Oregon Clean Fuels Program

Electricity Carbon Intensity Values for 2023

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Contact: OregonCleanFuels@deq.state.or.us

This document publishes the statewide and utility-specific grid mix carbon intensity values for electricity reported as a vehicle fuel in the Oregon Clean Fuels Program for the 2023 reporting year.

General methodology

The CFP calculates the carbon intensity of transportation fuels on a lifecycle basis, which means that both direct and indirect emissions are accounted for. For electricity, that means looking at both the direct emissions from the smokestacks of power plants and the indirect, upstream emissions from the extraction and transportation of the source of the electricity to the power plant.

Direct emissions

The electricity sector is one of many that is required to report annually to Oregon DEQ's Greenhouse Gas Reporting Program[1]. Each year, the utilities and electric generators report how much electricity they produce or procure from within and outside of Oregon and the resources used to generate their electricity, such as wind, coal, or others. The emission rates are reported in tons per megawatt-hours and then converted to grams of CO_2e per megajoule of energy by using the following factors[2]:

1 Metric Ton (MT) = 1,000,000 grams (g)
1 Megawatt-hour (MWh) = 1,000 Kilowatt-hour (kWh)
1 kWh = 3.6 megajoules (MJ)

The final reported mix of resources generating electricity consumed in Oregon includes in-state and out-of-state electricity generation. Electricity consumption from neighboring jurisdictions, like Washington state, is excluded in the final estimates.

Indirect emissions

The OR-GREET 3.0 model is used to calculate the upstream or indirect emissions associated with the mix of resources generating electricity. Resources include, for example, natural gas, wind, solar, and coal. In the case of natural gas, the indirect emissions include emissions from

[1] The Oregon Department of Energy also uses DEQ GHG reporting program data. For more information about ODOE's use of this data, reference the ODOE 'Data & Reports' website https://www.oregon.gov/energy/energy-oregon/Pages/Electricity-Mix-in-Oregon.aspx and ERM Visual FAQ https://www.oregon.gov/energy/energy-oregon/Documents/2022-06-13-ERM-Visual-FAQ.pdf.

[2] For more information on the GHGRPs emissions factor assignment methodology for specified sources, reference https://www.oregon.gov/deq/aq/Documents/ghg-SpecifiedSourceEFmethods.pdf

energy used at the wellhead and throughout the transmission system, including fugitive methane emissions. In the case of coal, indirect emissions include emissions from energy used in mining and transportation to the power plant.

Statewide mix carbon intensity calculations for 2023

Statewide mix direct emissions

The direct emissions accounting is based on 2021 electricity sector reported to GGRP, and the BPA's 2019 reported data. Table 1 shows the aggregated calculated emissions factor ($MTCO2_e$/MWh) and carbon intensity (gCO_2e/MJ) values for all providers of electricity that reported to GGRP and the adjusted statewide mix after removing the energy and emissions from the utilities that have requested a utility-specific mix.

Table 1. All providers of electricity and the adjusted statewide mix

Units	All electricity providers	Adjusted statewide mix
$MTCO2_e$/MWh	0.316	0.415
gCO_2e/MJ	87.87	115.19

Statewide mix indirect emissions

Table 2 shows the statewide resource mix for 2021. The indirect emissions are calculated using the OR-GREET 3.0 for the statewide mix based on the statewide 2021 data. The resultant indirect emissions amount to **19.86 gCO2e/MJ**.

Table 2. Statewide resource mix

Fuel resource type	Percentage of the resource in the statewide mix
Biogas	0.16%
Biomass (wood & wood residuals)	0.18%
Coal	14.05%
Geothermal	0.07%
Hydro	30.53%
Natural Gas	19.05%
Nuclear	3.07%
Other Biogenic	0.36%
Other Non-Biogenic	0.00%
Petroleum (distillate fuel oil)	0.01%
Solar	2.49%
Other waste (coal & heat)	0.15%
Wind	9.00%
Unspecified*	20.79%
Total	

*"Unspecified source of electricity" or "unspecified source" means a source of electricity that is not a specified source at the time of entry into the transaction to procure the electricity. Electricity imported, sold, allocated, or distributed to end users in this state through an energy imbalance market or other centralized market administered by a market operator is considered an unspecified source. These sources are accounted for using the emission factor in OAR 340-215-0120(2)(a): The emission factor for calculating emissions from unspecified power is 0.428 MT CO2e/MWh.

Utility-specific carbon intensity calculations for 2023

Utility-specific direct emissions

Table 3 shows the direct emissions attributable to individual utilities that have opted into using a utility-specific carbon intensity (gCO_2e/MJ) rather than the statewide mix carbon intensity.

