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

2022 Component Innovation Awardee: Pecos Wind Power

Project dates: April 4, 2023–Jan. 3, 2025

Project Overview

Sharpening Blade Design To Generate Power in Areas With Low Wind Speeds

Distributed wind energy systems supply electricity for nearby homes and businesses, often in remote and rural regions. Systems capable of capturing energy in areas with low wind speeds make it possible to deploy these clean energy systems in many geographic locations.

Pecos Wind Power's 85-kilowatt (kW) horizontal-axis PW85 wind turbine shows potential to reduce the levelized cost of energy by approximately 55% when compared to typical small wind systems while achieving utility-scale capacity factors of more than 40% in areas with lower wind speeds.

To maximize cost competitiveness, the Pecos Wind Power turbine needs a blade optimized for low wind speeds. Through its 2022 Competitiveness Improvement Project (CIP) award, Pecos Wind Power and partner Wetzel Wind Energy Services will model, optimize, fabricate, and validate a 14.5-meter wind turbine blade made specifically for these applications. Three prior CIP awards supported Pecos Wind Power's initial development of the PW85 turbine.

Project Outcomes and Deliverable

The Pecos Wind Power CIP project will result in a fully designed, fabricated, and tested blade that is ready for certification within the PW85 turbine. This turbine will reduce the cost and increase market potential of small wind energy systems among rural commercial electricity customers.

> "Not only will the Pecos Wind Power turbine make wind energy affordable for customers in remote locations, but it also effectively captures the wind in areas where other turbine installations would not be viable."
>
> —*Scott Dana, technical monitor, National Renewable Energy Laboratory (NREL)*

Project Approach

The project will examine how the WEI14.5 blade designed by Wetzel Wind will impact the PW85 wind turbine's certification to American Clean Power standards for small wind turbines. Aeroelastic computer simulations will model behavior of the PW85 with the WEI14.5 blade to optimize the turbine's control software. Then, a prototype blade will be fabricated and tested against American Clean Power certification requirements.

Pecos Wind Power's assembly of the PW85 wind turbine, which will generate wind energy in areas with low wind speeds, will benefit from a new blade with an improved design, thanks to a CIP award.
Photo from Pecos Wind Power

Employees, like those pictured behind the structural bedframe of their prototype PW85 turbine, will help Pecos Wind Power advance the turbine with a CIP award. *Photo from Pecos Wind Power*

Project Collaborators

Wetzel Wind Energy Services – blade design

Project Financial Information

Award Amount: $400,000

Awardee Share: $233,826

Total: $633,826

Component Innovation Award

One of nine types of CIP awards, Component Innovation Awards support innovation in existing wind energy generator designs to improve components, leading to a reduced levelized cost of energy.

About the Competitiveness Improvement Project

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

"Thanks to CIP, Pecos Wind Power has started U.S. manufacturing of our brand-new PW85 turbine. We expect this 14.5-meter blade will further improve the competitiveness of our turbine and allow us to deliver lower-cost electricity to rural commercial electricity customers nationwide."

— Josh Groleau, CEO, Pecos Wind Power

More Information

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

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National Renewable Energy Laboratory
15013 Denver West Parkway, Golden, CO 80401
303-275-3000 • www.nrel.gov

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