

## Climate Change

# Litigation & Corporate Risk

On September 17, 2008, Scientific American and co-sponsor Jones Day convened a multidisciplinary board of experts for a unique Roundtable discussion entitled "Climate Change Litigation and Corporate Risk." At this event, climate change lawyers, scientists, and policy and business leaders came together to debate two hot button issues within the broad context of climate change.

The event began with Panel 1, which focused on the challenges of potential climate change litigation, especially with regard to establishing liability and assigning damages. This was followed by Panel 2, which addressed the pros and cons of federal propositions for cap-and-trade systems versus imposing a carbon tax.

Whenever experts in various fields gather for discussion, the expectation

for heated discourse filled with nuggets of insight is high, and the event did not disappoint. Scientific American and Jones Day are proud to bring you the proceedings of this Roundtable, with Panels 1 and 2 summarized in one publication.

The views set forth herein are the personal views of the participants and not necessarily those of Scientific American or Jones Day.

### CONTENTS

#### Panel 1 ..... 1-8

Panel 1 Participants.....	2
The Big Hurdle.....	2
2009: A Time for Change.....	3
Superfund in the Sky.....	4
Counting Carbon.....	5
Climate Modeling .....	6

In the News .....	7
The Political Question Doctrine.....	7
Case History.....	8

#### Panel 2 ..... 9-15

Panel 2 Participants.....	9
Designing a Cap-and-Trade System..	9

Cap-and-Trade Considerations .....	10
Carbon Taxes .....	11
Carbon Markets .....	12
States' Rights .....	13
Insurance Uncertainty .....	14
Can Cap-and-Trade Save Us? .....	15

*A custom publication produced in collaboration with Jones Day.*

## Panel 1

### THE SCIENCE OF CLIMATE CHANGE IN THE COURTROOM

*Reconciling the Precautionary  
Nature of the Science with  
Daubert and Issues of Causation*



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Moderator

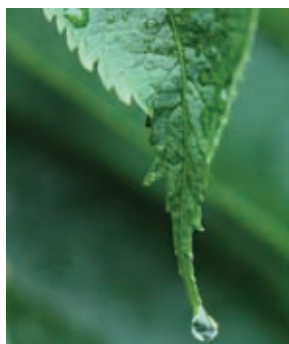
**Kevin P. Holewinski**

Partner, Jones Day

# The Big Hurdle

**ESTABLISHING A CAUSAL LINK BETWEEN THE DEFENDANT  
AND THE DAMAGE IS JOB ONE IN CLIMATE-CHANGE LITIGATION.**

It's easy to prove that the levels of carbon dioxide and other greenhouse gases in the atmosphere have risen since the Industrial Revolution. And Plaintiff's lawyers contend that it's relatively easy to figure out where a lot of those gases are coming from. What's difficult, says A.J. Gravel, managing director



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## Detection and Attribution

The first step in proving causation is establishing that climate change is occurring. You can do that fairly easily by assembling global average air temperature measurements from weather stations around the world and screening

of LECCG, is making a causal link between the industries emitting the gases and the havoc that climate change is wreaking on everything from beachfront property to polar bears. "That's something that no one has been able to successfully hurdle," Gravel says.

The issue isn't whether greenhouse gases are contributing to climate change. It's whether the plaintiff can prove causation in a tort case—a lawsuit that enables an injured party to recover damages if it can be proved that another party is legally responsible for those injuries.

Take the Inupiat coastal village of Kivalina, Alaska, for example. The waters there are rising, and the residents will soon have to move inland. How do you make the case that oil and power companies specifically caused those waters to warm and thus should pay for the relocation of the plaintiffs? "Specific causation is the big stumbling block," says Lisa Heinzerling, a law professor at the Georgetown University Law Center. (See "Case History" on p. 8 for more information on the Kivalina case.)

out obvious statistical problems, says Daniel A. Lashof, director of the Climate Center at the Natural Resources Defense Council. Measurements of increased heat in the ocean corroborate the air temperature measurements. "That nails the case with really as high a level of certainty as you can get in an observational science," Lashof says.

Step two is attribution: proving that the observed changes in the climate are the result of increased greenhouse gases in the atmosphere. That's a more difficult problem, but the most recent assessment by the Intergovernmental Panel on Climate Change concludes with high confidence that the climate is changing as a result of human activities that release these gases.

Step three is a matter of tracing those greenhouse gases back to their sources. Proving specific causation is the Herculean task facing scientists and litigators, especially when trying to allocate damages. Assigning responsibility when there are multiple contributors to the damage is a hugely complicated task, but

one for which there are some models (see “Superfund in the Sky,” p. 4). One starting point is to calculate greenhouse gas

*“Specific causation is the big stumbling block.”*

—Lisa Heinzerling

emissions using online databases such as the Climate Analysis Indicators Tool (see “Counting Carbon,” p. 5).

## The Daubert Question

Although the science is solid on a global level, proving causation on a local level presents major challenges, especially where it involves greenhouse gas emissions going back many decades. “I think that, on the causation side, what we’re going to continue to see is a scientific battleground,” Gravel says. “The Daubert question is going to be a huge question because with such complicated fact patterns as we have here, I think we’re going to necessarily want to make sure that we’re as robust as possible. Even a very small contribution will translate to enormous economic impact on specific industry sectors.”

Currently the courts do not take seriously their role as gatekeepers for scientific evidence, says Heinzerling. Many judges do not understand the science behind the evidence being presented, and so they use Daubert to avoid jury trials, she says. “If they continue those shenanigans, then industry has a very good chance of succeeding on a Daubert theory.” If, on the other hand, judges allow all of the scientific evidence to be heard, that will make it easier to clear the causation hurdle and move on to allocating responsibility for damages. (See “Case History” on p. 8 for background on Daubert.)

“I think that you’ll eventually jump the hurdle,” Gravel predicts. “What I see as the bigger problem is the second question, damages and apportionment. When you get down to the pocketbook of the industry, or the company within the industry, that’s where you’re going to see the heavy battles.”

# 2009: A Time for Change

The election of Barack Obama demonstrates that his campaign for “change” clearly resonated with the American electorate. A key element in his agenda was support for a cap-and-trade program to deal with the issue of climate change. Specifically, he called for a 35 percent reduction in greenhouse gas emissions by 2020, and an 80 percent reduction by 2050.

Both environmentalists and many business leaders now expect him to lead the United States to adopt such a cap-and-trade program in the very near future. Given the Democratic gains in Congress and the President-Elect’s post-election pledge that his Administration would help lead a “new era” of global cooperation on climate change and his statement that delay is no longer an option, 2009 is likely to be one of the most momentous

years in the environmental political history of the U.S., if not the world.

