

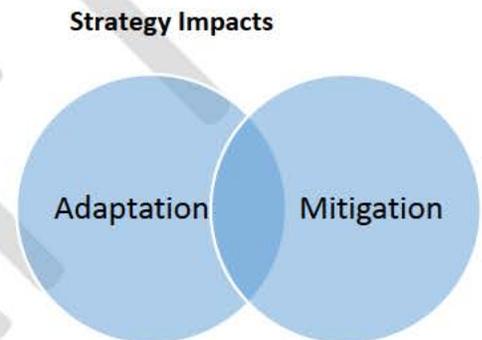
Draft List of Mitigation-Focused Strategies for CCAC Consideration and Feedback

This document presents an initial list of mitigation-focused strategies for consideration. It is organized as follows:

1. Process for selecting mitigation-focused strategies for consideration
2. Initial list of mitigation-focused strategies to consider for assessment

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 power generation” includes the policy option of increasing the Alternative Energy Portfolio Standard (AEPS).

A key component of the 2018 CAP update is to include strategies that have both mitigation and adaptation impacts 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 memo is written with a primary focus on strategies with mitigation impact, but it also includes the first iteration of tying in the adaptation impacts to these strategies.



This document should be reviewed prior to the April 24, 2018 CCAC meeting. At this meeting, ICF and DEP will be facilitating a discussion to get CCAC feedback and suggestions for mitigation-focused strategies to include in the CAP. Written feedback on this document should be provided to John Kruger (jkrueger@pa.gov) of DEP no later than April 27, 2018.

1. Process for selecting mitigation-focused strategies for consideration

1. Compile Initial List (*Complete – contained in this document*)

- a. Develop framework for compiling mitigation-focused strategies in line with CAP outline (see Table 1)
- b. Compile list of strategies to consider from:
 - i. Previous PA Climate Action Plans
 - ii. Suggestions from DEP
 - iii. Strategies with adaptation benefits (Task 7) draft list (submitted in 2017)
 - iv. Suggestions from the Climate Change Advisory Committee (CCAC)
 - v. List of what other jurisdictions are doing (based on Plan reviews conducted in 2017)
 - vi. Objective reviews of the Pennsylvania GHG Inventory and Energy Assessment (Tasks 1 and 2)
- c. Map strategies into the framework (see Table 1)
- d. Map mitigation strategies that intersect with adaptation strategies

2. Receive Feedback and Finalize List

- a. ICF and DEP to develop initial list of mitigation-focused strategies for consideration – April 2018
- b. Share draft mitigation-focused strategy list with CCAC – One week Prior to April CCAC meeting
- c. Present mitigation-focused strategy list and have discussion with CCAC at meeting – April 24, 2018
- d. Receive additional CCAC feedback on mitigation-focused strategy list – April 27, 2018
- e. Finalize adaptation-focused strategies list – April 2018
- f. Finalize strategy list, addressing both mitigation and adaptation – May 2018
- g. Share final strategy list with CCAC – May 2018

2. Initial list of mitigation-focused strategies to consider for assessment

Table 1 below presents an initial list of mitigation-focused strategies for consideration for assessment as part of the 2018 update to the Pennsylvania CAP. When reviewing this section ICF recommends also having the CAP outline open for reference.

Table Organization

- Table 1 is organized according to the CAP outline. Each row contains a proposed strategy. The table first identifies a sector and sub-sector(s), then presents the overarching strategy.
- Strategies are broader themes that are comprised of various elements (e.g., different policies and actions). ICF will quantitatively analyze (estimate numerical impacts) and/or qualitatively analyze (discuss application in PA) each strategy ultimately included in the CAP. This gives DEP the flexibility in what to include in the CAP.
- The Analysis Team will focus on providing quantitative modeling results at the broader strategy and sector levels for the Commonwealth.
- The table identifies example adaptation impacts for each strategy as available. ICF plans to integrate the mitigation and adaptation discussions within the CAP, and as noted above this will be an iterative process – the information presented in Table 1 is an early step in this process.

