Statement of
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House Permanent Select Committee on Intelligence
House Select Committee on Energy Independence and Global Warming

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I. Introduction

Chairman Markey, Chairman Eshoo, Ranking Member Sensenbrenner, Ranking Member Issa, and Committee Members: Thank you for the opportunity to share my views on global warming and national security.

I am Marlo Lewis, a senior fellow in environmental policy at the Competitive Enterprise Institute (CEI), a free-market public policy group with a strong focus on global warming and energy, among other issues.

CEI has long argued that most public discussions of global warming unwisely ignore the significant health, safety, and environmental risks of climate change policies. This can lead to policy decisions that do more harm than good.

A classic case is fuel economy standards. The new mpg standards enacted in December 2007 will haven no measurable effect on global temperatures.[1] However, those standards will put motorists at risk by forcing auto manufacturers to make the average vehicle smaller, lighter, and, thus, less protective of occupants in collisions. The National Highway Traffic Safety Administration estimates that the current 27.5-mpg standard contributes to an additional 1,300 to 2,600 auto fatalities per year.[2] Congress's decision to require a 40-percent increase in average fuel economy by 2020 will, at a minimum, limit the safety gains that automakers could otherwise achieve.

A related example is biofuel policy. The European Union's biofuel directive, although adopted in the name of saving the planet, is bankrolling deforestation and habitat destruction in Malaysia and Indonesia. This not only threatens the Orangutan and several other species, it also contributes to the burning and clearing of peat lands, producing large net increases in greenhouse gas emissions.[3]

Global warming policies can also adversely affect human health and life expectancy. Rising energy costs are widely viewed as a key cause of the current economic downturn. Policies like Lieberman-Warner, which the U.S. Energy Administration estimates would raise gasoline prices an additional 41 cents to $1.01 per gallon by 2030,[4] would make a bad economic situation worse. The bigger loss, however, could well be in lives. As Harvey Brenner of Johns Hopkins University argues, the most important factors affecting disease and death rates are income, employment, and socio-economic status. Even short-term, year-to-year fluctuations in economic indicators can measurably affect mortality rates. By increasing the costs of goods and services such as energy, and decreasing disposable incomes, global warming "regulation can inadvertently contribute to poor health and premature death."[5]

Please note, I am not saying that global warming is a myth or that there are no health, environment, and safety risks associated with climate change. What I am saying is that there are also risks associated with climate change policy. Policymakers should assess and weigh both sets of risks before deciding on a course of action. In most public discussions, however, the risks of climate policy are not even acknowledged. We ignore the risks of climate policy at our peril.

II. Geopolitical risks of global warming policy

An egregious example of this one-sided approach was the October 2003 study for the Defense Department by Peter Schwartz and Doug Randall, entitled, "An Abrupt Climate Change Scenario and Its Implications for United States National Security."[6] The study hypothesizes what might happen to the global economy and international stability if the Atlantic thermohaline circulation shuts down and the climate rapidly deteriorates into ice age-like conditions. In page after pulse-pounding page, the authors describe a world convulsed by famine, food riots, water shortages, energy shortages, trade wars, mass environmental refugee migrations, and armed conflict within and among nations.

Schwartz and Randall even hint that abrupt climate change would make nuclear war more likely:

> In this world of warring states, nuclear arms proliferation is inevitable. As cooling drives up demand, existing hydrocarbon supplies are stretched thin. With a scarcity of energy supply—and a growing need for access—nuclear energy will become a critical source of power, and this will accelerate nuclear proliferation as countries develop enrichment and reprocessing capabilities to ensure their national security.[7]

The authors predictably recommend that DOD invest in modeling capabilities to forecast how and where abrupt climate change could occur, the impacts on global food, water, and energy supplies, and the implications for national security.

Notice what they leave out. The report does not consider whether climate change policy could adversely affect the U.S. industrial base, the combat readiness of U.S. armed forces, global food and energy supplies, or international stability. Nor does it advise DOD to assess these risks in future studies.

So let's consider some of the geopolitical risks global warming policies may create.

"Money," an old adage declares, "is the sinews of war." If we learned anything from the Cold War, it is that economic power is the foundation of military power. The Soviet Union imploded because it lacked the economic base to support its military and geopolitical empire. U.S. economic might was critical to winning the Cold War—as it was to winning World War I and World War II.

At the risk of belaboring the obvious, there is always in democratic politics a tradeoff between guns and butter. It is harder in tough economic times than in prosperous times to raise the funds required to recruit, train, and equip the armed forces. It is harder to sustain public support for military interventions abroad when unemployment and malaise are rising on the home front.

So to the extent that climate policies pose a risk to U.S. economic growth, they also pose a risk to U.S. military strength and defense preparedness.

In this light, let's consider the Lieberman-Warner bill, which would require a 70-percent reduction in U.S. carbon dioxide emissions by 2050. CEI commissioned University of Guelph economist Dr. Ross McKitrick to assess both the economic impacts of the Lieberman-Warner bill and the Energy Information Administration's analysis of the bill. The EIA estimates that up to 1 million manufacturing jobs could by lost by 2030.[8] However, this is likely an underestimate, because the EIA's reference case assumes rates of population growth, emissions growth, and income growth that are significantly lower than the long-term rates over the past 45 years.[9]

In his forthcoming paper, Dr. McKitrick explains that a society's total emissions are a product of three factors: population, per capita GDP, and the carbon intensity of production. To reduce aggregate emissions, it is necessary to reduce one or more of those three factors. And there's the rub.

