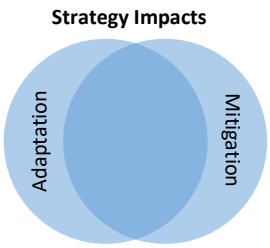
Compiled List of Strategies for Inclusion in the PA 2018 CAP

This document presents the compiled list of strategies for inclusion in the CAP, including both mitigation-focused and adaptation-focused strategies. Mitigation-focused strategies are primarily aimed at reducing greenhouse gas (GHG) in a cost-effective manner; adaptation-focused strategies are primarily aimed at increasing the Commonwealth's ability to prepare for, adapt to, and respond to the impacts of a changing climate. While mitigation-focused strategies can have adaptation benefits and adaptation-focused strategies can have mitigation benefits, those benefits are secondary to the strategy's primary aim. A strategy can also be both mitigation- and adaptation-focused if it has significant mitigation and adaptation impacts.

Throughout this write up, the term strategy is used to describe a high-level approach that encompasses multiple policies or other specific actions. For example, the strategy "Promote a diverse portfolio of clean, utility-scale electricity generation" includes the policy option of increasing the Alternative Energy Portfolio Standard (AEPS). Actions provided in this document are focused on what leaders (e.g., government) can do. As part of the CAP, actions for citizens and businesses will also be identified.

A key component of the 2018 CAP update is to include strategies that have both mitigation and adaptation benefits for the Commonwealth. Developing these integrated strategies is an iterative process that requires DEP and ICF to first consider strategies that have mitigation impacts and adaptation impacts individually, and then tie them together. Ultimately, most strategies in the CAP will provide these dual impacts or benefits (in addition to economic benefits), while a few strategies will have only mitigation or adaptation impacts (see Venn diagram). This document presents the full list of strategies, including mitigation-focused and adaptation-focused strategies presented in previous memos. This document contains the following:



1. **A Summary Table.** The table immediately below provides a summary of the included strategies and indicates where each strategy will be presented in the CAP, as well as which other sectors the strategies touch upon. The table also indicates which strategies have actions that are quantified and whether the strategies are mitigation-focused and/or adaptation-focused. A table like this one will be included in the CAP, in both the Introduction and Executive Summary.
2. **Additional Details on Each Strategy and Specific Actions/Policies.** Additional detail on included strategies is presented after the example write-ups, including a more detailed list of specific actions.

✱ strategy presented in this sector in the CAP ● strategy relates to this sector in the CAP

	Energy Consumption	Energy Production	Agriculture	Ecosystems	Outdoor Rec & Tourism	Waste	Water	Human Health	Quantified?	Mitigation Focus?	Adaptation Focus?
Increase end-use energy efficiency	✱		●		●	●	●	●	✓	✓	✓
Promote sustainable transportation planning and practices	✱			●	●	●		●	✓	✓	✓
Develop and promote clean energy financing options	✱	●	●		●	●	●	●		✓	
Promote clean, distributed electricity generation resources	●	✱	●			●	●	●	✓	✓	✓
Promote a diverse portfolio of clean, utility-scale electricity generation		✱					●	●	✓	✓	
Reduce upstream impacts of fossil fuel energy production		✱		●			●	●	✓	✓	
Promote the production and use of alternative fuels		✱	●			●		●	✓	✓	
Promote agricultural best practices			✱	●			●	●	✓	✓	✓
Provide resources and technical assistance to farmers to support adaptation			✱	●			●	●			✓
Promote protection and optimal use of ecosystems, including for outdoor recreation and tourism				✱	●		●	●		✓	✓
Monitor and identify ecosystem vulnerabilities				✱	●			●			✓
Help the outdoor tourism industry manage shifting climate patterns				●	✱		●	●			✓
Reduce and use waste sent to landfills		●				✱		●		✓	
Promote stormwater management best 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								✱			✓

	Energy Consumption	Energy Production	Agriculture	Ecosystems	Outdoor Rec & Tourism	Waste	Water	Human Health	Quantified?	Mitigation Focus?	Adaptation Focus?
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	●	●	●	●	●	●	●	●			✓
Conduct deeper dive analyses to inform further decision-making	●	●	●	●	●	●	●	●		✓	

Strategy	Actions that will be Quantitatively Modeled	Actions that will be Qualitatively Included