General Criteria for Selecting Strategies for Consideration

Recommended mitigation-focused strategies in Table 1 generally meet one or more of the following criteria:

- Addresses substantially large energy use or production and/or GHG emissions in Pennsylvania
- Overlaps with one or more adaptation strategies previously identified
- Covers existing programs and actions Pennsylvania is currently invested in
- Was highlighted as important by either/both DEP and the CCAC prior to the April 2018 CCAC meeting

When compiling the list in Table 1, ICF and DEP considered a large range of strategies in order to give a “menu” of options to consider. All of these strategies could be relevant for Pennsylvania, but ICF will require DEP and CCAC feedback to refine the list of what should be included in the CAP, and to determine the final list of strategies to be quantified. In coming up with this final list we (ICF, DEP, and the CCAC) all need to be conscious that there will be tradeoffs to ensure alignment with remaining resources and priorities and focusing on options that have a higher likelihood of implementation. ICF will also be reviewing the list in Table 1 to ensure it is streamlined for the CAP write up. For example, some potential policy options may be integrated or fall within others (e.g., Reduce VMT may include actions driving towards smarter commuting practices).

Specific Questions for CCAC

- Are there strategies and policy options that you would suggest adding or removing from Table 1 below, indicating that they should or should not be included in the CAP?
- Which strategies and policy options would you prioritize as most important for modeling and focus in the CAP?

Table 1. Strategies for Consideration for Assessment in the CAP

Sectors	Sub-sector	Strategy	Potential Policy Options and Actions to Include in Higher-Level Strategy Quantitative Modeling	Potential Policy Options and Actions for Qualitative Discussion	Example of Related Adaptation Impacts
Energy Production	Electricity generation	Promote a diverse portfolio of clean, utility-scale power generation	<ul style="list-style-type: none"> • Increase in-state generation and use of renewables (wind and solar) in line with the actions:^a <ul style="list-style-type: none"> ○ Support community solar legislation ○ SolarFuture ○ Provide tax benefits for wind and solar (e.g., exemption from property tax or relief or offsetting of federal solar import tax) ○ Invest in renewable technologies • Increase AEPS Tier 1 targets • Promote Utility-scale CHP • Limit carbon emissions through one of the following potential approaches, for example: <ul style="list-style-type: none"> ○ Develop an emissions standard for power generation, similar to the Clean Power Plan ○ Establish Cost of Carbon-based Feed-In Tariff ○ Establish a power sector Cap & Trade program ○ Establish a carbon tax • Reduce SF6 emissions from electric transmission and distribution 	<ul style="list-style-type: none"> • Invest in battery storage • Establish a work group to help optimize siting of renewables, and also review and streamline permitting and regulations at the state and local levels • Educate on and encourage community choice aggregation • Work with utilities • Establish state-wide carbon emissions cost (~\$53/ton federal) • Provide indexed carbon cost fees or incentives for electricity generation into PA grid <ul style="list-style-type: none"> ○ Consider feed-in tariff for renewables 	<ul style="list-style-type: none"> • Renewables can reduce air pollution effects caused by increased fossil fuel generation • A diverse energy supply that includes sources like wind and solar (which do not require water resources to operate) increases energy supply resilience to drought, blackouts, etc. • Working with utilities improves the reliability of energy transmission and distribution and can help identify and address regulatory barriers to climate preparedness and adaptation
Energy Production	Electricity generation	Promote clean, distributed generation resources	<ul style="list-style-type: none"> • Incentivize and encourage CHP for large campuses, hospitals, and industry 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • Promote distributed generation to reduce reliance on the transmission grid and

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			<ul style="list-style-type: none"> Invest in and promote building-scale solar Support community solar legislation Use microgrids in combination with DG where feasible 		<p>also lower peak demand (especially on hot days)</p> <ul style="list-style-type: none"> Increase resilience to power outages from extreme weather
Energy Production	Fossil fuels	Reduce upstream impacts of energy production	<ul style="list-style-type: none"> Promote policies and practices to reduce methane emissions across natural gas systems (well heads, abandoned wells, leakage in distribution system) 		<ul style="list-style-type: none"> n/a
Energy Production	Alternative Fuels	Promote the production and use of alternative fuels	<ul style="list-style-type: none"> Encourage recovery and use of methane from coal mines, agriculture, and landfills Increase biofuel production in Pennsylvania (e.g., expand on biodiesel requirements) 	<ul style="list-style-type: none"> Provide or purchase RECs for biomass and other gases Increase use of durable wood products for alternative energy 	<ul style="list-style-type: none"> A diversified fuel supply increases resilience to potential supply chain or other disruptions (e.g., to gasoline delivery)
Energy Consumption	Residential, commercial (including government buildings), industrial	Increase end use energy efficiency	<ul style="list-style-type: none"> Update building codes <ul style="list-style-type: none"> Allow (and/or incentivize) individual localities the ability to adopt stretch codes (i.e. more recent than state-wide adopted or the IGCC) Expand Act 129 to include more eligible measures, increase targets, increase or eliminate cost caps Promote EE for affordable housing Incentivize high performance/net zero buildings Create similar program to Act 129 for natural gas Expand energy assessments and provide more trainings for industrial and commercial sectors <ul style="list-style-type: none"> Reduce energy use at W/WWTPs 	<ul style="list-style-type: none"> Educate on and analyze the benefits of occupant performance and low energy usage pay for the healthy improvements in building system technologies Replace individual EDC-run Act 129 programs with a comprehensive, state-wide administered program (would reduce marketing, education, program operation and administrative costs by up to 50% or more) Continue supporting market trends for the use of LED lighting Consider adhering to standards (e.g., Passive House and EnergyStar) 	<ul style="list-style-type: none"> Energy efficiency—especially related to building cooling—can help counteract increased energy demand resulting from higher summer temperatures. Examples include Cool/Green Roofs, passive design, window glazing, and others. Certain designs can make buildings more resilient to energy-supply interruptions and droughts (e.g., passive heating and cooling, daylighting, gray water reuse, water recycling, distributed generation)

