume that the question of water is a residual issue that will be resolved along with the bigger cooperation package over land and borders. Rather, it holds that the conflict over water and the nature of the water crisis can be used as a means to set the conflicting players in a mode of cooperation and coordination that will help them address their shared water needs peacefully and that may set the groundwork for a wider peaceful resolution in the long term.

Secondly, this approach assumes that the water crisis in the Middle East represents a window of opportunity because of the very nature of water itself. To elaborate, the issues of a water crisis are pressuring, overwhelming and immediate by their nature. In other words, this is an issue that offers ideologists and politicians very little freedom to exercise political patience and procrastination, especially when considering the magnitude and extent of the effects of water shortages and of thedeterioration of water quality on the economic and social interests of their constituencies. Pg. 4-6

\*Forces Hawks to negotiate

\*Water overrides ideological disputes

#### Failure risks world war III

Sterling 11—MA in European Studies [Lord Sterling BS. in Poli Sci and History), “The Battle for Syria: How World War III Will Begin,” Before It's News, Wednesday, August 22, 2012 23:50, pg. http://tinyurl.com/d8nnzug]

As the alliance of NATO, Israel and the conservative Gulf Cooperative Council (monarchies continue with their relentless drive to destroy the generally popular (with the Syrian people) government of Syria and using the coming all-out battle in Syria as a backdoor to a regional war with Iran and Lebanon, Gaza and Palestine, other Major Powers have grown increasingly concerned.  Russia, China and members of the Collective Security Treaty Organization (CSTO) and members of the Shanghai Cooperation Organization (SCO) have made clear their opposition to any further globalist/NATO/Zionist aggression in the North Africa-Middle East-Southwest Asia arena.  In fact both Russia and China have emphasized that their Vital National Interests are involved in Syria and Iran and have warned of the dangers of nuclear war and of a Third World War beginning if the ‘West’ continues with its aggressive operations. Nuclear armed Pakistan is drifting towards a war state with the United States as it continues to refuse to allow NATO resupply to the Afghan War through Pakistan territory and increasingly objects to the use of armed American drone aircraft against targets in Pakistan.

The horrific False Flag massacres that the NATO, Israeli and GCC trained/equipped/led foreign mercenaries have committed in Syria, against unarmed civilians including large numbers of women and children, are designed to fool segments of the western population into supporting yet another war.  They do not, however, fool the leaders of the various axis powers that are coalescing around the SCO and CSTO in opposition to further military aggression against Syria and Iran.  These nations are carefully watching the deployment of commando assets in and near Syria and Iran, the buildup of naval, air and land forces in the Middle East, and the developing False Narrative that the globalist/Zionist mainstream news media are putting out concerning the “necessity” of “doing something to save the Syrian civilians from the Assad government”.

The issue of armed intervention was a key matter at the SCO Summit June 6th and 7th in Beijing.  Massive military intervention by Russia and China is being planned for if the NATO/Israeli/GCC alliance crosses the line with a military intervention against the Syrian, Iranian, and Lebanese nations.  This military intervention has a most profound danger of not only involving weapons-of-mass-destruction but of beginning the Third World War!

Russia is actively preparing a significant number of its best ground forces for a rapid intervention in Syria.  These forces include the 15th Division, the 76th Airborne Division, and Black Sea Spetznaz forces ([link](http://www.wsws.org/articles/2012/jun2012/rusy-j12.shtml)).  Additionally, the Russian Air Force in the South Military District has been rearmed with the latest fighter aircraft and helicopters for combat with American/Israeli/NATO air forces.  Russian Army forces in Armenia have been strengthened and additional attack and assault helicopters added and the families of its officers have been evacuated back to Russia ([link](http://articles.businessinsider.com/2012-04-09/news/31311454_1_russian-defense-ministry-military-action-dmitry-rogozin)).  According to Russian reports, the Russians expect to drive through Georgia into friendly Armenia to link up with Iranian forces northwest of Tehran.

