

Energy Technology Snapshot

Pacific Northwest

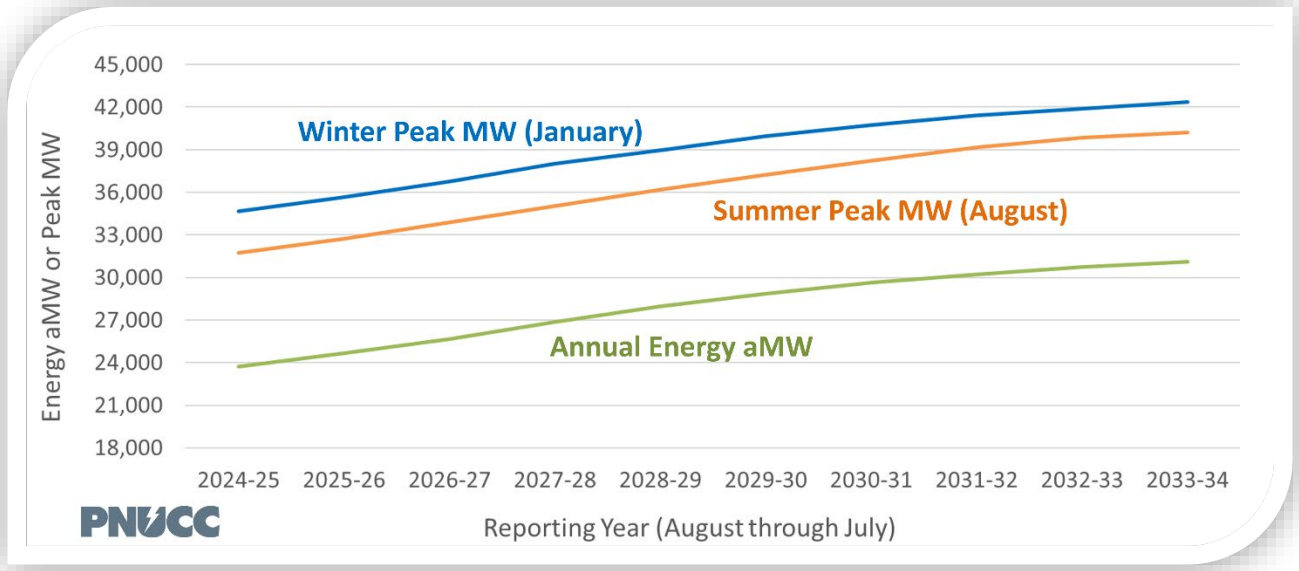
Energy Summit

July 15, 2024



Office of Senator Maria Cantwell

According to the Pacific Northwest Utilities Conference Committee, Northwest electricity demand is expected to increase by over 30 percent in the next decade, triple the prediction just three years ago.



There are a variety of reasons our region is going to need a lot more clean power ranging from population growth, to electrifying our transportation and building sectors, to new high tech manufacturing facilities, to data centers and AI, to meeting our state’s ambitious net zero goals.

These new power demands are ramping up at the same time climate change is starting to impact our energy system in profound ways. From changing water cycles, to more frequent and intense extreme weather like wildland fires and windstorms, to needing a lot more air conditioning -- as we all got reminded of during last week’s intense heat wave.

Today, I’m releasing an Energy Technology Snapshot highlighting how our region is leading in several of the key energy technologies areas including green hydrogen, fusion, advanced nuclear, energy storage, and smart grid technologies. These promising clean energy technologies will not only help us meet our region’s future energy needs but also ensure we all will continue to benefit from one of the world’s cleanest, most reliable, and most affordable energy systems.

Green Hydrogen

The Pacific Northwest is poised to become a leader in green hydrogen production, thanks to the region's abundant renewable energy sources which provide a strong foundation for producing cost-effective, emissions-free hydrogen.

