



Summary of 2023 Multnomah County Carbon Emission and Energy Trends

November 2025



THE BUREAU OF
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Introduction

This document summarizes Multnomah County’s carbon emissions inventory and energy trends for the years 1990-2023. Portland and Multnomah County have been tracking local carbon emission and energy use for over 30 years using an annual sector-based (or production-based) emissions inventory. Local, state, and national governments use this inventory widely as it meets the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions and through ICLEI’s Clearpath inventory software, and the format can be converted to meet the Global Protocol for Community-scale Greenhouse Gas Emission Inventories.

Local emissions have declined 35% from their peak in 2000. The 2023 data show a three percent decrease from 2022 emissions. Per capita emissions are 46% below 1990 levels. The highlight of this year’s inventory is seeing the continuously stubborn transportation sector emissions finally decline to their lowest level since 1990.

Emissions reductions are due to a combination of:

- Improved efficiency in buildings, appliances, and vehicles.
- A shift to lower-carbon energy sources like wind, solar and biofuels.
- Land use planning for healthy, connected neighborhoods that enable more walking, biking, and public transit.
- Reduced methane emissions from landfills and more composting and recycling.

Even with Portland’s success, the 2023 carbon emissions inventory shows that Portland is not on track to meet our 2030 and 2050 goals. While the annual decrease of three percent may seem on track, the reality is that emissions need to be reduced almost twice this rate every year to hit the 2030 reduction target.

The longer bold climate action is delayed, the more risks and costs associated with climate change are exacerbated. More severe, more frequent, and more disruptive climate-related events are already our norm. Portland and Multnomah County must take aggressive action in the next couple years to accelerate this trajectory to have a chance of achieving a 50% reduction in emissions by 2030.

2023 Emissions

The following statistics summarize key findings from the 2023 emission inventory. Full emissions data can be found at the end of this report in the Detailed Emission Tables. Portland publicly reports

emissions through the [Carbon Disclosure Project](#). Emissions data, trends, and progress towards goals also can be found online on Portland’s new [Climate and Energy Dashboard](#).

Portland and Multnomah County’s 2023 emission inventory found that:

- Total emissions in Multnomah County for 2023 were 26% below 1990 levels (6,875,000 MT CO₂e) and 35% below 2000 peak emissions, see Figure 1.
- These reductions have been achieved even as Portland has welcomed 38% more people and added 35% more jobs since 1990, see Figure 2, according to the Portland State University Population Research Center and the US Bureau of Labor Statistics.
- According to the PSU Population Research Center, population in Multnomah County is 2% lower today than before the pandemic. Population declined significantly in 2020 and 2021. Population began to climb again slowly in 2022 and 2023, reaching 805,007 people in Multnomah County in 2023. Emission inventories have been updated to account for these changes in population.
- Multnomah County continues to benefit from significant per-person emission reductions of 46% below 1990 levels even after accounting for recent population losses, see Detailed Emissions Tables.
- Emissions decreased 3% from 2022 levels. 2023 emissions were only 1% above 2020 emissions - the first year of the COVID-19 pandemic – the lowest in Portland’s modern history, see Detailed Emissions Tables.
- For comparison, total emissions in the United States for 2022 were 2% below 1990 levels and 14% below 2000 emission levels, see Figure 1. United States emissions didn’t peak until 2007, seven years after Portland. The United States did not publish a 2023 emissions inventory (Source: US EPA).

2023 Sectoral Insights

Emissions declined across all sectors, except for a 1% increase in commercial sector emissions. The highlight of the inventory data is seeing the continuously stubborn transportation sector emissions finally decline to their lowest level since 1990.

While we should be proud of and encouraged by these successes, it is vital to stay focused on the rapid acceleration in climate action required by all sectors to reach the City of Portland’s climate goals. The 2030 goal to reduce emissions 50% over 1990 levels is less than five years away.

A note about utility grid emissions factors. Pacific Northwest grid emission factors increased by five percent from 2022 to 2023. This increase was largely the result of reduced hydro power generation, with hydro share of the grid mix for the Pacific Northwest dropping 12% in 2023 from 2022 levels. As of 2023, 67% of Portland’s electricity was still generated by fossil fuels. This change impacts emissions in across all sectors that use electricity.

The following sections outline the drivers of emission changes in each sector from 2022 to 2023.

