

FACTS ABOUT DIRECT CURRENT TRANSMISSION LINES

Transmission Options

Power can be transmitted using either alternating current (AC) or direct current (DC). All modern power systems use AC to generate and deliver electricity to customers through transmission lines and then through distribution lines to where it is needed. The technology now exists to use DC for bulk power transmission. AC electricity is converted to DC electricity for transmission and then converted back to AC electricity for distribution to customers on the AC power grid. A converter station at each end of the line is required to convert power from AC to DC and back so we can use the power in our homes, farms and businesses.

In Canada, DC transmission lines are in operation in Manitoba and Quebec and have been used in many places throughout the world for decades. ATCO Electric has owned and operated a “back-to-back” converter station on the Saskatchewan border since 1989. (Power is converted from AC to DC and back again in the same station. Direct AC connections to the Saskatchewan power grid are not possible because their system frequency is not synchronized with Alberta’s.)

THE BENEFITS OF DC

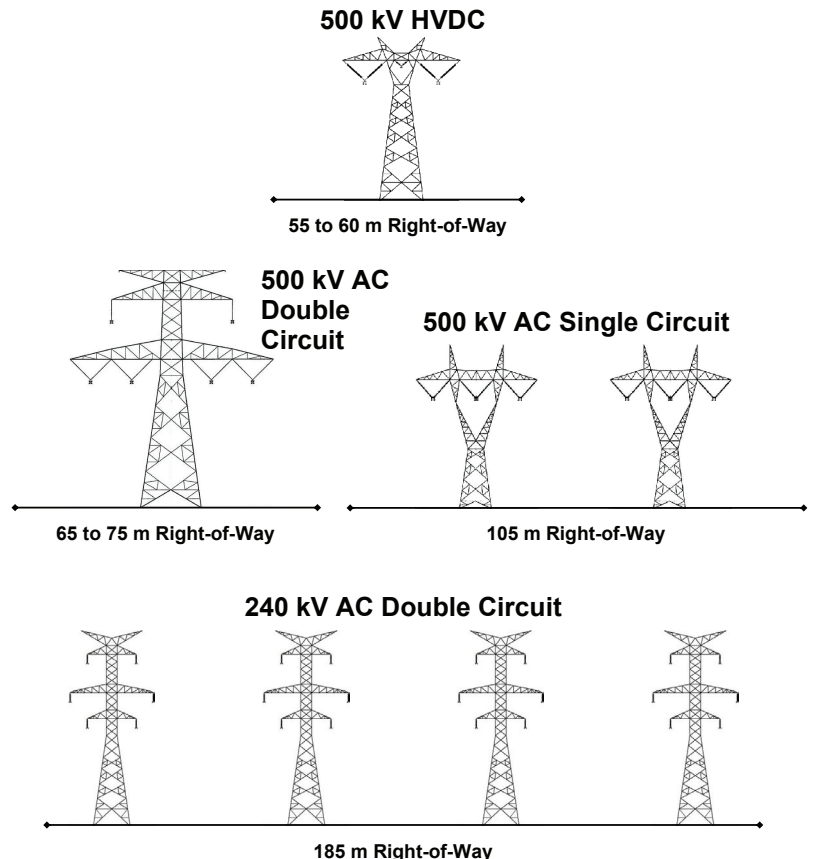
DC transmission lines can transmit power more efficiently than AC transmission lines and require a smaller right-of-way.

Energy Efficiency

DC lines experience lower line losses than AC lines. When electric current moves through the conductors of a transmission line some of the power is lost in the form of heat. Transmission conductors offer less resistance to DC, meaning less power is wasted.

Minimize Land Use Impact

A DC transmission line uses less land than an AC transmission system of equivalent capacity. One 500 kilovolt (kV) DC line can transport a similar amount of power as a double-circuit 500 kV AC line, two single-circuit 500 kV AC lines, or four double-circuit 240 kV AC lines. A comparison between the rights-of-way is shown in the diagram to the right.



QUESTION & ANSWER

What is the difference between AC and DC?

The difference between AC and DC systems is how the power moves through the lines. AC reverses polarity or “oscillates”, positive to negative and back again, 60 times per second. The polarity of DC does not oscillate and remains constant or “static” like the current flowing from a battery.

Do DC lines produce electric magnetic fields?

DC lines produce electric and magnetic fields but because the current doesn't alternate (oscillate) like it does for an AC line, the fields are referred to as static. These fields have the same characteristics as static fields that occur naturally in our environment.

Can you eliminate DC fields by burying the lines?

Burying DC lines under ground will block the electric field, but not the magnetic field. Both electric and magnetic fields diminish rapidly as the distance from a transmission line increases.

Will my radio or TV reception be affected by a DC line?

DC lines normally do not affect radio or television reception unless you are directly beneath or in very close proximity to a DC line. However, under certain atmospheric conditions there may be some static interference on AM radio and analog TV. FM radio and cable TV reception are not impacted by static interference.

Can I get a static electric shock from a DC line?

Occasionally, harmless spark charges may occur directly under a DC line if you touch a grounded metal object. These are similar to the static shock you could receive after walking across a carpet and touching a door knob.

What standards or guidelines apply to DC transmission lines?

All power lines in Alberta are required to be constructed and operated in compliance with provincial and federal electrical codes and standards, including those governing audible noise and radio interference.



Contact Us

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