Department of Environment & Conservation

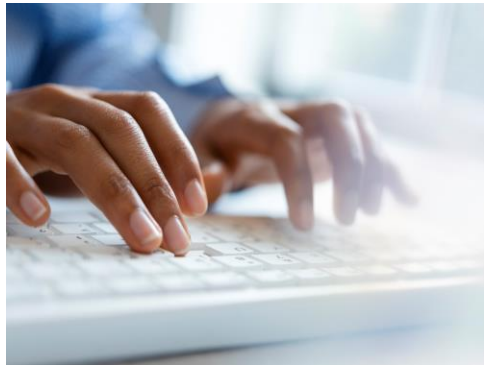
Emission Reduction Planning Advisory Committee

Meeting #5

August 28, 2025

Housekeeping

- Today's slides will be emailed to you and placed on the TVERS website.



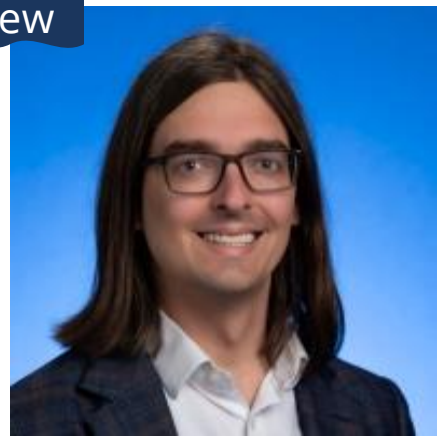
- ❑ **Share your name, title, and organization in the chat.**
- ❑ **Type any questions in the chat, and we will address them at the end of each section.** *In addition, there will be a designated time for discussion.*

- Below are the options available during the Teams meeting:

Chat box | Raise hand | Mute/unmute microphone | Leave meeting

Meet the TVERS Team!

New



Peter Murrey
Director,
Office of Policy and Planning

New

Emma Bartolo
Policy Analyst,
Office of Policy and Planning

Kris Macoskey
Vice President,
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Jenny Rickford O'Brien
Project Manager,
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Michelle Owenby,
Director,
Division of Air Pollution Control

Molly Cripps
Director,
Office of Energy Programs

Mary-Margaret Chandler
Business Administrator,
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Tara Pedraza,
Director,
Division of Stakeholder Engagement

Nikki Thompson
Grants Contracts Administrator,
Division of Air Pollution Control

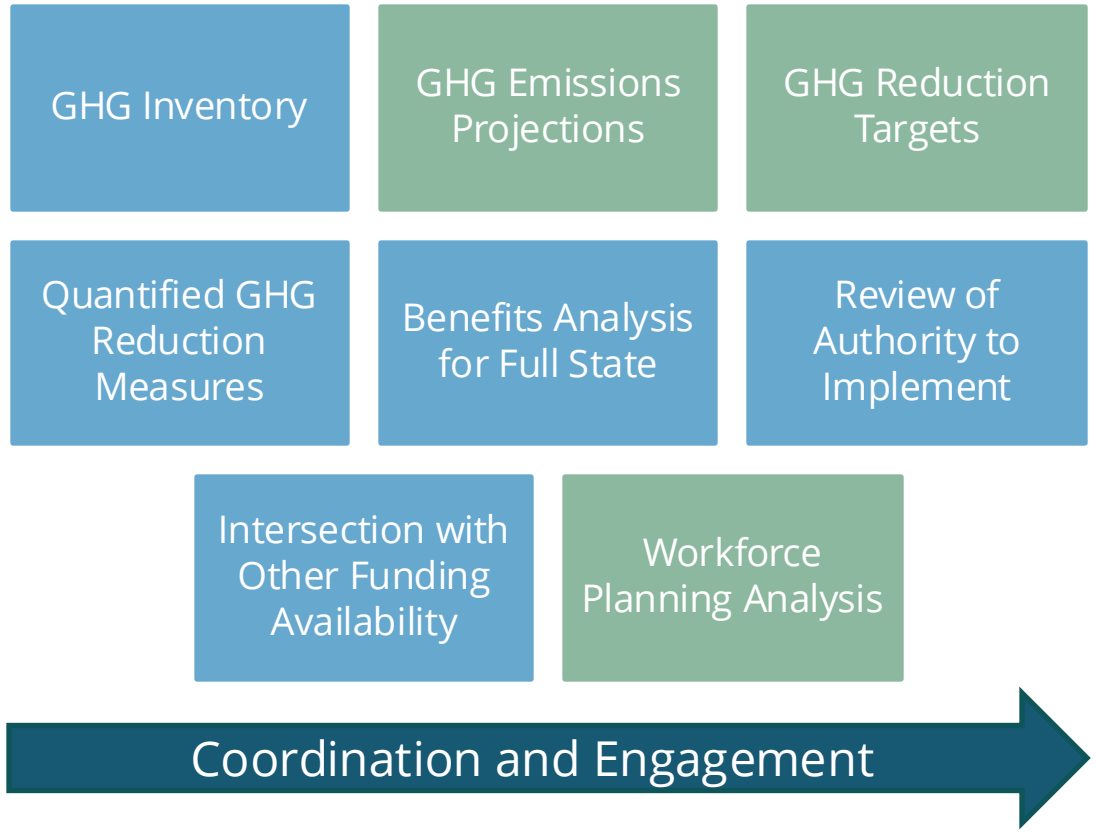
Michelle Oakes
Regulatory Development,
Division of Air Pollution Control

Travis Blake
Environmental Fellow,
Division of Air Pollution Control

Meeting Agenda

Time (CT)	Agenda Item	Topics to Cover
10:30 – 10:40	Welcome	
10:40 – 10:50	Comprehensive Plan Overview	• Comparison of Priority to Comprehensive Plan Element
10:50 – 11:00	GHG Inventory & Projections	• Significant changes from the Priority Inventory • Projections
11:00 – 11:30	GHG Reduction Measures Overview	• Summary of measures by Inventory Sector • Near-term and Long-term cumulative GHG reductions • Co-pollutant reductions
11:30 – 11:40	**Break**	
11:40 – 11:55	GHG Reduction Targets	• Economy-wide short- and long-term goals
11:55 – 12:05	Workforce Planning Analysis	• Overview of findings
12:05 – 12:25	Discussion	• Feedback on measures and targets
12:25 – 12:30	Completion Schedule	• Remaining milestones

Comprehensive Plan



In PCAP, to be updated for Comprehensive Plan

New Item for Comprehensive Plan

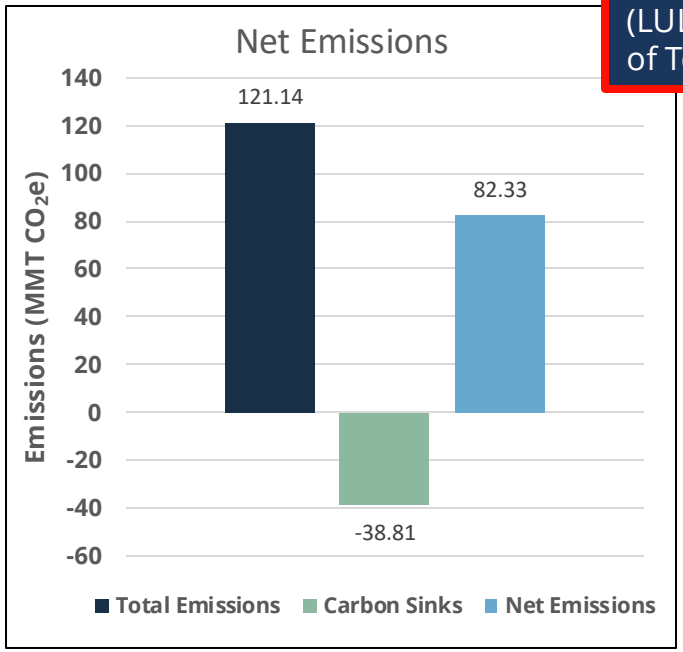
TDEC's CCAP is due to the EPA December 1, 2025