Residential sector

Residential sector emissions are produced from energy use in single family homes, townhomes, and multifamily buildings. Residential sector emissions decreased by 1% from 2022 levels. This decrease resulted from 2% lower grid electricity sales and 6% lower natural gas sales. The 1% reduction in residential sector emissions would have been greater if not for the Pacific Northwest grid emission factors noted above.

Commercial sector

Commercial sector emissions are produced from energy use in commercial buildings, including both small commercial businesses in Portland neighborhoods and large commercial office towers in downtown Portland. Commercial sector emissions increased 1% from 2022 to 2023. Emissions in this sector are still 13% below 1990 levels despite 35% increase in jobs over the same period.

Commercial sector electricity use declined one percent and natural gas use decreased two percent from 2022 levels. The overall sectoral increase was due to:

1. Increased electricity grid emission factors as mentioned earlier, and
2. Four percent increase in use of other fossil fuels, including fuel oil, propane, and kerosene.

The increased fossil fuel consumption may correspond with higher economic activity. The US Bureau of Economic Statistics found that total gross domestic product for the Portland-Vancouver-Hillsboro, OR-WA (MSA) increased by 7% from 2022 to 2023.

Industrial sector

Industrial sector emissions are produced by the largest electricity and natural gas consumers, including those who buy power wholesale instead of through the utility companies. The industrial sector includes

energy use in industrial and manufacturing facilities, some large municipal facilities, public street lighting, and large campuses like universities or hospitals that have onsite power generation.

Industrial sector emissions decreased six percent from 2022 levels. While the amount of change seems significant, the industrial sector has had extreme changes in the past, for example in 2020, industrial sector emissions decreased 18% resulting from the COVID-19 pandemic. Taking the increases and decreases into account, on average since 1990, industrial sector emissions decrease about three percent each year, the highest reduction rate for any sector, see Figure 4.

The six percent decrease in industrial sector emissions resulted primarily from a seven percent decrease in grid electricity sales, 23% increase in voluntary green power purchases (offsetting the increase in the Pacific Northwest grid emission factors), five percent decrease in natural gas consumption, and 11% reduction in use of other fossil fuels, including a three percent decrease in fuel oil use, 17% decrease residual fuel oil use, and 58% decrease in propane use. Industrial sector decreases are likely a combination of changes in industrial activity and changes in weather (particularly for hospitals and universities with onsite power generation).

Transportation sector

Transportation-sector emissions include fuel consumption from both on and off-road vehicles, along with emissions from rail and marine activity. Transportation sector emissions decreased four percent from 2022 levels. They are currently at their lowest levels since the City has been tracking transportation sector carbon emissions, 13% below 1990 levels. 2023 transportation sector emissions were even three percent lower than during the 2020 pandemic.

The decrease is largely the result of six percent lower gasoline sales, three percent lower fossil diesel fuel sales, and a 79% increase in use of renewable diesel replacing fossil diesel fuel, resulting from implementation of the Oregon Clean Fuels program.

The drop in gasoline sales is notable as gasoline prices in the Pacific Northwest also decreased 7% below the 2022 record high prices, according to the U.S. Energy Information Administration. Although there was a notable decrease in gasoline price, the 2023 average gasoline price for the Pacific Northwest remained higher than the historical trend. Typically, gasoline demand has an inverse correlation with price, and Portland expected to see an increase in gasoline sales as the price declined. The departure from this trend may be based on the 2023 average price still being relatively high or could reflect the growth in electric vehicle sales impacting total gas demand. According to Oregon Department of Transportation, 25,000 new electric vehicles were registered in Oregon 2023, a 41%

increase from 2022 levels. The result is that one out of seven new cars registered in Oregon in 2023 was an EV or a plug-in electric hybrid.

As more vehicles shift from gas to electric, those emissions move from the transportation sector to buildings. There are currently no methods to break out electric vehicle energy use from building energy use. Given this dynamic, increases in electricity use from electric vehicle charging will temper emission reductions from the residential sector.

Portland has been working on a new methodology for transportation sector emissions that better account for all trips within the jurisdictional boundary, rather than fuel sales. The new methodology is more challenging to produce as data isn't available prior to 2018. Portland published a sneak peak of the new data in 2022 and is currently working on backcasting emission trends for prior years. The new methodology will be published in separate report when completed.

Other sources

Emissions from solid waste decreased by four percent, including emissions from landfilled waste and emissions from composting of food and yard debris. The decrease was the result of reduced tonnage of solid waste hauled to landfills.

