MULTNOMAH COUNTY 2023 CARBON EMISSION AND ENERGY TRENDS

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Climate Action Policy Analyst

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Agenda

Discussion of local carbon emission and energy trends, covering three primary resources:

- Communitywide Multnomah County Emission Inventory – 1990 to 2023
- Consumption-based Multnomah County Emission inventory – 2012, 2015, 2021
- Pathways Modeling and Analysis

Multnomah County Community-wide Emission Inventory (1990-2023)

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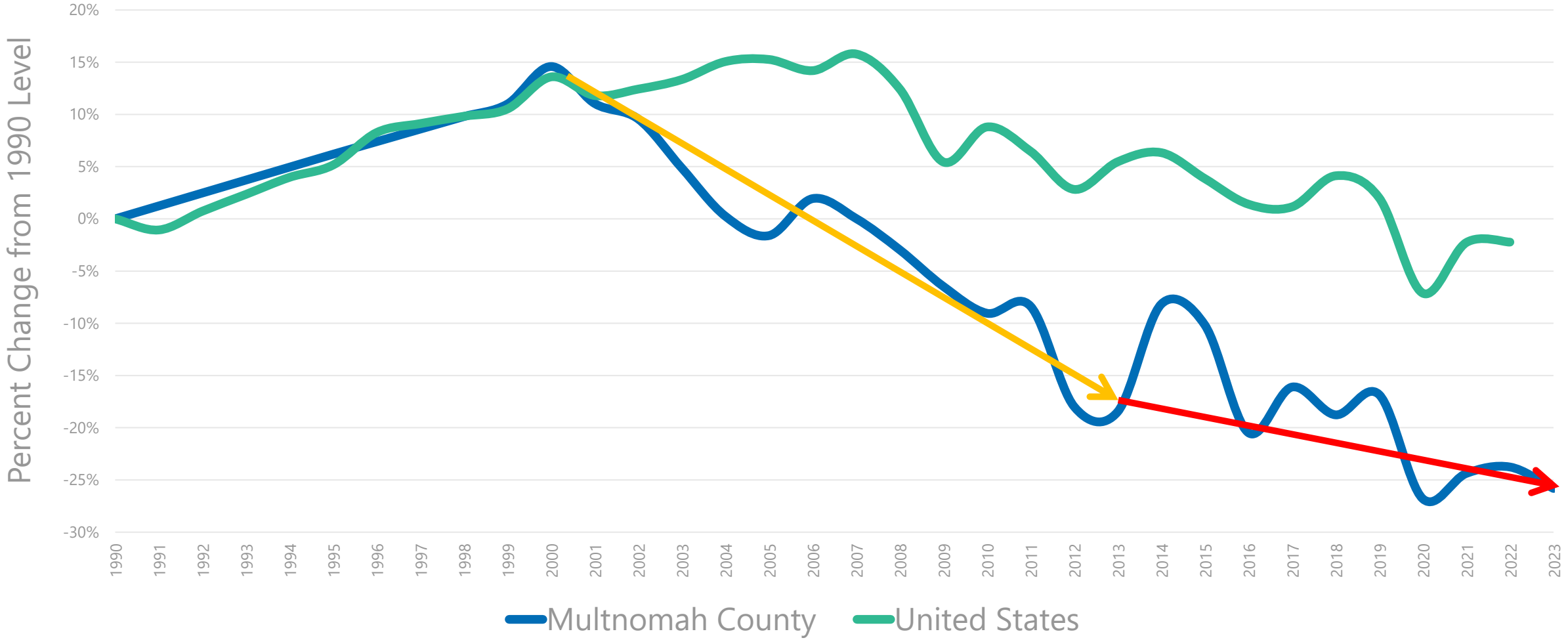
Change in Multnomah County Carbon Emissions Compared to United States Emissions 1990-2023



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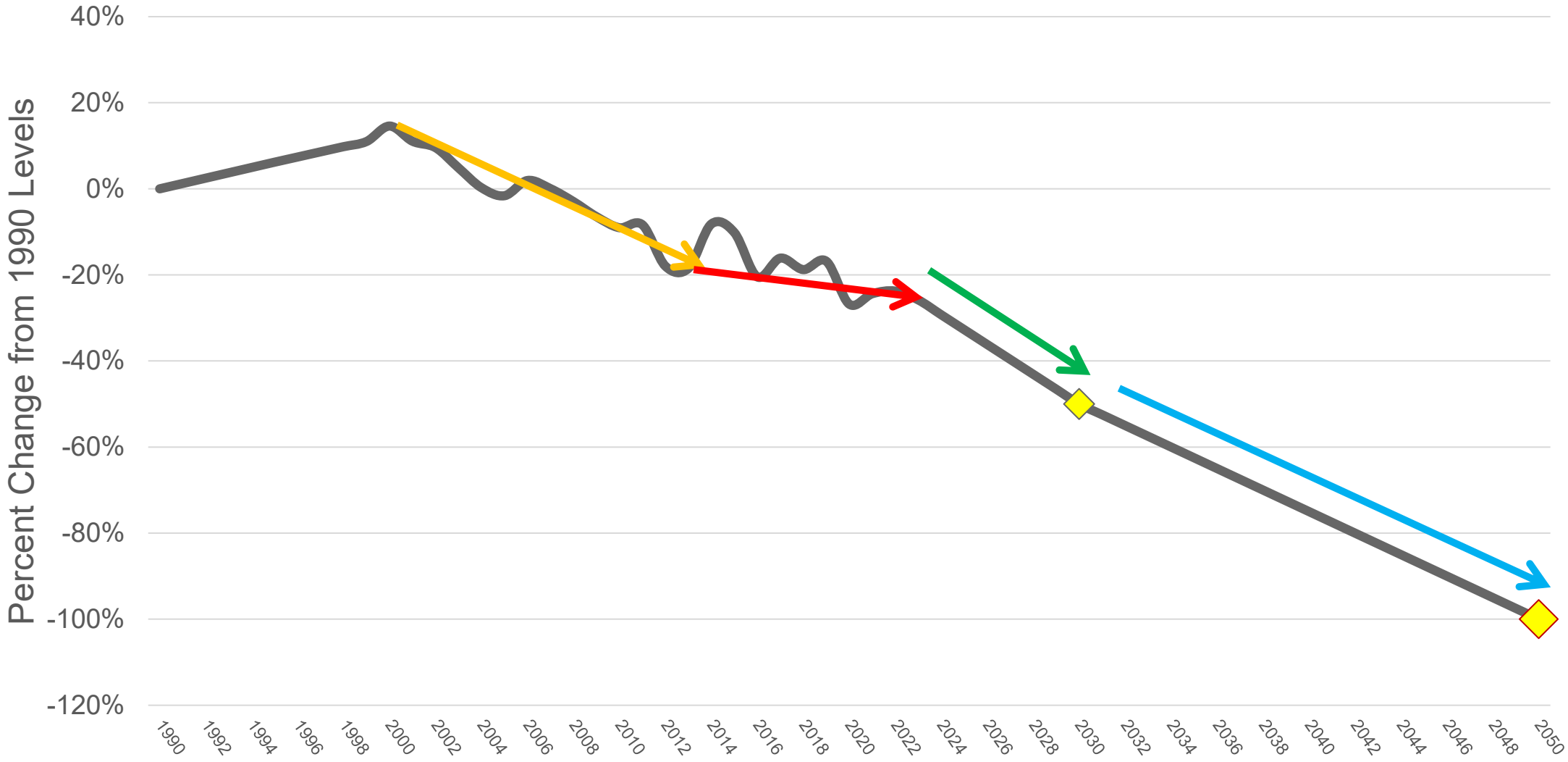
Emissions from Trend with 2030 and 2050 Goals



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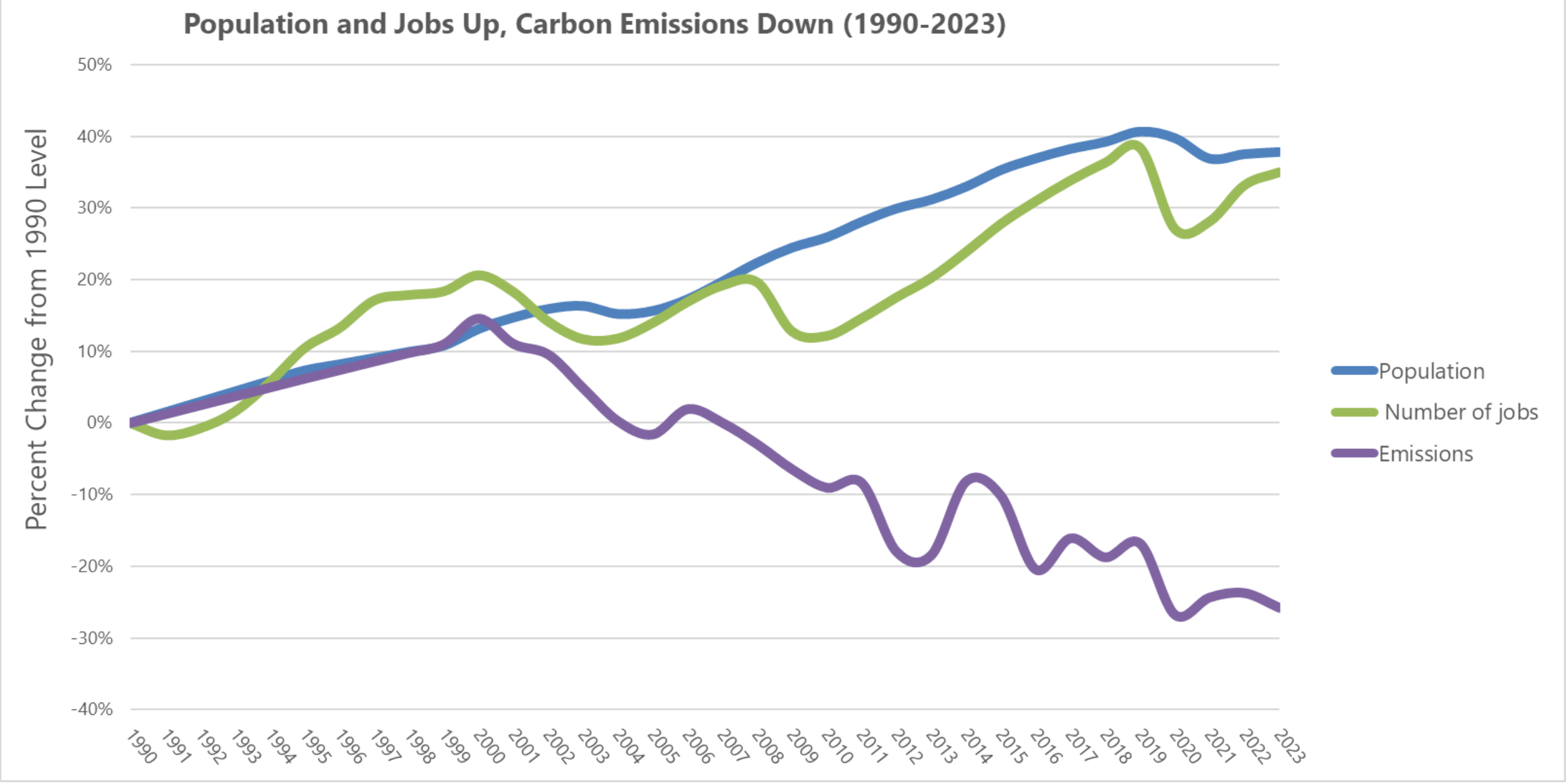
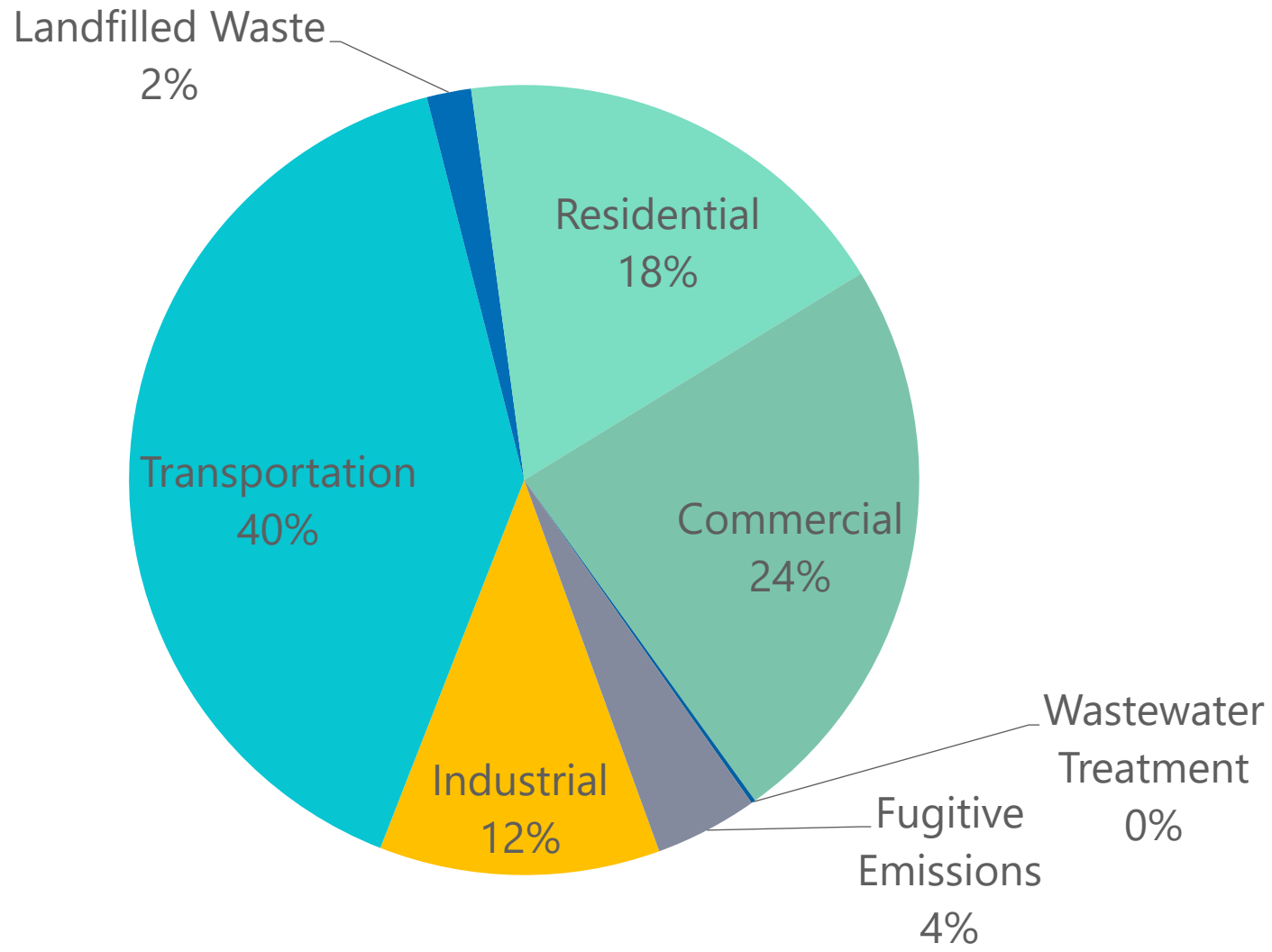
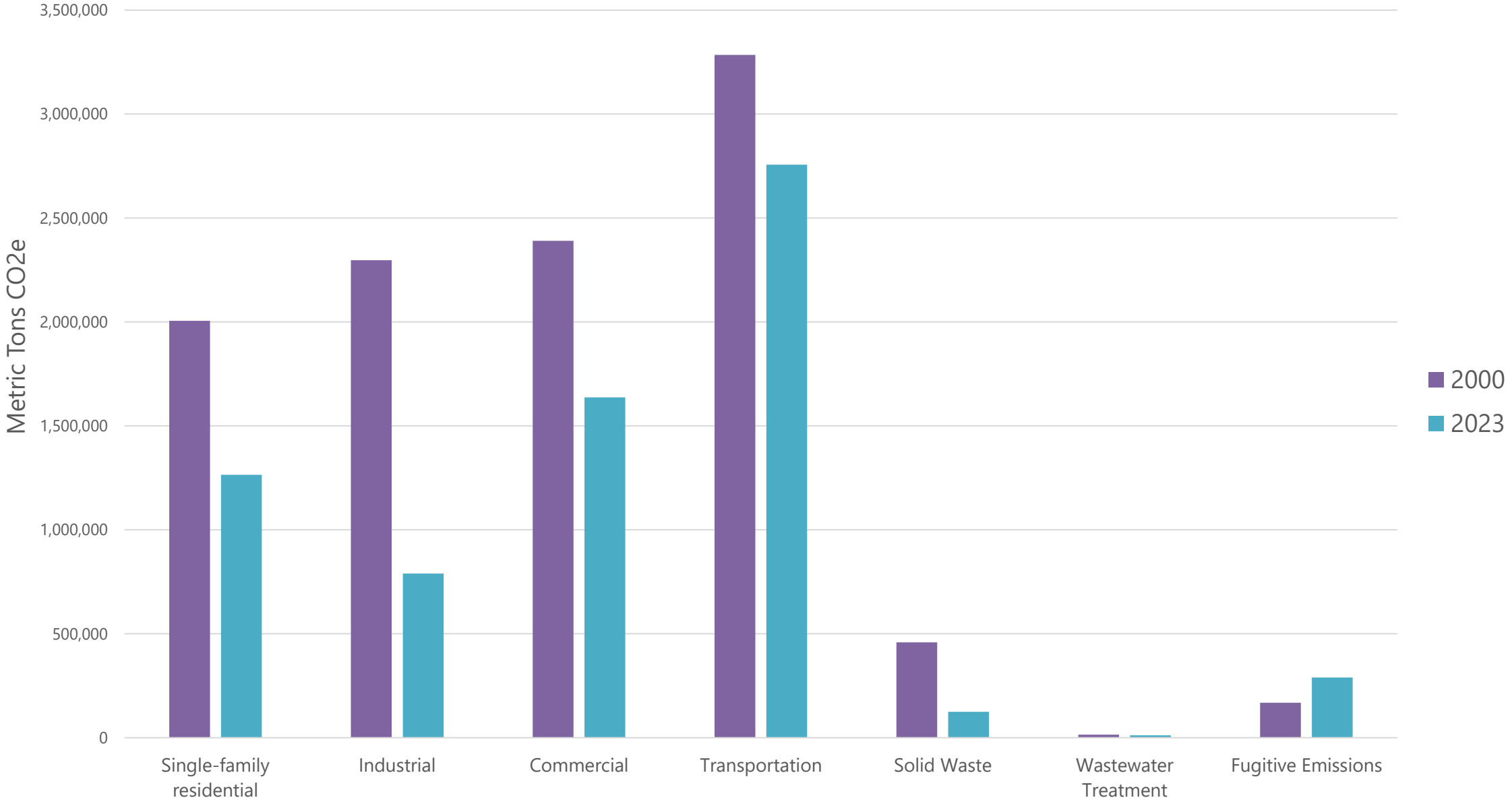