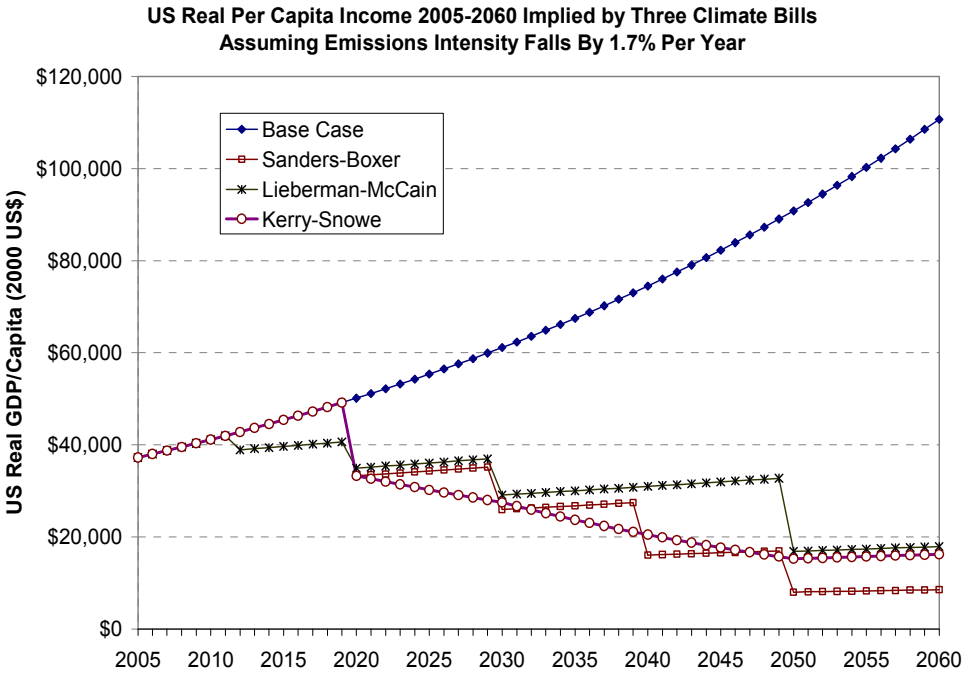
Population is growing at +1.1 percent per year. There is not much Congress can do about that. Real income is growing at about +2.2 percent per year, and presumably Congress wants that to continue. So to reduce emissions 70 percent by 2050, the other factor—emissions intensity—must decline by the following approximate amounts:

- 4.4% per year on average between 2006 and 2012
- 5.2% per year on average between 2006 and 2030
- 6.2% per year on average between 2006 and 2050

Dr. McKitrick comments: "There is no historical precedent for such rapid reductions in carbon dioxide intensity." Indeed, the historic rate of emissions intensity decline over the past 45 years is 1.6 percent per year.

If these somewhat miraculous reductions in carbon intensity do not occur, then the only way to reach the 70-percent emission reduction target will be through big increases in energy prices leading to big declines in economic growth. This is a recipe for stagflation and worse.

In another paper CEI has commissioned, Dr. McKitrick shows what happens to per capita GDP under several climate bills if population growth and emission intensity decline continue at their historic rates.



Instead of per capita GDP more than doubling between 2005 and 2060, it falls by half or more. The American dream becomes the American nightmare.

Does it have to happen that way? No. Technology breakthroughs that dramatically lower the cost of cutting emissions may occur. But it is in the nature of breakthroughs that they are difficult to plan or even predict. Thus, under these emission reduction mandates, there is a significant risk of severe economic damage.

So again let me state the obvious: An economically weakened America would be less able to sustain its defense commitments, keep the peace, and remain vigorously engaged in the world.

The top agenda item of many global warming activists today is stopping the construction of new coal-fired power plants. No new coal power plants should be built, we are told, unless they are equipped with carbon capture and sequestration. But it could take a decade to determine whether carbon capture and storage is economical under a range of emission reduction scenarios, years to

develop the regulatory framework for a carbon capture system, years to overcome NIMBY opposition, and a decade to build the infrastructure on an industrial scale.[10]

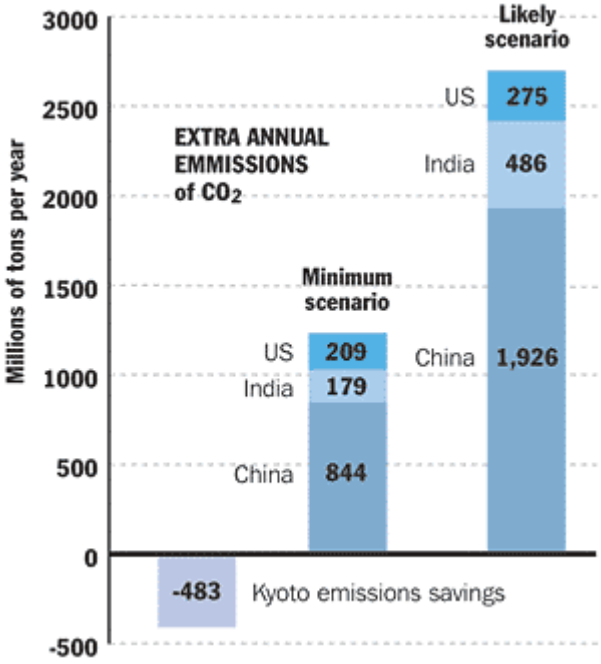
In the meantime, U.S. electricity demand is growing, and coal is the fuel of choice in many markets. The EIA forecasts that between 2007 and 2030, coal will provide 67 percent of all new electric generation in the United States, and new coal generation will constitute 15 percent of all U.S. electric power in 2030.[11]

