

Controversial New Climate Change Data: Is Earth's Capacity To Absorb CO₂ Much Greater Than Expected?

ScienceDaily (Nov 11, 2009) — New data show that the balance between the airborne and the absorbed fraction of carbon dioxide has stayed approximately constant since 1850, despite emissions of carbon dioxide having risen from about 1.7 billion tons a year in 1850 to 23 billion tons a year now.

This suggests that terrestrial ecosystems and the oceans have a much greater capacity to absorb CO₂ than had been previously expected.

The result is an entirely new synthesis of recent research which expects that the capacity of terrestrial ecosystems and the oceans to absorb CO₂ will start to diminish as CO₂ levels continue to rise, letting greenhouse gas levels skyrocket. Dr. Wolfgang Knorr at the University of Hamburg found that so far the trend in the airborne fraction since 1850 has only been 0.1 to 0.4% per decade, which is essentially zero.

The strength of the new study, published online in *Geophysical Research Letters*, is that it rests solely on massive means and statistical data, including historical records extracted from Antarctic ice, and does not rely on computer models with complex climate models.

This is an extremely important climate change point, because it sets out what is to be negotiated at the United Nations Climate Change Conference in Copenhagen early in December. It has been based on projections that have a carbon free sink of ability, matched in some research to have a carbon free sink, for this approach, including evidence that suggests the sink is already starting to decrease.

So is this good news for climate negotiations in Copenhagen? "Not necessarily," says Knorr. "Like all studies of this kind, there are uncertainties in the data, so rather than relying on Nature to provide a free service, we're picking up our own carbon, we need to accept that the proportion being absorbed has not changed."

Another result of the study is that emissions from deforestation might have been overestimated by between 18 and 75 percent. This was in agreement with results published in early November in *Science* by a team led by Guido van der Werf from VU University Amsterdam. They used a new deforestation data and concluded that emissions have been overestimated by an overall factor of two.



New data show that the balance between the airborne and the absorbed fraction of carbon dioxide has stayed approximately constant since 1850, despite emissions of carbon dioxide having risen from about 1.7 billion tons a year in 1850 to 23 billion tons a year now. Credit: Dr. Wolfgang Knorr

Journal reference

Knorr et al. Is the airborne fraction of anthropogenic CO₂ emissions increasing? *Geophysical Research Letters*, 36, L21102, 10.1029/2009GL040613

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Record High Temperatures Far Outpace Record Lows Across US

ScienceDaily (Nov. 12, 2009) — Spurred by a warming of mean daily record high temperatures recorded twice as often as record lows over the last decade across the continental United States, new research shows. The ratio of record highs to lows is likely to increase dramatically in coming decades if emissions of greenhouse gases continue to climb.

"Climate change is making itself felt in terms of day-to-day weather in the United States," says Gerald Mehl, the lead author and a senior scientist at the National Center for Atmospheric Research (NCAR). "The ways these trends are being broken show how our climate is already changing."

The study, by authors at NCAR, Colorado State University, The Weather Channel, and the National Oceanic and Atmospheric Administration (NOAA), has been accepted for publication in *Geophysical Research Letters*. It was funded by the National Science Foundation, NCAR's sponsor, the Department of Energy, and Climate Center.

If temperatures were not warming, the number of record daily highs and lows being set each year would be approximately even. Instead, for the period from January 1, 2000, to September 30, 2009, the continental United States set 9,127 record highs and 4,142 record lows, as the country experienced a rise in 1.2 warmer weather days for every summer day warmer.

A record daily high means that temperatures were warmer on a given day than on that same date throughout a weather station's history. The authors used a computerized process to create the reliability of data from thousands of weather stations across the country, with a focus on data over the past six decades to capture long-term trends.

This decade's warming was more pronounced in the western United States, where the ratio was more than two to one, than in the eastern United States, where the ratio was about one and a half to one.

The study also found that the two-to-one ratio across the country still would be exceeded — if by a comparatively small number of record lows than in a large number of record highs. This is the case that much of the nation's warming is occurring at night, when temperatures are dropping less often for record lows. This finding is consistent with years of climate model research showing that night-time record lows would be expected with climate change.

More records ahead

In addition to surveying actual temperatures, Mehl and his co-authors tested a regional climate computer model of global climate to determine how new record high and low temperatures are likely to change during the course of this century.

The modeling results show a rise, if not an increase, in the number of greenhouse gases via "business as usual" scenarios, the U.S. rate of daily record high to record low temperatures would increase to about 50-to-1 by mid-century and 90-to-1 by 2100. The multi-century ratios could be much higher. That is, with one-to-one even greater pace, or ratio, to be about 9-to-1 if emissions were reduced significantly, the model shows.

The authors caution that such long forecasts, by their nature, must use climate models not designed to capture mean daily highs and lows with precision, and it remains impossible to know future temperature trends with any degree of accuracy. The model used for the study, the NCAR-based Community Climate System Model, consistently captured the trends toward warmer average temperatures and the greater warming in the West, but over-stated the ratio of record highs to record lows.

However, the model results are expected because they show that, in all key scenarios of future greenhouse gas emissions, record daily highs should increasingly outpace record lows over time.

"To the climate-watcher, you would expect the number of temperature records to diminish significantly over time," says Claudia Tebaldi, a senior scientist with Climate Central who works on the paper's co-authors. "As you measure the high and low daily temperatures each year, it naturally becomes more difficult to break a record each number of years. But if the average temperatures continue to rise this century, we will keep setting more record highs."

An expanding ratio

The study team focused on weather stations that have been operating since 1950. They found that the ratio of record daily high to record daily low temperatures significantly exceeded one in the 1950s, dipped below that level in the 1960s and 1970s, and has risen since the 1980s. This results reflect changes in U.S. average temperatures, which rose in the 1950s, stabilized in the 1960s, and then began a warming trend in the late 1970s.

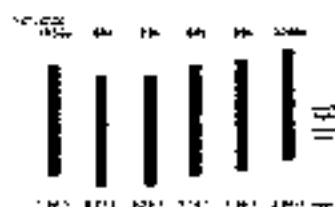
Even at that 10-year intervals of this year, when the United States cooled somewhat on a strictly national level, warming was the ratio of record daily high to record daily low temperatures was more than three to one.

Despite the increasing number of record highs, there will still be occasional periods of record lows, Mehl notes.

"One of the messages of this study is that you as a citizen can't say, 'Winter will be colder. Even in a much warmer climate, we're setting record low temperatures on a few days each year.' But the odds are shifting so there's a much better chance of setting record highs instead of lows."

Millions of readings from weather stations across the country

The study team analyzed several million daily high and low temperature readings taken over the span of six decades at about 1,500 weather stations across the country, thereby creating a complete historical daily high and low record. The readings, collected at the National Oceanic and Atmospheric Administration's National



This graphic shows the ratio of record daily high to record daily low temperatures in about 1,500 weather stations in the 48 contiguous United States from January 1, 1950, through September 30, 2009. Each bar shows the proportion of record highs to record lows (blue) for each decade. The 1950s and 1970s are slightly more record highs to than highs, but in the last 30 years record highs have increasingly predominated, with the ratio now again rising for the 42 states as a whole. Credit: Copyright © 2009 graphic by Mike Stuber.

Climate Data Center, undergo a quality-control process at the data center that looks for such potential problems as missing data as well as inconsistencies caused by changes in the meters, station locations, or other factors.

Mitch and his colleagues then used temperature simulations from the Community Climate System Model to compute daily record-high and low values, and compare future atmospheric concentrations of greenhouse gases.

Journal reference:

David A. Mitchell, Claudia Deser, Guy Walton, David Easter, and Larry McDaniel. "The relative increase of record high maximum temperatures compared to record low minimum temperatures in the U.S." *Geophysical Research Letters*. In press.

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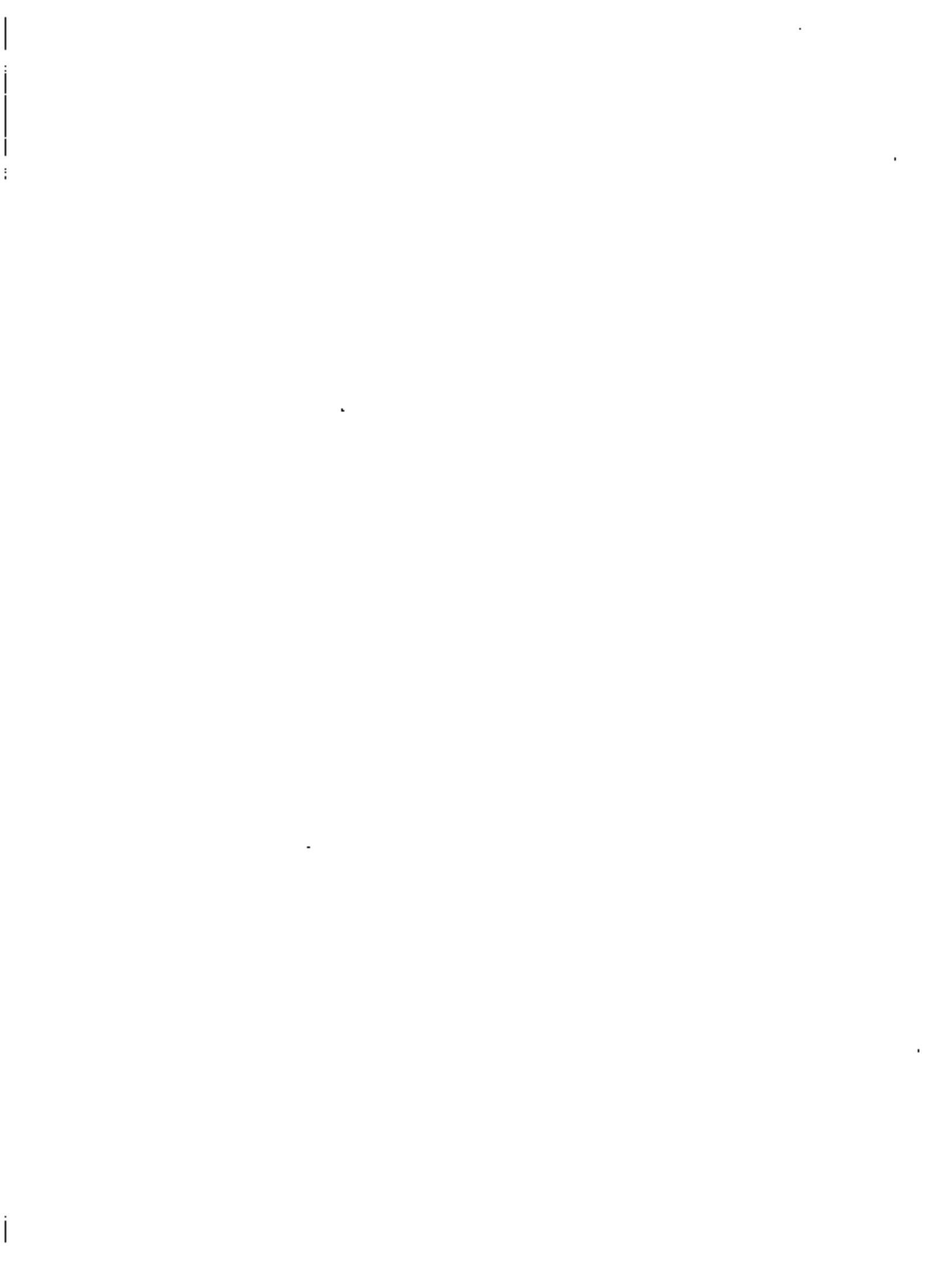
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NOVEMBER 17, 2009 6:00 AM ET

Get Smart: Honeywell, So Cal Edison Team Up to Curb Electricity Demand

Honeywell landed today an \$11 million grant from the Energy Department to install smart-grid technology in California. The size of the grant belies its potential importance in helping California—and eventually the country—use energy more wisely.

In short, Honeywell will install gear that helps big industrial and commercial users of Southern California Edison automatically downshift their electricity consumption the few days a year when California uses "critical peak pricing." The state has been toying with peak pricing regimes for years, but has largely left electricity users to respond manually.

Call it the smart half of the smart grid—allowing users to easily and automatically change how and when they use electricity. Both the utility and Honeywell figure that automating electricity demand in that way can roughly double the amount of juice not used compared with today's systems.

The idea carries lots of potential benefits. By stalling or eliminating electricity demand at peak periods, there's less risk of brownouts and blackouts—with all the billions of dollars that costs the economy.

Businesses, and increasingly regular consumers, can save money, because electricity prices at those super-peak periods are a lot higher than normal and off-peak rates.

And utilities, like So Cal Edison, can save money by building fewer power plants to provide that extra cushion of power to meet the absolute peak demand for fifty or one hundred hours a year. Negawatts are a lot cheaper than megawatts.

Larry Oliva, director of tariff programs at SCE, figures smarter commercial energy use through the new system could obviate the need for 1,700 megawatts of new peak power plants. "This could be a huge money saver for us," he says.

Business is a logical place to start this sort of thing. Businesses and factories use a lot more energy per square foot than even the biggest McMansions, for starters. And they're already equipped with all kinds of control systems, making it easier to introduce new gizmos. But the next big challenge will be to bring the true smart grid to regular homes. Honeywell is already working with other utilities in California and other states to roll out automated systems for regular homes.

