

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

# 2022 Component Innovation Awardee: Carter Wind Turbines

Project dates: Nov. 9, 2022–May 8, 2024

## Project Overview

### Competitively Priced and Easy-to-Transport Wind Turbines Could Boost Energy Production 11%

Remote grid-tied and off-grid power systems fed by wind energy can supply electricity needed to boost the world's developing economies and to run industrial facilities, farms, electric vehicle charging stations, and businesses in isolated and rural areas across the United States. To bring wind power to these locations, the wind energy industry needs viable technology solutions that can be rapidly and reliably deployed in remote sites at a cost comparable to that of traditional energy sources.

**Carter Wind Turbines** will develop a competitively priced, portable, ultra-lightweight, self-erecting turbine that will expand the viability of wind energy systems for commercial and residential customers in areas far from population centers. The new turbine is a taller version of the Carter Model 300, which was developed with funding from previous Competitiveness Improvement Project (CIP) awards. Compared to conventional turbines, the new assembly is cheaper to ship, can be erected in one day without any cranes or heavy excavation equipment, and is compatible with the wide range of grid configurations and site conditions found in remote areas.

## Project Outcomes and Deliverable

The new 60-meter tower designed by Carter Wind Turbines and its partners will produce 11% more energy than a 50-meter tower, for a total of 476 megawatt-hours per year. Its 9% reduction in levelized cost of energy results from cost-saving measures, including value-engineered designs, accurate

“Our new lightweight tower will cut shipping costs in half, simplifying delivery over long distances and installation at remote sites with limited infrastructure. Our technology not only helps bring electricity to these communities but also empowers developing regions around the globe with access to clean energy.”

*Matt Carter, president and CEO, Carter Wind Turbines*

prediction of loads through modeling, improved production methods, and more versatile delivery and installation options. Producing the new turbines also could stimulate employment growth in the U.S. clean energy manufacturing sector.

## Project Approach

To develop the new turbine, the Carter Wind Turbines team will:

- Evaluate, confirm, and verify the tower design and loads for certification.
- Provide system requirements and specifications.
- Design and engineer the tower, guy wires, anchoring, and other components.
- Fabricate the first tower and components.
- Develop procedures for tower transportation, assembly, erection, lay-down, and disassembly.
- Install and test the tower system.
- Calculate levelized cost of energy.



## Project Collaborators

Project partners include:

- **G-Tower**—tower support system engineering design and analysis
- **Advanced Energy Systems**—engineering support
- **eFormative Options**—diversity, equity, inclusion, and accessibility support; funding development; and management.

## Project Financial Information

**Award Amount:** \$354,741

**Awardee Share:** \$124,639

**Total:** \$479,380

## Component Innovation Awards

One of nine types of CIP awards, Component Innovation Awards 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.

## 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 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](http://www.nrel.gov/wind/competitiveness-improvement-project.html)

Carter Wind Turbines SUB-2023-10141

"This new tower component innovation award complements Carter's recent advancements to their wind turbine system with longer blades, variable-speed rotor, and energy storage. This project addresses the nation's need for affordable, reliable distributed wind generation in more locations, as well as employment growth in the clean energy manufacturing sector."

*Dave Snowberg, technical monitor, National Renewable Energy Laboratory (NREL)*



Compact and portable, the entire Carter Model 300 turbine assembly can be shipped in standard cargo containers anywhere in the world. The easy-to-transport turbines could supply remote communities with access to low-cost wind energy. *Photo from Carter Wind Turbines*