Department of Environment & Conservation

Emission Reduction Planning Advisory Committee

Meeting #4

October 30, 2024

Meeting Agenda

Time (CT)	Agenda Item
8:00 – 8:10	Welcome
8:10 – 8:30	Update: Greenhouse Gas (GHG) Inventory
8:30 – 8:50	Update: Business-As-Usual (BAU) Projection
8:50 – 9:00	Update: Stakeholder Engagement
9:00 – 9:45	Discussion: GHG Reduction Targets
9:45 – 10:00	***Break***
10:00 – 10:50	Discussion: CCAP Measures
10:50 – 11:00	Timeline and Next Steps

Since we last spoke…

March 2024 PCAP Submission

- TDEC submitted the Priority Climate Action Plan (PCAP) to the U.S. EPA
- EPA accepted the PCAP
- You can access the Tennessee PCAP on the TVERS website

April 2024 Implementation Applications

- TDEC submitted two competitive implementation applications to the U.S. EPA to fund measures included in the PCAP
- TDEC was not awarded either implementation grant

Summer 2024 GHG Inventory Updates and Projections

- TDEC and CEC worked on refining and customizing the Greenhouse Gas (GHG) Inventory included in the PCAP
- A brief update on the GHG Inventory will be shared today

Fall 2024 Stakeholder and Public Engagement

- TDEC hosted a CCAP kickoff webinar in June 2024
- Throughout Fall 2024, TDEC will be presenting at partner meetings and participating in community events to re-engage the public on TVERS

PCAP Measures

Commercial and Industrial Buildings Efficiency

Residential Weatherization and Efficiency

Upgrading Electricity Distribution

Preventing Deforestation

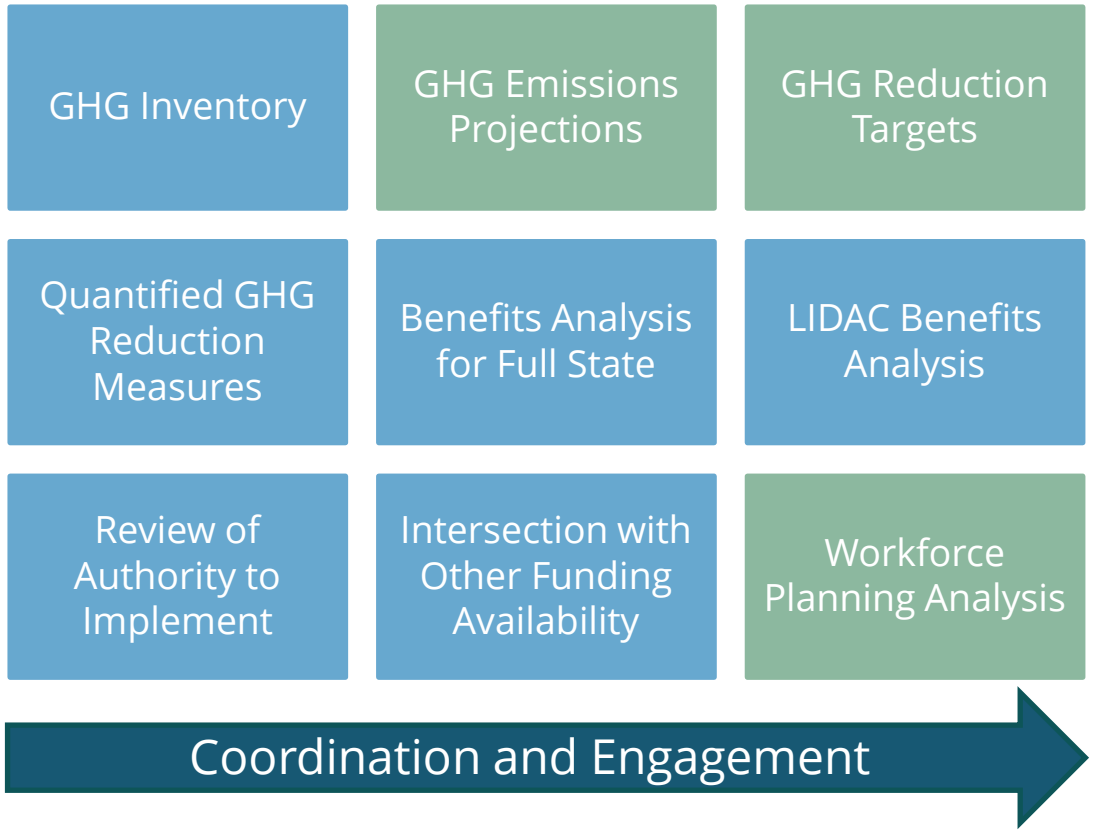
Electric Vehicle Adoption

Community EV Charging

Divert Food and Yard Waste

Renewable Energy Generation

Comprehensive Climate Action Plan (CCAP)



In PCAP, to be updated for CCAP

New Item for CCAP

ⓘ

TDEC's CCAP is due to the EPA in December 2025

Update: GHG Inventory

Inventory Process Realignment

1 Inventory Process Selections

Baseline Year

2019

2 Inventory Sectors

1. Transportation
2. Electricity Generation
3. Industry
4. Agriculture
5. Commercial and Residential Buildings
6. Waste and Materials Management
7. Wastewater
8. Land Use, Land Use Change, and Forestry

3 Inventory Methods

SIT Modules

The State Implementation Tool (SIT) modules:

- Developed by EPA
- Includes 12 modules

Emission Calculations

- Develop & document emission calculations methods as needed.

4 Quality Assurance Project Plan (QAPP)

Provides the methodology for developing a statewide Inventory of major sources of GHG emissions within Tennessee.

The CCAP QAPP was approved by EPA in May 2024.

CCAP Inventory Methodology

Data Gap Assessment

- Determine a significance threshold (5% of sector).
- Compile of list of significant subsectors.

Data Gathering

- Prepare data requests based on significant data gaps/uncertainties.
- Gather data from TN experts.
  - Data for state-wide and aligns with QAPP requirements.

Evaluate/Compile Data

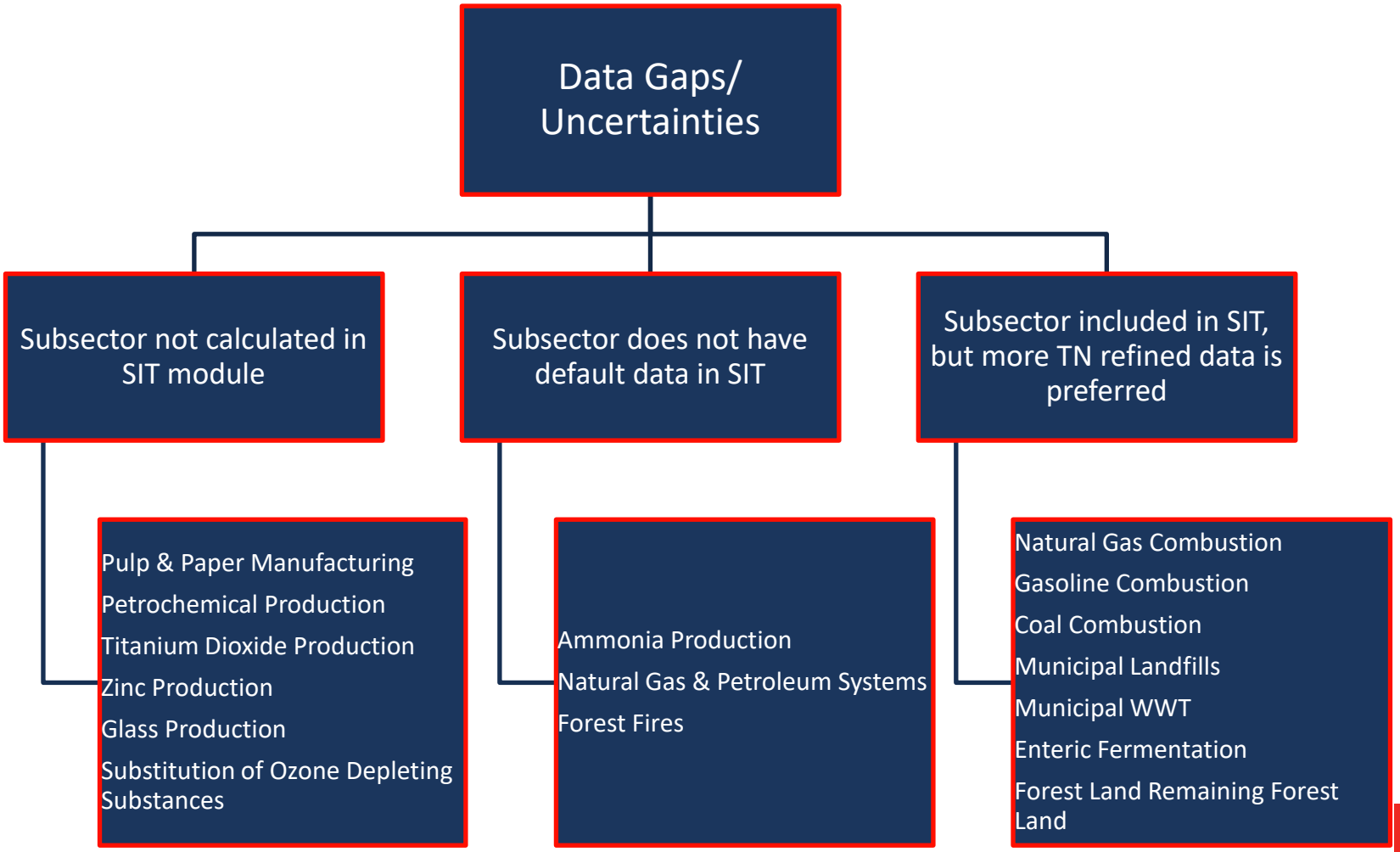
- Evaluate data quality against QAPP.
- Compile the data.