That's because the potential stakes are huge—which has Honeywell rubbing its hands. "With today's existing technology, we can save 15% to 20% of U.S. energy use," says Dan Sheffin, chief technology officer at Honeywell Automation and Control Solutions. "And 30% is a very realistic goal" for the future, he adds.

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THE WALL STREET JOURNAL

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NOVEMBER 18, 2009, 9:27 AM ET

NIMBY: How Much Green is Too Much?

Never underestimate the potential of NIMBYism to throw a wrench in new energy projects.



Eternal battleground

A few new developments out of—where else—California this week illustrate the perennial collision between new energy and old interests, varied as they may be.

For instance, should homeowners be allowed to put up any kind of solar-power installation, or should the rules of their community take precedence over any green rush? That's been an issue all over the U.S. and even overseas: New British government planning rules are specifically designed to promote clean energy over local reticence.

But in California, the issue has gone to court—Los Angeles Superior Court—in a case that pitted a homeowner's association against a rogue neighbor. The verdict? The jury just ruled against the homeowner who

refused to remove panels that violated the community's rules.

"This verdict is a vindication of the right of homeowners associations to protect the communities they manage and to balance the need for renewable energy with the integrity of their communities," said Ricardo Cestero, lead attorney for the plaintiffs.

In that case, it wasn't a blanket rejection of solar power per se, but about the limits of green zeal. As the press release from the victorious lawyers notes, "While the HOA had allowed other homeowners in the 1,100-home community to install solar panels, the defendants' installation was rejected for reasons of safety and aesthetics."

California has long styled itself a national leader in the clean-energy push, but it's also got more than its share of NIMBYism. Take the never-ending debate over solar projects in the Mojave Desert, long a nightmare for Sen. Dianne Feinstein.

BrightSource's 440-megawatt solar-power project for the desert just got a thumbs down from San Bernardino County Supervisor Brad Mitzelfelt, according to the L.A. Times.

"Obviously, there is a lot of political pressure to get this project expedited and under construction," Mr. Mitzelfelt said. "But its impacts in San Bernardino County and sensitive and scenic Mojave Desert environment are not worth the benefits."

All of which raises the question: Since NIMBYism isn't going away, and is a fact expanding beyond "backyards," isn't it time for a new acronym?

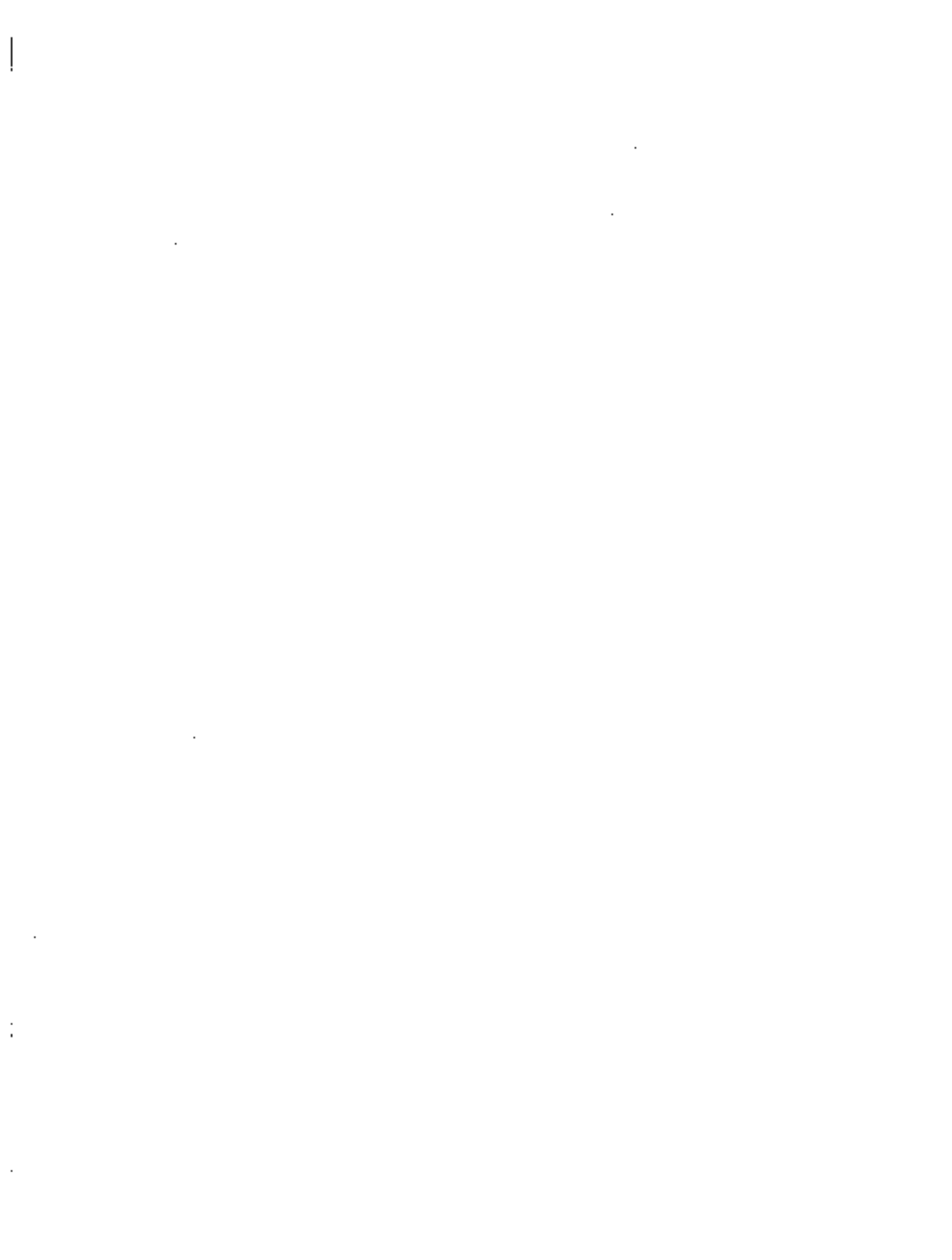
NIMHOA—Not In My Home Owner's Association—has a soothing Polynesian lilt. And for the much broader and pitched battle

over: whether to promote solar power or protect desert tortoises, how about NIMROD—No! In My Range Of Desert?

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- FOXNews.com

- November 23, 2009

U.S. to Propose Emissions Reduction Target at Copenhagen Next Month

The United States will propose an emissions reduction target at a U.N. climate change summit in Copenhagen next month, the White House said Monday.



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The United States will propose an emissions reduction target at a U.N. climate change summit in Copenhagen next month, the White House said Monday.

An administration official said that a decision will be made soon on whether President Obama will

attend the meeting, at which the attending nations plan to map a strategy to combat global warming.

China and the United States are the world's top two carbon polluters, according to the World Resources Institute. The European Union on Monday urged the two nations to commit to new targets at the Copenhagen summit.

Swedish Prime Minister Fredrik Reinfeldt called both nations' refusal to commit "untenable." Inaction "does not solve the threat of climate change," he wrote on an EU Web site.

The EU has pledged to cut greenhouse gas emissions by 20 percent below 1990 levels to 30 percent if others follow suit. By 2050, it wants to eliminate most emissions, with a target of up to 95 percent.

Congress has stalled on climate change legislation as it battles over health care. That leaves the world body unlikely to reach a legally binding agreement at the summit, and instead aiming for political commitments.

Obama said during his trip to Asia last week that the U.S. and China want the Copenhagen summit to lead to an agreement that has "immediate operational effect."

We "agreed to work toward a successful outcome in Copenhagen," Obama said after his meeting last week with Chinese President Hu Jintao.

"Our aim there is .. not a partial accord or a political declaration, but rather an accord that covers all the issues in the negotiations and one that has immediate operational effect."

Monday's White House announcement came as Michel Jarraud, the head of the U.N. World Meteorological Organization, reported that concentrations of greenhouse gases are at their highest levels ever recorded and climbing.

Scientists who support climate change theories say the rise in temperatures expected in coming decades demands urgent action, but skeptics are arguing that the evidence is being manipulated by a group of scientists who seek to benefit.

About 1,000 e-mails and 3,000 documents covering a decade's worth of exchanges among the leading scientists were stolen last week from England's University of East Anglia Climatic Research Unit. The materials were posted on Web sites and seized on by climate change skeptics.

Kevin Trenberth, of the U.S. National Center for Atmospheric Research in Colorado and the lead author of the U.N.'s 2001 and 2007 Intergovernmental Panel on Climate Change assessments, is among a group whose private e-mails were recently stolen by hackers and posted online.

Trenberth, who saw many of his e-mails posted, said he believes leaks may have been aimed at undermining next month's summit.

"It is right before the Copenhagen debate, I'm sure that is not a coincidence," Trenberth said.

The Associated Press contributed to this report.

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THE WALL STREET JOURNAL

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NOVEMBER 23, 2009

Energy and the Environment

After decades of drifting, the U.S. is moving toward a more-coherent energy policy. For the energy industry, that is both a boon and a threat. The broad goals of any new legislation and regulation are clear enough: to cushion the volatility of energy prices and curb greenhouse-gas emissions.

But the details are fuzzy, and those details will determine whom the energy transformation helps and hurts. Figuring that federal limits on greenhouse-gas emissions are inevitable, for instance, the industry wants the rules to come from Congress rather than from the Environmental Protection Agency. The reason: It thinks it can lobby Congress to cushion the blow more easily than it can lobby the EPA.

Jeffrey Ball, the Journal's environment editor, moderated the task-force discussion on energy and the environment. Here are edited excerpts of the presentation of their priorities to the CEO Council.

JEFFREY BALL: *There were a couple of broad pieces that I think are important to reflect—areas that the group thought were underappreciated. One is that people tend not to understand the scales that are the reality in the energy industry, that different areas of energy supply get thrown around without an appreciation of what really powers this world of ours.*

Second to that point, is that the vast majority of global energy comes from fossil fuels, and is predicted to continue to stay that way for several decades. And third, in terms of using energy more efficiently, it's probably not prudent to suggest that people are going to change their behavior of their own volition. And so there are going to have to be more structural reforms in the economic setup of the energy industry.

Let me just ask Lynn EISENHANS to talk about the first priority, which has to do with domestic energy supply.

LYNN EISENHANS: To put this in context, the EIA [Energy Information Administration] forecasts that energy demand globally of all types will grow more than 50% in 20 years, and that in the U.S. it will grow as much as 30%. And further, petroleum will be 60% of total demand, and, if you put all fossil fuels in there, it's probably over 80% of the demand.

So anything that doesn't address that is really going to ignore some fundamental problems if we're going to keep energy both secure and affordable, along with clean.

The key concepts that were put forward on this point were, one, the concept of diversification. We need it all. We have a lot of demand out there. To keep it secure, affordable, we need to develop it all. The second point is more of an emphasis on domestic resources and the development of domestic resources. Most countries in the world do take the resources they have and make the most of them, and the U.S. should do the same.

We have vast resources of coal. We now have, through new technologies, vast resources of natural gas. If we

had more access, we could have additional oil and gas from both conventional and unconventional sources. And yes, if we're going to have clean energy and zero emissions, we have to vastly expand the amount of nuclear energy in this country, and we should embrace all forms of renewable energy.

Pursuing Efficiency

MR. BALL: *The second priority had to do with efficiency broadly defined.*

LOUIS CHÈNEVERT: We had a discussion that suggests that at all levels in the supply chain, as well as in the consumer end, there's opportunities to substantially improve efficiency, as well as emissions.

We had discussions on what can be done with coal power plants or traditional plants to improve their emissions. Technology is available today. It's a question, sometimes, of return on investment and having a level playing field and knowing that you can get return for the investments that you'll put in.

The same is true, whether it's residential or commercial buildings.

There's a lot of technology available today that could reduce energy consumption substantially, and there's a need for labeling, for regulation that would force, basically, the adoption of some of these technologies that would have substantial impact on energy and the environment. In the discussion, I noted the fact that for large buildings, the recipe is there today to reduce consumption by 70%. Thirty percent is available easily—it's probably got less than a five-year payback.

The Need to Store

CARLOS GHOSN: If I can add one point to what has been said about energy efficiency, the ability to store energy is absolutely important.

Today, we know that we don't have any system allowing you to store energy, which means that when you invest in capacity, you invest in function of the peak consumption. Because if you don't invest in function of the peak consumption, you're going to create a situation of blackouts, which are very damaging.

So I think focusing and developing capacity to store energy for individuals, for facilities, for public services, for plants is absolutely fundamental to have a much higher efficiency in terms of use of energy.

MR. BALL: *There was an interesting discussion about what policies would be necessary to induce moves toward efficiency. And one of the discussions was whether there ought to be a call for higher energy prices that is, a direct call as opposed to a sort of less-direct call in the form of a cap-and-trade policy. There was a feeling that this group did not want to call for higher energy taxes, but that cap-and-trade was going to do that.*

So why don't we move into that—the third priority. There were those in the group who didn't want to recommend anything on carbon regulation, and indeed, who thought that the best policy would be no government action to restrict carbon emissions.

There was a larger group that felt it didn't really matter what the group wanted in that regard, because carbon regulations are coming, and so the group ought to make some suggestion as to what is the lesser of two evils.

There were a few points of agreement here.

First of all, that the EPA should not be regulating carbon emissions--that this ought to be up to Congress to act.

