



Testimony of Secretary Patrick McDonnell
Department of Environmental Protection
Hearing on Governor Wolf’s Climate Change Priorities
House Environmental Resources and Energy Committee
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Good morning Chairman Metcalfe, Chairman Vitali, and members of the committee. On behalf of Governor Wolf, I’d like to thank you for the opportunity to highlight how our administration is addressing the most critical environmental issue facing Pennsylvania, our residents, and every other state and country on this planet. Throughout this testimony, I hope you will find that not only is the Department of Environmental Protection (DEP) impacted by a changing climate, but so are many other agencies – like the Departments of Health, Agriculture, Transportation, Conservation and Natural Resources, Community and Economic Development, General Services, and the Pennsylvania Emergency Management Agency.

Climate change isn’t an issue that only the residents of coastal states are concerned about. Climate change has led to more flooding, more heat and respiratory illnesses, more vector-borne diseases and pests, and more disruptions to agricultural systems right here in Pennsylvania. Some simple facts for you:

- Since 1900, Pennsylvania has warmed by 1.8 degrees F.
- Annual precipitation has increased 10 percent on average, with some areas seeing a 20 percent increase over the same time period.
- From 1958 through 2010, the Northeast U.S. saw more than a 70 percent increase in the amount of precipitation falling during very heavy events.

The impacts of climate change are vast and what was predicted 10 years ago is being confirmed today. The projections are even more dire. By 2050, Pennsylvania is expected to warm by 5.4 degrees F. The Pennsylvania that you and I know will not be the same Pennsylvania that our children or our grandchildren will know. By the middle of this century, Philadelphia will feel like Richmond and Pittsburgh will feel like Washington, D.C. Precipitation patterns will also be increased by another 8 percent by 2050, with a winter precipitation increase of 14 percent.

Pennsylvania has recently experienced major impacts from this increase in precipitation and the resultant landslides, as 2018 was the wettest year on record. In just one year, PennDOT saw over \$125 million in emergency expenses to replace damaged infrastructure and cash-strapped local municipalities are dealing with the same budget-busting issues. Adding to the financial stress is that many flooding events are so localized that they do not qualify for Federal assistance, so homeowners, business owners, and local and state agencies must bear the brunt of repair costs. To further prepare for extreme weather events, PennDOT has completed an Extreme Weather Vulnerability Study with plans for additional phases.

As I said in my opening, climate change is not just an environmental issue. In June of this year, 70 medical and public health groups, including the American Medical Association, American Nurses Association, American Academy of Pediatrics, American Lung Association, and American Heart Association issued a call to action asking the U.S. government, business and leaders to address climate change. They stated:

“Climate change is one of the greatest threats to health America has ever faced—it is a true public health emergency. The health, safety and wellbeing of millions of people in the U.S. have already been harmed by human caused climate change, and health risks in the future are dire without urgent action to fight climate change. Climate change also exacerbates health inequities—disproportionately harming the most vulnerable among us— thus equity must be central to climate action. Therefore, we call on government, business, and civil society leaders and candidates for elected office to recognize climate change as a health emergency and to prioritize the actions in this Climate, Health and Equity Policy Action Agenda.... Building healthy energy, transportation, land use, and agriculture systems now will deliver immediate and sustained health benefits to all and reduce future health risks from climate change.”

Climate change will impact human health in a number of ways. It will likely increase ground-level ozone, small airborne particulates, and pollen and mold concentrations. Ozone is an irritant that causes respiratory issues, aggravates asthma, causes respiratory infections, and increases mortality. Higher plant growth, more pollen produced by each plant, increased allergenicity of the pollen grains, and a longer pollen season can also be expected. In Pennsylvania, mosquito and tick-borne diseases are spreading to new communities and impacting people’s lives. Since 2000, Pennsylvania has had the highest number of total Lyme disease cases – a list we shouldn’t strive to be at the top of. Penn State recently conducted a study that shows that the explosion of the deer tick prevalence throughout Pennsylvania is related to climate change and shifts in land use because our winters are not cold enough to kill off tick populations the way they used to.