Table 3. Utility-specific direct emissions

Organization Name	MWh	MTCO2e	MTCO2e/MWh	gCO_2e/MJ
Ashland Electric Department	174,693	2,079	0.012	3.31
Blachly-Lane Electric Cooperative	186,195	8,965	0.048	13.37
Cascade Locks	39,476	790	0.020	5.56
Central Electric Cooperative	823,376	32,644	0.040	11.01
Central Lincoln PUD	1,332,840	30,334	0.023	6.32
Clatskanie PUD	902,481	23,289	0.026	7.17
Clearwater Power Company	2,297	49	0.021	5.97
Columbia River PUD	524,302	10,486	0.020	5.56
Consumers Power	443,573	21,078	0.048	13.20
Coos-Curry Electric Cooperative, Inc	359,377	7,188	0.020	5.56
Douglas Electric Cooperative	166,989	3,528	0.021	5.87
Emerald PUD	510,895	31,740	0.062	17.26
Eugene Water & Electric Board	2,372,227	94,304	0.040	11.04
Forest Grove Light & Power	272,416	6,603	0.024	6.73
Hermiston Energy Services	110,063	2,201	0.020	5.56
Hood River Electric Cooperative	134,754	2,695	0.020	5.56
Lane Electric Cooperative	258,299	5,157	0.020	5.55
McMinnville Water & Light	690,841	7,961	0.012	3.20
Midstate Electric Cooperative	472,012	9,440	0.020	5.56
Milton-Freewater City Light & Power	109,837	1,008	0.009	2.55
Northern Wasco PUD	1,320,655	171,736	0.130	36.12
Oregon Trail Electric Cooperative	725,291	14,506	0.020	5.56
Salem Electric	332,391	6,648	0.020	5.56
Springfield Utility Board	800,206	16,004	0.020	5.56
Surprise Valley Electrification Corporation	184,978	2,220	0.012	3.33
Tillamook PUD	510,111	6,099	0.012	3.32
Umatilla Electric Cooperative	4,987,402	1,711,985	0.343	95.35

Utility-specific indirect emissions

Table 4 shows the indirect emissions attributable to individual utilities that have opted into using a utility-specific carbon intensity rather than the statewide mix carbon intensity. The indirect emissions are calculated using the OR-GREET 3.0 for the utility-specific generation mix based on the 2021 utility-reported data.

Updated carbon intensity values for 2023

Table 4 shows the carbon intensity values (gCO_2e/MJ) for the statewide mix and utilities requesting a utility-specific carbon intensity and the fuel pathway codes associated with each CI value.

Table 4. Carbon intensity values for the statewide mix and utilities that have requested a utility-specific carbon intensity

Name	Reported Direct Emissions (gCO_2e/MJ)	Modeled Indirect Emissions (gCO_2e/MJ)	Total Emissions (gCO_2e/MJ)	Fuel Pathway Code
Statewide Mix	115.19	19.86	135.05	ORELC**2023**
Ashland Electric Department	3.31	1.96	5.27	ORELC**AE23**
Blachly-Lane Electric Cooperative	13.37	4.61	17.98	ORELC**BL23**
Cascade Locks	5.56	1.98	7.54	ORELC**FRC23**
Central Electric Cooperative	11.01	3.81	14.82	ORELC**CEC23**
Central Lincoln PUD	6.32	2.23	8.55	ORELC**CLP23**
Clatskanie PUD	7.17	3.33	10.50	ORELC**CLA23**
Clearwater Power Company	5.97	2.11	8.08	ORELC**CPC23**
Columbia River PUD	5.56	1.98	7.54	ORELC**FRC23**
Consumers Power	13.20	4.55	17.75	ORELC**CP23**
Coos-Curry Electric Cooperative, Inc	5.56	1.98	7.54	ORELC**FRC23**
Douglas Electric Cooperative	5.87	2.08	7.95	ORELC**DEC23**
Emerald PUD	17.26	7.93	25.19	ORELC**EPD23**
Eugene Water & Electric Board	11.04	4.89	15.93	ORELC**EWE23**
Forest Grove Light & Power	6.73	3.01	9.74	ORELC**FG23**
Hermiston Energy Services	5.56	1.98	7.54	ORELC**FRC23**
Hood River Electric Cooperative	5.56	1.98	7.54	ORELC**FRC23**
Lane Electric Cooperative	5.55	1.97	7.52	ORELC**LEC23**
McMinnville Water & Light	3.20	2.02	5.22	ORELC**CMM23**
Midstate Electric Cooperative	5.56	1.98	7.54	ORELC**FRC23**
Milton-Freewater City Light & Power	2.55	1.51	4.06	ORELC**MF23**
Northern Wasco PUD	36.12	13.10	49.22	ORELC**NW23**
Oregon Trail Electric Cooperative	5.56	1.98	7.54	ORELC**FRC23**
Salem Electric	5.56	1.98	7.54	ORELC**FRC23**
Springfield Utility Board	5.56	1.98	7.54	ORELC**FRC23**
Surprise Valley Electrification Corporation	3.33	1.98	5.31	ORELC**SVE22**
Tillamook PUD	3.32	2.13	5.45	ORELC**TPD23**
Umatilla Electric Cooperative	95.35	32.86	128.21	ORELC**UEC23**

Accessibility

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