

# Midwest wind energy to get projected lift from climate change, study says

September 18 2015, by Bonnie Davis

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The Shepherds Flat Wind Farm is an 845 MW wind farm in the U.S. state of Oregon. Credit: Steve Wilson / Wikipedia.

Mother Nature will be delivering a future gift of 2 percent more wind energy in the Midwest if regional climate models are correct, according to research from Wake Forest University.

In a study recently published online by the journal *Renewable Energy*,

Robert Erhardt, assistant professor of mathematics and statistics, and 2015 Wake Forest graduate Dana Johnson, used data to project impacts of climate change on [wind energy](#) density in the United States. They compared data from current (1968-2000) and future (2038-2070) time periods.

"Climate change is causing an overall warming trend but different parts of the globe warm at different rates and this is changing the wind," said Erhardt, an environmental statistician. "Some would interpret this as good news about climate change, but I disagree with that. I wouldn't call it [good news](#). I would just call it a projected consequence of [climate change](#)."

Winds are caused by pressure gradients, which arise from things like the uneven heating of the atmosphere by the sun, the irregularities of the earth's surface, and rotation of the earth. When captured by wind turbines, this motion energy can be used to generate electricity without using water.

The researchers used data from four independently built climate models housed by the North American Regional Climate Change Assessment Program (NARCCAP), which warehouses all of the regional [climate models](#) for North America. One of the models used was built by the U.S. National Center for Atmospheric Research, a research and development center federally funded by the National Science Foundation.

All four models showed very strong agreement that wind energy density is projected to increase by more than 2 percent in a region encompassing Kansas, Oklahoma and northern Texas.

"It just so happens, that's already a windy part of the country with an established and growing wind industry," Erhardt said. "All three states have targets of generating a certain amount of wind energy by the year

2020 so it's a happy coincidence that these projected increases are in a region that already supports wind energy and is already invested in it. The region is well positioned to gain in these additional energy resources."

To break it down to practical application, the researchers picked a few counties in the region studied and asked, "how much additional power would each current person in this county get?" For example, in Kiowa county, Kansas, each person is projected to get somewhere between 1.7kW – enough power to run a dishwasher – and 5.2kW which is enough for everyone to run an air conditioner and stereo continuously.

According to the Department of Energy, the United State's wind industry is an important part of the energy strategy to cut carbon pollution, to diversify the country's energy economy and bring the next generation of American-made clean energy technologies to market. The United States' [wind power capacity](#) reached more than 65.8 gigawatts by the end of 2014, according to the department's website. That's enough electricity to power more than 17.5 million homes annually.

"If by the mid 21st century these projections hold, they just got 2 percent more energy for free," Erhardt said. "It's like a gift."

Provided by Wake Forest University

Citation: Midwest wind energy to get projected lift from climate change, study says (2015, September 18) retrieved 24 April 2024 from <https://phys.org/news/2015-09-midwest-energy-climate.html>

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