



pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Energy Programs Office



Pennsylvania's Climate Action Plan

PBI Environmental Law Forum

April 4, 2019

Tom Wolf, Governor

Patrick McDonnell, Secretary

Pennsylvania Climate Change Act

Act 70 of 2008 Requirements:

- Develop a climate impacts assessment (3 yrs.)
- Prepare and update a climate action plan (3 yrs.)
- Develop an inventory of greenhouse gases (GHGs) (update annually)
- Set up a voluntary registry of GHG emissions
- Administer a climate action committee (bimonthly)

Pennsylvania Climate Change Act

Climate Impacts Assessment:

- 2009: Study of the potential impacts of global climate change on Pennsylvania over the next century.
 - *Pennsylvania Climate Impacts Assessment* (Shortle et al., 2009) and *Economic Impacts of Projected Climate Change in Pennsylvania* (Abler et al., 2009).
- Update every 3 years. Currently working on an update.
 - Agriculture/Livestock
 - Water/Bay
 - Infrastructure

Pennsylvania Climate Change Act

Inventory of GHGs:

- Greenhouse gas emissions inventory helps track overall emissions reductions over time.
- Data is primarily obtained from the United States Environmental Protection Agency (EPA) State Inventory Tool (SIT).
 - Data is gathered by federal agencies and incorporates reported data from private, state, and local sources covering fossil fuels, electricity consumption, agriculture, forestry, waste management, and industry.
- Where default data are not available, state-specific data is incorporated into the SIT modules.

Pennsylvania Climate Change Act

Green House Gases “GHGs”:

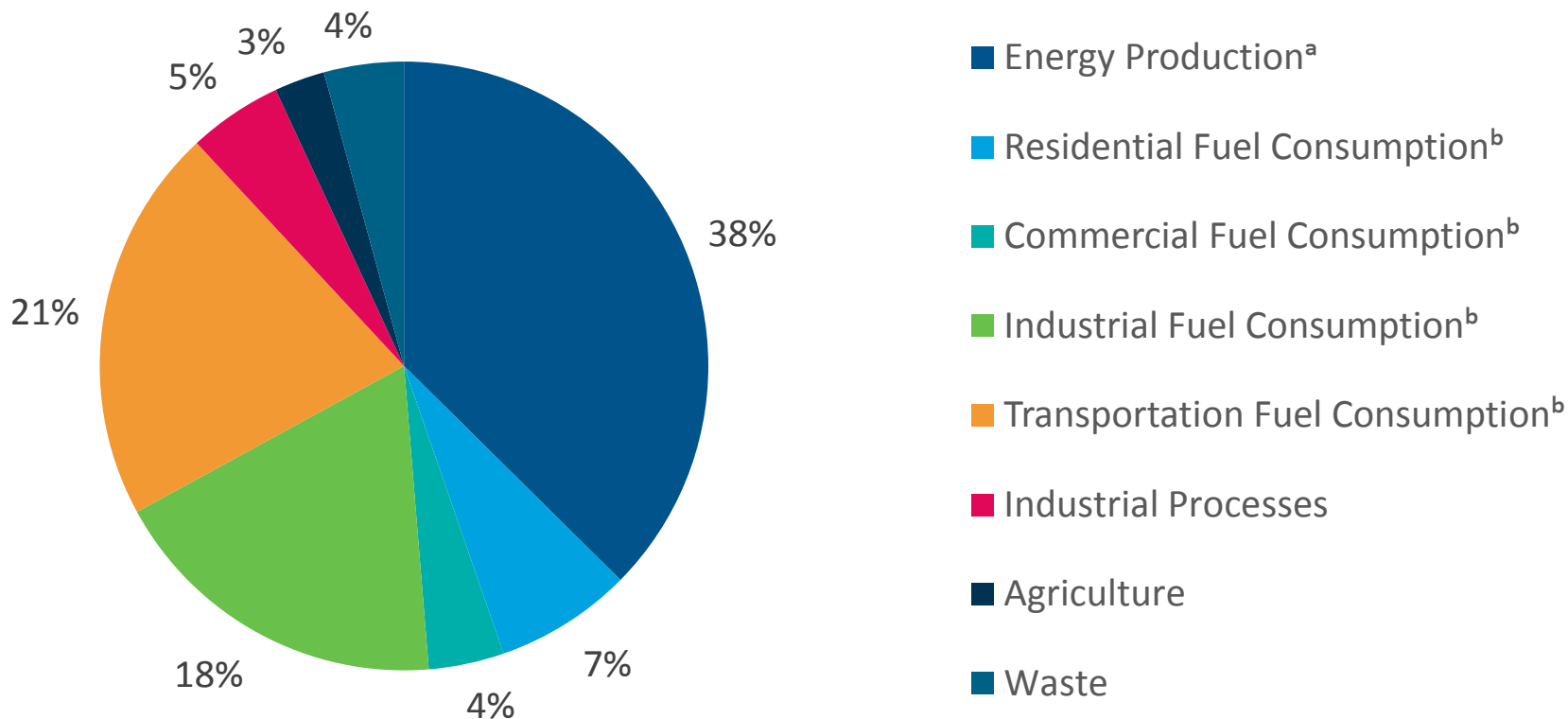
- Million metric tons of carbon dioxide equivalent (MMTCO₂e).
- A metric ton is equal to 2,204.6 pounds or approximately 1.1 short tons (US tons).
- The GHGs are typically accounted for are carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O).
- Each GHG has a different global warming potential (GWP), which is accounted for when converting emissions to MMTCO₂e.
- The default GWP used by the SIT for CO₂ is 1.0, CH₄ = 25, and N₂O = 298.
- The GWP of a GHG will vary depending on the time scale selected. The default time scale for the SIT is 100 years.