Significantly, this announced change in U.S. policy coincides with the so-called “Bali Road Map” adopted last year by U.N. climate delegates. The “Bali Road Map” calls for those delegates to finalize a new global agreement to reduce greenhouse gas emissions by the time the U.N. climate change negotiators meet in December 2009 in Copenhagen. Therefore, expect 2009 to be a time for change especially with regard to the politics of and legal frameworks for addressing climate change.

KEVIN P. HOLEWINSKI, MODERATOR

*Partner and Practice Coordinator  
of Jones Day’s Environmental Health  
and Safety Practice*

## .....*timeline to ’09*

**1963** Congress passes the original Clean Air Act, which establishes funding for the study and cleanup of air pollution.

**1970** Congress passes a much stronger version of the Clean Air Act and creates the Environmental Protection Agency (EPA), giving it responsibility for carrying out the Act.

**1990** Congress again revises and expands the Clean Air Act, giving the EPA even broader authority to regulate emissions.

**1999** Nineteen organizations petition the EPA, seeking regulatory action under the Clean Air Act to reduce greenhouse gas emissions from motor vehicles.

**2003** The EPA denies the petition, saying that the agency has no legal authority to control greenhouse gas emissions. In response, 12 states, three cities and 13 environmental organizations join forces to file a legal challenge, Massachusetts et al. v. EPA.

**2004** Eight states and New York City file suit against five major companies that operate fossil-fuel-burning power plants, saying that their emissions constitute a public nuisance.

**2005** The Kyoto Protocol goes into effect, imposing greenhouse gas emission limits on nations that have ratified the agreement. Nations can meet these limits by trading emission credits. The U.S. has not ratified the agreement.

**2007** The Intergovernmental Panel on Climate Change (IPCC) issues its fourth assessment report, concluding that there is strong evidence of human-induced climate change, and projecting dire impacts if steps are not taken to reduce emissions.

**2007** The U.S. Supreme Court issues its decision in Massachusetts et al. v. EPA, concluding that the EPA has the authority to regulate the greenhouse gases in tailpipe emissions, and must do so unless it can provide a scientific basis for its refusal.



# Superfund in the Sky

In 1980 Congress responded to the Love Canal disaster by passing the Comprehensive Environmental Response, Compensation, and Liability Act. Dubbed Superfund, the legislation gave the federal government authority to clean up abandoned toxic waste sites and to recover cleanup costs from the companies responsible for the contamination. Almost three decades later, Superfund may serve as a model for addressing excess greenhouse gases in the atmosphere, suggests A.J. Gravel, managing director of LECG. "The way I'm thinking about climate change right now," says Gravel, "is Superfund in the sky."

As with contaminated groundwater or landfills, there are multiple contributors to climate change. And once pollutants enter the ground, water or air, they mingle and disperse. That makes it difficult to trace pollution back to its sources. One possible solution is a market-share approach to assigning liability. Establishing a market-share claim for an oil company, for example, would not be difficult, says Daniel A. Lashof, direc-

## ASSIGNING BLAME FOR GREENHOUSE GAS EMISSIONS IS EVEN TOUGHER THAN TRACING HAZARDOUS WASTE TO ITS SOURCES.

tor of the Climate Center at the Natural Resources Defense Council. "You can go back to annual reports and see how much oil Exxon produced every year for the last 40 or 50 years, and there's obviously been some reorganization but you could trace that back." For power companies, you could estimate market share based on fuel consumption and power generation data. "That doesn't get you all of the sources, but I think for some of the big sources you can make pretty reasonable estimates of what their cumulative contribution has been," Lashof says.

Must every contributor to climate change, even small ones, be included in a liability case? "Courts can't manage cases where potentially you've got a million parties that someone wants to bring in," observes Kevin P. Holewinski, partner at Jones Day and session moderator. "That could be just overwhelming."

"I think this came up in Superfund maybe 20 years ago, a case in New York where the defendant said, 'Okay, we'll answer your Superfund suit with a suit against all the homeowners in the area for generating garbage,'" recalls Lisa Heinzerling, a law professor at the Georgetown University Law Center. "The courts won't tolerate it if it appears to be just an open ploy to show the stupidity of the litigation."

### Historical Contributions

But what happens when some of the larger polluters have gone out of business or changed hands over time? Carbon dioxide levels have been rising since the dawn of the industrial revolution. "That means we have a huge amount of carbon contributed in the historical pe-

riod," Gravel says. What's more, many of those contributions were made during a time when nobody knew they could be harmful to the climate.

Here too Superfund offers a precedent, Heinzerling says. "What's happened under Superfund is that people engaged in disposal of hazardous substances for decades...and yet we managed to reach back and hold them strictly liable nevertheless." She also points out that in cases such as Kivalina, there are allegations that some companies had reason to believe their emissions were contributing to climate change but decided to respond by sowing doubt about the science of climate change instead of changing their

*"We have a huge amount  
of carbon contributed in the  
historical period."*

—A.J. Gravel, LECG

business practices. If a conspiracy can be proven, Heinzerling says, that may make it easier to hold companies accountable for past behavior.

A market-share approach isn't the only option for analyzing contributions to climate change. Another possibility is probabilistic analysis, Gravel says. This is a tried-and-true method that has been used in establishing estimates for tort liability in cases involving asbestos, welding rods and other contexts. Climate change is a worldwide issue, though, so instead of hundreds of inputs you might have thousands or even tens of thousands, Gravel says. "So you would potentially open yourself up to Daubert challenges because people will certainly look at this rigorously and try to attempt to dissect it."

One other alternative Gravel suggests is a risk-pool model. Under this model, polluters would contribute to a central-

## THE Clean Air ACT

Adopted in 1963 and most recently amended in 1990, the Clean Air Act empowers the U.S. Environmental Protection Agency to protect human health and the environment by setting limits on the concentration of certain air pollutants in the atmosphere. The EPA issues operating permits that govern the emissions of air-pollution sources such as factories, chemical plants and utilities. Individual states and tribes are allowed to adopt stricter limits on air pollution than EPA but cannot set weaker limits. The Clean Air Act is credited with significantly reducing smog and acid rain over the last few decades, even as energy consumption and vehicle use have increased.

ized fund, and damage claims would be submitted to the fund's managers. "I think that what we can expect to see initially is a hybrid, something that's going to allow us to call on our experiences from the plumes and the landfills and all these other cases that we've all lived with for years," Gravel says.

## The Limits of Common Law

Although the Superfund analogy is helpful, it only goes so far. Superfund is a statute, rather than something that was crafted by common law courts. "It took all of the most extreme features of the common law and put them in one place," Heinzerling says. "It would take a fair bit of activity on the part of a single court to replicate that regime in a common-law case."

