



**pennsylvania**  
DEPARTMENT OF ENVIRONMENTAL PROTECTION



Energy Programs Office

# Climate Change Advisory Committee Meeting

## February 21, 2023

Josh Shapiro, Governor

Richard Negrin, Acting Secretary

# Agenda

- **Introduction**
- Approval of December Minutes
- Presentation/Discussion – Review of 2022 Topics, Key Takeaways for 2024 Pennsylvania Climate Action Plan (PA CAP), DEP
- Presentation/Discussion – Proposed 2024 Pennsylvania Climate Impacts Assessment and PA CAP Scope of Work (SOW), DEP
- Public Comment
- Break
- Presentation/Discussion – Climate Action for Environmental Justice (EJ) Communities, DEP
- Presentation/Discussion – Local Climate Action – Center Region Council of Governments (COG)
- Updates
- Next Meeting
- New Business

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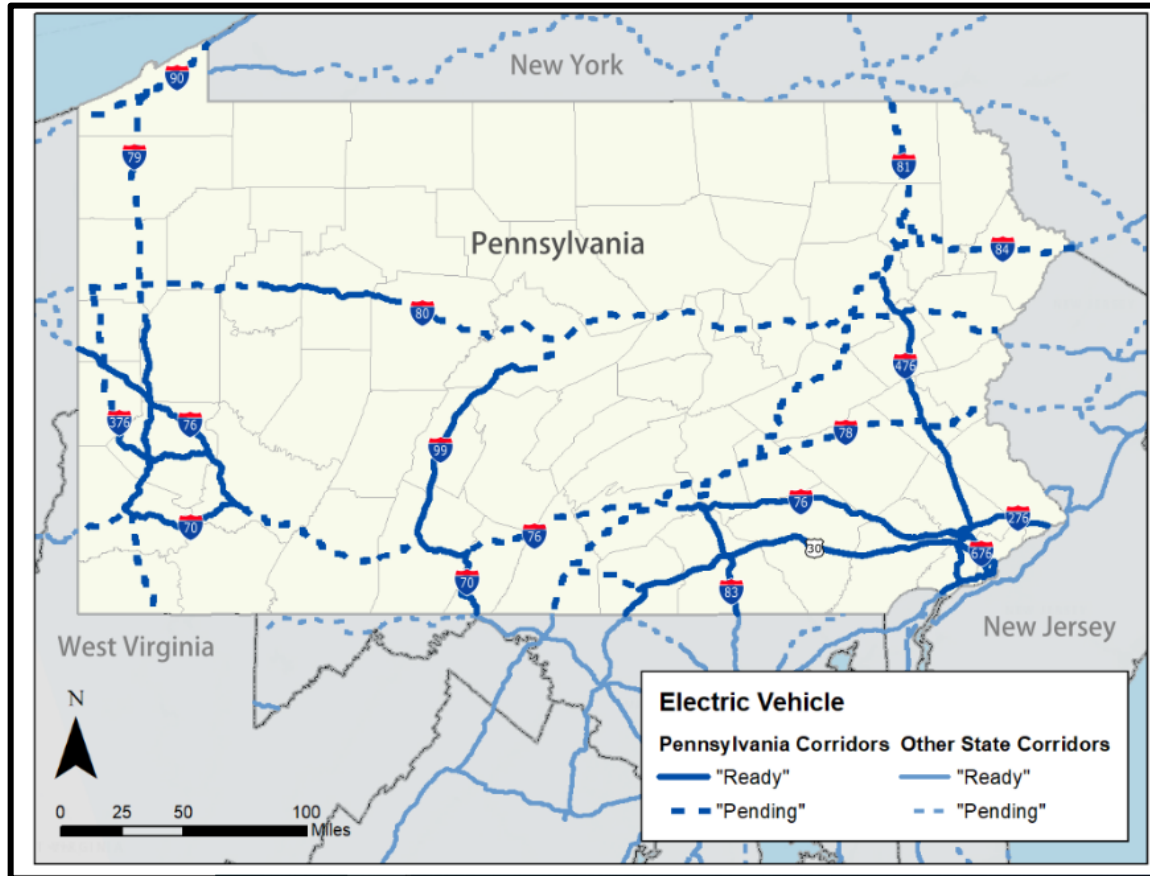
# 2022 CCAC Round-Up