Calculations

- Calculate the GHG emissions.
- Compile the statewide inventory.
- QA the calculations based on QAPP.

Data Gap Assessment

From the PCAP inventory, we identified 3 data gaps/uncertainties. We assessed each data gap/uncertainty against a significance threshold (5% of the sector).



Inventory Enhancements

From our data gathering and discussions with experts, we made the following impactful enhancements to our inventory.

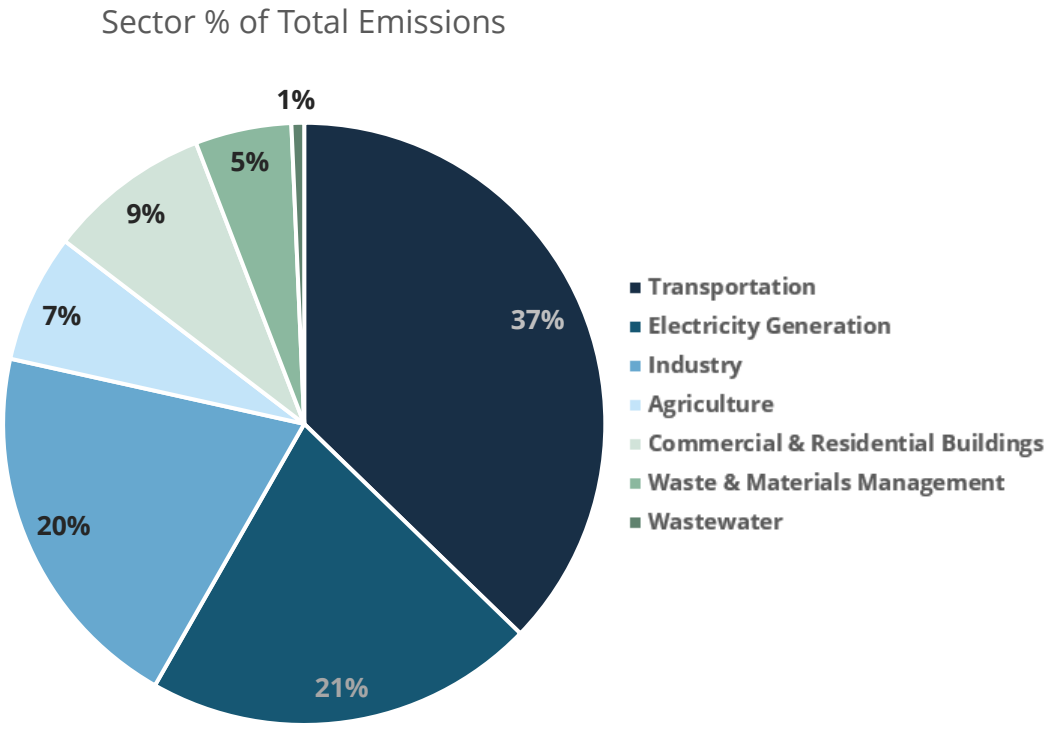
High Level Inventory Enhancements Overview	
Sector	**Changes**
Transportation	• Confirmation that US Energy Information Administration (EIA) fuel data is best state-available • Distribution of Substitution of Ozone Depleting Substances
Electricity Generation	• Incorporation of TVA provided data
Industry	• Incorporation of TN specific data (EPA Greenhouse Reporting Program (GHGRP)) • Included subsectors that previously did not have default data (e.g. pulp & paper, petrochemical, zinc, etc.)
Agriculture	• Confirmation that USDA information is best state-available • Evaluation of no-till vs till farming practice emissions
Commercial & Residential Buildings	• Confirmation that EIA fuel data is best state-available • Distribution of Substitution of Ozone Depleting Substances
Waste & Materials Management	• Incorporation of TN landfill data from TN Dept. of Solid Waste • Update of the methane generation rate (rate of decay)
Wastewater	• Incorporation of TN specific data (GHGRP)
Land use, Land-use Change, and Forestry (LULUCF)	• Confirmation that US Forest Inventory & Analysis data for land use is best state-available • Included subsectors that did not have default data (e.g. forest fires, wetlands).

CCAP Inventory – Total Emissions

The TN GHG CCAP Inventory with the baseline year of 2019 indicates that **Transportation** is the highest sector, followed by **Electricity Generation** and **Industry**. The top 3 sectors account for **78%** of total emissions.

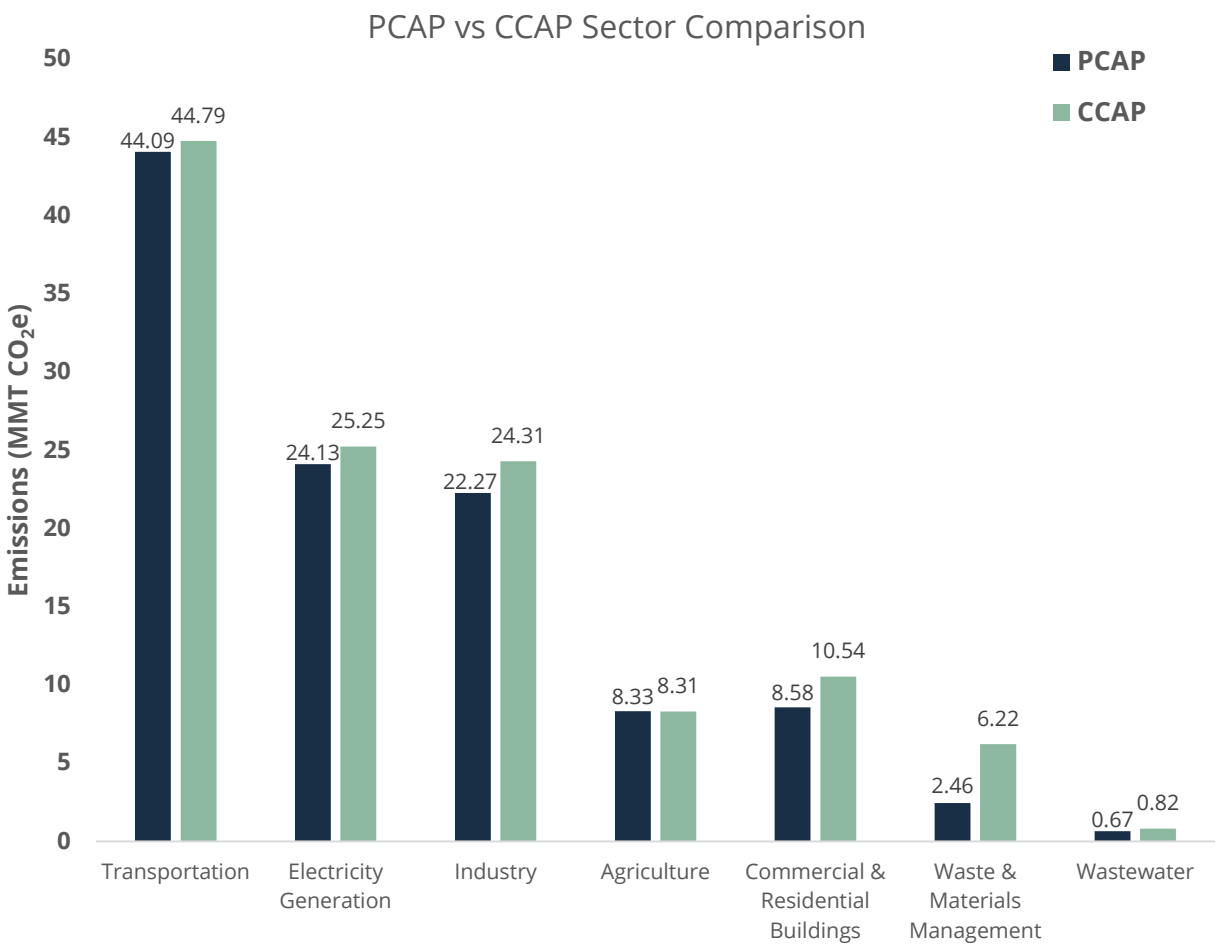
RY2019 Emissions (Million Metric Tonnes CO_2e)	
Pollutant	**Total**
Transportation	44.79
Electricity Generation	25.25
Industry	24.31
Agriculture	8.31
Commercial & Residential Buildings	10.54
Waste & Materials Management	6.22
Wastewater	0.82
Total Emissions	**120.22**