Moratoria that effectively ban new coal-based power could create a severe supply-demand imbalance. This would not only inflate electricity and natural gas costs (demand for coal would be diverted to natural gas as an electricity fuel), it would also jeopardize electric supply reliability. Indeed, some parts of the country may experience chronic energy crises characterized by repeated power failures and blackouts.

From a national security standpoint, this poses two main risks. One is that America will increasingly resemble a Third World country where nothing works very well. We will lose our international prestige and ability to lead by example. The other risk is that terrorists will view America's over-stretched, failure-prone electricity grid as a tempting target. They may calculate: If America's electric supply system is tottering on the edge, why not give it a few helpful shoves?

The anti-coal campaign is, of course, not limited to the United States. Global warming activists seek to ban new coal-fired power plants not only here but also in China, India, and other developing countries. This is essential to their agenda, and for a very simple reason. The emissions from new coal plants here and elsewhere will swamp all of the emission reductions that Europe, Japan, and Canada might, in theory, achieve under the U.N. global warming

treaty, the Kyoto Protocol.[12] Either the global warming movement kills coal, or coal will bury Kyoto.

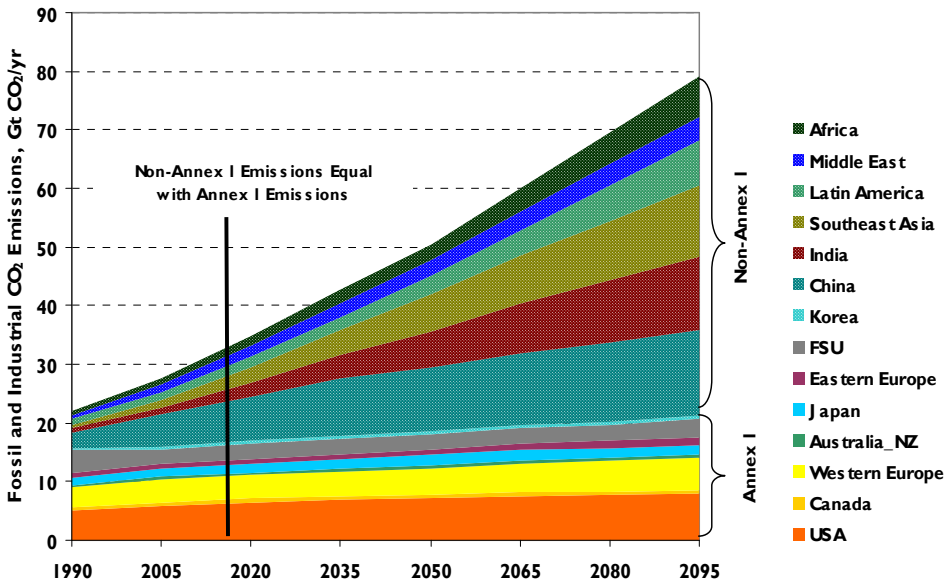


Source: Christian Science Monitor, 2004

The campaign to ban new coal worldwide raises additional national security concerns. First, how would a global moratorium on new coal plants be enforced, and by whom? Presumably this would be accomplished, initially, via trade sanctions. Already European and U.S. leaders are calling for carbon tariffs to penalize goods from countries like China and India that refuse to limit their emissions.[13] Warning: Trade wars are not always resolved peacefully! In any event, if the United States vigorously presses for a ban on new coal plants around the world, it will continually butt heads with China, India, and many other developing countries.