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			<ul style="list-style-type: none"> • Implement energy use disclosure for commercial and/or residential buildings, annually or at time of sale • Expand home weatherization programs beyond low-income (i.e. for mid- to moderate income) 		<ul style="list-style-type: none"> • Lowers likelihood of power outages due to overload on high heating and cooling degree days • Extends and improves resiliency
Energy Consumption	Transportation	Encourage smart transportation planning and practices with energy benefits	<ul style="list-style-type: none"> • Increase fuel efficiency for light, medium, and heavy duty vehicles • Reduce VMT <ul style="list-style-type: none"> ○ Promote better commuter practices (e.g., ride sharing, bicycling), such as expand opportunities for, and incentivize, public transit options / penalize or “tax” SOV commuters and/or remove incentives (paid parking) • Incentivize purchasing of alternative, low, and zero emissions vehicles through financial mechanisms or programs • Promote alt fuel public transportation 	<ul style="list-style-type: none"> • Educate citizens and business on the benefits of transportation DSM measures and clean and efficient transport options • Provide guidance to local governments on land use planning strategies to promote efficient use of public resources and reduce GHG emissions through compact, transit-oriented development that uses smart growth practices and complete streets • Reduce Non-CO2 emissions from truck and stationary refrigeration (e.g., pulling on federal programs like Green Chill) 	<ul style="list-style-type: none"> • Availability of alternative transportation options can reduce reliability on individual transportation assets • Reduced dependence on gasoline-based transportation can reduce vulnerability to increases in fuel prices • Biofuels can expand the supply of fuel available during petroleum shortage
Energy Consumption	Cross-cutting	Expand electrification	<ul style="list-style-type: none"> • Provide a strategic plan and incentives for increasing EV use for light, medium, and heavy duty vehicles^b • Expand use of electric technologies for heating, hot water and other major buildings end uses 	<ul style="list-style-type: none"> • Expand electrification for off-road applications, including vehicles, construction (see city of Portland study on inner-city pollution impacts due to construction activities), and materials handling equipment • Electrify maintenance equipment (mowers, blowers, chainsaws, etc.) 	<ul style="list-style-type: none"> • Availability of alternative transportation options can reduce reliability on individual transportation assets • Becoming overly reliant on one energy resource (power) may present risks if there

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Energy Consumption	Cross-cutting	Develop/promote clean energy financing options	<ul style="list-style-type: none"> • Commercial PACE legislation and broad local implementation • Residential PACE legislation and broad local implementation 	<ul style="list-style-type: 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 EC / EE low interest loan program similar to Keystone HELP • Fund a green bank through new revenue streams (e.g., EE charges on utility bills similar to Vermont) 	<p>were larger ore extensive outages</p> <ul style="list-style-type: none"> • Some clean energy financing options can also be used to finance resilience improvements, such as PACE programs being used to finance hurricane protection activities in Florida
Agriculture		Encourage best agricultural practices	<ul style="list-style-type: none"> • Implement and provide training for no-till and other sustainable farming practices, especially those that sequester carbon in soils and plants 	<ul style="list-style-type: none"> • Encourage the use of digesters for methane capture and recovery • Implement farm energy efficiency practices and encourage the use of renewable energy • Use of integrated farm management • Implement pesticide, herbicide, fertilizer, & nitrogen reduction programs • Implement runoff reduction strategies • Utilize switchgrass planting programs for soil & bank stabilization, runoff reduction and filtration, and biofuel production 	<ul style="list-style-type: none"> • Reduced water consumption improves drought resilience • Soil management best practices can reduce runoff and erosion associated with heavy precipitation events. • Solar farming could offer “crop diversification”