# Transportation

- PA Clean Transportation - DEP and PennDOT staff
  - Electric Vehicle (EV) grants, loans, rebates
  - Infrastructure Investment and Jobs Act (IIJA) funding for PennDOT's Active Transportation Plan and National Electric Vehicle Infrastructure (NEVI) program
- Reducing Vehicle Miles Traveled in New Jersey - Tim Evans, NJ Future
  - Land use planning for the future of New Jersey is based on urban density, multi-modal transportation, walkability, and less vehicle congestion.



# Transportation - Key Takeaways



- NEVI – how alternative fuel infrastructure is rolling out and where funding is going
  - EV charging infrastructure installed every 50 miles and within one travel mile of an interstate exit or highway intersection along the Alternative Fuel Corridor
  - At least four 150 kW DC Fast Chargers included
- Charging Infrastructure – data-informed infrastructure deployment

# Electricity Generation

- Advances in Nuclear and Future Uses: Modular reactors, light water reactors, hydrogen hub, molten salt – Marilyn Kray, Constellation Energy
  - Constellation awarded U.S. DOE grant to demonstrate an integrated hydrogen production strategy and install Proton Exchange Membrane at Nine Mile Point and Byron Direct Air Capture Project in 2023.
  - This is projected to capture 250,000 tons of CO<sub>2</sub> per year
- Getting to Net-Zero Power – Dr. Melissa Lot, Center on Global Energy Policy
  - In 2019, 37% of electricity in the U.S. was generated from zero-carbon sources; current trajectory is for electricity generation from zero-carbon sources reaching 50% by 2035.
  - Existing zero-carbon technologies must continue operating as long as possible.
  - Frame policies to support 100% zero carbon power.
  - Long-duration energy storage capacity costs must be equal or less than \$20/kWh to reduce costs by at least 10%.