Last October, the U.S. Department of Energy (DOE) selected the Pacific Northwest Hydrogen Association's PNWH2 Hub as a Regional Clean Hydrogen Hub following a competitive nationwide process. The DOE selection came with up to \$1 billion in federal funding, which Congress allocated in the Bipartisan Infrastructure Law, and is expected to be matched by over \$5 billion in local investment.



The Hub, which is projected to create at least 10,000 new jobs, will accelerate the adoption of clean hydrogen production and utilization across the Pacific Northwest by building out a robust network of hydrogen suppliers and off-takers in both western and eastern parts of Washington and Oregon, as well as parts of Montana. PNWH2 will target sectors that are difficult to decarbonize, such as long-duration energy storage, port operations, agriculture, and industrial processes.

Fusion

Washington state has the key elements necessary for creating an ecosystem to commercialize and become the world leader in fusion. These include cutting-edge research at the University of Washington, a well-educated workforce, a world-class aerospace and machining industry aligned with fusion companies' needs, and the Pacific Northwest National Laboratory (PNNL).

As soon as 2030, several Washington-based fusion companies anticipate providing fully commercially viable power plants utilizing a variety of sizes and technical approaches. Successfully commercialized and widely adopted fusion would be a breakthrough gamechanger and could replace fossil fuels and provide virtually unlimited power for Washington businesses and homes.

Over \$6 billion in cumulative equity investments have been made into private fusion companies, with 80% of these investments directed towards U.S.-based companies. Three of the most promising fusion energy companies are in Washington state and they have collectively raised hundreds of millions in venture capital funding and continue to hire more local employees.

Advanced Nuclear

Advanced nuclear energy encompasses next-generation nuclear reactors that offer improvements in safety, efficiency, and cost-effectiveness over traditional nuclear reactors. Washington state is actively pursuing advanced nuclear energy to help meet its ambitious climate goals and support efforts to provide emission-free baseload, dispatchable power to the grid.



Washington state is home to one of the world's leading advanced nuclear companies that is currently building a next generation facility in Wyoming, while other companies are looking to build new advanced nuclear plants in Central Washington. With supportive policies, existing nuclear expertise, and partnerships with leading companies in the field, the state is well-positioned to become a significant player in the advanced nuclear industry.

Energy Storage

Deploying energy storage technologies can help the Pacific Northwest by balancing the grid's supply and demand, especially during peak loads, and complementing variations in the availability of renewable energy generation. Additionally, energy storage technologies like long-duration storage can provide crucial support during extreme weather events, ultimately enhancing grid reliability and supporting the region's transition to a cleaner energy future.

The Pacific Northwest's leadership in energy storage is characterized by a comprehensive approach that spans from fundamental scientific research to real-world deployment. The Pacific Northwest National Laboratory (PNNL) in

particular is leading advanced research and development in energy storage technologies, focusing on innovative materials, scalable manufacturing, and long-duration storage solutions.

The Pacific Northwest is home to several key players in the energy storage sector, including several major companies near Portland focused on integrating batteries into the grid to improve efficiency and reliability. There are also several local utilities that have implemented battery storage pilot projects, as well as several very large pumped hydro energy storage projects currently under development.

Smart Grid Technologies

The U.S. Department of Energy estimates that the PNW will need to add 56% more transmission capacity by 2040 to meet growing demand, maintain grid reliability, and integrate new energy sources. This projection underscores the need for significant investments in transmission infrastructure and better coordination among stakeholders.

Fortunately, the Pacific Northwest is actively deploying a range of smart grid and transmission technologies to meet growing energy demands and enhance grid reliability. That includes developing and testing smart grid technologies like Advanced Metering Infrastructure (AMI), voltage optimization, demand response systems, capacitor bank controls, and smart transformers.

Last year, the Bonneville Power Administration (BPA) announced it is moving forward with over \$2 billion in electricity grid improvement projects that will significantly increase capacity by up to 6 gigawatts, enough to power about 4.5 million homes, to help meet growing demand for more affordable clean power.