Second, that remembering in the design of any cap-and-trade system that fossil fuels provide about 80% of global energy today, and are likely to continue to do that. And so to the degree that a cap-and-trade program incentivizes a diversity of energy resources, it needs to keep that reality in mind.

And third and really important, the point of global competitiveness--that the U.S. should not do anything on carbon regulations in the absence of action by other countries, particularly countries in the developing world.

Frustration With the Grid

MR. CHÈNEVERT: With regard to upgrading the electrical grid, there are so many roadblocks to overcome that eventually, it gets frustrating and it's always sub-optimized. If we're going to really succeed at energy efficiency, and the introduction of renewables, without an efficient grid it's not going to happen. So this is something that's a very high priority for the group and it's something that needs to be addressed fairly quickly if we're going to make substantial changes in the efficiency of the whole system.

MR. BALL: *This was one area in which there was really no disagreement on the desire for increased federal control. It was very interesting that if the government is going to essentially demand that energy resources be diversified, it has to give business the tools to make that happen.*

MR. GHOSN: On the fifth recommendation, the main point about transportation is the fact that today in the U.S., and in practically all the developed or developing countries, we're all net importers of oil.

Second, it is the only fuel for transportation. That means that if there is a problem with oil, the whole transportation system is paralyzed. And we came to the conclusion that oil is not the enemy, but too much dependence on oil becomes something that is very precarious.

So by saying diversify the transport system, we're saying, because it's a strategic consideration and also an economic consideration, a lot of effort should be made -- partnerships between governments, states, municipalities, companies, car companies, utility companies -- in order to find the best system adapted to the country or adapted to a specific city to bring electricity as a diversification from oil for transportation.

MR. BALL: *There was a sense in the group that this was a particularly interesting area for actual business-government cooperation.*

MR. GHOSN: Exactly. This is something that cannot happen because one company wants it or because one municipality or one government wants it. You need the technology, so you need the technology of the battery, you need technology from car makers, you need utilities to step in.

In fact, you know, we're signing a lot of agreements with the utility companies across the globe who are saying, well, this is an opportunity for us to increase our market share or increase our presence.

You need governments to be interested in putting their acts behind their will of being less dependent on oil or creating an environment where you have less emissions. And in fact, we're seeing today very clearly which are the governments and the municipalities standing up and saying OK, what do you need for this to become a reality? What kind of infrastructure, what kind of partner do you need? Without partnership, it can't work.

Agreement From Markey

ALAN MURRAY: *Ed Markey is the chairman of the special select committee that the House of Representatives established to deal with climate-change issues. You've had a chance to look over the recommendations; you've heard some of what they had to say.*

EDWARD MARKEY: I agree with your plan. I think that the priorities that you have selected are the most important ones, which is why each one of them is included inside of the Waxman-Markey legislation.

We have a broad array of incentives for all energy sources. On promoting energy, we include the largest single increase in funding for energy efficiency in any legislation in the history of our country.

We include a requirement that all new buildings have to be 50% more efficient in their energy consumption by the year 2016—dramatic increases in appliance efficiency. We give \$10 billion each year to the states to incentivize efficiency within their states.

We have passed a cap-and-trade bill. I think many of the executives who are represented here feel comfortable with that because they're already doing business in Europe, which has a system in place.

I think there's a higher comfort level, the larger the company, in terms of moving in this cap-and-trade direction.

We built billions of dollars of funding into Waxman-Markey for the smart grid, as we did into the stimulus package in February to telescope the time frame it will take for our nation to lay this out.

And finally, diversifying the transportation system: We moved, with incentives as well, more toward using natural gas as a source of energy, especially in the bus and the large truck fleet.

Winners and Losers

MS. ELSENIANS: Congressman, I'm a refiner and one of the principles that was put forward is what the task force said was a level playing field and not picking winners and losers.

There are many very good features about the bill, and I applaud those, but you've clearly picked refiners as a loser.

And you talk about Europe and being like Europe—well, it's not like Europe at all, because the Europeans got all the allowances for nothing and the European refiners were not responsible for the emissions of their customers. They were only responsible for their stationary emissions.

I fear that what we're doing is, we're basically going to disadvantage all U.S. refiners, all U.S. heavy industry—energy-intensive industries—and force those industries overseas. And so what we're going to do is end up trading off importing oil for importing products, and in the meantime, transporting jobs—good-paying jobs—from the U.S. overseas.

I will only speak for my company. I'm very willing to have my stationary emissions be part of cap-and-trade and learn how to be more energy efficient.

But asking us to also handle the emissions of our customers puts us in great peril. And basically, our ability to cap and trade is going to be more important than our ability to transform crude oil into products and deliver

those products to our customers.

REP. MARKEY: We put about \$2.5 billion per year in the deal with the additional cost for the refining industry, but that's still subject to negotiation as the bill moves through the Senate.

In addition, we actually put in a border tariff that is triggered in 2020 that will protect energy-intensive, trade-vulnerable industries from exploitation by China or India or other countries who are not engaging in the same kind of reduction in greenhouse-gas emissions that we are, so that there's a real signal being sent to the rest of the world.

We're not going to stand by and watch our steel, aluminum, cement and other energy-intensive industries get exploited by us moving along with the Europeans.

I think we have to be realistic here as we're going forward so that we are building in the protections for those energy-intensive industries.

Challenges of the Grid

MR. CHÉNEVERT: Congressman, how do you see overcoming some of the challenges on this electrical grid, because there are municipalities involved, there are people who don't like to see a hydro tower in the back of their homes, and you've got the Federal Energy Regulatory Commission that's involved?

That was the debate that we were having this morning on the difficulty of actually siting and implementing the electrical grid, and do you see anything that can be done to accelerate that process and, therefore, welcome the renewables, for example, into the communities?

REP. MARKEY: The Obama administration has put together an interagency task force for the first time so that there's coordination in the siting of these energy facilities. They clearly are intending on unleashing this renewable energy agenda.

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The Top Five Recommendations – CEO Panel

1. DIVERSIFY U.S. ENERGY

The U.S. should encourage all domestic energy supplies, including coal, expanded access to oil and gas coming from both conventional and unconventional sources, nuclear power and all renewables. Government shouldn't pick winners; let the markets decide.

2. PROMOTE ENERGY EFFICIENCY

Establish a holistic approach, supported by business, that produces energy efficiencies, from production to consumption. Policies should include tax credits, accelerated depreciation, altered building codes and performance standards. Change utility regulatory structure so utilities can recover cost of investments. Educate consumers about energy-efficiency methods.

3. CAP-AND-TRADE BILL

Instead of the EPA regulating greenhouse-gas emissions, Congress should set a cap on carbon emissions that protects the U.S. economy. The cap should recognize that most energy will continue to come from fossil fuels. The U.S. should not act alone on global warming. There should be a trigger requiring a global framework.

4. FEDERAL PLAN FOR ELECTRIC GRID

Congress should enact federal authority to deploy a more efficient electric grid that enables the diversification of U.S. energy supplies, gives the federal government more authority to site transmission lines through eminent domain and gives the Federal Energy Regulatory Commission the power to allocate costs.

5. DIVERSIFY TRANSPORTATION SYSTEMS

In its tax, regulatory, and investment policies, the government should stimulate transportation systems consistent with the broad goals of diversifying energy sources and reducing greenhouse-gas emissions.

Climate Studies to Benefit from 12 Years of Satellite Aerosol Data

ScienceDaily (Nov. 10, 2009) — Aerosols, very small particles suspended in the air, play an important role in the planet's climate balance and in regulating climate change. They are one of the greatest sources of uncertainty in climate change models. ESA's GlobAerosol project has been making the most of European satellite capabilities to monitor them.

Using data from the Along Track Scanning Radiometer-2 on the ERS-2 satellite, the Advanced Along Track Scanning Radiometer and the Medium Resolution Imaging Spectrometer on Envisat and the Spinning Enhanced Visible & Infrared Imager (SEVIRI) instrument on the Meteosat Second Generation, GlobAerosol has produced a global aerosol dataset going back to 1995. The full dataset is available on the GlobAerosol website.

Some aerosols occur naturally, originating from sea-spray, wind-blown dust, volcanic eruptions and bioaerosols emitted from oceans and forests, while others are produced through emissions from industrial pollution, road fuel burning, man-made forest fires and agriculture.

They are important because they strongly affect Earth's energy balance in two ways: they scatter and absorb sunlight and infrared emission from Earth's surface, and act as condensation nuclei for the formation of cloud droplets. According to the Intergovernmental Panel on Climate Change, these effects tend to cool the planet to about the same degree as carbon dioxide warming would. These estimates are uncertain, however, so more data are needed.

Satellite data can provide essential information on the global distribution of aerosols to help understand the impact of these processes for the purposes of predicting weather and climate as well as for monitoring the transport of industrial pollution.

To investigate the usefulness of the dataset, pilot studies were carried out by six atmospheric modelling groups from the European Centre for Medium-Range Weather Forecasts, the Laboratoire des Sciences du Climat et l'Environnement, the University of Leeds, the University of Edinburgh, the Max Planck Institute for Meteorology, and the Netherlands Organisation for Applied Scientific Research (TNO). Comparing the satellite data with the model predictions showed differences that helped to highlight deficiencies in both.

Results of the pilot studies were presented during ESA's Atmospheric Science Conference held in Barcelona, Spain, in September. Maria Grazia Frontoso, working on the development of the GLOMAP aerosol model at the University of Leeds in the UK, said: "GlobAerosol seems to be a very useful tool to address uncertainties in global models."

Arjo Segers from TNO in the Netherlands compared GlobAerosol data with model predictions of desert dust and forest fires over the Iberian peninsula. "The results of this study suggest that the GlobAerosol/SEVIRI dataset is especially useful for investigating aerosol levels over water."

Still, more work is needed to address the problems highlighted in the intercomparison study of the models, and to improve the overall accuracy of the satellite aerosol data. The valuable feedback obtained from the users will help to lay the foundations for the development of more accurate satellite-based aerosol measurements as part of ESA's new Climate Change Initiative.

The GlobAerosol project was carried out by GMV (Spain), the University of Oxford (UK), Rothamford Applied Laboratory (UK) and Laboratoire Optique Atmosphérique (France) and funded by the Data User Element under ESA's Earth Observation Envelope Programme.

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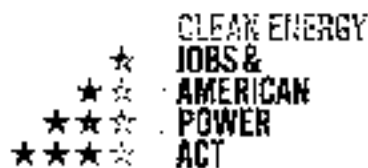
European Space Agency. (2009, November 10). Climate studies to benefit from 12 years of satellite aerosol data. *ScienceDaily*. Retrieved December 1, 2009, from <http://www.sciencedaily.com/releases/2009/11/091110105353.htm>

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Dust and smoke from the Western Sahara towards the Canary Islands seen in this 2009 maximum Medium Resolution Imaging Spectrometer (MERIS) image. The winds can move between 50 and 200 million tonnes of fine dust up from the Sahara each year. (Credit: ESA)





CLEAN ENERGY JOBS AND AMERICAN POWER ACT: SUMMARY OF PROVISIONS

SEIZING THE OPPORTUNITY

In this time of economic challenge, we have a unique opportunity to put Americans back to work and take charge of our security, our energy future and the fate of our planet. We have the chance to reclaim our energy destiny.

For too long, Washington has let oil companies, lobbyists, and special interests maximize their profits and minimize our progress. Our dependence on foreign oil has hurt our economy, helped our enemies, and put our national security at risk. It's time to invest in energy solutions that are made in America, and work for America. It's time to take back control.

This bill will get tough on corporate pollution and put American ingenuity to work to dramatically improve every facet of the way America generates and uses energy. It will create millions of new, good-paying jobs, protect our air and water from dangerous pollution, and secure our children's future by making America energy independent. And it does not raise the federal deficit by one single dime.

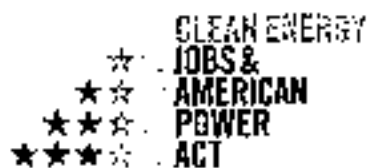
A New Congressional Approach to Achieving Energy Solutions

This bill departs from previous initiatives by taking a more comprehensive approach to the fundamental problems we face today. By the time this bill reaches the floor, it will include the concerns, advice, and perspective of six Senate Committees: Energy and Natural Resources (which passed the bipartisan American Clean Energy Leadership Act earlier this year), Finance, Agriculture, Commerce, Foreign Relations, and Environment and Public Works. The President has directed new funds for the task of addressing energy and climate, and this bill's provisions support the President's goals.

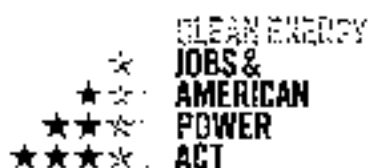
Our efforts center around four urgent national priorities: putting America back in control of our energy future, reasserting American economic leadership and competitiveness, protecting our families from pollution, and ensuring our national security.

PUTTING AMERICA BACK IN CONTROL OF OUR ENERGY FUTURE

The transition to clean energy means ensuring that all of America's energy sources—from coal and nuclear to solar and wind—are as clean and efficient as possible without damaging our short-term competitiveness. Making America more energy independent means investing in all of these sources of power as well as in a bold cutting-edge transmission and distribution system that reaches every part of America.