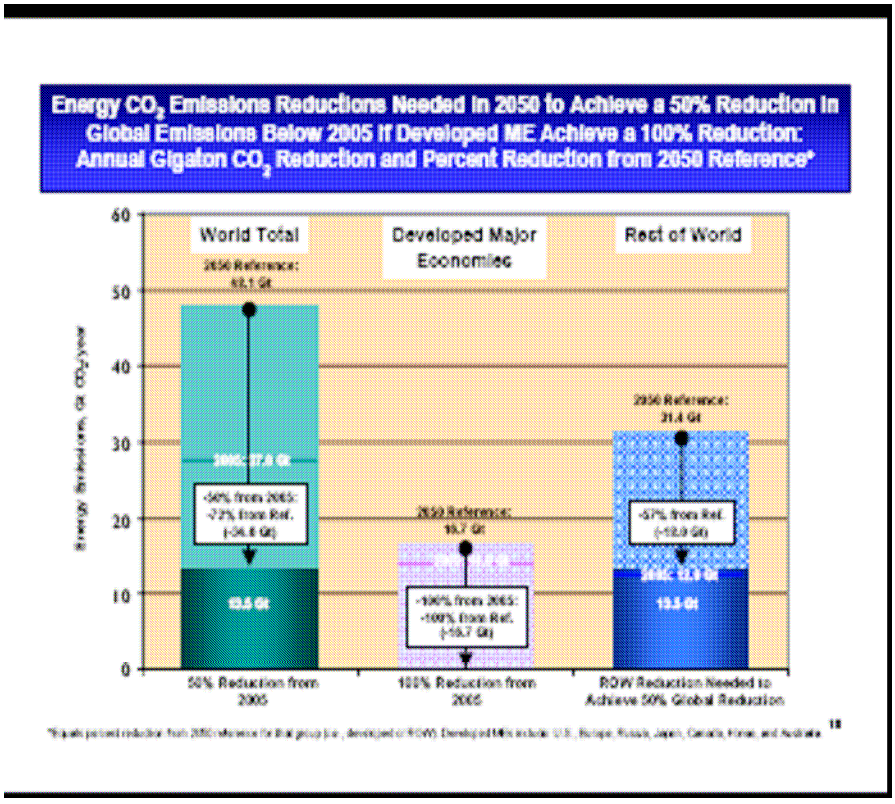
We often hear that the world must reduce global emissions 50 percent by 2050 to avert the more dangerous effects of global warming. Those who say this may not realize the kind of sacrifice they are asking developing countries to make. Almost all the

growth in emissions over the next few decades is expected to occur in developing countries.



Source: Department of Energy

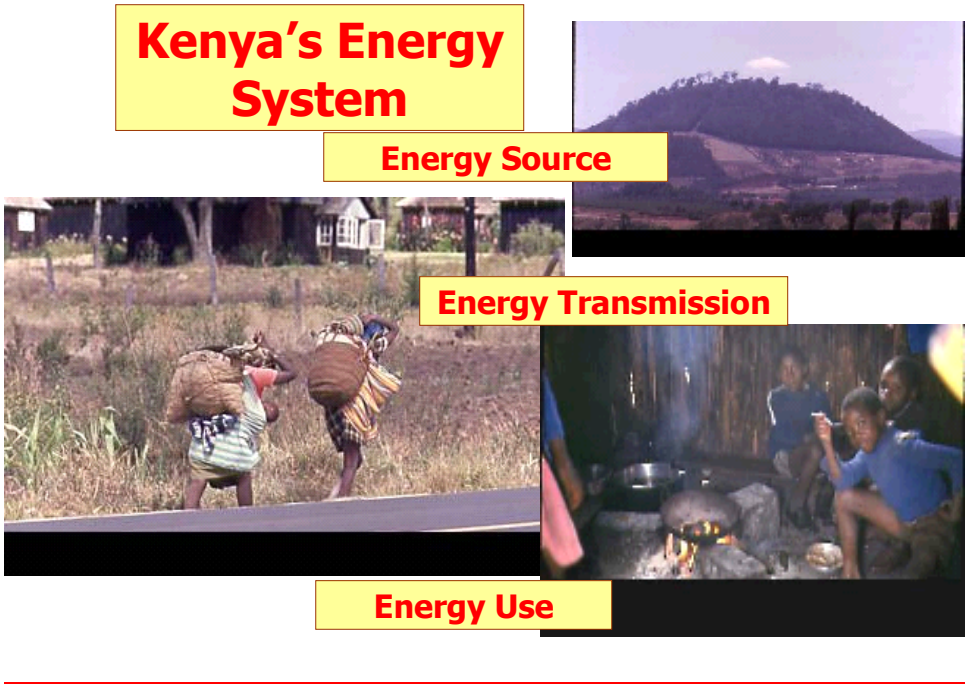
Analysis by the Department of Energy shows that even if the industrialized countries somehow go cold turkey by 2050 and achieve zero net emissions, developing countries would still have to cut their emissions 57 percent below baseline projections to reduce global emissions 50 percent below 2005 levels.



A great deal of political and, dare I say, military capital might have to be expended to bring the developing world into line with this agenda.

But assume the anti-coal policy triumphs. That would create another set of security risks. Much of the world is energy poor. An estimated 1.6 billion people have no access to electricity, and about 2.4 billion people still rely on traditional biomass—wood, crop waste, even dung—for cooking and heating.[14]

Kenya's "energy system" typifies the plight of millions of people around the world.



Source: Dr. John Christy

The "energy source" is wood chopped from the forest. The "energy transmission" system is the backs of women and girls, hauling the wood a U.N.-estimated average of 3 miles each day. The "energy use" system is burning the wood in an open fire indoors for heat and light.

These villagers breathe indoor air that is much dirtier than outdoor air in the world's most polluted cities. Respiratory disease among this large segment of humanity is rampant and kills more than a million people a year, most of them women and children. Reliance on traditional biomass also takes a heavy toll on forests and wildlife habitat.

A coal-fired power plant would improve the lives of those villagers in Kenya in many ways. Women would be freed from backbreaking toil and could pursue more fulfilling activities. People would be healthier because indoor air quality would

improve. Refrigeration would make food preparation easier and safer. Electric lighting would allow people to read and study at night. Computers and Internet access would follow. The beautiful forests and the species dependent on them would be saved.

Denying these people—and millions of others like them—access to coal-based power would be a humanitarian disaster. Some might even call it a crime against humanity. Trapping people in energy poverty will very likely make them hungry, desperate, and angry. The potential for conflict within and among countries under a global ban on coal-based power may be quite large.