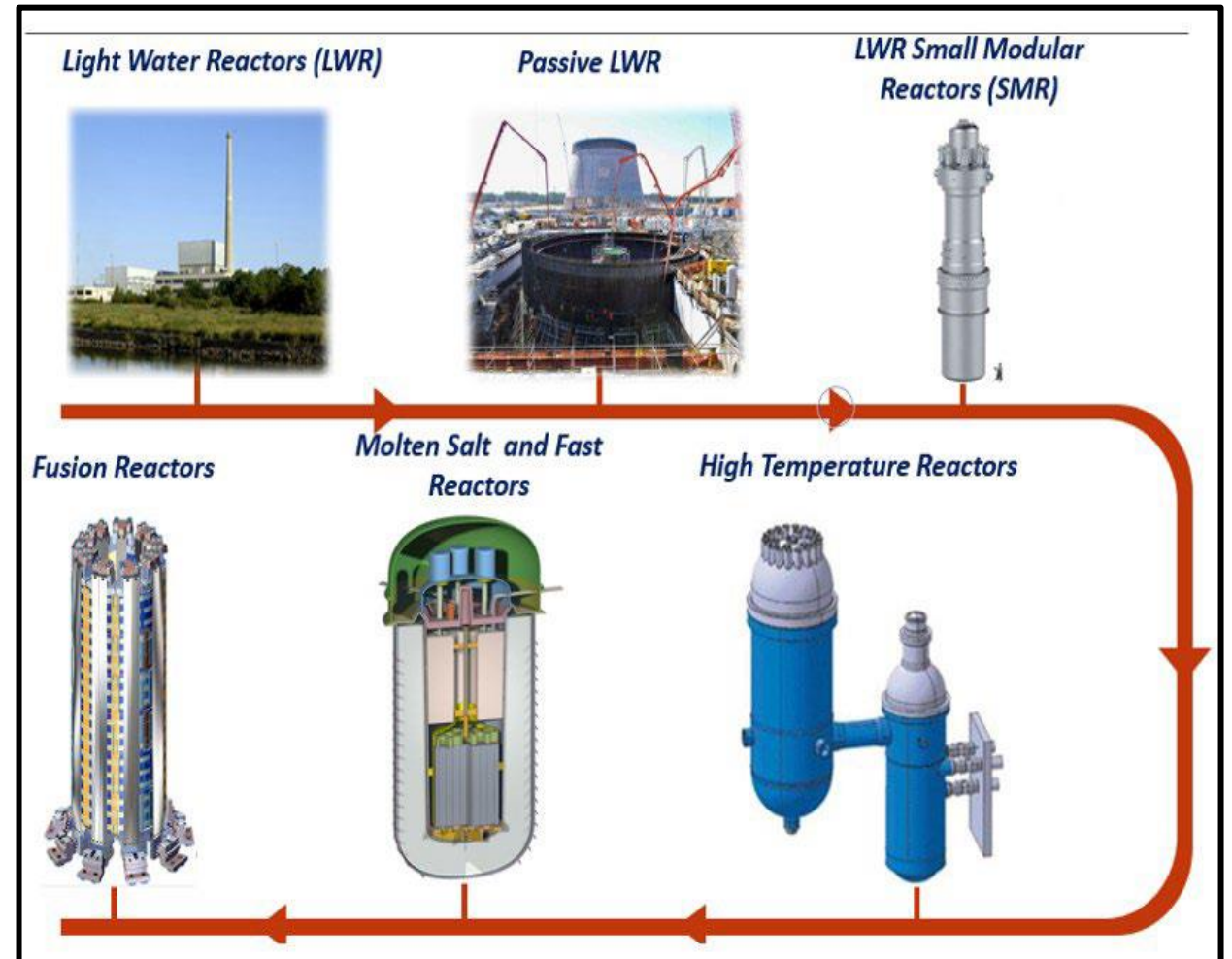


# Electricity Generation – Key Takeaways



Emerging Battery Technologies

## Emerging Nuclear Technologies



# Industrial Sector and Fuel Supply

Figure 4. Near-term capture opportunities infrastructure scenarios



Source: Figure authored by Elizabeth Abramson, 2022. Based on results of the SimCCS model and data from EPA GHGRP, 2020; NATCARB, 2015; SCo<sub>2</sub>T, 2020.

## Optimized transport network for near-term CO<sub>2</sub> capture and storage

- Regional CO<sub>2</sub> infrastructure (modeled)
- ▲ Potential CO<sub>2</sub> storage area

