



Oregon Clean Fuels Program

Updated Electricity Carbon Intensity Values for 2021

Implementing the Clean Fuels Program Electricity 2021 Rulemaking
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This document updates the carbon intensities of electricity used in the Clean Fuels Program following the adoption of the CFP 2021 Electricity Rulemaking. There were three main changes to the methodology:

- Switching from a 5-year rolling average to a single year value;
- Replacing the load from the now-closed Boardman coal-fired power plant with the unspecified electricity mix of 0.428 MT/MWh; and
- Removing the load from the utilities that have opted into a utility-specific carbon intensity.

The values provided here will apply to the 2021 compliance 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 as well as 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 DEQ's Greenhouse Gas Reporting Program. Utilities and electric generators report how much electricity they produce or procure and the source of their electricity generation. The emission rates are reported in tons per megawatt-hours and then converted to grams CO₂e per megajoule of energy by using the following factors:

1 Metric Ton(mt) = 1,000,000 grams (g)

1 Megawatt-hour (MWh) = 1,000 Kilowatt-hour (kWh)

1 kWh = 3.6 megajoules(MJ)

Indirect emissions

For electricity, indirect emissions represent anything upstream from the power plant. For example, in the case of natural gas it includes energy used at the wellhead and throughout the transmission system including fugitive methane emissions. In the case of coal, it includes energy used in mining and transportation to the power plant. The OR-GREET 3.0 model is used to calculate the upstream emissions associated with that generation mix.

Statewide mix carbon intensity calculations for 2021

Statewide mix direct emissions

The most recent information from the GHG Reporting Program is from 2019. The table below shows that information for all providers of electricity and the adjusted statewide mix after removing the energy and emissions from the utilities who have requested a utility-specific mix:

	All electricity providers	Adjusted statewide mix
mt/MWh	0.342	0.470
gCO ₂ e/MJ	94.99	130.52

Statewide indirect emissions

The table below shows the generation mix in 2019 for statewide emissions:

Fuel Type	Statewide %
Biogas	0.18%
Biomass	0.72%
Coal	27.45%
Geothermal	0.08%
Hydro	37.23%
Natural Gas	24.80%
Nuclear	3.50%
Other Biogenic	0.08%
Other Non-Biogenic	0.24%
Petroleum	0.05%
Solar	0.75%
Waste	0.06%
Wind	4.86%
Total	100.00%

The related upstream emissions as calculated in OR-GREET 3.0 for the statewide generation mix is **17.08 gCO₂e/MJ**.

BPA indirect emissions

The table below shows the generation mix for the Bonneville Power Administration, which serves a number of smaller utilities in Oregon, in 2020:

Fuel Type	BPA %
Biogas	0.00%
Biomass	0.00%
Coal	0.00%
Geothermal	0.00%
Hydro	83.16%
Natural Gas	5.39%
Nuclear	11.45%
Other Biogenic	0.00%
Other Non-Biogenic	0.00%

Petroleum	0.00%
Solar	0.00%
Waste	0.00%
Wind	0.00%
Total	100%

In line with DEQ guidance, market purchases without a specified source of electricity have been attributed to natural gas. The related upstream emissions as calculated in OR-GREET 3.0 for the BPA generation mix is **2.61 gCO₂e/MJ**.

Utility-specific carbon intensity calculations for 2021

Utility-specific direct emissions

The table below shows the direct emissions attributable to individual utilities that have opted in to using a utility-specific carbon intensity rather than the statewide mix carbon intensity.

