



A Competitiveness Improvement Project Component Innovation Award is enabling Windurance to develop and certify a wind turbine controller. The company is collaborating with several wind turbine manufacturers, such as Northern Power Systems, whose 100-kW wind turbine is shown here. *Photo from Northern Power Systems*

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

2021 Component Innovation Awardee: Windurance, LLC

Project dates: Nov. 3, 2021–Aug. 31, 2023

Project Overview

Certified Wind Turbine Controller Speeds Up Market Entry for Turbine Manufacturers

Distributed wind turbine manufacturers seeking to enter the market are often hampered by two challenges: not enough capital and no specific expertise in developing certified electronic equipment. A harsh reality is that off-the-shelf power electronics are neither certified nor cost-effective.

This lack of certified controller equipment in the distributed wind energy industry adds expense and impedes market penetration related to certification for individual wind turbines, wind system projects, and installations. Normally, these certification costs would be borne repeatedly by individual turbine manufacturers or developers on a model-by-model or project-by-project basis, resulting in cost and time delays as well as uncertainty and risk for project developers and prospective owners.

Windurance seeks to eliminate these challenges by developing and obtaining third-party certification of a standardized wind turbine controller. This will facilitate development, certification, and production while supporting efficiencies not easily achievable by individual manufacturers.

Windurance's Distributed Wind Industry Turbine Controller will enable manufacturers to apply proprietary turbine-

"We are eager to develop certified products for manufacturers with the goal of making distributed wind energy cost competitive with other distributed generation technologies."

Dan Clunies, business development manager, Windurance

specific configurations and functionality. When applicable, manufacturers can expand on a Windurance-provided software framework to add unique or proprietary functionality.

Project Outcome and Deliverables

Project deliverables are:

- A wind turbine controller hardware platform
- A software framework
- Third-party certification by Underwriters Laboratories 6142 and certified compliance to the Institute of Electrical and Electronics Engineers 2030.5 Standard for Smart Energy Profile Application.

The project outcome will be a wind turbine controller that simplifies certification and enables efficient integration of wind turbine subsystems.



Project Approach

Windurance will leverage existing, real-time, embedded control hardware and software, as well as wind turbine safety designs, to develop and certify a wind turbine controller. The company will collaborate with several wind turbine manufacturers to develop its controller and software.

Project Collaborators

Current and future project partners include:

- **REInnovations, Inc.**—certification support company
- **Intergrid LLC**—application code transfer company
- **Pecos Wind Power**—85-kilowatt (kW) wind turbine manufacturer
- **Wind Harvest International**—70-kW wind turbine manufacturer
- **Northern Power Systems, Inc.**—100-kW wind turbine manufacturer.

Project Financial Information

Award Amount: \$367,263

Awardee Share: \$209,196

Total: \$576,459

Component Innovation Award

One of eight types of Competitiveness Improvement Project awards, Component Innovation Awards are designed to support innovation in existing components—such as controllers, inverters, alternators, rotor blades, or towers—to lower costs and/or improve production. Projects can also include development of turbine components that will allow the wind turbine to enter new market areas.

“By designing and certifying a low-cost and reliable controller, Windurance will simplify the certification process for wind turbine manufacturers and eventually reduce the levelized cost of distributed wind energy.”

Lee Jay Fingersh, 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 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

Windurance SUB-2022-10036