Holewinski agrees that courts are ill equipped to rule on the merits of climate-change claims. Superfund was a legislative process in which the public had an opportunity to participate. In the case of climate change, federal and state court judges are being asked to adjudicate claims that would be more appropriate for Congress or the EPA, he says (see also "The Political Question Doctrine," p. 7).

Heinzerling, however, finds it ironic when anyone suggests that the courts should stay out of climate change. "With respect to Superfund, if you'll recall, one of the first things that industry did in response is file a bunch of lawsuits saying it was unconstitutional," she points out. "So it's unclear who's using the courts for what purpose." Heinzerling predicts that Congress will pass a law creating an emissions trading program, and industry will immediately respond by filing a lawsuit challenging state laws and state tort claims as unconstitutional.

The biggest challenge ahead, Gravel says, is how to apportion damages. "That's where you're going to have the epic battles, in my view, because the costs and the impacts are going to be so huge, not just for moving the 400 folks in Kivalina but for the long-term social and political impacts...it will make Superfund look like it was easy." ○

# Counting Carbon

**AN ONLINE DATABASE CALCULATES HOW MUCH CARBON DIOXIDE HAS BEEN RELEASED INTO THE ATMOSPHERE—AND BY WHOM.**

**H**ow can you hold companies or countries responsible for their greenhouse gas emissions if you can't measure those emissions directly? Calculating emissions for most industries isn't that difficult, according to Daniel A. Lashof, director of the Climate Center at the Natural Resources Defense Council. He starts with an online database, called the Climate Analysis Indicators Tool (CAIT), developed and maintained by the World Resources Institute. It's available online with free registration at <http://cait.wri.org>.

Let's say you want to calculate the total quantity of fossil-fuel carbon dioxide that has been added to the atmosphere since 1850. CAIT adds up the quantities of coal, oil and natural gas that have been extracted and consumed during that time period in the 186 countries for which it has records. Next CAIT calculates how much carbon is in that amount of fuel. Finally CAIT translates that figure into metric tons of carbon dioxide released into the atmosphere.

CAIT allows you to change the database parameters to look at different time periods, different nations, different industries and different greenhouse gases. How much carbon dioxide did the U.S. transportation sector emit in the year 2000? Answer: 1,714 million tons, about a third of the world's total for that sector. Which country had the highest emissions from agriculture that year? China, with about 18 percent of the world's total. What is the U.S. share of the carbon dioxide released into the atmosphere from 1850 until 2004, the last year for which figures are available? About 29 percent. China's share for that same period? About 8 percent, although China's annual emissions are now roughly equivalent to those of the U.S.

## Cumulative Emissions 1850-2004

Country	MtCO <sub>2</sub>	Rank	% of World Total	Tons CO <sub>2</sub> Per Person
U.S.A.	324,604	1	29.41%	1,105
European Union	290,856	2	26.35%	635
Russian Federation	90,135	3	8.17%	627
China	89,243	4	8.09%	69
Germany	79,450	5	7.20%	963
United Kingdom	67,907	6	6.15%	1,135
Japan	42,696	7	3.87%	334
France	31,776	8	2.88%	525
India	25,167	9	2.28%	23
Canada	23,930	10	2.17%	748

MtCO<sub>2</sub>= Million tons of carbon dioxide  
Source: World Resources Institute

## HUMAN *Fingerprints*

Climate models predict that human-induced global warming will conform to these three patterns. Together they provide statistical evidence of the greenhouse effect.

- Latitude: The farther you move away from the equator, the greater the warming.
- Altitude: Closer to the Earth's surface the warming is greater than high in the stratosphere.
- Ocean Depth: The greatest warming is at the water's surface, and warming is less observable as you descend.

## A Smoking GUN?

Proving causation might move forward by demonstrating a statistical relationship between elevated carbon dioxide and a resulting negative impact, just as attorneys in earlier days of tobacco litigation connected the dots between smoking and cancer. The impact ripest for litigation is sea level rise, says Daniel A. Lashof, director of the Climate Center at the Natural Resources Defense Council.

Melting ice isn't the main reason for rising sea levels. "Most of the observed sea level rise is from a very well understood direct relationship, which is simply the thermal expansion of the oceans. As the oceans absorb heat—which we can measure directly, and we know the source of that heat is the extra trapping of the sun's energy due to global warming pollution—the oceans actually expand," Lashof explains. "So that's a very direct causation that you can arrive at."

# CLIMATE MODELING: State of the Art

*Tim Hall is a senior scientist at NASA's Goddard Institute for Space Studies, which has developed one of the foremost global climate models. His answers to questions about climate modeling:*

## Q: WHAT'S THE DIFFERENCE BETWEEN A CLIMATE MODEL AND A WEATHER FORECAST?

The distinction is one of time scales. In weather forecasting, things like snow cover, the ocean temperature, the distribution of vegetation...those things are all fixed. What limits us is our inability to, with perfect accuracy, specify the initial state of the atmosphere. If you can't specify the disturbances with enough accuracy, you're not going to simulate with any accuracy the state of the atmosphere down the line. So our limit is somewhere around five days realistically now.

Climate models are an entirely different kettle of fish. Our inability to specify the current state of the atmosphere is irrelevant. In climate models we're interested in the slow evolution of variables. We have to allow them to evolve, not specify them, and allow them to interact with the atmosphere. So there are many, many more processes that we have to include in climate models. We have to include everything that weather models include but we also have to include ocean circulation, the distribution of trace gases, pollutants in the atmosphere, we have to include the evolution of snow cover, of sea ice. We'd have to include changes in vegetation and all these things interact with the atmosphere and the ocean to affect climate.

## Q: WHAT'S MISSING FROM TODAY'S CLIMATE MODELS?

Land-based ice sheets are essentially not included in an interactive way in the present generation of climate models. We have a very limited understanding of the complex dynamics of propagating cracks, the ice quakes on Greenland and Antarctica, and the possibility that water melting at the surface is lubricating the base of the ice sheet and accelerating its

flow over the underlying rock substrate. These things are poorly understood even by glaciologists.

## Q: HOW WELL DO CLIMATE MODELS SIMULATE NATURAL VARIABILITY?

They certainly do not do it perfectly. For example, one of the major natural climate variables that most people would be aware of is El Nino. Some climate models around the world do have an El Nino signal in them, but other common models don't. It's a very difficult thing for climate models to get right. On the other hand, one thing the present generation of models actually can do quite well is to simulate the evolution of globally averaged temperature during the 20th century.

