

How HVDC lines and the electric transmission system work

Transmission lines move power from where it's made to where it's needed

Electricity is delivered to homes, schools, hospitals, businesses and industries through an integrated system of generation facilities, power lines and substations. Transmission lines carry electricity from where it is generated to where it is needed. The transmission network enables a large amount of power to travel long distances. High-voltage direct current lines, such as Zephyr, are like an interstate highway for power. HVDC lines help bolster the electric grid by efficiently moving large amounts of power.

HVDC lines are a cost-effective, efficient option for moving large amounts of power over long distances. They can easily be added to the electric grid with converter substations and allow the direction and amount of power to be controlled. Instead of the traditional three phases, or three wires, in an alternating current line, HVDC lines use two wires, positive and negative, to move power.

Zephyr Power Transmission Project will bring wind power to market

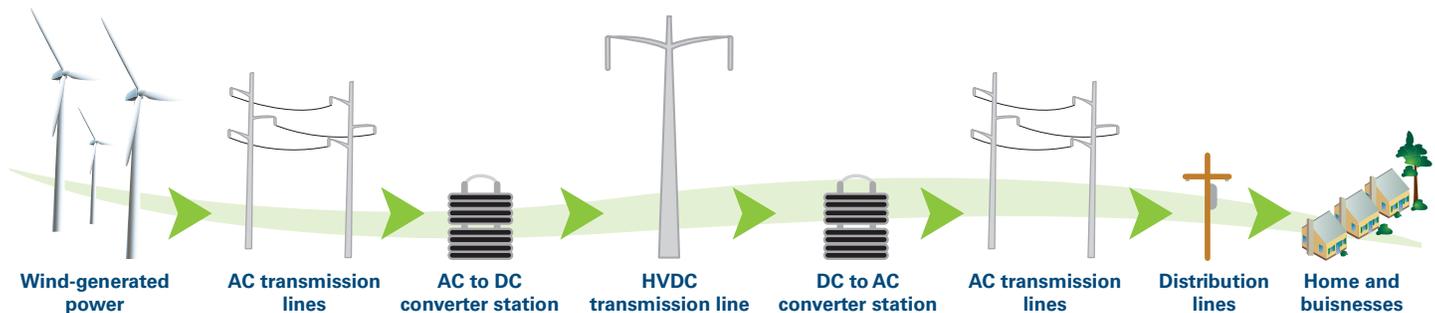
Zephyr will move wind energy from Wyoming, including the planned Pathfinder wind farm in Chugwater, Wyo., to markets in the southwestern U.S.

This wind power will be converted from alternating current (AC) to direct current (DC) and "stepped up" to 500 kilovolts at a converter substation. The power will move efficiently along the line with minimal electric losses. It will then be converted once again to AC and reduced to lower voltages at the endpoint substation, which allows electric distribution companies to bring the power to homes and businesses.

Grid assures reliability

Because electricity cannot be stored, it must be generated, transmitted and distributed at the moment it is needed. In the early days of electrification, power plants were small and generated electricity for the immediate area. As demand for electricity increased, larger, more efficient electric generation sources were built, and high-voltage transmission lines were developed to move the electricity over longer distances. To increase efficiency and reliability, the network of high-voltage transmission lines is connected to neighboring systems. These interconnected systems form a grid that allows power to flow from one region to another, improving reliability, lowering costs by providing alternative power paths and providing access to renewable energy resources.

The high-voltage transmission grid is the vital link between electric generation and the people who need it to power their everyday lives.



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