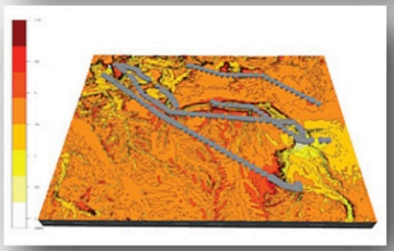
A **cool** way to **increase** existing overhead power line **capacity**

Integrating weather forecasts adds confidence to concurrent cooling and dynamic line ratings for increased transmission capacity.

Funded by DOE's Wind and Water Power Technologies Office, INL researchers innovate ways to increase transmission over existing lines by 10 to 40 percent.

Concurrent cooling enables the integration of renewable energy and increases transmission line capacity.



INL researchers use data from weather stations to create a 3-D mean wind speed map. The scale shows wind speeds in meters per second.

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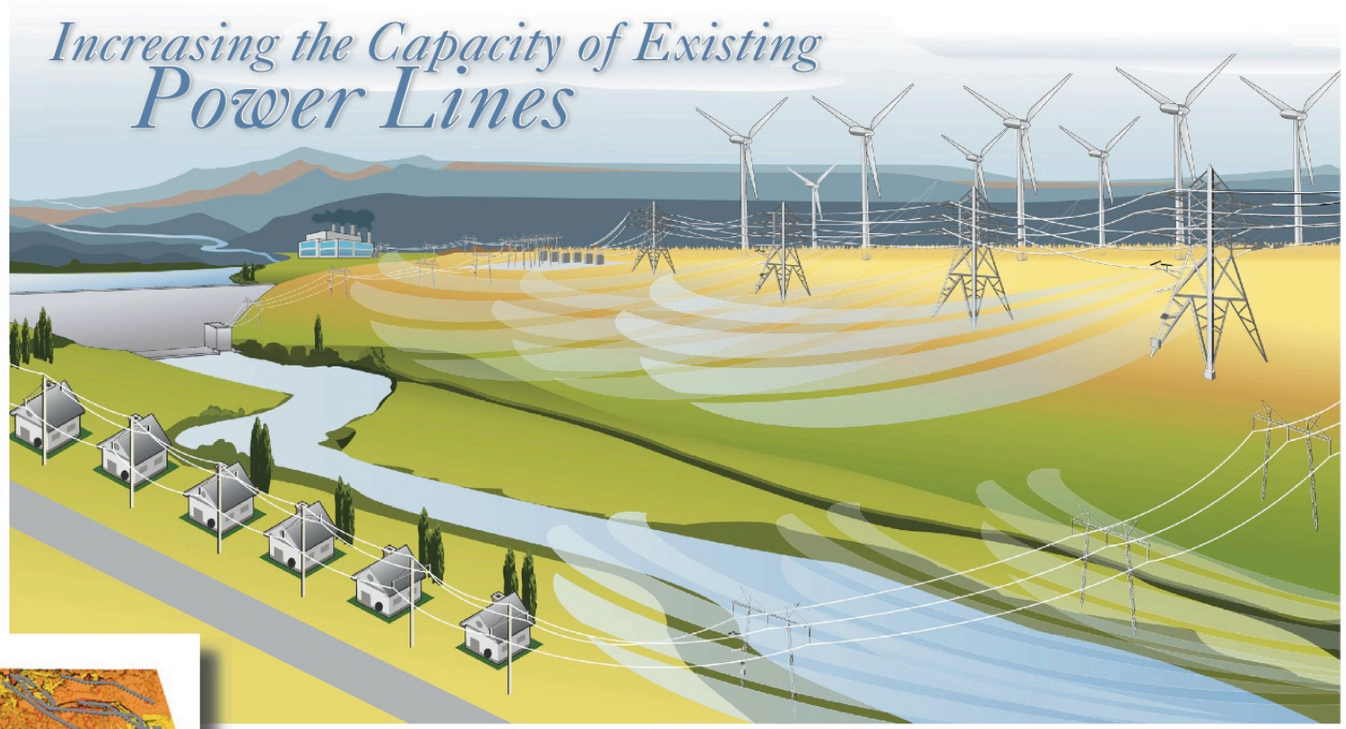
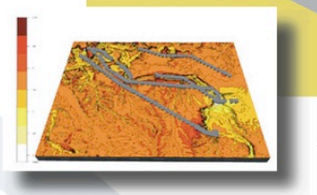
Increasing the Capacity of Existing Power Lines



Concurrent cooling enables increased transmission line capacity and renewable energy integration.



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A cool way to increase existing overhead power line capacity

In the continental United States, some 500 power companies operate a complex network of more than 160,000 miles of high-voltage transmission lines. The capacity of the grid has been largely unchanged for decades and needs to expand to accommodate new generation in order to support load growth. The difference in time and cost between using existing transmission lines or the construction of new ones can make or break plans for new, low cost generation.

Wind power researchers at INL believe moving more electricity through existing transmission lines is both possible and practical. In areas where wind farms are being developed, there is potential to take advantage of wind cooling on transmission lines concurrent with wind power generation, identifying additional capacity and line sag and clearance concerns to the ground, or nearby objects.

The key is to pay close attention to the weather. The more electric current a line carries, the hotter it gets. After a certain point, a line operator can not increase power flows without exceeding the thermal design limits of the conductor and other limiting devices, maintaining NERC compliance. However, adding weather based dynamic line ratings can increase line capacity by 10 to 40 percent, or more.

INL researchers are funded by the Department of Energy's Office of Energy Efficiency and Renewable Energy, Wind and Water Power Technology Office, and collaborate with Idaho Power Company, to research these efficiency gains.

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