BPA prepares for too much power

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When nature supplies your fuel, you don't mind a little rough weather

But in the Northwest, with its wealth of renewable water and wind power, nature occasionally provides too much fuel. The Bonneville Power Administration has long handled seasonal surges in river flows and the hydroelectricity that comes with them by using its transmission system to get the power to consumers.

Recently, under its open access transmission policies, BPA has provided service on its transmission system for an ever-increasing amount of wind generation.

As renewable energy expands in our region, BPA is learning how to handle the coupling of too much water and wind. The agency is now proposing a new policy called environmental redispatch, which would allow BPA to substitute free hydropower for other energy when necessary to avoid harm to endangered species.

Too much of a good thing

Water and wind can sometimes add up to too much power. That can be a problem because power systems rely on a constant balance between power demand and power generation. If one exceeds the other, the lights can go out.

BPA faced this situation in June 2010. Record-breaking downpours saturated rivers and generated hydroelectric power. BPA quickly had more energy than it could handle. To control generation, BPA held water in reservoirs. When those filled, we worked with dam operators to spill water over spillways rather than through turbines.

But too much spill can harm fish. As water plunges into the pool below, air bubbles dissolve into the water. The dissolved gas can lead to a condition in fish similar to the bends in humans. BPA is obligated under the Endangered Species and Clean Water acts to control these gas levels. We do that by directing more water through

hydroelectric turbines to control spill. However, that can create an oversupply of power.

BPA managed through this situation, but exhausted all possible actions to minimize spill. It became apparent the agency needs more tools to protect endangered species.

That's why as a last resort the agency is proposing environmental redispatch. By displacing non-hydro generation with renewable federal hydropower, BPA could maximize hydro generation, reduce spill to protect fish, and allow generators to continue serving their customers.

The risks are growing

High flows in the Columbia River system are not rare. There is a one-in-three chance of flows at least as high as those of June 2010 occurring in any year and lasting for one month or more.

BPA is used to managing these conditions. In the past, BPA sold hydro power at very low rates—or gave it away—to encourage coal, oil and natural gas power plants to reduce output and deliver hydropower to their

customers instead. BPA also made structural changes to dams to redirect spilled water, which helps reduce gas levels.

Wind power, however, is a new and rapidly growing variable. We expect it to nearly double by the end of 2013, increasing the chance of conditions that lead to excess spill.

The situation is real, and we need to be prepared to address it.

Expanding our options

Since June 2010, BPA worked with its stakeholders and developed possible solutions to maximize hydro generation when we need to avoid spill. We came up with a long list of possible actions. Many have some long-term potential.

For the upcoming spring runoff period, the most promising action is to replace the generation of thermal power plants with federal hydropower, which we call thermal displacement. BPA is arranging in advance to displace up to 1,000 megawatts of thermal generation. This would allow wind projects to continue to send renewable carbon-free energy through the transmission system.

BPA is also working on other actions to make more use of an over-supply of generation, such as increasing transmission capacity by modifying maintenance schedules and using the extra energy to pump water for later irrigation.

If these voluntary and marketing solutions are not sufficient to uphold our environmental and statutory obligations, BPA as a last resort could direct generators to reduce their output and replace it with federal hydropower at no cost.

Minimizing impacts

It usually makes economic sense for thermal plants to shut down and substitute free federal hydropower for their own. In that case, the thermal plant avoids the cost of fuel and still receives revenues from the sale of the replacement hydropower.

But some independent power producers have economic incentives to produce energy even when free federal power is available. This is especially true of wind generators, which may accrue production tax credits and renewable energy credits when they generate. Free replacement power can represent a net financial loss for those generators.

BPA is committed to minimizing the impact of environmental redispatch on these generators and would curtail their power only after displacing all other generation. BPA also is proposing to work with stakeholders on policy solutions to let wind generators qualify for production tax credits and renewable energy credits when environmental redispatch occurs. This would mitigate the potential economic impacts that environmental redispatch poses for wind generators.

For more information

To track BPA's progress in addressing excess power, visit our Columbia High Water Management website at *www.bpa.gov/corporate/AgencyTopics/ColumbiaRiverHighWaterMgmnt/.*