Organization Name	MWh	MTCO ₂ e	Direct (MTCO ₂ e/MWh)	Direct (gCO ₂ e/MJ)
Ashland Electric Department	170,447	3,474	0.020	5.66
Blachly-Lane Electric Cooperative	178,939	6,627	0.037	10.29
Cascade Locks	32,710	667	0.020	5.66
Central Electric Cooperative	794,960	20,404	0.026	7.13
Central Lincoln PUD	1,295,763	26,414	0.020	5.66
Clatskanie PUD	885,502	47,250	0.053	14.82
Clearwater Power Company	2,438	51	0.021	5.81
Columbia River PUD	496,691	10,125	0.020	5.66
Consumers Power	436,717	12,342	0.028	7.85
Coos-Curry Electric Cooperative, Inc	349,199	7,118	0.020	5.66
Douglas Electric Cooperative	158,218	3,225	0.020	5.66
Emerald PUD	652,345	94,329	0.145	40.17
Eugene Water & Electric Board	2,442,863	133,787	0.055	15.21
Forest Grove Light & Power	267,736	4,922	0.018	5.11
Hermiston Energy Services	110,692	2,256	0.020	5.66
Hood River Electric Cooperative	130,282	2,656	0.020	5.66
Lane Electric Cooperative	253,908	5,164	0.020	5.65
McMinnville Water & Light	694,227	14,152	0.020	5.66
Midstate Electric Cooperative	438,133	8,931	0.020	5.66
Milton-Freewater City Light & Power	108,366	1,685	0.016	4.32
Northern Wasco PUD	927,863	27,130	0.029	8.12

Oregon Trail Electric Cooperative	672,217	13,703	0.020	5.66
Salem Electric	329,189	6,710	0.020	5.66
Springfield Utility Board	797,082	16,248	0.020	5.66
Tillamook PUD	500,869	10,134	0.020	5.62
Umatilla Electric Cooperative	3,110,727	569,384	0.183	50.84

Utility-specific Indirect Emissions

For utilities that reported a mix of BPA and other sources, DEQ applied the BPA indirect emissions to their first 5.66 grams of carbon intensity and then prorated the statewide mix upstream emissions value for the remainder. So a utility with a direct emissions factor of 15 grams would be assigned an indirect emission factor based on this equation $2.61 + 17.08 * \frac{15-5.66}{94.99} = 4.29$ grams.

Updated carbon intensity values for 2021

The table below shows the carbon intensity values for the statewide mix and utilities that have requested a utility-specific carbon intensity.

	Direct (gCO ₂ e/MJ)	Indirect (gCO ₂ e/MJ)	Total (gCO ₂ e/MJ)	Fuel Pathway Code
Statewide Mix	130.52	17.08	147.60	ORELC2021
Ashland Electric Department	5.66	2.61	8.27	ORELCFRC21
Blachly-Lane Electric Cooperative	10.29	3.44	13.73	ORELCBL21
Cascade Locks	5.66	2.61	8.27	ORELCFRC21
Central Electric Cooperative	7.13	2.87	10.00	ORELCCEC21
Central Lincoln PUD	5.66	2.61	8.27	ORELCFRC21
Clatskanie PUD	14.82	4.26	19.08	ORELCCLA21
Clearwater Power Company	5.81	2.64	8.45	ORELCCPC21
Columbia River PUD	5.66	2.61	8.27	ORELCFRC21
Consumers Power	7.85	3.00	10.85	ORELCCP21
Coos-Curry Electric Cooperative, Inc	5.66	2.61	8.27	ORELCFRC21
Douglas Electric Cooperative	5.66	2.61	8.27	ORELCFRC21
Emerald PUD	40.17	8.81	48.98	ORELCEPD21
Eugene Water & Electric Board	15.21	4.33	19.54	ORELCEWE21
Forest Grove Light & Power	5.11	2.51	7.62	ORELCFG21

Hermiston Energy Services	5.66	2.61	8.27	ORELCFRC21
Hood River Electric Cooperative	5.66	2.61	8.27	ORELCFRC21
Lane Electric Cooperative	5.65	2.61	8.26	ORELCLEC21
McMinnville Water & Light	5.66	2.61	8.27	ORELCFRC21
Midstate Electric Cooperative	5.66	2.61	8.27	ORELCFRC21
Milton-Freewater City Light & Power	4.32	2.37	6.69	ORELCMF21
Northern Wasco PUD	8.12	3.05	11.17	ORELCNW21
Oregon Trail Electric Cooperative	5.66	2.61	8.27	ORELCFRC21
Salem Electric	5.66	2.61	8.27	ORELCFRC21
Springfield Utility Board	5.66	2.61	8.27	ORELCFRC21
Tillamook PUD	5.62	2.60	8.22	ORELCTPD21
Umatilla Electric Cooperative	50.84	10.73	61.58	ORELCUEC21

Accessibility

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