



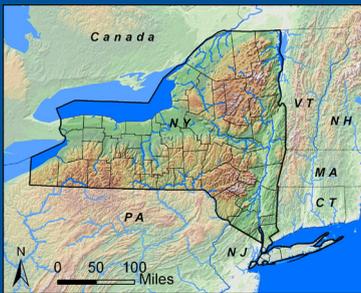
## CLIMATE CHANGE

### PRINCIPAL RESEARCHERS

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Center for Climate Strategies (CCS)

### PROJECT LOCATION

Statewide



Source: E&S Environmental Chemistry, Inc.

### CONTACT INFORMATION

For more information on this project, go to:  
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PROJECT NUMBER 10850

### KEYWORDS

- Carbon dioxide
- Climate change
- Cost curve
- Emissions
- Greenhouse gas



# Development of Greenhouse Gas Abatement Cost Curves for New York State

## PROJECT FOCUS

The research team will analyze the Greenhouse Gas (GHG) emission reduction potential as well as associated costs and savings of individual GHG mitigation technologies and best practices, and construct stepwise marginal cost (supply) curves to reflect the correlation between the amount of reduction and the cost per ton of emissions avoided across three time frames. In addition, the expected public health and economic co-benefits of mitigation options will be quantified, as applicable to New York State. The researchers will study potential mitigation options from four sectors: power supply; residential, commercial, and industrial; transportation and land use; and agriculture, forestry, and waste management. Results will be presented in a comprehensive report and as a portfolio of sector-specific and economy-wide stepwise marginal abatement cost curves.

## CONTEXT

Climate stabilization likely will require emissions reductions in many sectors. The set of technologies and best practices that could be adopted to achieve the required GHG emissions reductions will be determined by costs, technology availability, and policy. Several studies have assessed the cost and availability of different emission-reduction opportunities at the national level, and have produced GHG reduction curves to graph these opportunities, showing the potential amount of carbon dioxide (CO<sub>2</sub>)-equivalent emissions avoided versus the cost per ton. Research is needed to assess the available opportunities and associated costs specifically for New York State.



Electric tram cars are an example of mitigation options for the transportation sector to be analyzed in this study. Source: ©iStockphoto.com/Rakoskerti.

NYSERDA initiated this research project to help determine state policies that could most effectively achieve GHG emission reductions. Policymakers require an aggregate marginal abatement cost curve for each sector, balanced against a well-defined set of co-benefits (quantified in terms of public health and macroeconomics). For example, reductions of criteria air pollutants associated with mitigation options will be quantified for the power supply and transportation sectors. The incremental changes in air quality will be used to evaluate the impacts to public health. Co-benefits such as jobs, income, and value-added will be determined in a separate aggregate analysis.

The results of this project will not focus on any particular abatement strategy, but instead will offer a comprehensive technological assessment, analyzed within a cost-benefit framework, to help the state meet GHG emissions reduction goals in the most cost-effective manner.

## PROJECT IMPLICATIONS

The research from this project will provide a scientific and technical foundation for key policy and program decisions related to reducing GHG emissions in New York State. The project team will identify the most promising climate change mitigation technologies and strategies for New York State, and establish a methodology for calculating incremental reductions in GHG emissions as well as incremental costs, cost savings and co-benefits of various policy options.

## PROJECT STATUS

Initiated 2008



Northport Power Station.  
Source: National Grid.



Corn harvest.  
Source: ©iStockphoto.com/ Creischl.



The power (top photo), agriculture (middle photo), and residential (bottom photo) sectors will be analyzed in the course of this study.  
Source: ©iStockphoto.com/Nico\_Blue.



