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## **1. CLIMATE: Calif. bill fuels search for cost-effective emission curbs**

**Arthur O'Donnell, special to *Greenwire***

SACRAMENTO, Calif. -- Spurred by the passage of the landmark "Global Warming Act of 2006," California's scientific community is adjusting its approach to climate research to emphasize studies into cost-effective ways to reduce greenhouse gas emissions.

### **CLIMATE CHANGE SPECIAL REPORT**

The interplay between policy and science was a theme of a climate change research conference this week cosponsored by the California Energy Commission and the state EPA. "Research is the foundation of good policy formulation," said CEC member James Boyd. "It provides us the undeniable foundation of facts."

The CEC has spent about \$35 million over the past five years to support dozens of research projects into economic modeling, mitigation of emissions and possible strategies for adapting to expected changes brought about by global climate change. The effort was funded primarily by the Public Interest Energy Research (PIER) program, which uses public-goods charges collected via monthly utility bills, but it also includes a \$15 million grant from the U.S. Department of Energy for carbon sequestration research.

With the climate bill, A.B. 32, moving toward becoming law, its mandate to inventory and reduce carbon emissions by 20 percent compared to 1990 levels has become a driver of future research trends, said Kelly Birkinshaw, manager of environmental research for PIER. "We need to improve our ability to understand the impacts of climate change on infrastructure and vulnerable resources," he said.

Underlying the research effort is a key question: What are the least-cost controls? "We'll need a fairly comprehensive strategy to achieve the optimal mix of strategies," Birkinshaw said.

Preliminary work in economic modeling of carbon-reduction strategies indicates that "14 million tons of CO<sub>2</sub> equivalent can be reduced at a relatively low cost," Birkinshaw said. "We can also do a better job establishing the baseline of emissions."

### **Adaptation strategies**

While much of the state's research to date has taken the form of refining the understanding of climate change's potential effects, there is a growing need for long-term strategic planning because some level of climate change is inevitable. "Adaptation and coping strategies will receive more significant funding," Birkinshaw said.

Birkinshaw offered as an example "probabilistic forecasts for reservoir management," which could lead to changes in water releases based on expectations of altered precipitation and snowpack levels in the future. "This should result in more water being available for agriculture, recreation, environment and electricity generation while still protecting against flood risk," he said.

Another example of the linkage between science and policy was provided by researchers from the University of California, Davis, who are investigating how alternative farming methods may help to reduce carbon and nitrogen emissions. Agriculture is responsible for about 8 percent of California's GHG profile, said Johan Fix of the UCD plant sciences department, much of it in the form of methane, nitrogen oxides and carbon that are byproducts of livestock, fuel use and fertilizers.

Fix described how such techniques as reducing tillage, minimizing fertilizer use and turning to organic farming affect both crop yields and emissions rates. In a continuing study of six crops grown in rural Yolo County, Fix said, "Alternative management has a minimal impact on crop yield, but a big decrease in GHG, most especially with organic farming. Fertilizer reductions are good especially for grain crops."

Fix's colleague, Richard Howitt, is focusing on the policy side of the equation by trying to determine what kind of financial incentives will be most effective in getting farmers to switch to these alternative techniques. Farmers are still strongly wedded to conventional techniques, he said, because they consider alternative methods as "a lot of trouble and they're not sure if it pays off."

"Sequestration practices show significant technical potential," Howitt said, but "the economic reward is low for change. We have to provide incentives to farmers, but the economic incentive cannot exceed the market price for carbon." Currently, the market price for CO<sub>2</sub>, based on European emission trading, is about \$20 per ton.

## 'Irreversible impacts'

James Hansen, head of the NASA's Goddard Institute for Space Studies, offered a review of recent studies implicating human influence on climate change as well a warning that, "We have a very brief window of opportunity to deal with climate change in time to avoid disastrous impacts ... no more than a decade at most."

He listed potential "irreversible impacts" as the extermination of plant and animal species, the disintegration of ice sheets in Greenland and the Arctic, and regional climate changes that will increase the severity of tropical storms, wildfires, droughts and flooding.

Migration patterns are already changing northward as temperatures rise, Hansen said, but some animals are facing natural barriers to changing their habitats. "Species at the higher latitudes have no place colder to go," he said. "They are being pushed off the planet."

Hansen, who has been critical of the Bush administration for attempting to prevent him and federal researchers from speaking out about global warming, also suggested that scientists themselves have not done an adequate job explaining the threat in ways that the public can understand. "There's a huge gap between what is known about global warming by scientists and what is understood by the public and policymakers," he said.

"There are certain facts of life that the public needs to know," Hansen said. "In the long run, we simply have to go to energy sources that don't produce carbon, so why don't we do that now?"

Hansen said that the worst effects could be averted if the world is able to keep future temperature changes within 1 degree Celsius over the next 50 to 100 years. But in order to do that, CO<sub>2</sub> growth must decline and then go to zero.

"It may look difficult, but it's doable," Hansen said. "The alternative scenario is feasible if we phase out coal, and it requires that we put a price on carbon. We could still save the Arctic."

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## California Energy Commissioner Art Rosenfeld discusses landmark GHG law



With California signing a landmark greenhouse gas emissions reduction mandate, the debate over whether a national mandate should be implemented continues. During today's OnPoint California Energy Commissioner Art Rosenfeld discusses the need for more federal action in the transportation sector. He explains why it is not economic for California to be entirely self-sufficient in providing its residents with electricity. Commissioner Rosenfeld also comments on the changing American perception of conservation and efficiency. [Click here](#) to view today's OnPoint.