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Ecosystems		Promote protection and optimal use of ecosystems	<ul style="list-style-type: none"> • Increase use and adoption of Stormwater Best Management Practices (reference DEP publication) 	<ul style="list-style-type: none"> • Review the use of and expand on brown and green field redevelopment incentives and programs at the state and local levels • Pervious paving, structural, & non-structural BMPs • Capitalize on opportunities to use urban forestry (also mention ability to reduce heating and cooling loads in this context) • Forest protection easement • Promote planting of native plants to address climate change • Increase afforestation • Preserve wetlands 	<ul style="list-style-type: none"> • Wetlands reduce risks associated with flooding, storm surge, sea level rise • Protecting ecosystems from human-caused stressors can increase their ability to adapt to climate change stressors
Waste		Reduce waste sent to landfills		<ul style="list-style-type: none"> • 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 putting solar projects on landfill land • Promote pollution prevention – Reduce, reuse, recycle (buy bulk, minimize packaging, industrial waste etc.) 	<ul style="list-style-type: none"> • n/a
NA Note: These will be sprinkled throughout the report in	NA	Conduct deeper dive analyses to inform further decision-making		<ul style="list-style-type: none"> • Analyze the potential impacts of Pennsylvania joining RGGI^F • Consider carbon and other GHGs as tradable commodities, beyond the RGGI framework 	<ul style="list-style-type: none"> • n/a

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relevant sector sections.				<ul style="list-style-type: none"> • Study the economic impact of all types of energy in the commonwealth (fossil and renewables) • Evaluate impact of lost nuclear capacity • Study the potential impacts of the use of Carbon Capture, Utilization, and Sequestration on the Commonwealth • Consider the merits of using energy use intensity metrics for transportation mitigation 	
NA Note: These will be in text boxes or individual section(s) throughout the report.	NA	Lead by example in Commonwealth and local government practices and assets		<ul style="list-style-type: none"> • Establish a state government strategic energy management plan • Establish a state-wide Governor’s Sustainability Council • Use latest building codes and standards as basis of design for new construction and major renovation projects. • Consider use of energy-efficiency (EnergySTAR certification) and/or voluntary sustainability programs (LEED Gold) as higher-performance basis of design for NC & MR projects • Inventory state buildings and energy use patterns to ID savings opportunities • Conduct more training, education, and outreach for facility managers and the workforce 	<ul style="list-style-type: none"> • Commonwealth efforts to lead by example in adaptation can provide guidance to citizens and businesses to reduce their own risks (e.g., flood mitigation, heat awareness) • Most adaptation impacts from strategies listed above will carry through for actions from the Commonwealth to lead by example

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				<ul style="list-style-type: none"> • Set specific energy, water, and transportation emissions reductions targets and goals • Continue to monitor, track and report GHG emissions, energy trends, and climate impacts • Prioritize implementation of policy options and strategies CAP <ul style="list-style-type: none"> ○ Create an interagency work group dedicated to the implementation of mitigation and adaptation leadership actions listed in the CAP • Prepare comprehensive energy plan for PA • Incorporate climate change mitigation, adaptation, and resilience into decision making processes and criteria • Incorporate EE and requirements for using alternative fuels for transport • Continue to recognize businesses and municipalities that are also leading by example in the state through the through the Governor’s Awards for Environmental Excellence • Advocate for federal actions that benefit the Commonwealth • Learn from other examples through evaluation best practices from city of Philadelphia and city of Pittsburgh sustainability programs 	

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				<ul style="list-style-type: none"> ○ commercial building (and perhaps residential point of sale) benchmarking and transparency programs ○ stretch codes (in PA, due to recent legislation, this is only allowed in class 1 cities – Philadelphia) ● Learn from other examples of best practices from other leading sustainable city efforts – (e.g., Portland, Boston, Seattle, DC, NYC, Austin, Denver, etc.) ● Implement LBR strategies in state parks and similar facilities i.e.: replace jeeps & pickups with bicycles and NEVs & replace gas-powered maintenance equipment (mowers, blowers, chainsaws) with non-motorized (reel-type mowers, rakes, bow saws) or electric 	

^a In line with Solar Future through 2030.

^b In line with EV Everywhere (Roadmap).

NA – Not sector-specific. May reside in a separate section or of the CAP or be interwoven throughout the CAP.