Increase end-use energy efficiency	• Update building codes.
	  ○ Allow (and/or incentivize) individual localities the ability to adopt stretch codes (i.e. Zero Code, IgCC, and more recent versions of the state-wide adopted version of the ICC and IECC).
	  ○ Incentivize high performance/net zero buildings
	• Promote energy efficiency, including by expanding Act 129 to include more eligible measures, increase targets, and increase or eliminate cost caps.
	  ○ Promote EE for affordable housing.
	  ○ Reduce energy use at W/WWTPs.
	  ○ Implement energy use disclosure for commercial and/or residential buildings, annually or at time of sale.
	  ○ Expand use of electric technologies for heating, hot water and other major buildings end uses, when beneficial.
	  ○ Consider administrative changes to reduce costs (specific to Act 129).
	• Create a similar program to Act 129 for natural gas.
	• Expand energy assessments and provide more trainings for the commercial and industrial sectors.
		• Adhere to energy efficiency standards (e.g., Passive House and EnergyStar), including high-efficiency or net-zero requirements for new state buildings.
		• Expand home weatherization programs beyond low-income households (i.e. for mid- to moderate income).
		• Educate on and analyze the benefits of occupant performance and low energy usage improvements in building system technologies.
		• Support market trends for the increased use of LED lighting, including municipal street lighting, and other energy efficient technologies.
		• Encourage replacing high carbon and GHG producing fuels with less environmentally impactful options, such as switching from oil home heating fuel to natural gas or geo-exchange.
		• Encourage use of geo-exchange energy (ground source heat pumps).

Promote sustainable transportation planning and practices	• Reduce vehicle miles traveled for single-occupancy vehicles.
	  ○ Promote better commuter practices (e.g., ride sharing, bicycling).
	  ○ Expand opportunities for, and incentivize, public transit options.
	• Provide a strategic plan and incentives for increasing EV use for light duty vehicles in line with Drive Electric (Roadmap).
	• Promote clean public transportation, including supporting the electrification of municipal bus fleets.
	• Target light and medium-duty commercial fleets for alternative fuels use
		• Continue and expand PennDOT's efforts to assess climate risks to transportation infrastructure and incorporate expected future conditions into routine operations, maintenance, and inspection practices, project design, and capital planning. This includes developing procedures to consider climate risks in the return on investment for maintenance and capital investments.
		• Improve coordination between agencies and other stakeholders (e.g., PennDOT, DEP, Pennsylvania Emergency Management Agency, District and County emergency manager, municipalities, and energy utilities) to improve preparedness for increased extreme events.
		• Improve real-time monitoring of flooding, traffic, and other conditions to improve situational awareness and enhance response during extreme events.
		• Coordinate land use and transportation infrastructure decisions, and incorporate climate change projections into these decisions.
		• Consider possibilities for green infrastructure to be used in conjunction with transportation infrastructure to reduce flooding.
		• Prioritize and provide guidance to local governments on transportation and land use planning that promotes efficient use of public resources, reduces congestion, and minimizes

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		greenhouse gas emissions through compact, transit-oriented development that uses smart growth practices and complete streets. • Educate citizens and business on the benefits of transportation demand-side management (DSM) measures and clean and efficient transport options. • Support and implement multi-modal transportation networks where people can walk, bike, and use public transportation easily to reduce vehicle miles traveled for single-occupancy vehicles. • Promote clean public transportation, including by supporting additional infrastructure for municipal mass transit opportunities. • Provide a strategic plan and incentives for increasing electric vehicle use for light, medium, and heavy-duty vehicles. Tactics might include: encouraging workplace charging; incentivizing the purchase of alternative, low, and zero emissions vehicles through financial mechanisms or programs; and expanding electrification for off-road applications, including vehicles, construction, and materials handling equipment. • Reduce non-CO2 emissions from truck and stationary refrigeration (e.g., pulling on federal programs like Green Chill). • Work with vulnerable ports and airports to assess and reduce their risks.
Develop and promote clean energy financing options	*None.*	• Evaluate options for and engage in public-private partnerships (P3). • Encourage utilities to provide on-bill financing or repayment. • Expand use of performance contracting. • Create state and local clean energy tax incentives. • Establish a residential energy conservation and energy efficiency low interest loan program similar to Keystone HELP. • Fund a green bank through new revenue streams (similar to energy efficiency charges on utility bills in Vermont). • Encourage broad implementation of recent commercial PACE legislation. • Explore residential PACE once consumer protections are addressed.
Promote clean, distributed electricity generation resources	• Incentivize and encourage combined heat and power (CHP) for large campuses, hospitals, infrastructure, mass transit, and industry (e.g., streamlining and best practices sharing). • Invest in and promote building-scale solar energy. • Support community solar legislation and develop model ordinances (e.g., to streamline community solar development).	• Expand the ability of customers to use net metering. • Remove the barriers to the deployment of community solar systems in Pennsylvania • Ensure alternative ratemaking is addressed in a manner that does not create a disincentive for solar deployment • Enable and encourage municipalities to offer PACE programs that include solar projects. • Accelerate use of smart inverters to manage over-voltage concerns on low voltage distribution lines and avoid unnecessarily adding costs on small solar distributed generation projects.
Promote a diverse portfolio of clean, utility-	• Increase AEPS Tier 1 targets, and further increase in-state generation and use of renewables (wind and utility-scale solar), if possible through actions in line with Solar Future through 2030, such as:	• Establish a workgroup to help optimize siting of renewables, and to review and streamline permitting and regulations at the state and local levels. Focus on high value, implementable actions such as community choice aggregation and battery storage. • Establish a state-wide carbon emissions cost (~$53/ton federal).