Population and Jobs Up, Carbon Emissions Down (1990-2023)
Percent Change from 1990 Level
50%
40%
30%
20%
10%
0%
-10%
-20%
-30%
-40%
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
Population
Number of jobs
Emissions

Total Multnomah County Carbon Emissions by Sector (2023)



Change from peak emissions by sector, 2000-2023



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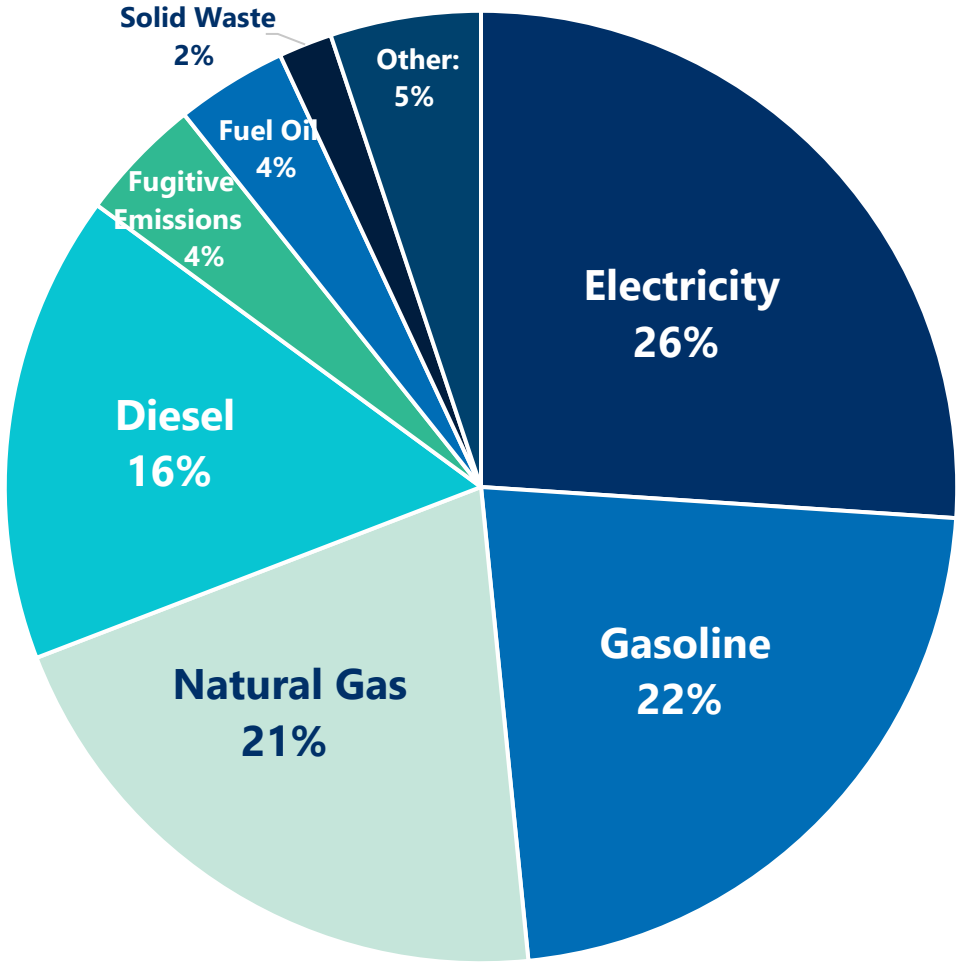
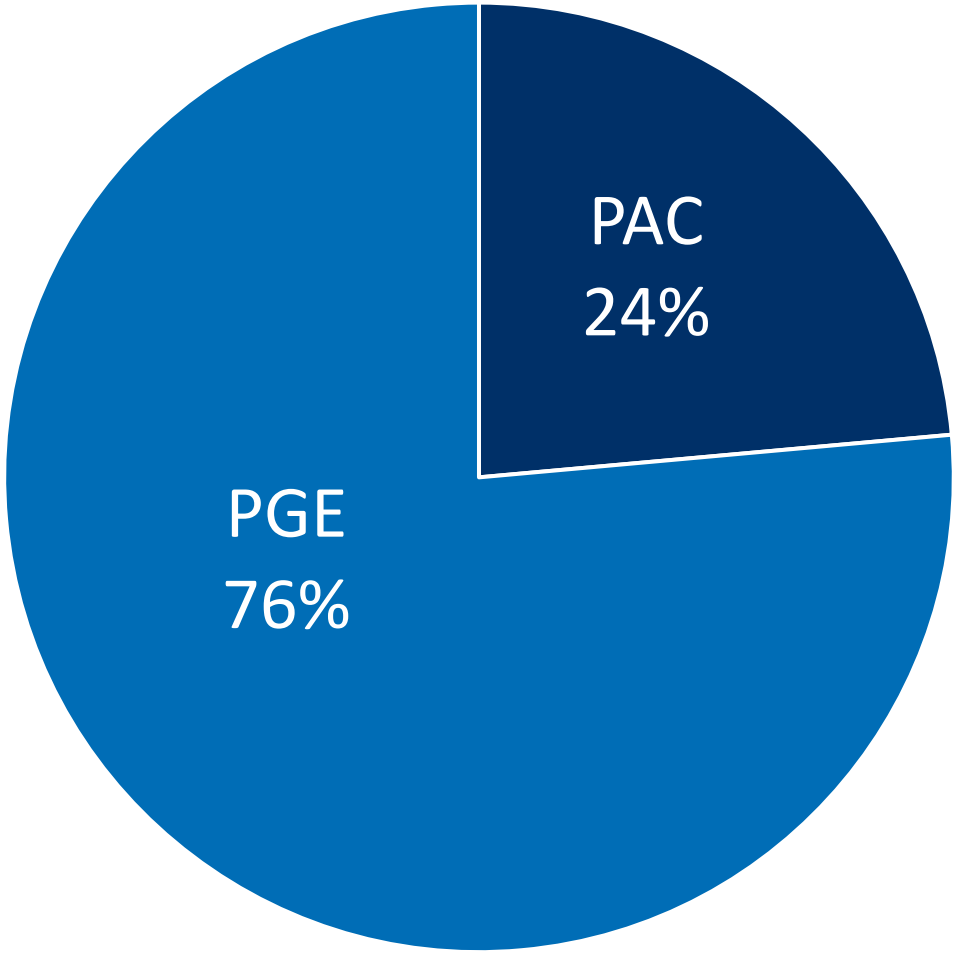
Multnomah County Emissions by Source (2023)



Emission Source	MT CO2e	Percent
Electricity	1,790,426	26%
Gasoline	1,537,920	22.4%
Natural Gas	1,426,443	20.7%
Diesel	1,094,401	15.9%
Fugitive Emissions	289,515	4.2%
Fuel Oil	259,852	3.8%
Solid Waste	124,974	1.8%
Other :	351,487	5.1%
Propane	*116,202*	*1.7%*
Com. and Ind. Gasoline	*114,736*	*1.7%*
Ethanol	*103,258*	*1.5%*
Wastewater Treatment	*11,757*	*0.2%*
Kerosene	*4,181*	*0.1%*
Residual Fuel Oil	*862*	*0.01%*
Biodiesel and Renewable Diesel	*491*	*0.01%*
TOTAL	**6,875,019**	

Multnomah County Electricity Sales by Utility (2023)



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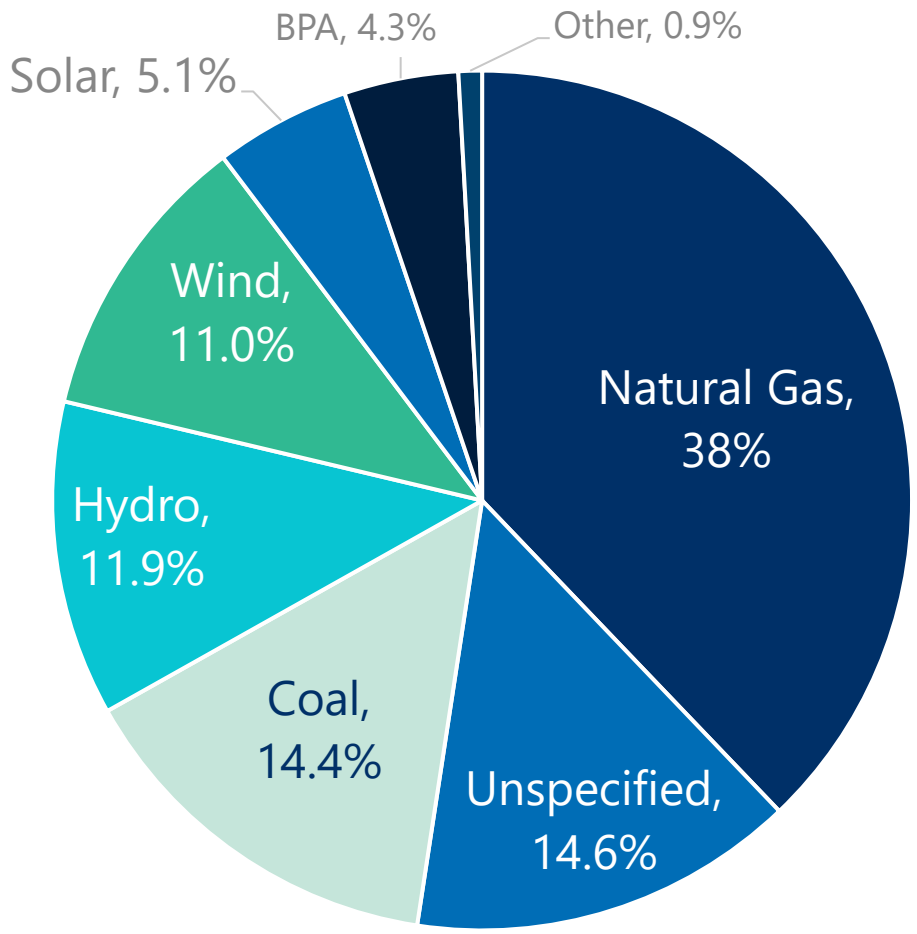
Multnomah County Grid Electrcity Generation Mix (2023)