Total emissions do not include carbon sinks.
CO_2e = carbon dioxide equivalents



Preliminary Data

PCAP vs CCAP Inventory – Sector Emissions

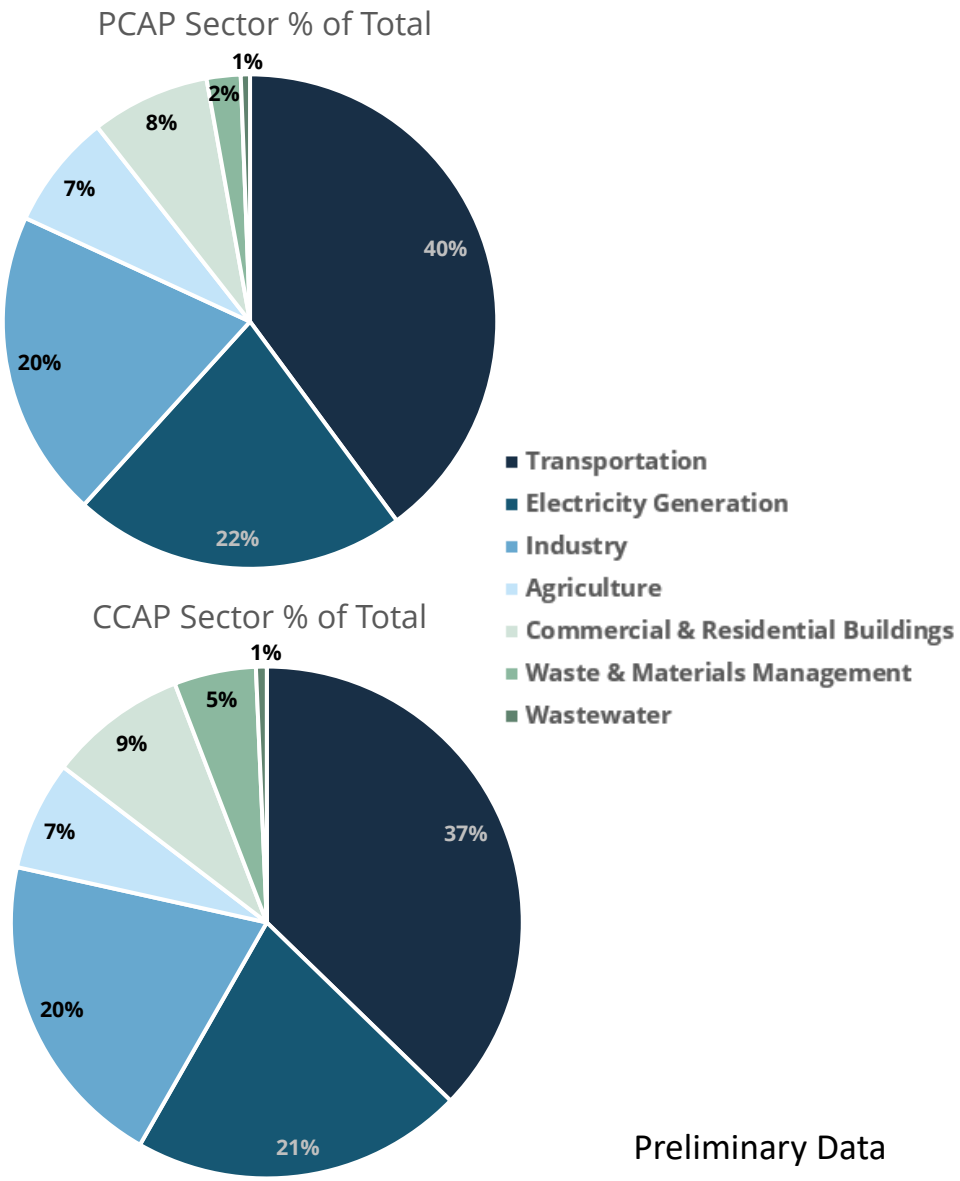


- Total Emissions increased by 9%.
- All sectors (except Ag) increased.
- Waste & Materials Management had the highest increase.

RY2019 Emissions (Million Metric Tonnes CO_2e)		
Sector	**PCAP**	**CCAP**
Transportation	44.09	44.79
Electricity Generation	24.13	25.25
Industry	22.27	24.31
Agriculture	8.33	8.31
Commercial & Residential Buildings	8.58	10.54
Waste & Materials Management	2.46	6.22
Wastewater	0.67	0.82
Total Emissions	**110.52**	**120.22**

Preliminary Data

PCAP vs CCAP Inventory – % of Total Emissions



- The top three sectors impacting the total emissions remained the same.
- Buildings and Waste Management have a larger impact on the CCAP Total Emissions.

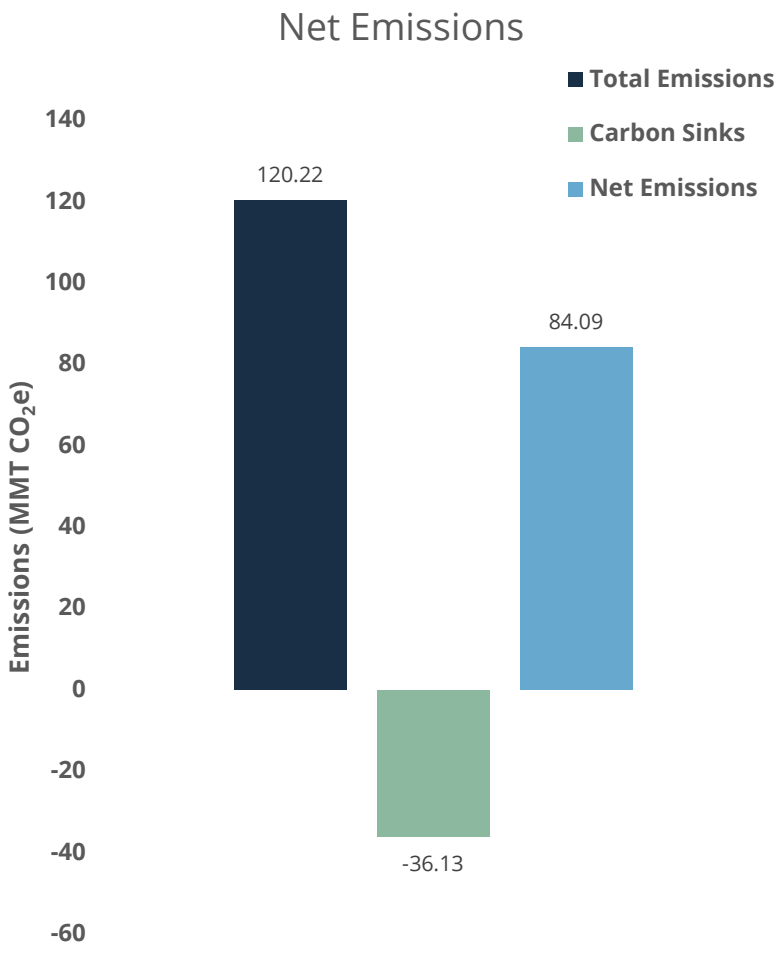
RY2019 Sector % of Total Emissions		
Sector	**PCAP**	**CCAP**
Transportation	40%	37%
Electricity Generation	22%	21%
Industry	20%	20%
Agriculture	7%	7%
Commercial & Residential Buildings	8%	9%
Waste & Materials Management	2%	5%
Wastewater	1%	1%