- ◆ **Coal** is an abundant energy source that America's consumers and producers depend on for 50% of our power. However, when burned using old technology, it produces dangerous pollutants that damage our health and cause climate change. That's why we need to invest in game-changing technologies that capture and store carbon pollution before it reaches the air we breathe. In the past, we had to rely on dirty, inefficient coal as our nation industrialized. But in the 21st century, we can reinvent coal as a clean, homegrown energy source and enable our coal industry to remain globally competitive as the world reduces its carbon pollution.
 - \$10 billion over ten years to support research and development of new carbon capture and sequestration technology to advance the next generation of coal-fired power plants.
 - Additional funding to reward first-movers who implement carbon capture and sequestration technology on new or retrofitted plants—the higher the level of carbon capture, the greater the level of funding.
 - Performance standards to provide definitive guidance to the industry on advanced technology implementation.
- ◆ **Natural gas** is by far the cleanest form of fossil fuel generated power, producing less than half of the emissions of an equivalent plant powered by coal. Currently, it provides nearly 20% of our nation's power. Recent discoveries have increased America's estimated natural gas reserves by 35%, decreasing our need to import natural gas from outside of North America.
 - A new federal program that encourages investment in low-carbon power generation especially natural gas.
 - Additional incentives that reward companies for reducing leaks from natural gas pipelines.
- ◆ **Nuclear energy** is a reliable energy source that virtually eliminates carbon pollution and has the capacity to deliver power to millions of Americans in the coming years. Already, it provides clean, affordable energy all around the world and supplies nearly 20% of our power in America—as much as 50% of electricity in individual states. That's why Democrats and Republicans alike agree that we must ease the way for nuclear power to play an increasing role in making America energy independent.
 - *Build on the significant provisions included in ACELA, including increased financing for loan guarantees and regulatory risk insurance.*
 - New programs for research and development for advanced nuclear technology and nuclear waste management.



Training programs to train the highly-skilled workforce necessary for the construction, operation, maintenance and support of nuclear facilities.

- **Renewable energy and energy efficiency** are critical to the clean energy economy we hope to build. Decades ago, American engineers and scientists invented the technologies behind wind and solar power but our competitors adapted them and surged ahead of us. Today, just five of the world's top thirty wind, solar, and advanced battery companies are American. It's time for us to become world leaders again in these fields.

Of course, the cleanest and cheapest kilowatt of energy is the one we never use. The global consulting firm, McKinsey & Company, estimates that 40% of the pollution reduction needed to prevent catastrophic global warming can be achieved through efficiency improvements alone. Already nearly a thousand U.S. cities have heard this message and adopted ambitious environmental standards for new construction and refitting existing buildings. Even as we invest in a wide range of clean sources of energy, every American can help put the country back in control of our energy—and save money on their monthly bills.

Finally, as we develop and deploy the latest electricity-generating technologies, we must ensure we have the transmission lines and power grid to carry American-made energy to every corner of the 50 states.

- *Build on the significant successes of ACELA, including ambitious new renewable energy standards, energy efficiency measures, and investments in infrastructure.*
- Grants to cities and states that embrace clean energy. Substantial investments to reward cities and states for investing in renewable energy, energy efficiency, retrofits and building upgrades.
- Significant new investments in cutting-edge research and development funding for renewable energy sources. Combined with ACELA, this bill will significantly increase annual investments in scientific innovation to advance clean energy technology.

REASSERTING AMERICAN ECONOMIC LEADERSHIP AND COMPETITIVENESS

Fifteen million Americans are out of work today, and the American people are demanding the next great engine of economic growth. The solution exists: the clean energy economy. It's no coincidence that the countries making speedy recoveries from the global economic downturn—Japan, Germany, and China—are all making strong investments in their energy sectors. These countries and others have put millions of their people to work by investing in the next-generation of energy technology.

This bill invests billions in clean energy research and development, as well as in deployment to our states, cities, and homes. It also sets ambitious new efficiency goals. And by investing in the solar, wind



and other renewable energy sources that will help save the planet, we will also save the economy by developing a workforce trained for the future—from researchers to roofers, the economic benefits will be broad and widespread. This bill is a superhighway to American prosperity that runs far into this century.

Consider this simple fact: Every dollar spent on clean energy creates nearly four times as many jobs as an equal investment in oil and gas. And the jobs it creates are good-paying, regionally diverse, and available to Americans of all educational backgrounds. These are jobs that can't be shipped overseas.

No worker should be left behind. This bill includes targeted protection for our manufacturing sector to ensure that American companies remain competitive and jobs remain here at home. New programs will train workers to succeed in the new energy economy. Agriculture and rural America will see a boom in investments in biofuels and alternative energy sources. Low- and moderate-income families will be protected from price increases through rebates on their electricity bills, and a market stability fund will limit price volatility.

- **Turning clean energy into an American economic advantage.** By taking bold steps to encourage companies to embrace clean energy technology, America's economy can retake its global leadership role in these fields. With strong market signals and significant investments, America can take charge and become the world's leader in clean energy once again.
 - A strong new investment in all aspects of our clean energy economy, including billions of dollars in investment for the clean, efficient, and renewable use of energy and the deployment of twenty-first century energy technologies.
- **Developing and training key workers.** We need to ensure that we not only provide the financial capital to jumpstart these new industries, but we also provide the training American workers need to succeed in the new energy economy.
 - Extensive worker training for new industries, including significant new programs at post-secondary institutions; transition programs for workers in slower-growth industries.
 - An online clearinghouse to help workers find new energy jobs
- **Support for affected industries.** The Clean Energy Jobs and American Power Act doesn't just create the jobs of the future—it also protects existing jobs in the manufacturing sector as our economy transforms. This bill has strong measures to ensure that jobs don't "leak" to other countries, who think they can pollute their way to economic success.
 - Support for energy-intensive, trade-exposed industries like chemicals to ensure that U.S. manufacturing remains competitive in the new energy economy.



- Robust border measures, consistent with our international obligations.
- Ironclad provisions to ensure small businesses and agricultural enterprises are not covered.
- **Protecting consumers.** The bill also shields consumers from increases in prices caused by inadvertent or abusive practices as we transition to a new energy economy.

Rebates for low- and moderate-income consumers on their energy bills help offset any increased costs.

- A market stability fund to protect consumers and businesses from excessive price volatility. This mechanism ensures that, even as the energy economy changes, customers will experience stable, affordable prices.
- Support for strong policing measures to establish marketplace accountability and ensure the new carbon marketplace is transparent, fair, and accountable.

PROTECTING OUR FAMILIES FROM POLLUTION

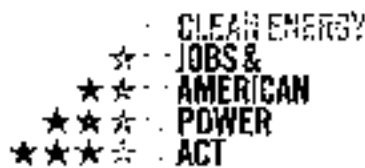
From chronic asthma to the arrival of diseases such as malaria rarely seen in America, the dangers of unrestrained carbon pollution and the climate change it causes are many and varied. Left unchecked, carbon pollution is a threat to the air we breathe, the water we drink, and the health of our families.

When acid rain and other chemicals threatened our health in the 1990s, we worked across party lines to craft an aggressive and effective response. Today we must return to tried and true methods to reduce dangerous pollution by enabling the private sector to seek out the most cost-effective path forward.

The bill sets ambitious and achievable goals to reduce carbon pollution. It targets a reduction of 20 percent by 2020 and 80 percent by 2050 from 2005 levels, the minimum scientists judge necessary to avert a climate disaster. The bill accomplishes these goals through a Pollution Reduction and Investment system that covers less than 2% of American businesses and keeps American industry competitive during the transition to a new energy economy.

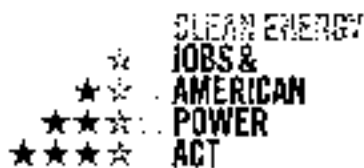
And as we reduce carbon pollution, we must also respond to the impacts of the climate change it already has and will continue to create. We must devote resources to address the dangers that this pollution poses to our cities, towns, and wildlife.

- **Pollution Reduction and Investment.** The system applies only to the largest polluters in the country—initially around 7,500 facilities that account for nearly three-quarters of U.S. carbon pollution. Over ninety-eight percent of American businesses, including farmers, are not covered by this program. It also provides necessary flexibility. If a company needs more time to



clean up its carbon pollution, it can pay for the right to keep polluting. Alternatively, if a business can decrease pollution quickly and affordably, it will be rewarded.

- *Pollution reduction.* Sets a pollution reduction target of 20% by 2020 and 80% by 2050 from 2005 levels. Preserves the important functions of the Clean Air Act in the area of carbon pollution.
- *Private investment incentives.* Allows companies to reduce carbon pollution at a minimal cost; rewards companies that have already taken action; and creates incentives for those American companies that are most innovative and efficient in their pollution reduction going forward.
- *Protections.* Ensures that all mechanisms for awarding investment or penalizing polluters operate in a transparent and well-regulated manner. Provides significant rebates to low-income and middle-income consumers to offset costs and creates mechanisms to avoid major price disruptions.
- *Not covered.* Does not cover any agricultural enterprise. Does not include any small businesses that pollute less than 25,000 tons of carbon-based pollutants. That's the same as 130 railway cars of coal, 2,300 homes, 4,600 cars, or 58,000 barrels of oil. That's more than a large apartment or commercial building and more than a stadium, shopping mall, or transit center.
- **State adaptation.** The tiny village of Newtok, Alaska has already been forced to relocate when flooding and melting ice shelves, believed to be caused by climate change, threatened their homes. This terrifying scenario will repeat itself further south and on a far larger scale. We need to help states to meet this new and rising challenge.
 - Funding for states to respond to the impacts of global warming, including help in fighting wildfires, combating droughts, protecting water supply, preventing floods, promoting recycling, and addressing sea level rise. Particular focus on coastal adaptation.
 - Critical funds for Indian tribes who face potentially dramatic changes to their way of life.
- **Wildlife.** From symbols of our country, like the bald eagle or the buffalo, to cherished American foods like Alaskan salmon or Atlantic cod, we treasure our American wildlife. As the climate changes, many of these species will see their habitats threatened.
 - Funding for the identification of at risk populations, habitats, and ecosystems and selective habitat protection of areas particularly susceptible to climate change.



ENSURING OUR NATIONAL SECURITY

Our national security faces two overarching threats. First, much of our energy supply currently lies in the hands of hostile countries halfway around the world. Americans are fed up with an oil addiction that sends nearly \$1 billion a day overseas to countries that often don't share our values.

Second, climate change injects a major new source of chaos, tension, and human insecurity into an already volatile world. It threatens to bring more famine and drought, worse pandemics, more natural disasters, more resource scarcity, and human displacement on a staggering scale. We risk creating new failed states that offer glaring opportunities to the worst actors in our international system. In an interconnected world, that endangers all of us.

Eleven highly-decorated former Admirals and Generals issued a report calling climate change a "threat multiplier" with "the potential to create sustained natural and humanitarian disasters on a scale far beyond those we see today." General Anthony Zinni, former commander of our forces in the Middle East, warned that "without action...we will pay the price later in military terms. And that will involve human lives. There will be a human toll."

To keep Americans safer, this bill includes measures that:

- **Move America toward energy independence.** With transportation accounting for 70% of our oil use, we must find ways to provide cleaner alternatives that do not rely as heavily on petroleum. Already public transportation saves more than 4 billion gallons of oil usage annually—we can increase that through smart development policies.
 - Reform transportation planning approaches in states and large metropolitan areas. By including reductions in harmful greenhouse gases as criteria for transit and development planning, we can encourage people to commute in ways that don't increase our dependence on foreign oil, whether by walking, bicycling, taking public transit, or driving in cars that use less oil—or even no oil at all.
- **Prevent runaway climate change.** Radical changes to our climate and environment threaten to bring more virulent disease and epidemics, more famine and drought, more natural disasters, more resource scarcity, and human displacement on a staggering scale. In an interconnected world, that endangers all of us.
 - Ambitious goals to reduce, steadily but dramatically, the carbon pollution that causes climate change; market incentives and rewards to help companies meet them
- **Proactively address adaptation needs.** By some estimates, more people worldwide will be displaced by environmental changes and natural disasters than by war next year. America must take a leadership role to prevent the "threat multiplier" effects of climate change.



- A firm annual commitment to help the poorest and most at-risk nations contain the effects of climate change and promote stability.

• • •

Our energy future, our economy, our health and our security all demand the same thing: We must reinvent the way America generates and uses energy. America has never shied away from a challenge before. Now, by passing the Clean Energy Jobs and American Power Act, we can lay the cornerstone for decades of economic growth and a stronger, more powerful America.



THE WALL STREET JOURNAL

WSJ.com

DECEMBER 1, 2009 9:29 AM ET

Exxon Sees Faster Growth for Wind, Solar Today than Year Ago

Every year, Exxon Mobil publishes an "Energy Outlook." It is a thoughtful view of what the company believes the future holds.

And while this year's Outlook isn't due to be published for a few more days, Exxon executive Andrew Swiger recently gave a sneak peek at a conference.

Bottom line: Exxon today expects wind, solar and biofuels to grow slightly faster than it did a year ago. And it expects oil and coal to grow slightly slower.

For those of you keeping score at home, here are the exact predictions Exxon now sees: wind/solar/biofuels growing at 9.6% a year from 2005 through 2030 versus 9.3% a year ago; oil is now 0.8% versus 0.9% and coal is 0.5% versus 0.6%. Now, these might seem like modest changes, but there are fortunes to be made and lost in these fractions. No change in Exxon's view of future nuclear, gas, biomass or hydro/geothermal growth. The 2008 Energy Outlook can be found [here](#).

