

Oregon Clean Fuels Program

Calculating the Carbon Intensity of Electricity used in the CFP

2015 – 2019, effective for the 2021 compliance period

This document explains the calculation of carbon intensity of electricity used in the Clean Fuels Program for both the statewide electricity mix and several utility-specific mixes. The values provided here will apply to the 2021 compliance year under the current rules. Changes to these values may be made pending the outcome of the Clean Fuels Program Electricity 2021 Rulemaking that is currently out for public comment and will be considered by the Environmental Quality Commission at its March 2021 meeting¹.

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 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. CFP uses the most recent five years' worth of data to develop the carbon intensity values; in this case, 2015 - 2019 data for the 2021 compliance period.

Direct Emissions

The electric 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 mt = 1,000,000 g
- 1 MWh = 1,000 kWh
- 1 kWh = 3.6 MJ

Indirect Emissions

For electricity, indirect emissions represent anything upstream from the power plant. 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. There is no single set of data that contains the generation mixes of all of the utilities in Oregon so DEQ used a combination of 2018 statewide and BPA data. The OR-GREET 3.0 model was used to calculate the upstream emissions associated with that generation mix.

Statewide Mix Carbon Intensity for 2021

Statewide Direct Emissions

Here are the emission rates as reported to the GHG program for the statewide mix:

	2015	2016	2017	2018	2019	Average
mt/MWh	0.380	0.335	0.334	0.339	0.363	0.350
gCO ₂ e/MJ	105.48	93.01	92.66	94.07	100.90	97.22



State of Oregon
Department of
Environmental
Quality

Oregon Clean Fuels Program

<http://www.oregon.gov/deq/air/programs/Pages/Clean-Fuels.aspx>

700 NE Multnomah St.
Portland, OR 97232
OregonCleanFuels@deq.state.or.us

DEQ is a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.

¹ See the Notice of Proposed Rulemaking here:

<https://www.oregon.gov/deq/Regulations/rulemaking/RuleDocuments/CFPE2021Notice.pdf>

Oregon Clean Fuels Program

Statewide and BPA Indirect Emissions

Here is the generation mix as reported to DEQ for the statewide and BPA fuel mixes and related upstream emissions as calculated in OR-GREET 3.0:

	Statewide fuel mix	BPA mix
Residual Oil	0.05%	
Natural gas	21.05%	0.01%
Coal	24.81%	
Nuclear	3.78%	10.69%
Biomass	0.60%	
Hydroelectric	43.28%	86.54%
Geothermal	0.12%	
Wind	4.69%	
Solar PV	1.33%	
Others (purchased)	0.29%	2.76%
Indirect /Upstream Emissions (gCO₂e/MJ)	14.94	0.40



State of Oregon
Department of
Environmental
Quality

Oregon Clean Fuels Program

<http://www.oregon.gov/deq/aq/programs/Pages/Clean-Fuels.aspx>

700 NE Multnomah St.
Portland, OR 97232
OregonCleanFuels@deq.state.or.us

DEQ is a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.

Utility-specific Mix Carbon Intensity for 2021

Utility-specific Direct Emissions

Here are the emission rates as reported to the GHG program for the individual utilities:

Utility	2015	2016	2017	2018	2019	Average
Ashland Electric Department	4.07	3.23	2.48	3.26	5.66	3.74
Blachly-Lane Electric Cooperative	3.87	3.06	2.35	3.07	10.29	4.53
Cascade Locks	4.07	3.23	2.48	3.26	5.66	3.74
Central Electric Cooperative, Inc	4.05	3.21	2.46	3.23	7.13	4.01
Central Lincoln PUD	4.07	3.23	2.48	3.26	5.66	3.74
Clatskanie PUD	20.23	8.38	9.16	9.93	14.82	12.50
Clearwater Power Company	4.07	3.23	2.48	3.26	5.81	3.77
Columbia River PUD	4.07	3.23	2.48	3.26	5.66	3.74
Consumers Power, Inc	3.84	3.05	2.35	3.06	7.85	4.03
Coos-Curry Electric Cooperative, Inc	4.06	3.23	2.48	3.26	5.66	3.74
Emerald PUD	39.06	30.09	26.50	33.18	40.17	33.80
Eugene Water & Electric Board (EWEB)	3.52	2.73	4.65	4.07	15.21	6.04
Forest Grove Light & Power	3.64	2.89	2.23	2.93	5.11	3.36
Hermiston Energy Services	4.07	3.23	2.48	3.26	5.66	3.74
Hood River Electric Cooperative	4.07	3.23	2.48	3.26	5.66	3.74
Lane Electric Cooperative, Inc	4.02	3.22	2.48	3.25	5.65	3.72
McMinnville Water & Light	4.54	3.23	2.48	3.26	5.66	3.84
Midstate Electric Cooperative	4.07	3.23	2.48	3.26	5.66	3.74
Milton-Freewater City Light & Power	3.27	2.58	2.02	2.62	4.32	2.96
Northern Wasco PUD	3.67	2.39	1.72	6.23	8.12	4.43
Oregon Trail Electric Cooperative	4.07	3.23	2.48	3.26	5.66	3.74
Salem Electric	4.07	3.23	2.48	3.26	5.66	3.74