Preliminary Data

CCAP Inventory – Net Emissions

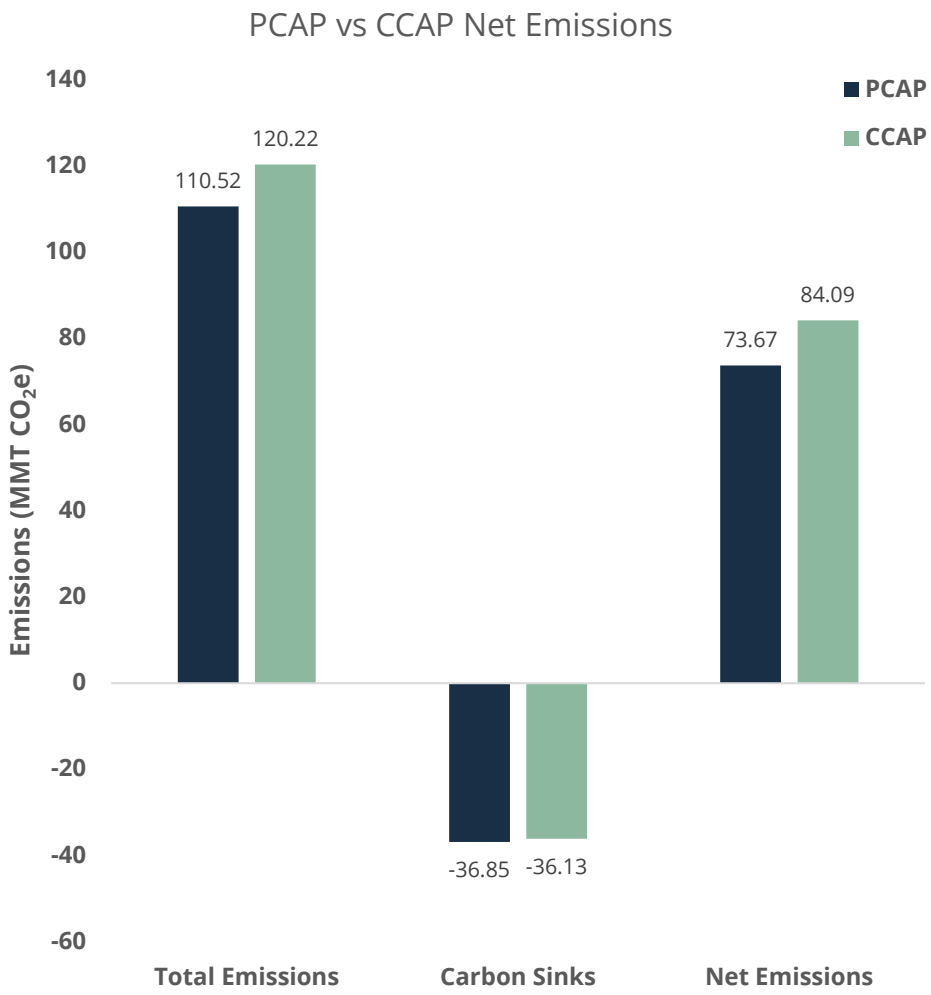
RY2019 Emissions (Million Metric Tonnes CO_2e)	
Total Emissions	**120.22**
Carbon Sinks	**-36.13**
Net Emissions	**84.09**

- Net Emissions include the contribution of the carbon sinks.
- Land use, Land-use Change, and Forestry (LULUCF) represent a carbon sink.
- LULUCF has a significant impact (–30% of the total emissions).



Preliminary Data

CCAP vs PCAP Inventory – Net Emissions



- Net Emissions increased by 14% (due to the increase in total emissions).
- Carbon sinks decreased slightly.

RY2019 Emissions (Million Metric Tonnes CO_2e)		
	PCAP	CCAP
Total Emissions	110.52	120.22
Carbon Sinks	-36.85	-36.13
Net Emissions	73.67	84.09

Preliminary Data

Questions?

Update: BAU Projection

Business as Usual (BAU) Process

BAU Definition

Development of the GHG emissions through 2050 under current best available information.

Methodology

- Based on statistical analysis
- 2019 Customized Inventory

Federal Policy Dependent – EIA Annual Energy Outlook

- Transportation
- Electric Power
- Industrial Combustion
- Commercial & Residential Combustion

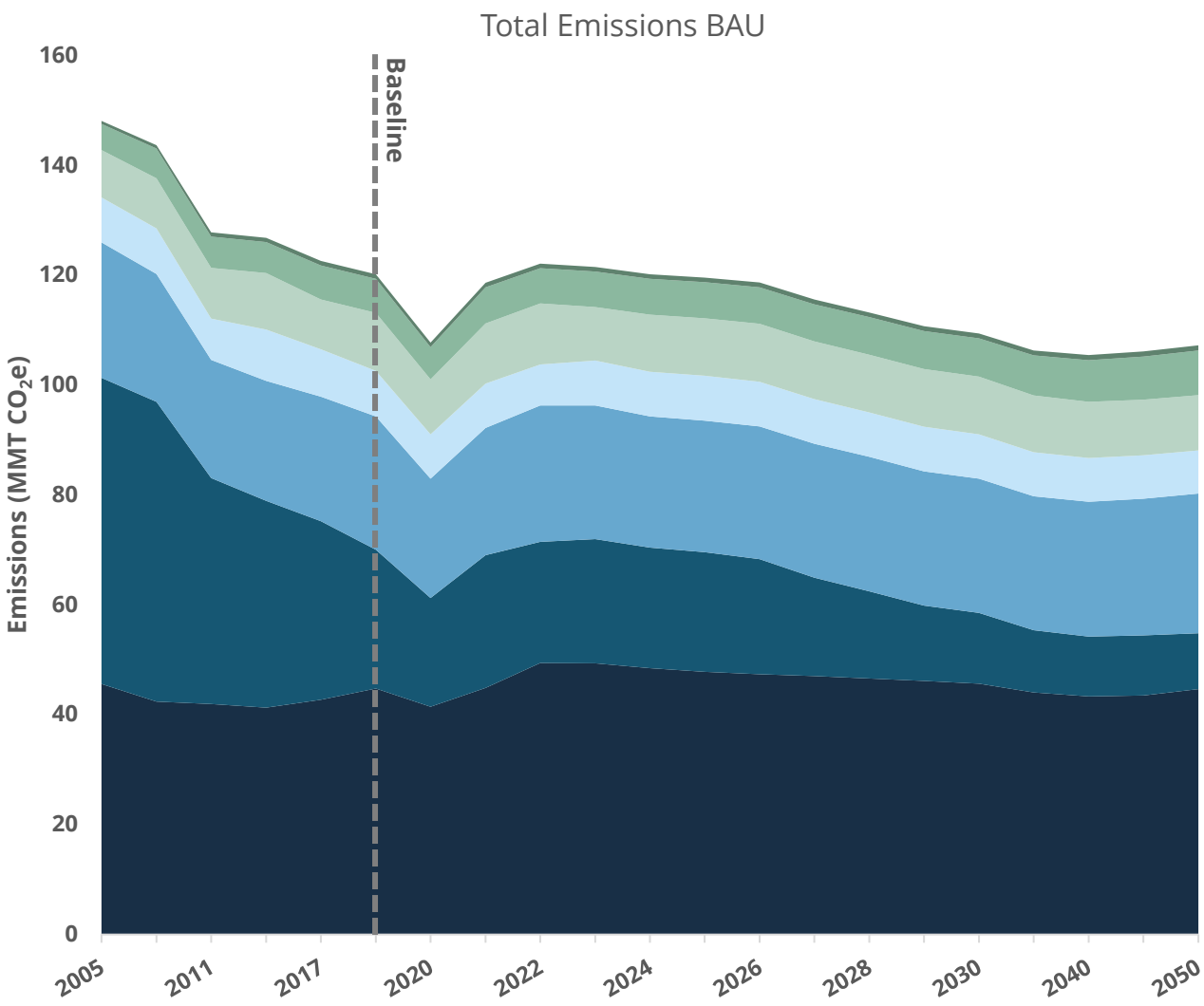
Historic Trends - Linear & Constant Statistics

- Agriculture
- Land Use
- Industrial Processes
- Waste
- Wastewater

Outcomes of BAU Analysis

Indicates estimated future trends by sector and cumulatively.