## Q: WHAT ARE METRICS IN CLIMATE MODELS?

A metric is a measured quantity against which the simulated quantity is compared. It could be marine cloud cover or the heat transport of the ocean, for example. These are things that we know are relevant to climate.

One of the metrics that's most bandied about is globally averaged surface air temperature, and one of the simple summaries of climate models that's most talked about is climate sensitivity—for example, the response of the globally averaged surface air temperature to a doubling of carbon dioxide in the atmosphere. All models cluster around 3 degrees Celsius for doubling of carbon dioxide, but there's a range probably from 2 to 4 degrees and that's a metric. It's a very crude one because it turns out that no one lives in the globally averaged surface air temperature. It's much more difficult to simulate local climate with a global climate model than it is to simulate global metrics.



## IN THE NEWS

*Public awareness of climate change is growing, and that could make litigation more acceptable to juries.*

Media attention to climate change has been steadily rising over the last few years, according to Chris Mooney, author of *Storm World: Hurricanes, Politics and the Battle Over Global Warming* and *The Republican War on Science*. Hurricane Katrina is partially responsible, but movies may have boosted press coverage more than any other factor, Mooney says. Still, though the coverage itself is increasing, what does this mean in terms of the type of stories reported or their impact on public opinion?

The 2004 film “The Day After Tomorrow” and Al Gore’s 2006 documentary “An Inconvenient Truth” raised consciousness levels to a new high. Tony Loserowitz of Yale University estimates that 21 million people saw “The Day After Tomorrow,” which is about 10% of the U.S. population. Although that is far more people than read any news story about climate change, 10% is not enough to change public opinion. Interestingly, the movie also spun off related media coverage at 10 times the volume of coverage for the 2001 Intergovernmental Panel on Climate Change (IPCC) report. Consciousness continued to rise, though, with major events like Hurricane Katrina and “An Inconvenient Truth.” The 2007 IPCC report fared better. It ranked as the #4 news story in terms of coverage, but the story was bumped from the lead the next week by the Super Bowl and an astronaut love triangle.

Perhaps more important than the growing volume of news about climate change is a change in the way these stories are structured, Mooney says. Until recently, journalists routinely attempted to balance their reporting by relying on a “he said, she said” structure: giving roughly equal space to scientists who accept that humans are contributing to climate change and to those who don’t. One study that sampled the five best-read newspapers in the U.S. from

1988 to 2002 found that about half of the articles on climate change had this balanced structure, despite a growing scientific consensus that humans were contributing to climate change. But in the period from 2003 to 2006, that type of article began to disappear, replaced by articles such as the 2005 USA Today cover story that proclaimed “The Debate’s Over: Globe is Warming.”

Now some scientists worry that the media bias has shifted too far in the other direction, making it impossible to have a reasoned debate about the science of climate change without being branded as a crackpot. Skepticism is healthy in science, says Timothy Hall, senior scientist at NASA’s Goddard Institute for Space Studies. “I think the media has had trouble distinguishing between skeptics and professional naysayers.” Mooney agrees, but points out that compared to the state of scientific understanding at the time, the skeptics had a disproportionate influence in the media in the past.

What do these changes mean in terms of public opinion? Will juries be less reluctant to award damages? Mooney’s opinion is yes, but it may be years away, “to some extent, courts follow society, if you look back historically ... When social changes happen, then often you can see sort of a correlation between some of the decisions that are made.”

## The Political Question Doctrine AN EASY WAY OUT FOR THE COURTS?

A federal court may decline to decide a case by ruling that it is a “political question.” Such a ruling allows the court to avoid decision-making on issues that are better solved by elected officials in other branches of the federal government. Judges citing this doctrine believe that political questions should be addressed through the political process instead of the courts.

For example, in *Murphy v. Comer Oil*, a federal judge dismissed a lawsuit filed by individuals who argued that global warming in the Gulf of Mexico had exacerbated the effects of Hurricane Katrina. “The court said it was a political question because climate change is such a big social issue that it can’t be handled by the courts,” explains Lisa Heinzerling, a law professor at Georgetown University Law Center. But, she points out, the same judge did not dismiss litigation against insurance companies for their failure to pay claims due to damage from Katrina.

“When I went to law school, the political question doctrine was one of those doctrines we all learned about and then we learned it was dead,” says Heinzerling. “And then suddenly it came to life again. But for now I think it’s on life support and to see it arise in these cases makes me think not that it’s thriving, but that there’s something about these cases that the courts would rather not deal with. I think it’s incorrect from a legal perspective.”



# Legal Climate Knowledge

As climate change continues to emerge as the major environmental issue of our time, our team draws on a global network with in-depth experience in the European Union Emissions Trading Scheme, the UK Emissions Trading Scheme, U.S. state and regional control schemes, and structuring joint implementation and clean development projects under the Kyoto Protocol. Our multidisciplinary and worldwide team also provides assistance in:

- All issues relating to project financing.
- Project structuring, such as providing advice from a tax perspective in order to optimize taxation of greenhouse gas reduction credits.
- Drafting industrial contracts required for project implementation.
- Management of relationships with governmental authorities to obtain required approvals.
- Drafting and negotiating emission reduction credit purchase agreements.
- Climate change litigation.



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*The cases mentioned in this publication will be crucial to climate change litigation and regulation as we move forward. Below is the background and ruling (if complete) for these cases.*

## **DAUBERT V. MERRELL DOW PHARMACEUTICALS, INC.**

The U.S. Supreme Court's 1993 ruling in Daubert has had a tremendous impact the admissibility of expert testimony within the justice system. The case involved a father and mother who alleged that their children's birth defects were caused by Bendectin, a Merrell Dow prescription drug taken by the mother while she was pregnant. The parents enlisted eight experts who concluded that animal studies show Bendectin can cause birth defects. The pharmaceutical company, however, presented an expert's review of the scientific literature that did not find Bendectin to be a risk factor for human birth defects. The Court ruled that trial judges are the "gatekeepers" of expert testimony, and that it is their responsibility to ensure that an expert's testimony is relevant and is grounded in scientific methods and knowledge. Since Daubert, the percentage of scientific testimony excluded from the courtroom has risen.

## **MASSACHUSETTS ET AL. V. EPA**

Massachusetts joined forces with 11 other states, three cities and 13 environmental organizations to challenge the Environmental Protection Agency's refusal to regulate carbon dioxide and other greenhouse gas emissions from motor vehicles as air pollutants. In a 5-4 decision last year, the U.S. Supreme Court concluded that the EPA has the legal authority to regulate tailpipe emissions under the Clean Air Act, and that the agency cannot avoid taking action unless it can provide scientific evidence that greenhouse gases do not contribute to climate change.