Vulnerable populations across Pennsylvania will be at a higher risk for heat related death. People with heart failure, the elderly, and those without access to air conditioning will all be increasingly exposed to more frequent and intense heat waves. One study found that if temperatures increase another three degrees, cities like Philadelphia will see hundreds more deaths than if warming is limited to one degree.¹

¹ <https://advances.sciencemag.org/content/5/6/eaau4373>

Currently, the Department of Health administers a Lyme Disease and Related Tick-Borne Disease Task Force, established by Act 83 of 2014. In the 2018-19 budget, \$2.5 million was allocated specifically for dealing with this issue. They are currently engaged in a significant education and outreach effort, to help school nurses, the general public, and even the Boy Scouts know how to implement personal protection and property actions. Additionally, they are implementing ongoing education programs for healthcare providers. As part of this effort, DEP completed tick drags and testing in all 67 counties to assess the risk of tickborne illnesses by tracking ticks' habitats, life stages and peak activity levels and testing them for human pathogenic diseases. This has helped the DOH to more accurately pinpoint when and where risk of human illness is most prevalent.

Similar to various public health pressures, the agricultural, food, and water systems we depend on for our survival are also under threat by climate change. The increase in precipitation and its variability could lead to higher plant disease, increased risk of flooding, difficulty in the timing of planting, and increased demand for irrigation. Extreme temperatures will stress grain crops and fruit crops that flower in the summer months (such as grapes). To adapt, Pennsylvania's wineries may choose to plant European varieties of grapes, which tend to do better in warmer climates, but this would also lead to increases in the cost of wine.

Pennsylvania's dairy production will also experience challenges from reduced milk yields, a result of heat stress on cows. Farmers may see additional capital expenditures necessary for cooling systems to reduce the heat stress on cows. The same is true for poultry and egg production. Investments in insulation, ventilation, fans, and air conditioning will be necessary to prevent heat stress to the birds. Currently, a large portion of poultry and hog production takes place in warmer, southern states like North Carolina and Georgia, showing that these production processes can still be viable with the increased costs of cooling. However, there may be a northward movement of these animals, bringing with them an increase in nutrient production and further stressing our obligations for water quality improvements.

Climate change is already having an impact on forests around the world and Pennsylvania's diverse and productive forests will likely also see impacts. Tree species are expected to shift to higher latitudes and elevations for suitable habitat. Mortality rates are expected to increase and regeneration is expected to decline. Rising temperatures increase insect reproductive rates, making pest outbreaks more destructive and harder to control. Additionally, pests that impact the forests of southern states could make their way into Pennsylvania forests. As the state's largest land management agency, the Department of Conservation and Natural Resources has created a Climate Adaptation Plan to manage their resources and they are working hard to reduce their impact through various measures, like the installation of electric vehicle chargers and solar panels for electricity use in state parks.

Outdoor recreation in Pennsylvania will also be impacted by climate change. Streamflows in the summer could be reduced and negatively affect sport fishing. Swimming in lakes and rivers could be limited by poor water quality, the result of higher temperatures, low summer flows, and nutrient and pathogen loadings. These combinations of circumstances can lead to harmful algal blooms or HABs. On August 22nd of this year, DCNR was notified that a dog died after swimming in a lake at Frances Slocum State Park. DEP tested the lake and found microcystin (a

toxin produced by blue-green algae) at 340 ppb, more than 42 times higher than the maximum level for human exposure from recreation of 8 ppb.

Warmer winter temperatures and reduced snowfall will negatively impact snow-based recreation. Pennsylvania's ski resorts will experience shorter seasons, higher snow making costs, and lower profits as a consequence of climate change. Research also suggests that dispersed winter recreation, such as cross-country skiing and snowmobiling, will decline because of less snowfall and fewer extended periods of cold weather.

The discussion of climate change is no longer about the science, because the science is clear. Science and modeling allow us the opportunity to be proactive in minimizing environmental damage and human suffering. Just like models that predict hurricanes in the Atlantic, the models predicting the impacts of a warming climate have continuously improved and become clearer over time. The models do not say we have plenty of time, in fact they say the opposite. Each one tells us that our time for action is now.

The people of Pennsylvania know this. The citizens of Pennsylvania are already seeing the impacts of climate change – on the national news and in their backyards. Extreme heat, powerful storms and floods, year-round wildfires, droughts, and other climate-related events are causing thousands of deaths and displacing tens of thousands of people in the U.S. from their homes, with significant personal loss. Asthma attacks, Lyme disease, HABs, flooding, and crop damage are just a few of the symptoms Pennsylvania is experiencing of a disease affecting our planet.