Pennsylvania Climate Change Act

Inventory of GHGs:

- 2015 total statewide gross GHG emissions for Pennsylvania (the latest year with complete data available from the SIT):
 - 287 MMTCO₂e.
- Pennsylvania's Forestry and Land Use sector provides a carbon sink for GHG emissions, absorbing approximately 30.18 MMTCO₂e in 2015
- Pennsylvania's net GHG emission for 2015:
 - 256.82 MMTCO₂e.

GHG Emissions by Sector in 2015



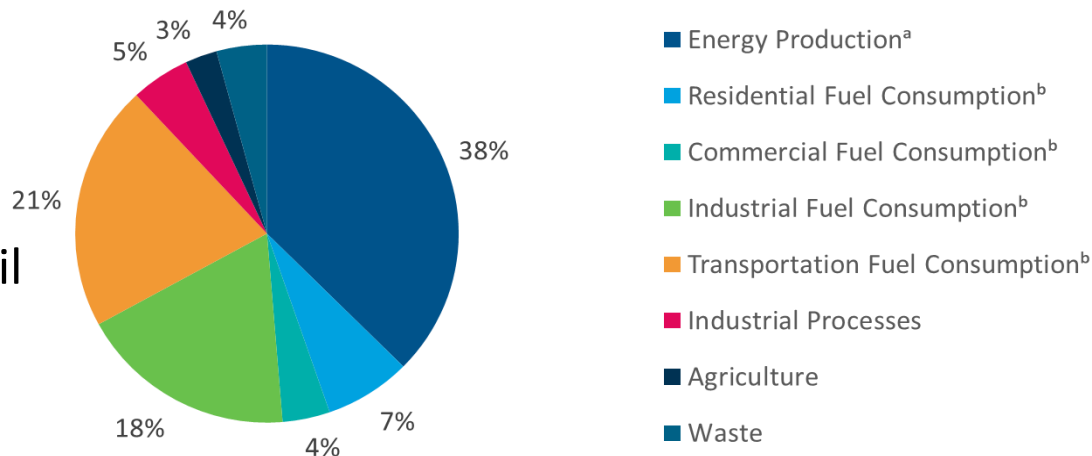
^a Energy Production includes emissions from electricity generation, coal mining, and natural gas and oil production.

^b Fuel Consumption includes emissions from direct fuel consumption. It does not include emissions from electricity consumption.

GHG Emissions by Sector in 2015

GHG Emissions:

- 38% of PA GHG emissions are from Energy Production. This includes emissions from electricity generation, coal mining, and natural gas and oil production.
- 50% of PA GHG emissions are from fuel consumption via residential, commercial, industrial, and transportation, so collectively energy consumption is the largest source of GHG emissions



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Climate Action Plan – Call to Action