Schwartz and Randall warn that abrupt climate change would cause food shortages and destabilize governments. Well, during the past six months food riots have broken out in more than 30 countries, and in at least one case—Haiti—rioters brought down the government.[15] Big jumps in the price of staples—corn, wheat, and rice—are pushing millions of people below the absolute poverty line.[16]

Today's food price inflation has several causes including a weak dollar, high oil prices, drought, and surging demand in India and China. But one factor fueling this crisis is a global warming policy—government subsidies and mandates for corn ethanol production.[17] Biofuels provide only about 1.5 percent of total motor fuel liquids, yet they accounted for almost half the increase in global consumption of major food crops in 2006-07, according to the World Bank.[18] More aggressive efforts to replace petroleum with biofuels could literally starve the hungry, creating chaos and conflict.

Schwartz and Randall warn that abrupt climate change will create millions of environmental refugees fleeing across borders to escape from hunger and water shortages. Millions of illegal migrants already cross the U.S. southern border from Mexico. Poor

Mexicans obtain 40 percent of their daily calories from tortillas, and the U.S. ethanol program, by inflating the price of corn, contributed to a "tortilla crisis" in Mexico.[19] Burning food in gas tanks exacerbates the poverty that is a root cause of illegal migration. Expect an increase in 'biofuel refugees' as the mandates ramp up.

Schwartz and Randall warn that abrupt climate change, by intensifying winter storms and expanding sea ice, could reduce the availability of gas and oil, leading to conflict over dwindling resources. Well, this implies that non-abrupt climate change, which is far more likely, could make gas and oil more available by opening up the long-sought Northwest Passage.[20]

More importantly, since Kyoto-style policies aim to restrict access to fossil fuels, they too have the potential to engender conflicts over energy. Cap-and-trade programs force participants to compete over slices of a shrinking pie. That is how cap-and-trade is supposed to work. When it doesn't work that way—as in phase one of the European Emissions Trading System—it is because companies and/or governments are cheating.[21]

As noted earlier, Schwartz and Randall warn that abrupt climate change could expand the use of nuclear power and endanger peace via proliferation. My guess is that a 50-percent global emission reduction target and a global ban on new coal plants would grow the nuclear industry faster than would abrupt climate change. I'm not fearful of nuclear power, but most environmental groups remain staunchly anti-nuke. Do they really suppose that poor nations will consent to ban coal as an electricity fuel and not demand access to nuclear power?

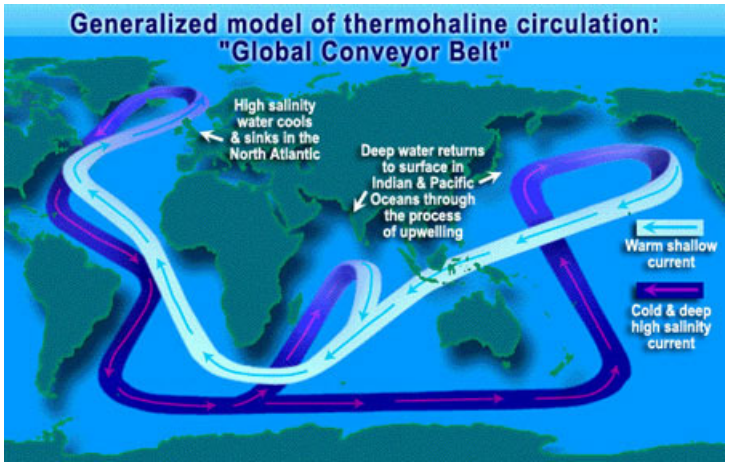
III. How plausible is the Schwartz-Randall abrupt climate change scenario?

The likely response to the foregoing is that even the most aggressive Kyoto-style policies would not endanger world peace and global stability as much as would abrupt climate change. I frankly do not know. Mandating 80- and even 90-percent reductions in U.S. emissions by 2050, as Vice President Gore advocates, mandating a 50-percent cut in emissions worldwide, banning new coal plants around the world, and attempting to enforce these policies through trade sanctions would, in my judgment, create endless conflicts and destroy America's leadership in the world.

But let's stipulate for the sake of argument that abrupt climate change is potentially a greater security threat. Nonetheless, if the Schwartz-Randall scenario is implausible, we would be unwise to adopt geo-politically risky policies in the hope of averting it.

The Schwartz-Randall abrupt climate change scenario goes as follows. Global warming increases the amount of fresh water entering the North Atlantic from glaciers, the Greenland ice sheet, rainfall, and river discharges. As the surface of the North Atlantic becomes fresher, it also becomes less dense. The less dense it becomes, the more slowly it sinks. Eventually—Schwartz and Randall conjecture as soon as 2010—it sinks too slowly to pull warm water up behind it from the tropics. The Atlantic branch of the thermohaline circulation, or THC,[22] popularly known as the oceanic "conveyor belt," shuts down. Average annual temperatures "fall by 5 degrees Fahrenheit over Asia and North America and up to 6 degrees Fahrenheit in Europe."[23]

How likely is this? Schwartz and Randall say this scenario is "plausible" because rapid cooling happened twice before in our current inter-glacial period, the Holocene.[24]