GHG Emission Inventory & Projections

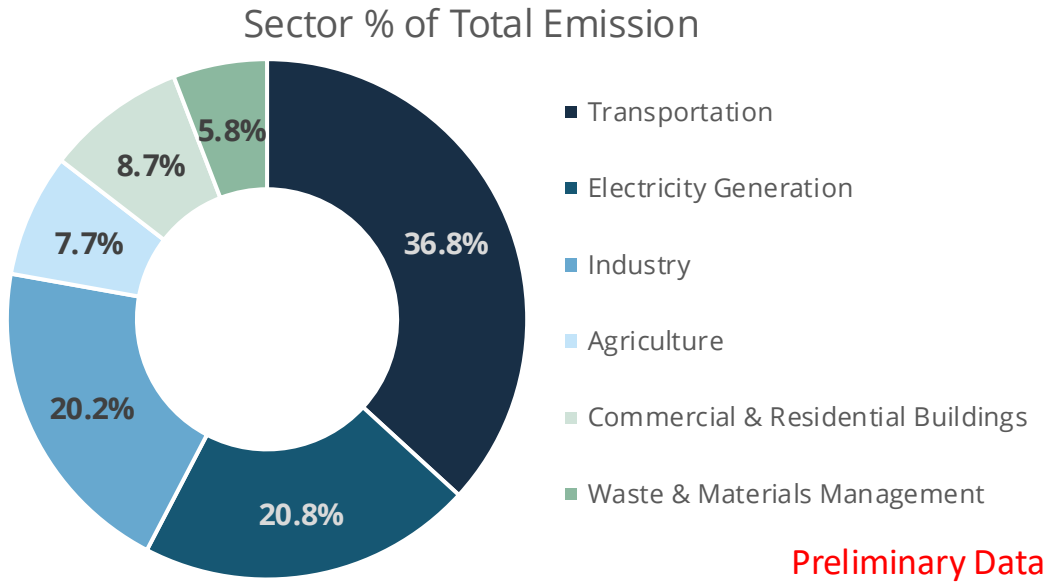
Comprehensive GHG Inventory

2019 GHG Inventory (MMT CO_2e)					
Pollutant	**CO_2**	**CH_4**	**N_2O**	**Other**	**Total**
Transportation	44.10	0.06	0.43	0.00	44.58
Electricity Generation	25.16	0.01	0.08	0.00	25.25
Industry	20.37	3.67	0.07	0.32	24.43
Agriculture	0.48	3.60	5.20	0.00	9.27
Commercial & Residential Buildings	10.43	0.09	0.02	0.00	10.54
Waste & Materials Management	-0.71	7.64	0.15	0.00	7.08
Land Use, Land Use Change, & Forestry	-38.97	0.02	0.15	0.00	-38.81
Total Emissions	**99.81**	**15.06**	**5.94**	**0.32**	**121.14**
Net Emissions	**60.84**	**15.08**	**6.09**	**0.32**	**82.33**

TN Carbon Sink (LULUCF) is -32% of Total Emissions



The top 3 sectors account for 78% of total emissions

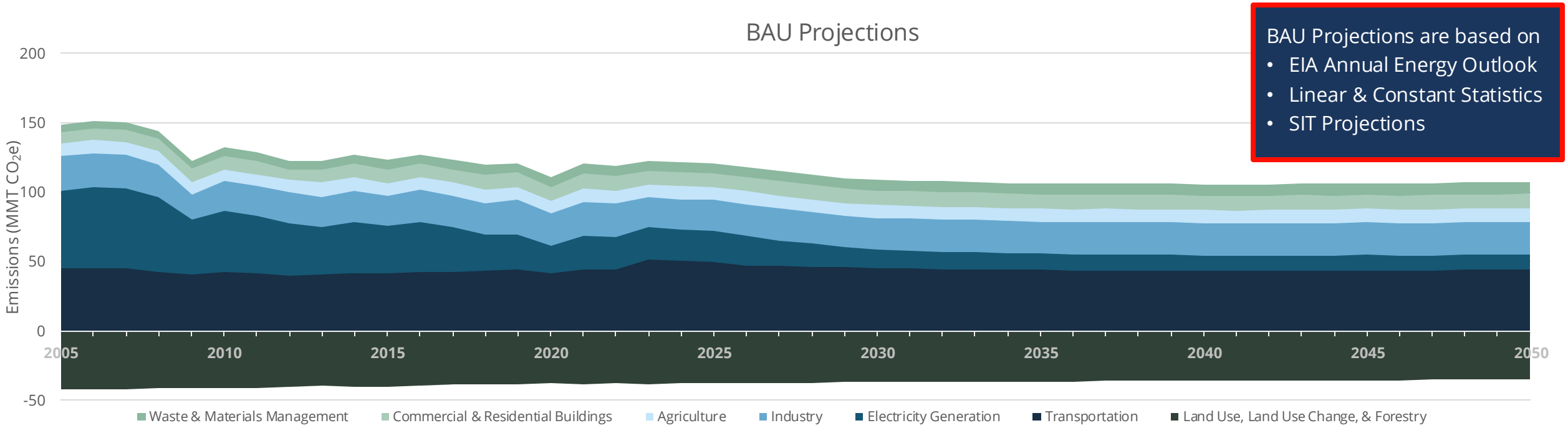


Preliminary Data

Inventory Reminders:

- The baseline year is 2019.
- Utilized TN specific activity data from TN experts.
- Emissions were derived utilizing SIT modules and other calculation methodologies.

Business-as-Usual Projections



BAU Projections are based on
- EIA Annual Energy Outlook
- Linear & Constant Statistics
- SIT Projections

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

Annual Emissions by Sector (MMT CO_2e)					% Difference
Sector	**2005**	**2019**	**2030**	**2050**	**2005 - 2050**
Transportation	45.13	44.58	45.47	44.47	-1%
Electricity Generation	55.74	25.25	13.19	10.45	-81%
Industry	24.79	24.43	22.83	23.80	-4%
Agriculture	9.17	9.27	9.38	9.90	8%
Commercial & Residential Buildings	8.67	10.54	10.47	10.08	16%
Waste & Materials Management	5.21	7.08	7.58	8.76	68%
Land Use, Land Use Change, & Forestry	-42.32	-38.81	-37.05	-35.17	17%
Total Emissions	**148.72**	**121.14**	**108.91**	**107.46**	**-28%**
Net Emissions	**106.41**	**82.33**	**71.86**	**72.30**	**-32%**

Preliminary Data

GHG Reduction Measures Overview

Reduction Measures Key Points

- Reduction Measures are strategies to reduce GHG emissions.
- All measures are voluntary.
- Measures were derived from existing institutionalized programs.
- TDEC has not anticipated any rulemaking to implement measures.
- Implementation schedules are based on best available information or statistical trend assumptions.

GHG Reductions by Sector and Measure

Measure			Comprehensive Plan (MMT CO_2e)		
Sector	**Measure**	**Name**	**2025 - 2030**	**2025 - 2050**	**Annual Average**
Transportation	1.1	Electrification of Light-Duty Vehicles	-2.22	-55.90	-2.15
	1.2	Electrification of Medium and Heavy-Duty Vehicles	-0.73	-9.80	-0.38
	1.3	Mode Shifting	-0.02	-0.75	-0.03
	1.4	Traffic Congestion Management	-0.08	-2.25	-0.09
Electricity Generation	2.1	Solar Energy	-0.46 to -1.29	-7.28 to -36.82	-0.28 to -1.42
	2.2	Nuclear Energy	+0.09 to +0.01	-31.39 to -155.79	-1.21 to -5.99
Industry	3.1	Industrial Energy Efficiency & Demand Response	-0.01 to -0.26	-0.05 to -2.64	-0.002 to -0.10
Agriculture	4.1	Cropland Preservation	-0.90	-8.50	-0.33
	4.2	Cropland Management Practices	-0.42	-1.81	-0.07
Commercial & Residential Buildings	5.1	Commercial Energy Efficiency & Demand Response	-0.002 to -0.12	-0.03 to -1.36	-0.001 to -0.05
	5.2	Residential Energy Efficiency & Demand Response	-0.002 to -0.17	-0.04 to -3.24	-0.002 to -0.12
Waste & Materials Management	6.1	State-Wide Waste Diversion	-0.06	-1.74	-0.07
Land Use, Land Use Change, & Forestry	7.1	Urban Afforestation	-0.07	-1.19	-0.05
	7.2	Forest Management & Preservation	-17.97	-157.05	-6.04
	7.3	Grasslands Conservation	-1.45	-8.45	-0.32
Total			**-24.30 to -25.75**	**-286.23 to -447.29**	**-11.03 to -17.21**