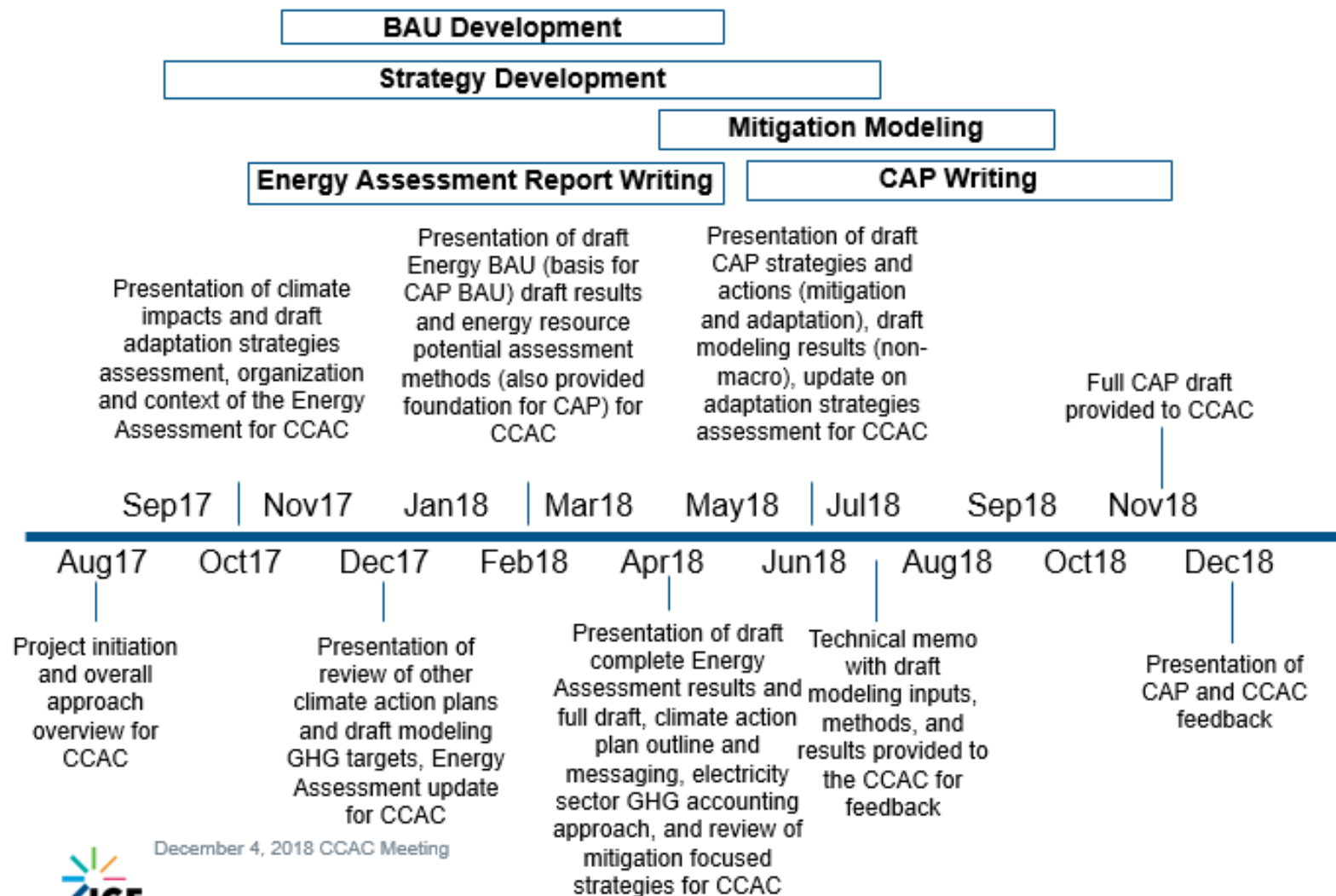
PA Leaders, Citizens, & Businesses Should:

- Consider how PA's climate may change in the future.
- Understand the impacts from those changes.
- Take action to adapt to those changes & reduce GHG emissions.

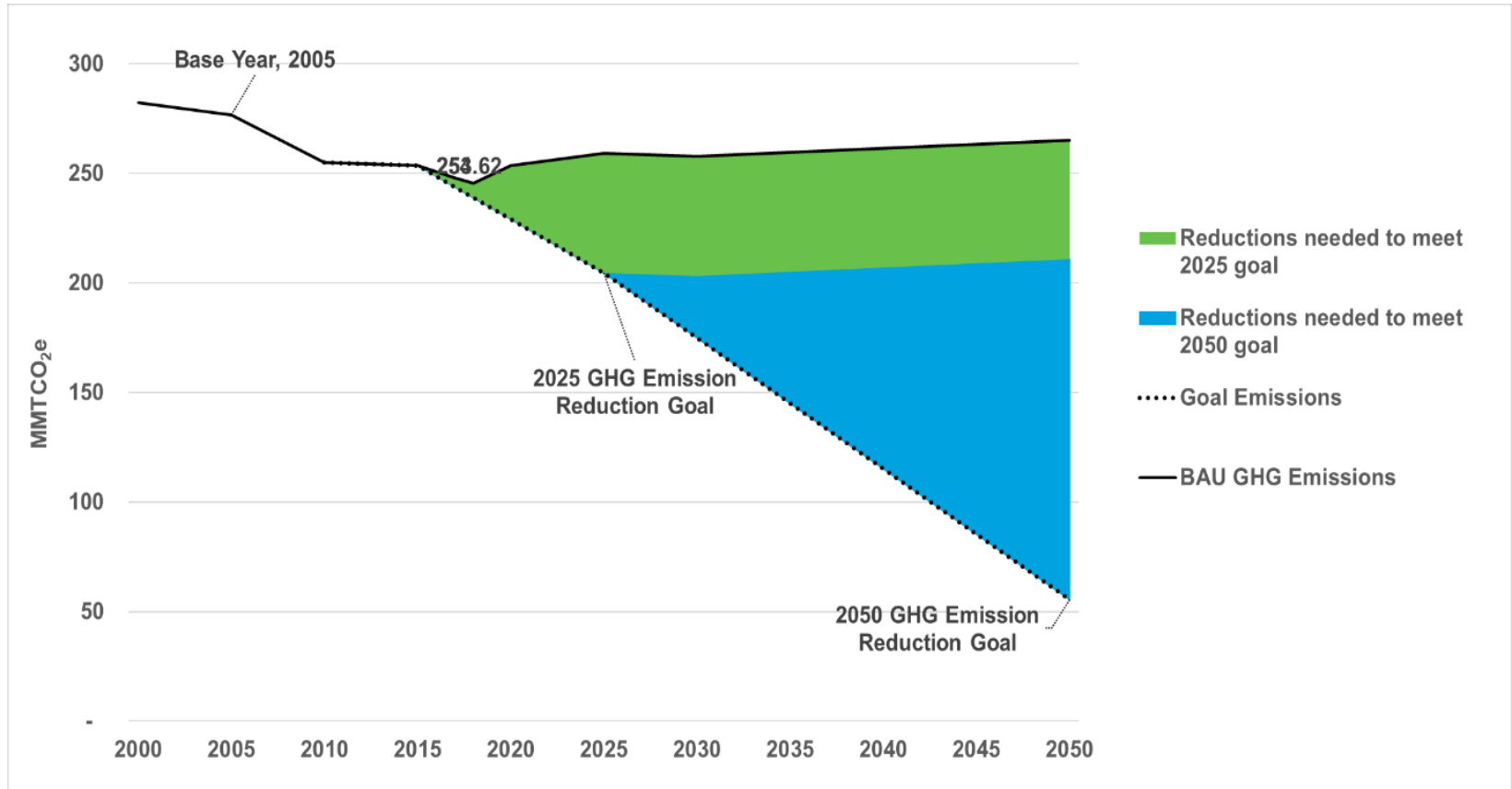
Results/Goals:

- Minimize disruptions to Pennsylvania's citizens, economy, and environment from climate-related hazards.
- Maintain cost-effectiveness

CAP Development Timeline



CAP Targets



Mitigation Targets:

- 26 percent reduction of net GHG emissions by 2025, from 2005 levels
- 80 percent reduction of net GHG emissions by 2050, from 2005 levels

Climate Action Plan

Summary:

- 8 Sectors :
 - 19 Strategies
 - Over 100 Leadership Actions + Additional Actions for Citizens and Businesses
 - 15 Quantitatively Analyzed Actions
- *Significant Components of Achieving Success*
 - Energy Efficiency/Conservation – Reduce Consumption
 - Increase Use of Zero Carbon or Low Carbon Energy Generation Resources
 - Reduce Transportation Sector Carbon Emissions

Sectors

Energy
Consumption

Energy
Production

Agriculture

Ecosystems
& Forestry

Outdoor Rec.
& Tourism

Waste
Management

Water
Resources

Human
Health



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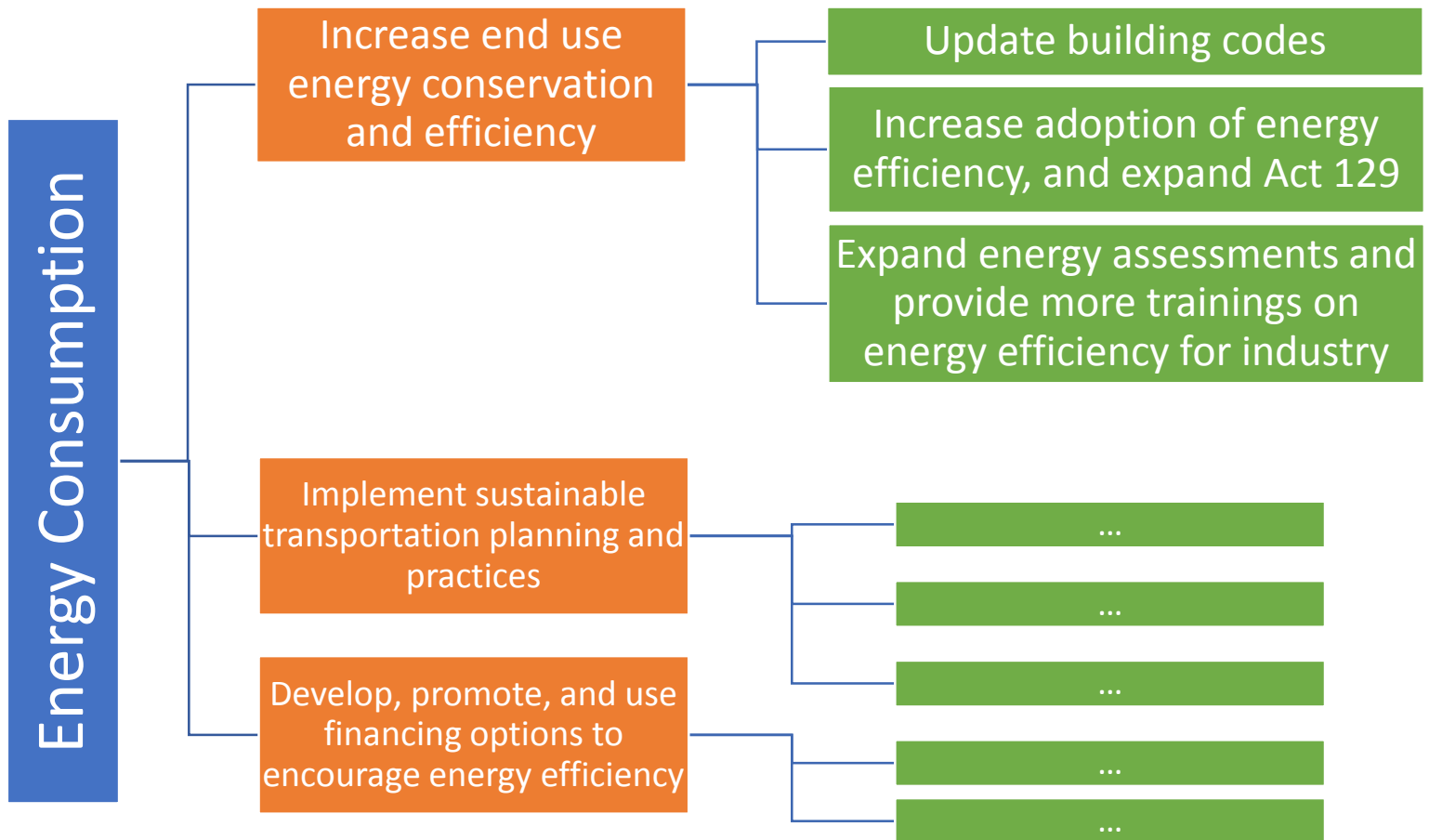
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Strategies and Actions