## **KIVALINA V. EXXONMOBIL CORP. ET AL.**

Filed in federal court in February 2008, this lawsuit seeks monetary



## Case History

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damages from Exxon Mobil Corporation, eight other oil companies, 14 power companies and one coal company for the destruction of Kivalina, an Alaska Native village of about 400 people. The suit accuses ExxonMobil and the other companies of threatening the village's existence by emitting huge quantities of greenhouse gases that contribute to global warming. The suit also accuses the companies of "furthering a conspiracy to suppress the awareness of the link between these emissions and global warming." Perched on a barrier reef between the Chukchi Sea and two rivers, Kivalina was once protected from storms by sea ice. But rising temperatures have melted the ice, and the village is now battered by waves that are eroding the coastline. The lawsuit estimates that it would cost \$400 million to relocate the village.



## Panel 2

FROM KYOTO TO BALI TO CAP  
AND TRADE IN THE U.S.

*How Do U.S. industry segments plan  
for and take advantage of climate  
change regulation or legislation?*



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Moderator

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Partner, Jones Day

## DESIGNING A

# Cap-and-Trade System

“Cap-and-trade” is the common name for any regulatory scheme that uses emissions trading to reduce air pollution. It provides market-based rewards for companies that reduce their emissions of certain gases and designates penalties for those with higher emissions. Many people see cap-and-trade as the most promising method for reducing emissions of the greenhouse gases responsible for climate change.

Here’s how it works: A government or international organization sets a cap on the level of greenhouse gases that can be emitted into the atmosphere. Companies emitting these gases are issued permits—sometimes called carbon credits—entitling them to emit a specific amount of gas. Over time, the cap is gradually reduced. To stay within the new limits, companies can either reduce their emissions (through energy efficiency improvements, for example) or purchase additional credits from other permit holders who have been more successful at reducing their emissions.

The advantage of such a system is that it reduces overall emissions without dictating what each company must do. Instead companies are free to select the most cost-effective methods for meeting their emissions targets. Some companies find it more cost-effective to buy credits from those who pollute less, while others choose to invest in emission reductions so that they can sell some of their credits. Such a trading system reduces pollution at the lowest possible cost to everyone concerned.

A number of trading programs for greenhouse gases are already in operation. The largest is the European Union Emissions Trading Scheme. In the United States, nationwide cap-and-trade programs for carbon dioxide and other greenhouse gases have been proposed but not yet approved. However, several state and regional programs have begun in the last

few years (see “Carbon Markets,” p. 12).

Although some of these programs focus exclusively on carbon dioxide—the biggest contributor to climate change—others include additional greenhouse gases such as methane. For convenience, emissions are measured in tons of carbon dioxide, and gases other than carbon dioxide are converted to a “carbon dioxide equivalent” based on their climate-changing potency. Some cap-and-trade programs focus exclusively on certain sectors of the economy, such as electric utilities. Others include multiple sectors, such as transportation and agriculture.

There is disagreement about exactly how to administer cap-and-trade programs. For example, how should emission allowances be distributed? Some experts recommend allocating them to companies based on their current emissions. Others recommend auctioning the allowances rather than giving them away.

There is also disagreement over how to regulate emission levels: Should they be regulated “upstream,” at the point where fossil fuels are extracted from the ground? Or does it make more sense to regulate “downstream,” where emissions reductions are most likely to be implemented? That could mean the difference between regulating a coal-mining company or a coal-burning power plant, for example (see “Cap-and-Trade Considerations,” p. 10).

Finally, some experts argue that a carbon tax would be more effective than a cap-and-trade program (see “Carbon Taxes: An Alternative to Cap-and-Trade,” p. 11). The latter ensures that money is spent on emissions reductions, rather than diverted to other government programs. However, cap-and-trade programs can be more complicated than a direct tax. The important thing, says Jonathan Stack, senior broker for carbon and renewable energy markets at CantorCO2e, “is sticking to a plan and making it as simple a plan as possible for people to follow.”

# Cap-and-Trade Considerations

**THERE IS MUCH DEBATE SURROUNDING HOW TO DESIGN AN EFFECTIVE YET REALISTIC CAP-AND-TRADE PROGRAM. THREE OF THE MAJOR POINTS OF CONTENTION ARE DISCUSSED HERE.**

## Economy-Wide or Sector-Specific?

Some cap-and-trade schemes focus on specific industries, but most experts agree that cap-and-trade will be more effective if it is implemented throughout the economy. It isn't feasible, however, to measure greenhouse gas emissions down to the level of an individual household.

Michael Goo, Climate Legislative Director for the Natural Resources Defense Council, says that focusing on one sector of the economy raises issues of fairness. "We favor the economy-wide approach because we think it gets us the coverage we need," Goo says. "In the end it's all about making sure we get a sufficient level of reductions to meet the science-based targets that we need to fight global warming."

However, Goo points out that in an economy-wide cap, 80 percent of the reductions are initially going to come from the electric power sector. Other sectors, such as transportation, require more time to develop and implement emission-reducing technologies.

While few experts disagree that the economy-wide approach is the best way to rein in global warming, such an approach could mean that small businesses or even individuals become subject to new regulations. Taken to its extreme, economy-wide regulation might mean that an individual could no longer drive to work at the end of the month because he had exceeded his carbon allocation.

Jonathan Stack, senior broker for carbon and renewable energy markets at CantorCO2e, says it makes sense to seek an economy-wide solution for what is an economy-wide problem. One way to avoid excessive regulation of individuals and small businesses, he suggests, is to set a threshold for greenhouse gas

emissions: Only companies emitting more than the threshold would be part of the cap-and-trade system.

"One of our clients is a tiny business in the magnesium industry," says Stack. "They only have 20 employees but they emit more than several hundred thousand tons of CO<sub>2</sub> a year because of what they do." Under a threshold system, such a company would participate in cap-and-trade, but commuters would be spared.

## Upstream or Downstream?

A cap-and-trade system sets limits on greenhouse gas emissions, but experts don't always agree on which companies should be held responsible for those emissions. Should regulations be aimed at "upstream" companies—for example, mining and drilling companies that extract fossil fuels from the ground? Or should they be targeted at "downstream" companies, such as the power plants or individual consumers that burn these fuels, releasing greenhouse gases in the process?

"If you have a cap-and-trade program at the federal level, it's probably going to be an all-inclusive program," says Graham Holden, a partner at Jones Day. "The general consensus is it's likely to be both upstream and downstream regulation."

