

Program – Stakeholder Engagement, Outreach, Human-Use Considerations Research & Workforce Development

2019 Wind Program Peer Review

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Wind Office Strategic Priorities

Clean, low-cost wind energy options nationwide

	Land-Based Wind	Offshore Wind	Distributed Wind
Technology Development & Scientific Research	Atmospheric Science & Wind Plant Systems Engineering	Atmospheric Science & Wind Plant Systems Engineering	Atmospheric Science
	Standards and Certification	Standards and Certification	Standards and Certification
	Technology Innovation	Technology Innovation	Technology Innovation
	World Class Testing Facilities	World Class Testing Facilities	
	Tech to Market Commercialization	Tech to Market Commercialization	
	Integrated Systems Design	Integrated Systems Design	
		Offshore Specific R&D Advanced Technology Demo Projects	
Market Acceleration & Deployment	Advanced Grid Integration	Advanced Grid Integration	Advanced Grid Integration
	Workforce and Education Development	Workforce and Education Development	Workforce and Education Development
	Stakeholder Engagement	Stakeholder Engagement	Stakeholder Engagement
	Environmental Research	Environmental Research	
	Siting & Wind Radar Mitigation	Siting & Wind Radar Mitigation	
Analysis & Modeling	Evaluate and Prioritize R&D	Evaluate and Prioritize R&D	Evaluate and Prioritize R&D
	Model Development and Maintenance	Model Development and Maintenance	Model Development and Maintenance
	Techno-economic Analysis	Techno-economic Analysis	Techno-economic Analysis
	Electricity Sector Modeling	Electricity Sector Modeling	Electricity Sector Modeling