8 Sectors

19 Strategies

> 100 Actions



Nineteen Strategies

1. Increase end use **energy conservation & efficiency**
2. Implement **sustainable transportation** planning & practices
3. Develop, promote, & 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** upstream **impacts of fossil fuel energy** production
7. **Increase** production & use of **alternative fuels**
8. Use **agricultural best practices**
9. Provide resources & **technical assistance to farmers** to adapt
10. **Protect ecosystem resilience**, including forest systems where species will shift
11. Monitor, identify, & **address ecosystem vulnerabilities**
12. **Help the outdoor tourism industry** manage shifting climate patterns
13. Reduce & **use waste sent to landfills**
14. Use **stormwater best management practices**
15. Promote integrated water resources management & **water conservation**
16. Improve reliability & accessibility of **public information about climate-related health risks**
17. Bolster **emergency preparedness** and response
18. **Lead by example** in commonwealth & local government practices & assets
19. **Incorporate** historical & projected **climate conditions into siting & design** decisions for long-term infrastructure

Leadership Actions

- **Over 100 Leadership Actions**

- What you can do to
- What business can do to...

Improve, Bolster, Incorporate, Develop, Reduce, Increase

Actions supported by:

- Resilience Benefits and Costs
- Environmental/Economic Benefits and Costs
- Key Performance Indicators

Leading by Example

Executive Order 2019-1

Signed by Governor Wolf on 1/8/19:

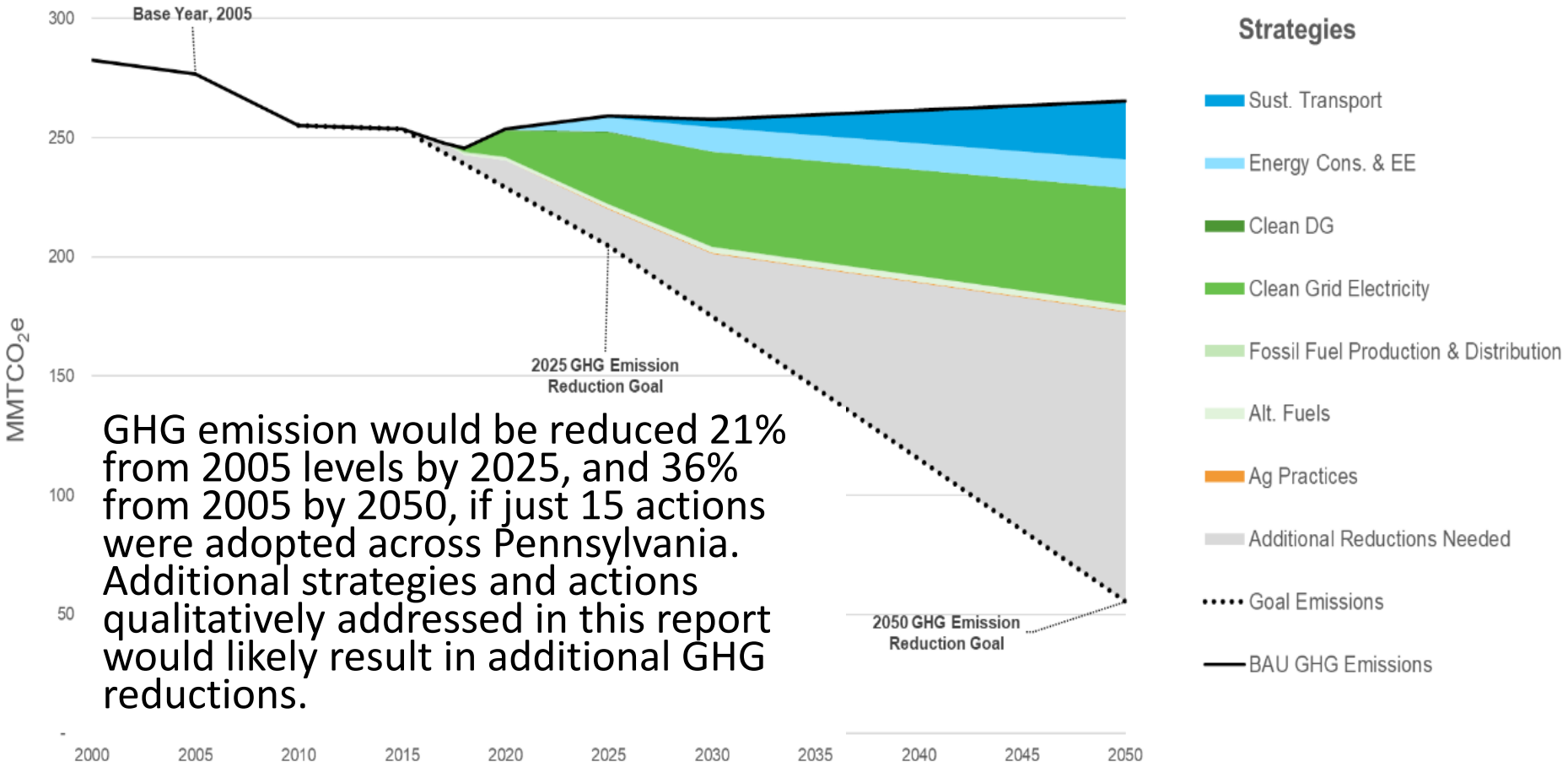
State and local governments can set an example by demonstrating emission reductions and climate adaptation.