## Geologic storage opportunity

- Assessed low-cost saline storage
- Saline CO<sub>2</sub> storage formation

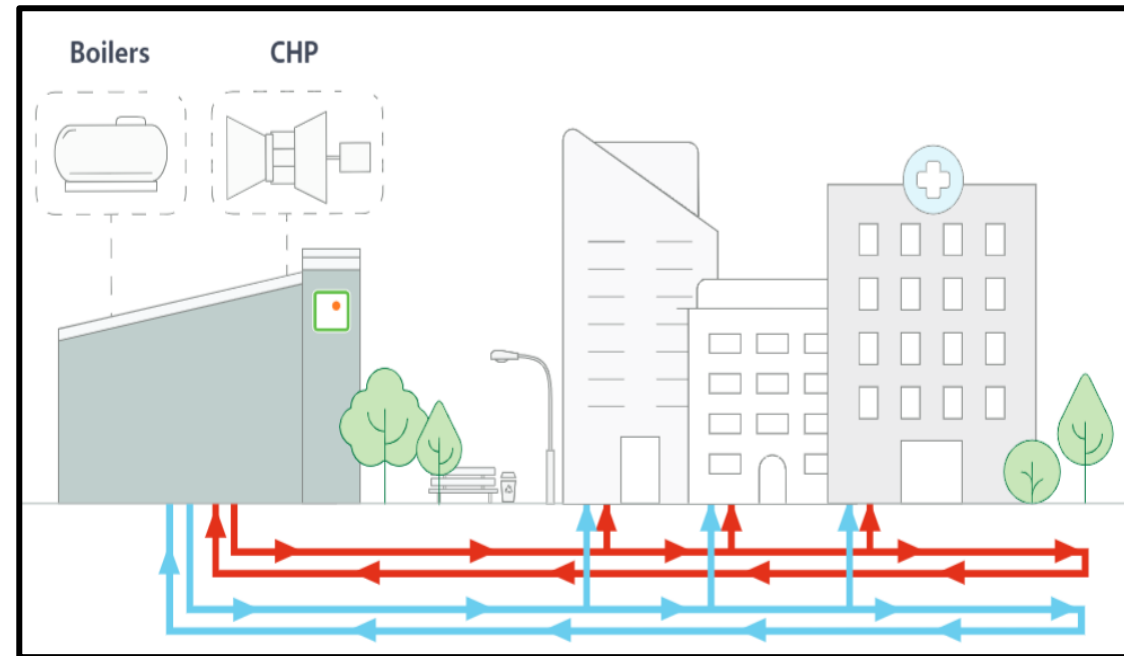
## Capture sources

- ☒ Cement & lime
- ⚡ Coal power
- 🍷 Ethanol
- ⚡ Gas power
- 🌲 Pulp & paper
- 🏭 Refineries
- 🏭 Steel
- ♻️ Waste

- PA Hydrogen Roadmap – Matt Fry, GPI
  - Pennsylvania has high potential for CO<sub>2</sub> storage capacity, 50 facilities are eligible for 45Q tax credit, 22 are identified as near-term capture opportunities.
- Decarbonizing Cement Manufacturing – Rick Bohan, Portland Cement Association
  - Carbon neutrality achieved through supply chain/product life cycle
  - Performance vs. Prescription
- Carbon Capture Utilization and Storage - Adam Walters, DCED
  - Pennsylvania is competitively advantaged for CCUS and hydrogen technologies

# Industrial Sector and Fuel Supply

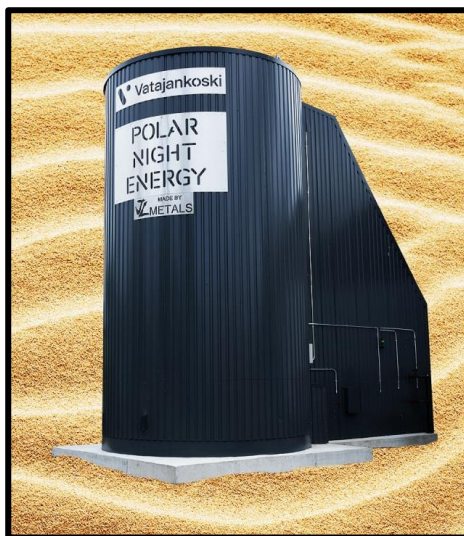
- Vicinity District Energy Systems
  - District systems with steam, hot water, chilled water.
  - Philadelphia District system: Removes over 300,000 short tons of carbon annually – 170 MW of combined heat and power (CHP) in 400 buildings, 96 million sq ft served.
  - CHP produces 90% of Philadelphia’s steam.
- New England University – Steam to Hot Water Conversion
  - 80 buildings, 3 natural gas boilers, 2 MW of natural gas cogeneration.
- Combined Heat and Power – Dr. Freihaut, PSU
  - Increasing dispersed microgrids on a centralized system increases resiliency, and CHP is a critical element of this.
  - Efficiency advantages will continue to increase as natural gas infrastructure decarbonizes.
  - 75% of this market is concentrated in the industrial sector.



