

# Chapter 1

## Background

There is scientific consensus that emissions of greenhouse gases (GHG) are affecting the Earth's climate. That consensus is represented by the work of the U.S. Global Change Research Program (USGCRP) and the Intergovernmental Panel on Climate Change (IPCC), a body established by the World Meteorological Organization and the United Nations to assess scientific, technical, and socio-economic information relevant for the understanding of climate change, its potential impacts, and options for adaptation and mitigation. On May 19, 2010, the U.S. National Academies of Science (Academies) released three reports emphasizing why the U.S. should act now to reduce GHG emissions and develop a national strategy to adapt to the inevitable effects of climate change. "Climate change is occurring, is caused largely by human activities, and poses significant risks for — and in many cases is already affecting — a broad range of human and natural systems," the report concluded.

The IPCC's Fourth Assessment Report, released in November of 2007, states, "Warming of the climate system is unequivocal, as is now evident from observation of increases in average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level." More recently, the U.S. National Aeronautics and Space Administration (NASA) reported, "All three major global surface temperature reconstructions show that Earth has warmed since 1880. Most of this warming has occurred since the 1970s, with the 20 warmest years having occurred since 1981 and with all 10 of the warmest years occurring in the past 12 years. Even though the 2000s witnessed a solar output decline resulting in an unusually deep solar minimum in 2007-2009, surface temperatures continue to increase."<sup>1</sup> Although the year is not over as of the release of this Interim Report, 2010 is on track to be one of the warmest years on record, globally, in the United States and in New York.

The IPCC, USGCRP, and the Academies concluded that these increased temperatures are largely attributable to human activities that result in emissions of GHGs that contribute to global warming. These gases include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), and several industrial gases including chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF<sub>6</sub>), and hydrofluorocarbons (HFCs). Other climate forcing agents, such as aerosols including sulfate (SO<sub>4</sub>) and black carbon (soot) also affect our climate.

The New York State Energy Research and Development Authority (NYSERDA) is currently funding an assessment of the potential effects of climate change and possible adaptation strategies specific to New York State, [\*Integrated Assessment for Effective Climate Change Adaptation Strategies in New York State\*](#), known as the ClimAID project, the findings of which have informed the development of this plan. A summary of the ClimAID project can be found in Appendix H.

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<sup>1</sup> <http://climate.nasa.gov/evidence/>

In addition to ClimAID, other scientific organizations have studied climate change effects for several regions of the U.S.<sup>2,3</sup> These reports indicate that northeastern U.S. is likely to experience the following climate-related changes:

- Extreme heat and declining air quality are likely to pose increasing problems for human health, especially in urban areas.
- Agricultural production, including that of dairy products, fruit, and maple syrup, is likely to be adversely affected as favorable climates shift.
- Severe flooding due to sea level rise and heavy downpours is likely to occur more frequently.
- Reduction in snow cover will adversely affect winter recreation and the industries that rely upon it.
- Sea level rise will threaten coastal groundwater supplies of fresh water.

## **Creation of the New York Climate Action Council**

In August of 2009, Governor David A. Paterson signed Executive Order 24 establishing the goal of reducing GHG emissions from all New York State sources to 80% below 1990 levels by 2050 (hereafter referred to as 80 by 50) and creating the New York State Climate Action Council (Council). The Council is made up of 13 agency heads in addition to representatives from the Governor's Office. The purpose of the Council is to assist New York in identifying the best opportunities to mitigate and adapt to climate change, reduce costs associated with climate change activities, and foster economic growth in New York.

The Council prepared the Interim Report with assistance from NYSERDA, the Department of Environmental Conservation (NYS DEC), and other Council member-agency staff. The Council convened three external advisory panels to assist and advise in areas requiring special expertise or knowledge: technical analysis, multi-sector integration, and 2050 Visioning. The 2050 Visioning Advisory Panel, the Integration Advisory Panel, and five Technical Work Groups (participants listed in Appendix C) have provided direct input to the Interim Report.