- Reduce energy use by 3% per year, and 21% by 2025 from 2017 levels.
- Procure renewable energy to offset at least 40% of the commonwealth's annual electricity use.
- New construction/renovation projects or leased buildings by a commonwealth agency that cost > 50% of the replacement cost of the building & commence design after 1/8/19 shall be designed and constructed as a high-performance building.
- Replace 25% of the state vehicle fleet with battery electric and plug-in electric hybrid cars by 2025.

15 Modeled Actions

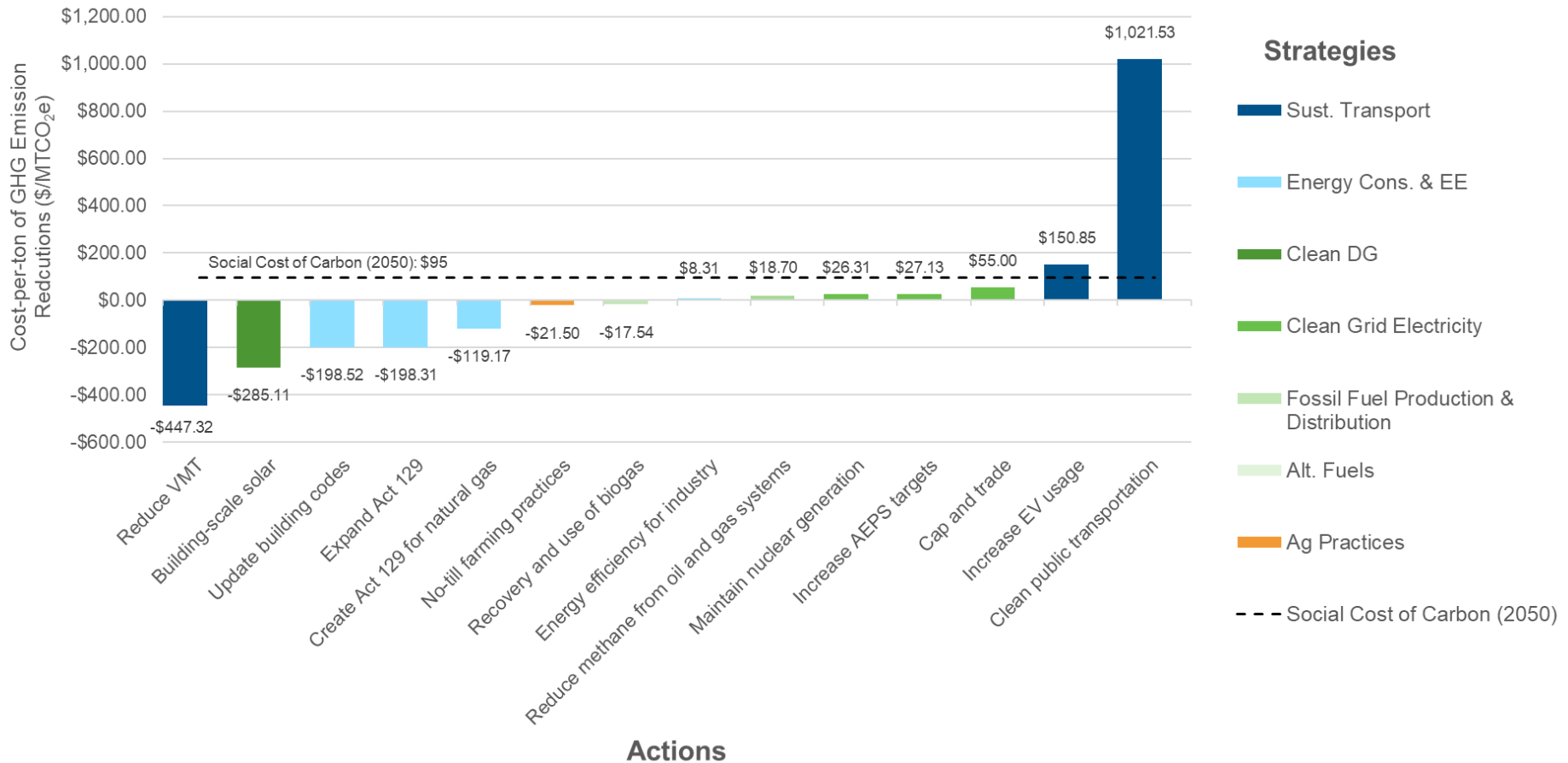
Sectors	Strategies	Actions Included in Quantitative Modeling
Energy Consumption	Increase end use energy conservation and efficiency	<ul style="list-style-type: none"> Update building codes Increase adoption of energy efficiency, and expand Act 129 Create an Act 129-like conservation and efficiency program for natural gas Expand energy assessments and provide more trainings on energy efficiency for industry
		<ul style="list-style-type: none"> Reduce vehicle miles traveled for single-occupancy vehicles Implement a strategic plan and incentives for increasing electric vehicle use Increase the use of clean public transportation through electric municipal bus fleets
	Implement sustainable transportation planning and practices	<ul style="list-style-type: none"> Invest in and promote building-scale solar Incentivize and increase use of combined heat and power (CHP)
		<ul style="list-style-type: none"> Increase Alternative Portfolios Energy Standard (AEPS) Tier 1 targets, and further increase in-state generation and use of renewables Implement policy to maintain nuclear generation at current levels Limit carbon emissions through an electricity sector cap and trade program
Energy Production	Increase use of clean, distributed electricity generation resources	<ul style="list-style-type: none"> Implement policies and practices to reduce methane emissions across oil and natural gas systems
	Create a diverse portfolio of clean, utility-scale electricity generation	<ul style="list-style-type: none"> Increase recovery and use of gas from coal mines, agriculture, wastewater, and landfills for energy
	Reduce impacts of fossil fuel energy production and distribution	<ul style="list-style-type: none"> Increase adoption rate of and provide training for no-till farming practices
Agriculture	Increase production and use of alternative fuels	
	Use agricultural best practices	

