Advanced Conductor Scan Report: *Summary*

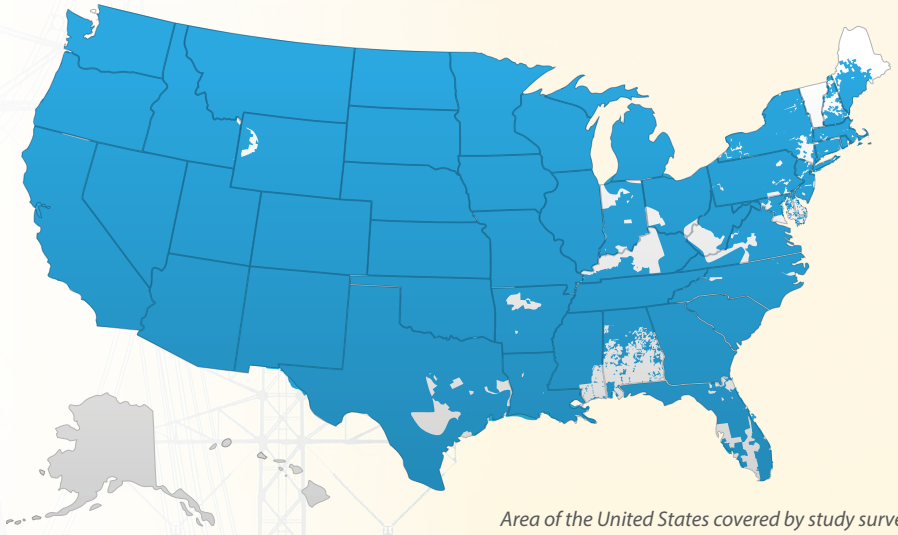
The transition to a carbon-free economy requires a large and rapid expansion of the United States electrical transmission system; however, construction of new transmission lines is being slowed by land use challenges, environmental impacts, and project costs.

At the heart of any transmission system are the wires that conduct electricity from where it is generated to where it is consumed. Advanced transmission conductors are technologies that can be used to increase the pace of transmission capacity growth, at a lower cost and with less impact to communities than traditional conductors. These innovative assets improve on many attributes of traditional conductors, offering increases in capacity, efficiency, and mechanical performance. Critically, advanced conductors can be used to upgrade existing transmission line routes by replacing existing wires on existing transmission structures to increase line performance through a process called reconductoring.

Designs for advanced conductors vary, but all take advantage of modern material science to enable increased power flows. A key characteristic of advanced conductors is their ability to withstand the high-conductor temperatures that occur when heavily loaded without excess thermal sag, which can result in unsafe conditions and impair reliability. Advanced conductors are also commonly used for very long spans, such as river crossings, and are increasingly being considered for construction of new lines, or where more efficient conductors are desired.

While the initial cost of advanced conductors is higher, their use can be justified economically when all benefits are considered. The costs of reconductoring with advanced conductors is only one-third of the cost of constructing new lines, yet can double the capacity of existing lines.

This scan profiles 44 electric transmission utilities and finds that while over 70% have deployed advanced conductors, there are still 118,821 miles of existing transmission lines that would benefit from reconductoring with advanced conductors to improve grid capacity and efficiency. The urgent need for capacity expansion to support the energy transition is expected to lead to a rapid increase in the use of advanced conductors.



Area of the United States covered by study survey.

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44 ELECTRIC TRANSMISSION UTILITIES SURVEYED

Over 70% have deployed advanced conductors

118,821 MILES OF EXISTING TRANSMISSION LINES WOULD BENEFIT FROM RECONDUCTORING WITH ADVANCED CONDUCTORS

To read the full report, visit inl.gov/national-security/grid-enhancing-technologies

For more information, contact Jake Gentle | jake.gentle@inl.gov

INL Idaho National Laboratory