



Fact Sheet

April 2016

Celilo Converter Station

The Celilo Converter Station, owned by BPA, tames and transforms the large volumes of electricity flowing through the northern end of the Pacific Direct Current Intertie.

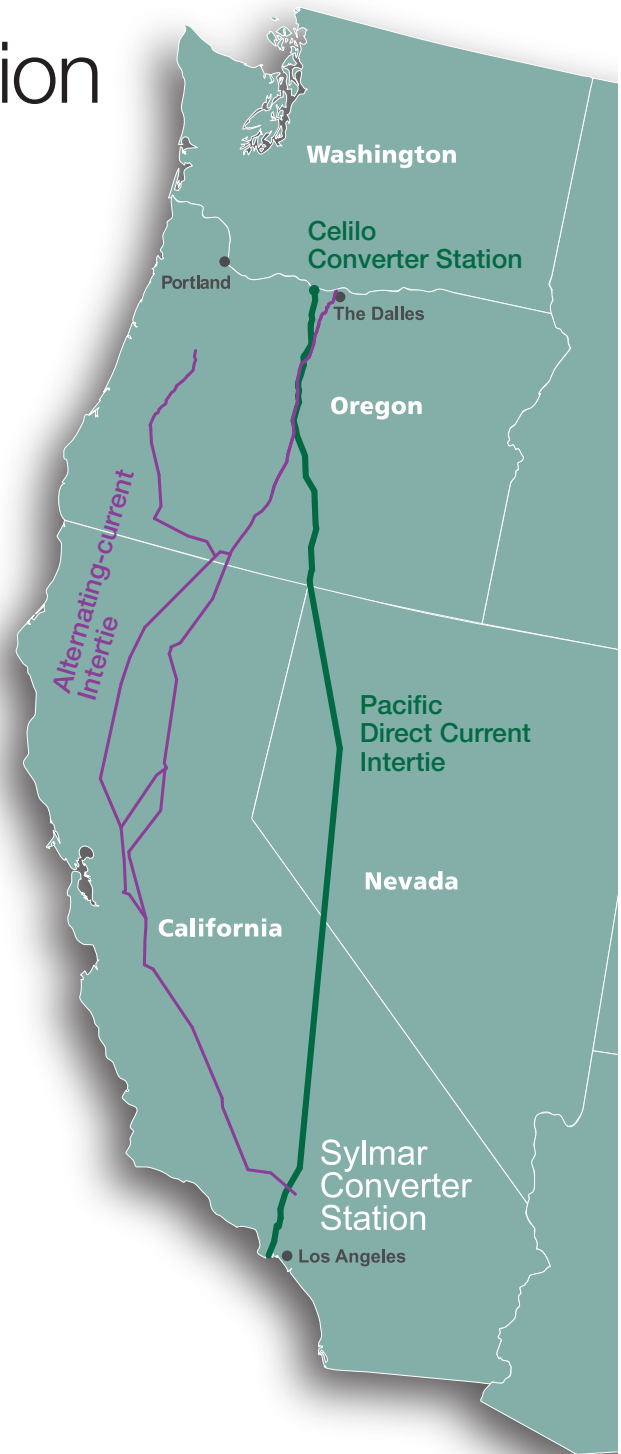
This 846-mile electron super-highway, the longest commercial transmission line of its kind in the nation, connects the Northwest at The Dalles, Ore., with the Pacific Southwest at Sylmar, Calif., near Los Angeles. At each end, a converter station performs the job of changing alternating current to direct current and back.

In 2016, BPA completed a \$370 million modernization of its Celilo Converter Station. Upgrades in 2016 on the 265-mile portion of the intertie that BPA owns from the Columbia River to the Nevada-Oregon border will raise the intertie's capacity to 3,220 megawatts. That's enough electricity to power 2.4 million homes.

The improved intertie strengthens the backbone of the 21st century transmission grid. It provides affordable energy, reliability and cost benefits to customers on the West Coast. The hydroelectricity that flows from north to south — generated by the 31 dams of the Federal Columbia River Power System — is virtually carbon-free.

History

The Pacific Direct Current Intertie, a high-voltage direct current system (HVDC), was a marvel and a model when it was energized in 1970. Direct-current systems can move large amounts of electricity over long distances more efficiently than alternating current lines of a similar length because less power is lost to the air as heat.





Seven massive new transformers made an 11,000-mile journey from manufacturer ABB in Sweden to the Celillo Converter Station in 2015. Watch a time-lapse video of their voyage up the Columbia River and through the town of The Dalles, Ore., at www.youtube.com/watch?v=pQ_f0BF0pvY.

The PDCI has been upgraded six times since going into operation in 1970:

- The original intertie, with a capacity of 1,440 megawatts, converted electricity between AC and DC using mercury arc valves. The capacity was updated to 1,600 megawatts in 1982 by taking advantage of design margins in the equipment.
- The 1985 upgrade added two 100-kilovolt thyristor valve groups in series with the existing mercury arc valves, increasing the voltage from 400 to 500 kV and the intertie's capacity to 2,000 MW.
- A 1989 expansion raised system capacity to 3,100 MW by adding two new converters to operate in parallel with the mercury arc valve and 100-kV thyristor valve groups using the same transmission line.
- A 2004 project replaced the last of the original vacuum-tube mercury arc valves with solid-state silicon-based thyristors, eliminating reliance on mercury to convert power. BPA also removed asbestos and installed more efficient cooling systems, making the station safer and more environmentally sound.
- In 2014–2015 Celillo received its most sweeping modernization as BPA invested \$370 million to remake the station for 21st century service, safety and reliability. The highly complex, customized project replaced vintage equipment that remained in operation for twice its expected original life thanks to careful operation and rigorous maintenance. The new equipment is faster, more reliable and easier to maintain. It also reduced the converter station's footprint by half.
- Most notable among Celillo's new equipment: seven huge transformers each weighing more than a 747 airliner; and state-of-the-art digital controls to replace analog equipment that was more than 40 years old. Months of comprehensive testing provided the assurance that this state-of-the-art asset will reliably serve the Northwest for decades to come.

FINANCING INFRASTRUCTURE THAT KEEPS THE LIGHTS ON

The Celillo Converter Station modernization project is financed through the Bonneville Power Administration's lease-purchase program, a financial tool that provides BPA with a supplement to its limited statutory borrowing authority with the U.S. Treasury. This nonfederal financing approach enables BPA to invest in the new infrastructure needed to support a safe and reliable transmission system across the Northwest. It also enables BPA to spread the costs over time so that current and future ratepayers who receive the benefits of the upgrade bear the costs equitably.

Here's how it works: The Port of Morrow, Oregon, issues about \$325 million in municipal bonds to cover the construction costs of the upgrade. The bonds will be repaid, with interest, solely from the money that BPA pays the port under a long-term lease-purchase agreement. The agreement provides BPA with exclusive rights to use, operate and maintain the Celillo equipment. The project is part of the federal transmission system, although the port holds the title. All of the costs, including the debt service on the bonds, will be borne by BPA.

Financing the Celillo Converter Station's modernization through the lease-purchase program is important to achieving BPA's goal of using nonfederal financing for about half of its new and replacement investments in the federal transmission system. The program helps BPA continue to provide low, stable transmission rates.