The Russians will seek to establish their dominance in the Caucasus and Caspian states and to finally secure military facilities on the Persian Gulf and Gulf of Oman.  They are apt to be supported by a large number of Chinese ground troops and fighter aircraft deploying through allied Pakistan into Iran.

The Russian and Chinese armed forces will come prepared for full NBC (nuclear, biological and chemical) warfare; tactical nuclear weapons are apt to be available to senior commanders but requiring Moscow’s and Beijing’s authorization prior to use.  Axis forces almost certainly will be supported by the deadly S-300 Air Defense System and the Russian forces may also use the even more advanced S-400 Air Defense System.  Top of the line Sukhoi fighter aircraft and AWACS type aircraft will be deployed.  Naval engagements may take place in the Black Sea and Mediterranean Sea between the Russian Navy and NATO navies, with additional naval clashes in the Caspian Sea.

Israeli and NATO forces may seek to do an ‘end run’ around any Russian/Chinese/CSO-CSTO counter-intervention by a quick coup de main utilizing rapid commando attacks on key Syrian and Iranian leadership targets and missile/air attacks on guided missile launch sites in Syria, Iran, Lebanon, and Gaza-Palestine.  This will not prevent Russian and Chinese forces from entering the war but may trigger a massive Iranian and Syrian use of Advanced Biological weapons against the NATO homelands in Europe and North America and against Israel and certain GCC states ([link](http://europebusines.blogspot.com/2012/02/war-on-iran-syria-what-they-are-not.html)).

The World at large has entered the most dangerous time in Human History as events continue to unfold in the Middle East and enter their climax phase.

### AT: Indo-Pak

#### Aff can’t solve—Indian dams makes war and collapse inevitable—aff doesn’t solve because desal doesn’t solve territory issues and no salt water to desalinate

Daly 12—John C.K. Daly is the chief analyst at the energy news site Oilprice.com. Dr. Daly received his Ph.D. in 1986 from the School of Slavonic and East European Studies, University of London [April 13, 2012, “Troubled Waters: Has The India-Pakistan Water Conflict Reached A Boiling Point?” http://www.economywatch.com/economy-business-and-finance-news/has-the-india-pakistan-water-conflict-reached-a-boiling-point.13-04.html]

In an editorial entitled “War With India Inevitable” published in Lahore's ‘The Nation’ on Sunday, the newspaper's Editor-in-Chief and Nazaria-i-Pakistan Trust Chairman, Majid Nizami, asked his fellow citizens to prepare for a war with India over water issues.

Nizami also told those attending the "Pakistan-India relations: Our rulers’ new wishes" session at Aiwan-e-Karkunan Tehrik-e-Pakistan, that, "Indian hostilities and conspiracies against the country will never end until she is taught a lesson."

While The Nation – a conservative daily that is part of the Nawa-i-Waqt publishing group – may have a circulation of just 20,000 readers, its close ties to Pakistan's highest military circles mean that Nizami's comments should hardly be rejected out of hand.

Tellingly, Nizami's audience at the session also included some high ranking Pakistani officials, including Nazaria-i-Pakistan Vice Chairman Dr Rafique Ahmed; Pakistan Movement Workers-Trust Chairman, retired Colonel Jamshed Ahmed Tareen; former Foreign Secretary Shamshad Ahmed Khan; Jamiat Ulema-e-Pakistan Secretary General Qari Zawar Bahadur; retired Air Marshall Khurished Anwar Mirza; retired Brigadier Hamid Saeed Akhtar and Jamaat-e-Islami Lahore Chief Ameer-ul-Azeem, among others.

At the heart of the issue are Pakistan's concerns over India's ongoing construction of two hydroelectric dams on the upper reaches of the Indus River. The Indus, which begins in Indian-controlled Kashmir and flows through both India and Pakistan, is Pakistan's primary freshwater source, on which 90 percent of its agriculture depends.