Preliminary Data

Transportation Reduction Measures

Measure	Name
1.1	Electrification of LD Vehicles
1.2	Electrification of MD & HD Vehicles
1.3	Mode Shifting
1.4	Traffic Congestion Management

Cumulative Emissions by Measure

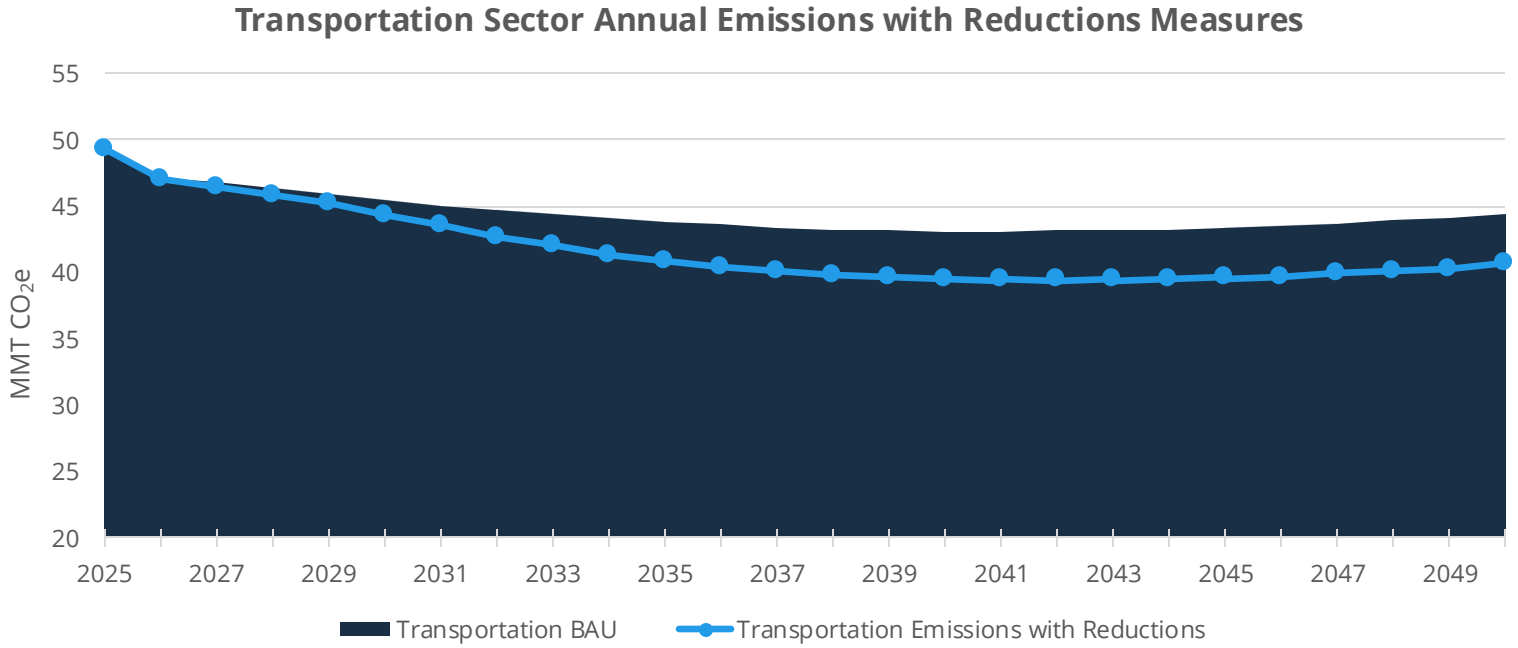
Pollutant		Cumulative Emissions 2025 - 2050			
ID	Units	1.1	1.2	1.3	1.4
CO_2e	MMT CO_2e	-55.90	-9.80	-0.75	-2.25
PM_{10}	Short Tons	--	165	-121	-274
$PM_{2.5}$	Short Tons	3,051	173	-24	-41
SO_2	Short Tons	9,786	357	--	--
NO_x	Short Tons	-22,194	-14,227	-273	-162
VOC	Short Tons	-51,754	-1,167	-152	-248
CO	Short Tons	--	-8,639	-4,105	-7,570

-- Indicates pollutant was not modeled

Approach: Modeled using AVERT, AFLEET, CMAQ, and calculations

Geographic Scope: varies from Statewide to MSA level

Existing Program: Drive Electric, MSA Specific Transits Plans, TDOT



Summary of Transportation

Pollutant		Cumulative (2025 thru date)	
ID	Units	2030	2050
CO_2e	MMT CO_2e	-3.06	-68.70
PM_{10}	Short Tons	-0.5	-230
$PM_{2.5}$	Short Tons	131	3,160
SO_2	Short Tons	418	10,142
NO_x	Short Tons	-1,956	-36,856
VOC	Short Tons	-2,160	-53,321
CO	Short Tons	-993	-20,314

Preliminary Data

Electricity Generation Reduction Measures

Measure	Name
2.1	Solar Energy
2.2	Nuclear Energy

Utilized TVA Draft IRP for analysis.
- Scenario A = Case 5E
- Scenario B = Case 2E

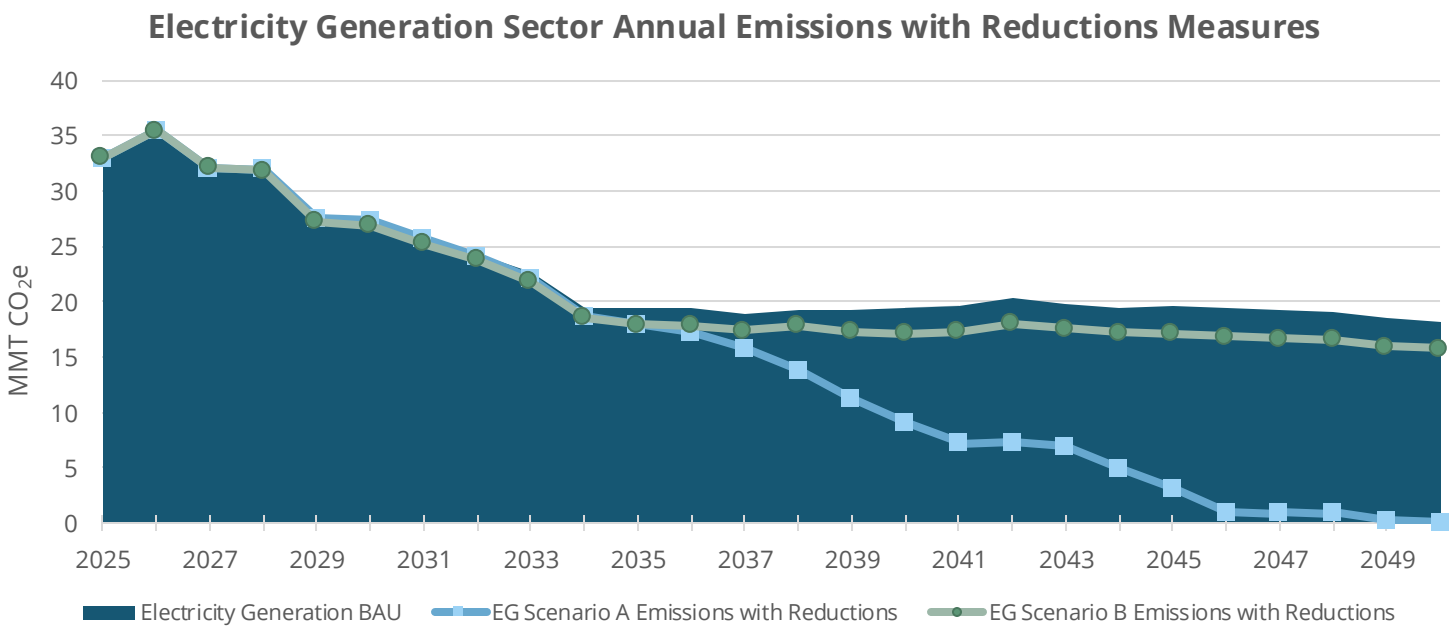
Both scenarios compared against Case 2A

Cumulative Emissions by Measure					
Pollutant		Cumulative Emissions 2025 - 2050			
ID	Units	2.1 (Scenario A)	2.1 (Scenario B)	2.2 (Scenario A)	2.2 (Scenario B)
CO_2e	MMT CO_2e	-36.8	-7.3	-155.8	-31.4
PM_{10}	Short Tons	-1,304	-250	-5,527	-1,114
$PM_{2.5}$	Short Tons	-1,304	-250	-5,527	-1,114
SO_2	Short Tons	-672	-129	-2,847	-574
NO_x	Short Tons	-1,957	-376	-8,291	-1,670
VOC	Short Tons	-415	-80	-1,759	-354
CO	Short Tons	-2,965	-569	-12,562	-2,531

Approach: Calculated natural gas emissions that could occur in absence of solar or nuclear energy.