The Council has approved a final New York State GHG emissions inventory and forecast, and this Climate Action Plan Interim Report. Following receipt of public comment on this report and the completion of additional research and macroeconomic analysis, the final Climate Action Plan will be developed and issued in 2011.

## **Approach to Climate Planning**

The New York State Climate Action Plan process relies heavily upon earlier and ongoing work performed by New York State and others. For example, in addition to ClimAID, NYSERDA funded an assessment of the technical potential for GHG emissions reductions and costs of

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<sup>2</sup> Frumhoff, P.S., J.J. McCarthy, J.M. Melillo, S.C. Moser, and D.J. Wuebbles. Confronting Climate Change in the U.S. Northeast: Science, Impacts, and Solutions. Synthesis Report of the Northeast Climate Impacts Assessment (NECIA). 2007. [http://www.climatechoices.org/ne/resources\\_ne/nereport.html](http://www.climatechoices.org/ne/resources_ne/nereport.html)

<sup>3</sup> The Committee on the Environment and Natural Resources National Science and Technology Council. Scientific Assessment of the Effects of Global Change on the United States. 2008. <http://www.climate-science.gov/Library/scientificassessment/Scientific-AssessmentFINAL.pdf>

mitigation technologies and best practices in New York, [Development of New York State Greenhouse Gas Abatement Cost Curves](#), which supported the analysis of mitigation policy options recommended here. Other notable reports are the [Renewable Fuels Roadmap](#) (NYSERDA, Pace University), [2009 New York State Energy Plan](#) (New York State Energy Planning Board), [Report of the Sea Level Rise Task Force](#) (NYS DEC), [PlaNYC](#) (New York City Mayor's Office), and [Envisioning a Low-Carbon 2050 for New York State](#) (Brookhaven National Laboratory).

The three advisory panels brought outside perspectives and expertise to the process. The Integration Advisory Panel reviewed and integrated the sector-focused work of the Technical Work Groups to ensure that the policy options took account and advantage of policy interactions and synergies. Council member designees were represented on the Integration Advisory Panel, which also included stakeholders representing public, private, and NGO interests.

The Technical Work Groups served as advisors to the Council and consisted of Council member-agency staff and additional public, private, and non-profit sector stakeholders with specific interest and expertise. Members of the public were invited to observe and provide input at all meetings of the Integration Advisory Panel and Technical Work Groups, in addition to attending public informational meetings held around the state during the process. Planning process documents, including deliberative and analytical products, were posted to the project's public Web site ([www.nyclimatechange.us](http://www.nyclimatechange.us)).

Prior to the organizational meetings of the Council and Integration Advisory Panel, the appointed participants attended a "2050 Visioning Conference" hosted by the New York Academy of Sciences and organized by Brookhaven National Laboratory. The focus of the conference was to place the challenge of the 80 by 50 goal into real-world context and, by example, to illustrate the kinds of transformational change needed to achieve the goal.

The Council began the formal deliberative process at the first meeting of the Integration Advisory Panel and Technical Work Groups on January 14, 2010. The Integration Advisory Panel met in person five times, and the five Technical Work Groups met in person and by teleconference on a bi-weekly basis since January 2010. The five Technical Work Groups considered potential policy options and were organized by the following sectors:

- Residential, Commercial/Institutional, and Industrial (RCI)
- Transportation and Land Use (TLU)
- Power Supply and Delivery (PSD)
- Agriculture, Forestry, and Waste Management (AFW)
- Adaptation

Policy options contained in this Interim Report are principally the product of Technical Work Group deliberations, with feedback and guidance from the Integration Advisory Panel, Council designees and the public. The Technical Work Groups that were charged with developing policies to reduce GHG emissions and enhance carbon sequestration potential in New York's soil, trees and wetlands, developed policy options through a stepwise process:

- 2050 Visioning;
- Identifying potential policies;
- Evaluating policy attributes and metrics, including co-benefits;
- Selecting priority policies;
- Developing New York-specific policy designs;
- Quantifying draft policy GHG reduction potentials and costs;
- Refining policy options;
- Presenting policy options to the Council for inclusion in the Interim Report.

