



Pecos Wind Power's PW85 wind turbine model is optimized for low-wind-speed power generation. *Graphic courtesy of Pecos Wind Power*

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

2020 System Optimization Awardee: Pecos Wind Power

Project Dates: November 9, 2020 – August 8, 2022

Project Overview

Pecos Wind Power's optimized PW85 wind turbine model could cut distributed wind energy installation costs in half

Distributed wind power can help the nation transition to clean energy. But the cost to install distributed wind energy technology is still too high for widespread use. Pecos Wind Power aims to help lower those costs while improving the performance and reliability of their new, community-scale, 85-kilowatt distributed wind turbine, the PW85.

This Competitiveness Improvement System Optimization Award will help Pecos Wind Power accomplish these goals by supporting their efforts to optimize the rotor nacelle assembly (components that turn wind energy into electrical power) of their PW85. The PW85 is a horizontal-axis wind turbine with an industry-leading rotor diameter of 30 meters, which minimizes the levelized cost of energy (LCOE) in low-wind-speed markets. With their improvements, Pecos Wind Power will not only edge their design closer to commercialization and certification, but they'll also help the entire distributed wind energy industry achieve LCOE targets and deploy wind turbines to a wider range of communities at costs comparable with other sources of electrical energy, including solar.

"The Competitiveness Improvement Project has been critical to the development of Pecos Wind Power's new, community-scale wind turbine, the PW85. Our award will advance the PW85 from a concept to a product that is ready for testing. CIP is essential for driving the development, certification, and commercialization of new, cost-competitive, distributed wind turbines like ours and will help unlock the enormous economic potential of distributed wind energy in the United States."

Josh Groleau, CEO, Pecos Wind Power

Project Outcomes and Deliverables

Pecos Wind Power will optimize their PW85 distributed wind turbine to achieve a production LCOE of \$0.099 per kilowatt-hour, which is a 48% cost reduction in distributed wind energy costs. This reduction is a critical step toward Pecos Wind Power's ultimate target of \$0.089 per kilowatt-hour.



Once complete, the PW85 rotor nacelle assembly will be tested on the 225-kilowatt dynamometer at NREL's Flatirons Campus. Ultimately, this work will help the distributed wind energy industry achieve lower energy costs for breakthrough deployment of distributed wind turbines by 2030.

Project Approach

With its Competitiveness Improvement Project System Optimization Award, Pecos Wind Power will enhance the cost, performance, and reliability of their existing PW85 wind turbine model. This product could be a cost-effective, clean-energy alternative for communities that currently cannot afford to install distributed wind turbines. To achieve the goals of their CIP award, Pecos Wind Power will:

- Develop and integrate NREL's Reference Open-Source Controller with the PW85 to enable engineers to remotely control the wind turbine as conditions, like wind speeds, change
- Study the performance of remote controller usage and implement utility-scale best practices
- Evaluate how varying loads—or wind forces—impact the PW85
- Use models to discover which materials make the PW85 most efficient
- Analyze which pitch—the angle of the wind turbine's blades—is optimal for energy production
- Identify which sensors to use to monitor the turbine's health to plan preventive maintenance
- Evaluate, confirm, and verify the system design and loads for certification
- Engage NREL's dynamometer to test the PW85's longevity.

Project Collaborators

- *RE Innovations LLC*—Aeroelastic simulations and certification advisement
- *Grün Robotics*—Production controller development

"Pecos Wind Power's system optimization has great potential to reduce the overall costs of distributed wind energy. Because their new PW85 wind turbine could decrease the installation costs of distributed wind by about 48%, this design holds great promise for the deployment of clean wind energy to communities that, as of now, cannot afford it."

Scott Dana, NREL technical monitor

Project Financial Information

Award Amount: \$400,000

Awardee Share: \$154,528

Total: \$554,528

System Optimization Awards

One of eight types of CIP awards, System Optimization Awards are designed to:

- Optimize a wind turbine system, such as adding a new drivetrain that includes storage, for an existing turbine platform
- Develop a new wind energy application, such as a deployable wind turbine system.

About the Competitiveness Improvement Project

The U.S. Department of Energy's (DOE's) Competitiveness Improvement Project supports U.S. leadership in distributed wind 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

Download the *DOE fact sheet*