The 45-megawatt, 190-feet tall Nimoo-Bazgo concrete dam and the 44-megawatt Chutak hydroelectric power project, Islamabad believes, will reduce the Indus River's flow towards Pakistan, and are capable of storing up to 4.23 billion cubic feet of water, which will violate the terms of the bilateral 1960 Indus Water Treaty.

“Already the Indus is experiencing water flows that are down 30 percent from its normal levels. According to a number of Pakistani agriculture and water experts, the nation is heading towards a massive water shortage in the next couple of years due to insufficient water management practices and storage capacity, which will be exacerbated by the twin Indian hydroelectric projects.”

So, if push comes to shove, who's got Pakistan's back? China.

During the Boao Forum for Asia held in China's southern Hainan Island on 1 April, Pakistan and China agreed to support each other "in all circumstances" and vowed to uphold their sovereignty and territorial integrity at all costs.

Pakistani Prime Minister Syed Yousuf Raza Gilani told Chinese Executive Vice Premier Li Keqiang: "China's friend is our friend, and China's enemy is ours," adding that Pakistan considers China's security as its own security and supports China's position on Taiwan, Tibet and Xinjiang.

Li replied that China would support Pakistan's sovereignty and territorial integrity in every situation, telling Gilani: "No matter what changes take place at international level, we will uphold Pakistan's sovereignty and territorial integrity."

It might be noted here that in October 1962, coinciding with the Cuban missile crisis, India and China fought a brief but bitter war along their disputed Himalayan border. Fifty years later, China and India have yet to resolve their border issues over Kashmir; and China continues to claim most of India's Arunachal Pradesh territory to the base of the Himalayas in the absence of any definitive treaty delineating the border.

Kashmir today also remains the site of the world's largest and most militarized territorial dispute with portions under the de facto administration of China (Aksai Chin), India (Jammu and Kashmir), and Pakistan (Azad Kashmir and Northern Areas).

No guesses therefore as to whom Beijing might back should Pakistani-Indian tensions continue to rise.

Accordingly, the only way to keep the peace may be, as to paraphrase Ronald Reagan in Berlin: "Prime Minister Singh, tear down those dams!" Just don't bet on it.

#### Water wars won’t escalate between India and Pakistan—they’ve already weathered the perfect storm and other issues cause tension

Alam 2—PhD in political geography from Durham University on the negotiations between India and Pakistan and a trained mediator [Undala, “Questioning the water wars rationale: a case study of the Indus Waters Treaty,” Dec 1, 2002, http://goliath.ecnext.com/coms2/gi\_0199-2567100/Questioning-the-water-wars-rationale.html]