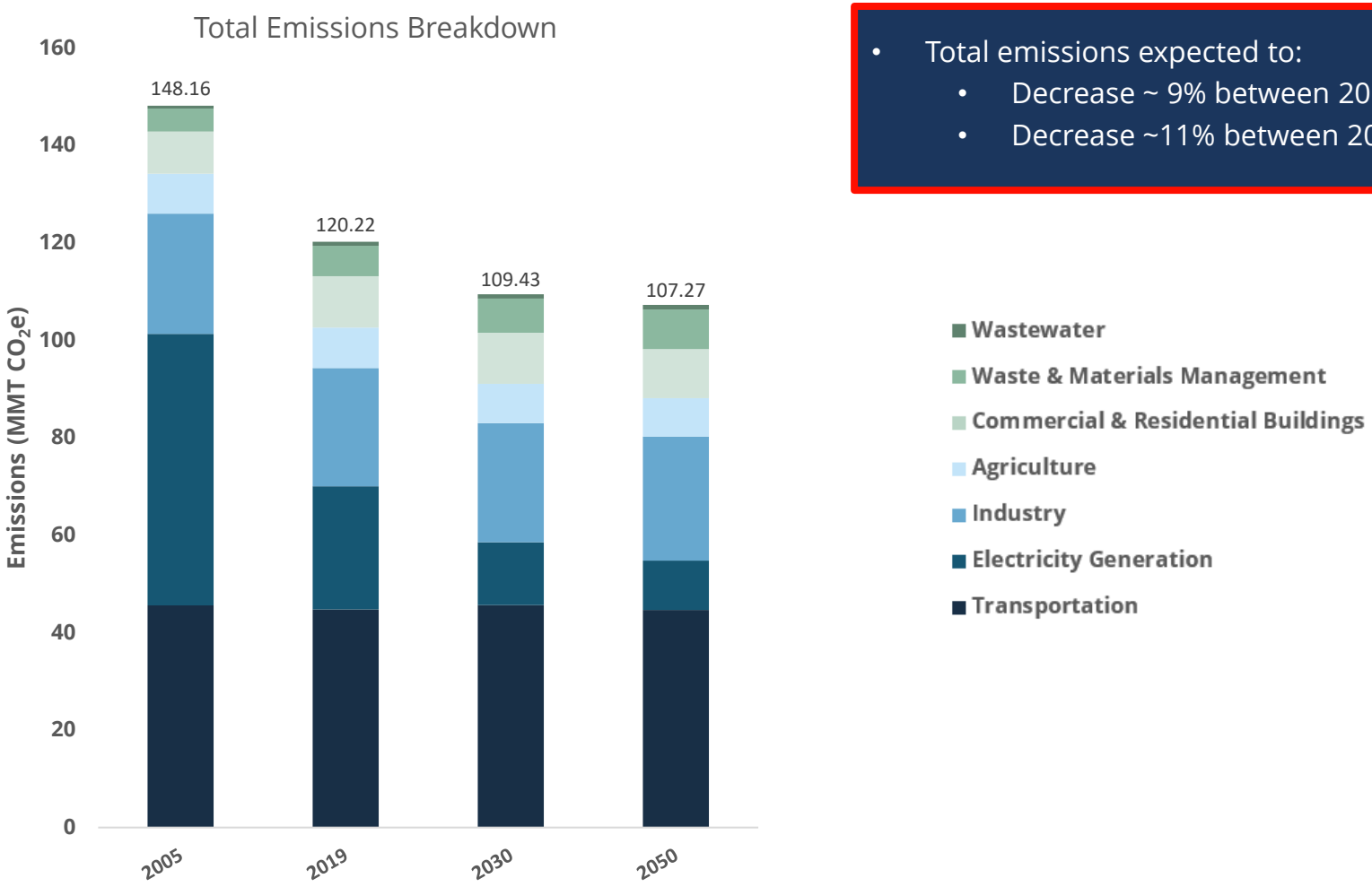
TN Total Emissions BAU



- Transportation remains the largest sector through 2050.
- Electricity Generation has the largest expected decrease through 2050.

Preliminary Data

TN Total Emissions BAU



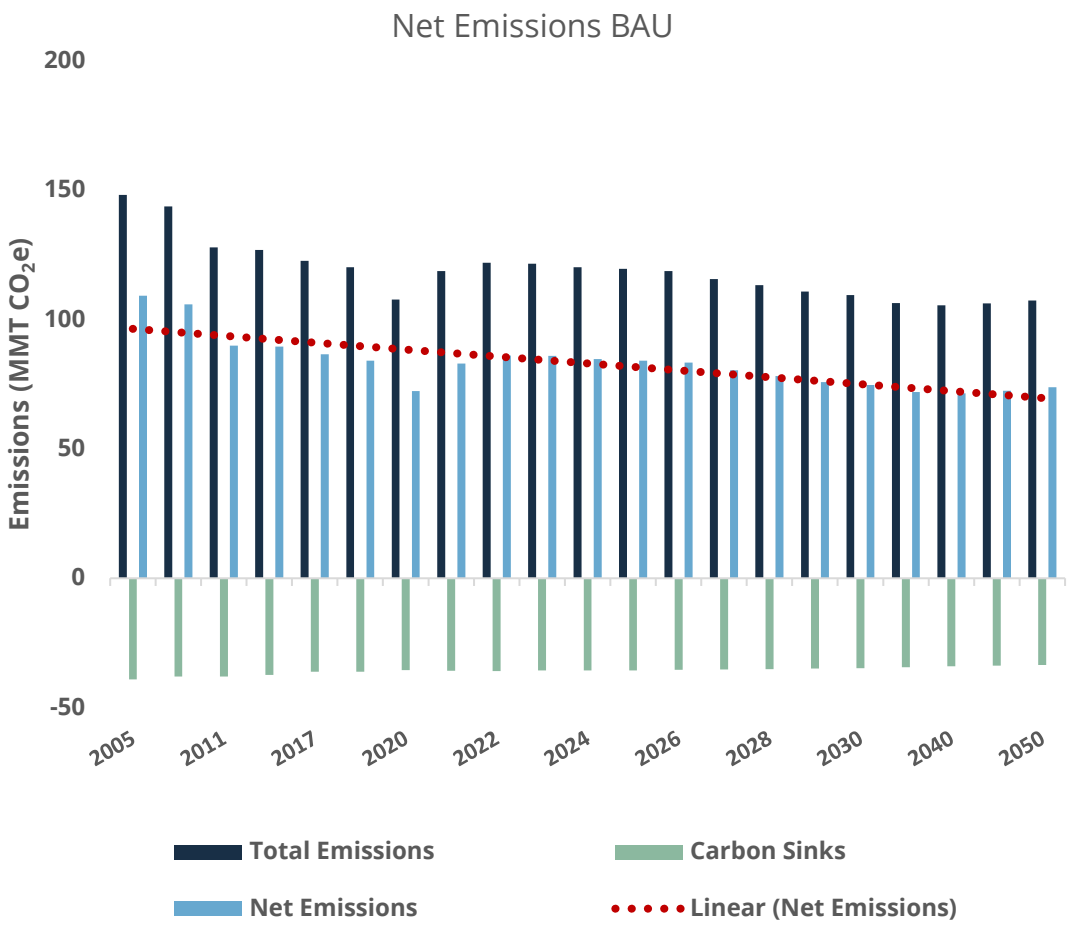
- Total emissions expected to:
  - Decrease ~ 9% between 2019 & 2030
  - Decrease ~11% between 2019 & 2050

Preliminary Data

TN Net Emissions BAU

- Net emissions expected to:
  - Decrease ~ 11% between 2019 & 2030
  - Decrease ~ 12% between 2019 & 2050
- Carbon sink expected to decrease (i.e., less carbon absorbed) ~ 7% between 2019 and 2050.

Net Emissions (Million Metric Tonnes CO_2e)				
	2005	2019	2030	2050
Total Emissions	148.16	120.22	109.43	107.27
Carbon Sinks	-39.02	-36.13	-34.72	-33.47
Net Emissions	109.14	84.09	74.71	73.80



Preliminary Data

Questions?

Update: Stakeholder Engagement

Public Outreach Events

432

In-Person Participants

Community Events

9

Partner Presentations

5

Online Survey

Tennessee Volunteer Emission Reduction Strategy (TVERS)
Public Input Survey

The State of Tennessee is currently developing a comprehensive plan through the Tennessee Volunteer Emission Reduction Strategy (TVERS) to reduce air emissions and pollution. The comprehensive plan builds from a priority plan completed in Spring 2024. Tennessee's plan supports investments in voluntary strategies that reduce emissions, strengthen the workforce, spur economic growth, and enhance health and quality of life. Thanks for sharing your input to support a plan that is right for Tennessee.

* 1. Which sectors should TDEC prioritize when developing voluntary actions to lower GHG emissions for inclusion in the comprehensive plan?

* 2. Choose two new actions that Tennessee should consider for inclusion in the comprehensive plan that are best for you or your community.

3. Please share additional actions that Tennessee should consider for inclusion in our comprehensive plan.

To support Tennessee's voluntary GHG emissions reduction targets, in the questions below indicate whether Tennessee's targets should include more or less reductions during the specified time period.