Source	Electricty Sales	Percent
Natural Gas	2,351,479,764	38%
Unspecified	904,985,094	14.6%
Coal	896,902,267	14.4%
Hydro	736,516,327	11.9%
Wind	683,099,406	11.0%
Solar	317,519,521	5.1%
Bonneville (BPA)	267,118,868	4.3%
Biomass	29,081,602	0.5%
Other Anthropogenic	15,345,668	0.2%
Geothermal	6,422,259	0.1%
Biogas	3,686,369	0.1%
Fuel Oil	371,741	0.01%
Hydrogen Fuel Cells	279	0.000004%
Total Sales	**6,212,529,165**	
	Percent Renewable	**32.9%**

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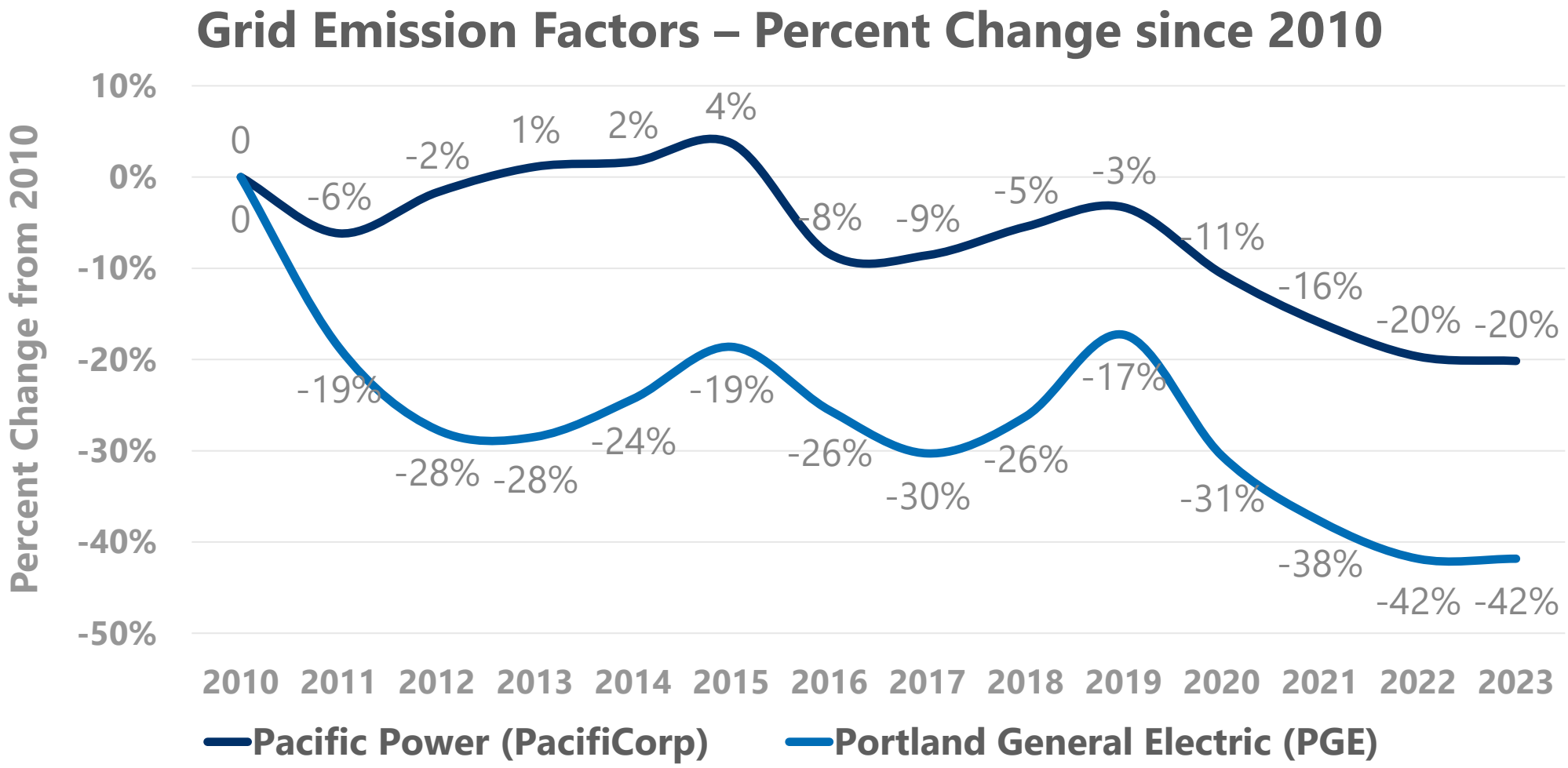
Comparing PAC and PGE Emission Factors



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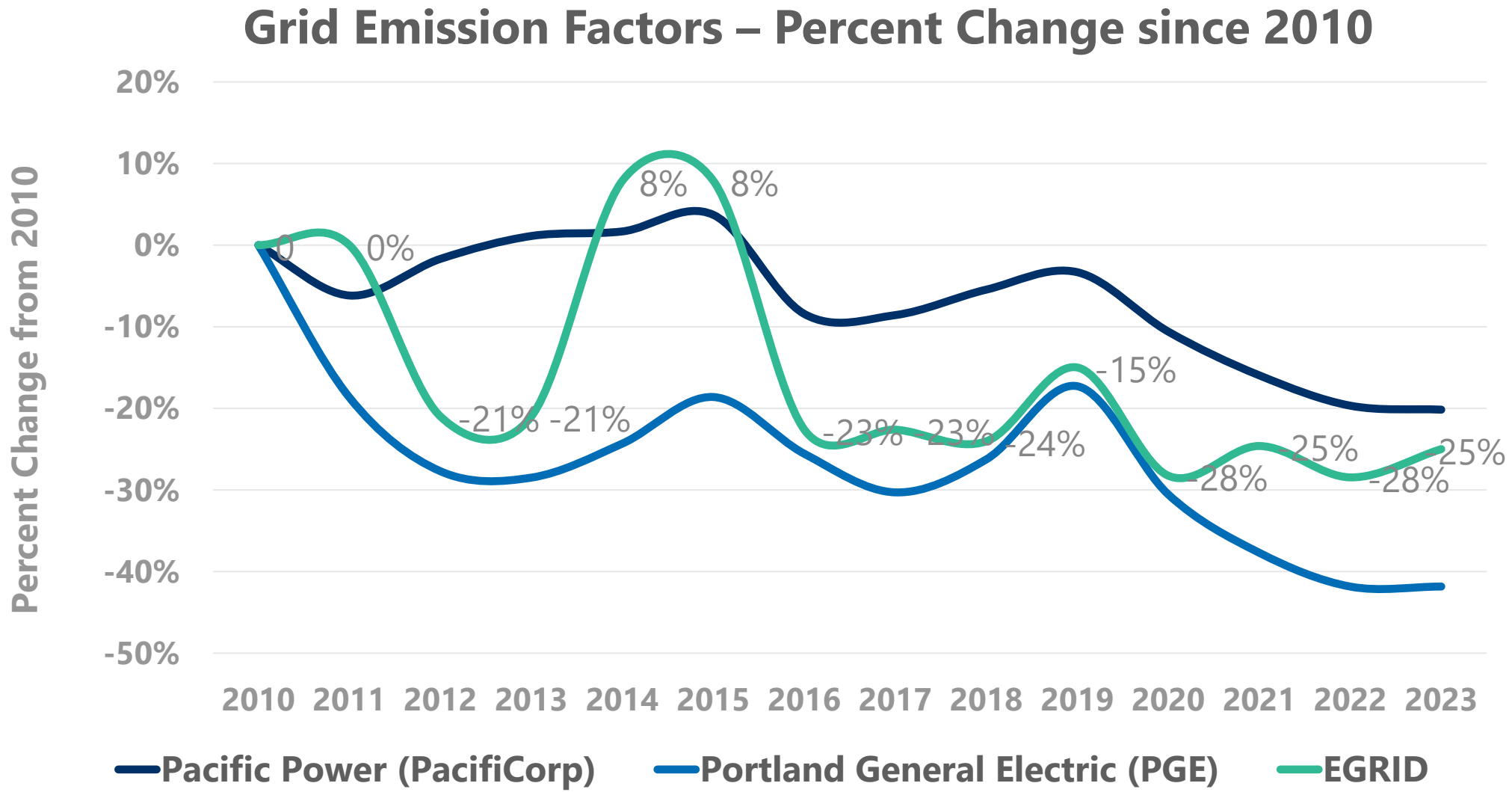
Adding EGRID



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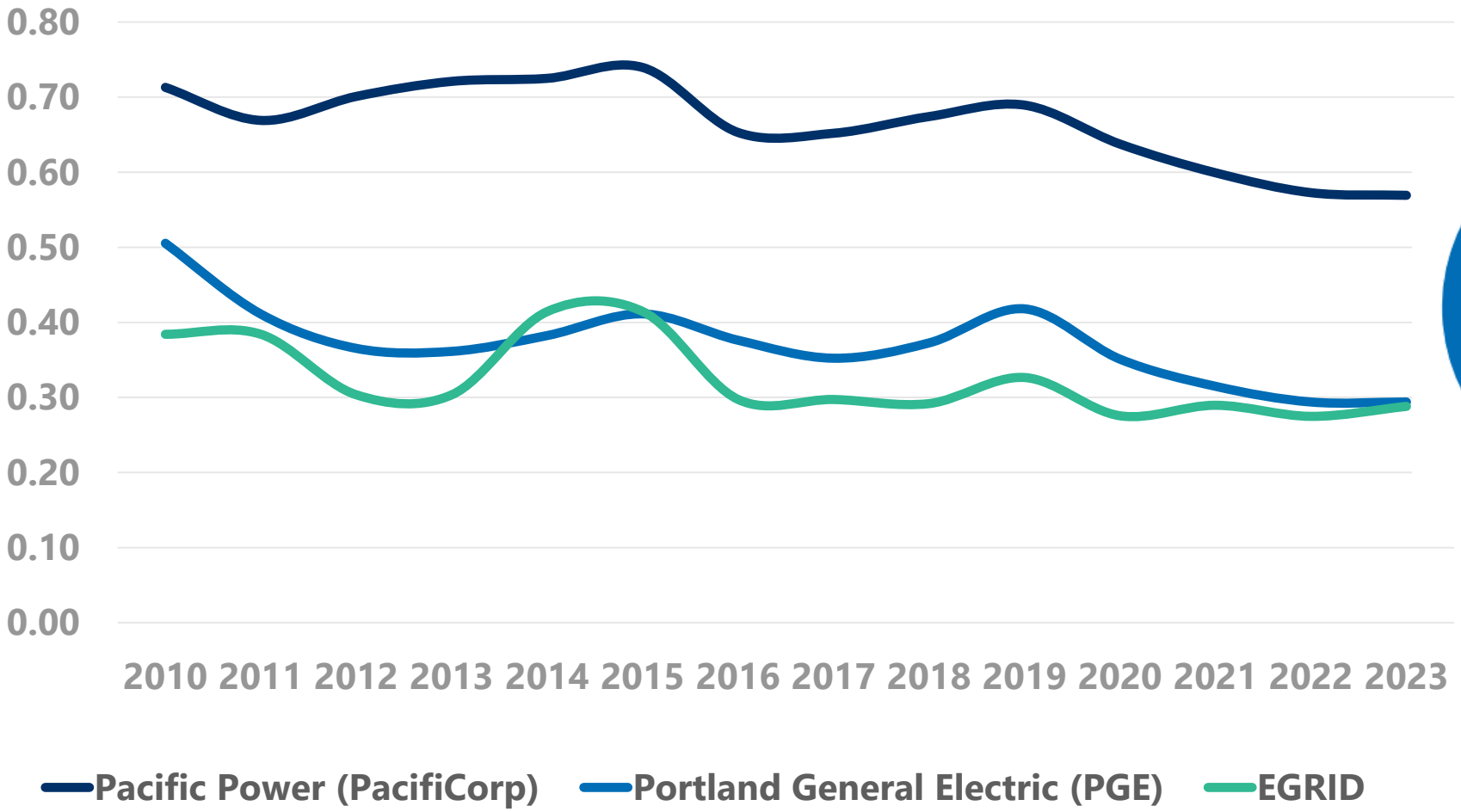
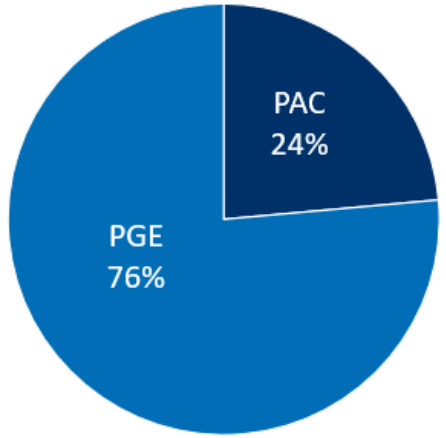
Emission Factor Comparison