In the Spring of 2018, Yale conducted surveys evaluating the opinions of Americans on the issue of global warming and policy solutions to address it. Yale's Climate Opinion maps provide granularity by national, state, congressional district, and county levels on climate change perspectives, risk perceptions, and policy support. Their data show that 70 percent of Pennsylvanians agree that global warming is happening. In Jefferson County, 60 percent of residents agree that global warming will harm plants and animals and future generations. On the policy aspect of their survey, Yale found that 82 percent of the people in Jefferson County support funding research into renewable energy sources and 79 percent support providing tax rebates for energy-efficient vehicles or solar panels. Similarly, 75 percent of the people of Butler County support regulating CO₂ as a pollutant and 61 percent support setting strict CO₂ limits on existing power plants.

It is clear that the Trump Administration has no interest in addressing climate change in a meaningful way. This has forced state governments to take responsibility for addressing the greatest environmental, public health, and economic threat to the world in order to protect our way of life. The policies that Governor Wolf supports and has put into place will not only help to address climate change, but they will also improve public health and the positively impact the lives of Pennsylvanians.

On January 8, 2019, Governor Wolf signed Executive Order 2019-01 – Commonwealth Leadership in Addressing Climate Change and Promoting Energy Conservation and Sustainable Governance. This E.O. set the first goal for Pennsylvania to reduce net greenhouse gas (GHG) emissions from 2005 levels by 26 percent by 2025 and 80 percent by 2050, putting us in line

with our obligations under the Paris Accord. In April, Governor Wolf announced that Pennsylvania would be the 24th state to join the U.S. Climate Alliance, a bipartisan group of 25 U.S. states to commit to reducing emissions set by the Paris Climate Accord. The Alliance represents 55 percent of the U.S. population, an \$11.7 trillion economy, and 40 percent of U.S. greenhouse gas emissions.

Greenhouse Gas Emissions in Pennsylvania

If all of these impacts are symptoms and climate change is the disease, we know that greenhouse gas emissions are the cause. Pennsylvania's greenhouse gas emissions come from a number of different sectors, including residential, commercial, industrial, transportation, electricity production, agriculture, waste management, and forestry and land use. According to DEP's most recent Greenhouse Gas Inventory, the total statewide gross GHG emissions for Pennsylvania were 287 million metric tons of carbon dioxide equivalents (MMTCO₂e).

Pennsylvania's emissions have shown a relative decrease of 13 percent in gross emissions from 2000 to 2015. This is a good start, but it's still not enough. The sectors with the largest contribution to the Commonwealth's GHG emissions are the transportation, industrial, and electricity production sectors, all of which combine to account for approximately 82 percent of Pennsylvania's emissions. Recently, we have seen the industrial sector, which includes natural gas production and coal mining, become the leading emissions producing sector. The electricity sector, totaling slightly less than the industrial sector, has seen decreasing emissions primarily due to flat electricity demand and fuel switching at our power plants from coal to natural gas.

Despite the encouraging trend of decreasing overall emissions, more must be done to make the reductions necessary to effectively mitigate climate change. In fact, DEP projects overall emissions to increase from 2015 levels by 2025 and even more so by 2050 if no additional policies are implemented.²

Pennsylvania's Climate Action Plan

As required by the Pennsylvania Climate Change Act (Act 70 of 2008), in April Governor Wolf released an updated Climate Action Plan. This plan provides strategies for moving the needle on GHG emissions reductions and includes adaptation measures for the first time. Solutions to a crisis of this magnitude require all Pennsylvanians work together and do their part.

The Climate Action Plan presents a list of potential strategies and actions that governments, citizens, and businesses in Pennsylvania can take to address and adapt to climate change. Included are 19 strategies, providing over 100 actions across eight different sectors that, if implemented by the state and local governments, would drastically lower Pennsylvania's GHG emissions and increase our ability to adapt to the impacts of climate change.

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<http://www.depgreenport.state.pa.us/elibrary/GetDocument?docId=1454161&DocName=2018%20PA%20CLIMATE%20ACTION%20PLAN.PDF%20%20%20%3cspan%20style%3D%22color:blue%3b%22%3e%28NEW%29%3c%2Fspan%3e>

These strategies include:

1. Increase end use energy conservation and efficiency
2. Implement sustainable transportation planning
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 waste facilities, and expand the beneficial use of waste
14. Use stormwater best management practices
15. Promote integrated water resources management and water conservation (adaptation)
16. Improve reliability and accessibility of public information about climate-related health risks (adaptation)
17. Bolster emergency preparedness and response (adaptation)
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

It also identifies adaptation strategies to minimize disruptions to Pennsylvania's citizens, economy, and environment from climate-related hazards; and increase Pennsylvania's ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from climate-related disruptions.