Some scientists believe that a sudden infusion of fresh water may have disrupted the conveyor belt and caused cooling events 12,800 and 8,200 years ago. But in both cases, this happened when giant ice dams—relics of the previous ice age—burst, allowing huge fresh water lakes to drain swiftly into the North Atlantic. An estimated 9,500 cubic kilometers of fresh water poured into the North Atlantic 12,800 years ago,[25] and more than 100,000 cubic kilometers 8,200 years ago.[26] The amount of ice melt from Greenland today is a comparative trickle—about 220 cubic kilometers a year.[27]

Is the THC slowing down? In 2005, Harry Bryden and two colleagues at the UK's National Oceanography Center reported a 30 percent decline in the THC's northward flow—only to announce one year later, after more data came in, that this was a false alarm.[28]

In 2006, Christopher Meinen and two colleagues at the Atlantic Oceanographic and Meteorological Laboratory in Miami found no change in the strength of the THC since the late 1980s. Similarly, a team of German scientists headed by Friedrich Schott found no change over the past decade.[29] Another group of mostly German scientists found an actual strengthening of the THC since 1980.[30]

In its Fourth Assessment Report, the Intergovernmental Panel on Climate Change (IPCC) summarized the scientific literature thusly: "Over the last 50 years, no coherent evidence of a trend in the strength of the meridional overturning circulation [THC] has been found."[31]

Finally, I would note that not all scientists believe that a shutdown of the Atlantic THC would have the catastrophic effects on Northern Hemisphere temperatures that Schwartz and Randall postulate. Richard Seager of Columbia University's Lamont-Doherty Earth Observatory argues that the key factor sustaining Europe's mild winters is a difference in the warmth of the prevailing winds that blow across northeastern North America and Western Europe. During the winter, "South-westerlies bring warm maritime air into Europe and north-westerlies bring frigid continental air into north-eastern North America."[32] If this finding is correct, then Europe should continue to enjoy mild winters even if global warming weakens the THC.[33]

IV. Catastrophic sea level rise

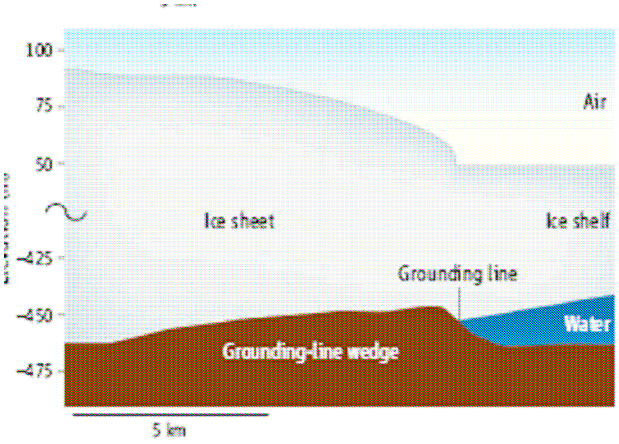
The thermohaline shut down scenario attracted a lot of media attention a few years ago, but today the scenario people worry about most is rapid sea level rise. In *An Inconvenient Truth*, for example, Mr. Gore suggests that sea levels could rise as much as 20 feet in our lifetimes or those of our children.

In the book version, Gore warns that, "If Greenland melted or broke up and slipped into the sea — or if half of Greenland and half of Antarctica melted or broke up and slipped into the sea — sea levels worldwide would increase by 18 to 20 feet." More than 100 million people living in Beijing, Shanghai, Calcutta, and Bangladesh would, he says, be "displaced," "forced to move," or "have to be evacuated." The World Trade Center Memorial would be "under water."

Well, yes, *if* half of Greenland Ice Sheet and half the West Antarctic Ice Sheet suddenly broke up or melted, these dreadful things would happen. The national security "implications" would also be profound. The U.S. armed forces would do little else besides evacuation and rescue operations.

But there is no evidence anything of the sort is likely to occur.

The West Antarctic Ice Sheet is actually more stable than scientists once believed, as *Science* magazine reported in 2007.[34] Scientists using radar imaging discovered a "miles-long pile of sediments as thick as 100 feet deposited beneath the Ross Ice Shelf over the last 1,000 years."



Source: Anderson (2007)

The Ross Ice Shelf is the southern portion of the West Antarctic Ice Sheet and the largest platform of floating ice in Antarctica.

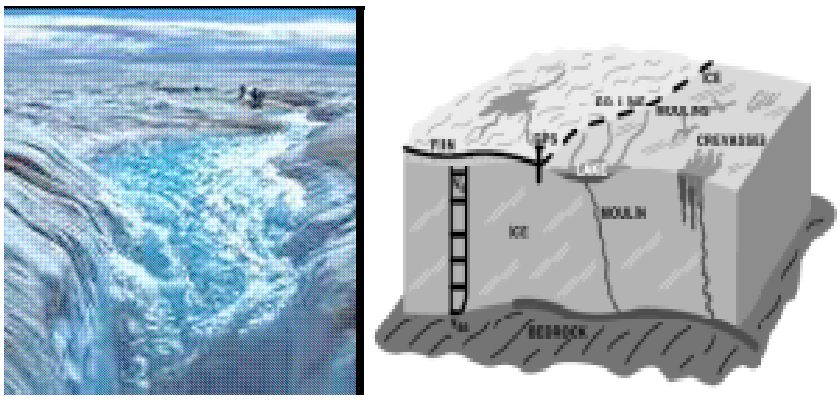
Previous research suggested that sea level rise of a few meters might float the ice shelf off its moorings, hastening its breakup and demise. Thanks to the stabilizing sedimentary deposits, the researchers now estimate sea levels would have to rise by 35 feet to float the Ross Ice Shelf. In other words, more than half the West

Antarctic Ice Sheet would have to fall into the sea to raise sea levels enough to cause half of it to fall into the sea.