The advantage of upstream regulation, Holden says, is that the market will respond by raising the price of carbon-containing fuels, and consumers in turn will reduce the amount of fuel they use. On the other hand, he says, the government may be able to get the largest reductions in emissions by directly regulating the companies that emit greenhouse gases. "I think there's logic to both approaches, which is why you might see both approaches, at least at the federal level," Holden says.

Goo suggests that the point of regulation might vary by industry sector. For example, in transportation, it would be a logistical nightmare to regulate individual vehicles. Instead regulations could be imposed upstream, on the importers and refiners of oil.

For electric power generated by burning coal, a hybrid approach might make the most sense. There are a relatively small number of coal-mining companies, which makes them easier to regulate. However, emissions reductions have to occur at the power plant where coal is burned, and those plants already have experience measuring and reporting their emissions.

For electric power generated by burning natural gas, the situation is a bit more complicated because some natural gas escapes into the atmosphere during the extraction process and contributes to global warming. So regulations may need to be imposed on gas drillers, as well as on the local distribution companies that supply the gas to customers who burn it for heating or power production. Industrial consumers would also be regulated. Goo agrees with Holden that the most likely solution is a combination of upstream and downstream regulation, rather than a one-size-fits-all approach.

## Allocation or Auction?

Under a cap-and-trade system, companies can trade carbon credits if they stay within the upper limit on emissions. But how should credits initially be assigned? One way is to allocate them to existing industries based on their historical emissions levels, in essence "grandfathering" them into the program but requiring reductions in emissions over time. Another way is to hold an auction and require companies to purchase the credits they need to cover their emissions. Michael Goo favors the auction approach. Jona-

than Stack prefers allocations. Here are some of the arguments on both sides.

**Stack:** At least at first you should allocate, and then let the market figure out a way to reduce emissions in the most efficient way. With an auction system you don't have as much incentive to reduce your emissions because you just go in, you buy what you need and that's all. Whereas under an allocation system, if these things are worth a lot of money, you're going to figure out a way to reduce your emissions and you're going to make a lot of money hopefully. I think personally that you should make a lot of money for reducing your emissions, and that will get people to reduce their emissions. So the big debate is: if you're giving away allocations free, essentially you're giving away a huge amount of money, but you're letting the market figure it out.

With auctions, one of the other debates is how to limit participation. Under the Regional Greenhouse Gas Initiative (see "Carbon Markets," p. 12) you don't have to be an emitter, you can be a bank, a hedge fund, or an NGO. When you allow anybody into an auction, a lot of our clients have deep pockets and they can move fast, and then you have guys hoarding these allowances.

**Goo:** We favor the auction approach because all the allowances are auctioned, the money goes into the Treasury, people buy what they need or they can speculate, and they can have a free market. When you give the allowances for free to the emitters, what you're doing is you're giving them a windfall profit. You're not actually reducing the compliance cost, you're not actually reducing the burden on consumers, you're simply handing them money. They will simply take those profits and they will use them for their bottom line for their shareholders.

We oppose free allocation but we understand the political realities. We understand that there will need to be some free allocation to emitters for transition purposes. We'd like to see it go through the local distribution companies, so they can make appropriate choices about reducing emissions.

# Carbon Taxes

## AN ALTERNATIVE TO CAP-AND-TRADE

Considering all the complications of administering a cap-and-trade system, some experts have suggested that it might be easier to simply tax emissions of carbon dioxide and other greenhouse gases. These experts argue that a "carbon tax" would give businesses a financial incentive to reduce their emissions.

The problem, according to experts who prefer cap-and-trade, is that a carbon tax does not provide a guaranteed level of emissions reductions. While some consumers might respond to a tax increase by reducing their emissions, others might simply choose to pay the higher price and go on polluting.

Carbon taxes are also regressive, says Michael Goo, Climate Legislative Director for the Natural Resources Defense Council. "Members of society who can least afford this kind of cost would be paying \$8 or \$10 a gallon at the gasoline pump, while people who could afford those prices would continue to drive their SUVs."

Goo also points out that "tax" is "a dirty word in Congress. No Congressman, no politician, no Senator in his right mind, is going to stand up and say I am responsible for imposing a \$4 gasoline tax on you."

Graham Holden, a partner at Jones Day, agrees that taxes are politically unpalatable but he says that's not a good reason to discount the idea. "It is a blunt instrument but that doesn't mean it's not effective," Holden says.

Holden admits that a tax might not initially achieve the emissions reductions necessary to halt climate change, but he points out that the tax could be fine-tuned to reach the necessary reductions. He also says that a tax could be made less regressive by providing subsidies to people who cannot afford \$10-a-gallon gas. "All those problems are fixable," Holden says, and a tax "is attractive to me because it is a lot simpler."

Holden says that he's heard from some industrial clients who say they prefer a tax, and others who prefer cap-and-trade. The real issue, he says, is what any program for emissions reductions will ultimately cost consumers. "We ought to all recognize the substantial costs associated with the program. Are we ready as a nation, as consumers, as a world, ready to bite that bullet?" One advantage of a carbon tax, Holden says, is that the costs are easier to quantify than with a cap-and-trade program.

*"No Congressman, no politician, no Senator in his right mind, is going to stand up and say I am responsible for imposing a \$4 gasoline tax on you."*

—Michael Goo

Tax policy isn't quite that simple, counters Goo. A tax that is ultimately worth billions or even trillions of dollars will attract lobbyists seeking all sorts of exemptions and favors from politicians, he says.

If the goal is to achieve emissions reductions, then a carbon tax is not the way to go, says Jonathan Stack, senior broker for carbon and renewable energy markets at CantorCO2e. A tax has fixed costs but unknown reductions in carbon levels, whereas a cap-and-trade system has fixed reductions but unknown costs. With the latter system, Stack says, "you know you're going to get reductions, and you're going to get them at the lowest cost because people are going to figure out how to get the reductions in a way that they can make money."



# Carbon Markets

A number of cap-and-trade programs have already been proposed or adopted in the United States. They differ in the scope of geographic area covered, as well as the types of greenhouse gases and industrial sectors covered.

## REGIONAL GREENHOUSE GAS INITIATIVE (RGGI, PRONOUNCED "REGGIE")

This is the first mandatory cap-and-trade program in the United States. Ten Northeastern and Mid-Atlantic states will cap and then reduce carbon dioxide emissions from electric utilities by 10 percent over the next decade. The states will sell emission allowances through auctions and invest the proceeds in improving energy efficiency and developing green technologies.

## CALIFORNIA GLOBAL WARMING SOLUTIONS ACT OF 2006

Also known as AB 32, this program requires statewide emissions of major greenhouse gases to be reduced to 1990 levels by 2020. It makes California's Air Resources Board responsible for monitoring and reducing emissions via regulations, market mechanisms and other actions. The Board is also required to evaluate impacts on the state's economy, the environment and public health.