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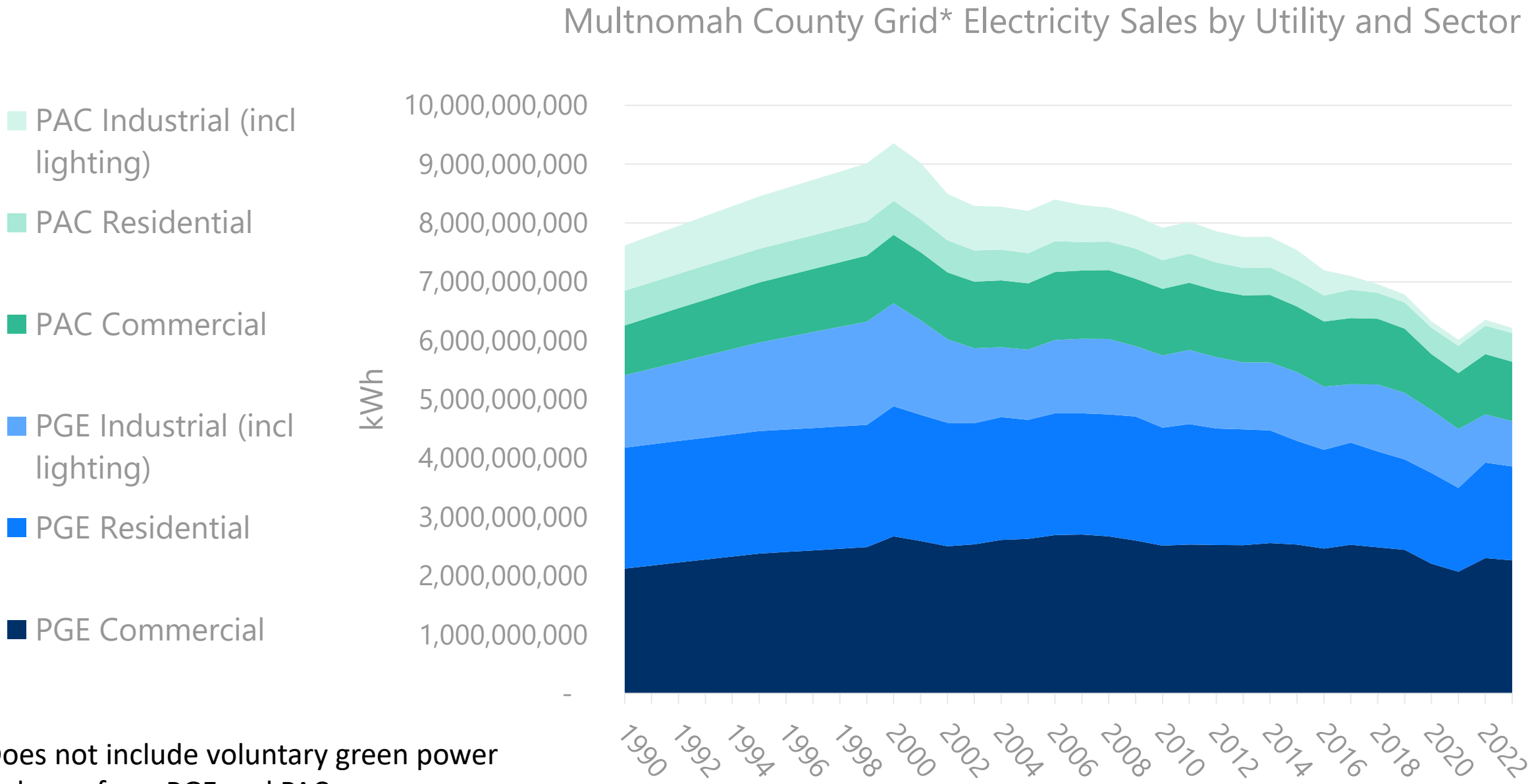
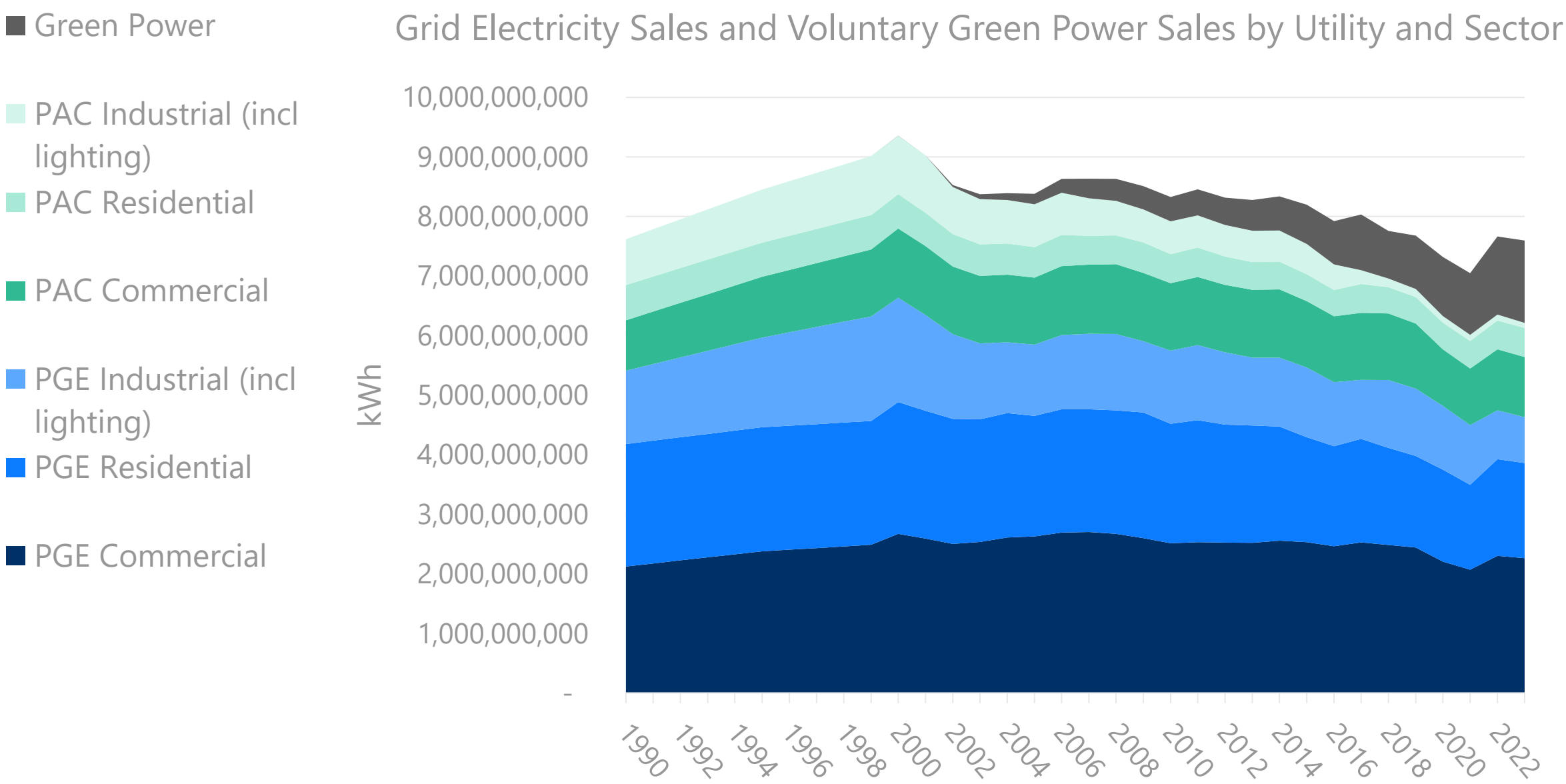
Electricity Trends (1990-2023)

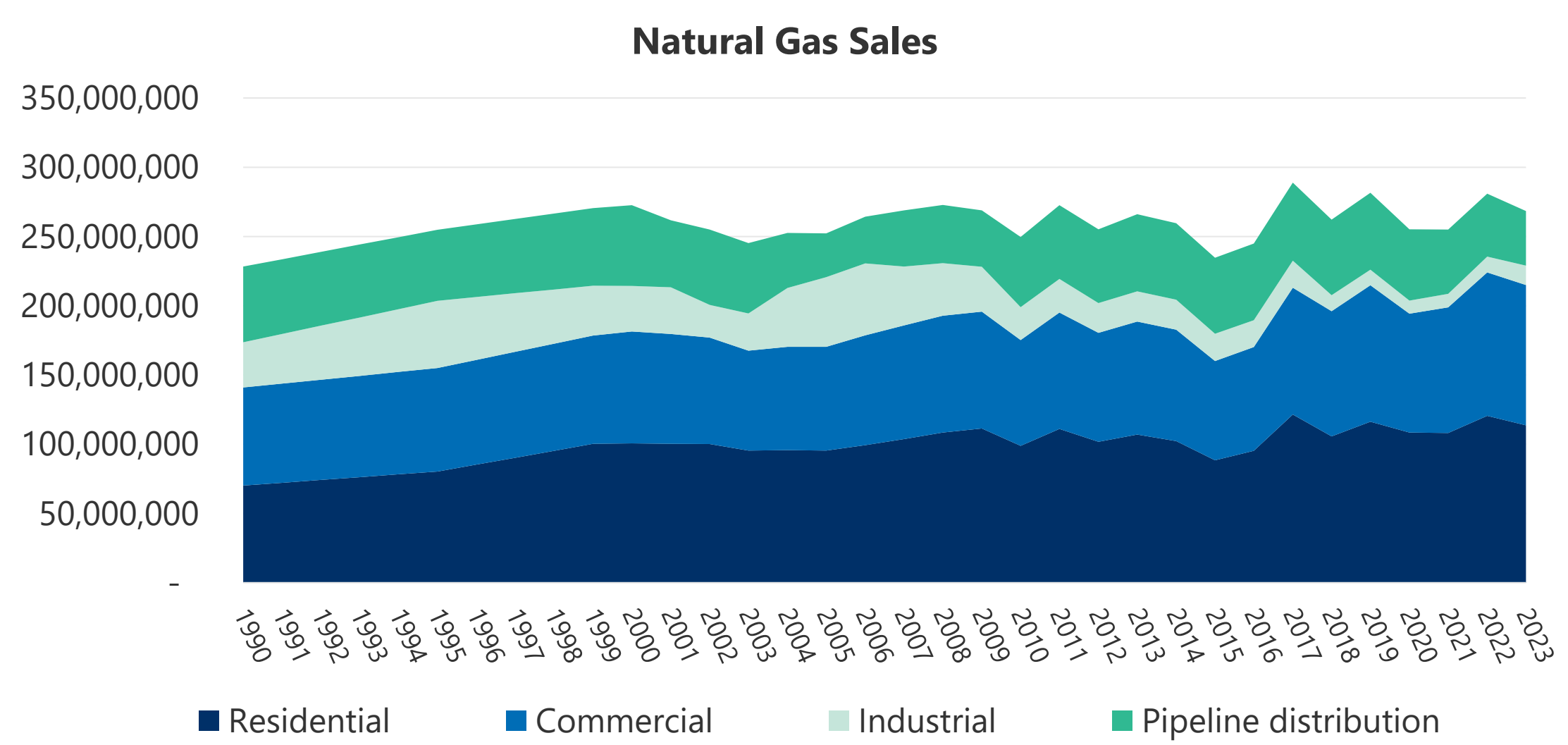


* Does not include voluntary green power purchases from PGE and PAC.

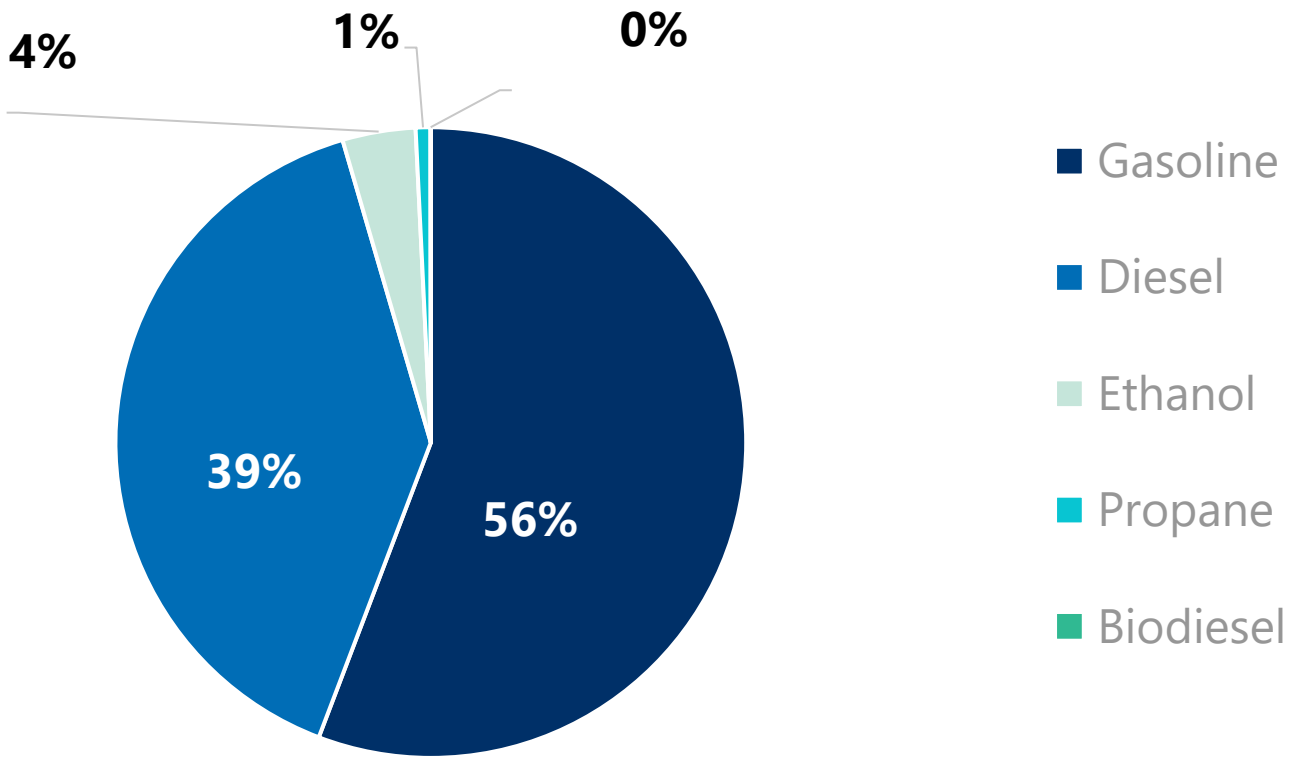
Electricity Trends (1990-2023)



Natural Gas Trends (1990-2023)



Transportation Sector Emissions by Source (2023)