Well, Gore also said half of it could melt. But that's not what the U.N. Intergovernmental Panel on Climate Change, the IPCC, is saying. In its 2007 report, the IPCC stated that, "Current model studies project that the Antarctic ice sheet will remain too cold for widespread surface melting, and gain mass due to increased snowfall."[35]

What about the Greenland Ice Sheet? Gore warns that melt water pools on the surface of the ice sheet form "moulins," vertical water tunnels that channel massive amounts of water down to the bottom of the ice. The moulins lubricate the bedrock on which the glacier rests. This process, says Gore, "destabilizes" the ice sheet.

To illustrate how moulins could destroy the Greenland Ice Sheet, Gore presented a photograph and a diagram from a study of moulins published in *Science* magazine in 2002.[36]



Source: Zwally et al. (2002)

In his film, Gore animates the diagram so that the ice sheet begins to split apart along the dashed line. However, the study in *Science* magazine did not hypothesize any such crack up. It found that moulins do accelerate glacial movement in Greenland in the

summertime, but only by a few percent. This means moulins add an extra 5 to 10 meters of movement to a glacier that otherwise would travel about 115 meters in a year. Keep in mind that the Greenland Ice Sheet is huge—about 2,500 kilometers long and 1,000 kilometers wide.

A 2008 study, also published in *Science*, provides additional evidence that moulins pose no threat to civilization.[37] The study found that the rate of glacial flow of several outlet glaciers in Greenland, including the biggest, Jakobshavn Isbrae, are "relatively insensitive" to the process of bedrock lubrication by moulins.

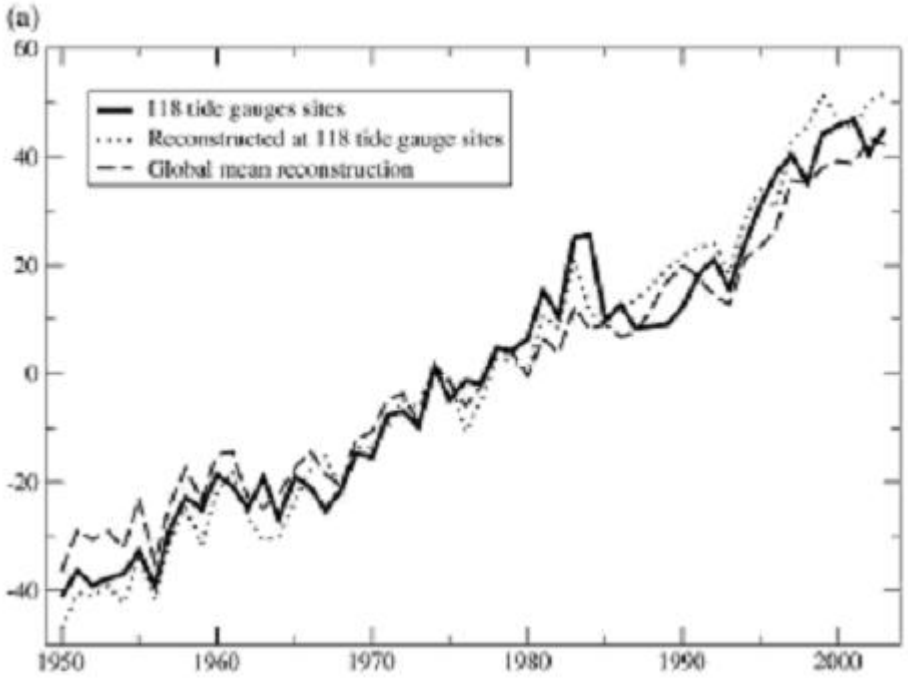
A companion article notes that an entire melt-water lake 4 kilometers long and 8 meters deep disappeared down a moulin in about 1.4 hours. The water rushed down the moulin "at an average rate of about 8,700 cubic meters per second, exceeding the average flow over Niagara Falls." Sounds terrifying, doesn't it? But, the article reports, "For all the lake's water dumped under the ice that day and all the water drained into new moulins in the following weeks, the ice sheet moved only an extra half-meter near the drained lake."[38] To repeat, the Greenland Ice Sheet is measured in thousands of *kilometers*.

Could global warming melt half the Greenland Ice Sheet, as Gore suggests? A modeling study reviewed by the IPCC in its 2001 report estimated that 5°C of additional warming would melt about half of Greenland's ice—over a thousand years.[39] Nobody can forecast temperatures that far into future. However, it's a safe bet that global energy infrastructure will have turned over many times long before then.

So how much sea level rise can we reasonably expect in the 21st century? The IPCC's 2007 report [Summary for Policymakers, p. 13] estimates a range of 0.18 to 0.59 meters, or 7 to 23 inches, with

a mean forecast of 14 inches. That's a far cry from Gore's 18-20 feet. Fourteen inches is about as much sea level rise as has occurred since the 1860s. Something else rose much faster—real estate values for beachfront property.