Emissions from wastewater treatment also decreased by four percent, although a smaller share of overall emissions. The overall sectoral reduction resulted from a 42% decrease in estimated emissions from septic tanks in Multnomah County due to a change in methodology. However, in-plant wastewater treatment emissions from both Columbia Boulevard Wastewater Treatment Plant and the Gresham Wastewater Treatment Plant increased due to more digester gas production.

Lastly, fugitive emissions decreased five percent. The decrease in fugitive emissions resulted mostly from 72% lower Industrial refrigerant, foam, solvent, and aerosol use, as reported by Oregon Department of Environmental Quality. There was also a four percent reduction in fugitive methane emissions from the natural gas distribution system, which corresponds to the overall decrease in natural gas system throughput.

Figures

Figure 1. Multnomah County Emissions Trend Compared to United States

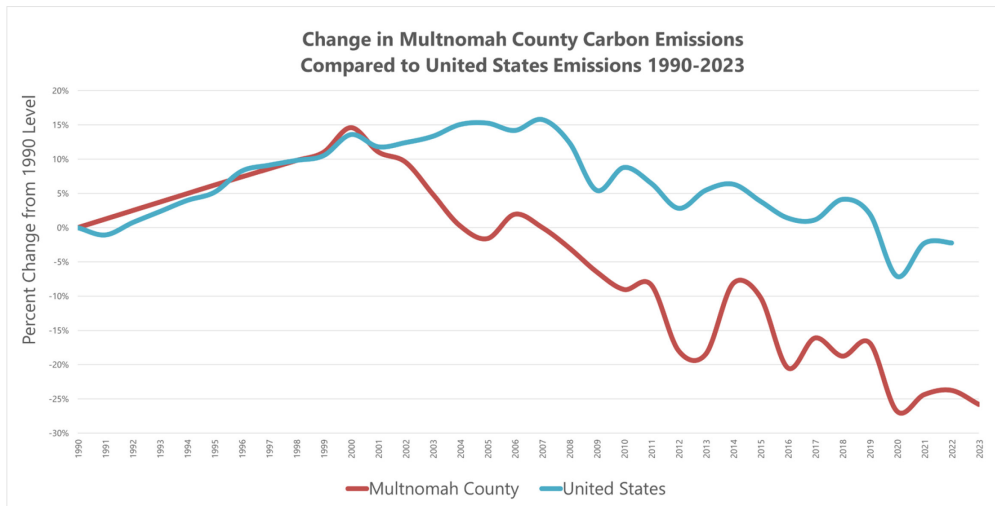


Fig 1: Carbon emission trends in Multnomah County have been significantly below U.S. trends in most years since 2001. Despite Portland's steeper emissions reductions, the data shows how much broader national economic conditions, such as the 2008 Great Recession and the recession that followed the COVID-19 Pandemic influence emissions at both the National and local level.