Figure 1-1 illustrates the Climate Action Plan process and where this Interim Report fits within the overall effort. This report presents the results of the policy selection, development, and preliminary cost analysis. The analytical results presented describe the potential effectiveness of the mitigation policies on a stand-alone basis and do not consider interactions among policies or overlapping emissions reductions.<sup>4</sup> Assessment of interactions will be done in the next phase of the analysis. It is therefore not appropriate to sum up the reductions or costs associated with individual policies in this report to estimate a cumulative result. A detailed explanation of the process employed for policy option development can be found in Appendix B.

The Adaptation Technical Work Group, as outlined in Figure 1-2, followed a slightly different process to build a foundation for New York State climate change adaptation planning:

- Evaluating the best available information on how the climate in New York State will change;
- Identifying potential vulnerabilities to a changing climate;
- Assessing risk levels of those vulnerabilities;
- Developing adaptation strategies that will help to minimize those risks;
- Prioritizing strategies, considering other adaptation tools, and developing an overall adaptation plan that is coordinated with GHG mitigation efforts.

The Adaptation Technical Work Group formed subgroups to evaluate eight sectors: agriculture, coastal zones, ecosystems, energy, public health, transportation, telecommunications and information infrastructure, and water resources. Evaluation of New York's climate-related risks and vulnerabilities were based on the latest climate projections and other information provided by the ClimAID project. As potential adaptation strategies were being developed, the sector workgroups spent much time reviewing and analyzing the efficacy, need, cost, environmental justice considerations, and timing of each proposed recommendation. A full description of the Adaptation Technical Work Group process is found in Chapter 11.

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<sup>4</sup> An example would be an energy efficiency measure in RCI that reduces the demand for electricity, and a PSD policy that makes electricity generation cleaner. The GHG reduction benefits associated with clean generation would be decreased by an overall reduction in demand for electricity. Failure to take this interaction into account would result in 'double counting' or overstating the reduction benefits of the two policies operating together.

Citizens living in economically disadvantaged communities have been represented and their concerns voiced through formal integration of environmental justice concerns throughout the process. Through the appointment of environmental justice advocates to the Integration Advisory Panel and Technical Work Groups, and by incorporating written comments and guidance at key junctures in the deliberations, the authors of these policy options have heard and sought to incorporate these concerns into the policy designs.

## Challenges of Climate Action Planning

Development of a Climate Action Plan for New York is a unique challenge in policy planning. Forty year planning, necessary to meet the 80 by 50 goal, is an unusually long time horizon, and the uncertainty associated with key variables—e.g. future prices of conventional and alternative fuels and technologies—complicates the analysis of policy options to a greater extent than is typical. This complication extends to the analysis of the cost of these policies and the cost of not taking action on climate change. Both are very difficult to estimate.

Another challenge is that while both the cost and cost-effectiveness metrics developed for each mitigation policy option are long-term societal costs, New York decision makers often must focus on short-term public costs, that is, the required State investment. Although many of these policy options have low or no cost to the State, there are notable exceptions: expanding and improving public transportation systems; investing in a clean energy and all-fuels efficiency fund for buildings; providing incentives to attract private capital to produce abundant low-carbon energy; enhancing New York's rail infrastructure for both people and freight; and investing in the research, development, and deployment necessary to grow the next generation of technologies and fuels and promote a clean energy economy.

