



Advantages of 765-kV Technology

765-kilovolt (kV) transmission offers a number of technological and operational advantages for expansion of the nation's energy grid.

Resource Conservation

- A single-circuit 765-kV line can carry as much power as three single-circuit 500-kV lines, three double-circuit 345-kV lines, or six single-circuit 345-kV lines, reducing the overall number of lines and rights of way required to deliver equivalent capacity.
- The high capacity of 765-kV technology can easily facilitate the efficient, economical integration of large-scale generation projects into the nation's transmission grid.
- 765-kV projects use a typical right-of-way width of 200 feet. Standard industry right-of-way width for 500-kV is also 200 feet, and 150 feet for 345-kV construction. For equivalent power carrying capability, lower voltages require more lines and as a result more right-of-way impact.
- Typical 765-kV lines have a tower height of approximately 130-140 feet. This is 30-40 feet shorter than a typical double-circuit 345-kV tower.

Performance and Design Efficiency

- Power losses in a transmission line decrease as voltage increases. Since 765-kV lines use the highest voltage available in the United States, they experience the least amount of line loss.
- The greater transmission efficiency of 765-kV can be attributed mainly to its higher operating voltage (and thus lower current flow), and larger thermal capacity/low resistance compared to lower voltage lines. This allows 765-kV lines to carry power over significantly longer distances than lower voltages.
- With up to six conductors per phase, 765-kV lines are virtually free of thermal overload risk, even under severe operating conditions.
- By shifting bulk power transfers from the underlying lower-voltage transmission system to the higher-capacity 765-kV system, overall system losses are reduced significantly.

- New 765-kV designs have line losses of less than one percent, compared to losses as high as 9 percent on some existing lines.
- The overlay of a 765-kV system allows for both scheduled and unscheduled outages of parallel lower voltage lines without risk of thermal overloads or increased congestion.
- Use of 765-kV technology allows transmission builders to take advantage of economies of scale. A 765-kV transmission line provides the same capacity as three 500-kV lines or six 345-kV lines.
- Utilizing 765-kV results in a substantial reduction in system losses. For instance, a loss reduction of 250 megawatts, equates to saving as much as 200,000 tons of coal, and 500,000 tons of CO₂ emissions on an annual basis.
- The addition of 765-kV systems relieves the stress on underlying, lower voltage transmission systems, postponing the potential need for upgrades of these networks.

Customer Benefits

- Over time, this results in additional savings for end-use customers. Our electric intensive society relies on the reliable delivery of power. By designing bulk power transmission systems to maximize efficiency and operational functionality, Pioneer Transmission is working to ensure that we can meet the energy needs of the nation's electricity users in a responsible and cost-effective manner.