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#### **Greenhouse Gas Pact Will Cut Md. CO2 Emissions and Cut Electric Bills, Says UM Study - 2007-02-06**

If, as planned, Maryland joins a regional compact designed to cut greenhouse gas emissions, it will have a modest positive environmental impact and will not translate into higher bills for electric customers, according to a new study from the University of Maryland's Center for Integrative Environmental Research (CIER).

The study is the first to look at the economic and environmental effects of having a heavy coal-based electric generation state like Maryland join the Regional Greenhouse Gas Initiative (RGGI), a cooperative agreement among Northeastern and Mid-Atlantic states designed to reduce emissions of carbon dioxide (CO2). The researchers say that in the absence of a national policy, the findings suggest that a regional, multi-state approach could help limit carbon emissions.

Among the key findings:

- The study estimates that between 2010 and 2025, Maryland's participation in RGGI would reduce the state's carbon dioxide emissions from electricity generators by roughly 10 percent. For all the RGGI states, the impact of Maryland's membership would be to reduce emissions 4.3 percent beyond levels achieved if Maryland were not participating.
- In the aggregate, profits from electricity production would likely decrease by about 12 percent. Profits from electricity production with coal-fired plants would decrease, while profits from electricity generated with oil- and gas-fired plants would rise somewhat. The report projects that retirement of generating plants would be limited to a small number of oil- and gas-fired facilities.
- Joining RGGI would have a slightly positive impact on the Maryland economy in both the short and long run, largely because of cost savings from more efficient energy use and the sale of unused emissions allowances. Electric bills would drop slightly for residential customers. Industrial customers who rely more heavily on electricity would see greater savings from efficiencies that lower power requirements, the report says.

"Sound environmental policy can make good economic sense for industry and consumers," says Matthias Ruth, the study's principal investigator and director of the Center for Integrative Environmental Research. "The RGGI plan puts Maryland and a handful of states in the forefront of independent action to control greenhouse gases. They are showing the direction for the nation. The more states participate, the larger the environmental achievements will be and the more rapidly we will improve efficiencies and cut costs."

At the direction of the legislature, the Maryland Department of Environment commissioned the study to assess the economic and energy impact of the global warming provision of the state's 2006 Healthy Air Act. The law calls for Maryland to join RGGI this year.

As a member, Maryland will be given an annual budget, or a cap, for carbon dioxide emissions. The state will then give electricity generating companies carbon dioxide emissions allowances. In the study, the researchers assumed that 75 percent of all the allowances will be divided among electricity generating companies for free, while 25 percent will be sold to

generators in an auction run by the state. The proceeds from this auction are expected to fund energy efficiency measures.

The current RGGI states are Connecticut, Delaware, Maine, Massachusetts (joined January 2007), New Hampshire, New Jersey, New York and Vermont.

This study is the first to assess the energy and economic impact of this program for Maryland.

#### DETAILED FINDINGS:

University of Maryland researchers partnered with economic and energy modeling teams at Johns Hopkins University, Towson University and Resources for the Future, using three separate modeling tools (see Methods below) to forecast the likely effects of Maryland joining RGGI.

All predicted changes represent a comparison between projected levels if Maryland joins RGGI versus a baseline level reflecting conditions if RGGI continues without Maryland and the state takes no action to cut CO2 emissions.

#### Energy and Environmental Impacts

**Electricity demand drops:** Under RGGI, at least 25 percent of the state's carbon dioxide allowances must be auctioned off and dedicated to strategic energy or consumer benefit purposes. When the revenues from this auction are invested in energy efficiency, as is expected, the researchers concluded that it will reduce net electricity demand in Maryland by one-and-a-half percent in 2010 and nearly double that by 2025.

**Lower carbon dioxide emissions:** The study estimates that between 2010 and 2025, Maryland's participation in RGGI would reduce the state's carbon dioxide emissions from electricity generators by 10 percent. For all the RGGI states, the impact of Maryland's membership would be to reduce emissions 4.3 percent beyond levels achieved if Maryland were not participating. This 4.3 percent includes "offsets," reductions in emissions of greenhouse gases from other sectors. Under RGGI rules, electricity producers are allowed to meet some of their emission reduction requirements in ways that don't involve electricity generation. For example, a producer would get credit for financing investments in technologies that reduce the amount of methane produced by landfills.

**Net energy imports will increase:** As a result of the newly introduced costs of using CO2 emissions allowances in Maryland, electricity exports from Maryland to other states will likely drop while imports into the state will rise, the report indicates. By 2015, net imports into Maryland will likely rise by four percent, and by 2025, 15 percent, relative to the baseline.

**Little "leakage" of carbon dioxide emissions to other states:** The report finds the potential for a so-called "leakage," or displacement, of greenhouse gas emissions to other states to be very small. The models indicate that non-RGGI states could see at most a small increase in carbon dioxide emissions or even a small reduction, as a result of Maryland joining RGGI.