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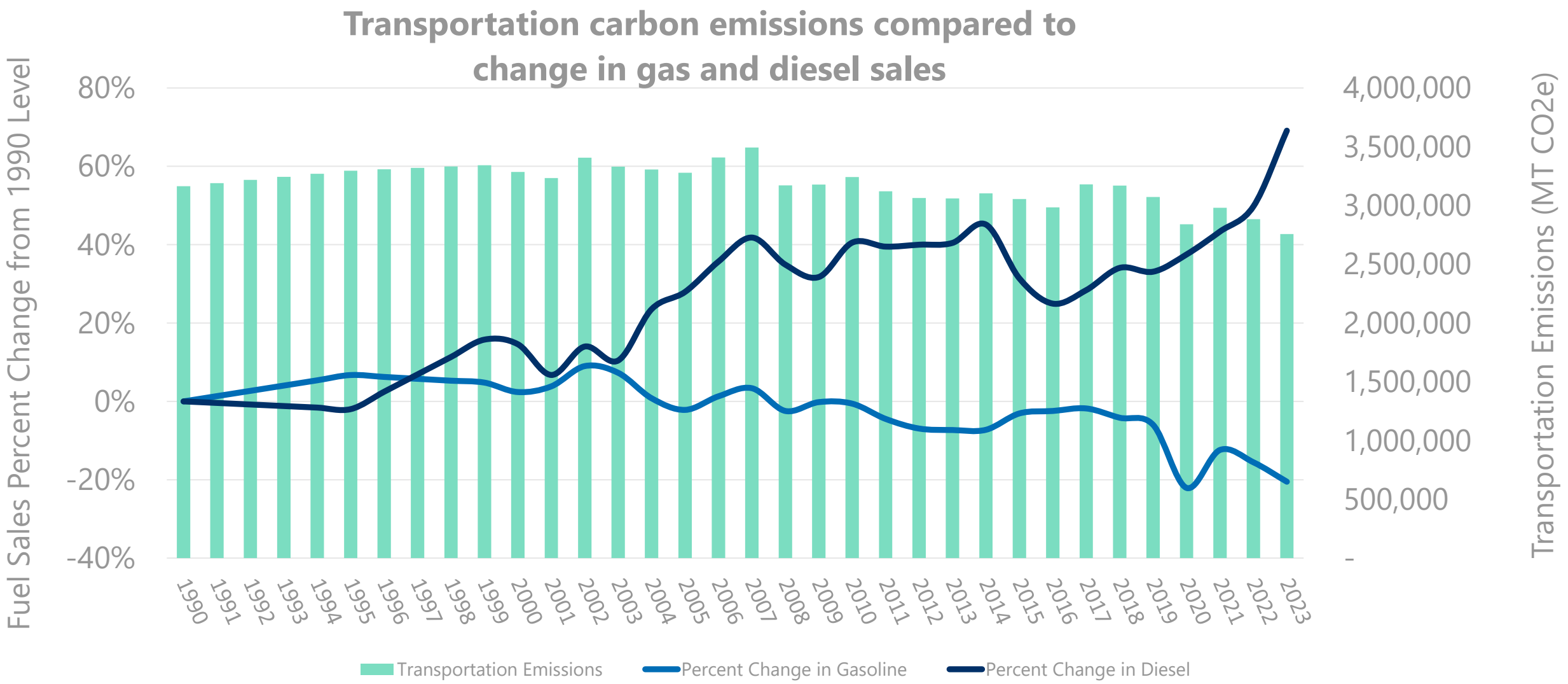
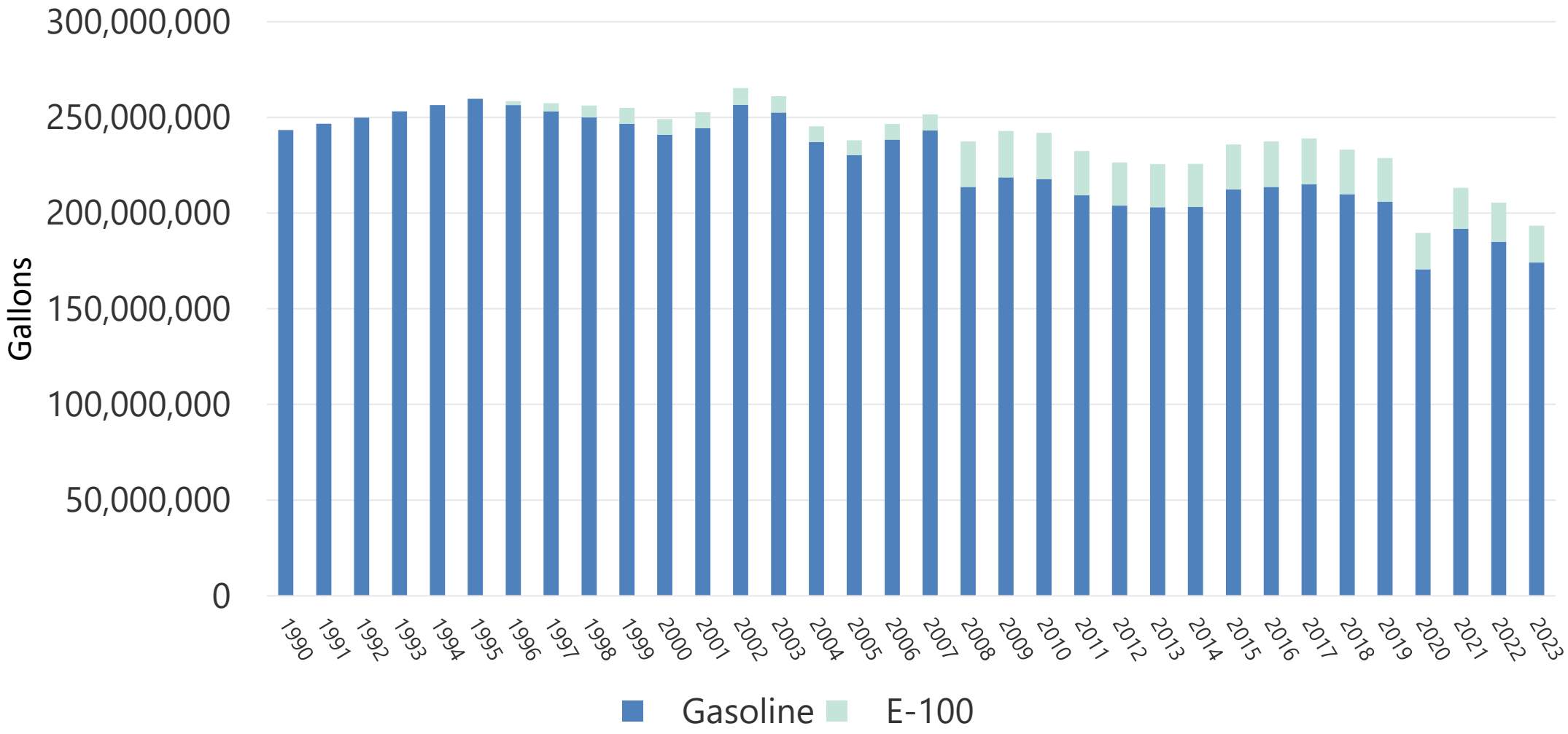
Transportation Emission Trends (1990-2023)



Gasoline Sales Trend (1990-2023)



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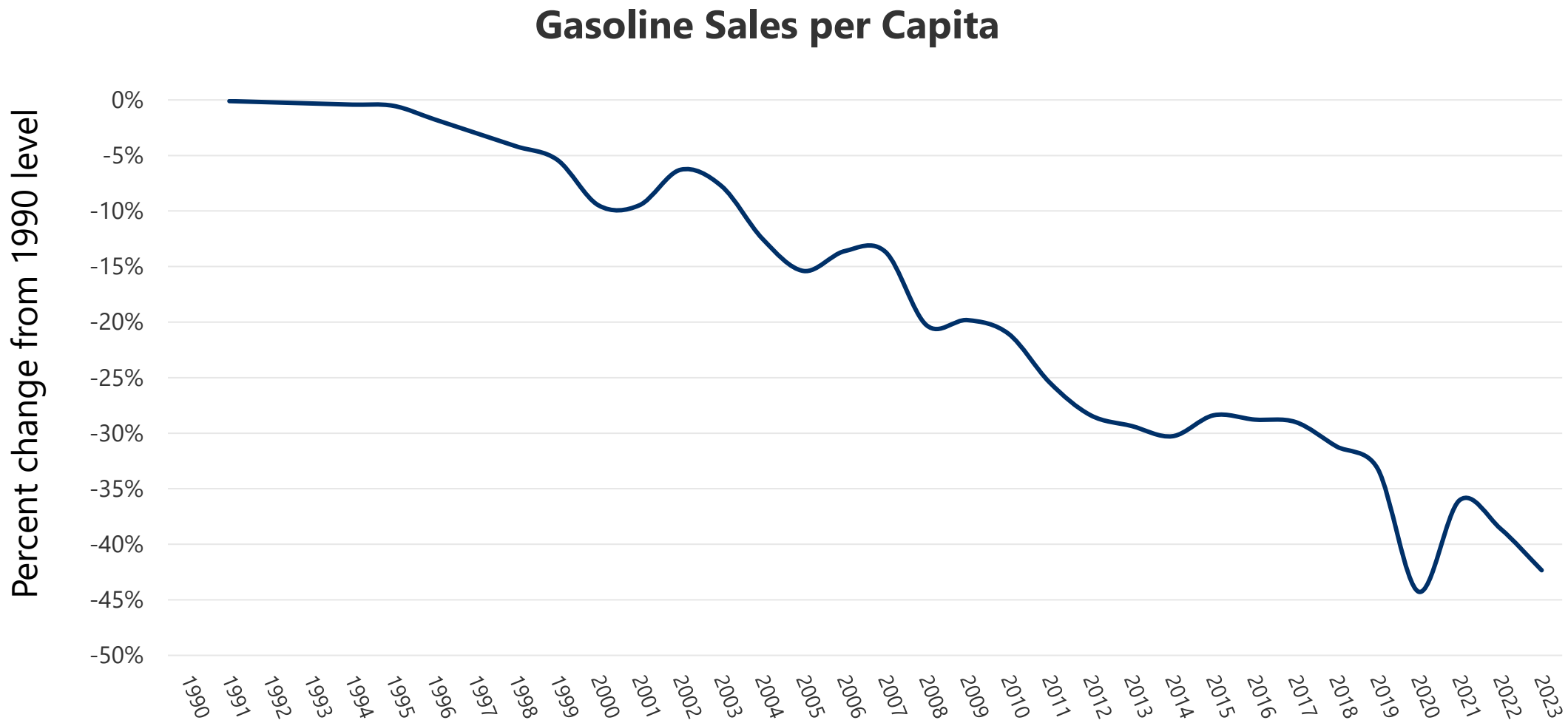

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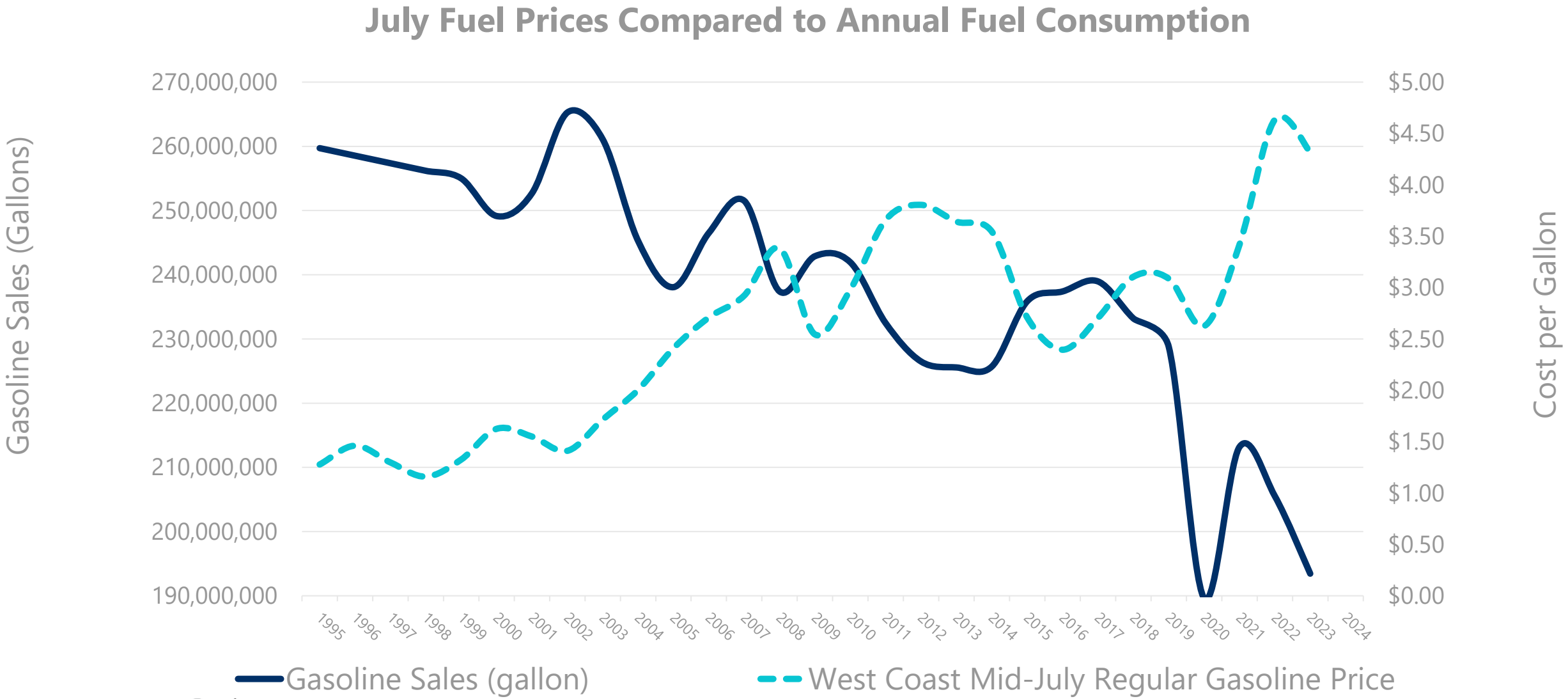
Gasoline Sales Trend (1990-2023)