## WESTERN CLIMATE INITIATIVE (WCI)

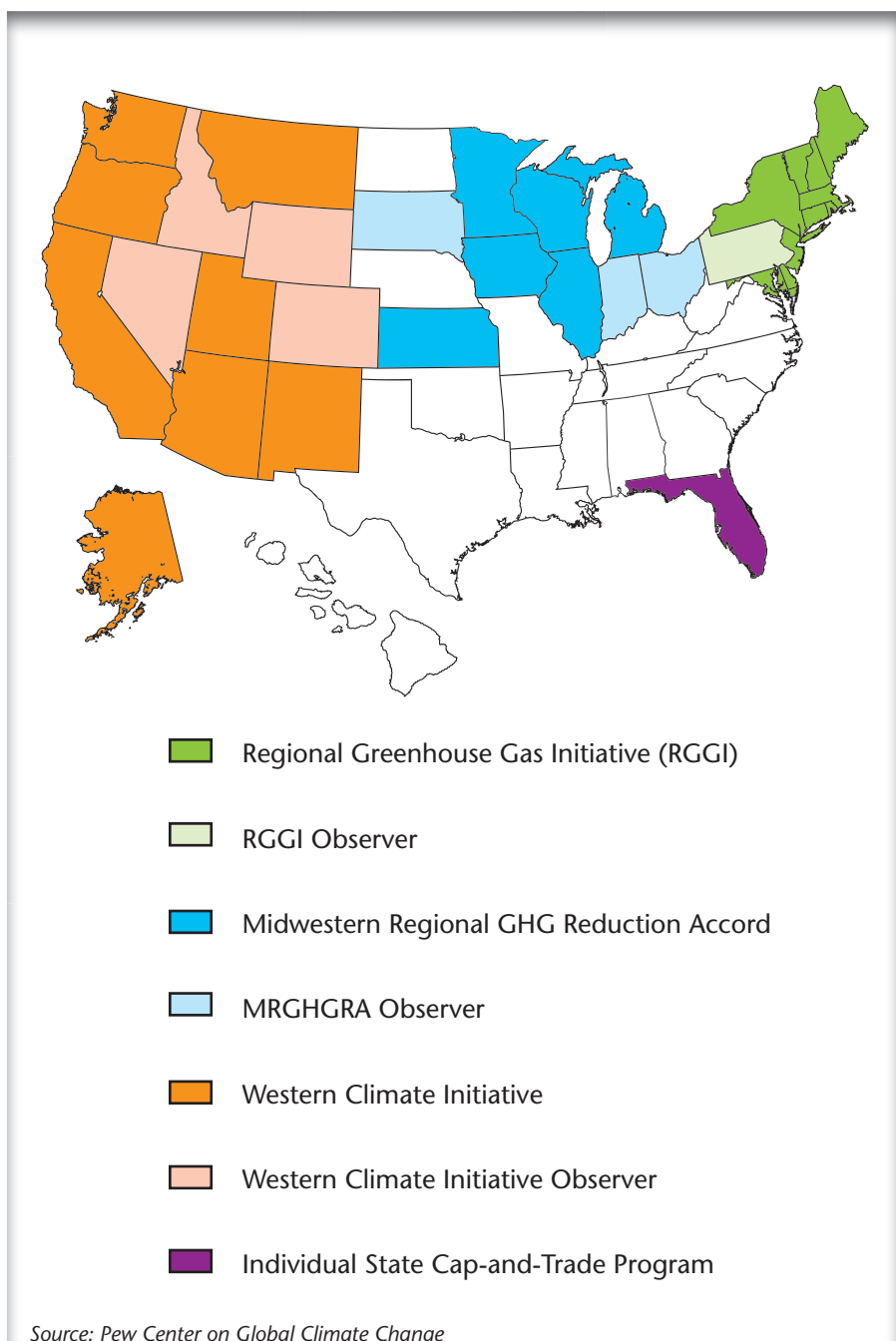
Launched in February 2007, WCI includes the governors of seven states (Arizona, New Mexico, Utah, California, Oregon, Washington and Montana) and the premiers of four Canadian provinces (British Columbia, Manitoba, Ontario and Quebec). WCI proposes to reduce greenhouse gases from power plants, factories and vehicles using a market-based cap-and-trade system. The details have not yet been worked out, but WCI aims to reduce the region's emissions below 2005 levels by 2020.

## MIDWEST REGIONAL GREENHOUSE GAS REDUCTION ACCORD

In November 2007, six states (Kansas, Iowa, Minnesota, Wisconsin, Michigan and Illinois) and the Canadian province of Manitoba agreed to set emission reduction targets and to develop a multi-sector cap-and-trade system to meet the targets. The agreement will be implemented by mid-2010.

## FLORIDA CLIMATE PROTECTION ACT

In June 2008 Florida adopted a law authorizing the Department of Environmental Protection to develop a cap-and-trade program for electric utilities. Once a final plan is approved by the state legislature, it may go into effect as early as January 2010. The law aims to reduce electric-sector emissions to 1990 levels by 2025.



## STATES' *Rights*

Some states and multi-state coalitions are already launching their own cap-and-trade programs (see "Carbon Markets"). One contentious issue is whether the federal government can, or should, enact a nationwide cap-and-trade program that preempts these state programs.

There is some precedent for having both federal and state programs. California, for example, has long had stricter automobile emissions standards than the federal government. "Even in the context of a strong federal program, California needs to have the ability to serve as a backstop and to have innovation," argues Michael Goo, Climate Legislative Director for the Natural Resources Defense Council. In addition, state programs often serve as "laboratories" or case studies in the design of larger federal programs.

Multiple cap-and-trade programs create some problems, however. Each program has its own pricing for carbon credits, which effectively creates different carbon currencies. "An RGGI credit may not be worth the same on the market as a California credit," says Jonathan Stack, senior broker for carbon and renewable energy markets at CantorCO2e. And on an even larger scale, any federal program would have a different currency than international programs such as the European Union Emissions Trading Scheme.

A federal program would not only eliminate separate state carbon currencies but could also eliminate greenhouse gas "leakage" between states (see next column for explanation). It would also be more efficient if companies did not have to keep separate accounts for multiple programs, says Graham Holden, partner at Jones Day.

The Supreme Court has become quite aggressive in preempting state laws, says Lisa Heinzerling, a professor at Georgetown University Law Center. "The way preemption law is going, I think there will be a lot of worries on the part of plaintiffs and on the part of states."