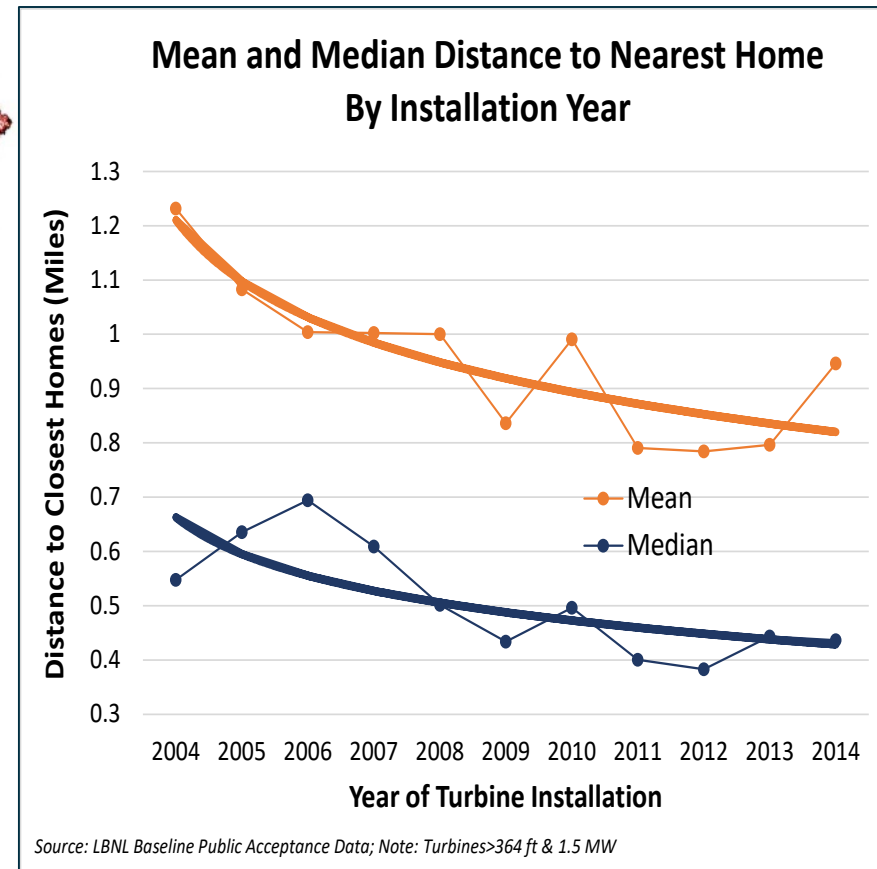
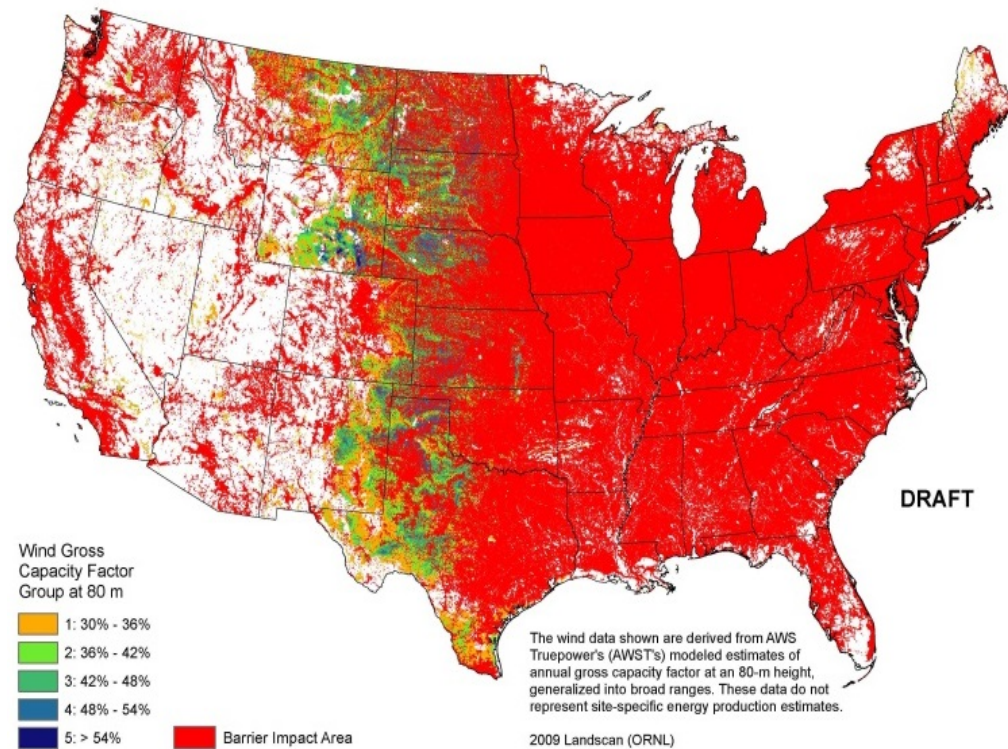
Stakeholder Engagement, Outreach, and Workforce Development

Motivation: Addressing community impacts and ensuring a robust domestic workforce.

The screenshot shows the WINDExchange website homepage. At the top, it features the ENERGY.GOV logo and the Office of Energy Efficiency & Renewable Energy. The main navigation bar includes 'About WINDExchange' and a search bar. Below this, there are several menu items: 'Market Sectors', 'Project Development', 'Technical Assistance', 'Education & Workforce Development', 'Maps & Data', 'Policies & Incentives', 'Publications', and 'News & Events'. The main content area is divided into sections: 'Wind information by state' with a dropdown menu and a map of the US; 'Utility-Scale Wind' with 'Land-Based' and 'Offshore' icons; 'Distributed Wind' with 'Community' and 'Residential' icons; 'Maps & Data' with four map thumbnails; 'Project Development' with four process steps: 'Site Selection', 'Economic Costs & Incentives', 'Wildlife Impacts', and 'Community Impacts'; 'Technical Assistance' with a brief description; 'News' with a recent article; 'Events' with a webinar listing; and 'Publications' with a market report.



What's the Problem?



Land area within 2500 feet of a residence – 1500 feet is a typical setback distance but setbacks range up to nearly 4000 feet

- As wind technology deployment becomes more widespread, opposition is magnified by fear of potential impacts.
- As the easy-to-deploy sites are developed, project costs at sites facing more deployment barriers will increase.
- Without credible sources of information, more initiated projects will be unsuccessful.