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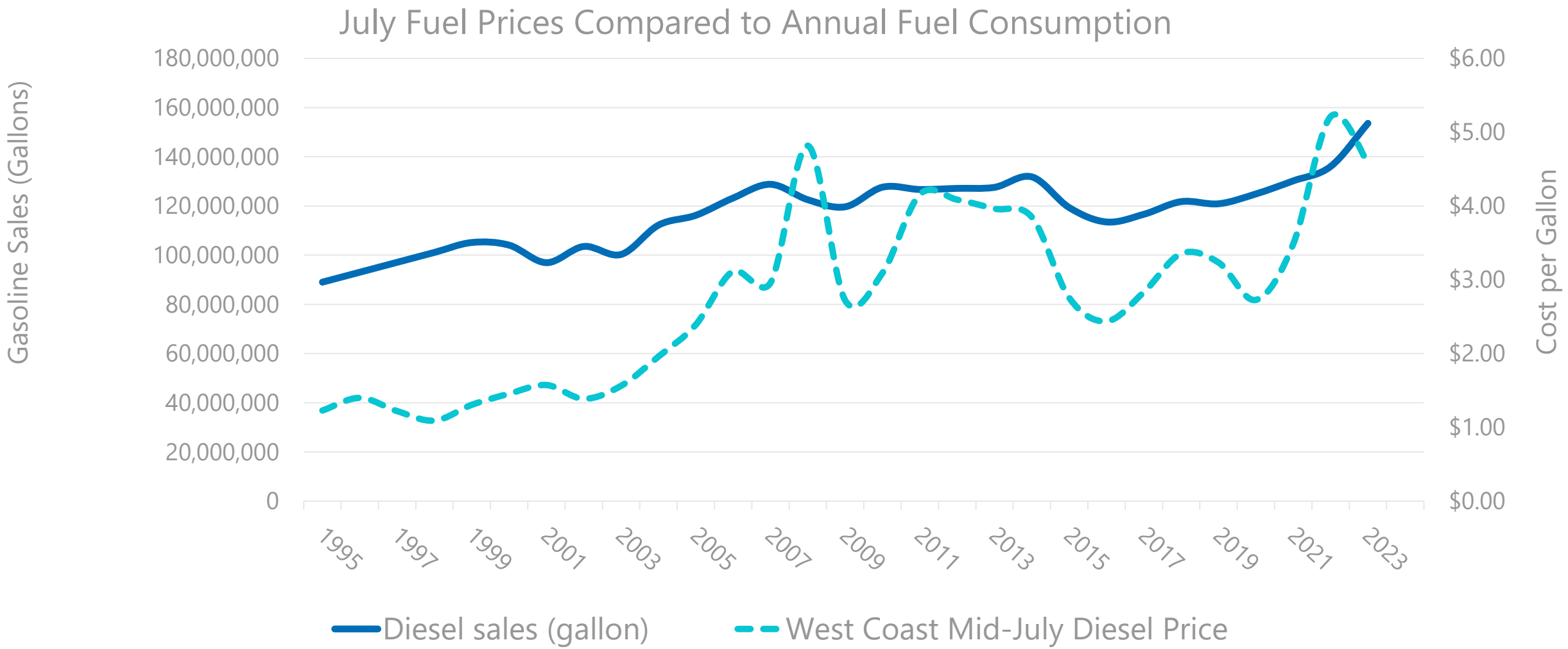
Diesel Sales Trend (1990-2023)



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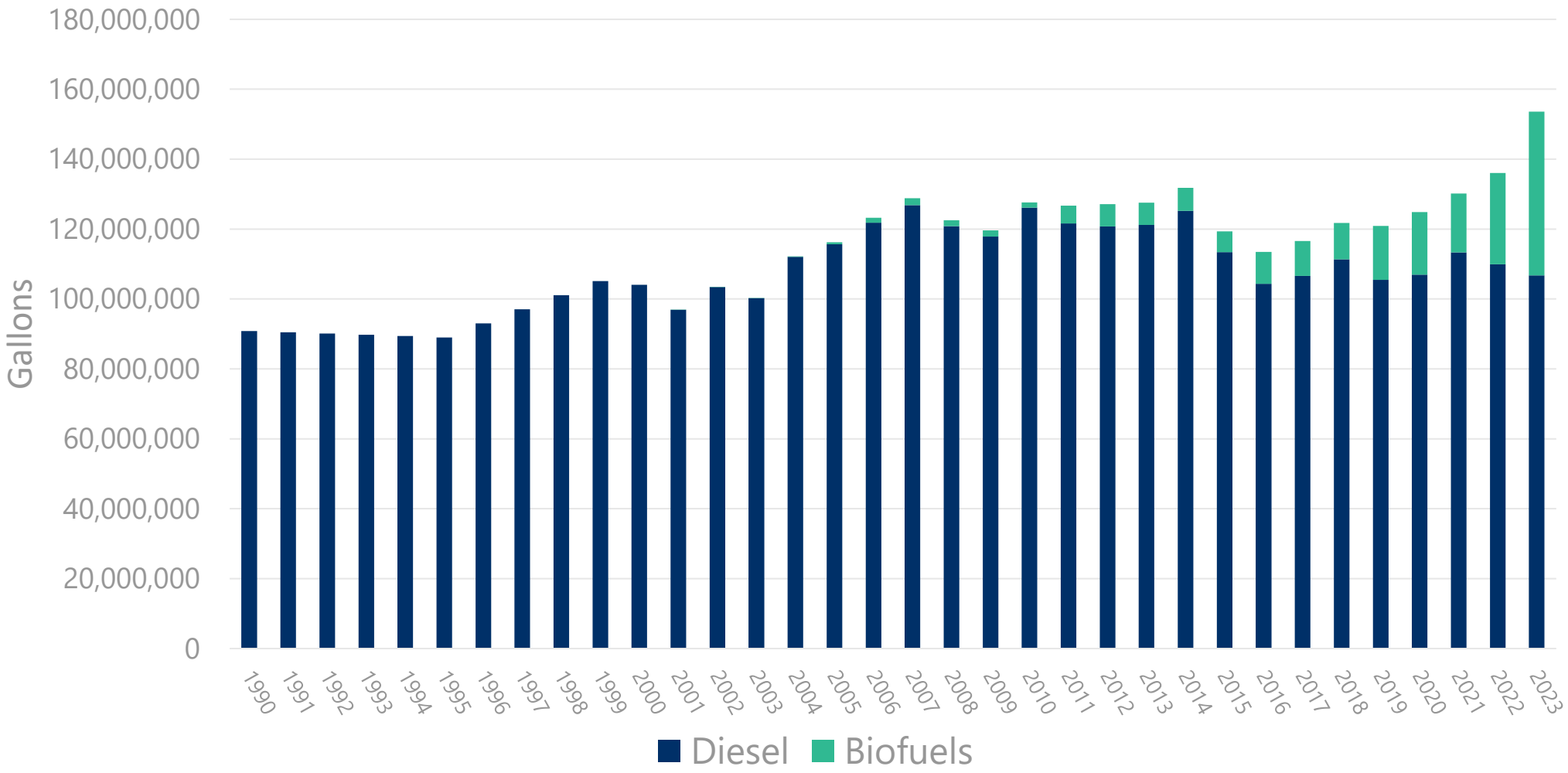
Diesel and Biofuel Sales Trend (1990-2023)



New Transportation Inventory Methodology

- Developing new methodology to comply with protocols, including air travel emissions.
- On-road is moving from fuel sales to include all trips in-boundary, based on VMT.
- VMT based on anonymous cell phone data tracking trips.
- More granularity for non-road sources: rail, transit, Off-road, and Water.

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Top Take Aways

- Emissions have declined significantly (-26%) to nearly pandemic levels but work still needs to accelerate to reach targets.
- 2023 changes resulted primarily from higher electric grid emission factors, changes due to weather, and increased use of biofuels offsetting diesel fuel use.
- New transportation methodology in development that accounts for all trips in boundary and adds air travel for the first time.

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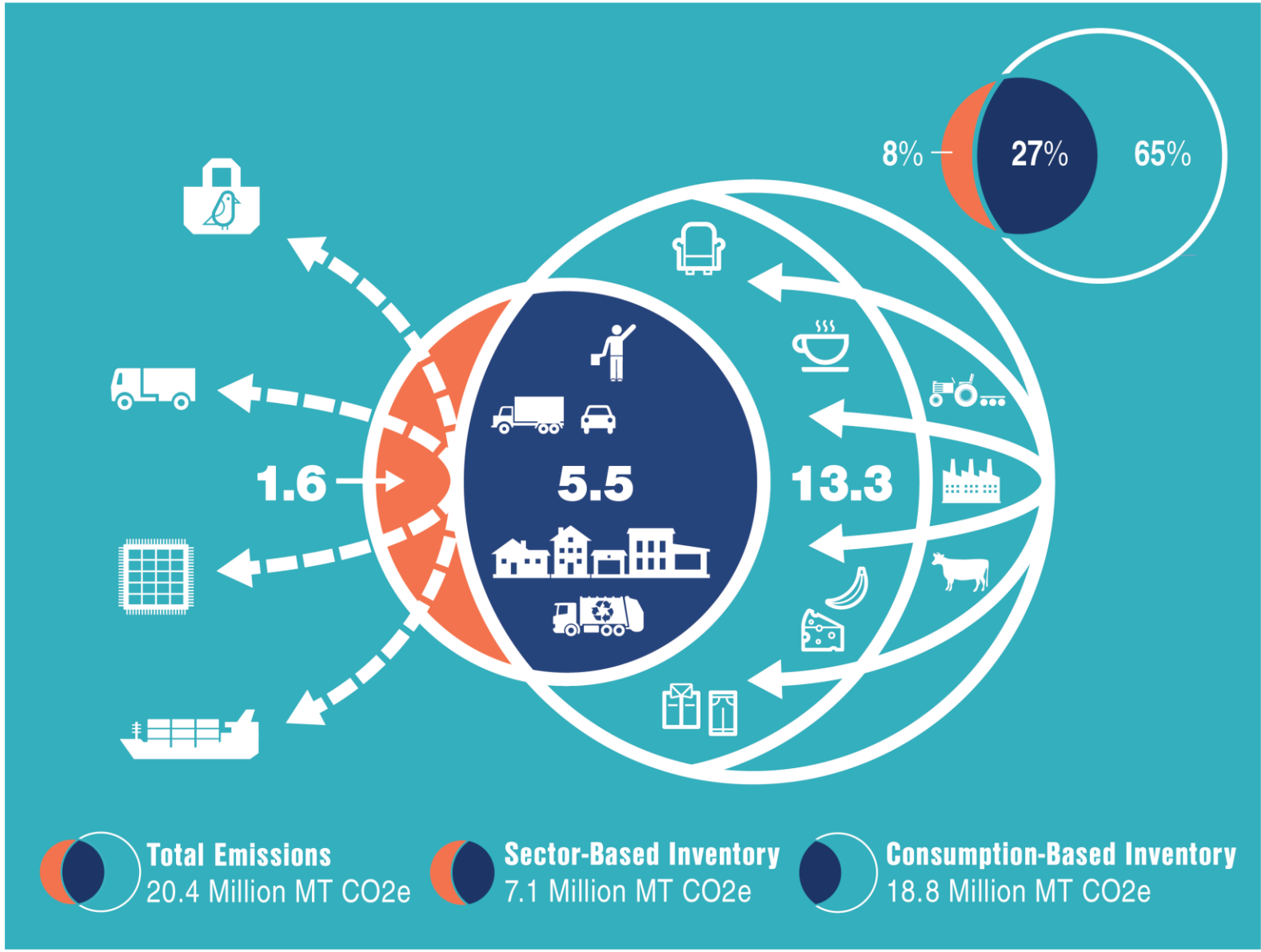
Consumption-based Emissions (2021)

Global emissions from local consumer demand are almost double emissions produced locally.



