

Pennsylvania Climate Action Plan

Strategies and actions to reduce and adapt to climate change



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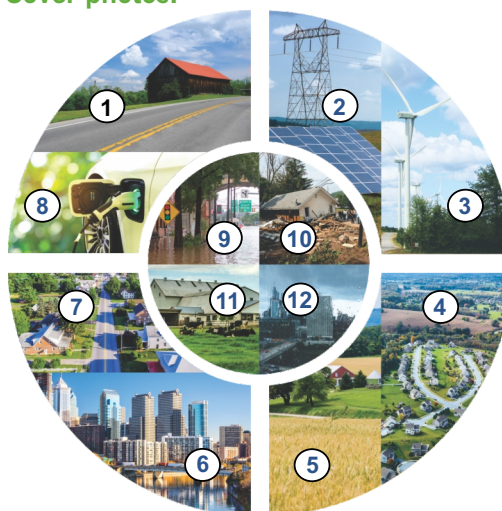
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Read the complete plan:

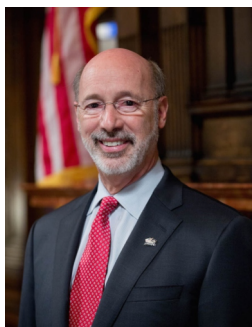
dep.pa.gov/climate

Cover photos:



1. Barn on Pennsylvania highway
2. Solar panels, farm in Germansville, PA
3. Wind turbines, Mahanoy, PA
4. Red Lion, PA
5. Farm, York County, PA
6. Philadelphia
7. Shrewsbury, PA
8. Electric car charging
9. Flooding 2011, Front Street, Harrisburg, PA
10. Flood damage 2018, New Albany, PA
11. Pasture at Amish farm, Lancaster, PA
12. Rainstorm, Philadelphia

Message from Governor Wolf



Climate change, created by increased greenhouse gas emissions, is the most critical environmental threat facing the world. Science indicates that just a 2 degrees Celsius rise likely will have potentially irreversible major consequences, including sea level rise, superstorms, and crippling heat waves.

In the absence of federal leadership, states and cities are taking action to reduce emissions and protect their communities, economies, infrastructures, and environments from the significant risks of a warming climate.

By executive order, I've set the first statewide goal to reduce greenhouse gas emissions in Pennsylvania. The commonwealth will work to achieve a 26 percent reduction of greenhouse gas emissions by 2025 and an 80 percent reduction by 2050, compared with 2005 levels.

I've also established the Green Government Council to ensure that state government offices lead by example to help achieve these goals. Agencies will work together to increase green and sustainable practices, while saving taxpayers money and creating jobs in Pennsylvania's clean energy economy.

Developed by a team of state agencies and partners, *Pennsylvania Climate Action Plan 2018* is an outstanding example of such leadership. One hundred actions are recommended that all Pennsylvanians can take, together and individually, in the highest levels of state office, in our communities, on the shop floor, and at home. We must be proactive to protect quality of life and livelihoods today and for coming generations of Pennsylvanians.

A handwritten signature in blue ink that reads "Tom Wolf".



April 2019



Message from Secretary Patrick McDonnell



Pennsylvania Climate Action Plan 2018 marks 10 years since state law first required the Department of Environmental Protection to develop a climate plan and periodic updates. It builds on earlier versions to recommend the most effective strategies to reduce greenhouse gas emissions and protect our communities, economy, and environment from the significant impacts of climate change. For the first time, it also emphasizes the need to start adapting

today, given temperature and precipitation shifts Pennsylvania is already experiencing.

The plan incorporates the latest state data, quantitative modeling, and national best practices to recommend 19 strategies and 100 actions that state and local government leaders can take to reduce greenhouse gas emissions and increase economic gains in Pennsylvania. Modeling showed that 15 actions, if started now, will achieve a 21 percent reduction in emissions by 2025.

Perhaps the biggest recommendation is this: An all-out team effort is needed. Governor Wolf's executive order on climate change requires state government offices to lead by example, taking measures well beyond current energy efficiency efforts. It's vitally important that legislative and local government leaders, business owners, community organizations, and citizens join in, deciding what they can do now to reduce emissions and protect quality of life in the state. *Pennsylvania Climate Action Plan 2018* is the leading resource to inform those decisions.