Education and Workforce: Program Elements & Focus

The U.S. wind industry continues to grow and employ Americans through education and workforce development programs across the country. **The American wind energy industry currently supports more than 100,000 jobs**, including vital positions such as turbine technicians, researchers, scientists, engineers, trade workers, educators, transportation workers, and workers focused on business and sales

The following DOE activities focus on STEM and Workforce Initiatives:

Collegiate Wind Competition

Introduces students to the primary disciplines within the wind energy industry, including engineering, project management, business, and stakeholder engagement

Prepares students from multiple disciplines to enter the wind energy workforce by providing real-world technology and project development experience.

Wind for Schools

Introduces wind energy education and careers to teachers and K-12 and post-secondary students, supporting the industry's need for a skilled and qualified workforce

Equips college students with hands-on wind energy applications and education to provide the growing U.S. wind industry with a competitive workforce.

Provide workforce analysis to better understand current wind workforce trends and what challenges can be addressed to ensure a readied, domestic workforce.

Stakeholder Engagement, Outreach & Workforce Development: Strategic Approach

Strategic Area	Challenges	Goals	Approach
Stakeholder Engagement and Outreach	<p>Information tool and resource sharing</p> <p>Outreach and Engagement</p>	<p>Data and information sharing.</p> <p>Enable understanding of the economic impacts of wind energy development.</p> <p>Improve understanding through communication products on wind energy deployment and community impacts.</p>	<ul style="list-style-type: none"> • Provide an accessible & relevant platform to share information. • Provide accessible and appropriate tools to understand wind development economics to benefit community knowledge. • Create fact-based, non-biased information that is critical for community impacts considerations and decision-making.
Human Use Considerations Research	<p>Information, Tool, and Resource Sharing</p> <p>Available research on improving understanding of impacts</p>	<p>Engage the academic community and broaden the available social science available on living nearby wind turbines.</p> <p>Enable access to wind energy information through databases and tools.</p> <p>Improve understanding by analysis and modeling i.e. modeling audibility of homes.</p>	<ul style="list-style-type: none"> • Ensuring broad-scale dissemination of results of Public Acceptance Baseline study, funding and initiation of high priority follow-on work. • Release a publically available tool with partners, USWTDB. Continue to further capabilities of tools.
Workforce Development	<p>Timely and relevant workforce analysis</p> <p>Convening partnerships to support educational programming</p> <p>Providing educational programming</p>	<p>Understand workforce trends in the growing wind industry.</p> <p>Bring industry and education institutions together to ID ways in which to facilitate robust workforce of the future</p> <p>Develop a future wind energy workforce through STEM education</p>	<ul style="list-style-type: none"> • Gather data and analyze the current state of the wind workforce • Work closely with industry, as well as KidWind and National Energy Education Development Project • Provide K-12 and university students hands-on educational opportunities that prepare them for the wind workforce

Stakeholder Engagement & Outreach and Human Use Considerations Research: Activities & Accomplishments (FY17-18)

Strategic Area	Accomplishments	Collaborators
<p>Stakeholder Engagement & Outreach</p>	<ul style="list-style-type: none"> ➤ Website Updates to WINDEXchange to ensure technology sustainability and improving the user experience. ➤ Published 2017 State of Wind Development in the United States by Region ➤ Newly released product development on National Farm Broadcasters Association audio interviews, new informational slide decks, and a number of added publications to the database. ➤ A success story developed for each of the 6 Regional Resource Centers to highlight their work in the regions working on issues in the areas of: Federal and Military; Markets and Policies; Siting and Permitting; Transmission and Integration; Wind Energy Education 	<ul style="list-style-type: none"> ➤ Regional Resource Centers; Academia; Other regional wind-focused organizations; National Labs; Federal agencies
<p>Human Use Considerations Research</p>	<ul style="list-style-type: none"> ➤ Public Acceptance Baseline Research (LBNL): Rich set of products; 6 journal papers, multiple conference sessions and webinars (including the Nebraska Wind and Solar conference 2018), and several media hits. ➤ U.S. Wind Turbine Database (LBNL): Launched April 2018 USWTDB is a continuously updated data portal containing the locations and attributes of all wind turbines across the U.S., Data combined from FAA, AWEA, LBNL and USGS, including 58,449 turbines wind turbines from 43 U.S. states, plus Guam, & Puerto Rico. Featured in Vox, the Washington Post, and a number of additional national media features. 	<ul style="list-style-type: none"> ➤ U.S. Geological Survey, AWEA, Resource Systems Group, University of Connecticut, University of Delaware, Medical School of Hamburg