**Adequate generating capacity:** New investment in Maryland generating capacity will be 45 percent less in 2025, in part because demand will be lowered by energy efficiency programs. But there will not likely be a significant retirement of power generation plants. Overall, generation capacity should be adequate due to drops in energy demand. The researchers found no evidence that changing patterns of electric production will lead to increased exercise of market power by generating companies.

#### Economic Impacts

**Little net impact on Maryland economy:** The positive economic effects from reduced electricity costs and energy efficiency investments will be partially offset by reduced investment and profits in the electricity generating sector. Still, RGGI will have a positive overall economic impact on Gross State Product -- approximately \$100 million in 2010, increasing to about \$200 million by 2015 and beyond. Joining RGGI will create approximately 1,200 jobs statewide by 2010 and 2,800 jobs by 2025. But to put this in context, the positive impacts represent less than 0.1 percent of the overall Maryland gross state product and employment in all years.

**Profits from some power generation plants decline while others rise:** In the aggregate, profits from electricity production would decrease by about 13 percent in 2010. In 2025 the aggregate decrease would likely be 12

percent. Profits from electricity generation with coal-fired plants would decrease (13 percent in 2015; 20 percent in 2025), yet the researchers found that the smaller profits are not expected to trigger any plant retirements. As a result of trading unused emissions allowances with other RGGI member states, profits from oil and gas steam plants are expected to rise in the aggregate, but a very small number of these types of facilities will not be able to cover their going forward costs and are expected to retire.

Electricity bills for all customers will drop: Overall, electricity bills will decrease over \$100 million in 2010 and more than \$200 million by 2025. This is a result of energy efficiency measures, which will lower customer demand. Since the heaviest users will save the most, more than half the savings (between 53 percent and 63 percent) will go to industrial and commercial customers. On average, a residential ratepayer will see a modest reduction -- about \$22 savings per household in 2010.

#### METHODS:

Three models were employed by the research team to determine a variety of impacts on the economy and the electric power grid. Included in the study were effects within other RGGI states and related areas. By using three separate models, the research team was able to sharpen and customize its projections and cover the broad array of effects and geographical areas to be studied. Three subcontractors provided projections based on their proprietary models.

"We've carefully selected the three models based on their comprehensiveness and applicability to the research questions," says Steven Gabriel, the co-principal investigator and a civil engineering professor at the University of Maryland.

**Haiku Model:** A national economic simulation of electricity markets based on market equilibrium concepts. Haiku was created by Karen Palmer, Dallas Burtraw and Anthony Paul from Resources for the Future, a nonprofit and nonpartisan organization that conducts independent research on environmental, energy, and natural resource issues. This model helped to answer questions such as how will Maryland's electric power prices change and how the fuel mix for power generation will change if the state joins RGGI.

**JHU-OUTEC:** "Johns Hopkins University-Oligopoly Under Transmission and Emissions Constraints" was developed by Yihsu Chen and Ben Hobbs. It is a regional market equilibrium model for the mid-Atlantic power generation market. It is designed to account for the possible exercise of market power in the generation sector. This model enabled Chen and Hobbs to incorporate details about the region's electric transmission grid, so they could evaluate whether market power might be exacerbated by RGGI.

**IMPLAN:** Towson University used IMPLAN, an input-output model, to estimate statewide changes in employment levels, among other important economic indicators. Daraius Irani of Towson's Regional Economics Study Institute (RESI) and Jeffrey Michael from Towson's College of Business and Economics measured statewide economic and fiscal impacts of Maryland joining RGGI.

#### STAKEHOLDER INPUTS:

At various stages throughout the project, the researchers got invaluable input from various private and public stakeholders. To allow for final comments to the report, all private and public stakeholders potentially affected by an expansion of RGGI, individuals or organizations, will have three weeks (until 5 p.m. on February 22, 2007) to send comments to the University of Maryland Center for Integrative Environmental Research (CIER). All comments will be posted verbatim to the CIER Website ([www.cier.umd.edu](http://www.cier.umd.edu)) and will be delivered to the legislature as an addendum to the report. The stakeholder input will be collected by the Environmental Finance Center at the University of Maryland. Instructions for comment are available on the CIER Website.

The full CIER report, "Economic and Energy Impacts from Maryland's Potential Participation in the Regional Greenhouse Gas Initiative," is available online: [http://www.cier.umd.edu/RGGI/documents/UMD\\_RGGI\\_STUDY\\_Jan07.pdf](http://www.cier.umd.edu/RGGI/documents/UMD_RGGI_STUDY_Jan07.pdf).

As an entity within the University of Maryland Division of Research, CIER's unique strengths lie in its ability to reach across all colleges of the university

to effectively assemble the state's best researchers to address pressing environmental, technological, economic and policy issues. CIER's unique role also helps leverage input from the many research organizations and other universities outside the University of Maryland.

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