The Climate Action Plan also identifies what specific actions Pennsylvania's business owners can do, such as:

- 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.
- Reduce stormwater runoff via green infrastructure, such as green roofs, rain gardens, permeable pavement, or curb cuts in parking lot islands.

The macroeconomic analysis included in the Plan shows that implementation would result in economic benefits to Pennsylvania through an increase in total jobs and gross state product. If only 15 actions, out of the over one hundred in the Plan, were implemented, we could expect a \$200 million increase to the state economy by 2025 and a \$3.7 billion increase by 2050. These actions would also add 6,500 new jobs in 2025 and 40,000 new jobs in 2050, primarily in industries related to energy conservation and efficiency. These are good-paying, family-sustaining jobs, such as electricians, needed to install energy efficiency equipment.

It is our ethical responsibility to ensure that policies are in place to drive and support market transformation to an economy with lower greenhouse gas emissions. This will require public and private investment, scaling of infrastructure (e.g., bike shares and electric vehicle charging), and changes to consumer behavior to achieve the projected large climate and economic benefits through 2050. To find out more about what residents, businesses, and governments can do, the final Climate Action Plan is available on DEP's website: <https://www.dep.pa.gov/climatechange>.

Cleaning up the Grid

Since electricity generation is the second largest greenhouse gas contributor in Pennsylvania, we have the opportunity to address climate change by prioritizing clean electricity generation. Pennsylvania is the third highest electricity generating state in the nation and the top electricity exporter. This means that the Commonwealth generates more electricity than it consumes, and the remaining amount is used in other states. Fifty-seven percent of Pennsylvania's electricity comes from coal and natural gas, so there are significant opportunities to reduce emissions from the electricity generation sector.

Governor Wolf is leading efforts to ensure the growth in Pennsylvania natural gas development does not lead to drastic methane emissions through his Methane Reduction Strategy. The Strategy is designed to reduce emissions from unconventional natural gas well sites, compressor stations and along pipelines, and will protect the environment, reduce climate change, and help businesses reduce the waste of a valuable product. DEP began implementing this strategy by completing the General Permits for new oil and gas well sites and updating the permit for compressor stations in 2018.

The Bureau of Air Quality is now currently developing regulations that establish emission limitations and other requirements consistent with reasonably available control technology, or RACT, recommendations of the Control Technique Guidelines for the Oil and Natural Gas Industry finalized by the EPA on October 27, 2016. This is the final piece of the Governor's methane strategy. The rulemaking will establish RACT requirements for volatile organic compounds and other pollutants from existing oil and natural gas production facilities, compressor stations, processing plants, and transmission stations. The control of VOC emissions will also achieve collateral methane emission reductions equal to approximately 50,000 tons.

There are also regional opportunities for Pennsylvania to reduce emissions in the electricity sector. One specific regional initiative occurring in the Northeastern United States that Pennsylvania could participate in to reduce emissions and generate economic growth is the Regional Greenhouse Gas Initiative, or RGGI. RGGI is a carbon pricing system for electricity generation, that nine Northeast and Mid-Atlantic states currently participate in. RGGI is a market-based solution, composed of individual carbon budget trading programs in each state that link together. A CO₂ allowance represents a limited authorization to emit one short ton of CO₂, as issued by a respective state. Pennsylvania is currently the only state in the Northeast and Mid-Atlantic that does not participate (or is working toward participating) in RGGI. As the major electricity exporter, we have an immense opportunity to generate revenue for Pennsylvania-specific policy initiatives like the ones supported by Pennsylvanians in the Yale survey.

The RGGI states have reduced power sector CO2 pollution by over 45 percent since 2005, while the region's per-capita GDP has continued to grow. RGGI-funded programs also save consumers money and help support businesses. RGGI investments in 2015 are estimated to return \$2.31 billion in lifetime energy bill savings to more than 161,000 households and 6,000 businesses that participated in programs funded by RGGI investments, and to 1.5 million households and over 37,000 businesses that received direct bill assistance. Pennsylvania is being left out and left behind.