Geographic Scope: Statewide

Existing Programs: TVA IRP



Summary of Electricity Generation			
Pollutant		Cumulative (2025 thru date)	
ID	Units	2030	2050
CO_2e	MMT CO_2e	-0.4 to -1.3	-38.7 to -192.6
PM_{10}	Short Tons	-11 to -40	-1,364 to -6,832
$PM_{2.5}$	Short Tons	-11 to -40	-1,364 to -6,832
SO_2	Short Tons	-6 to -20	-703 to -3,519
NO_x	Short Tons	-17 to -60	-2,046 to -10,248
VOC	Short Tons	-4 to -13	-434 to -2,174
CO	Short Tons	-26 to -90	-3,100 to -15,527

Preliminary Data

Industrial Reduction Measures

Measure	Name
3.1	Industrial Energy Efficiency & Demand Response

Utilized TVA Draft IRP for analysis.
- Scenario A = Case 5D
- Scenario B = Case 2E

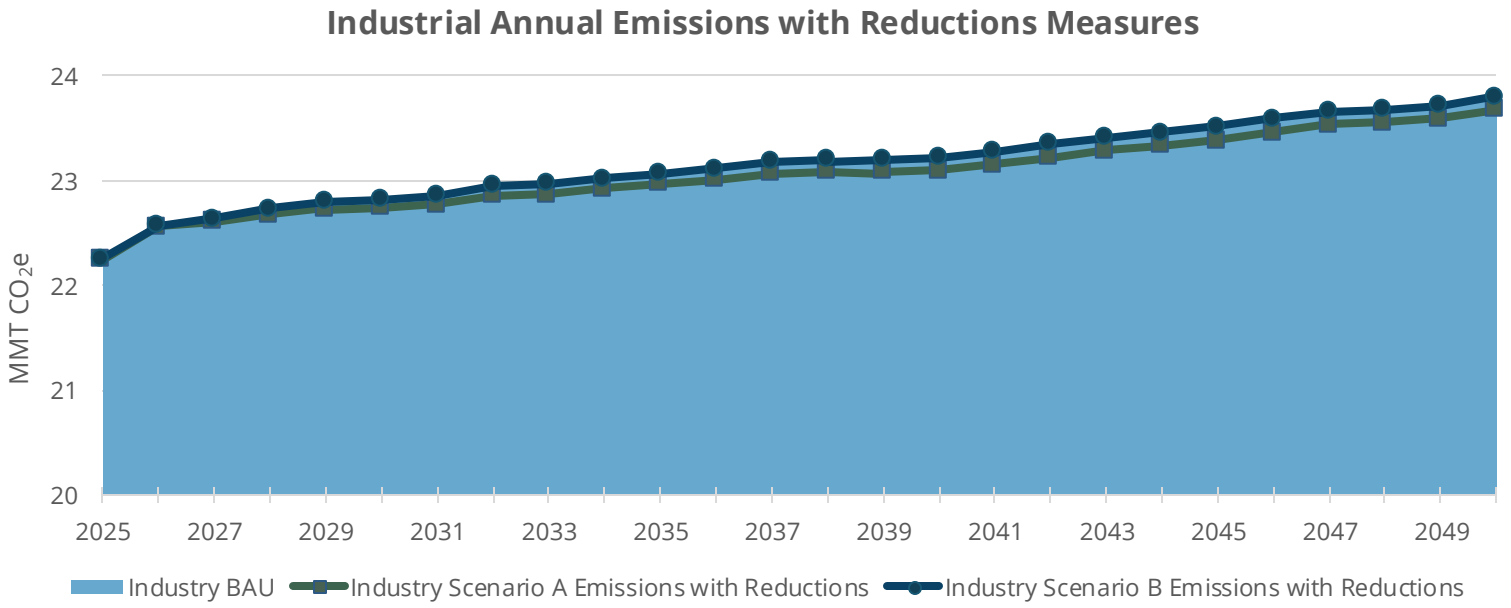
Both scenarios compared against Case 2A

Cumulative Emissions by Measure			
Pollutant		Cumulative Emissions 2025 - 2050	
ID	Units	3.1 (Scenario A)	3.1 (Scenario B)
CO_2e	MMT CO_2e	-2.6	-0.1
PM_{10}	Short Tons	-75	-1
$PM_{2.5}$	Short Tons	-71	-1
SO_2	Short Tons	-157	-3
NO_x	Short Tons	-1,070	-20
VOC	Short Tons	-23	-0.4
CO	Short Tons	-168	-3

Approach: Calculated natural gas emissions that could occur in absence of EEDR

Geographic Scope: Statewide

Existing Programs: TVA IRP – EEDR



Summary of Industrial			
Pollutant		Cumulative (2025 thru date)	
ID	Units	2030	2050
CO_2e	MMT CO_2e	-0.01 to -0.3	-0.1 to -2.6
PM_{10}	Short Tons	-0.2 to -9	-1 to -75
$PM_{2.5}$	Short Tons	-0.1 to -7	-1 to -71
SO_2	Short Tons	-1.5 to -73	-3 to -157
NO_x	Short Tons	-2.1 to -101	-20 to -1,070
VOC	Short Tons	-0.1 to -2	-0.4 to -23
CO	Short Tons	-0.4 to -19	-3 to-168

Preliminary Data

Agriculture Reduction Measures

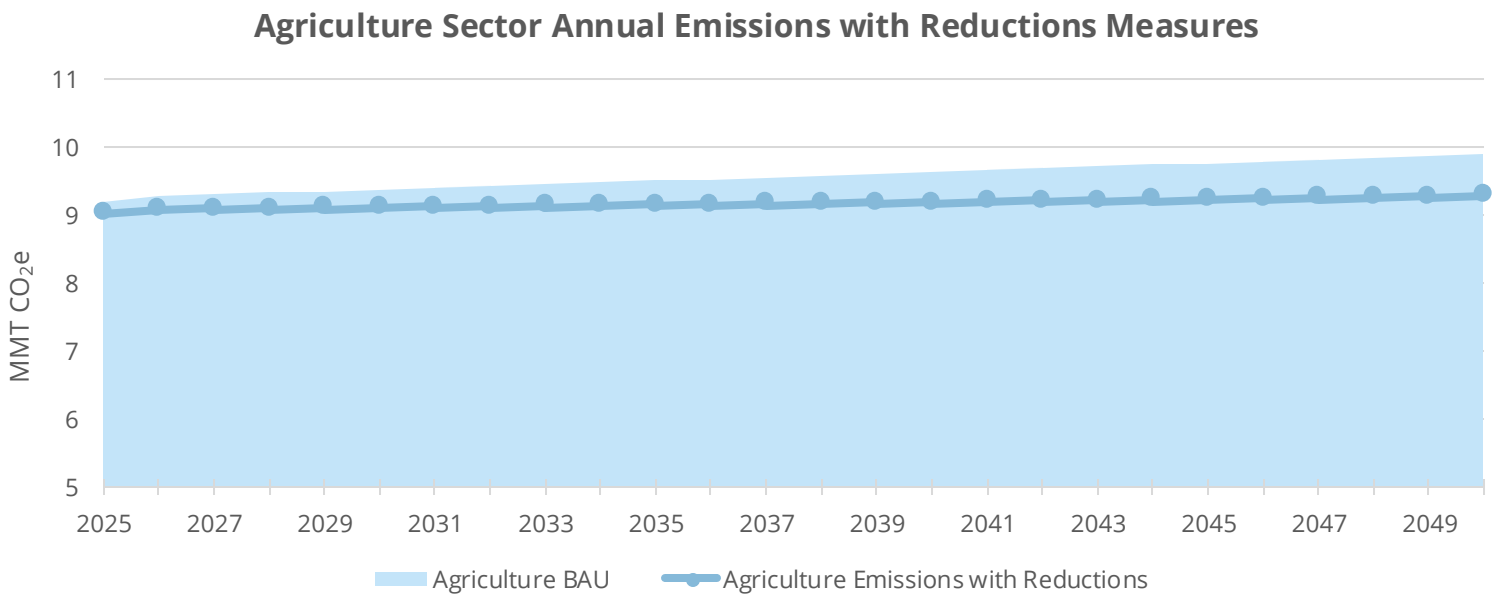
Measure	Name
4.1	Cropland Preservation
4.2	Cropland Management Practices