Modeled Actions



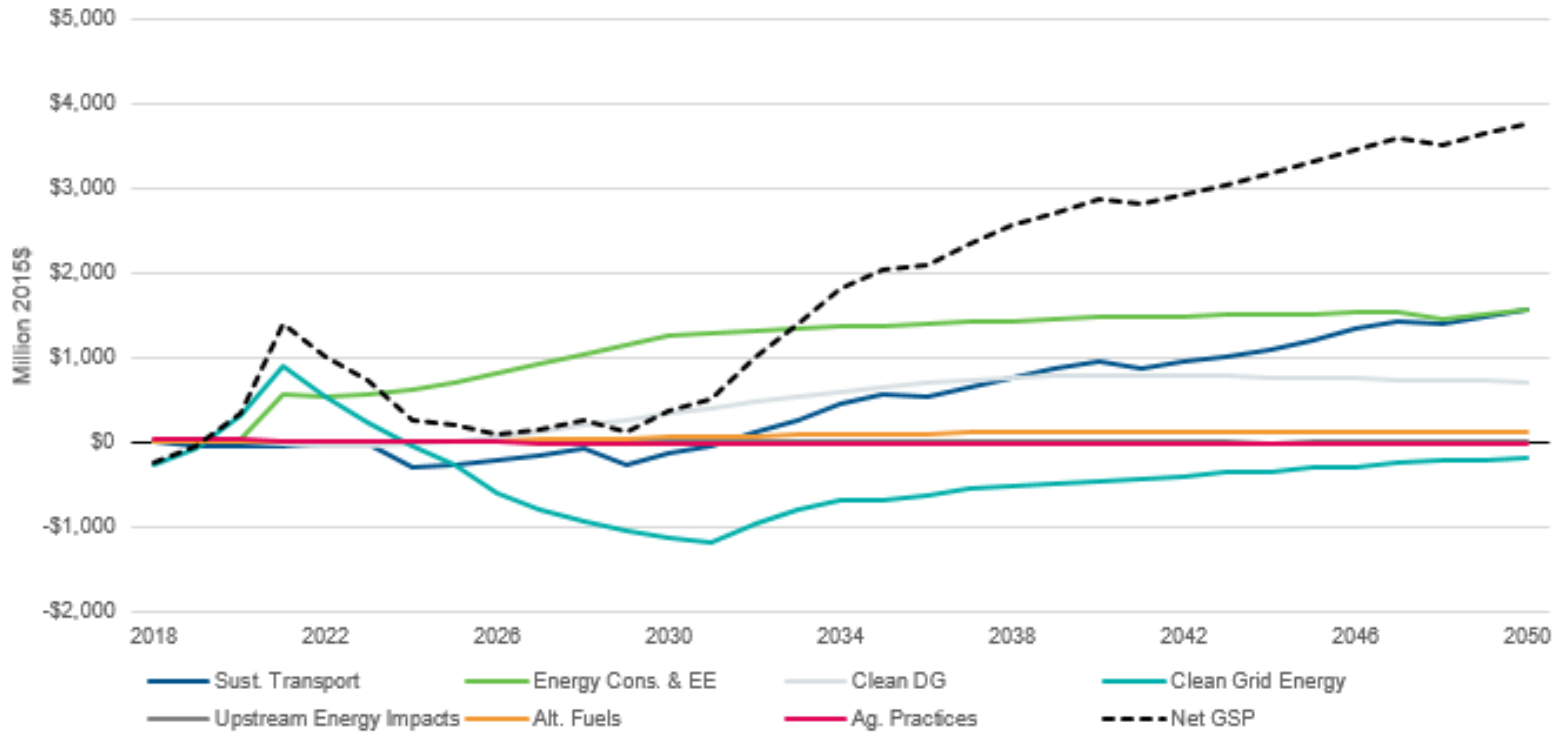
GHG emission would be reduced 21% from 2005 levels by 2025, and 36% from 2005 by 2050, if just 15 actions were adopted across Pennsylvania. Additional strategies and actions qualitatively addressed in this report would likely result in additional GHG reductions.

