Climate Change: Adaptation and Mitigation Policy



RTI International provides independent, interdisciplinary research to evaluate the economic implications of climate change policy alternatives. RTI's economic modeling and research capabilities deliver robust, objective analyses, and our work supports policy development and implementation efforts at every decision-making level, informing international negotiations, development of adaptation strategies, and the design of domestic offset programs.

RTI INTERNATIONAL

Climate change is widely considered to be one of the most significant societal problems we face. Anthropogenic, or human-derived, greenhouse gases (GHGs) and energy-absorbing aerosols are contributing to a general warming of the planet and creating the potential for greater damage from severe weather events. Developing effective adaptation and mitigation policies requires assessment of the economic costs and potential benefits of policy alternatives while considering dynamic influences such as innovations in environment-improving technology and uncertainty in expected impacts. Our economists draw on RTI's diverse technical expertise in the environmental, engineering, geospatial, and public health sciences to conduct informed, independent assessments of various GHG mitigation technologies and policy alternatives.

RTI's Climate Change Economic and Policy Research

RTI is an international leader in economic modeling of the agricultural and forestry sectors, and more broadly in economy-wide impacts of climate change and mitigation/adaptation policy.

In collaboration with leading university and government researchers, RTI is analyzing the effectiveness and potential costs of various carbon sequestration programs using the Forest and Agricultural Sector Optimization Model with Greenhouse Gases (FASOM–GHG), a dynamic nonlinear programming model. Our economists have also assessed the effectiveness of GHG mitigation options in the agriculture and forest sectors, including the expanded use of renewable fuels. RTI is currently applying the FASOM-GHG and GTAP (Global Trade Analysis Project) economic models to analyze biofuel policy alternatives and assess the potential environmental and economic impacts from domestic and international land use changes due to increased bioenergy production.

RTI has also developed and maintains the Applied Dynamic Analysis of the Global Economy (ADAGE) model—an economy-wide model of the United States that is useful for examining a range of climate change mitigation policy options at the international and U.S. regional levels. Since 2007, our economists have used ADAGE to analyze various national GHG mitigation policy proposals for the U.S. Environmental Protection Agency and U.S. Congress. Most recently, we used ADAGE to estimate the economic impacts of the Waxman-Markey climate change bill, the American Clean Energy and Security Act of 2009 (H.R. 2454).

Finally, RTI has developed international marginal abatement cost models for the energy, waste, and agricultural sectors that estimate potential reductions in GHG emissions from the adoption of mitigation options at specific carbon prices. Our analysis and modeling efforts of non-CO_2 mitigation potential have been published in several international peer-reviewed journals as well as the Intergovernmental Panel on Climate Change's 4th Assessment Report.

Methods

Our economic research team's interdisciplinary approach to economic modeling and analysis enables RTI to conduct informed, independent, integrated assessments of alternative adaptation and GHG mitigation policy options. Our research methods apply economic theory, combined with evidence-based data, to model and analyze potential environmental and economic impacts, evaluate barriers to mitigation technology adoption, and estimate economically feasible GHG emissions reduction under alternative mitigation policy scenarios. Climate change economic and policy research methods include the following:

- Economic modeling—computable general equilibrium models

- Agricultural and forest-sector modeling—nonlinear mathematical programming models
- Economic impact analysis related to environmental regulations
- Life-cycle analysis of biofuels and other renewable energy alternatives
- Marginal abatement cost analysis
- Secondary literature reviews of climate change policy and mitigation options
- In-depth interviews and technical expert elicitation.

Project Highlights

Past and ongoing research projects include the following:

- Evaluating the economic impact of the American Clean Energy Security Act (Waxman-Markey bill) on the U.S. economy and its implications for international trade
- Life-cycle analysis of biofuels; estimating net GHG emissions associated with production, distribution, and consumption
- Estimating the environmental and economic impacts of land use changes resulting from increased biofuels production
- Evaluating international GHG emission reporting protocols to support the formulation of a mandatory U.S. GHG emission reporting system
- Modeling the impact of technology change on the mitigation technology costs and projected GHG emission reductions over technologies over time
- Quantification and valuation of the benefits of carbon sequestration as an ecosystem service
- Evaluating the economic impact of U.S. mandatory GHG reporting regulations on U.S. industries.

Peer-reviewed publications include the following:

- The global impacts of biofuels mandates. 2010. *The Energy Journal,* 31(1):75–100.
- Net farm income and land use under a U.S. greenhouse gas cap and trade. 2010. *Policy Issues.* PI 7:1–5.
- U.S. climate mitigation pathways post-2012: Transition scenarios in ADAGE. 2009. *Energy Economics,* 31(2009):S212–S222.
- Estimating the potential GHG mitigation and agricultural energy efficiency in the United States. 2009. *Journal of Energy Efficiency,* 2(2):207–220.
- Global cost estimates of reducing carbon emissions through avoided deforestation. 2008. *Proceedings of the National Academy of Sciences,* 105(30), 10302–10307.
- Mitigation potential and costs for global agricultural greenhouse gas emissions. 2008. *Agricultural Economics,* 38(2), 109–115.
- Economic consequences of consideration of permanence, leakage and additionality for soil carbon sequestration projects. 2006. *Climatic Change,* 80(1), 127–143.
- Modeling the impact of technical change on emissions abatement investments in developing countries. 2005. *Journal of Technology Transfer,* 30(1/2):211–225.
- Region-specific marginal abatement costs for methane from coal, natural gas, and landfills through 2030. 2005. In Rubin, E.S., D.W. Keith, & C.F. Gilboy (Eds.), *Greenhouse Gas Control Technologies Special Edition.*

Selected Clients

U.S. Department of Agriculture

U.S. Environmental Protection Agency

Pew Center on Global Climate Change

Environmental Defense Fund

Methane to Markets Partnership

Electric Power Research Institute

More Information

Michael P. Gallaher, PhD
Director, Environmental, Technology, and Energy Economics
919.541.5935
mpg@rti.org

RTI International
3040 Cornwallis Road
Research Triangle Park, NC 27709-2194 USA

RTI 7124 0710

RTI INTERNATIONAL

RTI International is one of the world's leading research institutes, dedicated to improving the human condition by turning knowledge into practice. Our staff of more than 2,800 provides research and technical expertise to governments and businesses in more than 40 countries in the areas of health and pharmaceuticals, education and training, surveys and statistics, advanced technology, international development, economic and social policy, energy and the environment, and laboratory and chemistry services. For more information, visit www.rti.org.