Cumulative Emissions by Measure			
Pollutant		Cumulative Emissions 2025 - 2050	
ID	Units	4.1	4.2
CO_2e	MMT CO_2e	-8.5	-1.8
PM_{10}	Short Tons	--	--
$PM_{2.5}$	Short Tons	--	--
SO_2	Short Tons	--	--
NO_x	Short Tons	--	-369
VOC	Short Tons	--	--
CO	Short Tons	--	--

Approach: First order approximation (Preservation) and COMET-Planner (Management)

Geographic Scope: Statewide

Existing Programs: Farmland Preservation Act & Farm Bill



Summary of Agriculture			
Pollutant		Cumulative (2025 thru date)	
ID	Units	2030	2050
CO_2e	MMT CO_2e	-1.3	-10.3
PM_{10}	Short Tons	--	--
$PM_{2.5}$	Short Tons	--	--
SO_2	Short Tons	--	--
NO_x	Short Tons	-85	-369
VOC	Short Tons	--	--
CO	Short Tons	--	--

-- Indicates pollutant was not modeled

Preliminary Data

Commercial & Residential Reduction Measures

Measure	Name
5.1	Commercial Energy Efficiency & Demand Response
5.2	Residential Energy Efficiency & Demand Response

Utilized TVA Draft IRP for analysis.
- Scenario A = Case 5D
- Scenario B = Case 2E

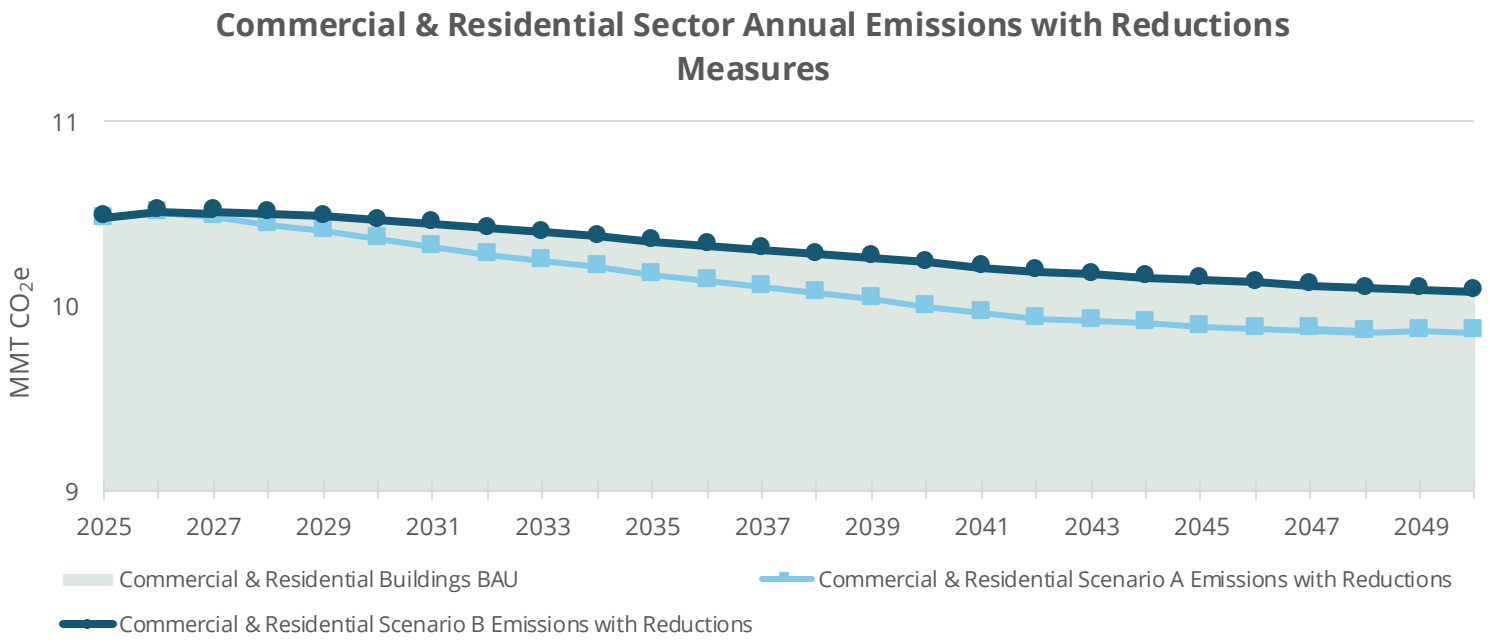
Both scenarios compared against Case 2A

Cumulative Emissions by Measure					
Pollutant		Cumulative Emissions 2025 - 2050			
ID	Units	5.1 (Scenario A)	5.1 (Scenario B)	5.2 (Scenario A)	5.2 (Scenario B)
CO_2e	MMT CO_2e	-1.36	-0.03	-3.24	-0.04
PM_{10}	Short Tons	-39	-0.8	-91	-1.2
$PM_{2.5}$	Short Tons	-37	-0.7	-88	-1.1
SO_2	Short Tons	-75	-1.7	-139	-2.1
NO_x	Short Tons	-552	-11	-1,315	-17
VOC	Short Tons	-12	-0.2	-28	-0.4
CO	Short Tons	-87	-1.7	-204	-2.6

Approach: Calculated natural gas emissions that could occur in absence of EEDR

Geographic Scope: Statewide

Existing Programs: TVA IRP -EEDR



Summary of Commercial & Residential			
Pollutant		Cumulative (2025 thru date)	
ID	Units	2030	2050
CO_2e	MMT CO_2e	-0.005 to -0.28	-0.07 to -4.60
PM_{10}	Short Tons	-0.17 to -10	-1.9 to -130
$PM_{2.5}$	Short Tons	-0.13 to -7	-1.8 to -124
SO_2	Short Tons	-1.3 to -80	-3.8 to -214
NO_x	Short Tons	-1.9 to -112	-28 to -1,866
VOC	Short Tons	-0.05 to -3	-0.60 to -40
CO	Short Tons	-0.36 to -21	-4.3 to -291

Preliminary Data

Waste & Materials Management Reduction Measures

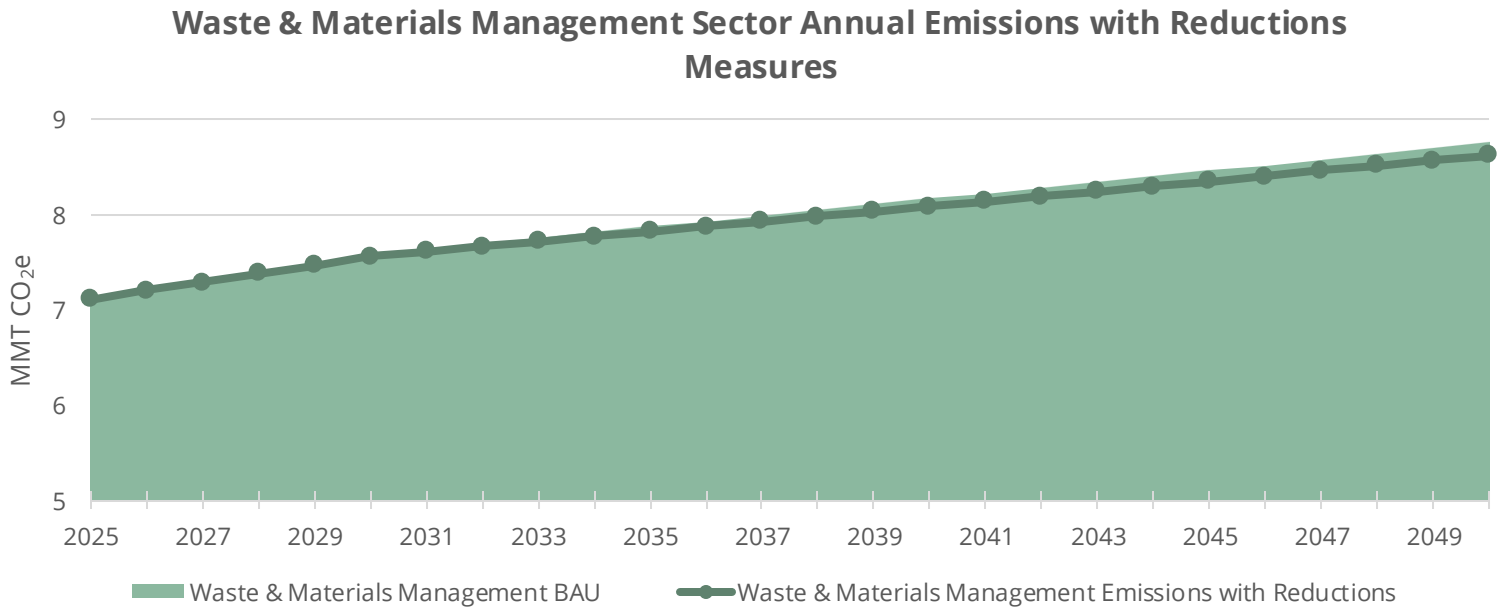
Measure	Name
6.1	State-wide Waste Diversion