To get an idea of actions your government agency, organization, farm, business, or household can take, I invite you to turn the page. For more guidance, please see the complete plan and more information on climate change at dep.pa.gov/climate.

April 2019

Impacts of Climate Change in Pennsylvania

Signs of climate change are increasing in Pennsylvania. Temperatures have risen almost 2° F in Pennsylvania since the start of the 20th century and have been higher in the 2000s than at any previous time. The greatest frequency of warm nights occurred from 2010 to 2014, according to the latest data available.¹

Average annual precipitation in Pennsylvania has increased about 10 percent in the past 110 years, and 2018 was the wettest year on record, bringing a total of 63.97 inches of rain.²

This weather created flooding that took Pennsylvanians' lives, destroyed roads, and severely damaged homes and businesses. Many municipalities have yet to recover, facing infrastructure repairs that are way beyond their budgets, running into millions of dollars in some cases, but fall short of requirements for federal aid.

Farmers also took an economic hit, with fruit and vegetable crops lost to saturated soil or fungus, and livestock and poultry affected by disease or other problems.

Rising heat, increasing rainfall, and more extreme weather events are a trend line with significant implications for the ability of infrastructure to withstand flooding and the electric grid to function reliably.

Predicted sea level rise in Philadelphia and other coastal areas may increase risk to public safety and to property. Health problems, including asthma and illnesses carried by mosquitoes and other insects, are expected to increase.

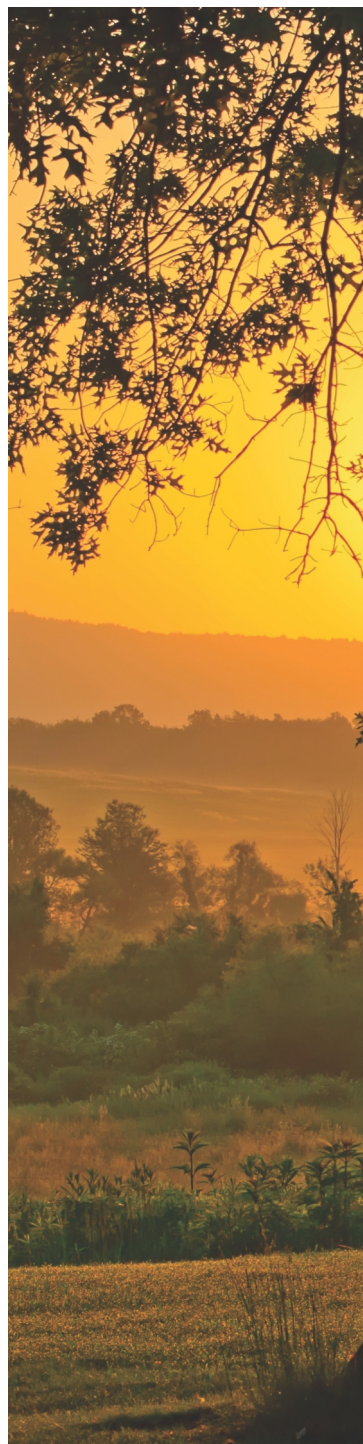
New invasive plant species are anticipated to move into the state, and those already here will increase. Native species and habitats will decline, and local species extinction may occur.³ Agriculture, timber, recreation, and other businesses may see significant economic impacts.

With so much at stake, it's important that the commonwealth provide a cohesive set of actions that everyone can begin to take now to slow down climate change and safeguard Pennsylvania, today and tomorrow.

¹Frankson, R., K. Kunkel, S. Champion, B. Stewart, A.T. DeGaetano, and W. Sweet, 2017: *Pennsylvania State Climate Summary*. NOAA Technical Report NESDIS 149-PA

²<https://www.weather.gov/ctp/RecordPrecip2018>

³http://www.docs.dcnr.pa.gov/cs/groups/public/documents/document/dcnr_20033655.pdf





Plan Partners

Many state agency partners contributed to *Pennsylvania Climate Action Plan 2018*:

- 🏛️ Department of Agriculture
- 🏛️ Department of Community and Economic Development
- 🏛️ Department of Conservation and Natural Resources
- 🏛️ Department of Environmental Protection
- 🏛️ Department of General Services
- 🏛️ Department of Health
- 🏛️ Department of Transportation
- 🏛️ Pennsylvania Emergency Management Agency
- 🏛️ Public Utility Commission

The Climate Change Advisory Committee, consisting of 21 members from public and private organizations, provided expert review and input. ICF International performed modeling and co-wrote the document with DEP.