Figure 2. Multnomah County Emissions Trend Compared to Population and Jobs

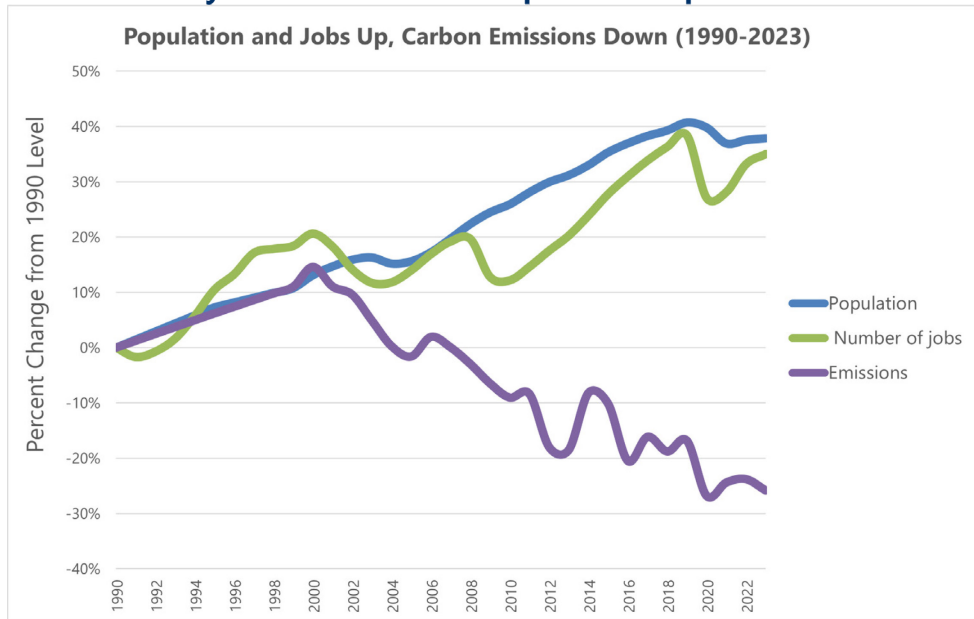


Fig 2: Over the last 30 years Multnomah County has successfully reduced emissions by 26%, while also welcoming 38% more people and 35% more jobs. This demonstrates that it is possible to reduce emissions while still growing the economy. However, the 26% reduction is insufficient to achieve the science-based targets adopted by Portland City Council: 50% by 2030 and net-zero emissions by 2050.

Figure 3. Multnomah County Carbon Emissions by Sector

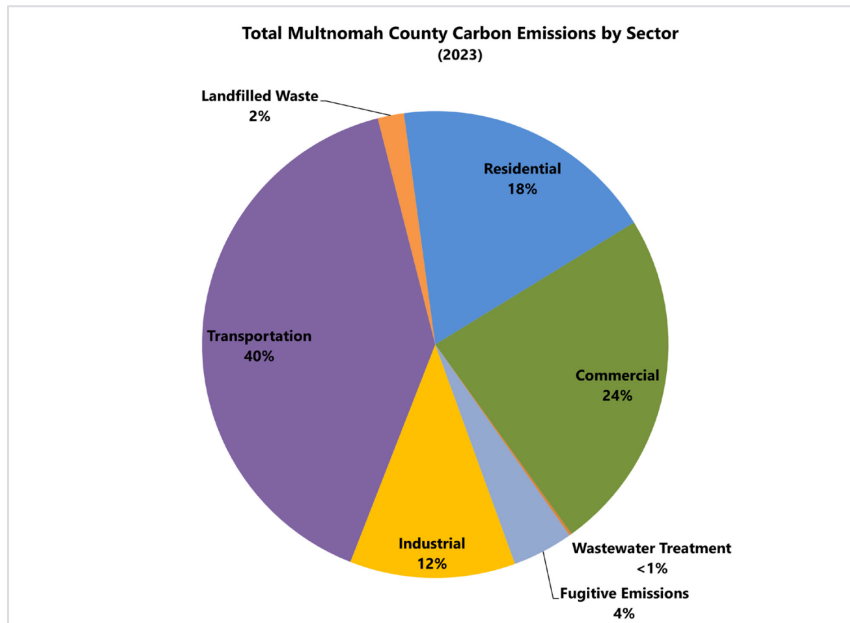


Fig 3: The commercial sector was the only sector that increased emissions from 2022 to 2023, up 1% and increasing its share of total emissions from 22% to 24%. Even though transportation sector emissions decreased by 4% from 2022 to 2023, it remains the single largest source of emissions at 40%.

Figure 4. Multnomah County Carbon Emissions Comparing Peak Emissions to Current Levels