According to RGGI, clean and renewable energy make up 16 percent of 2015 investments and 14 percent of cumulative investments. The investments in these technologies in 2015 are expected to return \$785.8 million in lifetime energy bill savings to 19,600 participating households and 122 businesses in the region. Our residents and businesses are missing out.

Solar Energy

Another option to decarbonize the grid is through investments in solar and wind energy. Solar energy is one of the biggest opportunities for clean energy in Pennsylvania. Although solar energy is growing in Pennsylvania, we still see less than 1 percent of our electricity generated from solar, while an increasing number of neighboring states are getting at least 5 percent or even 10 percent of their electricity from this clean, reliable, and renewable energy source. Significant potential remains for solar energy development to transform Pennsylvania's electricity generation sector.

Governor Wolf has been paving the way for more solar in Pennsylvania by signing legislation, providing financing opportunities, and identifying how to overcome barriers to solar deployment. In 2017, Governor Wolf signed Act 40, which requires utilities to purchase solar energy credits from in-state solar sources, prohibiting them from obtaining credits from sources in other states. Prior to Act 40 taking effect, Pennsylvania allowed these credits to be generated anywhere in the PJM region, which stretches from North Carolina to Illinois. This resulted in a huge supply of credits being available from other states and our investment dollars going across our borders.

In order to generate more investment in solar within Pennsylvania, last year Governor Wolf announced 78 new solar projects to be financed through the Commonwealth Financing Agency's Solar Energy Program. The \$30 million in grants are funding projects across 22 counties, expanding solar energy implementation and promoting development across Pennsylvania.

DEP led an 18-month project, involving over 500 stakeholders, called Finding Pennsylvania's Solar Future that identified how to grow solar in Pennsylvania and the economic and environmental benefits of doing so. The Plan presents a vision of a Pennsylvania in 2030 that, with just a modest increase in solar energy construction, reaps the benefits of reduced greenhouse gas emissions and related public health challenges as well as increased jobs and economic opportunities.

The Plan estimates that approximately 60,000 to 100,000 new jobs would be created in rural, urban, and suburban areas if the 10 percent target is reached. If the plan is implemented, these

emissions could decrease up to 9.3 percent from the electricity sector, helping to reduce associated health challenges and negative environmental impacts. To get to 10 percent solar generation, a modest increase in overall annual energy spending to build and interconnect solar energy systems may be required, and approximately 124 square miles of land, equal to less than 0.5 percent of Pennsylvania's total land area, would be needed.

The Plan presents 15 strategies for Pennsylvania to grow solar, including strategies such as:

- Increasing the amount of electricity that utilities are required by state law to get from solar from 0.5 percent to 4-8 percent and maintaining the requirement that they get this solar energy within Pennsylvania;
- Expanding loan products to residential and commercial projects to enable solar ownership;
- Implementing a carbon pricing program and investing the proceeds in renewable energy and energy efficiency measures.

There are additional strategies that could overcome the existing barriers for solar in Pennsylvania that can be found in the Plan on DEP's website.

Electricity generation is a key area for renewable energy innovations to reduce pollutants and the challenges they create for public health and our environment. For Pennsylvania to achieve leadership in renewable energy generation from solar, more investment and recognition of the long-range economic and environmental benefits will be necessary. To do so, I encourage you all to support Senate Bill 600 and the companion House Bill 1195 that increases the Alternative Energy Portfolio Standard. This bill would increase the AEPS Tier I requirement from 8 percent-30 percent, including a 10 percent carveout for solar, which is in line with the targets of the PA Solar Future Plan.

Sustainable Transportation

Another key opportunity to reduce emissions is in the transportation sector, which accounts for over one-fifth of Pennsylvania's Greenhouse Gas emissions. Transportation emissions can directly impact human health and can often travel across counties, states, and regions. In the absence of federal policy, the most effective way to reduce emissions is through collaborative regional action, such as the Transportation and Climate Initiative.

Transportation & Climate Initiative

The Transportation and Climate Initiative, or TCI, is a regional collaboration of states that seeks to reduce carbon emissions from the transportation sector and develop the clean energy economy while improving transportation systems. Pollution from transportation accounts for the largest portion of climate-changing carbon emissions in the Northeast and Mid-Atlantic region and it does not stop at state borders.