The other key takeaways:

Gas will overtake coal as the second-largest global fuel source and continue to grow into a major energy fuel. As the pace on carbon emissions increases, Exxon expects gas to grab a bigger slice of the power generation market from coal. (Little wonder that Mr. Swiger spent a big chunk of his time talking to some of the world's bankers and investors extolling Exxon's global gas strategy.)

From Japan to the U.S. to Europe, energy consumption will be flat. Exxon expects zero growth in energy consumption in the world's developed economies. Indeed, energy demand is expected to be slightly lower in 2030 than in 2005. "The main reason is efficiency," says Mr. Swiger. It's a very different story in China, India and other developing economies which are expected to boast a 2.1% annual growth in energy consumption.

This energy consumption includes everything from driving cars to heating homes to recharging our Blackberries. No growth in energy consumption in big chunks of the world. It's something to think about.

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Associated Press

The Oracle of Exxon?

-WST, 12/1/09

The Climate Science Isn't S

By Richard S. Lindzen

Is there a reason to be alarmed by the prospect of global warming? Consider that the measurement used, the globally averaged temperature anomaly (GATA), is always changing. Sometimes it goes up, sometimes down, and occasionally—such as for the last dozen years or so—it does little that can be discerned.

Claims that climate change is accelerating are bizarre. There is general support for the assertion that GATA has increased about 1.5 degrees Fahrenheit since the middle of the 19th century. The quality of the data is poor, though, and because the changes are small, it is easy to nudge such data a few tenths of a degree in any direction. Several of the emails from the University of East Anglia's Climate Research Unit (CRU) that have caused such a public fiasco dealt with how to do this so as to maximize apparent changes.

Confident predictions of catastrophe are unwarranted.

The general support for warming is based not so much on the quality of the data, but rather on the fact that there was a little ice age from about the 15th to the 19th century. Thus it is not surprising that temperatures should increase as we emerged from this episode. At the same time that we were emerging from the little ice age, the industrial era began, and this was accompanied by increasing emissions of greenhouse gases such as CO₂, methane and nitrous oxide. CO₂ is the most prominent of these, and it is again generally accepted that it has increased by about 30%.

The defining characteristic of a greenhouse gas is that it is relatively transparent to visible light from the sun but can absorb portions of thermal radiation. In general, the earth balances the incoming solar radiation by emitting thermal radiation, and the presence of greenhouse substances inhibits cooling by thermal radiation and leads to some warming.

That said, the main greenhouse substances in the earth's atmosphere are water vapor and high clouds. Let's refer to these as major greenhouse substances to distinguish them from the anthropogenic minor substances. Even a doubling of CO₂ would only upset the original

balance between incoming and outgoing radiation by about 2%. This is essentially what is called "climate forcing."

There is general agreement on the above findings. At this point there is no basis for alarm regardless of whether any relation between the observed warming and the observed increase in minor greenhouse gases can be established. Nevertheless, the most publicized claims of the U.N.'s Intergovernmental Panel on Climate Change (IPCC) deal exactly with whether any relation can be discerned. The failure of the attempts to link the two over the past 20 years bespeaks the weakness of any case for concern.

The IPCC's Scientific Assessments generally consist of about 1,000 pages of text. The Summary for Policymakers is 20 pages. It is, of course, impossible to accurately summarize the 1,000 page assessment in just 20 pages; at the very least, instances and events have to be omitted. How even it has been my experience that even the summary is hardly ever looked at. Rather, the whole report tends to be characterized by a single iconic claim.

The main statement publicized after the last IPCC Scientific Assessment two years ago was that it was likely that most of the warming since 1957 (a point of anomalous mild) was due to man. This claim was based on the weak argument that the current models used by the IPCC couldn't reproduce the warming from about 1978 to 1998 without some forcing, and that the only forcing that they could think of was man. Even this argument assumes that these models adequately deal with natural internal variability—that is, such naturally occurring cycles as El Niño, the Pacific Decadal Oscillation, the Atlantic Multidecadal Oscillation, etc.

Yet articles from major modeling centers acknowledged that the failure of these models to anticipate the absence of warming for the past dozen years was due to the failure of these models to account for this natural internal variability. Thus even the basis for the weak IPCC argument for anthropogenic climate change was shown to be false.



Of course, none of the articles stressed this. Rather they emphasized that according to models modified to account for the natural internal variability, warming would resume—in 2009, 2013 and 2030, respectively.

But even if the IPCC's iconic statement were correct, it still would not be cause for alarm. After all we are still talking about tenths of a degree for over 75% of the climate forcing associated with a doubling of CO₂. The potential (and only the potential) for alarm enters with the issue of climate sensitivity—which refers to the change that a doubling of CO₂ will produce in GATA. It is generally accepted that a doubling of CO₂ will only produce a change of about two degrees Fahrenheit if all else is held constant. This is unlikely to be much to worry about.

Yet current climate models predict much higher sensitivities. They do so because in these models, the main greenhouse substances (water vapor and clouds) act to amplify anything that CO₂ does. This is referred to as positive feedback. But

as the IPCC notes, clouds continue to be a source of major uncertainty in current models. Since clouds and water vapor are intricately related, the IPCC claim that they are more confident about water vapor is quite implausible.

There is some evidence of a positive feedback effect for water vapor in cloud-free regions, but a major part of any water-vapor feedback would have to acknowledge that cloud-free areas are always changing, and this remains an unknown. At this point, few scientists would argue that the science is settled. In particular, the question remains as to whether water vapor and clouds have positive or negative feedbacks.

The notion that the earth's climate is dominated by positive feedbacks is intuitively implausible, and the history of the earth's climate offers some guidance on this matter.

About 2.5 billion years ago, the sun was 20%-30% less bright than now (compare this with the 2% perturbation that a doubling of CO₂ would produce), and yet the evidence is that the oceans were unfrozen at the time, and that temperatures might not have been very different from today's. Carl Sagan in the 1970s referred to this as the "Early Faint Sun Paradox."

For more than 30 years there have been attempts to resolve the paradox with greenhouse gases. Some have suggested CO₂ - but the amount needed was thousands of times greater than present levels and incompatible with geological evidence. Methane also proved unlikely. It turns out that increased thin cirrus cloud coverage in the tropics readily resolves the paradox - but only if the clouds constitute a negative feedback. In present terms this means that they would diminish rather than enhance the impact of CO₂.

There are quite a few papers in the literature that also point to the absence of positive feedbacks. The implied low sensitivity is entirely compatible with the small warming that has been observed. So how do models with high sensitivity manage to simulate the currently small response to a forcing that is almost as large as a doubling of CO₂? Jeff Kiehl notes in a 2007 article from the National Center for Atmospheric Re-

search, the models use another quantity that the IPCC lists as poorly known (namely aerosols) to arbitrarily cancel as much greenhouse warming as needed to match the data, with each model choosing a different degree of cancellation according to the sensitivity of that model.

What does all this have to do with climate catastrophe? The answer brings us to a scandal that is, in my opinion, considerably greater than that implied in the hacked emails from the Climate Research Unit (though perhaps not as bad as their destruction of raw data): namely the suggestion that the very existence of warming or of the greenhouse effect is tantamount to catastrophe. This is the grossest of "that and switch" scams. It is only such a scam that lends importance to the machinations in the email designed to nudge temperatures a few tenths of a degree.

The notion that complex climate "catastrophes" are simply a matter of the response of a single number, GAGG, to a single forcing, CO₂ (or solar forcing for that matter), represents a gigantic step backward in the science of climate. Many disasters associated with warming are simply normal occurrences whose existence is falsely claimed to be evidence of warming. And all these examples involve phenomena that are dependent on the confluence of many factors.

Our perceptions of nature are similarly dragged back centuries so that the normal occasional occurrences of open water in summer over the North Pole, droughts, floods, hurricanes, sea-level variations, etc. are all taken as omens, portending doom due to our sinful ways (as optimized by our carbon footprint). All of these phenomena depend on the confluence of multiple factors as well.

Consider the following example. Suppose that I leave a box on the floor and my wife trips on it, falling against my son, who is carrying a carton of eggs, which then fall and break. Our present approach to emissions would be analogous to deciding that the best way to prevent the leakage of eggs would be to outlaw leaving boxes on the floor. The chief difference is that in the case of atmospheric CO₂ and climate catastrophe, the chain of inference is longer and less plausible than in my example.

Mr. Lindzen is professor of meteorology at the Massachusetts Institute of Technology.

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DECEMBER 7, 2009, 10:02 AM ET

Survey Says: Lots of Hot Air, Less Public Support for Tackling Climate Change

Time to see what you really think

Now that the Copenhagen climate-change summit is finally underway, do the thousands of delegates gathered there to save the planet have much of a mandate from their home countries? A pair of fresh surveys paint a very different picture of public concern about climate change—and enthusiasm for big fixes.

A new poll by the Nielsen Company shows public concern about climate change falling sharply in the last two years—roughly when the global economy started to sputter. A separate survey by Globe Scan/BBC still shows plenty of worry about climate change, but a very mixed picture about how far people are willing to go to combat it.

The Nielsen survey shows concern about climate change falling in 35 of 54 countries over the last two years. In the U.S., for example, the percentage of people describing themselves as “very concerned about climate change” fell to 25% in October, from 34% in October 2007. Other countries had even bigger declines: 29% of Australians are “very concerned,” compared with 51% two years ago. Concern in Sweden has halved to 17% in the last two years, and so on.

The Globe Scan/BBC poll offers a different picture, with nearly two-thirds of respondents in 23 countries describing climate change as “very serious,” and 61% supporting action to fight it, “even if these investments hurt the economy.”

But those global results mask some very important details. American exceptionalism, for instance, is on full display. Only 45% describe climate change as very serious, among the lowest of any country and in line with Russia and Pakistan.

More tellingly, 12% say climate change is not a problem at all—the only double-digit response to that question in the survey. (In contrast, take China: 57% say it’s “very serious” and only 1% say it’s not a problem at all.)

That reluctance translates into feelings about what to do about climate change. Asked about support for government investment to tackle climate change, “even if it hurts the economy,” some 42% of Americans say no—the highest total on the survey. Only 52% of Americans support costly action, again, one of the lowest totals in the survey.

Chinese seem a lot more convinced: 89% support government investment at any cost, compared with just 6% opposing. (Well, some Chinese anyway; the survey interviewed urban Chinese, who are better off than their rural cousins.)

But don’t bank on that turning into a tsunami of cooperation at Copenhagen between the world’s two biggest emitters of greenhouse gases.

Fully 14% of Americans oppose any climate agreement in the Danish capital—the highest total in the survey. And Chinese respondents favor a “moderate” and “gradual” approach to climate change over their country playing a “leadership” position at the summit.

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THE WALL STREET JOURNAL

WSJ.com

DECEMBER 7, 2009 11:49 AM EDT

Tailor Made: The EPA Prepares to Regulate Greenhouse-Gas Emissions

All the buzz about climate change is in Copenhagen. The action may be in Washington.

The Environmental Protection Agency is set today to finalize its ruling that greenhouse-gas emissions endanger public health and welfare, opening the door to executive-branch regulations of emissions. A year, the specter of EPA action on climate has jockeyed with congressional action. But with the energy and climate bill hung up in the Senate, the EPA is moving ahead. More on all that [here](#).



Associated Press

Slits, striving for the perfect fit.

Since the Obama administration announced its intention to let the EPA regulate greenhouse-gas emissions, there have been plenty of howls from the business community. In the wake of "Climategate," congressional Republicans are asking the EPA decision to be pulled or held. Even among environmentalists, there's been a big debate over whether it's better to have legislation to tackle climate change or EPA action.

And it's still an open question whether the EPA authority is meant as a stick to finally prod the Senate into taking action, whether it's meant to give President Obama something concrete to show world leaders in Copenhagen next week, or whether the EPA really intends to regulate emissions on its own.

One aspect of the EPA decision in particular could prove a battleground: The so-called tailoring rule.

That is, the EPA says it will regulate greenhouse-gas emissions under the existing Clean Air Act, which is meant to regulate much smaller emissions of harmful things. (Here's the EPA's "plain English" guide.)

To avoid having to regulate every chainsaw and lawn mower in the country, the EPA plans to unilaterally "tailor" the Clean Air Act for greenhouse-gas emissions, only covering big emitters who chum out at least 25,000 tons of gases a year. The EPA plans to revise those thresholds after five years.

The legal folks at Mondaq summarize the logic behind the tailoring rule and

its possible pitfalls quite nicely:

According to EPA the cost of processing these permits [for the whole economy] would be about \$15.9 billion, and the cost to the regulated community to obtain these permits would be about \$39.6 billion [...]

Because the thresholds for the applicability of (Clean Air Act) requirements are in the statute, it is very unclear whether EPA has the legal authority to change those thresholds by regulation. EPA's proposal simply asserts that the higher thresholds are an "administrative necessity" to avoid the "absurd results" associated with regulating GHG emissions under the CAA.

In other words, in seeking to make executive regulation of greenhouse-gas emissions feasible, the EPA could open itself up to legal challenges. Those could come from environmentalists, who want to see wider regulation of emitters. They could also come, paradoxically, from the business community. Any legal challenge that upends EPA authority to regulate emissions as planned could throw a giant wrench in the works.