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scale electricity generation	○ Support community solar legislation. ○ Implement strategies identified in Solar Future. ○ Include a nuclear tier of the AEPS (in an additive way so that increased renewables accompany any credits for nuclear). • Promote utility-scale CHP. • Limit carbon emissions through a power sector cap and trade program.	• Provide indexed carbon cost fees or incentives for electricity generation into the Pennsylvania grid.
Reduce upstream impacts of fossil fuel energy production	• Promote policies and practices to reduce methane emissions across natural gas systems (e.g., from well heads, abandoned wells, leakage in distribution system).	*None.*
Promote the production and use of alternative fuels	• Encourage recovery and use of gas from coal mines, agriculture, and landfills for energy.	• Finalize the draft air general permit. • Increase biofuel production in Pennsylvania (e.g., expand on biodiesel requirements).
Promote agricultural best practices	• Implement and provide training for no-till farming practices, especially those that sequester carbon in soils and plants.	• Encourage the use of digesters for methane capture and recovery. • Encourage farm energy efficiency practices and the use of renewable energy. • Encourage integrated farm management. • Implement pesticide, herbicide, fertilizer, and nitrogen reduction programs • Implement runoff reduction strategies. • Use switchgrass planting programs and other stormwater best management practices for soil and bank stabilization, runoff reduction and filtration, and biofuel production. • Expand regional planning initiatives, especially in agricultural areas, focusing on agricultural security zones and local food security. • Include opportunities to restore forested riparian buffers for healthy water systems, create and maintain connections to allow both ecological and recreation corridors, and reserve lands for agriculture in land use plans. • Research the benefits of periodic fallowing for active floodplain acres to maximize floodplain storage, nutrient processing, and sediment capture (or to prevent major scour damage). • Review existing conservation and agricultural measures to see how they could further support resilience to climate change, and modify where necessary. • Restore networks of riparian buffers. • Purchase wetland easements on marginal and flood-prone agricultural lands to diversify grower income, buffer productive lands from flood events, and improve the environmental services provided by these lands. • Promote agriculture that is compatible with periodic flooding.

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		• Ensure that manure is land-applied only at agronomic rates.
		• Provide financial incentives and support for agricultural best practices.
		  ○ Develop incentives (e.g., sales or property tax exemptions, rebates) for the use of advanced irrigation systems such as GIS, GPS, and satellite crop and soil moisture sensing systems.
		  ○ Incentivize conservation best management practices (e.g., conservation planning) with reduced agricultural insurance (crop/index-based) rates.
		  ○ Require agricultural insurance (crop/index-based) to factor climate risk reduction benefits of best management practices in rates.
		  ○ Determine and establish economic and cooperative structures that can transfer risk away from the bank and farmer, such as Community Supported Agriculture (CSA), where risk is shared between the community and the farmer.
		  ○ Implement pricing systems that reward conservation (e.g., seasonal pricing).
		• Incentivize local community and neighborhood urban farming practices