With this in mind late last year, Pennsylvania joined 12 states and the District of Columbia to announce our joint commitment to design a regional, market-based, low-carbon transportation policy proposal that would reduce emissions from transportation and generate funds for states to invest in cleaner and more resilient transportation systems and infrastructure. This design effort

is still underway, with modeling yet to be completed. We are committed to being at the table during the design process to ensure Pennsylvania has a voice, provides input, and that the program is fully understood in hopes that it will be an effective program to reduce greenhouse gas emissions from the second largest contributor of greenhouse gas emissions in the country, transportation.

Electric Vehicles

Additionally, DEP supports specific transportation technologies that produce fewer GHG emissions. In recent years, technological and policy advancements have accelerated the availability and utilization of emission free transportation options, particularly electric vehicles, or EVs. EVs do not produce any tailpipe emissions and over their lifecycle are much cleaner than gasoline-powered vehicles. By 2023, each mile driven by an EV passenger car compared to a gasoline-powered vehicle would emit 50 percent less greenhouse gases based on the anticipated regional electricity mix.³ As the electricity mix gets cleaner, the benefits of EVs will be magnified.

For these reasons, rapid EV adoption is occurring across the country. Since 2011, the number of distinct EV models made available by car manufacturers has grown from under five to over 53, increasing the available options for consumers. EV sales in the light-duty vehicle market have been growing in Pennsylvania, growing from less than 2,000 sold in 2015 to over 6,000 sold in 2018 – because consumers are catching on.

Along with the increasing EV sales, other indicators are projecting continued growth of EVs. Across the U.S., the number of public EV charging stations has doubled from 30,000 in 2015 to over 60,000 in 2019. In Pennsylvania, there are over 483 publicly listed electric vehicle charging stations, and 1,169 total plugs, most of which are Level 2 chargers.⁴

DEP is preparing for the future by identifying the key actions needed to increase adoption of EVs in Pennsylvania through the *Pennsylvania Electric Vehicle Roadmap*, released in 2018. The Roadmap reviews the state of the EV market in Pennsylvania, defines a set of proposed strategies to support the expansion of the EV market, and provides estimates of the potential benefits and impacts to the state from an increased EV market.

DEP will continue to evaluate opportunities to grow the EV market by collaborating with a broad range of stakeholders with the goal of increasing EV adoption in Pennsylvania, including the Drive Electric Pennsylvania Coalition (the Coalition), which includes state and municipal government officials, U.S. Department of Energy's (DOE) Clean Cities Coalitions, EV businesses and consultants, transportation organizations, electric utilities, environmental groups, auto companies, and other interested stakeholders.

³ <http://files.dep.state.pa.us/Energy/OfficeofPollutionPrevention/StateEnergyProgram/PAEVRoadmap.pdf>

⁴ <https://afdc.energy.gov/data/>

DEP and our partners in the Coalition are contributing to the growth in EVs with a number of initiatives, including funding, planning, and outreach. Currently, there are three main funding opportunities for Pennsylvanians interested in EVs:

1. Alternative Fuel Vehicle Rebates provide eligible residents rebates of \$1000-\$1500 per plug-in vehicle depending on vehicle type. The program has been growing over time; between just 2018 to 2019, 2,389 vehicles received rebates totaling \$3.7 million, up from 1,997 vehicle rebates between 2015-2018.
2. The Alternative Fuel Incentive Grant Program has provided grants to support EV fleet vehicles and EV Fleet refueling. Over \$2.8 million has been awarded in support of these projects across Pennsylvania.
3. Due to the settlement with Volkswagen, Pennsylvania was allocated \$118.5 million to spend on clean transportation initiatives through its Driving PA Forward Program. PA is spending the maximum allowed 15 percent of these funds on electric vehicle charging infrastructure, equal to \$17.7 million. Since the program began in fall of 2018, the Department has approved 157 Level 2 charging projects (479 new plugs) and 5 DC fast charging projects, equal to \$3,275,000.

The Department also offers additional funds through these programs for other Alternative Fuel Vehicles such as natural gas, propane, and clean diesel.

Efficient Buildings

Energy conservation, which includes behavioral and operational measures and programs, such as changing temperature settings, turning off unused lights and energy consuming devices, reducing the operation hours for space conditioning and energy systems, and changing industrial process operations, is cheap to implement, easiest to accomplish, and has instant—though often smaller—economic benefits compared to energy efficiency measures. Energy efficiency includes improving the overall operating performance of building envelopes (such as better windows, insulation, and air sealing), kitchen and laundry appliances, lighting, heating and cooling systems (such as ground-source heat pumps, variable refrigerant flow, and ductless systems), as well as influencing the behavior of consumers to reduce their energy use. Reducing energy demand through energy efficiency or conservation can help offset some of the expected increases in energy demand due to higher temperatures, helping individual consumers and the grid overall.