The water wars rationale forecasts war between countries dependent upon a shared water resource if there is water scarcity, competitive use and the countries are enemies due to a wider conflict. Following this rationale, a war should have occurred between India and Pakistan over the Indus basin waters. Instead, the countries negotiated an international water treaty and have maintained it for over 40 years through two wars and the nuclear era. In trying to explain India and Pakistan's successful cooperation over water, as recommended by Biswas (1992), the author has had unique access to the Indus basin files in the World Bank's archives (see Alam 1998). (2) The water wars rationale Drawing heavily on the situation in the Middle East, the water wars rationale reasons that given water's critical role (3) in a country's survival if there is water scarcity amidst a wider conflict, and enemy states depend on same shared resources, each country will try to ensure that it has the access to water that it needs. Controlling access to water is vital for national security and, therefore, highly political. Under a wider conflict, the spectre of an enemy controlling another country's water supply is untenable. This means that each country might wage war to safeguard its supply (Gleick 1993a). In other words, because water is scarce, vital, a security issue and demand is outstripping supply, states will go to war with their competitors to secure supplies. This implies that '"[w]ater [w]ars" are, unfortunately, likely to be of more and more common occurrence in the future' (Young et al. 1994). Water wars are understood to be international wars between states triggered and sustained solely over issues arising from access to water. This is to distinguish them from water-related conflicts within countries, and water used as a weapon. The concept derives from the Middle East's increasing demand for water due to urbanization, industrialization, increasing populations, consumerism and irrigated agriculture (Postel 1992; Falkenmark and Lindh 1993; Gleick 1993a; Richards and Waterbury 1996; Biswas 1997), and the political nature of water use in the region (Naff and Matson 1984; Starr and Stoll 1988; Anderson 1988 1994; Beschorner 1992; Bulloch and Darwish 1993; Gleick 1993c; Guyatt 1998; Naff 1994; Haddad and Mizyed 1996; Medzini 1996; Waterbury 1997; Soffer 1999). Expecting a water war in the Indus basin Following the water wars rationale, India and Pakistan should have gone to war over the Indus waters. All the ingredients were present -- two enemies engaged in a wider conflict; a riparian completely dependent upon the Indus waters; water scarcity despite large average runoffs; and poverty preventing the construction of infrastructure to offset this scarcity (Alam 1998; Ali 1967; Alvi 1962; Government of Pakistan 1953a 1953b 1958a 1958b 1958c; Gulhati 1973; Lilienthal 1966 1976; Michel 1967; Shivananda 1961). The enmity between India and Pakistan has its roots in the movement to gain independence from Great Britain. The principal fault line ran along religious lines and placed Hindus against Muslims. The process by which the British partitioned the Indian sub-continent in 1947 into independent India and Pakistan helped to fuel this animosity. In particular, the issue of Kashmir has persistently aggravated Indo-Pakistan relations. Partition led to a number of disputes between the countries, for example, over refugee property and currency exchange rates. Over the latter issue, Pakistan even spoke of an economic war fuelled by the belief that 'there is a large element in India that does not accept the partition of India, that is still talking and planning to undo what they insist was a mistake' (Lilienthal 1966). Another source of Indo-Pakistan tensions was the Indus waters dispute.

### More d

#### Water wars are a myth—overwhelming empirical evidence

Weinthal and Vengosh 11—\*Erika Weinthal is Associate Professor of Environmental Policy at the Nicholas School of the Environment at Duke University and \*\*Avner Vengosh is a Professor of Geochemistry and Water Quality and chair of the Water and Air Resources program at the Nicholas School of Environment in Duke University [ed. Richard Parker, Marni Sommer, “Water and Conflict,” ch. 26, *Routledge Handbook of Global Public Health*, Taylor & Francis, Feb 1, 2011]

By the end of the twentieth century, it was thus widely assumed that water scarcity would be a driver of conflict between nation states, especially in the arid regions of MENA. World leaders such as former UN secretary-general, Boutros Boutros-Ghali, famously warned, ‘the next war in the Middle East will he fought over water, not politics' (Vesilind 1993: 53). The Economist, furthermore, predicted in 1999 that '[w]ith 3.5 billion people affected by water shortages by 2050, conditions are ripe for a century of water conflicts.’ The empirical evidence, however, has yet to support such prophecies. Rather, when it comes to water resources at the interstate level, cooperation is much more ubiquitous. The historical record shows that states rarely if ever go to war over water; in parsing more than 1,800 state-to-state water interactions in trans-boundary basins between 1946 and 1999, Wolf et al. (2003) demonstrated that none have led to formal war. Yet such encouraging findings should not obscure the fact that the ‘[MENA] region has a striking absence of inclusive and comprehensive international water agreements on its most significant trans-boundary water courses’ (World Bank 2007: 80). The Nile River Basin, which is shared by ten countries and inhabited by approximately 150 million people, for example, has a long history of tension (e.g. Egypt-Sudan conflicts in the l950s). In spite of current progress with the Nile Basin Initiative (World Bank 2007: 83), Egypt—the dominant downstream riparian (i.e. water user along the river)—continues to appropriate more than 90 per cent of the Nile River.