Cumulative Emissions by Measure		
Pollutant		Cumulative Emissions 2025 - 2050
ID	Units	4.1
CO_2e	MMT CO_2e	-1.74
PM_{10}	Short Tons	--
$PM_{2.5}$	Short Tons	-6.2
SO_2	Short Tons	--
NO_x	Short Tons	-14
VOC	Short Tons	-1.5
CO	Short Tons	-21

Approach: EPA WARM & Emission Calculations

Geographic Scope: Statewide

Existing Programs: TDEC Division of Solid Waste



Summary of Waste & Materials Management			
Pollutant		Cumulative (2025 thru date)	
ID	Units	2030	2050
CO_2e	MMT CO_2e	-0.06	-1.74
PM_{10}	Short Tons	ND	ND
$PM_{2.5}$	Short Tons	-0.22	-6.2
SO_2	Short Tons	--	--
NO_x	Short Tons	-0.49	-14
VOC	Short Tons	-0.05	-1.5
CO	Short Tons	-0.74	-21

-- Indicates pollutant was not modeled

Preliminary Data

LULUCF Reduction Measures

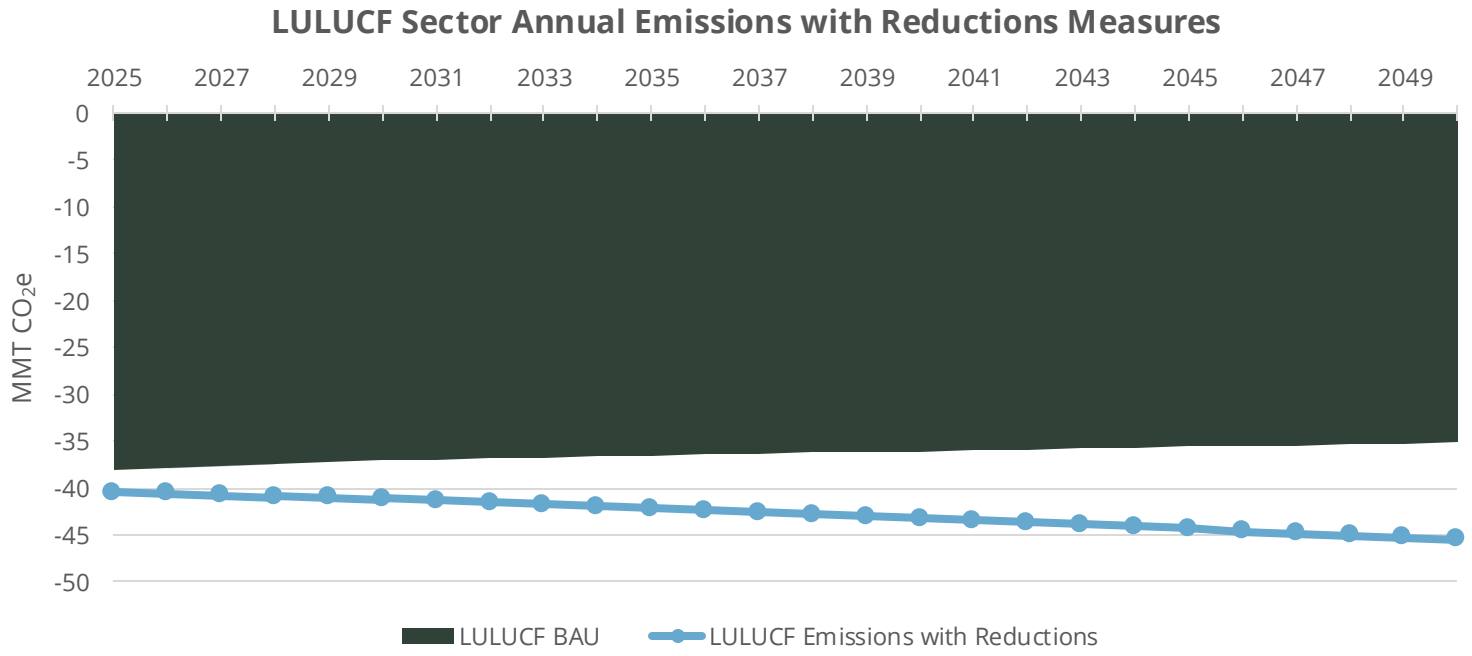
Measure	Name
7.1	Urban Afforestation
7.2	Forest Management & Preservation
7.3	Grasslands Conservation

Cumulative Emissions by Measure				
Pollutant		Cumulative Emissions 2025 - 2050		
ID	Units	7.1	7.2	7.3
CO_2e	MMT CO_2e	-1.2	-157.0	-8.4
PM_{10}	Short Tons	-430	--	--
$PM_{2.5}$	Short Tons	-44	--	--
SO_2	Short Tons	-111	--	--
NO_x	Short Tons	-215	--	--
VOC	Short Tons	--	--	--
CO	Short Tons	-43	--	--

Approach: First order approximation (Forest & Grasslands) and calculations (urban)

Geographic Scope: MSA and Statewide

Existing Programs: MSA Afforestation Plans, TN Department of Forestry



Summary of LULUCF			
Pollutant		Cumulative (2025 thru date)	
ID	Units	2030	2050
CO_2e	MMT CO_2e	-19.5	-166.7
PM_{10}	Short Tons	-99	-430
$PM_{2.5}$	Short Tons	-10	-44
SO_2	Short Tons	-26	-111
NO_x	Short Tons	-50	-215
VOC	Short Tons	--	--
CO	Short Tons	-10	-43