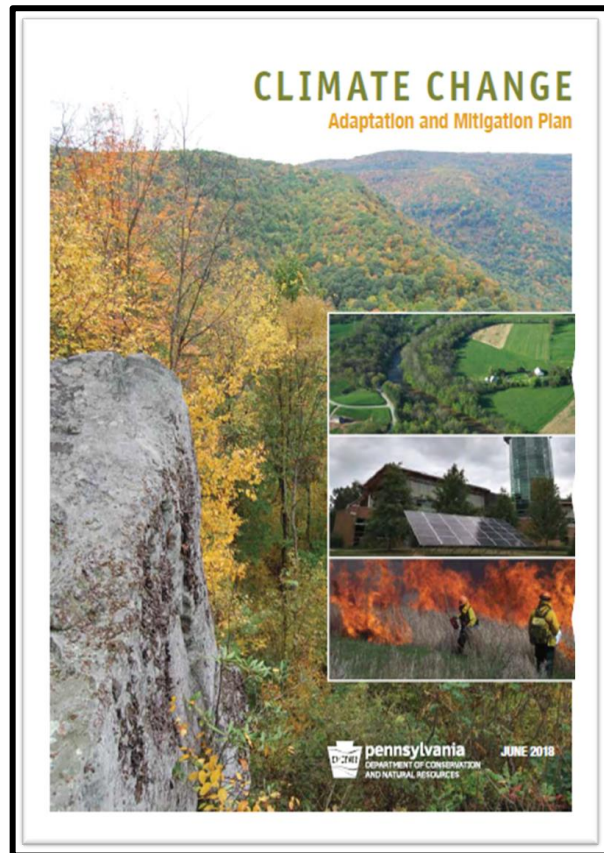
# Industrial Sector and Fuel Supply – Key Takeaways



- U.S. DOE Industrial Decarbonization Roadmap: Sept. 2022, Applicability to PA Industry
  - Iron and steel manufacturing
  - Food and beverage
  - Cement manufacturing
  - Natural gas
- Commercial Energy Efficiency and CHP
  - Penn State Hershey Medical Center
- District Energy Systems and Emerging Technologies
  - Polar Night Energy, Ramboll, Vicinity



# Agriculture and Land Use



- Urban Forests - Cody Kiefer, City of Lancaster
  - Incorporate equity considerations into tree canopy analysis and policy development.
  - Identify barriers and burdens to property owners of tree plantings.
- Forests and Carbon – Seth Cassell and Shawn Lehman, DCNR
  - Provide guidance to private forest owners for forest management.
  - Evaluate carbon offset programs.
  - Consider timber in embodied carbon and green building policies.
- Climate Impacts on Ag, Farm Preservation – Mike Roth, PDA.
  - Incorporate conservation practices, such as cover crops, no-till, anaerobic digesters, and forest buffers to aid mitigation.
  - Use agricultural products in green building material (hempcrete) to reduce GHG emissions.

# Agriculture and Land Use – Key Takeaways

- Ecosystem services, monetized value of street trees and green infrastructure (air pollution and stormwater runoff reduction, etc.)
- DCNR's Carbon Quantification Model study – applications for GHG accounting, carbon offsets
- Green buildings with agricultural and forestry products – incorporate into building sector strategies and modeling

# Climate Adaptation



- Climate Adaptation of Sharpsburg – Brittany Reno
  - Climate adaptation and mitigation: flooding, environmental/energy justice and equity
  - Eco-District and solar co-op, solar installer cert – Community College of Allegheny County
- Hazard Mitigation Funding – Tom Hughes PEMA
  - Silver Jackets Team
  - National Flood Insurance Program – \$800M in Funding
  - Building Resilient and Infrastructure Communities (BRIC)
- Post-Construction Stormwater Management manual – Sean Furjanic, DEP
  - PCSM updated, released publicly for 90-day comment period
  - Increases in expected runoff of 8-10% by 2050 factored into updates