Cost Effectiveness



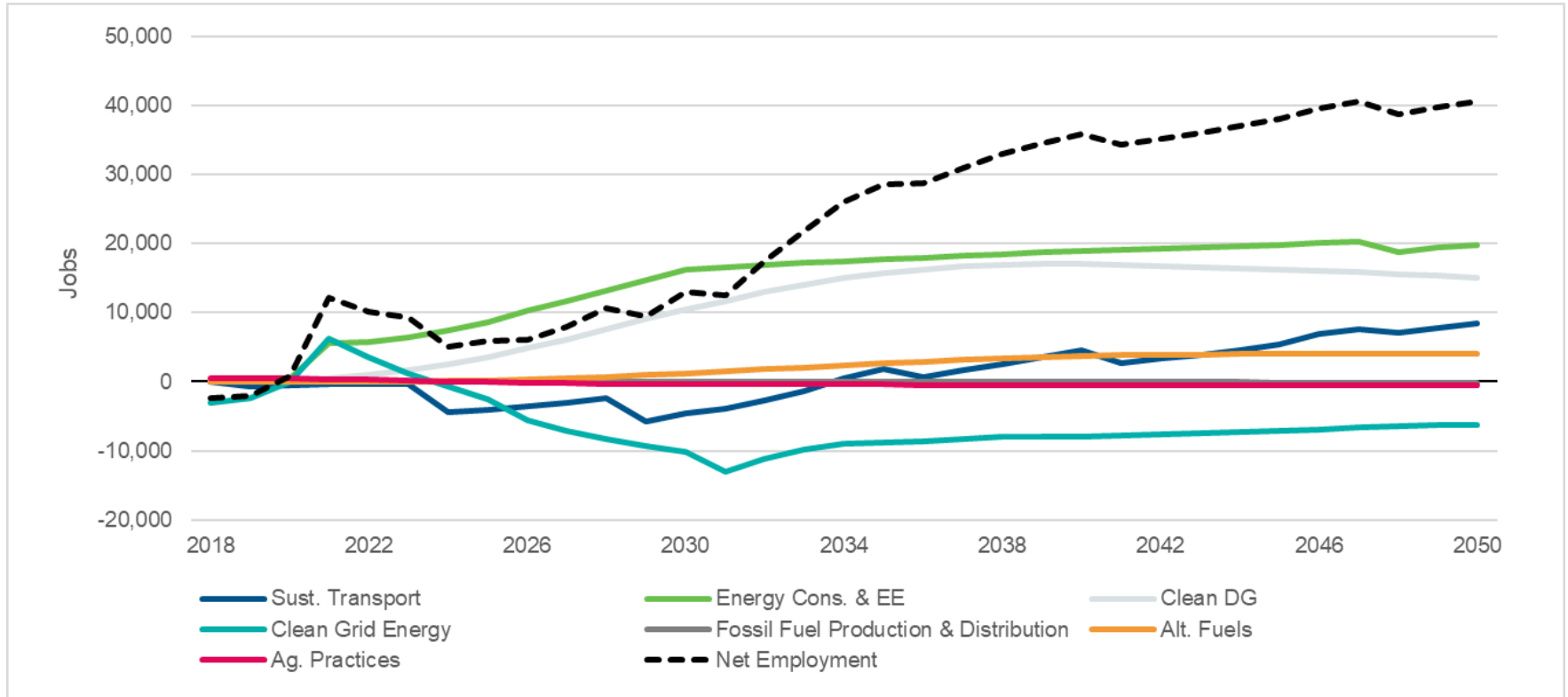
A social cost of carbon (the cost of damages of one ton of carbon emissions) of \$95 is used as the benchmark for cost-effectiveness. Anything below the benchmark (dotted line) is cost-effective, based on this perspective.

Impact on Gross State Product by Strategy



By 2050, gross state product will be increasing \$3.76 billion annually

Job Creation



If the 15 quantified actions were implemented, approximately 40,000 jobs would be created in 2050.

Coming Soon!

Climate Action Plan

- Modeling
- Leadership Actions
- Commentary
- Energy Assessment Report

Climate Impacts Assessment

Climate Story Map – DEP website

- What is changing?
- What does this mean for Pennsylvania?
- Why is this happening?
- What is being done?
- What can I do?

Pennsylvania's Climate Action Plan

Thank you!

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