Plan Goals

1. **Reduce greenhouse gas emissions from 2005 levels:**

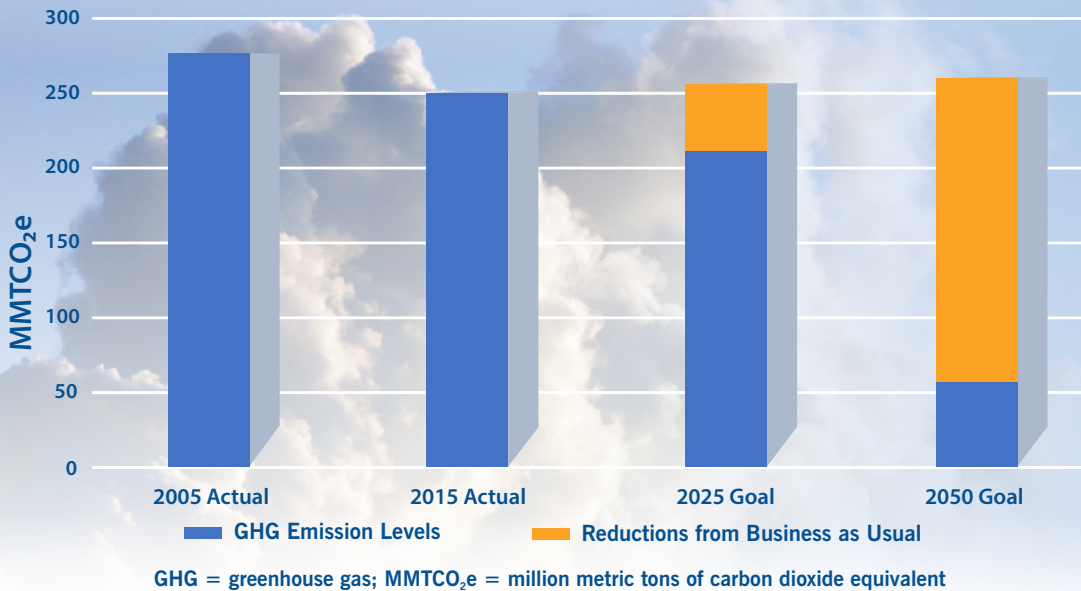
- 26 percent by 2025
- 80 percent by 2050

Science indicates that, if all states and other nations met comparable goals, global temperature rise could be kept below the 2° Celsius threshold for irreversible dire consequences.

2. **Adapt to changes already happening:**

- Minimize disruptions to Pennsylvania's citizens, economy, and environment.
- Increase Pennsylvania's ability to prepare for and adapt to changing conditions and withstand, respond to, and recover rapidly from climate-related disruptions.

Greenhouse Gas Reductions Needed to Meet 2025 and 2050 Goals

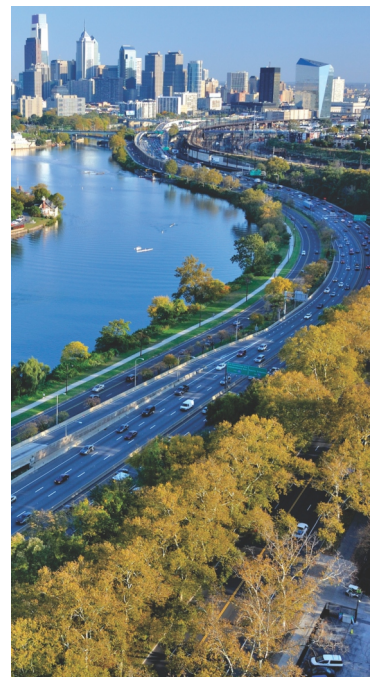


Current Greenhouse Gas Emissions

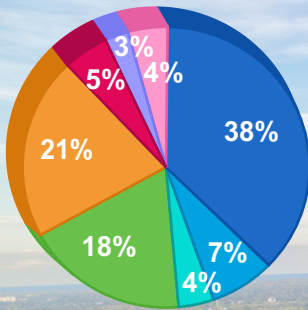
Fully 88 percent of Pennsylvania's greenhouse gas emissions came from energy consumption and energy production in 2015, the latest year for which data are available.

