

Quincy

What is exciting here is that transformative change happened because a significant group of people, a university, asked for it.

New Hampshire could not be more different from Texas. Where power lines can travel 500 miles across Texas flatlands, Granite State cities and towns are surrounded by thousands of acres of forests, on mountains that are the aesthetic jewel of the northeast, a draw for hikers and outdoor enthusiasts for centuries.

Still, wind power has a history in New Hampshire. In 1980, the first wind farm in the world was installed at Crotched Mountain, decommissioned decades ago. Today, there are three operational wind farms—Lempster Mountain, Granite Wind and Granite State Reliable. The 33-turbine Granite State Reliable wind farm is located in the remotest part of the state, in Millsfield and Dixville, with seven turbines on Dixville Peak, eight on Mount Kelsey, six on Owlshead, and 12 along Fishbrook Ridge.

After a decade of debate, the most recent wind farm in the state was approved last August with completion slated for August. The nine-turbine project was the first instance in which the New Hampshire Site Evaluation Committee initially rejected the proposal because of the anticipated visual and aesthetic impact the turbines would have on the Audubon Society of New Hampshire's Willard Pond Sanctuary. Interestingly, when concerns were voiced about turbines killing birds, the facts play out differently. In fact, the number one killer of birds, to the tune of 4 billion per year, are domestic house cats.

The Antrim Wind Project is now widely supported in the town of Antrim. It will produce enough clean renewable energy to supply more than 12,000 average New Hampshire homes. Years of debate have produced an even wider benefit—the permanent conservation of more than 900 acres of valuable forestland and wildlife habitat in keeping with production of clean energy.

New Hampshire is one of the best states for wind power because of its abundant wind and exceptionally good federal and state wind incentives and rebates, which when combined can yield a 50 percent cost reduction. Innovations in technology have reduced the cost of

wind and solar power.

One recent innovation may make an even greater impact across the globe, but not through turbine towers that are hundreds of feet tall. Two students in the U.K. are changing the shape of wind power, literally, with the O-Wind Turbine, an innovation which won the 2018 James Dyson Award. The small (25-cm), ball-shaped O-Wind Turbine is fixed on an axis with geometric vents at different angles to capture wind from divergent directions.

This simple idea was inspired by the Mars Tumbleweed Space Rover, a failed NASA project. The Space Rover, an inflatable ball designed to bounce and roll across the surface of the planet like a tumbleweed while gathering geographical and atmospheric data, was powered by unidirectional wind so its mobility was hampered by obstacles.

For his final-year project as an undergraduate, Chilean designer Nicolas Orellana developed a space rover that could move and explore a surface while using cross-winds and tested it in a desert in Chile. Based on what he learned, he and his colleague, Kenyan designer Yassen Noorani, both international students studying for the master of science in international innovation at Lancaster University (UK), came up with their wind turbine.

The exciting thing is that this small turbine does not need consistent wind. It can be installed by individuals in a wide range of places, including urban settings such as balconies or attached to the sides of buildings. Wind in cities is multi-directional, often trapped between buildings, then dragged down to streets, then pushed up into the sky, causing "chaotic" wind. In addition, this same turbine can be used as "affordable" energy in developing towns and cities.

The designers will receive 30,000 British pounds toward the project, plus 5,000 pounds for their university department. Orellana and Noorani are currently in discussion with investors to secure a deal to mass-produce the O-Wind Turbine, and are investigating different business models and subsidies for developing countries.

Orellana: "Cities are windy places, but we are currently not harnessing this resource. Our belief is that by making it easier to generate green energy, people will be encouraged to play a bigger role in conserving our planet."

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