Of course, all this just affects the U.S. What happens with global greenhouse-gas emissions will depend on what China, India, Europe and the rest of the world decide at Copenhagen.

Or, as said U.S. climate negotiator Jonathan Pershing said today at the summit, "The U.S. is currently responsible for one-fifth of global emissions, which means that four-fifths come from other countries, which means that unless we can work out a successful global agreement we won't solve the problem."

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U.N. Weather Agency at Climate Conference Says This Is Warmest Decade on Record

Tuesday, December 08, 2009

Associated Press

COPENHAGEN --

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This decade is on track to become the warmest since records began in 1850, and 2009 could rank among the top-five warmest years, the U.N. weather agency reported Tuesday on the second day of a pivotal 192-nation climate conference.

In central Africa and southern Asia, this will probably be the warmest year, but overall 2009 probably will be "about the fifth-warmest year on record," said Michel Jarraud, secretary-general of the World Meteorological Organization.

Only the United States and Canada experienced cooler conditions than average, it said, although Alaska had the second-warmest July on record.

The agency also noted an extreme heat wave in India in May, and a heatwave in northern China in June. It said parts of China experienced their warmest year on record, and that Australia so far has had its third-warmest year. Extreme warm events were also more frequent and intense in southern South America.

The decade 2000-2009 "is very likely to be the warmest on record, warmer than the 1990s, than the 1980s and so on," Jarraud told at a news conference, holding up a chart with a temperature curve pointing upward.

The decade has been marked by dramatic effects of warming.

In 2007-2008, the summer melt has shrunk the Arctic Ocean ice cap to its smallest extent ever recorded. In the 2007-2009 International Polar Year, researchers found that Antarctica is warming more than previously believed. Almost all glaciers worldwide are retreating.

Meanwhile, such destructive species as jellyfish and bark-eating beetles are moving northward out of normal ranges, and seas expanding from warmth and glacier melt are encroaching on low-lying island states.

If 2009 ends as the fifth-warmest year, it would replace the year 2003. According to the U.S. space agency NASA, the other warmest years since 1850 have been 2005, 1998, 2007 and 2006. NASA says the differences in readings among these years are so small as to be statistically insignificant.

The U.N. agency reported that the global combined sea surface and land surface temperature for the January-October 2009 period is estimated at 0.44 degrees C (0.79 degrees F) above the 1961-1990 annual average of 14.00 degrees C (57.2 degrees F), with a margin of error of plus or minus 0.11 degrees C. Final data will be released early in 2010.

The data were released as negotiators at the two-week talks in Copenhagen turned Tuesday to "metrics" -- "gas inventories" and other dense technicalities, as delegates worked to craft a global deal to rein in carbon dioxide and other greenhouse gases and stem climate change.

Governments, meanwhile, jockeyed for position leading up to the final tale next week, when more than 100 national leaders, including President Barack Obama, will converge on Copenhagen for the final days of bargaining.

Scientists say without an agreement to wean the world away from fossil fuels and other pollutants to greener sources of energy, the Earth will face the consequences of ever-rising temperatures: The extinction of plants and animals, the flooding of coastal cities, more extreme weather, more drought and the spread of diseases.

In Britain, Prime Minister Gordon Brown urged fellow Europeans to raise the bar bid on reducing greenhouse gas emissions to pressure the U.S. and others to offer more at Copenhagen.

"We've got to make countries recognize that they have to be as ambitious as they say they want to be. It's not enough to say 'I may do this, I might do this, possibly I'll do this.' I want to create a situation in which the European Union is persuaded to go to 30 percent," Brown was quoted as saying by Britain's Guardian newspaper.

The European Union has pledged to reduce greenhouse gas emissions by 20 percent by 2020, compared with 1990, and is considering raising that to 30 percent. Other governments also aim high. EU leaders will have an opportunity to make such a move at an EU summit this Thursday and Friday in Brussels.

On Monday, when the climate conference opened, the Obama administration gave the talks a boost by announcing steps that could lead to new U.S. emissions controls that don't require the approval of the U.S. Congress.

The U.S. Environmental Protection Agency (EPA) said scientific evidence clearly shows that greenhouse gases "threaten the public health and welfare of the American people" and that the pollutants — mainly carbon dioxide from burning fossil fuels — should be reduced, if not by Congress then by the agency responsible for enforcing air pollution.

As Congress considers the first U.S. legislation to cap carbon emissions, the EPA finding will enable the Obama administration to act on greenhouse gases without congressional action, potentially imposing federal limits on climate-changing pollution from cars, power plants and factories.

Yvo de Boer, U.N. climate chief, said Tuesday the EPA finding gives Obama "something to fall back on."

"I think that will boost people's confidence" at the Copenhagen talks in the Americans' ability to offer more, he said.

The European Union had called for a stronger bid by the Americans — who thus far have pledged emissions cuts much less ambitious than Europe's. The U.S. has offered a 17 percent reduction in emissions from their 2005 level — comparable to a 3-4 percent cut from 1990 levels.

"This is meaningful because it's yet a sign that the Americans have more to offer. My evaluation is that the U.S. can offer much more," EU environment spokesman Andreas Cargren told reporters Tuesday in Stockholm.

Whether the prospect of EPA action will satisfy such demands — and what China may now add to its earlier offer — remains to be seen. And success in the long-running climate talks hinges on more than emissions reductions. Most important, it requires commitments of financial support by rich countries for poor nations to help them cope with the impact of a changing climate.

Swedish negotiator Anders Tomte said Tuesday the U.S. 17 percent reductions "are insufficient and we hope more would come out of that."

He suggested the U.S. buy more carbon credits on the international market where emissions reductions by developing countries can be credited and sold to the industrialized world.

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John Lott

- FOXNews.com

- December 08, 2009

Surprise, Surprise, Many Scientists Disagree On Global Warming

There is hardly unanimity among scientists about global warming or mankind's role in producing it. But you wouldn't know it if you just listened to the Obama administration.

As the Climate-gate controversy continues to grow, amid charges of hiding and manipulating data, and suppressing research by academics who challenge global warming, there is one oft-repeated defense: other independent data-sets all reach the same conclusions. "I think everybody is clear on the science. I think scientists are clear on the science ... I think that this notion that there's some debate . . . on the science is kind of silly," said President Obama's Press Secretary, Robert Gibbs, when asked about the president's response to the controversy on Monday. Despite the scandal, Britain's Met, the UK's National Weather Service, claims: "we remain completely confident in the data. The three independent data sets show a strong correlation is highlighting an increase in global temperatures."

But things are not so clear. It is not just the University of East Anglia data that is at question. There are about 450 academic peer-reviewed journal articles questioning the importance of man-made global warming. The sheer number of scientists rallying against a major intervention to stop carbon dioxide is remarkable. In a petition, more than 30,000 American scientists are urging the U.S. government to reject the Kyoto treaty. Thus, there is hardly the unanimity among scientists about global warming or mankind's role in producing it. But even for the sake of argument, assuming that there *is* significant man-made global warming, many academics argue that higher temperatures are actually *good*. Higher temperatures increase the amount of land to grow food, increase biological diversity, and improve people's health. Increased carbon dioxide also promotes plant growth.

Let's take the issue of data. The three most relied-on data series used by the United Nation's Intergovernmental Panel on Climate Change assessment report came from the University of East Anglia, NASA, and the British Met Office. As noted in my previous piece for the Fox Forum, the problem of secretiveness is hardly limited to the University of East Anglia. NASA also refuses to give out its data. NASA further refuses to explain mysterious changes in whether the warmest years were in the 1930s or this past decade. The British Met office, too, has been unable to release its data and just announced its plans to begin a three-year investigation of its data since all of its land temperatures data were obtained from the University of East Anglia (ocean temperatures were collected separately), though there are signs that things might be speeded up.

Neither the Climate Research Unit (CRU) at the University of East Anglia nor the British Met are able to provide their raw data to other research scientists because of the confidentiality agreements that Professor Phil Jones at CRU entered into. Unfortunately, Jones did not keep records of those agreements and, according to the British Met, can neither identify the countries with the confidentiality agreements nor provide the agreements. Earlier this year the British Met wrote the following to Steve McIntyre at Climate Audit:

"Some of the information was provided to Professor Jones on the strict understanding by the data providers that this station data must not be publicly released and it cannot be determined which countries or stations data were given in confidence as records were not kept."

A press spokesman for the British Met, John Hammond, confirmed this statement in a telephone conversation on Monday to FoxNews.com. But the claimed confidentiality restrictions have hardly been followed consistently. When asked why the University of East Anglia was allowed to release the data to the Met but not to other academics, Mr. Hammond e-mailed back. "This is a question for the UEA." Unfortunately, however, neither the University of East Anglia nor anyone associated with the CRU was willing to answer any questions about the climate research conducted at the university.

But why would countries want confidentiality agreements on decades old data that they are providing? "Climate data continues to have value so long as it is commercially confidential," Mr. Hammond says. But when pushed for evidence that this was in fact the concerns that countries had raised, Mr. Hammond said: "Although I do not have evidence to hand at the moment, some nations, especially in Africa for example, believe that the information does have commercial value." Earlier, in July, the Met had raised a different issue -- that scientists in other countries would be less willing to share their scientific research if the Met could be expected to pass on the data to others.

However, professional meteorologists are unimpressed by the claimed reasons for confidentiality. "Research data used as the basis for scientific research needs to be disclosed if other scientists are to be able to verify the work of others," Mike Steinberg, Senior Vice President, AccuWeather, told FoxNews.com. In addition, while the data access may be restricted in some countries because they sell data and forecasts, that doesn't explain why the data isn't released for all other countries.

It is not just the University of East Anglia that has been accused of massaging the data (what they called creating "value added" data). Recently, New Zealand has also had its temperature series from the National Institute of Water and Atmospheric Research (NIWA) challenged. Still the NIWA continues to insist that the "Warming over New Zealand through the past is unequivocal." Indeed, the institute claims that the New Zealand warming trend was 50 percent higher than the global average. But the difference in graphs between what NIWA produced after massaging the data and what the original raw data showed was truly remarkable and can be seen here. As the Climate Science Coalition of New Zealand charged: "The shocking truth is that the oldest readings have been cranked way down and later readings artificially lifted to give a false impression of warming, as documented below." Similar concerns have also been raised about Australian temperature data.

Global warming advocates may believe that if they just keep shouting that everyone agrees with them, they will be able to enact their far-reaching regulations before everyone catches on. With President Obama's -- and the Democrats' -- fondness for more spending and increased regulations, our hope may have to rest with India and China to finally bring the Copenhagen conference to its senses.

John B. Lou, Jr is a FoxNews.com contributor. He is an economist and author of "Freedom@mpics."

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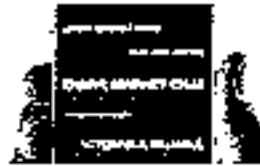
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THE WALL STREET JOURNAL

WSJ.com

DECEMBER 14, 2009, 8:20 AM ET

Copenhagen Walkout: Poor Countries Bail on Climate Talks

The climate-change conference in the Danish capital of Copenhagen is in disarray after some 150 developing countries walked out of the confab on Monday. That's led to at least a temporary suspension of the conference while non-world delegations try to convince dove-footing nations to re-join the talks.

Fundamentally, the walkout seems to be a "put up or shut up" message from poor countries to rich ones. The developing countries are upset that the Copenhagen conference may ditch the 1997 Kyoto Protocol and are upset with pally amounts of financing offered so far by developed countries.

An official in the Nigerian delegation, which was part of the walkout, said Europe's lowball offers of financial support were "pathetic." He added, "There will be no commitments from the G77 [bloc of developing countries] until we get better assurances about financial and technology transfers," [reports](#) our colleague Alessandro Torelli from Copenhagen.

Here's more on the walkout, from [BBC](#), [Sky News](#), and the [Sydney Morning Herald](#). Tree Huggler calls the walkout the "[nuclear option](#)" for developing countries, while noting that it's a tactic used before at climate conferences.

The [WaPo reports](#) on the walkout as well, and underscores that despite developing-world protests, keeping Kyoto alive doesn't seem like much of an option at this point.

The developing world loves the Kyoto Protocol because it imposes emissions limits on industrialized nations, but not on developing countries (not even really big ones, such as China.) At the same time, Kyoto envisions richer countries helping underwrite climate-change policies and clean-energy projects in developing countries.

Those two issues—who will cut emissions and who will pick up the bill—have been at the center of contentious climate negotiations for months, but the showdown has come to a head in the final week of the Copenhagen conference, just days before world leaders including President Obama are scheduled to arrive.

Stay tuned.

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Think economy, jobs in climate debate

By Thomas J. Donohue, Special to CNN

STORY HIGHLIGHTS

- Thomas Donohue, Climate policies must improve environment but preserve jobs
- He says developing and developed nations must share responsibility for global solutions
- Technology should boost coal, nuclear, renewable energy performance
- Donohue: Business must have seat at climate policy table

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Editor's note: Thomas J. Donohue is president and CEO of the U.S. Chamber of Commerce, a business federation and powerful lobbying organization representing 3 million U.S. businesses.

Washington (CNN) -- There's been a lot of gloom surrounding the climate talks in Copenhagen, Denmark, and let's face it, some of it is well-founded. Trying to get 192 countries to agree on a new treaty would be tough even in the best of economic times, and these aren't the best of economic times.