To cover the investment necessary for these types of policy options, New York State would need to identify a funding mechanism—a difficult challenge in the current fiscal crisis. While this Interim Report generally does not propose specific mechanisms for supporting these types of policy options, there are some principles that should be adhered to in the next stage of climate action planning:

- Policies that set a price for carbon and largely allow the market to dictate actions will be the most efficient and will likely bring about the most benefit, both by reducing emissions at least-cost and raising revenue for reinvestment in GHG reduction programs that have an overall societal benefit;
- State investment in research and development should be strategic given limited resources, and should focus on those activities that overcome a critical barrier and offer significant co-benefits such as attracting clean energy investment to New York or creating jobs.
- For each sector, it will be important for New York to pursue a federal advocacy strategy to bring the resources of the U.S. government to bear on research, development, and infrastructure investment.
- Any necessary mechanisms to raise revenue should be carefully crafted not to put New York State at a competitive disadvantage. This may imply a multi-state strategy. It could also imply the application of an environmental tax shifting approach. This tax structure would provide a “double dividend” leading to a decrease of an undesired polluting activity while

simultaneously increasing government revenue. This increase in government revenue would reduce the tax burden currently placed on desired activities (e.g. employment or economic activity).

- Revenue generation mechanisms should be directly linked to the relevant activity (GHG emissions) and dedicated to the desired outcome (reduction of GHG emissions). Research has shown that these types of “green” fees dedicated to specified uses garner more public support than generalized revenue sources and uses. This approach also recognizes and harnesses the systems benefit dynamic whereby financial support benefits both the direct recipient and the entire system (e.g. transportation system, electricity system).
- Funding for projects and proposals throughout the Climate Action Plan will require substantial private investments in addition to the public funding detailed above. Coordinated public-private partnerships will play an integral role in attracting increased venture capital, a critical component of an economic transition of this magnitude.

In some cases, the policy options described in the Interim Report could be designed and implemented either as a revenue-neutral mechanism or a revenue-generating mechanism. To demonstrate just one example, a revenue-neutral feebate system to influence vehicle purchasing behavior would be structured so that the total amount offered as an incentive is equal to the amount charged as a disincentive. The rebates disbursed could be slightly smaller than the fees collected, with a small amount reserved to cover administrative cost. In contrast, a vehicle purchase incentive program could also be designed to be revenue generating (e.g. gas-guzzler sales tax surcharge), or to be revenue-negative (e.g. tax credit for purchase of electric cars). In any case, for the variety of potential pricing mechanisms, both the amount of GHG emissions reductions and the amount of revenue that will result depends upon the size and scope of the pricing mechanism, and the elasticity of demand for the technology or activity.

## **2011 Final Climate Action Plan**

The next phase of the planning process will consider all mitigation policy interactions and produce an integrated projection for action plan emission reduction potentials and costs. Also to be included in the next phase is a macroeconomic analysis of the potential for climate change policies to expand New York’s clean energy economy. Costs and savings associated with policies in this report consider only the direct costs and savings to society, defined as within the geographic boundaries of New York State. Direct costs include capital, operating, maintenance, or other costs directly associated with the implementation of the policy or technology. Direct savings are typically reduced fuel consumption, but may also include reduced labor, operations, maintenance, etc. Secondary, indirect, or macroeconomic effects on statewide employment, income, energy price, and gross state product will be examined in the next phase of the plan with the results presented in the final report.

Critical to the charge of Executive Order 24 is developing the policies necessary to achieve the 80 by 50 goal. The quantitative analyses conducted for the Interim Report cover the period from 2010 through 2030. Some key policy options consider GHG reduction needed for the period from 2030 through 2050, but cost estimates are limited to the next twenty years due to the increasing uncertainty associated with longer-range projections. The final Climate Action Plan will include an

analysis of whether the 80 by 50 goal can be achieved by implementing the policy options presented in the Interim Report.

The Interim Report (see Chapter 12) brings together policy options that involve regional or national policy actions or interactions. The final Climate Action Plan will expand upon these interactions and lay the groundwork for strategic policy implementation, which will address not only the needs and opportunities for partnerships with the federal government and neighboring states and provinces, but also the specific actions New Yorkers must take to realize the environmental, economic and security benefits of a low carbon economy.