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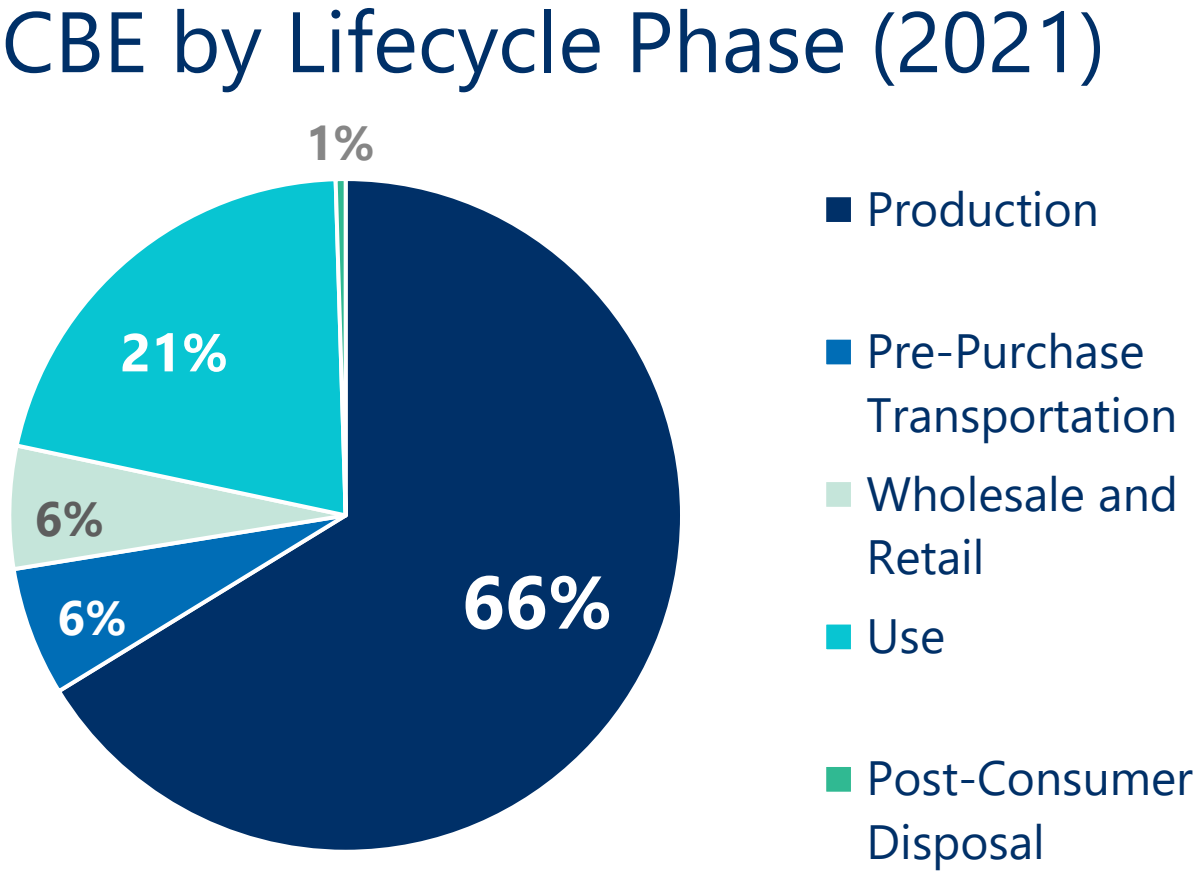
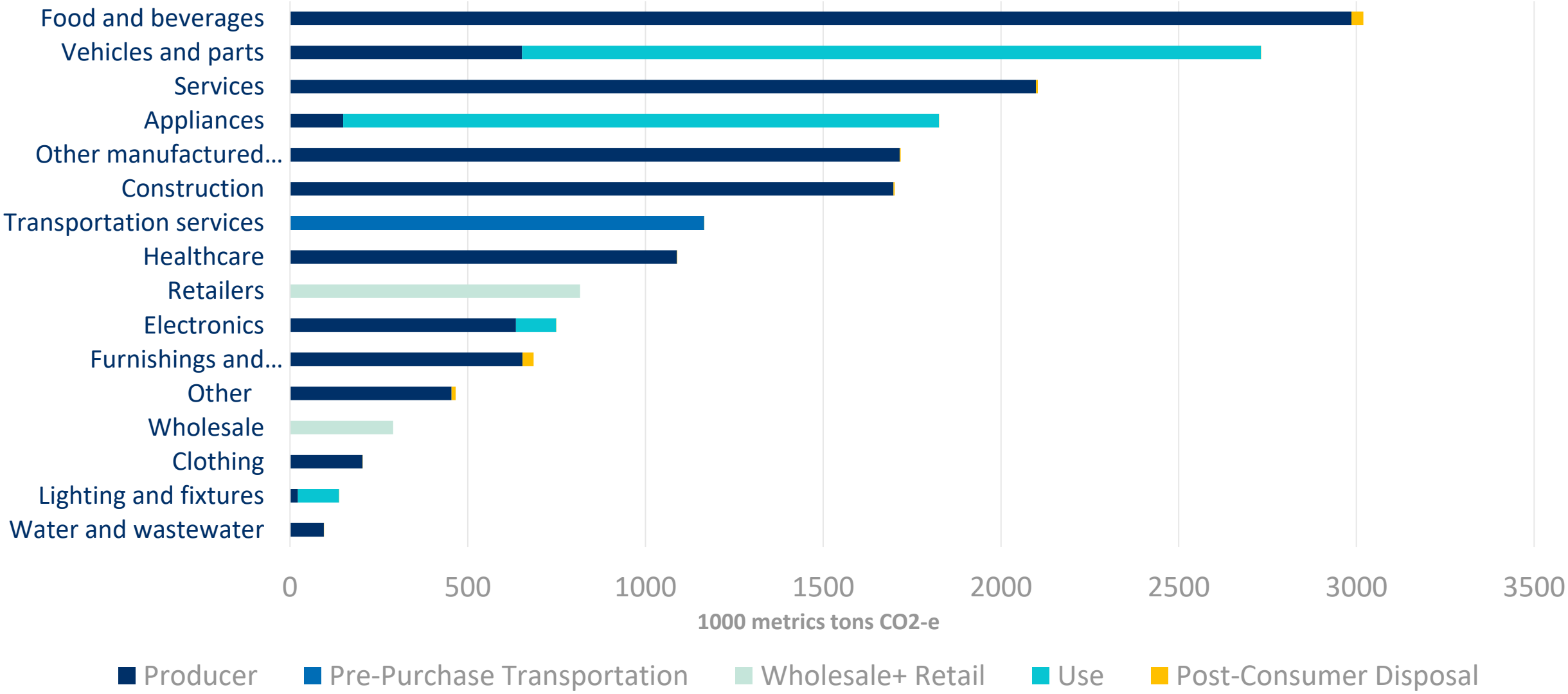
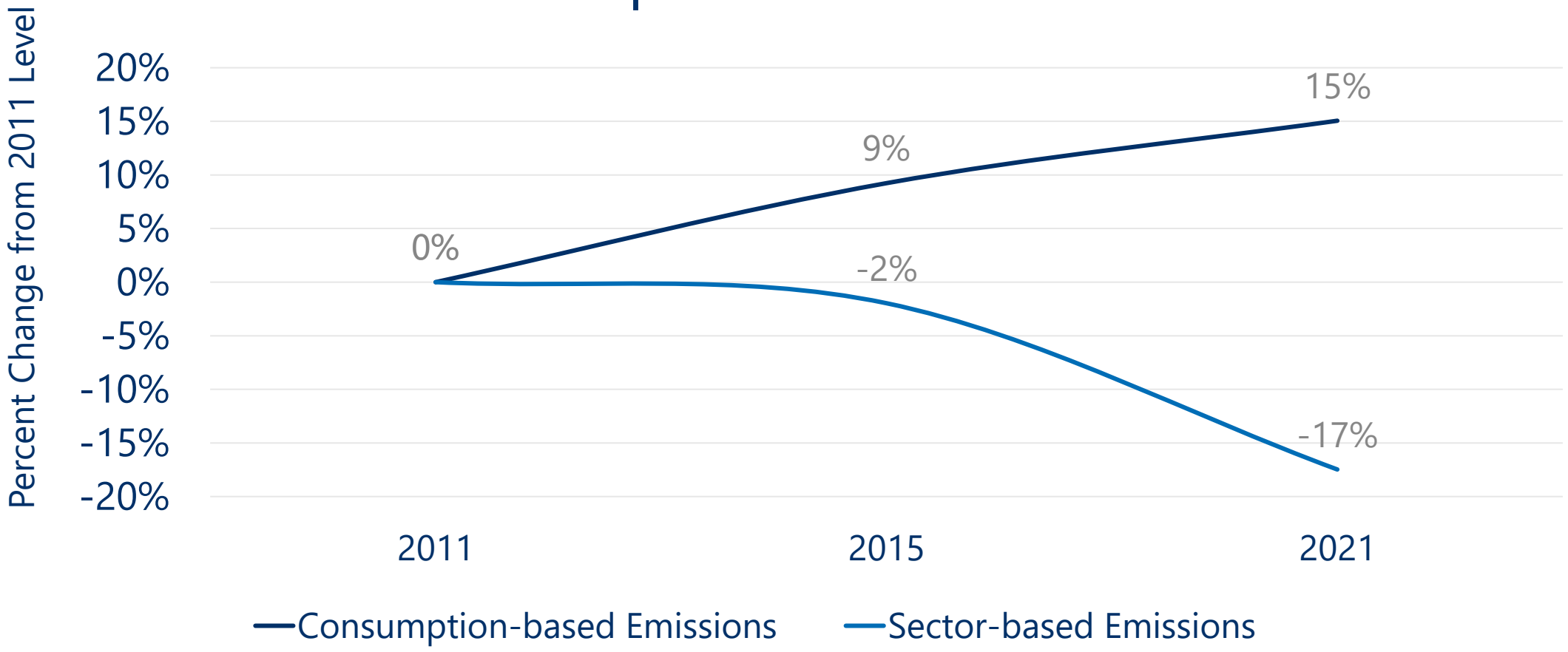
Production phase emissions account for 66% of consumption-based emissions



CBE by Category and Lifecyle Phase



Multnomah County Consumption-based Emissions Compared to Sector-based



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Consumption- and Sector-Based Emissions, 1990 – 2021

Figure 3-9 illustrates how Oregon's consumption-based and sector-based emissions have changed over a 31-year long time span.

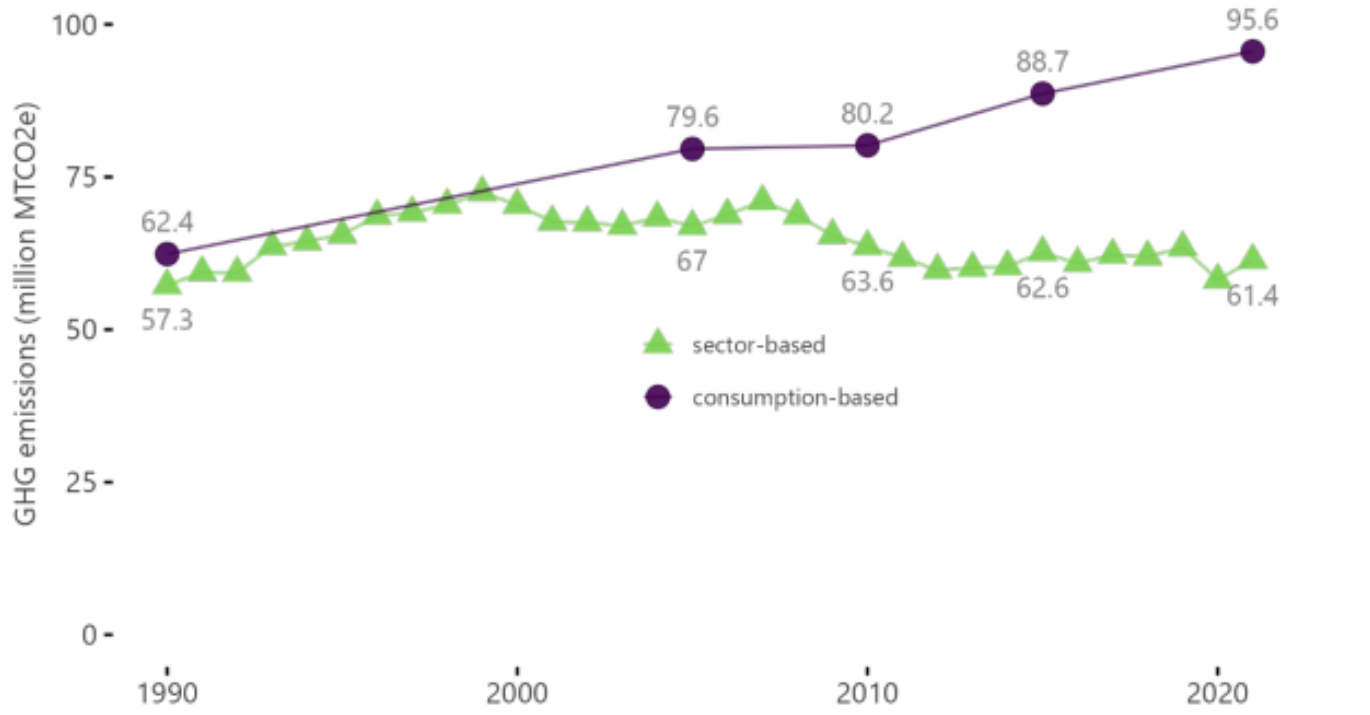
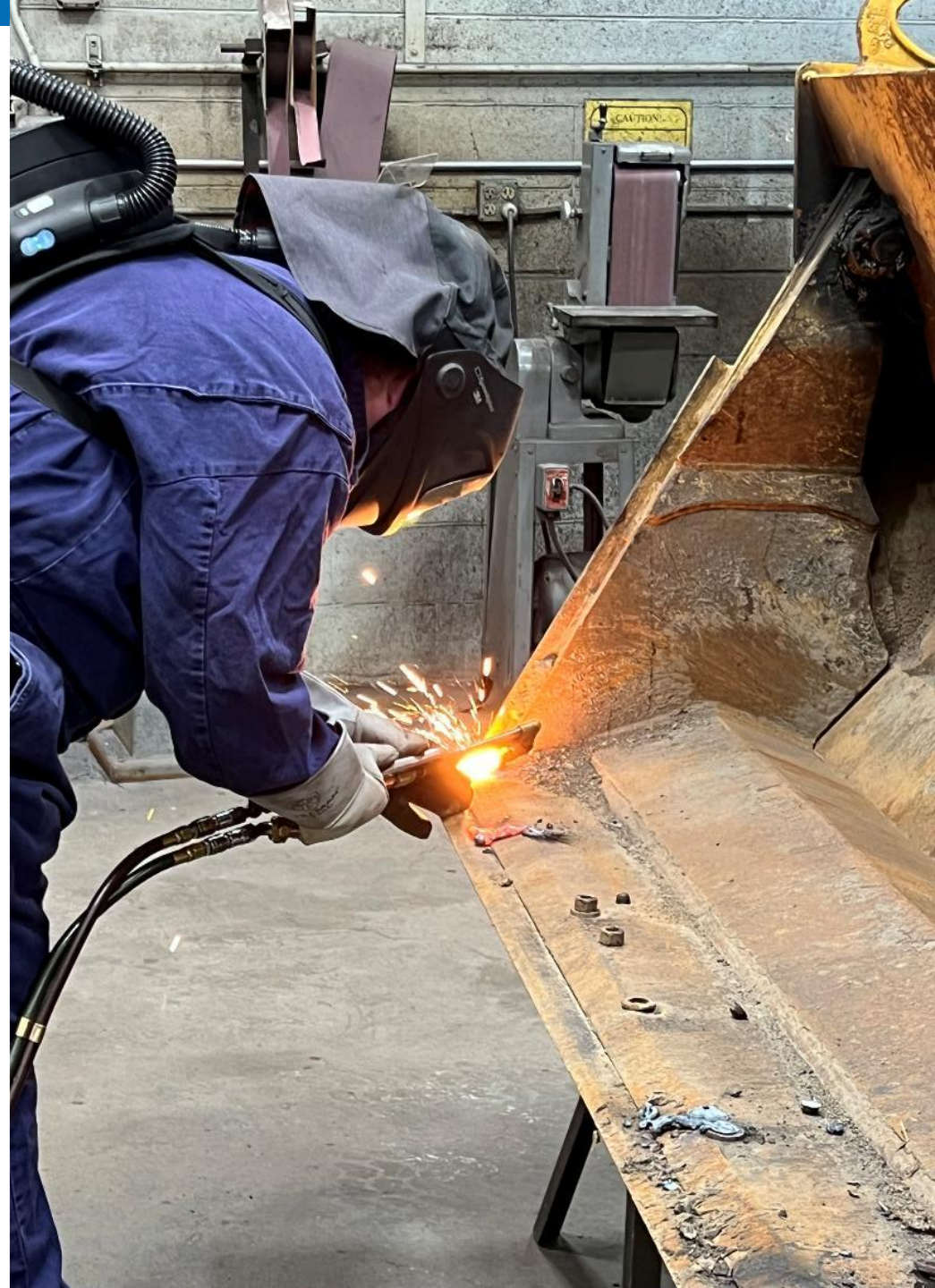