The biggest source of emissions is energy consumption:

- Transportation—personal vehicles and fleet fuel
- Homes—fuel and electricity for heating/cooling, water heating, appliances, lighting, electronics
- Businesses—fuel and electricity for heating/cooling, water heating, lighting, office equipment, and IT systems
- Industry—fuel and electricity for technologies, motor systems, and lighting



Greenhouse Gas Emissions by Sector in 2015*



- Energy Production^a
- Residential Fuel Consumption^b
- Commercial Fuel Consumption^b
- Industrial Fuel Consumption^b
- Transportation Fuel Consumption^b
- Industrial Processes
- Agriculture
- Waste

**Latest data available.*

^a Includes emissions from electricity generation, coal mining, and natural gas and oil production.

^b Includes emissions from direct fuel consumption; excludes emissions from electricity

Overview of Plan Recommendations

Pennsylvania Climate Action Plan 2018 recommends 19 overall strategies in energy, transportation, forestry, farming, recreation, and other areas that will significantly reduce greenhouse gas emissions to help slow climate change and enable Pennsylvanians to adapt to changes already happening.

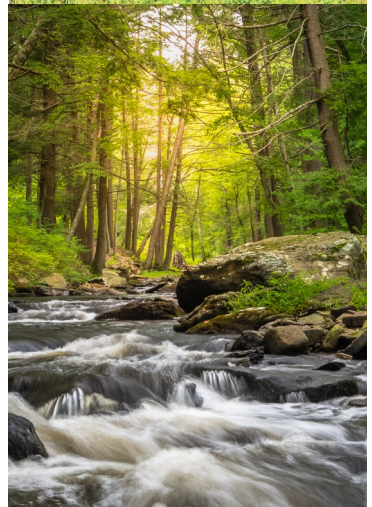
The plan recommends 100 specific actions for government leaders, as well as actions for business owners, farms, community organizations, and residents.

These strategies and actions will prepare Pennsylvania for the 21st century economy with new jobs, an increase in Gross State Product, and long-term economic benefit.

This booklet presents top-line recommendations from the plan. For more recommended strategies and actions, see the complete plan at dep.pa.gov/climate.

19 Strategies to Reduce Greenhouse Gas Emissions and Adapt to Climate Change

1. Increase end use energy conservation and efficiency.
2. Implement sustainable transportation planning and practices.
3. Develop, promote, and use financing options to encourage energy efficiency.
4. Increase use of clean, distributed electricity generation resources.
5. Create a diverse portfolio of clean, utility-scale electricity generation.
6. Reduce impacts of fossil fuel energy production and distribution.
7. Increase production and use of alternative fuels.
8. Use agricultural best practices.
9. Provide resources and technical assistance to farmers to adapt.
10. Protect ecosystem resilience, including forest systems where species will shift.
11. Monitor, identify, and address ecosystem vulnerabilities.
12. Help the outdoor tourism industry manage shifting climate patterns.
13. Reduce waste generated by citizens and business thereby reducing waste sent to landfills, and WTE facilities, and expand the beneficial use of waste.
14. Use stormwater best management practices.
15. Promote integrated water resources management and water conservation.
16. Improve reliability and accessibility of public information about climate-related health risks.
17. Bolster emergency preparedness and response.
18. Lead by example in commonwealth and local government practices and assets.
19. Incorporate historical and projected climate conditions into siting and design decisions for long-term infrastructure.





What Business Owners Can Do

- Design and construct buildings to reduce energy demand by proper solar orientation, sufficient insulation and air sealing, energy efficient windows, and other measures.
- Purchase fuel-efficient or low-emission vehicles, including fleet vehicles.
- Develop on-site clean energy resources, buy clean power through competitive electricity markets, and/or enter into power purchase agreements for clean power.
- Ask your local government leaders if the Commercial Property Assessed Clean Energy finance option is available in your municipality to help you pay for energy efficiency and renewable energy projects.
- Reduce stormwater runoff via green infrastructure, such as green roofs, rain gardens, permeable pavement, or curb cuts in parking lot islands.
- Use reclaimed water for nonpotable uses (e.g., industrial cooling, landscape irrigation).
- For more actions, go to dep.pa.gov/climate and click on “Pennsylvania Climate Action Plan 2018.”