Provide resources and technical assistance to farmers to support adaptation	*None.*	• Establish a network of agro-meteorological stations statewide to collect climate observations, including estimates of evapotranspiration, to support research and development of agricultural practices. • Expand the collection and dissemination of local weather information for irrigation planning. • Improve the accuracy of existing real-time weather warning and forecasting systems for drought and extreme events. • Develop and disseminate seasonal climate forecasts. • Conduct or sponsor research to understand topics such as how climate change will affect the intensity and distribution of weeds, insects and diseases; best practices for agricultural emergency response plans for severe drought and other extreme events; conservation best practices (e.g., cover cropping, conservation tillage, soil fertility) to enhance soil's water-holding capacity; and methods for maintaining the genetic diversity of crops • Facilitate information sharing networks for farmers and the agricultural research community to share experiences and best practices.
Promote protection and optimal use of ecosystems, including for outdoor recreation and tourism	*None.*	Protect wildlife from ecosystem degradation. • Conserve areas representing the full range of habitats and build and conserve corridors and transitional habitats between ecosystem types using land exchanges, conservation easements, leases and other approaches. This will allow species to migrate to suitable habitats, and will increase potential area to transplant stressed species. • Restore wetlands and riparian areas for natural flood abatement and to provide breeding habitat for waterfowl, fish, and amphibian species. • Conserve critical feeding and breeding habitats, and reduce outside pressures from illegal hunting, pollution, and development. • Expand or revise current minimum riparian buffer zones to better protect thermal conditions in streams—especially in headwater and small streams. • Implement pervious paving, structural, and non-structural best management practices.

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		• Preserve wetlands. • Promote planting of native, drought-tolerant, and extreme environment-tolerant plants. Protect fish habitat that provides support for wildlife and recreational opportunities for citizens. • Protect strongholds of fish habitat by increasing available habitat and reestablishing stream connectivity to allow fish to move to suitable habitat. • Build more wetlands along streams and rivers to protect fish from warmer water temperatures, drought, stormwater, saltwater intrusion, etc. that put stress on fish populations. • Conserve and enhance fish and wildlife habitat (e.g., remove small dams and restore riparian buffers to conserve and enhance connectivity, temperature, and quality). • Implement living shoreline programs that allow for the natural retreat of coastal ecosystems and natural processes to replenish beaches. These programs include the removal (or the discouragement of rebuilding) coastal armoring features, and planting native coastal vegetation above the high tide line. • Remove barriers (e.g., dams, culverts) to improve connectivity, facilitate fish migration, and improve habitats (flow), particularly those that are no longer needed or are a barrier to fish passage. • Monitor and encourage reduction of thermal, waste, and other discharges that, either individually or cumulatively, have significant deleterious impacts on aquatic life. • Inform sport fishermen and other stakeholders about the importance of climate change impacts on freshwater aquatic systems. • Increase use and adoption of stormwater best management practices (reference DEP publication). Conserve forests and allow them to adapt. Forests provide important ecosystem services and habitat for key species throughout the state. • Promote forest growth and conservation, as well as urban trees, which sequester carbon from the atmosphere, improve air quality, and provide shade for cooling. • Establish a carbon banking and trading system that pays landowners to plant and manage working forests on both private and public land. • Promote alternatives to mowing, including meadows, native plants, and trees to reduce water needs and pest problems. • Capitalize on opportunities to use urban forestry, including to reduce heating and cooling loads. • Increase carbon sequestration through afforestation and forestry management practices. • Leverage forest protection easements. Preserve and create open spaces, parks, and trails that allow people to continue to engage in outdoor activities and maintain connectivity to natural resources.