4. Over the next 10 years?

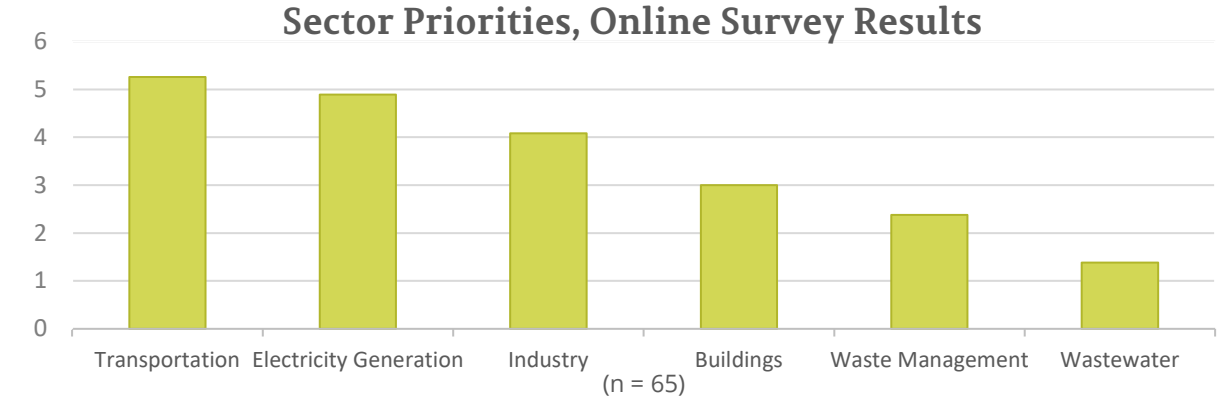
Less reductions — More reductions

5. Over the next 25 years?

65

Participants

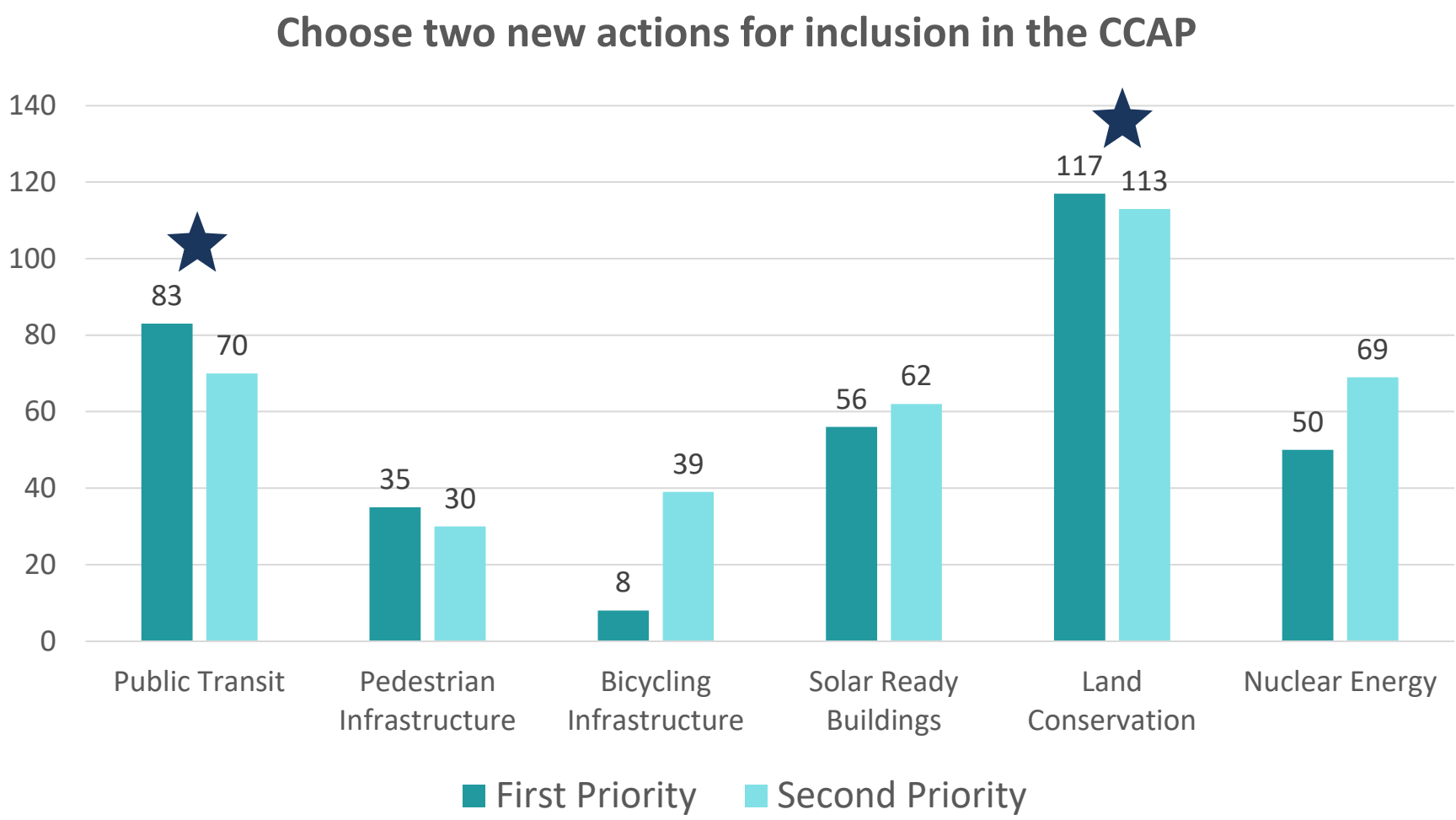
Public Feedback: Sectors



- Participants were shown the PCAP GHG Inventory and asked which sectors TDEC should prioritize when developing voluntary actions for the CCAP.
- Participants overwhelmingly chose transportation as a major priority.
  - Many chose waste management as their second

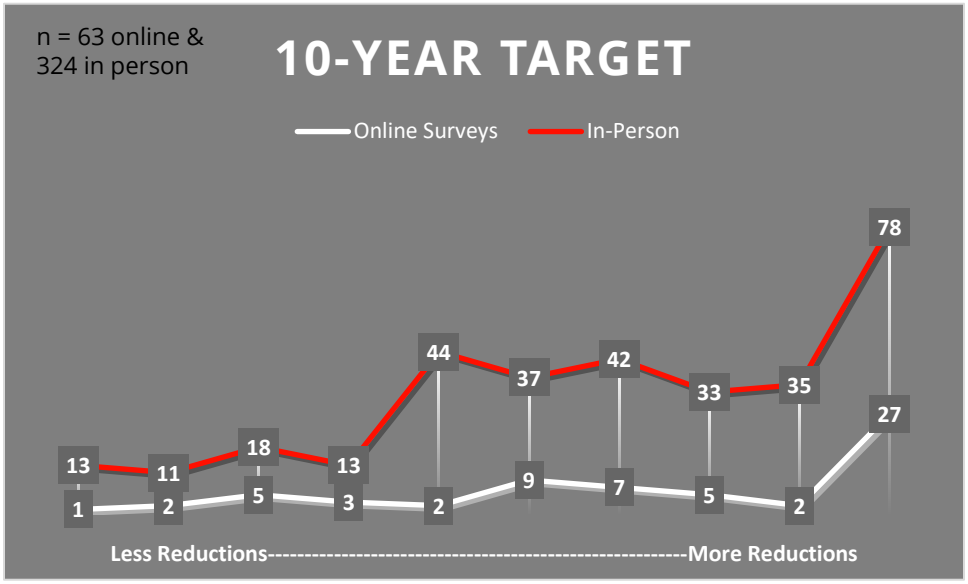
Note: Agriculture/ Natural and Working Lands was unintentionally excluded from this question in the online survey.

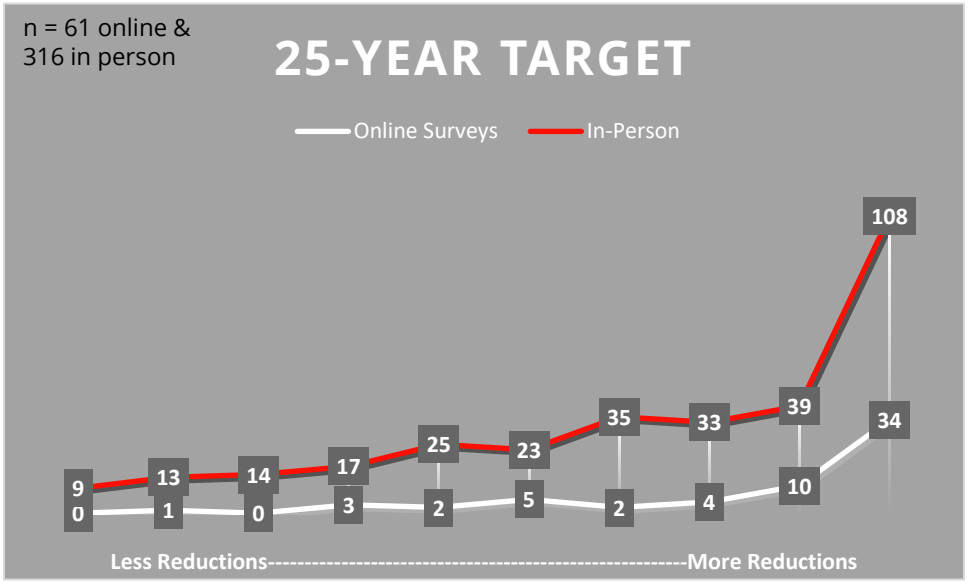
Public Feedback: Measures



★ Top measures/ actions identified for CCAP inclusion in online survey

Public Feedback: Targets





- Participants were asked whether CCAP targets should include more or less reductions on a scale of 1 to 10.
  - Some described it as a reduction percentage or how ambitious the targets should be.
- Participants felt that a short-term target should not be overly ambitious, since there isn't much time to achieve it.
- Participants felt that a long-term target should be more ambitious, with the majority expressing interest in eliminating emissions in the long-term.

