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Wind Power's Location, Location, Location

Renewable Energy: Small local breezes may cost less to harness than distant high winds

[Janet Pelley](#)



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ON THE FARM Although wind on the Great Plains is prime for electricity generation, the costs of transmitting the power to major cities are high.

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Wind is the fastest growing renewable power source in the U.S., but it faces an expensive dilemma: Great distances often separate the best wind sites from major electricity markets. Experts say that costly new transmission lines will be necessary to bring this prime wind power to consumers. However, a new study that examines wind power's costs concludes that local sites with weaker winds may provide a cheaper option than distant farms with big gusts ([Environ. Sci. Technol.](#), DOI: 10.1021/es100751p).

A 2008 [U.S. Department of Energy report](#) proposed that to generate 20% of the nation's electric power with wind by 2030, engineers would have to build a transmission superhighway to send electricity from wind farms in the Great Plains to East Coast cities. But recent studies on the capital costs of wind power have suggested that local farms may deliver electricity more cheaply than remote wind sites, says engineer [Dalia Patino-Echeverri](#) of [Duke University](#).

Patino-Echeverri and colleagues wanted to quantify this potential difference in cost, so they modeled the costs of producing energy at two types of sites: a low-quality wind site near Chicago and a range of blustery sites about 750 km away in the Great Plains states.

To generate the same power output, the researchers calculated that the local

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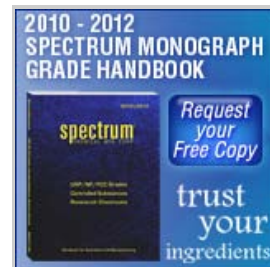
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site would require taller and higher-efficiency turbines than the distant sites would. So a wind farm in the Great Plains would cost 25% less to install than one near Chicago would.

But building new lines from distant sites is expensive. What's more, the cost of the electricity itself increases with transmitted distance because the power lines' resistance whittles away at the power supply as it travels from wind farm to market.

When the researchers included these considerations in their calculations, they found that supplying Chicago with 1,000 gigawatt-hours of electricity annually would cost more than twice as much over new transmission lines from far away as it would from a local source.

Although earlier studies have hinted that wind farms close to consumers might deliver cheap power, says **Jay Apt**, a physicist at **Carnegie Mellon University**, the current study "took that qualitative statement and made it superbly quantitative."

Warren Katzenstein, an associate with the **Brattle Group**, a consulting firm, says that the findings are a good first step to help investors decide where to build transmission lines and wind farms. But he cautions that other factors, such as government subsidies, might also affect the cost of electricity.

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