-- Indicates pollutant was not modeled

Preliminary Data

Break

GHG Reduction Targets

GHG Reduction Target Key Points

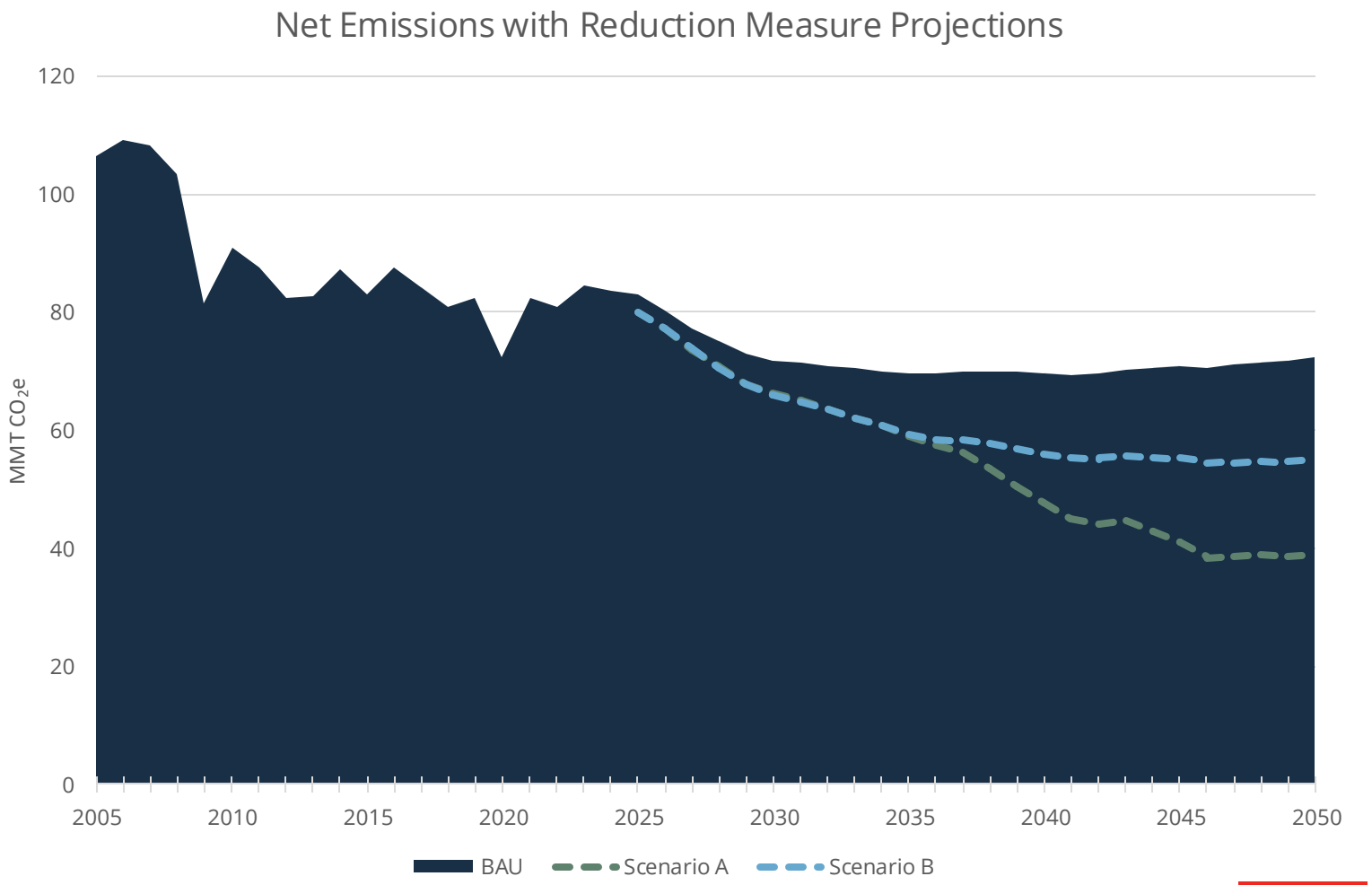
- Targets should be: Actionable, Ambitious, & Achievable
- Targets are non-binding (no penalties for not achieving)
- Must state a near-term (2030) & long-term target (2050)
- Targets can be economy-wide
- Targets will be set using a bottom-up approach
- We seek your input to help set the targets

Projected Outcomes of Measures

Statewide Net Emissions			
Year	BAU	Scenario A	Scenario B
	MMT CO2e	MMT CO2e	MMT CO2e
2005	106.41	--	--
2019	82.33	--	--
2025	82.94	80.10	80.12
2030	71.86	66.20	65.99
2035	69.75	58.99	59.26
2040	69.60	47.59	56.06
2045	70.89	40.98	55.23
2050	72.30	38.86	54.77

Annual % Reduction in Comparison to 2030			
From	BAU	Scenario A	Scenario B
2005	-32%	-38%	-38%
2019	-13%	-20%	-20%

Annual % Reduction in Comparison to 2050			
From	BAU	Scenario A	Scenario B
2005	-32%	-63%	-49%
2019	-12%	-53%	-33%



Net emissions include carbon sinks from LULUCF

Preliminary Data

Workforce Planning Analysis

Workforce Planning Analysis

Workforce Advisory Group (WAG)

- Provide data
- Support program development
- Review documents

Research Team

- TDEC contracted University of Tennessee, Baker School of Policy to compile the report

Workforce Planning Analysis

Purpose

- Provide industry employment and occupational projections for Tennessee and its three largest metropolitan statistical areas (MSAs): Knoxville, Memphis, and Nashville related to the energy transition
- Offer an overview of education and training resources available to support the projected needs for workforce adaptation and shifts in market demands

Key Findings

- Tennessee offers a robust network of education and training programs
- Sectors associated with emissions reduction activities are projected to experience steady or strong growth
- Additional investments are needed to enhance training capacity, update curricula, and strengthen collaboration between education providers and employers

Conclusion

- Tennessee should pursue a dual approach—balancing cautious, data-informed program development with more proactive investment in areas of demonstrated and predicted growth

Discussion

DISCUSSION

- Any Questions?
  - Measures
  - Methodologies
  - Underlying assumptions
  - Workforce Planning

- Thoughts on Target-Setting?

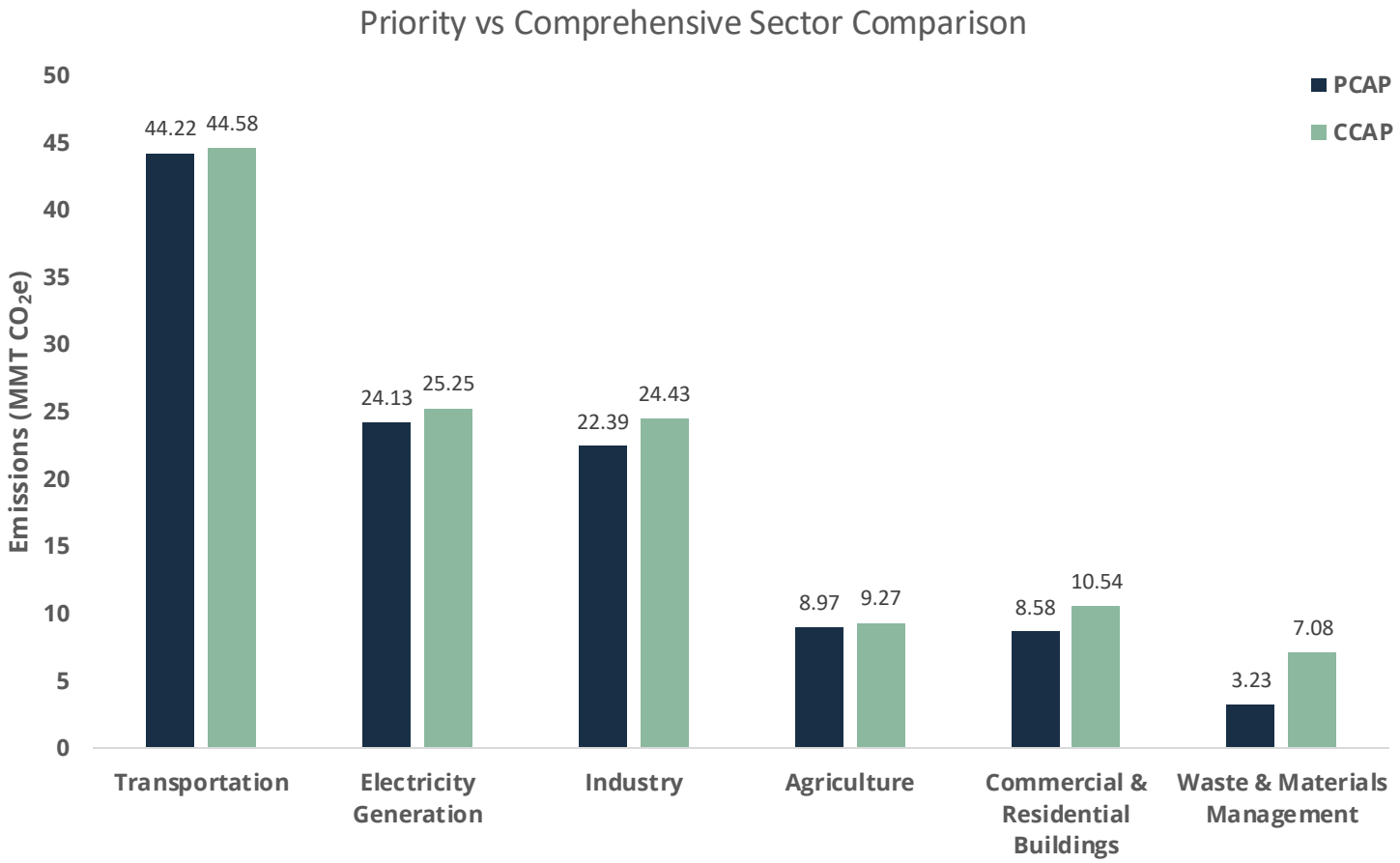
Completion Schedule

Completion Schedule

Thank you!