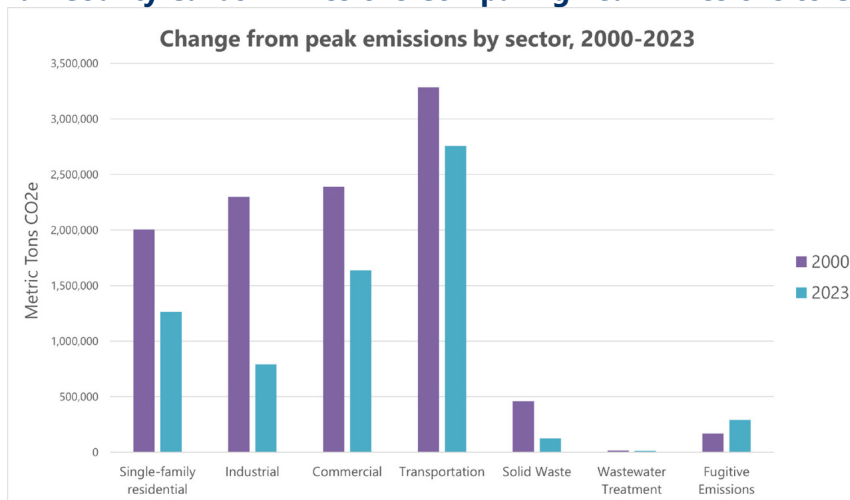


Fig 4: Multnomah County carbon emissions peaked in 2000, chart compares peak emissions to the most current levels, 2023. All primary sectors have declined below 2000 levels, except for fugitive emissions. While fugitive emissions declined from 2022 to 2023, they are still higher today when compared to 2000 levels, as fugitive emissions are modeled, in part, based on population. The industrial sector has achieved the greatest reductions with a 66% reduction in emissions from 2000 levels.

Figure 5. Multnomah County Carbon Emissions by Source

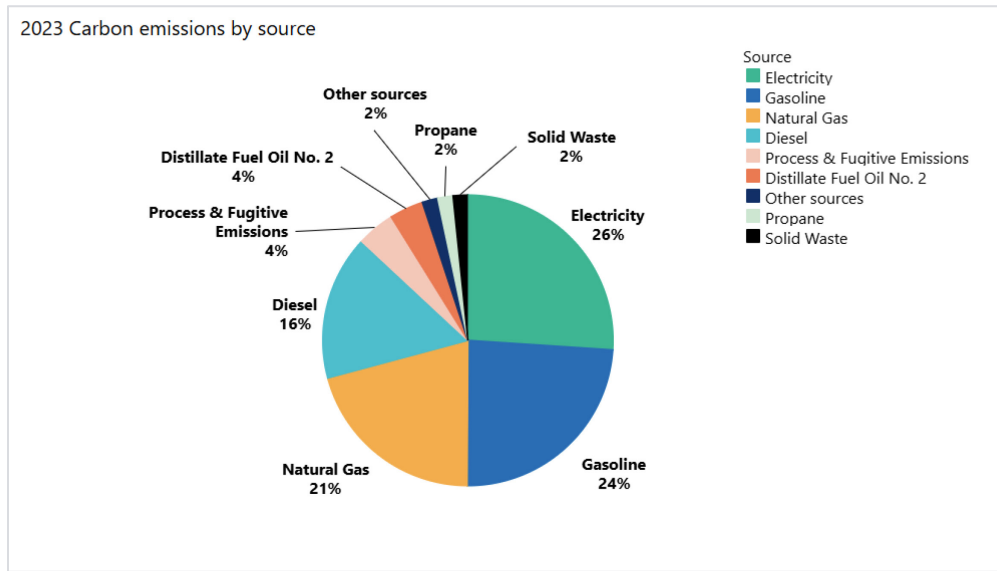


Fig 5: Carbon emissions by source in Multnomah County for 2023. The top four primary emissions sources are 1) electricity, 2) gasoline, 3) natural gas, and 4) diesel fuel. Collectively, these emissions account for 85% of local carbon emissions.

Figure 6. Multnomah County Electricity Generation Sources

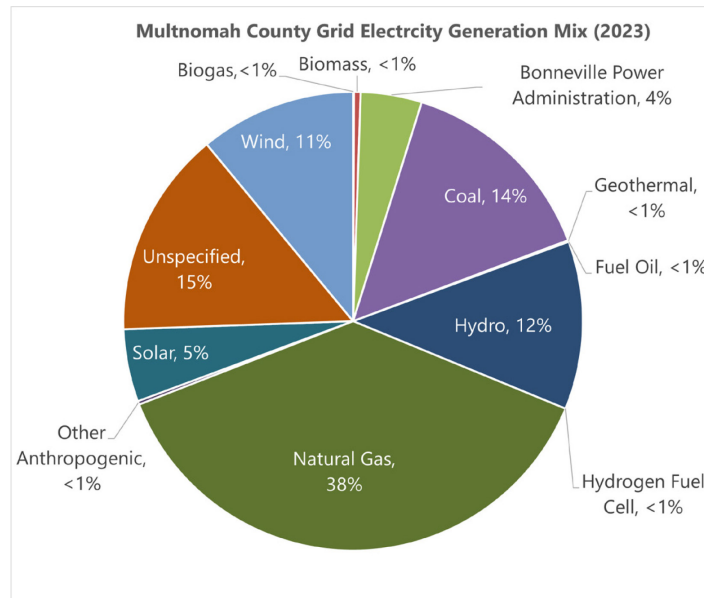


Figure 6: Multnomah County weighted average of electricity generation sources for PGE and Pacific Power in 2023. 67% of electricity sales were still produced from fossil fuels. Oregon requires electric utilities to be 80% renewable by 2030, 90% by 2035, and 100% by 2040. [Oregon Department of Energy Oregon Electricity Use Resource Mix](#) for PGE and Pacific Power, including market and Bonneville Power Administration purchases, weighted average based on utility sales calculated by Portland BPS.