# Climate Adaptation – Key Takeaways

- Collaborative Models of Climate Planning and Climate Action
  - Triboro Ecodistrict model for intergovernmental cooperation
  - CONNECT, DVRPC, LVPC, Centre Region COG – regional planning organizations provide opportunities for collaboration
- Hazard Mitigation Funding – PEMA
  - Ensuring local governments that are eligible for resources such as NFIP, BRIC, etc. are aware of options and process to apply
- Post-Construction Stormwater Management
  - Ensuring the best management practices for stormwater management are understood and considered for local government climate planning



# Buildings

- Impacts of Energy Codes on GHG Reduction – Maureen Guttman, Energy Solutions
  - Over 40% of electricity use in PA from residential and commercial buildings (2021).
  - 50% of buildings constructed between 1960-1999 had no focus on energy provisions.
  - Energy codes can significantly reduce building energy consumption.
- Decarbonizing the Built Environment – Vincent Martinez, Architecture 2030
  - 27% of global emissions are due to building operations.
  - Topics included the need for transit-oriented planning and design, electrification, energy efficiency, etc.
- Gas Utilities Energy Efficiency & Conservation – Mark Binder, UGI
  - The UGI Save Smart Rebate Program promotes energy efficiency by providing rebates to residential and commercial customers.
  - From 2017-2021: 747,121 mcf natural gas conserved, 49,013 MW saved, \$29M in rebates.
- City of Easton Energy Management Plan - Kate Semmens, Nature Nurture Foundation:
  - Plan includes lowering residents' energy costs by 20% by 2030 with GHG emissions reduction targets of 30% by 2030 and 80% by 2050.

# Key Takeaways

- Green Building Codes, Energy Efficiency, and Contractor Training
  - Philadelphia Building Performance Policy: On average these building “tune-ups” yield energy savings of 10-15% per year, resulting in the equivalent in carbon reduction of removing 40,000 automobiles off PA’s roads.
  - Centre Region COG: Contractor Training on Energy Efficiency and Residential/Commercial Resources
- Utility Energy Efficiency Rebate Programs: Engaging utilities – Promotion/expansion of these programs
  - Act 129
  - UGI
  - Columbia

# Public Health and Environmental Justice

- Climate Change and Public Health - Dr. Julie Becker, Physicians for Social Responsibility
  - Exposure pathways and climate drivers for physical ailments identifying how communities get exposed to these impacts and the related physical and mental health problems.
- DEP Environmental Justice (EJ) Policy Update – Ngani Ndimbie, DEP
  - Climate Justice - Addresses ethical dimensions of climate change.
  - Climate-related initiatives must consider and prioritize communities disproportionately impacted by climate change.
- Equitable Energy Future U.S. DOE – Yasmin Yacoby
  - Energy equity and EJ for disadvantaged communities (DACs).
  - Jim Crow Laws, redlining, and siting of highways and industrial facilities formed DACs through 1968.
  - Energy insecurity has been increasing in the US since 2015.
  - Justice40 Initiative dictates that 40% of all federal funding and programs must flow to DACs.

# Public Health and EJ – Key Takeaways

- Incorporate EJ/Equity throughout planning and implementation
  - DEP internal policy for EJ and Justice40 requirements
  - Requires consideration of climate impacts on EJ communities and to direct benefits/funding to these communities
- Equitable Energy Future – Climate Action for EJ Communities
  - EPO project to solicit input from EJ and energy justice communities throughout Pennsylvania to inform the 2024 Climate Action Plan
  - 6 meetings in different regions of the state, approximately inline with the 6 DEP regions
- Current Status of DEP EJ Policy Updates

# 2022 CCAC Round-Up Discussion

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# 2024 Pennsylvania Climate Impacts Assessment and Climate Action Plan SOW

# Objectives

- Prepare a report on potential climate change impacts for Pennsylvania.
- Develop climate change mitigation and adaptation strategies, model the impacts of those strategies, and provide a CAP for the commonwealth.



