DEP prepares and updates the statewide greenhouse gas inventory annually, as information becomes available.

How this Plan was Developed

The strategies in this report reflect an iterative process between the DEP Energy Programs Office, Bureau of Air Quality, and Policy Office; their sister agencies (the Pennsylvania Departments of Conservation and Natural Resources (DCNR), Agriculture, Community and Economic Development, Health, Transportation, General Services, Pennsylvania Emergency Management Agency, and Pennsylvania Public Utility Commission); the Climate Change Advisory Committee; and other stakeholders. More specifically, DEP's process included the following steps:

1. DEP, with the support of the analysis team (ICF), separately identified strategies with adaptation benefits and strategies with emissions reduction benefits. DEP and the analysis team iteratively prioritized and integrated the strategies, prioritizing those with both adaptation and emissions reductions benefits.
2. DEP and the team refined the list of strategies based on sister agency and CCAC feedback, and selected strategies and actions to quantitatively model to estimate GHG reductions, cost-effectiveness, and other effects. Strategies were selected for modeling based on an initial screen of potential contributions to GHG reductions—strategies that were expected to result in larger GHG reductions were quantitatively assessed. Most of the quantified strategies focus on clean energy, consistent with the majority of emissions (88 percent in 2015) in Pennsylvania resulting from energy production and consumption.
3. DEP and the analysis team then conducted modeling for selected strategies for GHG, energy, and micro-economic effects.
4. Macro-economic modeling (e.g., changes in jobs) for each strategy was conducted using the REMI PI+ model.
5. Lastly, DEP and the analysis team outlined additional specific actions within each strategy for leaders, citizens, and businesses, and specified implementation steps for modeled actions.

Plan Sectors, Recommended Strategies, and Actions

Sectors: The Plan is organized by and addresses eight sectors:

- ► Energy Consumption
- ► Energy Production
- ► Agriculture
- ► Ecosystems and Forestry
- ► Outdoor Recreation and Tourism
- ► Waste Management
- ► Water Resources
- ► Human Health

Recommended Strategies: Within each sector, the Plan identifies sector-specific climate change impacts, as well as one or more strategies to adapt to climate change impacts and reduce emissions within that sector. Altogether, the Plan identifies 19 strategies, as follows:

- ► Increase end use energy conservation and efficiency
- ► Implement sustainable transportation planning and practices
- ► Develop, promote, and use financing options to encourage energy efficiency
- ► Increase use of clean, distributed electricity generation resources

- ▶ Create a diverse portfolio of clean, utility-scale electricity generation
- ▶ Reduce impacts of fossil fuel energy production and distribution
- ▶ Increase production and use of alternative fuels
- ▶ Use agricultural best practices
- ▶ Provide resources and technical assistance to farmers to adapt
- ▶ Protect ecosystem resilience, including forest systems where species will shift
- ▶ Monitor, identify, and address ecosystem vulnerabilities
- ▶ Help the outdoor tourism industry manage shifting climate patterns
- ▶ Reduce and use waste sent to landfills
- ▶ Use stormwater best management practices
- ▶ Promote integrated water resources management and water conservation
- ▶ Improve reliability and accessibility of public information about climate-related health risks
- ▶ Bolster emergency preparedness and response
- ▶ Lead by example in commonwealth and local government practices and assets
- ▶ Incorporate historical and projected climate conditions into siting and design decisions for long-term infrastructure

Recommended Actions: Each strategy encompasses multiple actions—specific policies, programs, or activities for state and local leaders (i.e., government), citizens, and businesses. The strategy descriptions include lists of these specific leadership, citizen, and business actions, as well as information on strategy benefits and costs, including climate resilience, environmental, and economic benefits and costs.

The Plan explicitly models the benefits and costs for 15 leadership actions within seven of the strategies, ones deemed the most impactful in reducing GHG emissions, as listed below.

- ▶ Increase end use energy conservation and efficiency
    - o Update building codes
    - o Increase adoption of energy efficiency, and expand Act 129
    - o Create an Act 129-like conservation and efficiency program for natural gas
    - o Expand energy assessments and provide more trainings on energy efficiency for industry
- ▶ Implement sustainable transportation planning and practices
    - o Reduce vehicle miles traveled for single-occupancy vehicles
    - o Implement a strategic plan and incentives for increasing electric vehicle use
    - o Increase the use of clean public transportation through electric municipal bus fleets
- ▶ Increase use of clean, distributed electricity generation resources
    - o Invest in and promote building-scale solar
    - o Incentivize and increase use of combined heat and power (CHP)
- ▶ Create a diverse portfolio of clean, utility-scale electricity generation
    - o Increase Alternative Energy Portfolio Standard (AEPS) Tier 1 targets, and further increase in-state generation and use of renewables
    - o Implement policy to maintain nuclear generation at current levels
    - o Limit carbon emissions through an electricity sector cap and trade program