Meeting the Carbon-Free Electricity Generation Challenge:

Building Blocks for a 21st Century Energy Resource Stack

HYDROPOWER

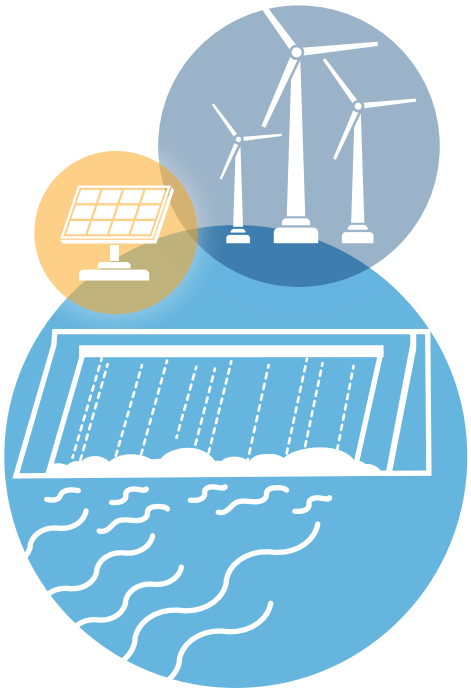
WIND AND SOLAR

NUCLEAR

EFFICIENCY AND CONSERVATION

With more than 34,000 megawatts of electricity available, hydropower will continue to provide over half the power needed for a carbon-free, renewable energy future in the Pacific Northwest.

RIVERS provide flexible, reliable hydropower when wind and solar power are not available.



HYDROPOWER

Preserving and strengthening this resource base is critical. As important, hydropower provides:

Energy Storage: Hydropower projects with reservoirs, sometimes called lakes, behind them can "store" water to generate electricity when it's most needed. Think of them like giant, clean, carbon-free renewable batteries that provide "peaking" power when electricity demand is highest. For instance, in the morning when people are getting ready for the day with hot showers and other activities. Reservoir storage is also used to balance the availability of river flows from one season to the next. For example, high water flows in the spring can be stored until the summer when river flows slow in unison with less rainfall and melting snowpack.

Flexibility: Because the amount of water flowing through a dam's turbines is easy to adjust, hydropower can be quickly ramped up and down to ensure power is available when customers like you need it.

WIND AND SOLAR

In 2005, wind contributed 1 percent to the Northwest's generating capacity and solar contributed zero. Fast forward to 2023 and wind contributes over 19 percent of the Northwest's power generating capacity and solar 3 percent. Wind and solar resources will continue to be added to the system.

Hydropower is the perfect carbon-free renewable partner for wind and solar because it's reliable, available and can quickly be ramped up to meet demand when the wind isn't blowing or the sun isn't shining.

CONSERVATION AND EFFICIENCY

In many cases, the least expensive way to meet electricity demands is to use less or more efficiently use what already exists. For example:

Conservation: Home improvements such as adding insulation, installing energy efficient window replacements or upgrading to programmable thermostats. Also, changing habits like turning lights and appliances off when not using them.

Efficiency: Installing new appliances like refrigerators, stoves and hot water heaters that use less electricity to produce the same result. Likewise, people are replacing inefficient incandescent and halogen light bulbs with LED lights.

Thanks to actions taken between 1978 to 2023, power needs were reduced by more than 7,800 average megawatts. That's enough power savings to meet the annual needs of about seven cities the size of Seattle. If your household engaged in conservation and/or efficiency, your energy consumption was reduced, helping to reduce your power bills. And better still, each year our power system is avoiding emission of 25 million metric tons of carbon dioxide (the largest source of greenhouse gas).

Even with new conservation and efficiency measures, additional carbon-free power generation will be needed to meet rapidly growing demands.

SMALL MODULAR REACTORS (SMRs)

SMRs are being developed to provide additional carbon-free nuclear power. They use a modular and scalable design to support flexible energy output while enhancing efficiency and safety.

USING LESS ADDS UP FOR THE NORTHWEST

energy efficiency + conservation ANNUALLY AVOIDS

25M METRIC TONS

OF CARBON DIOXIDE (CO_2) (a greenhouse gas) EMISSIONS

Source: Northwest Power and Conservation Council