Priority vs Comprehensive Emission Inventory

Priority vs Comprehensive Inventory – Total Emissions

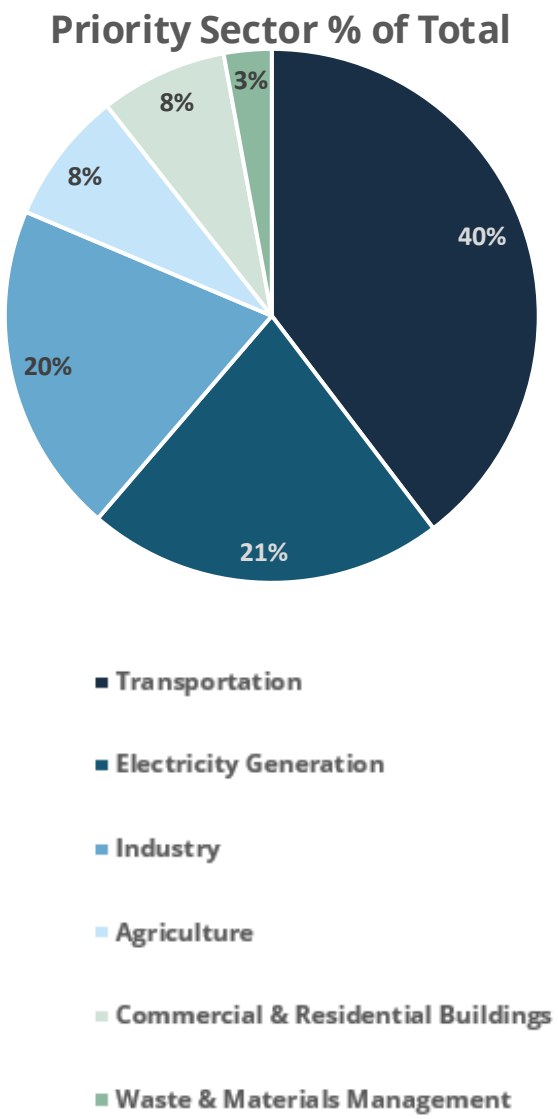


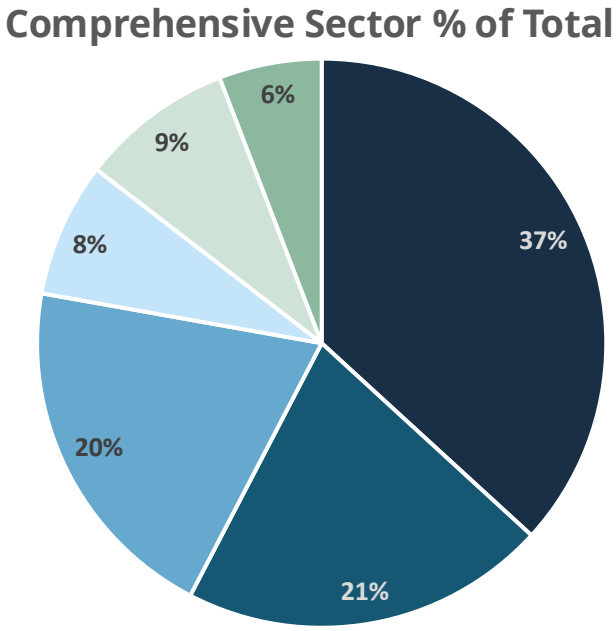
- Total Emissions increased by 12%.
- All sectors increased.
- Waste & Materials Management had the highest increase.

2019 Emissions (Metric Tonnes CO_2e)		
Sector	**PCAP**	**CCAP**
Transportation	44.22	44.58
Electricity Generation	24.13	25.25
Industry	22.39	24.43
Agriculture	8.97	9.27
Commercial & Residential Buildings	8.58	10.54
Waste & Materials Management	3.23	7.08
Total Emissions	**108.29**	**121.14**

Preliminary Data

Priority vs Comprehensive Inventory – Total Emissions



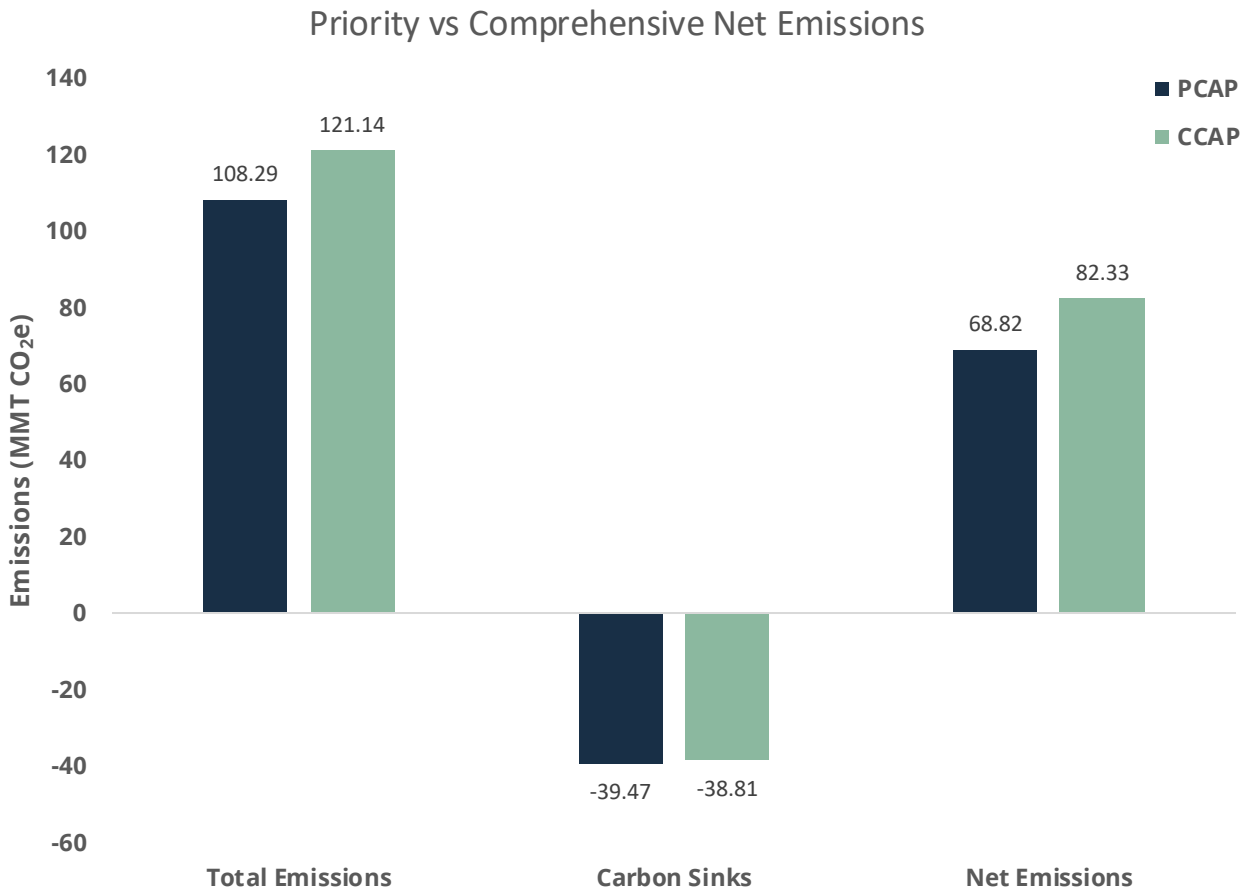


- The top three sectors impacting the total emissions remained the same.
- Buildings and Waste Management have a larger impact on the CCAP Total Emissions

2019 Sector % of Total Emissions		
Sector	**PCAP**	**CCAP**
Transportation	40%	37%
Electricity Generation	21%	21%
Industry	20%	20%
Agriculture	8%	8%
Commercial & Residential Buildings	8%	9%
Waste & Materials Management	3%	6%
Total Emissions	**108.29**	**121.14**

Preliminary Data

Priority vs Comprehensive Inventory – Net Emissions



- Net Emissions increased by 20% (due to the increase in total emissions)
- Carbon sinks decreased slightly.

2019 Emissions (Metric Tonnes CO_2e)		
	PCAP	CCAP
Total Emissions	108.29	121.14
Carbon Sinks	-39.47	-38.81
Net Emissions	68.82	82.33

Preliminary Data