Detailed Emissions Tables

The tables on the following pages show detailed data for Multnomah County for selected years between 1990 and 2010 and then annually through 2023. Data tables show the primary sectors tracked by the City of Portland since 1990 - residential, commercial, industrial, transportation, solid waste, wastewater treatment, and fugitive emissions. The first table is a summary of total carbon emissions and per capita emissions in metric tons of carbon dioxide equivalents, a standard unit for all greenhouse gases. The second table is a summary of the corresponding total and per capita energy consumption in million British thermal units, a standard unit of energy content.

Greenhouse Gas Emissions in Multnomah Co., 1990 - 2023

This report has been generated for Portland, Oregon using ClearPath software suite from ICLEI-USA

Note: Figures have been revised from previous years to incorporate revised data from US EIA, US Census, and other methodology improvements.

Total emissions (metric tons CO2-equivalent)

Year	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023	Change since previous year	Change since 1990
Residential	1,723,000	1,754,000	2,005,000	1,639,000	1,553,000	1,438,000	1,190,000	1,363,000	1,224,000	1,327,000	1,177,000	1,190,000	1,277,000	1,265,000	-1%	-27%
Commercial	1,874,000	2,039,000	2,390,000	2,005,000	1,891,000	2,004,000	1,579,000	1,715,000	1,686,000	1,827,000	1,480,000	1,506,000	1,614,000	1,638,000	1%	-13%
Industrial	1,890,000	2,102,000	2,297,000	1,470,000	1,334,000	1,391,000	1,173,000	1,058,000	988,000	1,022,000	837,000	882,000	842,000	790,000	-6%	-58%
Transportation	3,165,000	3,297,000	3,285,000	3,280,000	3,243,000	3,055,000	2,985,000	3,180,000	3,170,000	3,072,000	2,840,000	2,981,000	2,884,000	2,757,000	-4%	-13%
Solid Waste	553,000	532,000	459,000	513,000	103,000	114,000	116,000	120,000	123,000	119,000	120,000	127,000	130,000	125,000	-4%	-77%
Wastewater Treatment	19,430	22,890	15,100	12,550	14,100	17,240	16,080	16,510	15,230	15,150	12,850	12,230	12,270	11,760	-4%	-39%
Fugitive Emissions	43,000	95,000	168,000	200,000	291,000	306,000	312,000	322,000	322,000	325,000	316,000	310,000	306,000	290,000	-5%	574%
Total	9,267,000	9,841,000	10,619,000	9,119,000	8,430,000	8,326,000	7,370,000	7,775,000	7,528,000	7,707,000	6,784,000	7,008,000	7,065,000	6,875,000	-3%	-26%
% change from 1990	0%	6%	15%	-2%	-9%	-10%	-20%	-16%	-19%	-17%	-27%	-24%	-24%	-26%		
% change from 2000			0%	-14%	-21%	-22%	-31%	-27%	-29%	-27%	-36%	-34%	-33%	-35%		

Year	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023	Change since previous year	Change since 1990
Multnomah Co. population	583,887	626,500	660,486	675,175	735,334	790,294	799,766	807,555	813,300	821,730	816,353	799,551	803,279	805,007	0%	38%
Multnomah Co. Jobs	375,768	415,113	453,254	428,305	421,452	480,109	492,062	502,929	512,206	520,002	477,432	481,459	500,424	507,231	1%	35%
Commercial establishments	-	-	-	-	27,782	31,888	33,160	34,412	35,353	36,164	37,130	39,193	41,813	43,305	4%	

Per capita emissions (metric tons CO2-equivalent)