Figure 3-9
Oregon consumption-based and sector-based GHG emissions, fig – 2021

Top Take Aways

- 65% of CBE are not in the Sector-based emissions inventory
- Total 2021 carbon emissions (sector and CBE) were 20.4 Million (MT CO2e), *not 7 Million*
- CBE are increasing year over year, as local emissions have declined
- Production accounts for 66% of CBE



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Updated Pathway Analysis Tool

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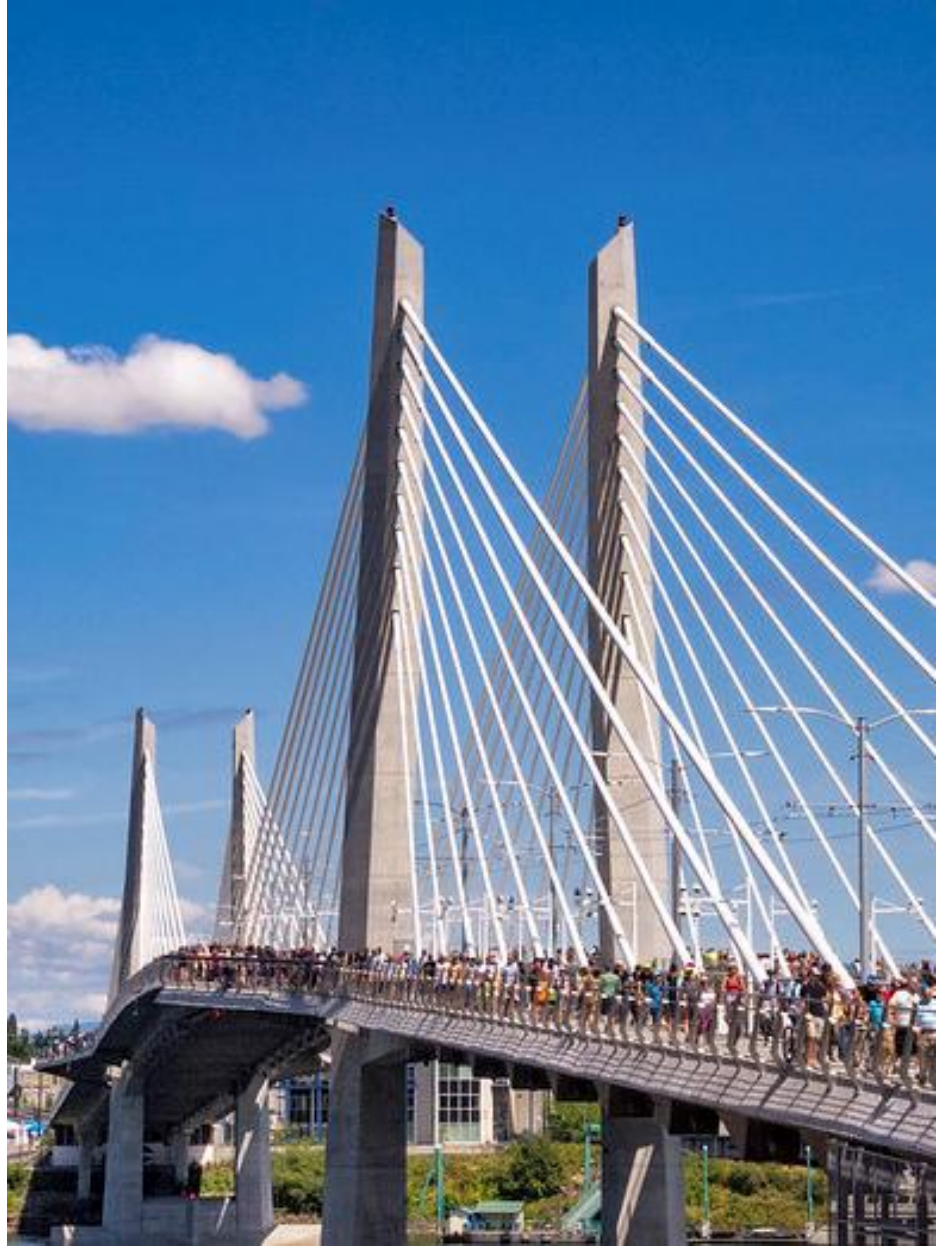
This tool is a visualizer, built upon and aligns the results from four distinct analytical resources:

1. Multnomah County Community Greenhouse Gas Inventory,
2. Portland Bureau of Transportation VisionEval modeling,
3. City of Portland's Building Analysis and Projections, and
4. iTree Tool from USFS.

The tool also includes custom modeling for other sectors.



Pathways is not prescriptive in precisely which strategies are taken or how those strategies will be implemented.

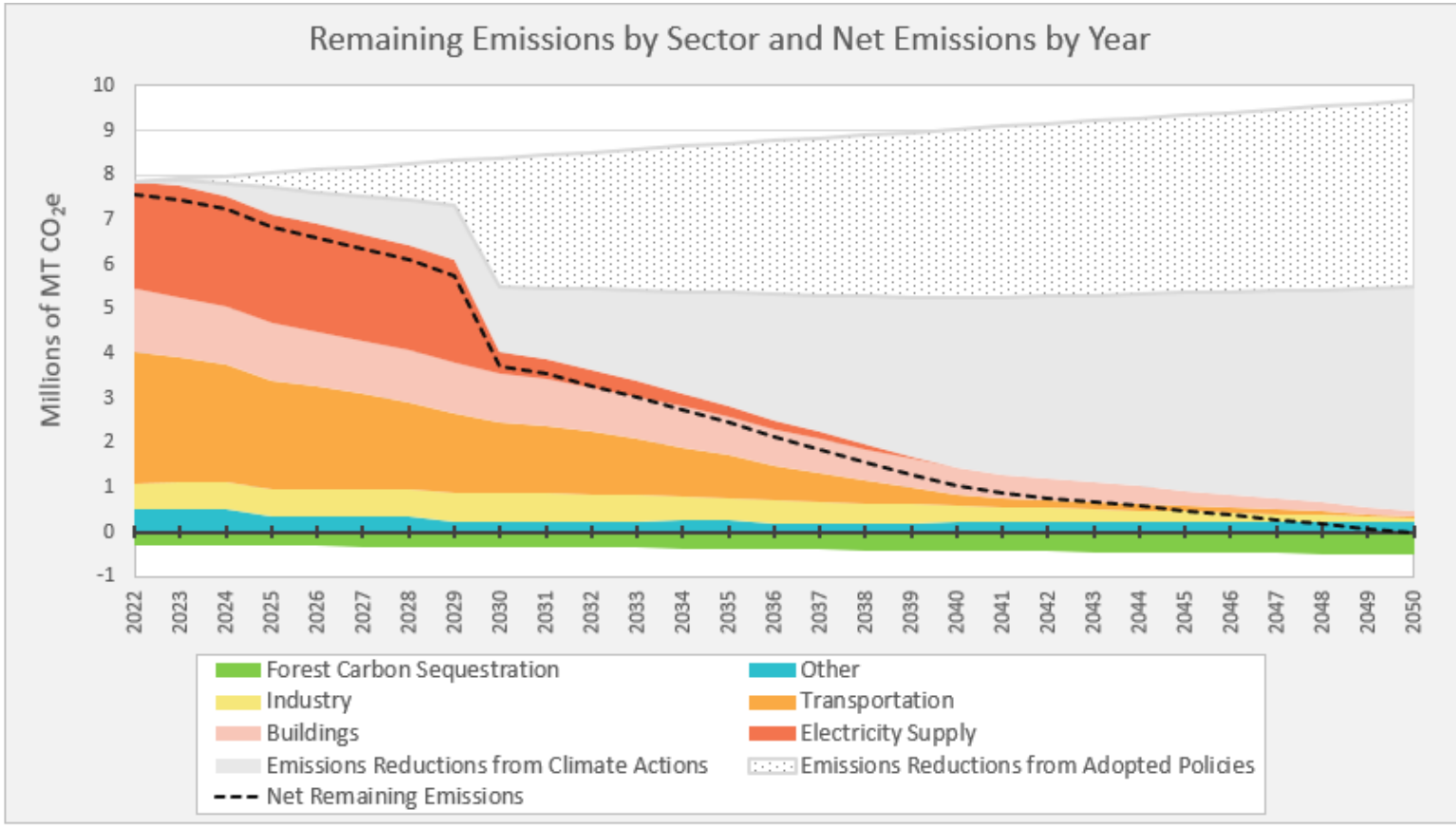
Portland's Pathway to Net-zero by 2050

Top Results

Emissions Reduction from 1990 Baseline in 2030	64.8%
Emissions Reduction from 1990 Baseline in 2050	100.0%
Net Remaining Emissions in 2030 (MTCO2e)	3,707,231
Net Remaining Emissions in 2050 (MTCO2e)	-22,689
Cumulative Emissions, MTCO2e, 2025-2050	62,495,831

Remaining Emissions by Sector - 2030 and 2050

Sector	2030	2050
Electricity Supply	498,963	0
Buildings	1,095,880	112,186
Industry	643,515	95,012
Transportation	1,556,891	48,130
Other	243,424	224,515
Sequestration	-331,442	-502,533
TOTAL	**3,707,231**	**-22,689**



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Pathways Scenario Comparison

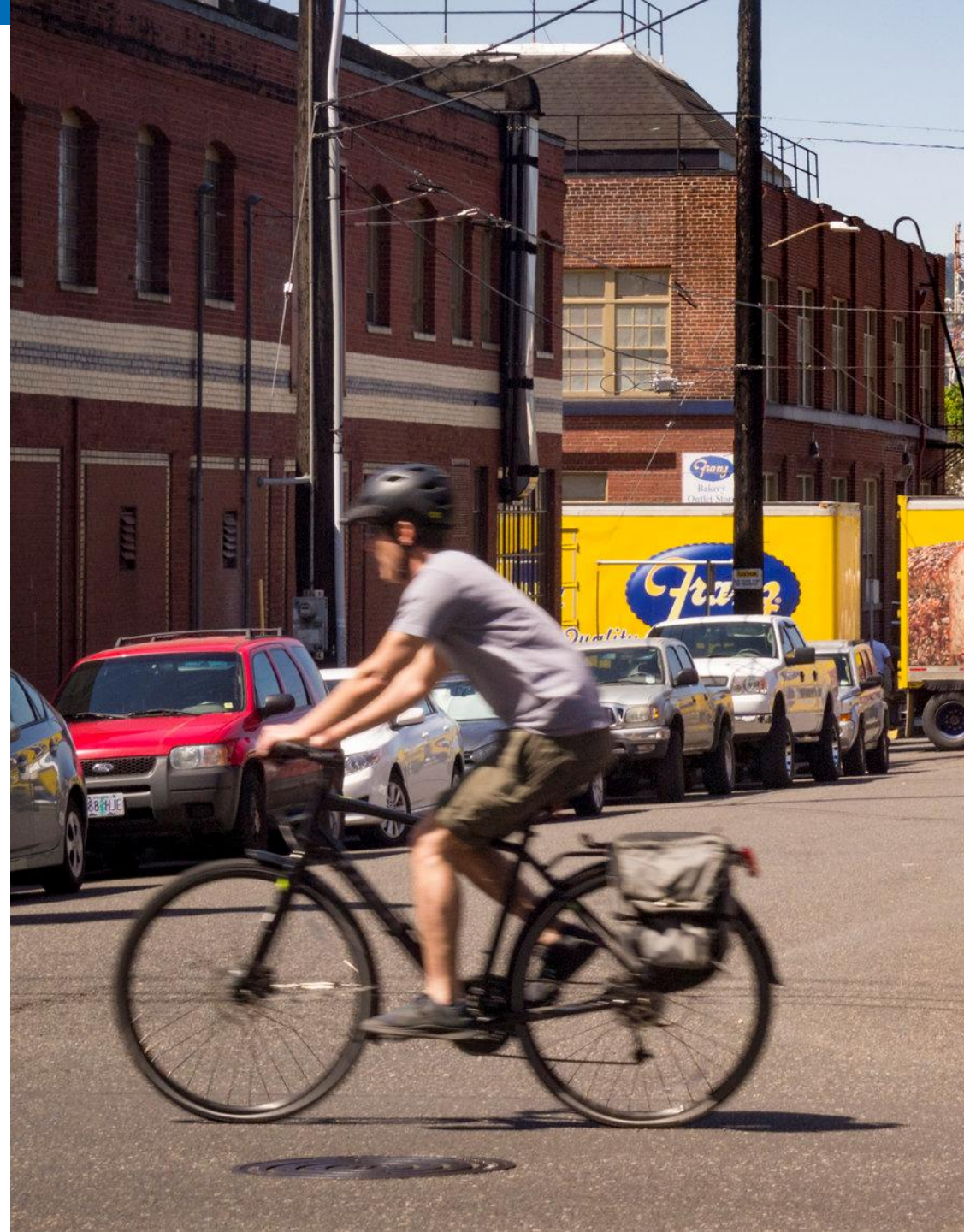
Table 1. Scenario Analysis Quantitative Results

Metric	Net-Zero Pathway	Grid Only to 2030	Missed Targets
Emissions % Reduction from 1990 Baseline in 2030	65%	56%	61%
Emissions % Reduction from 1990 Baseline in 2050	100%	97%	91%
Net Remaining Emissions in 2030 (MT CO_2e)	3,707,231	4,612,486	4,133,957
Net Remaining Emissions in 2050 (MT CO_2e)	-119,887*	275,711	924,627
Cumulative Emissions, MT CO_2e, 2025-2050	61,475,247	76,875,305	81,146,671

**Forest carbon sequestration is responsible for the negative emissions in the Net-Zero scenario.*

Top Take Aways

- Portland can achieve 2030 and 2050 adopted goals with known and available solutions.
- If adopted policies stay on track and utilities achieve 80% renewable electricity by 2030, Portland can reach 2030 targets.
- If the City acts aggressively now instead of waiting until 2030, cumulative carbon emissions could be 15 million tons lower.



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