Nevertheless, I remain optimistic that a workable climate change agreement is possible over time if the governments and business communities agree on some fundamental principles. Let me suggest what some of these principles should be.

First, whatever we do should not harm our economies or destroy jobs. Our policies must embrace the aspirations of people everywhere for a better life. We should never stand in the way of progress that reduces poverty, measurably improves health and living conditions, and restores human dignity. The fact is, we can't have healthy environments without first having healthy economies.

Today China, India, Brazil and other large developing countries are rapidly industrializing and becoming major players in the world's economy and energy markets. But with billions of people worldwide still lacking electricity, providing modern and affordable energy services to lift their people out of poverty remains a priority for many countries. A climate agreement that ignores the desire for economic growth and energy security will not be viable in the long run.

Second, climate change is a global problem that requires a global solution, so we need to ensure participation from all nations. But finding consensus among developed and developing nations has proven elusive in the international negotiations. We need a new approach that can bridge differences between developed and developing countries.

Though it has its admirers, I would argue that the "top-down" approach taken in the Kyoto Protocol hasn't worked. We need a new approach that's flexible and recognizes that countries are vastly different. Each nation must decide for itself the right mix of tools and technologies to achieve results that are realistically ambitious and measurable, and offer those as part of a binding commitment. While our strategies may be different, we share a common responsibility to reduce greenhouse gas emissions while keeping our economies competitive and growing.

Third, we have to recognize the fundamental role that technology must play in any solution. It's the key to tackling the challenges of climate change and ensuring affordable and reliable energy. The pace at which we're able to develop and adopt advanced technologies will be the single most important factor that determines how quickly and at what cost greenhouse gas emissions can be reduced.

Existing technologies can make a start in reducing emissions, but they aren't enough. New and in some cases revolutionary energy technologies, many still years if not decades over the horizon, will have to be developed and adopted commercially. We need an accelerated program to improve the performance and lower the costs of advanced energy technologies of all kinds -- in clean coal, nuclear, and renewable energy and energy efficiency.

Business thrives on innovation. Let's make sure a new international agreement creates the proper conditions for industry to create the technologies that one day will transform the way we produce and use energy.

Fifth, when all is said and done, it will be up to the business community to implement whatever emerges from the negotiations, so it only seems right that business has a seat at the table. We've been leading an effort with other business groups, representing over 25 million member businesses from six continents, on solutions that protect our environments and our economies.

And finally, there are certain things we must agree not to do.

We must fight any attempt to weaken intellectual property protections for clean energy technologies. Such protections are crucial because there is little incentive for companies to invest in advanced technologies that could be expropriated outright by companies in developing countries. The result would be that new technologies would be slower in coming just when we need them most.

In addition, we must resist the urge to use protectionist trade policies to gain domestic advantages in the name of the environment. Slapping carbon tariffs on the products of countries we don't think are doing enough to reduce greenhouse gas emissions is a failed and dangerous approach. Such policies invite a green trade war when the global economy is already on the ropes.

Instead, our governments should be working with the World Trade Organization to remove trade barriers to environmental goods and services in a non-discriminatory manner, so all nations can access the right technology to improve their environment more affordably. That would create jobs here and around the world and improve the environment. This is the type of win-win approach negotiators should be embracing.

Our energy sector also suffers from a lengthy and unpredictable regulatory maze that delays or halts entirely new energy projects, even renewable projects. It has become too easy for energy projects to get wrapped up in green tape. One of the most effective things government can do to promote green jobs is to provide a predictable regulation so that project developers can move ahead with confidence.

This is the message that the business community will be bringing to Copenhagen.

The opinions expressed in this commentary are solely those of Thomas J. Donohue.

Find this article at:

http://www.cnn.com/2009/OPINION/12/08/donahue.climatechange.copenhagen/index.html?cnnS1G_text

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THE WALL STREET JOURNAL

WSJ.com

NOVEMBER 17, 2009 4:34 PM EST

Norway Laments Climate Conference Struggles

For the Norwegians, this is more than just a mess — it's a disaster.

"This feels like we're close to losing a major historic opportunity," said Norway's Environment Minister Erik Solheim in an interview, heaving a heavy frowny sigh.

As one of the negotiators at the Copenhagen climate conference, he's shocked at the way things have panned out. A summit that was supposed to change the future of the world has got bogged down in petty disputes about procedure. The small-time addresser shocks him.

"There's such a disconnect between the global dimensions of the issues at stake here and the points of order," he said. "We're spending time on formalities instead of focusing on the main issues."

He's unfortunately right. Precious time has been wasted at Copenhagen because of arcane disagreements over process. On Wednesday negotiations were held up for hours because developing nations thought the Danes, who are chairing the conference, were cooking up their own draft treaty behind the scenes.

Only everyone could be like Norway. The Scandinavian nation intends to cut 100% of its emissions by 2050, making it the first carbon neutral country. By 2020 its emissions will be down 30% on 1990 levels — 10% higher than the EU's current target.

It's also committed large amounts of aid, unlike some other Western nations. It says it will spend \$500 million a year to prevent deforestation in poor countries.

So why can't everyone be like Norway? What's holding up a deal? Mr. Solheim sees the culprits on all sides. Developed nations' targets are too unambitious. Developing countries are too reluctant to let the big guys come in and verify their emissions reductions. And the west has been too slow to stump up enough cash to help the poor fight climate change.

For now, all eyes are on the world leaders who have descended on Copenhagen to seal a deal now looking less realistic with every passing minute. His job is effectively done. "Nothing will happen among the negotiators," says Mr. Solheim. "It's the heads of state who must set the tone and the direction."

French President Nicolas Sarkozy said failure in Copenhagen is "forbidden."

"Failure would be catastrophic for each of us. ... We would have to face the world's public opinion," he said. Mr. Sarkozy called for an urgent meeting of heads of state and government Thursday evening to get on with "real" negotiations and shift gear in the discussions. "We are not here for a seminar on global warming; we are here to make decisions," he said.

— *Alessandra Torollo contributed to this post.*



Reuters

Norway's Minister of the Environment Erik Solheim

Balanced living can be tough

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THE WALL STREET JOURNAL

WSJ.com

DECEMBER 15, 2009 10:51 AM ET

Obama's Copenhagen Speech: Some Reactions

For all the expectations that President Barack Obama's appearance at the Copenhagen climate conference could part the waters and break the dead lock, his 8-minute speech thrilled nobody.

Granted, he met beforehand with a score of world leaders—and a dozen more at lunch—not to mention an hour-long one-on-one with the Chinese premier in between—but his speech left plenty of frustration inside Copenhagen's Bella Center and without.

Here's a smattering of reactions to the speech:

The Guardian (U.K.): "In the absence of any evidence of that commitment the words rang hollow and there was a palpable sense of disappointment in the audience [...] The lackluster speech proved a huge frustration to a summit that had been looking to Obama to use his stature on the world stage—and his special following among African leaders—to try to come to an ambitious deal."

The BBC (U.K.): "Around the Bella Center, delegates huddled around TV monitors listening with rapt attention, some, doubtless, hoping that the president would bring a rabbit out of a hat, a conjurer sprinkling some magic dust to create a fairy tale deal out of what is at the moment a bottomless morass of texts and tensions. Reactions were mixed."

The Gaggie (Newsweek): "It went over decently – it was neither stellar nor awful – because of the incredibly high tension that has built up at the end of talks. How did Obama do? We grade the different parts ..."

It's Got to Hold It Here: "Obama's speech this morning didn't just lack substance, it even lacked good rhetoric..."

The Globe and Mail (Can.): The newspaper offers a roundup of responses from environmental and activists groups—none were cheering, exactly.

Finally, though not dealing directly with President Obama's speech, National Review's **Jonah Goldberg** did lay into the trip, the conference itself—and the whole concept of half-shirted environmentalism: "Want to know the best way to heat the planet? Create more rich countries. Want to know the best way to heat the planet? Throw a wet blanket on economic growth."

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THE WALL STREET JOURNAL

WSJ.com

DECEMBER 21, 2009, 11:28 AM CT

Climate Chaos: Is There a Silver Lining to the Copenhagen Fiasco?

President Barack Obama put in 12 hours of negotiations and appears to have saved the Copenhagen climate talks from utter collapse with his last-minute push. But is George W. Bush the real victor?

One of the early and overwhelming conclusions in the wake of the "Copenhagen Accord" is that the United Nations process for reaching agreement on climate change is broken. Take this, for example, from Newsweek: "The best chance of reaching an emissions of greenhouse gases and avoiding dangerous climate change is to stamp a big green R.I.P. over the sprawling United Nations process that the Copenhagen talks were part of."

The goal of giving every country, big and small, equal say in crucial issues and the need for unanimous consent led to countries such as Sudan and Tuvalu playing an outsized role in global negotiations. British climate secretary Ed Miliband called the two-week process a "farce," and called for a reform of the UN process, saying "We cannot again allow negotiations on real points of substance to be hijacked in this way."

Indeed, it's not clear whether the summit's conclusion underscores the need to ditch the existing UN framework or whether that framework has already been scuttled.

Thanks to the opposition of a handful of countries—luminaries of international cooperation such as Bolivia, Venezuela, Sudan, and Cuba—the conference ended not with a formal agreement but simply by "taking note" of the 3-page climate accord. Which, in diplomatic language, means pretty much what it means when you tell your mother-in-law you'll "take note" of her suggestions.

So what's that leave? Perhaps a return to climate talks between a handful of major economies which between them account for the vast majority of greenhouse-gas emissions. As Michael Levi puts it:

This conference has also starkly demonstrated the limits of the UNFCCC process. Future climate arrangements are far more likely to be hammered out in small groups like the one that gathered Friday night to salvage a deal than in plenaries of nearly two-hundred countries...this is likely to be the last time that the world places such high hopes on the global climate conference.

Yes, there's a name for that—the Major Economies Meeting or Forum. That's something that then-president George W. Bush started, and which President Obama kickstarted. It puts the emphasis on reaching emissions agreements between countries—with the U.S. and China at the forefront—whose climate policies actually will make or break global attempts to rein in emissions, and whose economies produce clean-tech gear and generate the hundreds of billions of dollars needed to help the rest of the world adapt.

Of course, as Mr. Levi points out, President Bush's idea alone wouldn't bear fruit. Witness the rest of the world's intransigence.

on taking steps without some sort of U.S. commitment in writing.

That is, the breakdown of the UN process in Copenhagen may drive climate talks in a more productive direction—but even that won't go far unless the U.S. Senate takes up climate legislation in earnest next year.

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Expert credibility in climate change

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Although preliminary estimates from published literature and expert surveys suggest striking agreement among climate scientists on the tenets of anthropogenic climate change (ACC), the American public expresses substantial doubt about both the anthropogenic cause and the level of scientific agreement underpinning ACC. A broad analysis of the climate scientist community itself, the distribution of credibility of dissenting researchers relative to agreeing researchers, and the level of agreement among top climate experts has not been conducted and would inform future ACC discussions. Here, we use an extensive dataset of 1,372 climate researchers and their publication and citation data to show that (i) 97–98% of the climate researchers most actively publishing in the field support the tenets of ACC outlined by the Intergovernmental Panel on Climate Change, and (ii) the relative climate expertise and scientific prominence of the researchers unconvinced of ACC are substantially below that of the convinced researchers.

citation analysis | climate change | expertise | publication analysis | scientific prominence

Preliminary reviews of scientific literature and surveys of climate scientists indicate striking agreement with the primary conclusions of the Intergovernmental Panel on Climate Change (IPCC): anthropogenic greenhouse gases have been responsible for “most” of the “unequivocal” warming of the Earth’s average global temperature over the second half of the 20th century (1–3). Nonetheless, substantial and growing public doubt remains about the anthropogenic cause and scientific agreement about the role of anthropogenic greenhouse gases in climate change (4, 5). A vocal minority of researchers and other critics contest the conclusions of the mainstream scientific assessment, frequently citing large numbers of scientists whom they believe support their claims (6–8). This group, often termed climate change skeptics, contrarians, or deniers, has received large amounts of media attention and wields significant influence in the societal debate about climate change impacts and policy (7, 9–14).

An extensive literature examines what constitutes expertise or credibility in technical and policy-relevant scientific research (15). Though our aim is not to expand upon that literature here, we wish to draw upon several important observations from this literature in examining expert credibility in climate change. First, though the degree of contextual, political, epistemological, and cultural influences in determining who counts as an expert and who is credible remains debated, many scholars acknowledge the need to identify credible experts and account for expert opinion in technical (e.g., science-based) decision-making (15–19). Furthermore, delineating expertise and the relative credibility of claims is critical, especially in areas where it may be difficult for the majority of decision-makers and the lay public to evaluate the full complexities of a technical issue (12, 15). Ultimately, however, societal decisions regarding response to ACC must necessarily include input from many diverse and nonexpert stakeholders.

Because the timeline of decision-making is often more rapid than scientific consensus, examining the landscape of expert opinion can greatly inform such decision-making (15, 19). Here, we examine a metric of climate-specific expertise and a metric of overall scientific prominence as two dimensions of expert credibility in two groups of researchers. We provide a broad assessment of the relative credibility of researchers convinced by the evidence (CE) of ACC and those unconvinced by the evidence (UE) of ACC. Our consideration of UE researchers differs from previous work on

climate change skeptics and contrarians in that we primarily focus on researchers that have published extensively in the climate field, although we consider all skeptic/contrarians that have signed prominent statements concerning ACC (6–8). Such expert analysis can illuminate public and policy discussions about ACC and the extent of consensus in the expert scientific community.