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		• Retrofit existing parks and create new parks to strengthen the community, improve habitat connectivity, and offer an environmentally sound remedy to stormwater and flooding problems in surrounding neighborhoods and along urban river corridors. • Prioritize maintenance of parks and trails along rivers to ensure continued access to recreation facilities and natural areas. • Manage trails by creating more usable corridors and crossings for wildlife; providing more water sources for human users stressed by higher temperatures; and connecting paths to schools, workplaces, and retail centers to promote pedestrian use and provide benefits to wildlife and people.
Monitor and identify ecosystem vulnerabilities	*None.*	• Develop a central database to store relevant data. • Establish baseline conditions for vulnerable and ecologically valuable species and habitats, using existing data or new data. • Establish a statewide monitoring and research network of academics, civil society, and citizen scientists to monitor ecosystem factors, such as physical changes, species distribution, weather conditions, and general ecological conditions. • Identify and prioritize habitat and ecosystems most vulnerable to climate change and other stressors. • Monitor wildlife populations, including disease outbreaks, competition from invasive species, and other issues that might arise. • Identify critical habitat needs and life cycles for fish and mussel species (and other aquatic invertebrates) to better target protection and management actions; include examination of thermal tolerance ranges and thermal impacts for sensitive aquatic species. • Review existing legal, regulatory and policy frameworks that govern protection and restoration of fisheries habitats, and identify opportunities to improve their ability to address climate change impacts.
Help the outdoor tourism industry manage shifting climate patterns	*None.*	• Establish a formal climate change working group building on existing partnerships, comprised of the Pennsylvania Game Commission, Department of Conservation and Natural Resources, Department of Community and Economic Development, Fish and Boat Commission, federal agencies, academic institutions, the business community, and environmental NGOs. • Explore developing new collaboratives with surrounding states. • Create a business ombudsman or technical assistance center for affected recreational industries and establish a source of grant funding or tax incentives to help industry and municipalities transition from winter to summer activities. • Educate facilities about diversification opportunities for more warm-weather or cold-weather activities (e.g., ski slopes can maintain mountain bike trails for warm weather) with consideration of environmental impacts. • Encourage ski resorts to consider natural snowfall, temperature conditions, and expected visits to determine the timing of ski area openings.

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		• Improve climate forecasting to enhance risk assessment and strategic business assessment for season openings and weather insurance.
Reduce and expand beneficial use of waste sent to landfills	*None.*	• Implement programs to encourage citizens and business to reduce waste (including food waste) and use recycling and composting programs. • Encourage the use of digesters for methane capture and recovery. • Support solar projects on landfill land. • Promote pollution prevention through reduce, reuse, and recycle actions (e.g., buy bulk, minimize packaging, industrial waste).
Promote stormwater management best practices	*None.*	• Provide incentives for the installation and use of gray water and rainwater harvesting. • Revise stormwater regulations to accommodate increases in precipitation and run-off (e.g., update and install stormwater best management practices, restrict use of impervious surfaces in key watershed areas, restore floodplain wetlands and forest areas to reduce runoff amounts and rates, and develop or apply management practices to increase groundwater recharge for stormwater control and wastewater systems). • Institute laws, regulations, and local ordinances requiring implementation of green infrastructure with new development or substantial redevelopment, building on retention standards. • Revise State Revolving Fund (SRF) (PennVest) state ranking criteria to require a thorough analysis and maximization of the use of green infrastructure, where appropriate. • Develop and enforce a stormwater retention standard for new development and redevelopment. • Implement a fee for impervious surfaces to reduce stormwater runoff and improve groundwater recharge. • Implement forest management practices that improve water-holding capacity in watersheds. • Consider guidelines, such as the International Green Construction Code (IGCC) or IAPMO Green Code Supplement (GCS) for increased reclaimed, recycled, and gray water use for non-potable applications (e.g., irrigation, toilet flushing). • Promote and require preservation of natural features that treat and infiltrate runoff, such as riparian zones, estuaries, wetlands, floodplains, and related landscapes. • Require installation of permeable surfaces (e.g., permeable pavement), buffers, and vegetated filters for all transportation-related projects, such as sidewalks or parking lots.
Promote integrated water resources management and water conservation	*None.*	• Support additional research on climate change impacts on water supply. • Conduct a statewide assessment of long-term changes to basin hydrology by using hydrologic models to project changes in surface runoff and groundwater due to climate change, and incorporate modeling results into water supply planning. • Assess the impact of climate change on critical water supply and wastewater infrastructure, and encourage the development of facility-specific adaptation plans.

