

U.S. DEPARTMENT OF
ENERGY

Office of
ENERGY EFFICIENCY &
RENEWABLE ENERGY

Wind for Schools and Workforce Development M15

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National Renewable Energy Laboratory



Turbine repair crew.
Photo from South Dakota WAC



AMERICAN WIND WEEK
Students at Wind Energy Camp.
Photo from Virginia WAC



JMU WAC students wiring a met tower.
Photo from Virginia WAC



FY17–FY18 Wind Office Project Organization

“Enabling Wind Energy Options Nationwide”

Technology Development

Atmosphere to Electrons

Offshore Wind

Distributed Wind

Testing Infrastructure

Standards Support and International
Engagement

Advanced Components, Reliability, and
Manufacturing

Market Acceleration & Deployment

Stakeholder Engagement, Workforce
Development, and Human Use Considerations

Environmental Research

Grid Integration

Regulatory and Siting

Analysis and Modeling (Cross-Cutting)

Project Overview

M15: Wind for Schools and Workforce Development

Project Summary

- Understand current and future wind industry workforce needs and the educational infrastructure to support them.
- Support the development, expansion, and collaboration of university-based wind education programs.
- Provide hands-on, wind-focused educational programming across the educational spectrum (~ages 4–20) to expand interest in and knowledge of wind energy.

Project Objective & Impact

- Inspire and collaborate with teachers and students in wind energy education.
- Equip college students with hands-on wind energy applications and education to provide the growing U.S. wind industry with a highly qualified and competitive workforce.
- Develop state-based centers of excellence for wind energy education.
- Collect and provide empirical data on the U.S. wind workforce to support wind energy development.

Project Attributes

Project Principal Investigator(s)

Ian Baring-Gould

DOE Lead

Jocelyn Brown-Saracino

Project Partners/Subs

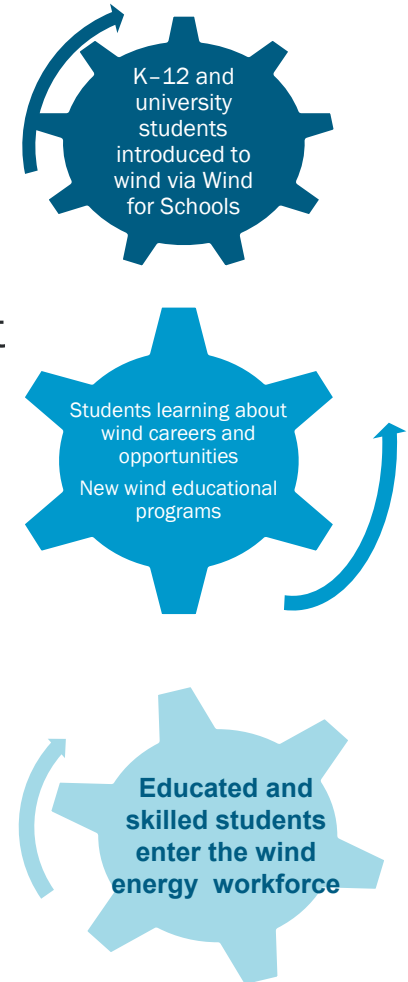
Distributed Wind Energy Association, KidWind Project, National Energy Education Development Project, Wind Application Center universities, North American Wind Energy Academy

Project Duration

Length of project from inception through end of most recently approved Annual Operating Plan Merit Review

Technical Merit and Relevance

- The U.S. wind workforce must be highly qualified to compete in a global energy market. Some U.S. companies are hiring people from Europe because of a perception that European graduates have better wind energy experience.
- DOE's *Wind Vision* and NREL research demonstrate that the U.S. wind industry needs more wind energy education and training programs from kindergarten through graduate school.
- Students and educational institutions often are not introduced to wind energy career options.
- The wind energy workforce lacks diversity. Currently, the industry is made up of approximately 20% women, with little data available on minorities or veterans.
- Many U.S. communities have limited understanding or examples of wind energy.