# 2024 Climate Impacts Assessment Content

## Act 70 of 2008:

- Scientific predictions regarding changes in temperature and precipitation patterns;
  - *This will include a discussion on the current status of attribution science, which aims to link specific extreme weather events to climate change.*
- Potential impact of climate change on human health, the economy, forests and ecosystems, wildlife, recreation, agriculture and tourism; and
  - *An updated summary of impacts identified in previous iterations, as well as a current analysis of climate change impacts to human health and safety in the commonwealth, particularly in EJ communities.*
- Economic opportunities for the commonwealth created by the potential need for adaptation and mitigation strategies.
  - *With a specific focus on opportunities for EJ communities*

# 2024 Climate Action Plan Content

## Act 70 of 2008:

- Identify GHG emission and sequestration trends and baselines in the Pennsylvania
  - *Include information on actions already being taken within the Commonwealth, including notable efforts by municipal and county entities within Pennsylvania, toward mitigating GHG emissions and adapting to climate change, and how these successes can be built upon to reach net zero GHG emissions.*
- Include strategies to reduce GHG emissions and adapt to climate change, focusing on GHG reduction.
  - *Meet goal of 80% reductions from 2005 levels by 2050 and identify and model strategies that may also go beyond and help to achieve an equitable reduction to net zero GHG emissions by 2050 .*
  - *Adaptation strategies included in the report will be informed by the PA CIA and its triannual updates.*
  - *GHG reduction and adaptation strategies will incorporate the results of DEP's Climate Actions for EJ Communities stakeholder outreach and planning efforts.*

# 2024 Climate Action Plan Content

## Act 70 of 2008:

- Evaluate cost-effectiveness, including analysis of costs, benefits, and co-benefits (including those related to public health) of each strategy or suite of strategies, including the impact on the capability of meeting future energy demand within Pennsylvania.
- Recommend to the General Assembly legislative changes necessary to implement the CAP.
  - *Include sample legislative language resulting from a literature review.*
  - *Sample legislative language should be aimed at achieving GHG reductions via implementation of the strategies enumerated in the 2024 CAP.*

# 2024 Climate Action Plan Content

## Additionally:

- Electricity modeling and associated GHG emissions should be based on in-state generation rather than consumption.
- Strategy development should include review of examples outside Pennsylvania, including actions being taken by other states, municipalities, NGOs, and businesses doing business and employing workers in Pennsylvania.

# 2024 Climate Action Plan Content

- Considerations from CCAC comments on the 2021 CAP:
  - Include a more detailed analysis of economic costs and benefits of the proposed strategies than in previous CAPs and the cost of inaction.
  - Provide a greater consideration of net-zero buildings and embodied carbon in buildings.
  - Include discussion of implementation considerations for each strategy, such as responsible parties, first steps, and barriers.
  - Include considerations for equitable transition for EJ communities and energy communities.
  - Include strategies to address fugitive emissions from fossil fuel production and transmission activities.
  - Include strategies to address the waste sector, including recycling.
  - Discuss energy and climate policies and programs already in place that have decreased Pennsylvania's GHG emissions and how to build on those successes.
  - Make CAP more accessible to a general audience.

