



## Distributed Wind Competitiveness Improvement Project

The Competitiveness Improvement Project (CIP) is a periodic solicitation through the U.S. Department of Energy (DOE) and its National Renewable Energy Laboratory (NREL). Manufacturers of small- and medium-sized wind turbines are awarded cost-shared subcontracts via a competitive process to optimize their designs, develop advanced manufacturing processes, and perform turbine testing. The goals of the CIP are to make wind energy cost competitive with other distributed generation technologies and increase the number of wind turbine designs certified to national testing standards. Shown here is the Bergey Excel 15 wind turbine, developed through the CIP, which has reduced the cost of energy by 50% compared to the Bergey Excel 10 wind turbine. *Photo by Bergey Windpower*

### Increased Performance and Capability

CIP component innovation awardee Bergey Windpower LLC of Norman, Oklahoma, developed an innovative, concrete-free foundation for its new 15-kW wind turbine (shown above). The foundation will lower the costs of a standard turbine installation by 38%.

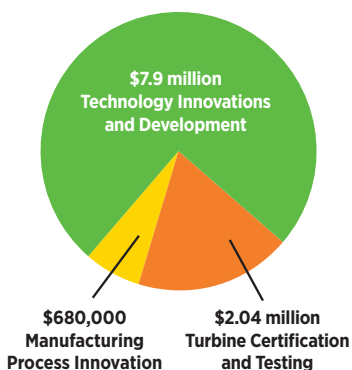
### Reduced Hardware Costs

CIP manufacturing process innovation awardee Pika Energy of Westbrook, Maine, reduced blade costs by approximately 90% by developing an innovative tooling strategy to produce blades using injection-molded plastic.

### Certified Turbine Performance and Safety

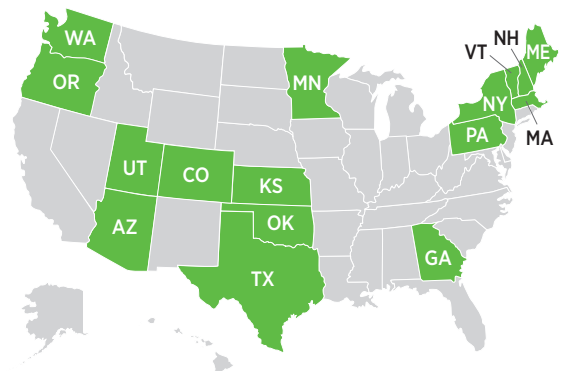
CIP turbine certification testing awardee Primus Windpower of Lakewood, Colorado, achieved turbine certification—third-party verified testing for safety, function, performance, and durability—on two of their turbine models. Bergey Windpower also recently received certification of the new Bergey Excel 15 turbine. Additional CIP awardees are currently conducting certification testing.

Since 2012, NREL has awarded 44 subcontracts to 23 companies, totaling \$10.62 million of DOE funding while leveraging \$5.41 million in additional private-sector investment.



Funding breakdown for three CIP research areas

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| Bergey Windpower (Norman, OK)            | Pika Energy (Westbrook, ME)            |
| Carter Wind Turbines (Wichita Falls, TX) | Primus Windpower (Lakewood, CO)        |
| Ducted Wind Turbines (Potsdam, NY)       | QED Wind Power (Tucson, AZ)            |
| Endurance Wind Power (Seattle, WA)       | Rock Concrete (Augusta, KS)            |
| Intergrid (Temple, NH)                   | Sonsight (Lawrenceville, GA)           |
| Matric Limited (Seneca, PA)              | Star Wind Turbines (East Dorset, VT)   |
| Northern Power Systems (Barre, VT)       | United Wind (Potsdam, NY)              |
| Pecos Wind Power (Somerville, MA)        | Urban Green Energy (New York City, NY) |
|  | Ventura Wind (Duluth, MN)              |



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|-------------------------------------|---|
| Westergaard Solutions (Houston, TX) | Windward Engineering (Spanish Fork, UT) |
| Wetzel Engineering (Lawrence, KS)   | Xflow Energy (Seattle, WA)              |
| Windurance (Coraopolis, PA)         | Xzeres (Portland, OR)                   |



## Why the U.S. Department of Energy Invests in the Competitiveness Improvement Project

Cost reductions, more reliable technologies, and consumer-friendly business models are making distributed generation more accessible to businesses and consumers interested in producing their own electricity. DOE investments in the CIP help support U.S. leadership in distributed wind technologies and advance wind energy as a low-cost distributed generation technology option by 1) reducing technology costs, 2) supporting new product innovation, 3) optimizing wind turbines for distributed applications, and 4) ensuring that distributed energy consumers have wind technology options that are certified for performance and quality.

Small wind generators like this Primus Windpower AIR 40 provide battery charging in remote locations. *Photo from Primus WindPower, NREL 44229*

The CIP has helped advance Intergrid's inverter from concept to reality so that we can meet the needs of U.S. wind turbine manufacturers.

—Robert Wills, President, Intergrid LLC

### CIP Highlight: Intergrid Inverter a Game-Changer for Distributed Wind Industry



Thanks to the CIP, manufacturers of small wind turbines will soon have a certified, off-the-shelf 25-kW power inverter that will change the variable power produced by the turbine's generator into power that can be used by homes and businesses or supplied to the grid. Component innovation awardee **Intergrid LLC** developed the inverter, which meets the latest interconnection standards for distributed wind. Future work on the inverter will be performed under CIP 2020 awards: Matric Limited will develop scale manufacturing for the inverter and Windurance LLC will modify it for deployment on wind turbines with capacities up to hundreds of kilowatts.