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		• Include climate change projections in water supply and water quality planning to enhance reliability, improve quality, and improve instream flows and fish passage.
Improve reliability and accessibility of public information about climate-related health risks	*None.*	• Support efforts to increase data quality and availability and to develop new surveillance databases, especially for climate-sensitive morbidity. • Update Community Health Assessments to include climate change and health tracking metrics, using the following indicators: heat stress emergency department visits, heat stress hospitalizations, heat vulnerability maps, and heat-related mortality. • Increase interdisciplinary collaboration among medical and health professionals and other environmental and social scientists to better understand the linkage between climate change and disease. • Help local health departments assess their capacity to respond to health threats and to integrate climate preparedness into their hazard response plans and daily operations. • Develop a web-based resource hub to provide information and technical resources on public health and climate change preparedness. • Incorporate climate change and public health messages into existing education and outreach efforts, targeting vulnerable populations, clinicians, and health professionals. • Increase real-time reporting to educate the public regarding vector-borne disease, harmful algal blooms, and waterborne diseases. • Enhance education of health-care professionals to understand the health risks of climate change, including diagnosis and treatment for health outcomes that may become more prevalent. • Expand public outreach and education efforts concerning the negative impacts of stormwater on flooding, water quality, and public health risks following floods; the hazards of building in flood-prone areas; and the importance of sanitary sewer inflow and combined sewer overflow prevention. • Use community-based groups and business/trade organizations to conduct outreach and education about risks and prevention and to connect individuals and families to appropriate services. • Work locally with vulnerable groups, including senior citizens, people with impaired mobility, and people with limited English language proficiency, by engaging existing community networks to increase their response capacity and preparedness. • Assist at-risk communities with the development, adoption, practice, and evaluation of response, evacuation, and recovery plans. • Regularly map locations of vulnerable populations and use the information to help emergency managers focus interventions during extreme weather and power outages and to target the location of community outreach to at-risk neighborhoods. • Invest in HVAC systems at targeted Recreation Centers that provide public access to cooling during high heat events.

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		• Review occupational health and safety standards to identify occupations at significant risk due to climate change, and revise as necessary.
Bolster emergency preparedness and response	*None.*	• Review existing emergency response, preparedness, and management plans to ensure that events that will become more likely with climate change (e.g., floods, wildfires, extreme heat) are adequately addressed and to address the most updated estimates of likely levels of precipitation, flooding, and extreme storm events. • Expand the scope of the state hazard mitigation plan to factor in expected vulnerabilities from climate change impacts. • Assess the effectiveness of existing community evacuation plans in at-risk areas (with input from affected community groups and individuals), including plans for nursing home facilities and public housing, to identify what elements require improvements. • Revise the Pennsylvania strategic climate change plan to include a section that addresses the public health response. • Require that emergency preparedness plans include coordination and communication among critical stakeholders, such as community organizations, local businesses, local health departments, hospitals, and other health-care delivery facilities, utilities, and local government. • Foster collaboration between communication service providers and agencies (e.g., the Pennsylvania Emergency Management Agency, PennDOT, Nuclear Regulatory Commission, Pennsylvania State Police, and Pennsylvania Department of Health) on a statewide effort to provide reliable communications especially in times of power outages and emergencies such as a natural disaster or evacuation events. • Evaluate the capacity of existing disease prevention programs, enhance surveillance of disease and disease-causing agents, and enhance the capacity of public health programs that control disease-causing agents. • Evaluate the adequacy and effectiveness of current early-warning systems for extreme events. • Establish heat advisories, increase availability of cooling stations, and implement other preventive measures to reduce the impact of extreme heat events. • Improve the accuracy and technological capabilities of flood forecasting, early-warning, and emergency-preparedness systems. • Restructure disaster-recovery policies to ensure that redevelopment efforts strive to reduce long-term risk.
Lead by example in Commonwealth and local government	*None.*	• Establish a state government strategic energy management plan. • Establish a state-wide Governor's Sustainability Council. • Continue to use the latest building codes and standards as basis of design for new construction and major renovation projects.

