



Fact Sheet

May 2018

Managing seasonal power oversupply

Plentiful renewable power resources in the Northwest occasionally provide more fuel than needed to meet the demand for power. During high water conditions, the Bonneville Power Administration will increase spill to reduce hydropower generation. In some cases, BPA may have to displace non-hydropower resources with energy from the Federal Columbia River Power System to balance supply and demand through an action called the Oversupply Management Protocol.

The Oversupply Management Protocol balances BPA's objectives to preserve reliability, protect fish and provide low rates.

As the wholesale power marketer for the Northwest's 22,000-megawatt federal hydropower system, BPA manages the power supply to ensure it always equals demand. The supply and demand must match exactly at any given moment to ensure safe, reliable power and transmission system operations.

During periods of high river flows and low power demand, dam operators limit generation by storing water in reservoirs and sending water through spillways rather than turbines. But storage in the Federal Columbia River Power System is limited. So is the use of spill, which at high levels can affect water quality and harm aquatic species. When its other options to balance supply and demand are exhausted, BPA implements the Oversupply Management Protocol. Under the protocol, BPA reduces non-hydro generation so that it can maximize the amount of water it sends through turbines to generate hydropower and reduce spill.

Water quality standards limit spill

Too much spill can harm fish. The force of the plunging water can cause tiny bubbles of air, filled with nitrogen and oxygen, to dissolve in the river. This is measured as total dissolved gas, or TDG. High levels of TDG threaten the health of aquatic species, including endangered salmon and steelhead.

To manage TDG, Washington and Oregon have set water quality standards under the Clean Water Act. BPA and its federal partners, the U.S. Army Corps of Engineers and Bureau of Reclamation, take actions to keep TDG levels consistent with these standards. The federal partners also operate the river consistent with the Endangered Species Act and in accordance with the Pacific Northwest Electric Power Planning and Conservation Act.

BPA evolves with the region's changing generation fleet

BPA has long managed seasonal surges in river flows by using its transmission system to move large amounts of power throughout the Northwest or export it to other regions. BPA has maximized sales of hydropower by selling it at very low rates, or even giving it away. This encouraged coal, oil and natural gas plants to reduce their output. It was a win-win outcome: The other generators were able to deliver reliable power to their customers while saving the cost of fuel, and BPA was able to move more water through turbines to avoid excess spill.

But beginning in the early 2000s, the Northwest saw an influx of new wind generators that have different operating incentives than thermal plants. Wind generators can



earn production tax credits and state renewable energy credits based on the amount of power they produce. Plus, their fuel is free. So they have no incentive to accept BPA's offer for free federal hydropower.

By the spring of 2010, nearly 3,000 megawatts of wind power had been added to BPA's transmission grid. That same spring, record-breaking downpours saturated rivers. Reservoirs were filled to capacity and spill reached its limits. With nowhere for the hydropower to go, and with the additional supply of wind generation in the region, it became apparent that BPA needed more tools to maintain reliable system operations and protect endangered species.

BPA began working with stakeholders to find solutions. After a lengthy public process, BPA adopted the Oversupply Management Protocol in 2012, giving it the option to displace generation in its operating area, including thermal and wind resources, and compensate affected generators for their losses.

How it works

When other actions aren't enough to avoid an oversupply event, BPA determines how much generation must be reduced each hour of the event.

BPA displaces generation in the order of least-cost, based on the cost of displacement for each facility. Generators provide their displacement costs to an independent evaluator in advance of each oversupply season, and

then BPA uses those costs to determine the order of displacement. For renewable generators, the cost of displacement includes production tax credits or renewable energy credits the generator would have received, as well as the costs associated with power purchase agreements.

All generators in BPA's balancing authority area — the generators BPA has operational control over — with a generating capacity of at least 3 megawatts are subject to the protocol.

Who pays?

As a nonprofit federal power marketer, BPA must recover all of its costs through rates. That includes the payments BPA makes to generators for displacing energy during oversupply events. In the development of its oversupply rate, BPA heard many perspectives on the issue of who should pay the costs. These perspectives helped shape the allocation methodology that BPA adopted in the 2014 Oversupply Rate Proceeding.

The oversupply rate allocates the displacement costs to generators that are scheduled to use the transmission system during oversupply event hours. These are the generators that are on line during an oversupply event, and therefore contribute to the costs of implementing the protocol. BPA allocates the costs to these generators in proportion to their scheduled generation, which represents their contribution to the magnitude of the event.

OTHER ACTIONS TO MANAGE OVERSUPPLY

Before deciding to displace generators under the Oversupply Management Protocol, BPA evaluates other measures that are available and takes the actions it determines will reduce or avoid the need for displacement. These measures are listed in Attachment P of BPA's open access transmission tariff. The most commonly available and effective measures are:

- **MAXIMIZING THE AMOUNT OF IRRIGATION PUMP LOAD AT BANKS LAKE:** Banks Lake stores irrigation water that is pumped from the reservoir behind Grand Coulee Dam. BPA operates the large, electrically operated pumps with federal hydropower during low demand periods, reducing oversupply.
- **COORDINATING SPILL AT THE WILLAMETTE BASIN DAMS:** BPA works closely with the U.S. Army Corps of Engineers to shift load from Willamette dams to those on the Columbia by diverting water to spillways at Willamette dams when it does not violate operational constraints, such as water quality standards, below those projects.

- **WAIVING IN-KIND REAL POWER LOSS RETURN OBLIGATIONS:** Transmission customers are required to return power losses to BPA either financially or with in-kind power. BPA will waive in-kind power loss return obligations before an oversupply event.

In addition to the measures listed in its transmission tariff, BPA also coordinates with Energy Northwest, the operator of the 1,174 MW Columbia Generating Station nuclear plant near Richland, Washington. In certain conditions, Energy Northwest is able to reduce the output of Columbia to 85 percent capacity — a level that maintains plant reliability and allows BPA to increase hydro generation.

BPA must decide whether to take some of these actions, including displacing Columbia and waiving loss returns, a day or more before an oversupply event occurs, using forecasts to assess the risks.