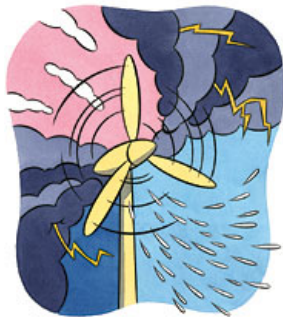


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Catch the Wind, Change the Weather

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Wind turbines have been hailed as an environmentally friendly way to reduce the world's dependence on fossil fuels. But a wind farm with hundreds or even thousands of large turbines removes an enormous amount of energy from the air. So is wind power really benign?



Chris Gash

In one of the first studies to get at that question, scientists have modeled the impact of a hypothetical large-scale wind farm in the Great Plains. Their conclusion, reported in *The Journal of Geophysical Research*, is that thousands of turbines concentrated in one area can affect local weather.

The impact, said the study's lead author, Dr. Somnath Baidya Roy, comes not so much from the turbines' rotor blades slowing down the air but from atmospheric mixing that occurs in the blades' wake. This creates warmer, drier conditions at the surface.

"We found that it's the turbulence generated by the rotor that is crucial when you talk about the impact on local meteorology," said Dr. Baidya Roy, who did the research at Princeton but is now at Duke.

The simulated wind farm in the study consisted of 10,000 turbines, with rotor blades 165 feet long, in a 60-by-60-mile grid in north-central Oklahoma.

In the Great Plains there is a nighttime stream of fast-moving air that separates cool, moist air near the ground from drier, warmer air above. The simulation found that the turbines catch this nocturnal jet, and the ensuing turbulence causes vertical mixing.

The warming and drying that occur when the upper air mass reaches the surface is a significant change, Dr. Baidya Roy said, and is similar to the kinds of local atmospheric changes that occur with large-scale deforestation. "You might see some kind of convective clouds or scattered rainfall here and there," Dr. Baidya Roy said.

He noted that the study was only preliminary, but that it pointed to the need to improve rotor design to reduce turbulence.

A wind farm of the size used in the simulation is much larger than those that have been built so far, Dr. Baidya Roy acknowledged, but it is not out of line with what is being considered as more power from renewable resources is sought.

"When you think of wind energy, people have a quaint idea of a lone windmill by the river," he said. "We are quite a ways from

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