Oregon Clean Fuels Program

Springfield Utility Board	4.07	3.23	2.48	3.26	5.66	3.74
Tillamook PUD	4.03	3.22	2.48	3.24	5.62	3.72
Umatilla Electric Cooperative	2.77	3.66	5.05	28.04	50.84	18.07



State of Oregon
Department of
Environmental
Quality

Oregon Clean Fuels Program

<http://www.oregon.gov/deq/aq/programs/Pages/Clean-Fuels.aspx>

700 NE Multnomah St.
Portland, OR 97232
OregonCleanFuels@deq.state.or.us

DEQ is a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.

Utility-specific Indirect Emissions

For utilities that reported a mix of BPA and other sources, DEQ applied the BPA indirect emissions to their first 3.74 grams of carbon intensity and then prorated the statewide mix upstream emissions value for the remainder.

Carbon Intensity Values for 2021

Below are the carbon intensity values for the statewide mix and utilities that have requested a utility-specific CI score.

Utility	Direct Emissions (gCO ₂ e/MJ)	Indirect Emissions (gCO ₂ e/MJ)	Carbon Intensity (gCO ₂ e/MJ)
Statewide mix	99.19	14.96	114.15
Ashland Electric Department	3.74	0.40	4.14
Blachly-Lane Electric Cooperative	4.53	0.52	5.04
Cascade Locks	3.74	0.40	4.14
Central Electric Cooperative, Inc	4.01	0.44	4.46
Central Lincoln PUD	3.74	0.40	4.14
Clatskanie PUD	12.50	1.72	14.23
Clearwater Power Company	3.77	0.40	4.17
Columbia River PUD	3.74	0.40	4.14
Consumers Power, Inc	4.03	0.44	4.47
Coos-Curry Electric Cooperative, Inc	3.74	0.40	4.14
Emerald PUD	33.80	4.93	38.73
Eugene Water & Electric Board (EWEB)	6.04	0.75	6.78
Forest Grove Light & Power	3.36	0.34	3.70
Hermiston Energy Services	3.74	0.40	4.14
Hood River Electric Cooperative	3.74	0.40	4.14
Lane Electric Cooperative, Inc	3.72	0.40	4.12
McMinnville Water & Light	3.84	0.41	4.25
Midstate Electric Cooperative	3.74	0.40	4.14
Milton-Freewater City Light & Power	2.96	0.28	3.25
Northern Wasco PUD	4.43	0.50	4.93
Oregon Trail Electric Cooperative	3.74	0.40	4.14
Salem Electric	3.74	0.40	4.14
Springfield Utility Board	3.74	0.40	4.14
Tillamook PUD	3.72	0.40	4.11
Umatilla Electric Cooperative	18.07	2.56	20.63

Oregon Clean Fuels Program

Want more information?

For information about the Clean Fuels Program, go to the program webpage at:
<http://www.oregon.gov/deq/aq/programs/Pages/Clean-Fuels.aspx>.

Accessibility

Documents can be provided upon request in an alternate format for individuals with disabilities or in a language other than English for people with limited English skills. To request a document in another format or language, call DEQ in Portland at 503-229-5696, or toll-free in Oregon at 1-800-452-4011, ext. 5696; or email deqinfo@deq.state.or.us



State of Oregon
Department of
Environmental
Quality

Oregon Clean Fuels Program

<http://www.oregon.gov/deq/aq/programs/Pages/Clean-Fuels.aspx>

700 NE Multnomah St.
Portland, OR 97232
OregonCleanFuels@deq.state.or.us

DEQ is a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.