Energy & Science

A Recycling Plan to Clear Wind Turbine Blades From Graveyards

A Danish startup aims to turn old turbines into a material that can address a different environmental threat: noise pollution.

By Laura Millan Lombrana
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A worker walks past wind turbine blades awaiting transport in Fort Madison, Iowa. *Photographer: Timothy Fadek/Corbis News*

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It's difficult to recycle a gigantic wind turbine. The blades are built to withstand extreme weather, from scorching desert heat to hurricane-like winds, and that means their life almost always ends in a landfill. In Europe alone, about 3,800 blades will be removed every year through at least 2022, according to BloombergNEF, as the oldest turbines reach retirement age.

Now a Danish startup has found a way to crush these blades, turning an ultra-resistant mix of fiberglass and industrial glue into barriers designed to block noise from highways and factories. Copenhagen-based Miljoskarm can grind the blades into small pieces of 1 to 2 centimeters with the same type of machines used in auto junkyards. The material is then placed in recycled plastic cases that block noise at least at the same level as barriers made from aluminum and mineral wool, with less maintenance required.

The noise barrier absorbent side showing the cassettes containing acoustic absorbent material of recycled glass fiber. *Source: Miljoskarm*

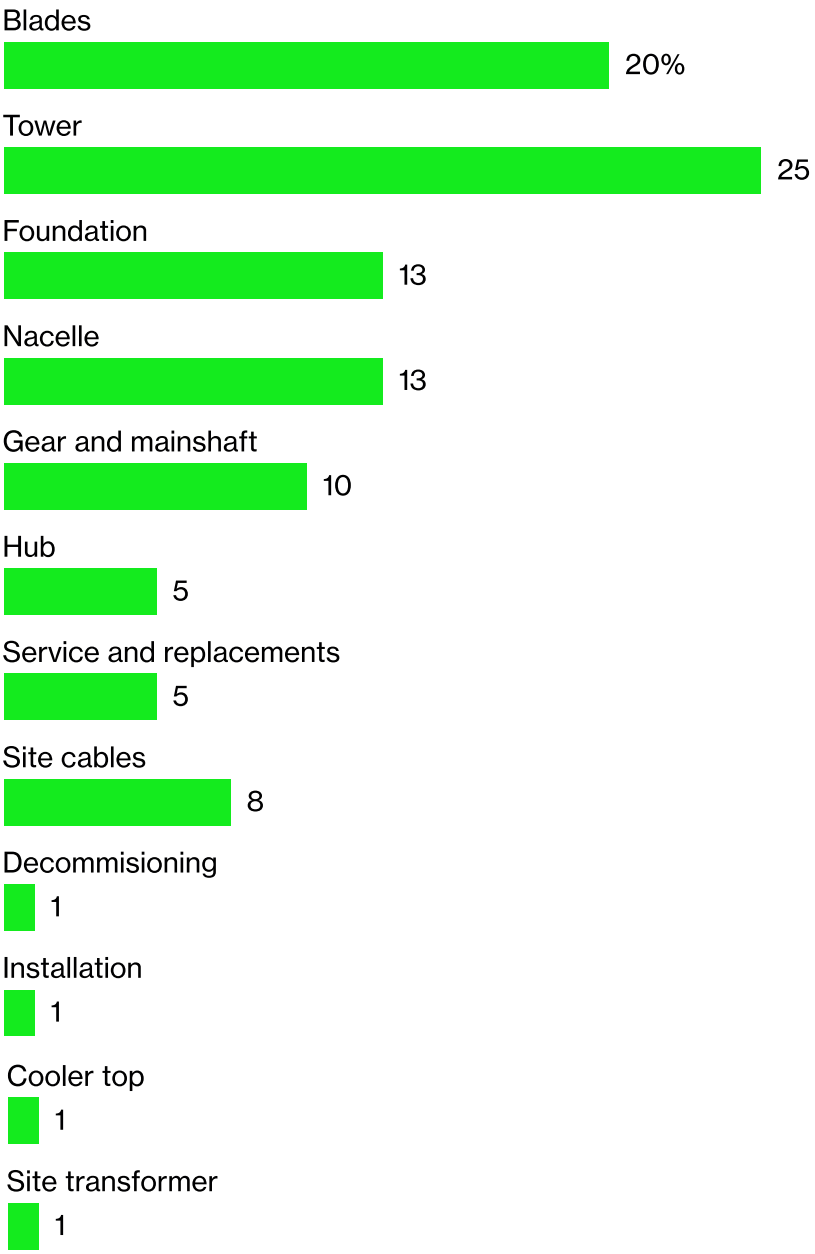
“For most people, noise is one of the main problems with wind turbines,” said Jakob Nielsen, Miljoskarm’s chief executive officer and founder. “So I liked the idea that they could be turned into something that blocked the noise. This all plays into the idea of the circular economy.”

The question of what to do with aging blades only emerged over the last five years or so as the first wind turbines reached the end of their lives after more than two decades of service. The need for a better solution than landfills has steadily increased as the newest blades in use have grown increasingly larger. That’s spurred a mini-industry of companies with new ideas on how to recycle them.

In the U.S., Global Fiberglass Solutions has developed a method to crush the blades into pellets to be used in flooring and walls. In the Netherlands, architectural firm Superuse Studios were able to cut up five discarded blades and use the parts to create climbing towers at a children's playground in Rotterdam. Miljoskarm, meanwhile, expects to process

50 to 100 tons of material this year. At about 15 tons for one 50-meter blade, that's the equivalent of recycling 3 to 6 blades.

Wind Turbine Emissions Impact
Around 80% of the lifetime emissions of a wind turbine come from raw materials and components



Source: Vestas, Bloomberg Intelligence
Calculations based on V150-4.2 MW turbine model. Chart shows percentage contribution to global warming potential by wind plant component

The company is now approaching investors for 1 to 2 million euros ($1.1 to $2.3 million) in funding to scale up its processing capacity with added machines. It's also working on new
products that may allow the company to expand into other markets, according to Nielsen.

"Plastic and glass fibers have problematic properties because they do not degrade," he said. "But used in a noise barrier they are very good properties because they last for years."

Nielsen sees his company's product as becoming increasingly important as demand for noise panels rises. Public institutions are potential buyers because they're responsible for installing the sound barriers that shield local communities on the side of large highways and roads. Miljoskarm has also sold panels to industrial and private clients, with a square meter of noise barrier starting at 100 euros.

In Europe, the number of people exposed to noise pollution will increase through 2030 with the use of road, rail and air transport all forecast to rise, according to a new report the the European Environment Agency. Noise levels will go up even if half of combustion engine cars disappear and are replaced by electric cars within the next decade, the study found.

"We are going to see so many thousands of tons of discarded blades and glass fibers that something needs to be done with them," Nielsen said. "It's not really the way forward to put them on landfills."

— With assistance by Chris Martin