Although the IPCC sea-level rise estimate is much lower than Gore's, it may still be too high. A study published in the journal *Global and Planetary Change* found that global sea levels rose by 1.48 mm/yr from 1955 to 2003, with no acceleration during those five decades. That translates into 14.8 centimeters or 5.8 inches in a century.[40]



Source: Berge-Nguyen et al. (2008), Sea level rise, 1950-2003, in millimeters

No child should go to bed worrying about a 20-foot wall of water. Neither should the generals at DOD.

But let's assume sea level rise will accelerate through the 21st century, and that sea levels will rise close to the high end of the IPCC range of 7 to 23 inches. Here again, global warming policies could create more risk than they avert.

Consider the case of Bangladesh, a country with lots of land near and below sea level. Reason Foundation science correspondent Ronald Bailey notes that in 2006, Bangladesh's $55 billion economy was growing at 6 percent per year. If that growth rate continues, the Bangladesh economy will be $1 trillion in 2050 and $18.5 trillion in 2100. But now assume that the threat of trade sanctions induces Bangladesh to adopt a carbon tax, or that global restrictions on energy use slow global GDP growth, and Bangladesh's growth rate drops by just one percentage point, to 5 percent per year. In that case, the Bangladesh economy is only $630 billion in 2050 and $7.2 billion in 2100.[41]

A small reduction in the economic growth rate compounds into big long-term differences in national wealth. A poorer Bangladesh will have fewer resources to invest in education, health care, and, yes, protection from sea-level rise. Bangladesh could actually lose more land to sea level rise in a poorer cooler world than in a richer warmer world.

If defense intelligence analysts are going to examine the national security implications of the potential impacts of sea level rise on developing countries, then they should also consider the implications of climate policy choices that could impair the ability of countries like Bangladesh to protect themselves from sea level rise.

More broadly, defense analysts should consider the security implications of policy choices that by restricting trade, increasing energy costs, and slowing global GDP growth, impair the ability of

developing countries to solve persistent underlying problems—like hunger, malaria, and coastal flooding—that climate change might exacerbate.

V. Conclusion

The global warming debate suffers from a profound lack of balance. Proponents of carbon suppression policies spotlight, trumpet, and even exaggerate the risks of climate change but ignore or deny the risks of climate change policy.

This one-sided perspective dominates recent attempts to link global warming to national security concerns. The remotest possibility of abrupt climate change is seized upon as a rationale for policies with enormous potential to harm people, the economy, and, indeed, national security. This hearing will have served a valuable purpose if it begins to redress the balance.

Bio

Marlo Lewis, Jr. is a Senior Fellow at the Competitive Enterprise Institute (CEI), where he writes on global warming, energy policy, regulatory process reform, and other public policy issues. Prior to joining CEI, Marlo served as director of external relations for the Reason Foundation and as staff director of the House Government Reform Subcommittee on Regulatory Affairs. He has published in National Review, the Washington Times, Investors Business Daily, the American Spectator, Tech Central Station, Energy, Pollution Liability Report, and The Hill. He has appeared on various TV and radio programs including Oprah Winfrey, C-SPAN, CNBC Capital Report, CBC-News Marketplace, and BBC TV. He holds a Ph.D. in Government from Harvard University and a B.A. in Political Science from Claremont McKenna College.

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[1] John Christy, "My Nobel Moment," Wall Street Journal, November 1, 2007, http://online.wsj.com/public/article/SB119387567378878423.html. Christy estimates that even if the entire world adopted California's new emissions standards, which effectively set fuel economy requirements at 43 miles per gallon within the next decade, "the net effect would reduce projected warming by 0.05 degrees Fahrenheit by 2100, an amount so miniscule as to be undetectable."

[2] National Research Council, *Effectiveness and Impacts of Corporate Average Fuel Economy Standards* (2002), page 3, finding 2, http://books.nap.edu/openbook.php?isbn=0309076013&page=3

[3] Jonathan Lewis, Clean Air Task Force, Leaping Before They Looked: Lessons from Europe's Experience with the 2003 Biofuel Directive, October 2007, http://www.catf.us/publications/reports/Leaping_Before_They_Looked.pdf

[4] Energy Information Administration, Energy Market and Economic Impacts of S. 2191, the Lieberman-Warner Climate Security Act of 2007, p. viii, http://www.eia.doe.gov/oiaf/servicerpt/s2191/pdf/sroiaf(2008)01.pdf
[5] Harvey Brenner, The Health Benefits of Low Cost Energy: An Econometric Case Study, Air and Waste Management Association Forum, 2005, http://www.ceednet.org/docs/Brenner%20Coal%20Case%20Study%20Nov05.pdf
[6] Peter Schwartz and Doug Randall, An Abrupt Climate Change Scenario and Its Implications for United States National Security, October 2003 (hereafter cited Schwartz and Randall). The study is available at http://www.climate.org/PDF/clim_change_scenario.pdf
[7] Schwartz and Randall, p. 19.
[8] Compare line 1797 in the Reference and the Limited/No International Cases, http://www.eia.doe.gov/oiaf/servicerpt/s2191/excel/s2191bivnoi.xls.
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