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practices and assets		• Consider use of energy-efficiency (EnergySTAR certification) and/or voluntary sustainability programs (LEED Gold) as higher-performance basis of design for new construction and major renovation projects.
		• Push for Net Zero Buildings, Zero Energy Codes, and Passive House standards as both a lead by example strategy and a goal for all commonwealth (commercial and residential) buildings.
		• Inventory state buildings and energy use patterns to identify savings opportunities.
		• Conduct more training, education, and outreach for facility managers and the workforce.
		• Set specific energy, water, and transportation emissions reductions targets and goals.
		• Create an interagency workgroup dedicated to the implementation of mitigation and adaptation leadership actions listed in the CAP. The group would help prioritize implementation of policy options and strategies, as well as monitor, track, and report GHG emissions, energy trends, and climate impacts.
		• Prepare a comprehensive energy plan for Pennsylvania.
		• Incorporate climate change mitigation, adaptation, and resilience into decision making processes and criteria.
		• Incorporate energy efficiency and using alternative fuels requirements for transport.
		• Continue to recognize businesses and municipalities that are also leading by example in the state through the Governor's Awards for Environmental Excellence.
		• Advocate for federal actions that benefit the Commonwealth and our environment.
		• Learn from other examples through the evaluation of best practices from city of Philadelphia and city of Pittsburgh sustainability programs, including:
		  ○ Commercial building (and perhaps residential point of sale) benchmarking and transparency programs.
		  ○ Stretch codes (in Pennsylvania, due to recent legislation, this is only allowed in class 1 cities like Philadelphia).
		• Learn from other examples of best practices from other leading sustainable government efforts (e.g., Portland, Boston, Seattle, DC, NYC, Austin, Denver).
		• Implement LBE strategies in state parks and similar facilities (e.g., replace jeeps and pickups with bicycles and neighborhood electric vehicles (NEVs), replace gas-powered maintenance equipment (mowers, blowers, chainsaws) with electric or non-motorized (reel-type mowers, rakes, bow saws) equipment).
		• Conduct a statewide comprehensive climate change risk assessment that builds off the current climate impacts assessment but allows for prioritization across sectors, geographies, and strategies.
		• Implement strategies identified in department-level adaptation plans.
		• Adopt climate resilience design guidelines for all new public infrastructure.
		• Implement a process to monitor climate change impacts over time and identify triggers for adaptive action.

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Strategy	Actions that will be Quantitatively Modeled	Actions that will be Qualitatively Included
		• Add climate change resilience as a prioritization factor for new capital projects. • Deploy distributed generation resources and backup power generators at public facilities. • Increase energy efficiency in public facilities to reduce demands on the energy grid. • Reduce water use in public buildings. • Ensure that newly planted public vegetation can handle increased temperatures and heavy rainfall events; review maintenance schedules to adjust watering, mowing, and other practices. • Decrease the backlog of tree maintenance and removal projects to reduce unpruned and dead trees falling on power lines during storm events. • Ensure that key government operations have energy backups to protect important security features in the case of more frequent or prolonged blackouts. For example, the Pennsylvania Army National Guard is building a solar farm on its largest military base to have its own backup power. • Highlight adaptation work already occurring in Pennsylvania.
Incorporate historical and projected climate conditions into siting and design decisions for long-term infrastructure	*None.*	• Develop or update floodplain mapping using the best available science (including LIDAR surveys, climate models, stream migration, etc.) to identify flood-prone areas and especially at-risk facilities, accounting for the impacts of climate change. • Establish statewide design guidelines for incorporating climate change such as the New York City design guidelines (NYC Mayor's Office of Recovery and Resiliency 2018). • Seek to ensure that state investments in infrastructure and development projects (direct or indirect via grants, loans, tax incentives, or other funding mechanisms) reflect potential climate change impacts, especially future risk projections. • Integrate climate change considerations into agency-level capital planning processes. For example, require project sponsors to self-identify vulnerabilities to climate change and incorporate climate change impacts into the return on investment calculations. • Implement new or modified policies (e.g., zoning regulations, tax incentives, and rolling easements) that encourage appropriate land use and reduce repetitive losses. • Consider new mortgage products similar to Property Assessed Clean Energy (PACE) loans to incorporate the costs of adaptation into private property transactions. PACE allows a local government to provide loans to homeowners for renewable energy and efficiency retrofits, with the loans paid back via tax bills. • Adopt insurance mechanisms and other financial instruments, such as catastrophe bonds, to protect against financial losses associated with infrastructure losses. • Establish a committee to investigate data adequacy on climate risks for insurers, adaptive options to mitigate insured losses, and whether insurance rates structures can provide incentives for early adoption. • Incorporate new climate change weather data in PJM's load forecast to better model energy demand and ensure appropriate electric transmission planning.

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Strategy	Actions that will be Quantitatively Modeled	Actions that will be Qualitatively Included
		• Encourage owners and operators of critical energy infrastructure to evaluate vulnerability to the impacts of climate change, including the risk of damage and the potential for disruptions and outages from flooding, sea level rise, extreme heat, drought, erosion and other extreme weather events.
Conduct deeper dive analyses to inform further decision-making	*None.*	• Consider impacts of carbon and other greenhouse gases as tradable commodities, beyond the RGGI framework. • Evaluate impact of lost nuclear capacity. • Study the potential impacts of the use of carbon capture, utilization, and sequestration on the Commonwealth.

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