With the maturation of the field of water conflict and cooperation, the notion of impending water wars has come to be better understood as a ‘myth’ rather than a ‘reality’ (Bencala and Dabelko 2008). This is not to say that tensions do not exist among states regarding their shared and limited water resources, but rather there is a growing realisation that the source of conflict is emanating from disagreements within a country due to a lethal combination of population growth, unsustainable water withdrawals, lack of adequate water management, weak institutions, and pressure for economic development (e.g. see Wolf 2007). The Pacific Institute's Water Conflict Chronology indicates that between 2000 and 2009, most occurrences of water conflict were at the sub-national level, of which nearly half were development disputes. Examples in 2009 include hundreds of Mumbai residents in India protesting water cuts that resulted in one person being killed and dozens injured, and violent clashes in Ethiopia over access to water in the Somali border region.

#### Cooperation over water outweighs—interdependence prevents conflict

Deen 6—Thalif, internationally awarded U.N. bureau chief and editor of the U.N. edition of the IPS journal [“'Water Wars' a Myth, Say Experts,” 8/25/06, Inter Press Service News Agency, http://ipsnews.net/news.asp?idnews=34465]

STOCKHOLM, Aug 25 (IPS)—The world's future wars will be fought not over oil but water: an ominous prediction made by the U.S. Central Intelligence Agency (CIA), the British ministry of defence and even by some officials of the World Bank. But experts and academics meeting at an international conference on water management in the Swedish capital are dismissing this prediction as unrealistic, far-fetched and nonsensical. "Water wars make good newspaper headlines but cooperation (agreements) don't," says Arunabha Ghosh, co-author of the upcoming Human Development Report 2006 themed on water management. The annual report, commissioned by the U.N. Development Programme (UNDP), is to be released in December. In reality, Ghosh told the meeting in Stockholm, there are plenty of bilateral, multilateral and trans-boundary agreements for water-sharing -- all or most of which do not make good newspaper copy. Asked about water wars, Prof. Asit K. Biswas of the Mexico-based Third World Centre for Water Management, told IPS: "This is absolute nonsense because this is not going to happen -- at least not during the next 100 years." He said the world is not facing a water crisis because of physical water scarcities. "This is baloney," he said. "What it is facing is a crisis of bad water management," argued Biswas, who was awarded the 2006 international Stockholm Water Prize for "outstanding achievements" in his field. The presentation ceremony took place in Stockholm Thursday. According to the Paris-based U.N. Educational, Scientific and Cultural Organisation (UNESCO), one-third of all river basins are shared by more than two countries. Globally, there are 262 international river basins: 59 in Africa, 52 in Asia, 73 in Europe, 61 in Latin America and the Caribbean, and 17 in North America. Overall, 145 countries have territories that include at least one shared river basin. Between 1948 and 1999, UNESCO says, there have been 1,831 "international interactions" recorded, including 507 conflicts, 96 neutral or non-significant events, and most importantly, 1,228 instances of cooperation. "Despite the potential problem, history has demonstrated that cooperation, rather than conflict, is likely in shared basins," UNESCO concludes. The Stockholm International Water Institute (SIWI) says that 10- to 20-year-old arguments about conflict over water are still being recycled. "Such arguments ignore massive amounts of recent research which shows that water-scarce states that share a water body tend to find cooperative solutions rather than enter into violent conflict," the institute says. SIWI says that during the entire "intifada" -- the ongoing Palestinian uprising against Israel in the occupied territories of West Bank and Gaza -- the only thing on which the two warring parties continued to cooperate at a basic level was their shared waters. "Thus, rather than reaching for arguments for the 'water war hypotheses,' the facts seem to support the idea that water is a uniting force and a potential source of peace rather than violent conflict." SIWI said. Ghosh, co-author of the UNDP study, pointed out several agreements which were "models of cooperation", including the Indus Waters Treaty, the Israel-Jordan accord, the Senegal River Development Organisation and the Mekong River Commission. A study sponsored by the Washington-based Woodrow Wilson International Centre for Scholars points that despite newspaper headlines screaming "water wars are coming!", these apocalyptic warnings fly in the face of history. "No nations have gone to war specifically over water resources for thousands of years. International water disputes -- even among fierce enemies -- are resolved peacefully, even as conflicts erupt over other issues," it says. The study also points out instances of cooperation between riparian nations -- countries or provinces bordering the same river -- that outnumbered conflicts by more than two to one between 1945 and 1999. Why? "Because water is so important, nations cannot afford to fight over it. Instead, water fuels greater interdependence. By coming together to jointly manage their shared water resources, countries can build trust and prevent conflict," argues the study,

