



With support from the Competitiveness Improvement Project, Accelerate Wind plans to develop their prototype roof-edge wind turbine design, shown as nine 5-kilowatt wind turbines (airfoil shapes on the roof edge) in this artist's rendering. *Illustration by Sophie Schaffer, Accelerate Wind, Inc.*

U.S. Department of Energy Competitiveness Improvement Project (CIP)

2021 Prototype Design Development Awardee: Accelerate Wind, Inc.

Project dates: October 26, 2021–July 24, 2023

Project Overview

Life on the edge—pairing rooftop wind and solar to boost clean energy production on commercial buildings

In the United States, rooftop photovoltaic systems can be installed on most commercial buildings. However, even if all available rooftop space is used, solar energy cannot satisfy the building's total energy demand. With many building owners trying to move toward net-zero-carbon-emission energy generation, these customers often have no way to achieve this goal on-site.

Rooftop wind energy technology could be an option, but most rooftop wind turbines are not economically viable because they do not produce meaningful amounts of energy and are not likely to pay for themselves within their lifetime. Some rooftop wind turbine companies have attempted to exploit the fact that wind naturally speeds up at the edge of a roof; but, so far, these solutions have also struggled to produce significant energy because only a small portion of that wind can be captured so close to the edge of the roof.

Accelerate Wind, Inc., developed an idea that uses a hybrid approach, pairing rooftop solar with specially designed, roof-edge-grabbing wind turbines to provide a robust and affordable rooftop renewable energy solution for commercial buildings.

“One of the major risks of developing an unconventional turbine is certification. No rooftop wind turbine has been certified to date, so it's critical that we work with NREL early to determine what this certification process will look like and how we need to evolve our design to allow it to be certified. We're excited to get feedback and support from NREL scientists throughout our design process to develop the best turbine that we can.”

Erika Boeing, CEO and founder, Accelerate Wind, Inc.

Project Outcomes and Deliverable

This Competitiveness Improvement Program Prototype Design Development award will allow Accelerate Wind to develop a robust solution that is designed for reliability, safety, and power predictability before entering the market.

The project outcome is a full set of design drawings for a small rooftop wind turbine system that meets all relevant criteria for certification at the International Electrotechnical Commission 61400-2 standard and is ready for prototype manufacture and testing.



Project Approach

For three years, Accelerate Wind worked with researchers at Argonne National Laboratory to develop an affordable wind turbine for use on commercial buildings. This modular 5-kilowatt wind turbine system is designed to be installed in quantities determined by the length of a commercial building's rooftop. The turbine is affordable because it features:

- A carefully designed modern airfoil shape that hangs over the roof, preventing flow separation and capturing the higher speed wind that occurs naturally at a roof's edge
- A design that integrates a space- and energy-efficient crossflow wind turbine from XFlow Energy Company
- A system design that can be installed easily by solar panel installers at the edge of the building's roof alongside solar panels.

Throughout the design process, Accelerate Wind worked closely with solar panel installers to ensure its wind turbine design would be feasible for professionals to install. This approach allows Accelerate Wind to leverage the success of rooftop solar power commercialization, including lowered costs for customer acquisition, installation, and permitting.

Project Collaborators

XFlow Energy Company—Rotor design for manufacturing and turbine controls development

Project Financial Information

Award Amount: \$200,000

Awardee Share: \$95,164

Total: \$295,164

Prototype Design Development Award

One of eight types of Competitiveness Improvement Project awards, Prototype Design Development projects focus on moving original concepts from the preliminary design phase to development of a production prototype that can be evaluated.

The goal of these awards is to develop a final prototype turbine design ready for manufacturing and prototype testing.

“Accelerate Wind’s project combines two viable clean energy solutions for commercial buildings—rooftop solar power and rooftop wind energy. Capturing wind energy at a roof’s edge is a unique and challenging approach that has the potential for impactful distributed wind energy contribution in commercial and industrial applications.”

Brent Summerville, technical monitor, NREL

About the Competitiveness Improvement Project

The U.S. Department of Energy’s (DOE’s) Competitiveness Improvement Project supports U.S. leadership in distributed wind energy technologies. Managed by NREL on behalf of DOE’s Wind Energy Technologies Office, the Competitiveness Improvement Project supports innovation to advance wind energy as a low-cost, distributed generation technology option.

More Information

Visit NREL’s website at www.nrel.gov/wind/competitiveness-improvement-project.html

Accelerate Wind SUB-2022-10020