



Fact Sheet

March 2013

Measuring the carbon content of BPA's power supply

BPA's resources — primarily hydroelectric — make its power nearly carbon free

The Bonneville Power Administration, a federal power marketing agency, supplies electricity to meet the energy needs of about 140 utility and direct-service industrial customers in four states across the Pacific Northwest. The agency also sells power in excess of regional needs outside the Northwest.

BPA's power supply comes from a number of energy resources. The vast majority of the electricity BPA markets is hydropower generated by the 31 federal dams on the Columbia and Snake rivers, a system that is carbon emission-free. Up to about 10 percent of the power marketed by BPA comes from the Columbia Generating Station in Richland, Wash., the Northwest's only nuclear plant and another resource considered to be free of carbon emissions.

However, the agency cannot claim that its power has no carbon content.

Why is that? Because BPA also acquires a small amount of power that can't be attributed to a specific fuel source.

BPA's emission factor

An emission factor is defined as the average emission rate of a greenhouse gas from a given source,



Hydroelectric power is free of carbon emissions.

relative to units of activity. In BPA's case, it is expressed in pounds of CO₂ equivalent per megawatt-hour (CO₂-e/MWh). The following facts about BPA's emission factor are taken from the agency's 2012 submission to the states of Oregon, Washington and California, based on the 2011 numbers shown below.¹

These states have enacted legislation that requires their utilities, including many BPA customers, to disclose their generation/fuel mix each year. The laws are aimed at providing information to consumers about the emission levels of the electricity they buy from their

¹ *The formats used and the level of granularity provided to separate agencies are different, but all submissions are based on the same underlying information about our resources, purchases and sales.*





A turbine shaft spins at Grand Coulee Dam.

retail suppliers. Recently, a second California agency, the California Air Resources Board (CARB), started to require similar information. While none of these states has jurisdiction over BPA, the agency voluntarily reports its system resource mix. In BPA's reports to the Oregon Department of Environmental Quality and the Climate Registry, the agency also calculates emission factors.² For the small amount of electricity in BPA's mix that is purchased from the wholesale power markets, the agency uses the average annual emissions for the Northwest Power Pool's mix of resources (U.S. only) to calculate the emission factor.

This chart summarizes the carbon dioxide-equivalent (CO₂-e) emission factor BPA reported to Oregon and the Climate Registry for calendar year 2011. For comparison, the lower row shows the average

emission factor for all power generated in the Northwest Power Pool across the broader region in 2011.

EMISSION FACTORS

BPA 2011 resource mix emission factor	48.37 lbs. CO ₂ -e per MWh ³
Average NW Power Pool emission factor	819.21 lbs. CO ₂ -e per MWh

As these numbers show, BPA's emission factor in 2011 was less than 6 percent of the regional average.

BPA's emission factor may be higher in years when the agency is obliged to make additional purchases on the open power markets. Among the occasions when this would occur: BPA's hydroelectric generation is diminished due to low water flows in the Columbia River; or the Columbia Generating Station nuclear plant experiences an extended outage. Overall, BPA's emission factor is comparatively low because hydropower still makes up the majority of its resources.

BPA's resource mix

The power BPA markets is the product of its overall resource mix. That is, BPA does not sell power from

² Washington state and the California Air Resources Board (CARB) take the same BPA report of our resource mix but apply a slightly different methodology to calculate BPA's emission factor. However, the results are not significantly different from those reported here for Oregon and the Climate Registry.

³ Emission factors are based on data from the U.S. EPA's Emissions & Generation Resource Integrated Database (eGRID) and from the California Air Resources Board for the U.S. portion of the Northwest Power Pool. Greenhouse gas emissions are reported in CO₂-equivalent amounts that reflect the effect of all greenhouse gases, not just CO₂. (Emissions embodied in the mining and manufacture of the resources themselves — for example, emitted by the cement, steel and mining companies that produced products used to originally construct the resources — are not included in this reporting.)



Bonneville Dam

a particular generator on its system; rather, BPA sells power that comes from its entire system of resources.

BPA's current mix of resources is broken out in the chart below. As can be seen, the numbers can change depending on conditions. For example, in 2011, the year of the data most recently submitted to the states, the nuclear plant had an extended maintenance outage, and streamflows and hydroelectric generation

were above average. By contrast, the year 2010 was drier. However, in all cases, BPA's total emissions are very low.

Despite the fact BPA's own resources have almost no emissions, the power BPA supplies does include a small percentage of carbon for the following reasons.

1. BPA purchases a small amount of energy from wholesale power markets when demand for electricity is greater than the federal power system's output. BPA also regularly purchases power at night when market prices are low to conserve water for power generation during peak periods. Known as load factoring the system, this allows the agency to use its hydro storage to maximize the value of its generation. The emissions for such power purchased from the market are based on the emissions of the average Northwest resource mix, which is much higher than BPA's own resource mix. This category accounts for the large majority of BPA's total carbon emissions.
2. BPA's resource mix includes wind generation, which is part of the power marketed by BPA as

BPA RESOURCE MIX

	2011	2010
Hydropower	89%	72%
Nuclear	5%	12%
Market purchases	5%	15%
Wind, solar, biomass & natural gas	1%	1%
Total	100%	100%

seen in the previous chart. Some states have policies about the reporting of the environmental attributes, or “Renewable Energy Credits” (RECs), associated with renewable power. In general, they do not allow the reporting of a zero emission for a carbon-free renewable resource if the RECs associated with its generation are not held by the reporting entity. Under BPA’s current long-term power sales contracts, BPA distributes RECs to its customer utilities along with the power they have purchased. Because BPA no longer holds the RECs, the wind power in its resource mix is reported as “wind without RECs.” The agency reports the emissions from this category as having the higher emissions profile of the Northwest resource mix rather than the lower one typically associated with wind.

3. BPA acquires the output from a cogeneration facility that is fueled by both biomass and natural gas. This energy has a low emission factor. It is not zero, however, because while biomass is a renewable resource, natural gas is not. In the larger context of BPA’s resource mix, this amount is negligible.

Together, these three small adjustments mean BPA’s power has not zero, but minimal, greenhouse gas content.⁴ By comparison, the average emission factor of power supplied by other utilities in the Northwest, as illustrated by the first chart, is more than 17 times higher than that of BPA power.

Residents of the Northwest are uniquely fortunate to have a power system that is not only among the cleanest in the United States, because it is based on emission-free hydroelectric generation, but also provides some of the lowest electricity rates in the nation.

⁴ In 2011, the emissions in market purchases accounted for about 84 percent of the small amount of BPA power that had any emissions. Wind without RECs accounted for another 15 percent and biomass/natural gas for 1 percent of emissions within this small fraction of the total power provided by BPA.