Approach and Methodology

- **Provide seed funding to university programs** to support hands-on wind energy education and expanded educational collaboration.
- **Catalyze active educational enrichment efforts at the primary and secondary levels** (KidWind and the National Energy Education Development Project) to expand community engagement and early introduction to wind energy.
- **Implement a sustainability effort** to shift the funding burden to non-DOE sources.
- **Collect and disseminate workforce statistics, analyses, and trends** to educate industry and educational stakeholders.



Tony Pirvu (EE) constructed a demo version of a Skystream with used and damaged parts. *Photo from Nebraska WAC*



Engaging students with a wind turbine. *Photo from CSU WAC*

Accomplishments and Progress

Accomplishments

- 60+ university courses and events providing wind and solar education: 800 students engaged
- 90 university students employed or assisting with educational activities
- 124 turbines registered on OpenEI (141 turbines in the Wind for Schools network)
- 190 K–12 schools contacted (primarily an in-person visit; however, substantive phone support also was counted as a contact)
- 70+ K–12 educational lessons and presentations providing wind and solar education: 2,100+ students introduced to wind-energy concepts
- 17 teacher workshops: 270 teachers participated
- 40 outreach activities: 3,700 people engaged

Challenges

- Management and staffing changes handled in collaboration with the WETO
- Implementation of innovative Sustainability Plan (mostly successful)



University of Alaska–Fairbanks Society of Women Engineers. *Photo from Alaska WAC*



MobiLanding dedication at Beech Mountain, North Carolina. *Photo from Brent Summerville, NC WAC*

Accomplishments and Progress

Project Timeline

- Wind for Schools (WfS) was initiated as a pilot project in 2005 and was widely implemented in 2006 with an expansion in 2009. It was shuttered in 2013 and 2014 due to administration priorities but was restarted in 2015, with efforts in 2017 and 2018 to stabilize the Wind Application Centers (WACs) and implement a sustainability plan.
- More general workforce efforts were wrapped up in 2013, with the development and update of the 2014 Wind Energy Workforce report being implemented in 2017 and 2018.
- The North American Wind Energy Academy (NAWEA) Symposium was supported in the summer of 2017, with planning for the 2019 symposium underway.

Slipped Milestones and Schedule

None

Go/No-Go Decision Points

A strong stage gate approach has been used around the development and implementation of a sustainability plan for the WfS efforts, including:

- FY17: Determination of WfS Sustainability Plan implementation, and
- FY18: Determination of exercising option period of implementation of WfS Sustainability Plan.

Communication, Coordination, and Commercialization

- Publications are promoted through effective outreach efforts including the WETO newsletter, WINDEXchange, the NAWEA, industry trade organizations, and other workforce contacts.
- Students are engaged early and often in their educational careers to increase the chance that overall WfS goals are achieved. This stresses the importance of creating a connection, including the following.
 - The OpenEI portal provides a one-stop online shop for the 150+ member schools.
 - The WACs implement various outreach events in the community and other educational venues.
 - The NREL team holds monthly calls with WACs and the expanded WfS team.
 - NREL is developing a promotional brochure, poster, and stickers that can be placed at host schools.
- NREL engages directly with several additional outreach pathways (including Repowering Schools (REpS), the American Wind Energy Association (AWEA) education and workforce committee), and will make use of the newly forming State Consortia to expand outreach to key audiences.

Upcoming Project Activities

- NREL will provide WETO staff with an update of the WfS Sustainability Plan, outlining any changes needed to the WfS Sustainability Plan implementation.
- NREL will continue to work with REpS to strengthen national and state funding of state education programs, freeing up WETO WfS funding for reprogramming to other areas.
- Based on the outcomes of a WfS summit conducted in Q2 of FY19 and other dialog with stakeholders, NREL will develop a broader wind-workforce strategic plan that will expand targeted workforce-related efforts and reduce WfS support.
- NREL will support the implementation of the FY19 NAWEA Research Symposium and TORQUE Conference.

Fundraising Status	
Revenue Category	4-Oct
	4th Q
National 501c3 (Pledged)	\$21,925
Foundations	\$0
Corporations (Non Wind Industry)	\$0
Wind Industry	\$21,500
Individual Donations	\$425
State Consortia (Pledged)	\$ 143,500
Colorado SC	\$ 26,500
NE, VA, SD	\$ 90,000
IL, NC, PA, KS	\$ 27,000
AK, AZ, ID, MT	\$ -