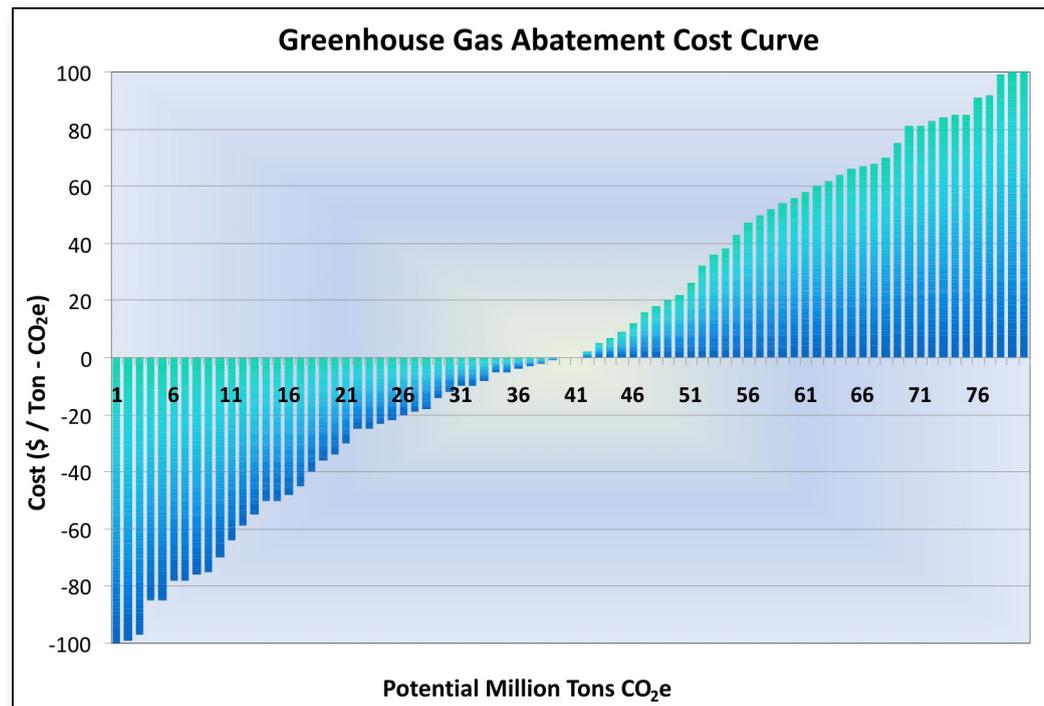
Since 1975, the New York State Energy Research and Development Authority (NYSERDA) has developed and implemented innovative products and processes to enhance the State's energy efficiency, economic growth, and environmental protection. One of NYSEDA's key efforts, the Environmental Monitoring, Evaluation, and Protection (EMEP) Program, supports energy-related environmental research. The EMEP Program is funded by a System Benefits Charge (SBC) collected by the State's investor-owned utilities. NYSEDA administers the SBC program under an agreement with the Public Service Commission.

## METHODOLOGY

Researchers will address six gases included in the US Greenhouse Gas Inventory: CO<sub>2</sub>, methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>). Carbon dioxide equivalence will be used to establish a common metric. Because dollar values for GHG reduction benefits are not available, physical benefits will be used instead, measured in terms of cost savings per ton or cost effectiveness. Both costs and cost savings will be estimated for technologies and best practices that mitigate GHG emissions. Combined with GHG impacts assessments, the results of these cost estimates will be aggregated into a marginal supply and abatement cost curve by sector or subsector, and for New York City compared with the rest of the state.



Forests are one of the sectors being studied in this project.  
Source: E&S Environmental Chemistry, Inc.



This project will produce a GHG abatement curve such as this one, which shows the amount of potential GHG abatement on the horizontal axis, and the cost for that abatement, in dollars per ton of CO<sub>2</sub> equivalents (CO<sub>2</sub>e) across across a given timeframe, on the vertical axis. The blue bars represent various abatement technologies and strategies, such as reforestation, carbon capture and storage, renewable energy sources and conservation/energy efficiency initiatives. Source: Pace Energy and Climate Center.

The researchers will assess the availability, cost, and potential GHG mitigation benefits from a wide range of current, emerging, and potential technologies and best practices across the four sectors studied. Analyses will be presented for the years 2010, 2020 and 2030. NYS-specific abatement curves will be developed for all technologies and best practices by sector and economy-wide. Researchers will construct a detailed database of existing NYS sources, determine cost and performance of mitigation technologies, develop a baseline emissions forecast for NYS, analyze the cost of saved carbon for each technology option, and quantify the co-benefits of each option. The project will draw from a national database of costs and benefits of over 350 mitigation technologies, policies, and strategies.

In addition to stand-alone results for individual technologies or best practices, the cumulative impacts will be estimated for all options combined. Double counting of GHG reduction potential and cost will be avoided by evaluating areas of overlap or equilibrium effects.