What Citizens Can Do

- Install energy efficient lighting and appliances by searching for products that carry the Energy Star label.
- Use public transit, carpool, walk, or bike.
- Purchase a more fuel-efficient or low-emission vehicle, such as a battery electric vehicle.
- Buy local to reduce emissions generated by long-range transport of food products and building materials.
- Purchase clean power for your home through PA Power Switch: <https://www.papowerswitch.com/>
- Invest in rooftop solar electric and water heating systems on your home.
- Decrease fertilizer use, which increases greenhouse gas emissions, and use electric-powered landscaping equipment.
- For more actions, go to dep.pa.gov/climate and click on “Pennsylvania Climate Action Plan 2018.”

What Government Leaders Can Do

Pennsylvania Climate Action Plan 2018 identifies over 100 actions that state and local government leaders can take to reduce greenhouse gas emissions.

Quantitative analysis showed that taking just 15 of these actions now will achieve a 21 percent emissions reduction in the state by 2025. The many other actions outlined in the plan will build on this significant start to achieve greater emissions reduction.

Actions to Take Now:

Update building codes. Updating building energy codes and allowing or incentivizing local governments to use “stretch codes” reduces energy use and costs for building owners and homeowners.

Expand Act 129. Act 129 requires Pennsylvania's largest electric utilities to develop energy efficiency and conservation plans and to help consumers find ways to reduce energy usage. Increasing those requirements will decrease electricity consumption and save consumers money.

Create an Act 129 program for natural gas. Ensuring Pennsylvania's largest gas utilities have similar requirements as the electric utilities will provide gas customers with opportunities to reduce costs and emissions.

Energy efficiency for industry. Expanding energy assessments and energy efficiency trainings for industry offers opportunities for manufacturers to save money on their energy bills and develop the workforce to help them grow their business.

Reduce vehicle miles traveled. Incentivizing ride sharing, bicycling, public transit, and walking options to reduce single occupancy vehicle use reduces reliance on fossil fuels and results in better air quality at the local level.

Increase electric vehicle usage. Developing incentive programs to increase electric vehicle use, based on the Pennsylvania Electric Vehicle Roadmap, will reduce emissions by replacing gasoline powered vehicles.

Clean public transportation. Taking advantage of decreasing costs and available state grant programs such as Driving PA Forward and Alternative Fuel Incentive Grants will help transit agencies improve access to public transportation, increase local air quality, and reduce emissions.



Building-scale solar. Investing in and promoting building scale solar energy will allow individuals and businesses to reduce emissions from their electricity use. Homeowners and small businesses can use solar to decrease their monthly electricity costs and increase the value of their property.

Increase CHP use. Creating incentives for large campuses, hospitals, infrastructure, mass transit, and industry to switch to combined heat and power (CHP) technology reduces emissions and increases resiliency by using the waste heat from power generation to provide for heating.

Increase AEPS targets. Increasing Alternative Energy Portfolio Standard (AEPS) Tier 1 targets for electric distribution companies beyond the current requirement will clean Pennsylvania's grid and ensure that more of the electricity you purchase comes from alternative energy sources.

Maintain nuclear generation. Maintaining nuclear generation at current levels keeps Pennsylvania's largest current zero-emitting electricity generation resource from being replaced by fossil resources, which produce emissions.

Cap and trade. Establishing a carbon cap and trade program would require electric utilities to reduce their emissions by a set percentage each year.

Reduce methane from oil and gas systems. Reducing methane, a potent greenhouse gas, emissions from oil and natural gas production decreases the environmental impact of these sources of energy and helps ensure these systems aren't leaking into the atmosphere.

Recover and use biogas. Expanding outreach efforts to industry to increase recovery and re-use of methane gas from coal mines, agriculture, wastewater, and landfills decreases emissions of a potent greenhouse gas and allows for economic development of a waste.