Questions?

Discussion: GHG Reduction Targets

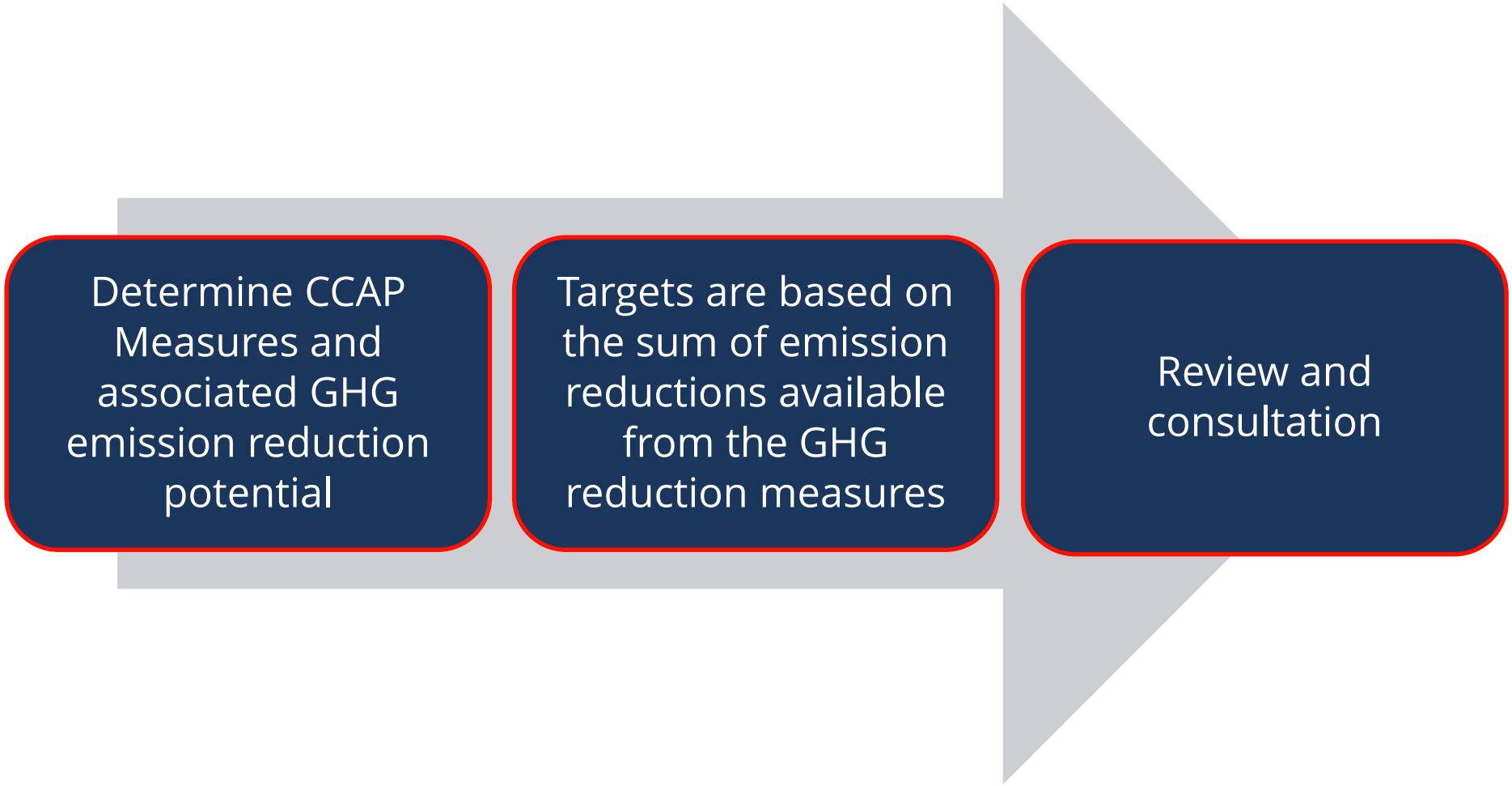
GHG Targets: Requirements

- Set economy-wide GHG emission reduction targets
  - near-term (e.g., 2030-2035)
  - long-term (e.g., 2050)
- EPA is not requiring a specific reduction target, but targets should not be inconsistent with the U.S. commitments to reduce emissions 50-52% relative to by 2030 and to reach net-zero emissions by 2050.
- Actionable, Ambitious, Achievable
- *Note: targets are not binding and there are no consequences for not meeting targets*

Existing Plans & Priorities

- Tennessee does not have existing GHG targets
- Target setting can be top-down or bottom up or a hybrid or iterative approach
- Target setting is informed by:
  - Local climate and sustainability plans
  - TVA Valley Pathways Study
  - Neighboring state targets
  - Organizational sustainability goals
  - Public and stakeholder engagement

TVERS Target Approach: Bottom-Up



Target = Reduce economy-wide emissions by **[X percent]** below 2019 emission by 2030/2050

Break – 15 minutes

Discussion: CCAP Measures

What is a measure?

- Activity or program to reduce GHG pollution and other co-pollutants

Commercial and Industrial Buildings Efficiency

Residential Weatherization and Efficiency

Upgrading Electricity Distribution

Preventing Deforestation

Electric Vehicle Adoption

Community EV Charging

Divert Food and Yard Waste

Renewable Energy Generation

- For the CCAP, not every measure needs to have modeled GHG emission reductions

Priority Plan to Comprehensive Plan

Priority Plan

- 11 measures across 6 sectors
- Focused on *near-term* and *implementation-ready* programs
- All programs currently existed in Tennessee
- Modeled full implementation across the state ("The art of the possible")

Comprehensive Plan

- At least 1 measure must be included from all sectors
- Measures can be *near-term* or *long-term* in nature (planning period extends through 2050)
- Open to keeping the PCAP measures and including new measures/programs
- Modeled emission reductions will be used to support reduction targets for 2030 and 2050

Ongoing Measure Selection Process

Emission Reduction Measures Inventory

250+ emission reduction measures aggregated from EPA guidance, national policies, and review of measures included in state and local plans

PCAP Measures

Near-term, implementation-ready

- Partner Program Survey
- GHG Inventory
- Public & Stakeholder Engagement
- Implementation Grant Priorities

Stakeholder Engagement

- Partner Discussions
- Sector Subject-Matter Expert Roundtables
- ERPAC
- Alignment with existing state plans and priorities