#### Cooperation creates resilient institutions that unite countries during crises

Wolf et al. 5—Associate Professor of Geography at Oregon State University and Director of the Transboundary Freshwater Dispute Database [Aaron, also professor of geography at Oregon State University, Annika Kramer, research fellow, Alexander Carius, Director of Adelphi Research in Berlin, and Geoffrey Dabelko, Director of the Environmental Change and Security Project at the Woodrow Wilson International Center for Scholars, "Water Can Be a Pathway to Peace, Not War," Global Policy Forum, June 2005, http://www.globalpolicy.org/security/natres/water/2005/06peace.htm]

These apocalyptic warnings fly in the face of history: no nations have gone to war specifically over water resources for thousands of years. International water disputes—even among fierce enemies—are resolved peacefully, even as conflicts erupt over other issues. In fact, instances of cooperation between riparian nations outnumbered conflicts by more than two to one between 1945 and 1999. Why? Because water is so important, nations cannot afford to fight over it. Instead, water fuels greater interdependence. By coming together to jointly manage their shared water resources, countries build trust and prevent conflict. Water can be a negotiating tool, too: it can offer a communication lifeline connecting countries in the midst of crisis. Thus, by crying “water wars,” doomsayers ignore a promising way to help prevent war: cooperative water resources management. Of course, people compete—sometime violently—for water. Within a nation, users—farmers, hydroelectric dams, recreational users, environmentalists—are often at odds, and the probability of a mutually acceptable solution falls as the number of stakeholders rises. Water is never the single—and hardly ever the major—cause of conflict. But it can exacerbate existing tensions. History is littered with examples of violent water conflicts: just as Californian farmers bombed pipelines moving water from Owens Valley to Los Angeles in the early 1900s, Chinese farmers in Shandong clashed with police in 2000 to protest government plans to divert irrigation water to cities and industries. But these conflicts usually break out within nations. International rivers are a different story. The world’s 263 international river basins cover 45.3 percent of Earth’s land surface, host about 40 percent of the world’s population, and account for approximately 60 percent of global river flow. And the number is growing, largely due to the “internationalization” of basins through political changes like the breakup of the Soviet Union, as well as improved mapping technology. Strikingly, territory in 145 nations falls within international basins, and 33 countries are located almost entirely within these basins. As many as 17 countries share one river basin, the Danube. Contrary to received wisdom, evidence proves this interdependence does not lead to war. Researchers at Oregon State University compiled a dataset of every reported interaction (conflictive or cooperative) between two or more nations that was driven by water in the last half century. They found that the rate of cooperation overwhelms the incidence of acute conflict. In the last 50 years, only 37 disputes involved violence, and 30 of those occurred between Israel and one of its neighbors. Outside of the Middle East, researchers found only 5 violent events while 157 treaties were negotiated and signed. The total number of water-related events between nations also favors cooperation: the 1,228 cooperative events dwarf the 507 conflict-related events. Despite the fiery rhetoric of politicians—aimed more often at their own constituencies than at the enemy—most actions taken over water are mild. Of all the events, 62 percent are verbal, and more than two-thirds of these were not official statements. Simply put, water is a greater pathway to peace than conflict in the world’s international river basins. International cooperation around water has a long and successful history; some of the world’s most vociferous enemies have negotiated water agreements. The institutions they have created are resilient, even when relations are strained. The Mekong Committee, for example, established by Cambodia, Laos, Thailand, and Viet Nam in 1957, exchanged data and information on the river basin throughout the Viet Nam War.