

outbursts

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spotlight on Chile research partnership

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Stormy weather ahead for wind farms?

By Andrea Brunais

Wind turbines provide clean, abundant energy and bolster America's power grid. But across the world people are banding together to fight wind farms, blaming noise for interrupted sleep and a host of health problems.

Scientists lack sufficient understanding of wind turbines' noise and best ways to mitigate the effects, says Jorge Arenas, a faculty member in the Universidad Austral de Chile's College of Engineering Sciences and director of its Institute of Acoustics.

Noise is annoying and, worse, linked to health problems, many researchers say. A newspaper in the U.K. captures the sensation: "Residents near some wind farms have likened the noise to a cement-mixer or a shoe stuck in a tumble-dryer," writes energy editor Emily Gosden in a story in *The Telegraph*.

"The noise from wind turbines is not very loud," says Virginia Tech's Ricardo Burdisso, a professor of mechanical engineering and Arenas' colleague in Blacksburg. "However, it is annoying because of its amplitude modulated characteristic. That is, the noise fluctuates in levels with a period of 0.7 to 1.5 seconds, depending on the size of the turbine. The fluctuation in levels can be as high as 10 to 12 decibels."



Arenas and Virginia Tech colleagues who are known for their wind tunnel research will study the vibrations of wind turbines at a large Chilean wind farm along with health impacts on nearby residents. The goal is to make wind turbines more acceptable.

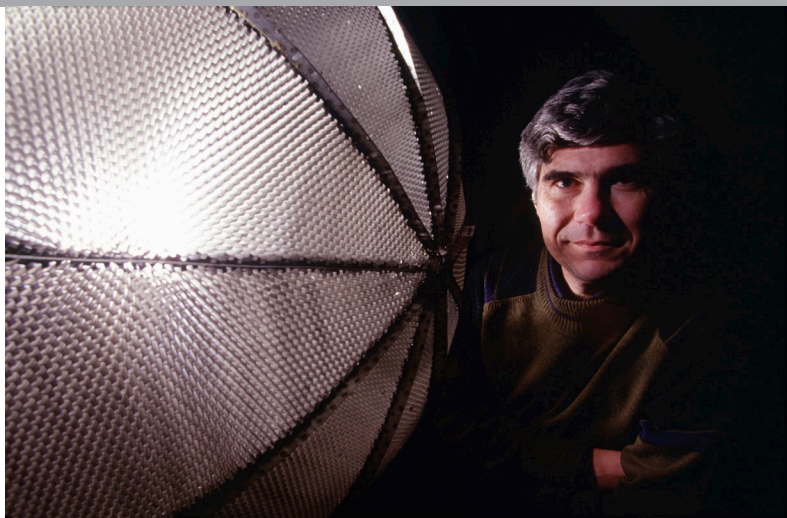
Last year Ohio legislators passed a law requiring wind turbine blades to be at least a quarter-mile from the nearest property line. That's because sounds in the low frequency range can travel great distances; they "are not well attenuated by air," Arenas says. "Low frequency noise is hard to mitigate."

Are restrictive noise laws a setback for the industry? Dayna Baird Payne, a lobbyist in Columbus who represents the American Wind Energy Association, says developers of large-scale wind farms in Ohio "are in a pretty bad hurt," according to an Associated Press report.

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– Ricardo Burdisso, professor of mechanical engineering at Virginia Tech



Clashes over wind farms have spread across the country – from Minnesota to Missouri, Alabama, Maryland and Massachusetts, writes Bonner R. Cohen, a senior fellow with the National Center for Public Policy Research.

And on the shore of Lake Michigan, residents filed suit claiming that Consumers Energy's Lake Wind Energy Park's two years of operations caused headaches, sleeplessness, nausea, dizziness, stress, and fatigue, Cohen reports.

Europe is the site of pitched battles as well. In early March, politicians in Northern Ireland called for better monitoring of noise as well as limits on how many wind turbines could be spread across the landscape.

Arenas hopes to develop a model to predict a turbine's noise levels. The interaction of blades with air "is a very challenging research problem," he says. The layout of wind farms might be amenable to better design – but first things first. The current approach is to first study and understand "the effect of the noise on people" and then find solutions.



Jorge Arenas, a faculty member in the Universidad Austral de Chile's College of Engineering Sciences and director of its Institute of Acoustics.

'Scientists lack sufficient understanding of wind turbines' noise and best ways to mitigate the effects.'

– Jorge Arenas, Universidad Austral de Chile

Hear directly from researchers on these two projects...



■ **Earthquake:**
<http://tinyurl.com/VT-Earthquake>



■ **Wind farms:**
<http://tinyurl.com/VT-WindFarms>

Virginia Tech's Chile research partnership

Seed funding for half a dozen research projects begun in early 2015 comes from three sources: the Institute for Critical Technology and Applied Science at Virginia Tech, Outreach and International Affairs at Virginia Tech, and Universidad Austral de Chile.

Research topics include ways that fish-processing waste might be transformed to become a source of energy and a better understanding of how buildings withstand earthquakes depending on the soil beneath their foundations. Also, a fourth project focuses on the microbiome of Patagonia and its potential to generate new antibiotics.

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