Helping Businesses and Residents Save Energy

State and local leaders can increase energy efficiency by financing or incentivizing more energy efficient design standards and technologies, as well as by improving efficiency of government-owned facilities and equipment. Governor Wolf is doing all of that. Governor Wolf's executive order last January establishes a strategic energy management plan for public facilities that includes benchmarking and specific energy, water, and transportation emissions reductions targets and goals. The E.O. sets a goal to collectively reduce overall energy consumption by three percent per year, and 21 percent by 2025 from 2017 levels, along with other energy efficiency and conservation goal for state agencies.

Governor Wolf is also helping small businesses save money on energy. Commercial Property Assessed Clean Energy, or C-PACE, enabling legislation was signed into law in 2018. This

legislation allows municipalities to offer a financing mechanism that enables low-cost, long-term funding for energy efficiency upgrades to commercial and industrial properties, including renewable energy projects and installation of high efficiency heating, ventilation, and air-conditioning (HVAC) systems. C-PACE programs are already being created and passed in counties across the Commonwealth. These programs are expected to support the creation of new clean energy projects, enhance property values, and lower business costs by reducing the up-front costs of installing energy-efficient projects.

The Department also supports small businesses in saving energy through the Small Business Advantage Grant, which can provide 50 percent matching grants to enable Pennsylvania small businesses to purchase energy efficient or pollution prevention equipment or adopt waste reduction processes.

Governor Wolf also pushed for updated building codes, which help homeowners save energy, and signed Act 36 in 2017. This required the Review and Advisory Council (RAC) to re-review the 2015 building codes, eventually leading to the abandonment of the 2012 codes and the adoption of the 2015 codes across the Commonwealth, and of the 2018 codes in Philadelphia. Updated building codes reduce emissions across Pennsylvania and ensure homeowners and businesses can save energy and money.

Smart Land Use

Pennsylvania has several policies that aim to ensure the agricultural and forestry sectors are maximizing their contributions to addressing climate change, while simultaneously beginning to prepare for the impacts of climate change. For example, Growing Greener was signed into law on December 15, 1999, and led to \$547.7 million allocated to help slash the backlog of farmland-preservation projects statewide; protect open space; eliminate the maintenance backlog in state parks; clean up abandoned mines and restore watersheds; provide funds for recreational trails and local parks; help communities address land use; and provide new and upgraded water and sewer systems.

The Department of Agriculture offers grants and loans through PAgrows, which helps farmers in many ways including financing projects that will reduce emissions such as bio-fuels and no-till farming. Additionally, Clean and Green, a preferential tax assessment program that encourages protection of the Commonwealth's valuable farmland, forestland and open spaces, bases property taxes on use values rather than fair market values. Currently, more than 9.3 million acres are enrolled statewide.

DCNR's Bureau of Forestry works to ensure the long-term health, viability, and productivity of the Commonwealth's 2.2-million-acre state forest system, which comprises 13 percent of the forested area in the Commonwealth. These forests act as critical carbon sinks that absorb carbon from the atmosphere and significantly reduce Pennsylvania's emissions. DCNR also is leading the effort to plant trees along streams to assist with preventing the flooding that is occurring with wetter weather.

As I said, the impacts of climate change are real and will continue to put Pennsylvanians at risk from increased flooding, higher temperatures, and more. If not properly accounted for, these trends will threaten Pennsylvania in other ways: agriculture will have to adapt to greater

extremes in temperature and precipitation; forests will be subject to multiple stressors; suitable habitat for plant and wildlife species is expected to shift to higher latitudes and elevations; winter recreation will decline; and public health will deteriorate because climate change will worsen air quality relative to what it would otherwise be, causing increased respiratory and cardiac illness.

These impacts can be alleviated if all Pennsylvanians—including citizens and businesses, but especially leadership—understand their responsibility to combat and adapt to climate change and take action. The benefits of acting include economic growth, jobs, cleaner air, resilience and more. Pennsylvanians want to provide a prosperous commonwealth with clean air, water, and land for generations to come, now is the time to take action on climate change.

Thank you again for inviting DEP to testify before the committee on this important topic. I am available to respond to any questions you may have.