

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

# 2022 Prototype Design Development Awardee: RRD Engineering

Project dates: Jan. 2, 2023–July 1, 2023

## Project Overview

### U.S.-Produced Midsize Distributed Wind Turbine To Offer Reliability and Low Cost

Distributed wind turbines, which are installed near points of electricity use, are expected to play a key role in the shift toward clean energy sources in the coming decades. Until now, the U.S. distributed wind industry has faced challenges as a result of the unreliability of smaller turbines (<65 kilowatt [kW]) and the high levelized cost of energy (LCOE) of large units (>100 kW).

The innovative BladeRunner distributed wind turbine concept from RRD Engineering will address the need for dependable, efficient, and affordable midsize turbines to power operations in the commercial, industrial, agricultural, military, governmental, and institutional sectors. The inventive design funded by this Competitiveness Improvement Project (CIP) award reduces LCOE by using materials and components that cost and weigh less than those found in conventional turbines, while delivering savings related to manufacturing and maintenance requirements.

“RRD Engineering’s first CIP award will help move this inventive BladeRunner concept past the proof-of-concept stage, making it possible for the company to eventually build a full commercial prototype.”

Rick Damiani, principal, RRD Engineering

## Project Outcomes and Deliverables

Using a novel design loosely based on a vertical-axis wind turbine, the BladeRunner project will lay the foundation for development of a device with potential to reduce LCOE to less than \$0.07 per kilowatt-hour. The RRD Engineering team will complete preliminary designs of key components (i.e., blade, hub-wheel, and tower), determining size and cost specifications.



## Project Approach

The team will calculate loads for key components—which combine low-cost and easy-to-manufacture blades with slender and efficient support structures—and then conduct preliminary structural sizing. Blade geometry and internal structure will be optimized to minimize mass and cost. A technical design evaluation will be conducted in collaboration with the National Renewable Energy Laboratory (NREL). An aeroelastic model will be developed in subsequent phases of the project.

## Project Collaborators

Project partner and previous CIP awardee Windward Engineering will engineer turbine parts and test components. Both RRD Engineering and Windward Engineering are contributing to the more-than-50% project cost share.

## Project Financial Information

Award Amount: \$47,151  
Awardee Share: \$64,400  
Total: \$111,551

## Prototype Design Development Award

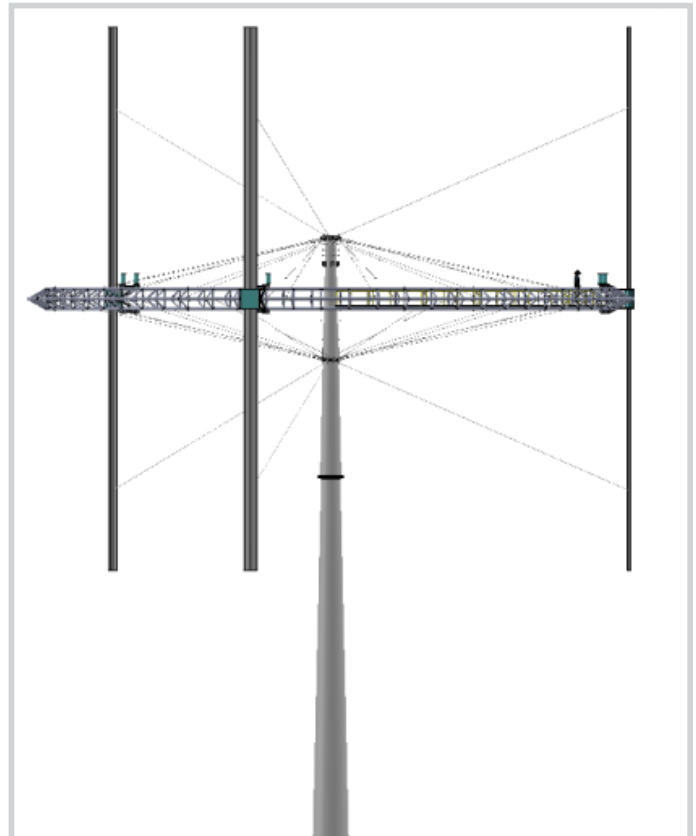
One of nine types of CIP awards, Prototype Design Development projects focus on moving original concepts from the preliminary design phase to development of a production prototype that can be evaluated. The goal of these awards is to develop a final prototype turbine design ready for manufacturing and prototype testing.

## 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.

"The innovative, low-cost BladeRunner design has potential to play a critical role in our country's transition to renewable energy, while also building the U.S. share of the global energy market."

Brent Summerville, technical monitor, NREL



The BladeRunner will offer a dependable, affordable midsize distributed wind turbine option for commercial, industrial, agricultural, military, governmental, and institutional applications. *Graphic from RRD Engineering and Windward Engineering*

## More Information

Visit NREL's website at [www.nrel.gov/wind/competitiveness-improvement-project.html](http://www.nrel.gov/wind/competitiveness-improvement-project.html)

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