Public Engagement

PCAP and CCAP

- Surveys
- In-Person Events
- Public Meetings

CCAP DRAFT Measures

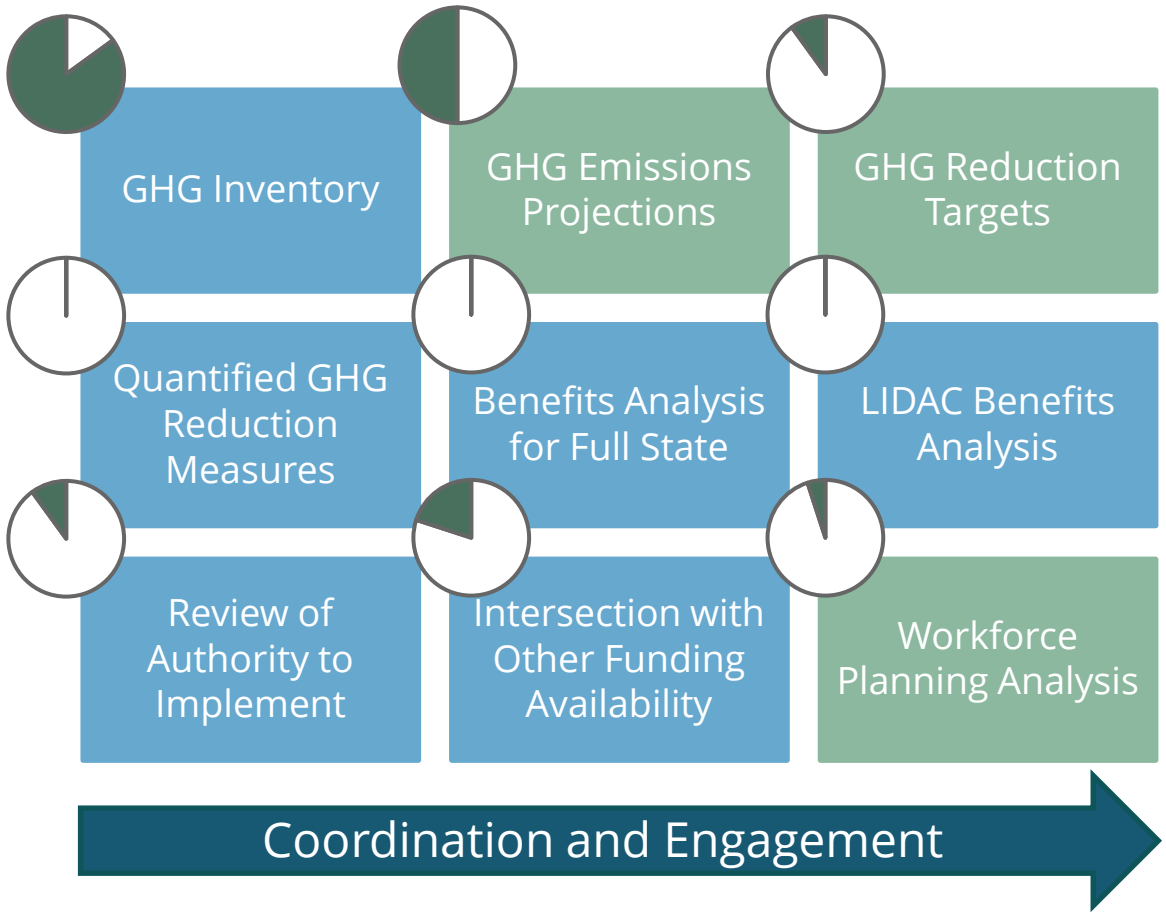
	Keeping from PCAP	NEW: Under Consideration for CCAP

Buildings	• Building energy efficiency enhancements
	  • Residential
	  • Commercial
	• Weatherization programs for residential buildings
		• Geothermal for buildings
		• Ensuring buildings are solar-ready and electric vehicle-ready

Industry	• Building energy efficiency enhancements (Industrial)	*TDEC is exploring additional measures in this space due to public interest, we welcome feedback and input from the ERPAC*
Agriculture		• Soil management practices (cover crops) • Farmland preservation • Electrification of small farm equipment • Anaerobic digestion for agricultural operations
Electricity Generation	• Solar and storage (distributed and utility-scale)	• Nuclear energy • Nuclear fusion (no emission reductions by 2050, but consideration for workforce analysis)
Trans-portation	• Light-duty electric vehicle adoption • Medium- and heavy-duty electric vehicle adoption • Expansion of electric vehicle charging infrastructure	• Mass transit (bus and bus rapid transit) • Active transportation (biking and walking) • Alternative fuels – hydrogen, sustainable aviation fuel • Traffic congestion management
Land Use	• Preserving forestlands	• Urban afforestation • Forest management practices • Wetlands conservation • Grasslands conservation
Wastewater		• Wastewater treatment plant energy efficiency improvements
Waste Management	• Organics and food waste reduction and diversion	• Landfill methane gas recovery • Biochar

Timeline and Next Steps

Comprehensive Climate Action Plan (CCAP)



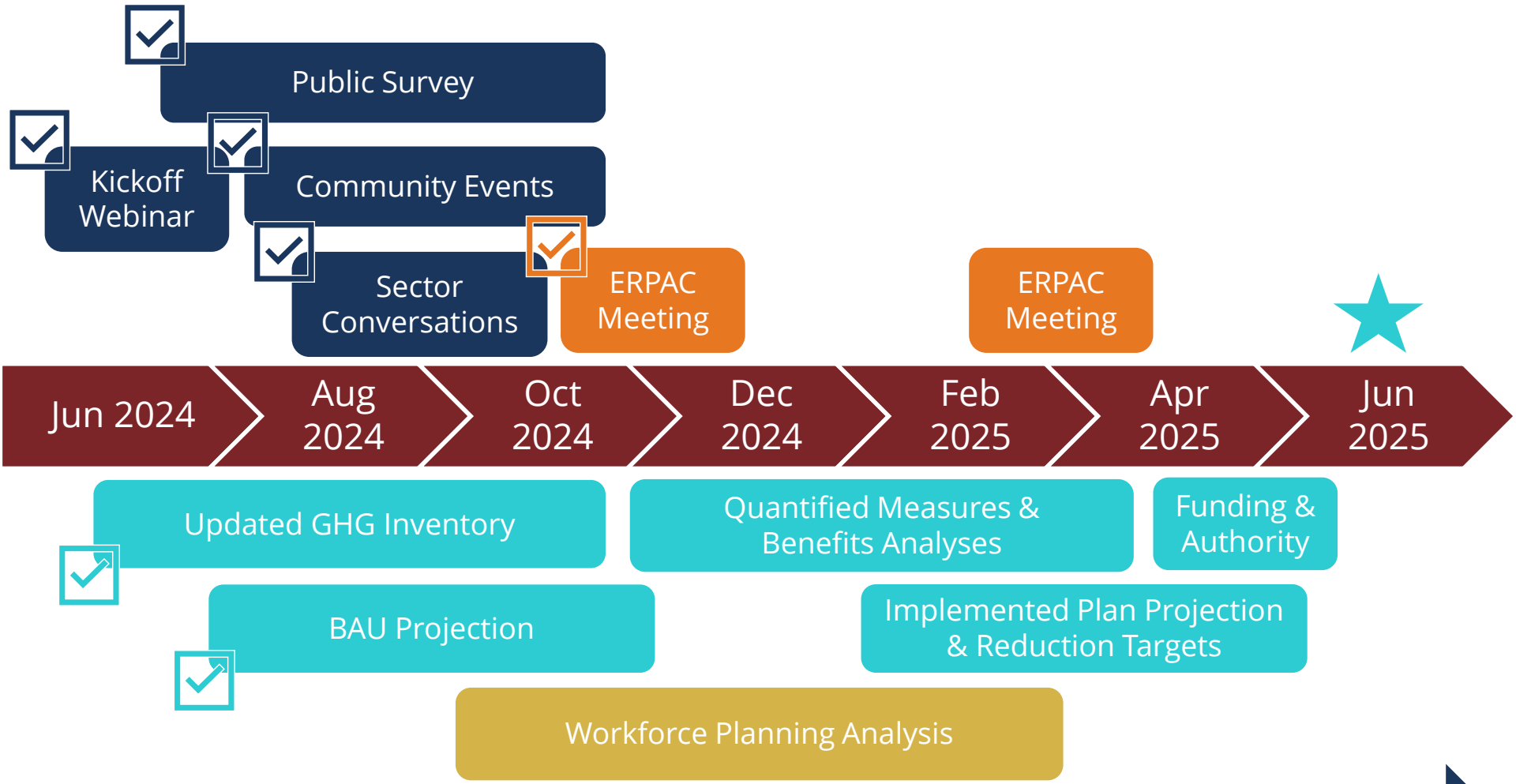
In PCAP, to be updated for CCAP

New Item for CCAP

ⓘ

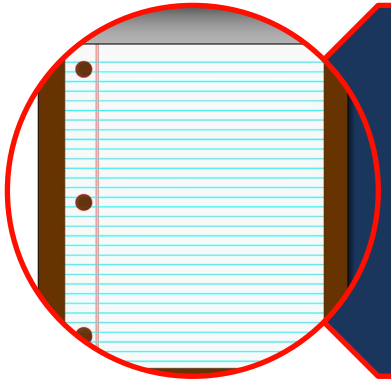
TDEC's CCAP is due to the EPA in December 2025

CCAP Timeline (*Tentative*)



Next Steps & Action Items

- Next ERPAC Meeting will be tentatively scheduled for March 2025
  - We may schedule an additional meeting before submitting the CCAP to the EPA
- Action Items and Key Dates
  - Please email any additional questions or feedback to TDEC.TVERS@tn.gov by Friday, November 15



June 2025 (*tentative*)

Comprehensive Climate Action Plan Due

Questions?

tn.gov/environment/policy/tvers.html

tdec.tvers@tn.gov

Signup for our listserv