## WHAT IS *Leakage?*

One concern about any cap-and-trade program is that greenhouse gas emissions may "leak" beyond the geographic borders of the program. For example, what if California sets a cap on emissions but Nevada does not? California-based emitters might choose to move across the border so that they would not be forced to reduce their emissions or purchase carbon credits. If so, the company's emissions would escape the boundaries of the California regulatory program. "Leakage" might also occur if the U.S. adopts a nationwide cap-and-trade program, and an affected company moves offshore.

California legislators are trying to address potential leakage by extending regulations to all companies that sell products in the state. Similarly, a federal cap-and-trade program could include regulations or incentives for importers.

## LIEBERMAN-WARNER

### *Climate Security Act* OF 2007

Proposed in the Senate but not yet passed, this bill directs the Administrator of the Environmental Protection Agency to establish a greenhouse gas registry and to set emission allowances that could be bought and sold. The bill covers the electric power and industrial sectors, as well as companies that produce or import petroleum- or coal-based transportation fuels or chemicals. The bill would gradually reduce the cap on emissions over the period from 2012 to 2050. It includes provisions for cost-relief measures if the emissions market poses significant harm to the U.S. economy.

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## AN *International* PROBLEM

One criticism of cap-and-trade is that it would put U.S. businesses at a competitive disadvantage. Under existing international treaties, emission caps do not apply to developing nations such as China and India, whose emissions are growing rapidly. China, for example, now emits more greenhouse gases annually than the U.S. does.

Some cap-and-trade proposals include a provision called a border tax adjustment. For energy-intensive industries with large emissions—such as cement and steel production—the adjustment requires that countries exporting products to the United States take action to reduce their emissions over a period of time, or face a tariff. That helps level the playing field, says Michael Goo, Climate Legislative Director for the Natural Resources Defense Council. Some Congressmen have also proposed allowances for these U.S. businesses to help them modernize and become more competitive.

Eventually, Goo says, we need a binding global treaty that includes developing nations. But he points out that although China is now the world's largest emitter, the U.S. is still responsible for almost a quarter of the world's cumulative emissions since pre-industrial times, whereas China is responsible for only about 8%. Also, if you look at emissions on a per-capita basis, the U.S. is still at a much higher level than China.

We can't ask China to stop industrializing, Goo says, nor can we refuse to change until China acts. "We just can't take that negotiating stance and expect to have success."

Capping emissions will actually be a good thing for the U.S. economy, he argues. "We're going to have lots of business opportunities, we're going to have green technologies, we're going to become more energy-secure and energy-independent. And we are going to lose this race to India and China if we don't cap emissions now."

# Insurance Uncertainty

Companies facing the prospect of a cap-and-trade system are concerned about how to manage the potential risks of such a system. Rodney J. Taylor, managing director at Aon Environmental Services Group, works with companies around the world that are hoping to insure themselves against these risks.

"We've had people asking for the ability to verify that the credits that they're paying for are actually going to be delivered," Taylor says. "We've had other people who are looking to stabilize the price that they're going to have to pay if they're buying credits." He says it is difficult for people in the insurance business to determine what the underwriting factors are, especially at a time when the insurance industry is in turmoil because of financial mismanagement at large companies such as AIG.

One risk factor is that many of the emission-reduction projects being proposed are located outside the United States. Let's say, for example, that investors want to build a hydroelectric facility in China and sell renewable-energy carbon credits. In a case like that, "you're dealing with some of the most complex risks that you could possibly be looking at," Taylor says.

The permitting process will happen in a foreign country, which carries some political risk. There are also risks associated with finding contractors and supplies, and finishing the project on time. "So when we write insurance for these kinds of projects, we put together a package of insurance programs that are relatively sophisticated, relatively exotic and relatively expensive—not to mention in some cases very difficult to place," Taylor says.

Another risk, he says, is whether a project such as a hydroelectric dam will actually generate as much power—and

carbon credits—as anticipated. That's a risk that is difficult to insure even in the United States, where the engineering is better understood.

Taylor says he recently saw a proposal to grow saw grass in Ecuador and transport the material to Germany, where it would be made into ethanol and sold. That project, he said, would not only face the risk of doing business overseas but would also carry risks associated with transportation and crop failure. For such a project, insurance may represent as much as 20 percent of the investment cost, he says.

Companies would like a one-stop shop where they can insure all of these risks, but Taylor says the insurance industry may not be ready for that. Not every country or energy technology is going to be covered.

One technology that the insurance industry is not ready to cover is carbon sequestration. From a risk standpoint, sequestering carbon in the ground is an unknown technology. We don't know the long-term impact of injecting CO<sub>2</sub> into the ground or trying to keep it there. Companies are worried that they might be liable for geological events that could suddenly release stored carbon from underground salt domes or former oil wells.

Insurance companies are already so complex, says Taylor, "that even the people who manage them have a hard time figuring out what's going on." He says he has seen contracts for buying and selling carbon credits that are unnecessarily complicated. "If I'm trying to figure out what my exposure is from a risk-management standpoint, I'll never be able to figure it out because I need 10 variables to plug in there in order to figure out whether I have a dollar loss or a million-dollar loss. So keep it simple."



## **CAN** *Cap-and-Trade* **SAVE US?**

Under a new Administration, it seems more likely than ever that the U.S. will adopt a cap-and-trade system. What's less certain is whether such a system can turn things around in time to avert global catastrophe.

Michael Goo, Climate Legislative Director for the Natural Resources Defense Council, says that it's important to prevent the temperature from rising more than 2 degrees Celsius above pre-industrial averages. At higher temperatures, the risk of intense hurricanes, drought, sea level rise and other negative impacts reaches a dangerous level.

"We cannot simply continue to put carbon into the atmosphere," Goo says. "We have a global burden of carbon that has been stored over millions of years in fossil fuels, we're releasing it at a rate that is unprecedented in geologic time, and if we do that we risk the worst kinds of climate change." For example: 60 to 90 days per year of 110-degree temperatures in Washington, D.C.

Cap-and-trade alone probably cannot solve the problem, says Rodney J. Taylor, managing director of Aon Environmental Services Group. "We're trying to solve a problem with cap-and-trade that really is a larger question. And that is national energy policy, which we don't have the political will yet to enact. It's going to have to be done. We can't solve the problems without more comprehensive solutions."

### • FURTHER READING •

Cap and Dividend, Not Trade. Peter Barnes in *Scientific American Earth* 3.0, Vol. 18, No. 5, Pages 20-21; 2008.

Making Carbon Markets Work. David G. Victor and Danny Cullenwald in *Scientific American*, Vol. 297, No. 6, Pages 70-77; December 2007.



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Scientific American and Jones Day would like to thank the panelists and attendees for their time and participation in this event.

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