Challenges to Powering a Renewable, Carbon-Free Future

In 2024, 23 percent of the Northwest's capacity to generate electricity came from power plants burning coal and natural gas. To meet 2045 Washington State goals to fully phase out these fossil fuels, 15,000 megawatts of electricity (enough to power over 10,000,0000 homes annually) need to be replaced.

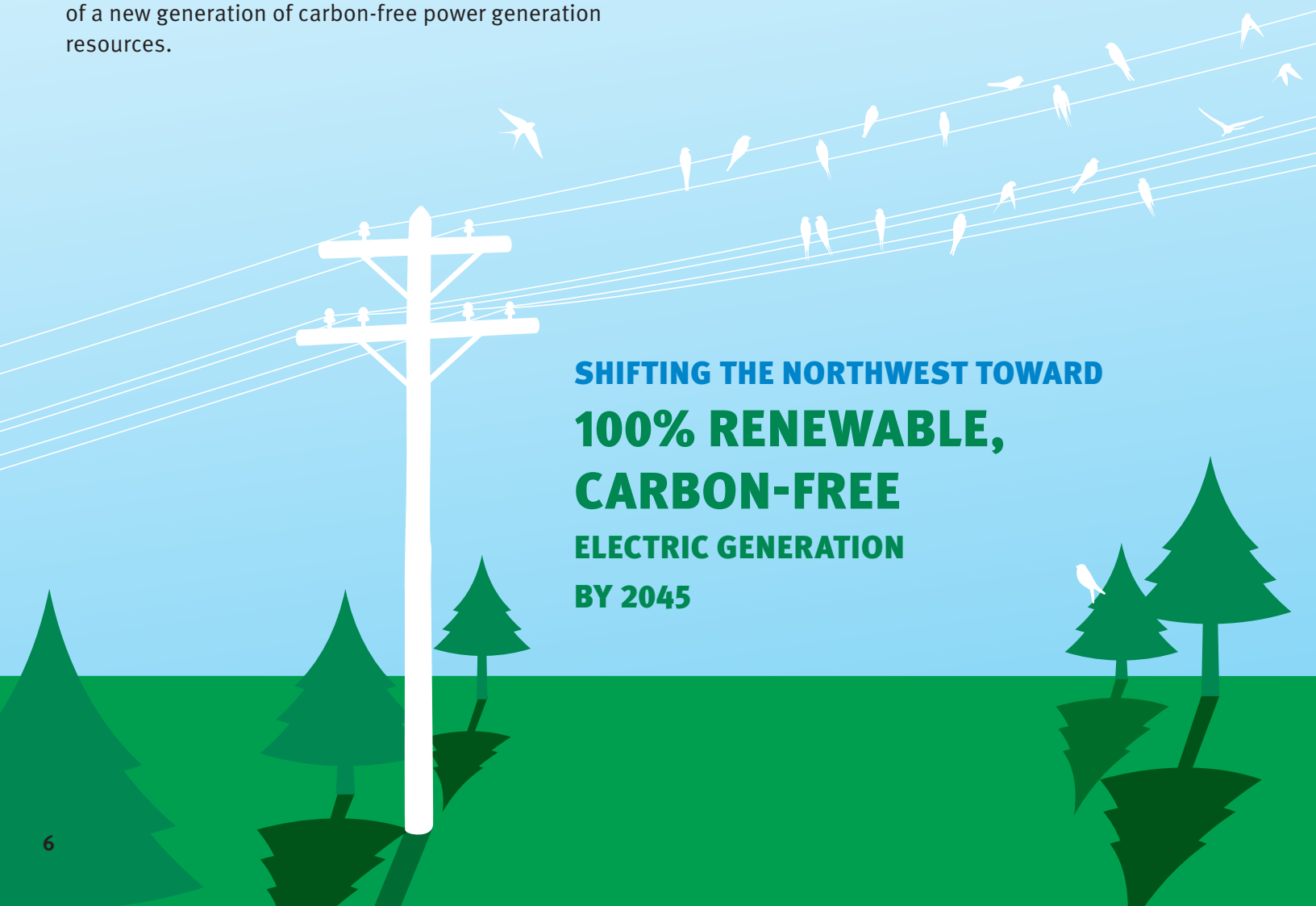
In addition, by 2045 power demands driven by population growth and data centers powering Artificial Intelligence are projected to increase by 30 to 50 percent.

Some of these power needs can be met with additional gains in conservation, efficiency and power generation sharing. Much, however, will require the development of a new generation of carbon-free power generation resources.

Solar and wind power are fast growing renewable resources being built to replace fossil fuel power plants and meet new power demands. Integrating these renewable resources, however, is not simple.

Think of it as the difference between extraction vs. weather-based generation. Coal and natural gas supplies are extracted from the earth, stored and made continuously available. But the availability of wind and solar power is based on the weather, which is why they are called intermittent resources.

Hydropower is also weather dependent. But unlike wind and solar, storage of water behind some dams provides much needed flexibility.



SHIFTING THE NORTHWEST TOWARD

100% RENEWABLE, CARBON-FREE

ELECTRIC GENERATION

BY 2045

Further, almost all hydropower facilities can provide some power generation on demand if flowing water is available. As a result, hydropower also provides a critical renewable alternative to wind and solar power when the wind isn't blowing or the sun isn't shining.

When weather dependent (renewable) power isn't available during a heat wave or cold snap, the chances of blackouts and brownouts (meaning no or not enough electricity for homes and businesses) increase. Even if power is available, there can be spikes in cost that cause higher bills for electric utility customers.

In addition to wind and solar power, a new generation of pumped storage hydropower and nuclear energy are expected to come online. Hydrogen, marine energy, and fusion technology are resources that also hold promise for increasing power supply.