Figure 1-1. New York State Climate Change Mitigation Planning Process Flowchart

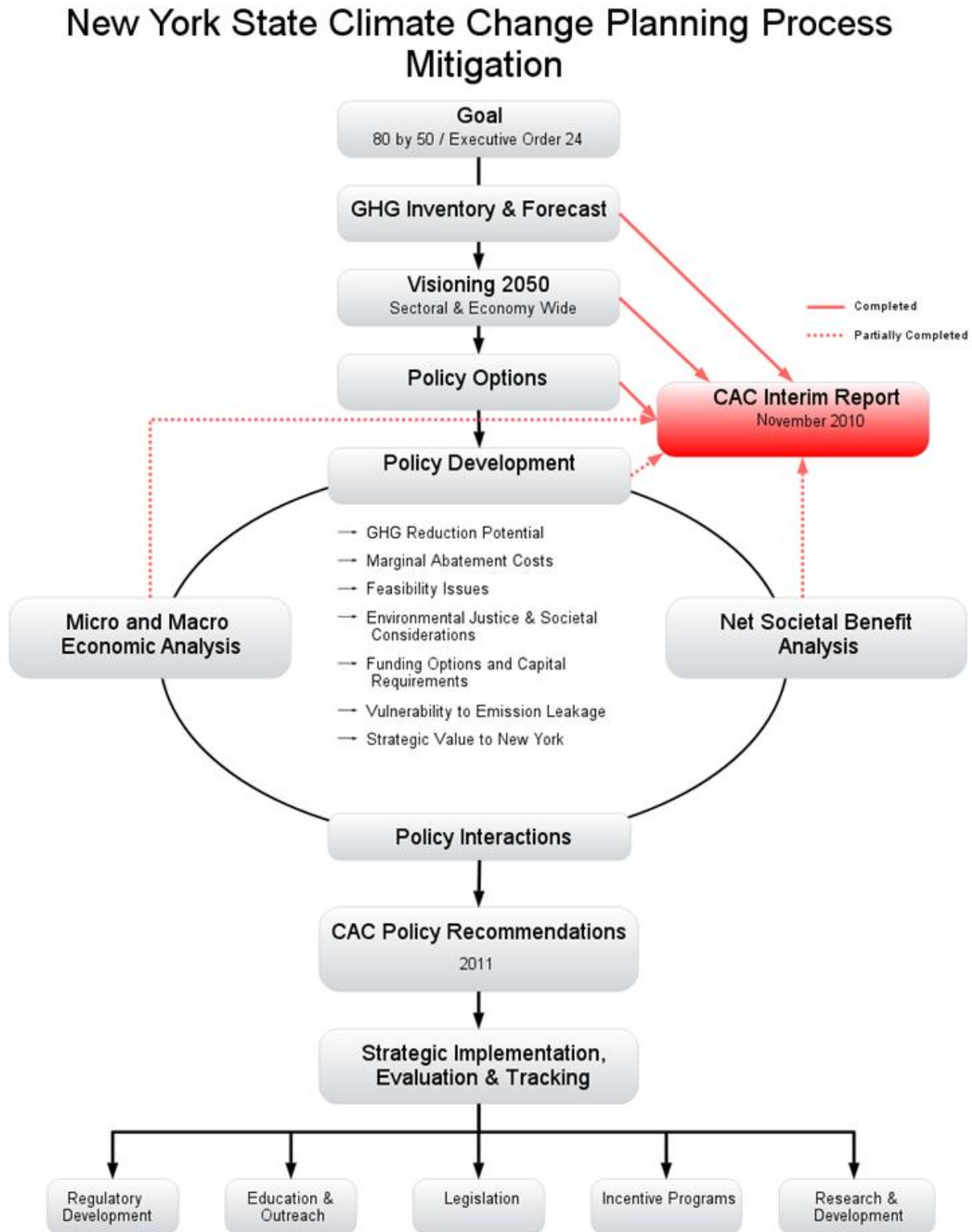




Figure 1-2. New York State Climate Change Adaptation Planning Process Flowchart

## New York State Climate Change Planning Process Adaptation