Workforce Development and Education: Activities & Accomplishments (FY17-18)

Strategic Area	Accomplishments	Collaborators
Workforce Development	<ul style="list-style-type: none"> ➤ Held the 2017 Collegiate Wind Competition Technical Challenge in Boulder, CO 	<ul style="list-style-type: none"> • National Renewable Energy Laboratory
	<ul style="list-style-type: none"> ➤ Held the 2018 Collegiate Wind Competition at AWEA WINDPOWER in Chicago, IL and introduced a new wind tunnel that achieves real world max design wind speed (25m/s), incorporates yaw and complex flow, and allows for modularity to accommodate different challenges 	<ul style="list-style-type: none"> • National Renewable Energy Laboratory, American Wind Energy Association
	<ul style="list-style-type: none"> ➤ Initiated a long-term funding strategy for Wind for Schools resulting in a Sustainability plan for future consistent funding mechanisms 	<ul style="list-style-type: none"> • Distributed Wind Energy Association, RePowering Schools
	<ul style="list-style-type: none"> ➤ Provided significant wind educational opportunities, teacher trainings, and resources through Wind for Schools ➤ Conducted a national analysis of wind workforce current and future resources, needs and gaps 	<ul style="list-style-type: none"> • National Renewable Energy Laboratory, KidWind, NEED • National Renewable Energy Laboratory

Stakeholder Engagement & Outreach: Future Priorities (FY19 and beyond)

Strategic Area	Future Priorities	Collaborators
Stakeholder Engagement and Outreach	<ul style="list-style-type: none"> ➤ Finalize Updates to the WINDEXchange state profile pages. ➤ Collaborations to create the first County Economic Development Guidebook. ➤ Updates to JEDI for both land based and offshore wind. ➤ Regional Resource Centers (RRCs) Retrospective Report soon to be released. 	<ul style="list-style-type: none"> ➤ Regional Resource Centers; Academia; Other regional wind-focused organizations; National Labs; Federal agencies
Human Use Considerations Research	<ul style="list-style-type: none"> ➤ U.S. Wind Turbine Database (LBNL): <ul style="list-style-type: none"> ○ And, as of March 2019, the database can now be pinged using Application Protocol Interface or "API" functionality, meaning users can collect info from and query the database directly. This means the data's broad appeal to a variety of users including government, industry, the general public, and international users will continue to increase. ➤ Sound Audibility and Annoyance Modeling (LBNL): Conducting Data Summary Statistics to perform analysis. Datasets include: turbine tip speed, RPM, specific power, and, potentially, adaptive and/or independent pitch control characteristics for each of the project sites to be studied. Additional results of turbine audibility modeling results, to identify potential links between RPM, tip speed, rotor diameter and specific power on turbine audibility and how those relationships might influence setback distances as turbines scale in the future, and inform future DOE R&D priorities. ➤ IEA Task 28 Social Acceptance of Wind (LBNL & NREL): The complexity of social acceptance navigated with international collaboration around definable and useful outputs. 	<ul style="list-style-type: none"> ➤ U.S. Geological Survey, AWEA, Resource Systems Group, University of Connecticut, University of Delaware, Medical School of Hamburg

Workforce Development: Future Priorities (FY19 and beyond)

Strategic Area	Future Priorities	Collaborators
Workforce Development	<ul style="list-style-type: none">➤ The 2019 Collegiate Wind Competition will be held May 6-9 at the National Wind Technology Center in Boulder, CO.➤ DOE announced 12 teams selected to participate in the 2020 Collegiate Wind Competition taking place in June 2020 at AWEA WINDPOWER in Denver, CO➤ Workforce Analysis Report to be released in May 2019➤ Continue towards long-term funding strategy for Wind for Schools with RePowering Schools and Wind Application Centers	<ul style="list-style-type: none">• NREL, AWEA; RePowering Schools, KidWind, NEED, WACs

Stakeholder Engagement, Outreach & Workforce Development: Key Projects Over Time