Increase no-till farming practices. Providing training to increase farmers' use of no-till practices keeps carbon sequestered in soils and plants rather than being released as a greenhouse gas into the atmosphere.



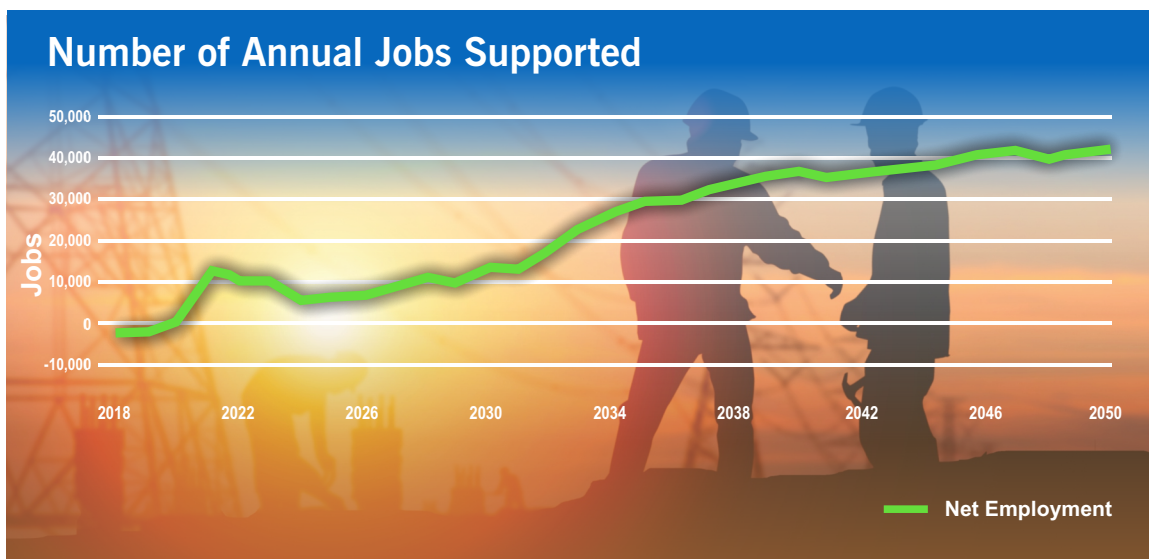


Economic Benefits

These 15 actions by government leaders will show positive effects on total jobs and gross state product (GSP) in Pennsylvania:

- A \$200 million increase in 2025 GSP and a \$3.7 billion increase in 2050 GSP. (GSP is a metric that represents the sum of value added for all industries in the state.)
- About 6,500 new jobs in 2025 and 40,000 new jobs in 2050, primarily in industries related to energy conservation and efficiency, such as increased demand for electricians to install energy efficiency equipment.

Energy conservation and efficiency, sustainable transportation planning and practices, and increasing use of clean, distributed electricity generation resources will have the largest long-term economic benefits.





How State Agencies Will Lead by Example

Governor Wolf's 2019 Executive Order on Climate Change established performance goals for state government offices. The following actions align with those goals.

- Establish a strategic energy management plan for public facilities that includes emissions benchmarking and reduction targets.
- Maximize on-site renewable energy generation and purchase additional renewable power through renewable energy certificates or direct purchasing.
- Implement a statewide benchmarking strategy and platform (such as EnergyStar's Portfolio Manager) for energy and water consumption. Engage the Pennsylvania Public Utility Commission and utilities to automate billing and data input into the platform. Encourage businesses, industry, schools, and municipalities to adopt similar platforms.
- For existing public buildings, consider EnergyStar certification. For new construction and major renovation, pursue Architecture 2030, LEED, net-zero designs, and climate resilience design guidelines.
- Put emissions reduction and climate resilience measures in place in public facilities—such as distributed energy generation, backup power generation, water efficiency, and climate resilient vegetation.
- Require energy efficiency and alternative fuels use in fleet vehicles and equipment.



Learn More and Take Action

Government leaders, businesses, and citizens can take many steps, small and large, to reduce greenhouse gas emissions and slow the impact of climate change on communities, the economy, and the environment in Pennsylvania. For complete details on recommended strategies and actions, see the *Pennsylvania Climate Action Plan 2018* at dep.pa.gov/climate.



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