Year	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023	Change since previous year	Change since 1990
Residential	3.0	2.8	3.0	2.4	2.1	1.8	1.5	1.7	1.5	1.6	1.4	1.5	1.6	1.6	-1%	-47%
Commercial	3.2	3.3	3.6	3.0	2.6	2.5	2.0	2.1	2.1	2.2	1.8	1.9	2.0	2.0	1%	-37%
Industrial	3.2	3.4	3.5	2.2	1.8	1.8	1.5	1.3	1.2	1.2	1.0	1.1	1.0	1.0	-6%	-70%
Transportation	5.4	5.3	5.0	4.9	4.4	3.9	3.7	3.9	3.9	3.7	3.5	3.7	3.6	3.4	-5%	-37%
Solid Waste	0.9	0.8	0.7	0.8	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.2	-4%	-84%
Wastewater Treatment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-4%	-56%
Fugitive Emissions	0.1	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	-6%	392%
Total	15.9	15.7	16.1	13.5	11.5	10.5	9.2	9.6	9.3	9.4	8.3	8.8	8.8	8.5	-3%	-46%
% change from 1990	0%	-1%	1%	-15%	-28%	-34%	-42%	-39%	-42%	-41%	-48%	-45%	-45%	-46%		
% change from 2000			0%	-16%	-29%	-34%	-43%	-40%	-42%	-42%	-48%	-45%	-45%	-47%		

Energy use in Multnomah Co, 1990 - 2023

This report has been generated for Portland, Oregon using ClearPath software suite from ICLEI-USA

Total energy use (million BTUs)

Year	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023	Change since previous year	Change since 1990
Residential	18,214,000	18,900,000	21,253,000	20,012,000	20,554,000	18,910,000	19,493,000	23,024,000	20,992,000	22,113,000	21,471,000	21,421,000	23,267,000	22,534,000	-3%	24%
Commercial	19,415,000	20,606,000	22,593,000	21,236,000	21,465,000	21,442,000	21,620,000	23,951,000	23,799,000	24,346,000	21,899,000	21,945,000	24,167,000	23,878,000	-1%	23%
Industrial	20,226,000	23,911,000	23,502,000	18,127,000	17,124,000	17,569,000	17,441,000	16,268,000	14,627,000	14,512,000	12,492,000	13,032,000	13,840,000	13,071,000	-6%	-35%
Transportation	43,105,000	44,842,000	45,226,000	45,603,000	46,867,000	44,947,000	44,293,000	44,959,000	44,930,000	44,247,000	40,001,000	43,601,000	43,416,000	44,195,000	2%	3%
Wastewater Treatment	363,000	373,000	354,000	593,000	677,000	749,000	698,000	705,000	707,000	709,000	638,000	637,000	599,000	709,000	18%	95%
Total	101,323,000	108,632,000	112,928,000	105,571,000	106,687,000	103,617,000	103,545,000	108,907,000	105,055,000	105,927,000	96,501,000	100,636,000	105,289,000	104,387,000	-1%	3%

Year	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023	Change since previous year	Change since 1990
Multnomah Co. populatic	583,887	626,500	660,486	675,175	735,334	790,294	799,766	807,555	813,300	821,730	816,353	799,551	803,279	805,007	0%	38%

Per capita energy use (million BTUs)

Year	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2020	2021	2023	Change since previous year	Change since 1990
Residential	31.2	30.2	32.2	29.6	28.0	23.9	24.4	28.5	25.8	26.9	26.3	26.8	29.0	28.0	-3%	-10%
Commercial	33.3	32.9	34.2	31.5	29.2	27.1	27.0	29.7	29.3	29.6	26.8	27.4	30.1	29.7	-1%	-11%
Industrial	34.6	38.2	35.6	26.8	23.3	22.2	21.8	20.1	18.0	17.7	15.3	16.3	17.2	16.2	-6%	-53%
Transportation	73.8	71.6	68.5	67.5	63.7	56.9	55.4	55.7	55.2	53.8	49.0	54.5	54.0	54.9	2%	-26%
Wastewater Treatment	0.6	0.6	0.5	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.7	0.9	18%	42%
Total	173.5	173.4	171.0	156.4	145.1	131.1	129.5	134.9	129.2	128.9	118.2	125.9	131.1	129.7	-1%	-25%
% change from 1990		0%	-1%	-10%	-16%	-24%	-25%	-22%	-26%	-26%	-32%	-27%	-24%	-25%		

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About City of Portland Bureau of Planning and Sustainability

The Bureau of Planning and Sustainability (BPS) develops creative and practical solutions to enhance Portland's livability, preserve distinctive places, and plan for a resilient future.



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