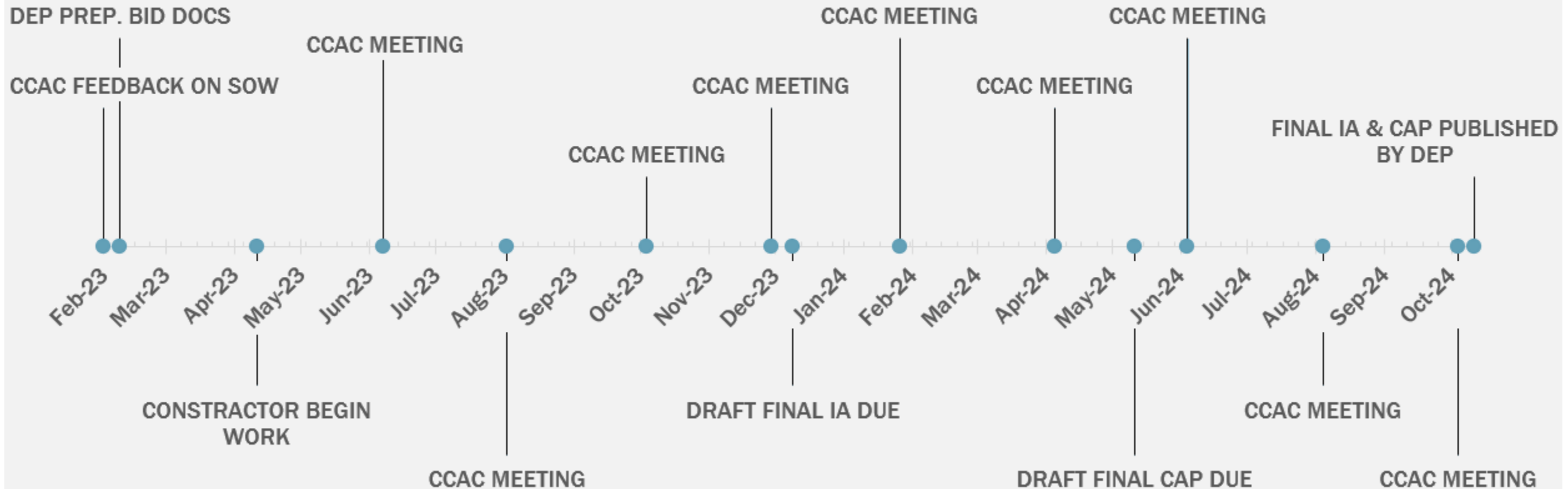
# 2024 Climate Action Plan Content

## Other items to consider:

- Subheading on 2021 CAP: *Strategies for government, business, agriculture, and community leaders – and all Pennsylvanians*
- Suggestions for 2024 CAP subheading:
  - *Equitable Decarbonization*
  - *Getting to Net Zero*
  - *Progress to Build On*

# 2024 IA & CAP Timeline

## PROJECT TIMELINE



# Next Steps

- CCAC members may provide feedback on the 2024 PA CIA and CAP SOW via email to [lbyron@pa.gov](mailto:lbyron@pa.gov).
- CCAC feedback should be received no later than close of business **Monday, February 27<sup>th</sup>**.
- DEP will consider CCAC feedback and aim to begin procurement process on February 28<sup>th</sup>.



# 2024 Pennsylvania Climate Impacts Assessment and Climate Action Plan SOW Discussion

# Public Comment (15 min)

# Break

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# Updates

## Climate Outreach Efforts and Notable Events:

- Jan. 7-14 - 2023 Pennsylvania Farm Show Display
- TheBurg Jan. 2023 Issue - [Change Agent: Meet Greg Czarnecki, a man on a mission to impact climate change, one Pennsylvanian at a time](#)
- GreenGov Update – Mark Hand

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# 2023 Meeting Planning

## Proposed Themes :

- ~~February 21 – 2023 Impacts Assessment/CAP Planning~~
- **April 25**
- June 27
- August 22
- October 24
- December 19

# Next Meeting – Proposed Agenda

## **April 25, 2023:**

- Introduction
- Approval of December Minutes
- **Presentation/Discussion**
- **Presentation/Discussion**
- Public Comment
- Break
- **Environmental Justice/Equity TBD**
- **Local government climate action – LCAP Participant TBD**
- **DEP Updates**
- **Review June meeting agenda**
- New Business

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