We compiled a database of 1,372 climate researchers based on authorship of scientific assessment reports and membership on multistakeholder statements about ACC (*SI Materials and Methods*). We tallied the number of climate-relevant publications authored or coauthored by each researcher (defined here as *expertise*) and counted the number of citations for each of the researcher’s four highest-cited papers (labeled here as *prominence*) using Google Scholar. We then imposed a *a priori* criterion that a researcher must have authored a minimum of 20 climate publications to be considered a climate researcher, thus reducing the database to 908 researchers. Varying this minimum publication cutoff did not materially alter results (*Materials and Methods*).

We ranked researchers based on the total number of climate publications authored. Though our compiled researcher list is not comprehensive nor designed to be representative of the entire climate science community, we have drawn researchers from the most high-profile reports and public statements about ACC. Therefore, we have likely compiled the strongest and most credentialed researchers in CE and UE groups. Citation and publication analyses must be treated with caution in inferring scientific credibility, but we suggest that our methods and our expertise and prominence criteria provide conservative, robust, and relevant indicators of relative credibility of CE and UE groups of climate researchers (*Materials and Methods*).

Results and Discussion

The UE group comprises only 2% of the top 50 climate researchers as ranked by expertise (number of climate publications), 3% of researchers of the top 100, and 2.6% of the top 200, excluding researchers present in both groups (*Materials and Methods*). This result closely agrees with expert surveys indicating that ≈97% of self-identified actively publishing climate scientists agree with the tenets of ACC (2). Furthermore, this finding complements direct polling of the climate researcher community, which yields qualitative and self-reported researcher expertise (2). Our findings capture the added dimension of the distribution of researcher expertise, quantify agreement among the highest expertise climate researchers, and provide an independent assessment of level of scientific consensus concerning ACC. In addition to the striking difference in number of expert researchers between CE and UE groups, the distribution of expertise of the UE group is far below that of the CE group (Fig. 1). Mean expertise of the UE group was around half (60 publications) that of the CE group (119 publications; Mann–Whitney U test, $W = 57,020$; $P < 10^{-14}$), as was median expertise (UE = 34 publications; CE = 84 publications).

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Furthermore, researchers with fewer than 20 climate publications comprise ~50% the UE group, as opposed to less than 10% of the CE group. This indicates that the bulk of UE researchers on the most prominent multistatement statements about climate change have not published extensively in the peer-reviewed climate literature.

We examined a subsample of the 50 most-published (highest-expertise) researchers from each group. Such subsampling facilitates comparison of relative expertise between groups (normalizing differences between absolute numbers). This method reveals large differences in relative expertise between CE and UE groups (Fig. 2). Though the top-published researchers in the CE group have an average of 456 climate publications (median = 344), the top UE researchers average only 59 publications (median = 66; Mann-Whitney U test: $W = 2,455$; $P < 10^{-15}$). Thus, this suggests that not all experts are equal, and top CE researchers have much stronger expertise in climate science than those in the top UE group.

Finally, our prominence criterion provides an independent and approximate estimate of the relative scientific significance of CE and UE publications. Citation analysis complements publication analysis because it can, in general terms, capture the quality and impact of a researcher's contribution—a critical component to overall scientific credibility—as opposed to measuring a researcher's involvement in a field, or expertise (*Materials and Methods*). The citation analysis conducted here further complements the publication analysis because it does not examine solely climate-relevant publications and thus captures highly prominent researchers who may not be directly involved with the climate field.

We examined the top four most-cited papers for each CE and UE researcher with 20 or more climate publications and found immense disparity in scientific prominence between CE and UE communities (Mann-Whitney U test: $W = 50,710$; $P < 10^{-6}$, Fig. 3). CE researchers' top papers were cited an average of 172 times, compared with 105 times for UE researchers. Because a single, highly cited paper does not establish a highly credible reputation but might instead reflect the controversial nature of that paper (often called the single-paper effect), we also considered the average the citation count of the second through fourth most highly cited papers of each researcher. Results were robust when only these papers were considered (CE mean: 137; UE mean: 84; Mann-Whitney U test: $W = 50,492$; $P < 10^{-6}$). Results were robust when all 1,372 researchers, including those with fewer than 20 climate publications, were considered (CE mean: 126; UE mean: 59; Mann-Whitney U test: $W = 3.5 \times 10^5$; $P < 10^{-15}$). Number of citations is an imperfect but useful benchmark for a group's scientific prominence (*Materials and Methods*), and we show here that even considering all (e.g., climate and nonclimate)

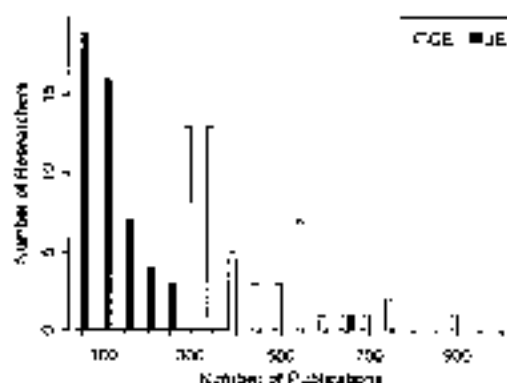


Fig. 2. Distribution of the number of the top 50 most-published researchers from CE and UE categories with a given number of total climate publications. Tick marks indicate the center of right-inclusive categories (e.g., 20–50, 51–100, 101–150, etc.).

publications, the UE researcher group has substantially lower prominence than the CE group.

We provide a large-scale quantitative assessment of the relative level of agreement, expertise, and prominence in the climate researcher community. We show that the expertise and prominence, two integral components of overall expert credibility, of climate researchers convinced by the evidence of ACC vastly overshadows that of the climate change skeptics and contrarians. This divide is even starker when considering the top researchers in each group. Despite media tendencies to present both sides in ACC debates (9), which can contribute to continued public misunderstanding regarding ACC (7, 11, 12, 14), not all climate researchers are equal in scientific credibility and expertise in the climate system. This extensive analysis of the mainstream versus skeptical/contrarian researchers suggests a strong case for considering expert credibility in the relative weight of and attention to these groups of researchers in future discussions in media, policy, and public forums regarding anthropogenic climate change.

Materials and Methods

We compiled a database of 1,372 climate researchers and classified each researcher into two categories: convinced by the evidence (CE) for anthropogenic climate change (ACC) or unconvinced by the evidence (UE) for ACC. We defined CE researchers as those who signed statements broadly agreeing with or directly endorsing the primary tenets of the IPCC Fourth Assessment

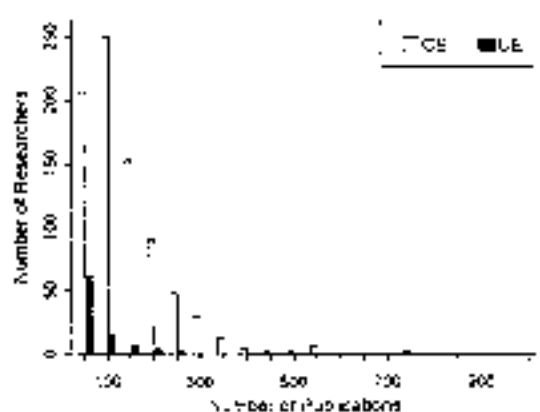


Fig. 3. Distribution of the number of researchers ($n = 908$) in CE and UE categories with a given number of total climate publications. Tick marks indicate the center of right-inclusive categories (e.g., 20–50, 51–100, 101–150, etc.).

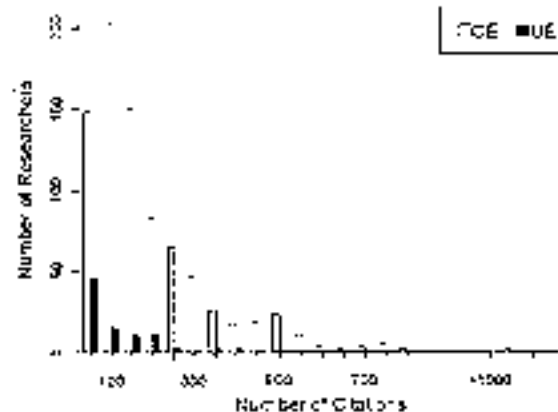


Fig. 4. Distribution of the number of researchers ($n = 908$) in CE and UE categories with a given number of citations. Tick marks indicate the center of right-inclusive categories (e.g., 0–50, 51–100, 101–150, etc.), stepped by increments of 50 until 1,000 citations, and 500 thereafter.

Report that it is "very likely" that anthropogenic greenhouse gases have been responsible for "most" of the "unequivocal" warming of the Earth's average global temperature in the second half of the 20th century (3). We compiled these CE researchers comprehensively from the lists of IPCC AR4 Working Group I Contribution and four prominent scientific statements endorsing the IPCC (in a 92), *Science* (in a 10), and *Science* (in a 10) (Materials and Methods). We defined UE researchers as those who have signed statements strongly dissenting from the views of the IPCC. We compiled UE names comprehensively from 12 of the most prominent statements criticizing the IPCC conclusions ($n = 472$, *Materials and Methods*). Only three researchers were members of both the CE and UE groups (due to their presence on both CE and UE lists) and remained in the dataset, except for calculation of the top 50, 100, and 200 researchers' group membership.

Between December 2008 and July 2009, we collected the number of climate-relevant publications for all 1,372 researchers from Google Scholar (search term: "Author (first, last name climate)"), as well as the number of times cited for each researcher from four top-cited articles in any field (search term: "climate") removed. Overall number of publications was not used because it was not possible to provide accurate publication counts in all cases because of similarly named researchers. We verified, however, author identity for the four top-cited papers by each author.

To examine only researchers with demonstrated climate expertise, we imposed a 20 climate-publications minimum to be considered a climate researcher, bringing the list to 818 researchers ($N_{CE} = 613$, $N_{UE} = 470$). Our dataset is not comprehensive of the climate community and therefore does not infer absolute numbers or proportions of all CE versus all UE researchers. We acknowledge that there are other possible and valid approaches to quantifying the level of agreement and relative credibility in the climate science community, including alternate climate researcher outputs, publication databases, and search terms to determine climate-relevant publications. However, we provide a useful, conservative, and reasonable approach whose qualitative results are not likely to be affected by the above assumptions. We conducted the above analysis with a climate researcher cutoff of a minimum of 10 and 40 publications, which yielded very little change in the qualitative or strong statistically significant differences between CE and UE groups. Researcher publication and citation counts in Earth Sciences have been found to be largely similar between Google Scholar and other peer-reviewed citation indices such as ISI Web of Science (20). Indeed, using Google Scholar provides a more conservative estimate of expertise (e.g., higher levels of publications and more experts considered) because it includes a greater breadth of sources than other citation indices. Our climate-relevant search term does not, understandably, capture all relevant publications and exclude all nonrelevant publications in the detection and attribution of ACC, but we suggest that its generality provides a conservative estimate of expertise (i.e., higher numbers of experts) that should not differentially favor either group.

Publication and citation analyses are not perfect indicators of researcher credibility, but they have been widely used in the natural sciences for comparing research productivity, quality, and prominence (21–24). Furthermore, these methods tend to correlate highly with other estimates of research quality, expertise, and prominence (21–26). These standard publication and citation metrics are often used in many academic fields to inform decisions regarding hiring and tenure. Though these methods explicitly estimate (and adjust) to other academic fields which might not directly translate to credibility in broader discourse, polls suggest that about 70% of the American public generally trusts scientific opinion on the environment, making this assessment broadly relevant (27). Criticism of the two methods centers around issues of self-citation, additionality of multiple authors, single citation, and age demography (e.g., age distribution where older researchers can accrue more publications and citations) differences between groups (21–26, 28, 29). All of these criticisms are expected to have the least influence at high levels of aggregation (e.g., an entire field) and high-level citations, both of which are analyzed here (21–25, 26, 28, 29).

Regarding the influence of citation patterns, we acknowledge that it is difficult to quantify potential biases of self-citation or single citation in the analysis presented here. However, citation analysis research suggests that the potential of these patterns to influence results is likely to decline as sample size of researchers, possible claims, and papers analyzed for citations increased (22, 25–28). By selecting an inclusive sample of 1,372 researchers and focusing our analysis only on the researchers' four most cited papers, we have designed our study to minimize the potential influence of these patterns. Furthermore, we have no a priori basis for assuming any relation (e.g., self-citation rates) or demographic differences (e.g., age effect on publications or citations) between CE and UE groups. Preliminary evidence suggests these differences would likely favor the UE group. From the ~60% of researchers whose year of PhD was available, mean year of receiving a PhD for UE researchers was 1973, versus 1987 for CE researchers, implying that UE researchers should have on average more publications due to an age effect alone. Therefore, these methods are likely to provide a reasonable estimate of the preeminent researchers in each group and are useful in comparing the relative expertise and prominence between CE and UE groups.

Ultimately, of course, scientific confidence is earned by the winnowing process of peer review and replication of studies over time. In the meantime, given the immediacy attendant to the state of debate over perception of climate science, we must seek estimates while confidence builds. Based on the arguments presented here, we believe our findings capture the differential climate science credentials of the two groups.

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