

Distributed Wind Portfolio Update

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WINDEXchange

U.S. Department of Energy

Agenda

- Moderator:
 - **Bret Barker**, New West Technologies in support U.S. Department of Energy
- Presentations by:
 - **Bret Barker**, Advisor for Distributed Wind, New West Technologies in support of U.S. Department of Energy, *“U.S. DOE Distributed Wind Portfolio Update”*
 - **Ian Baring-Gould**, Technology Deployment Manager, NREL, *“Wind Regional Resource Centers”*
 - **Robert Preus**, Technical Lead, Distributed Wind Technologies, NREL, *“Small Wind Turbine Site Assessor Guidelines Document”*
 - **Trudy Forsyth**, Managing Director, Wind Advisors Team, *“SMART Wind Consortium Project Introduction”*
- Question & Answer Period
 - To ask a question:
 - Click Q&A at the top of the Live Meeting Window
 - Type your question in the Q&A box
 - Click “Ask” to send question

Upcoming Webinars

Upcoming WINDEXchange Webinars

The third Wednesday of each month at **3:00 pm Eastern**

- January 21, 2015: Wind Turbine Recycling and Repowering
- February 18, 2015: National Development Siting Considerations
(Tentative)
- March 18: National Development Siting Considerations II: Radar
(Tentative)

Offshore Wind Webinar Series

- January 15, 2015: Design Conditions for the Hurricane Metocean Environment

Contact Information

WINDEXchange Stakeholder Education & Outreach Contacts

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Thank You!

Distributed Wind Portfolio Updates

Topics:

- White House & DOE Priorities
- Evolution of Distributed Wind Portfolio
- Request for Information
- Competitiveness Improvement Project
- Turbine Certification Requirements

White House & DOE Priorities

White House

- Generate 80% of the nations' electricity from clean energy sources by 2035
- Reduce carbon emissions 80% by 2050
- Lead the world in clean energy innovation, stimulate jobs and economic growth with a clean energy economy

DOE

- Ensure America's security and prosperity by addressing energy and environmental challenges through transformative science and technology solutions
- Maintain a vibrant U.S. effort in science and engineering as a cornerstone of economic prosperity

EERE

- Invest in clean energy technologies that strengthen the economy, protect the environment, and reduce dependence on foreign oil
- Increase U.S. competitiveness in the production of clean-energy materials and products

WWPTO

- Improve the performance, lower the costs, and accelerate the deployment of innovative wind and water power technologies

The *mission* of the Wind and Water Power Technologies Office is to enable U.S. deployment of clean, affordable, reliable and domestic wind and water power to promote national security, economic growth, and environmental quality.

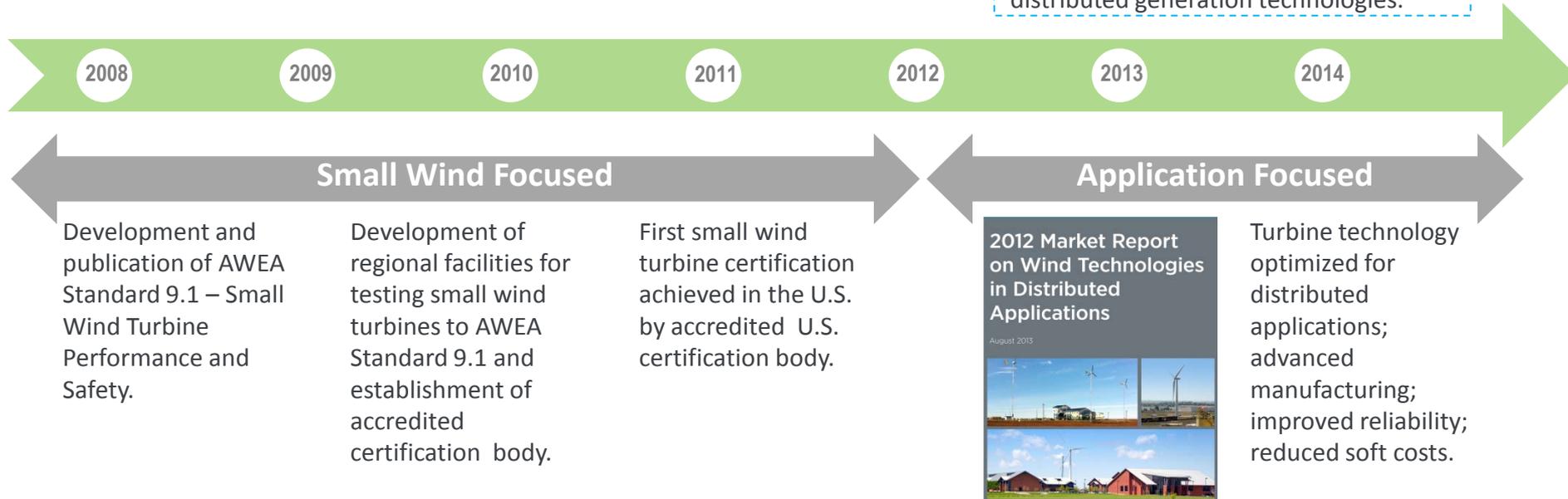
Distributed Wind Portfolio Evolution

Provide national leadership by redefining distributed wind to including all wind technologies used in distributed applications (not just small wind turbines) and establish new R&D priorities.

Goal: By 2015, expand the market for small wind technologies five fold from 2007 baseline.

Goal: By 2020, increase the number of certified small and medium wind turbine models to 40 from 2010 baseline of zero.

Target: DW COE competitive with other distributed generation technologies.



Perspective shift in 2012 required examination of key DW issues – led to increased engagement with industry and stakeholders on factors most affecting adoption of distributed wind systems

Request for Information: Purpose

To inform future activities and priorities by solicit feedback from industry, academia, research laboratories, government agencies, and other stakeholders regarding:

➤ **New national definition for distributed wind.**

- Connected either physically or virtually on the customer side of the meter (to serve on-site load) or directly to the local distribution or micro grid (to support local grid operations or offset nearby loads).
- Typically installed on residential, agricultural, commercial, institutional, and industrial sites.
- Includes wind turbines and projects of many sizes (e.g. 500 watt turbine off-grid at a remote cabin, 10 kilowatt turbine at a farm, one or several multi-megawatt turbines at a industrial facility).

➤ **DOE Distributed Wind Portfolio R&D focus areas.**

1. Turbine Technology
2. Wind Resource Characterization & Assessment
3. Distributed Grid Integration
4. Soft Cost Reduction

52 Respondents

➤ **15 unique responses that address the purpose of the RFI.**

➤ **30 'form letters' supporting 1 consensus response addressing the purpose of the RFI.**

➤ **7 responses that do not address the purpose (soliciting funds or marketing products).**

Request for Information: Takeaways

Strong support for new national definition of distributed wind, no one opposed.

Soft Cost Reduction and Turbine Technology R&D are top priorities.

➤ **Stakeholders see significant potential for Soft Cost Reduction.**

- Especially for smaller systems where soft costs can be equal to or more than hardware.
- Difficult permitting, which is more the rule than the exception, is the largest barrier to market development.
- With over 25,000 zoning jurisdictions in the US, the industry needs support to advance zoning policy.
- DW soft costs are not isolated to permitting and are not as well documented or understood as they are for solar.

➤ **Turbine Technology not optimized, but industry is confident it's headed in right direction.**

- Increased rotor diameters hold great prospects for small and medium wind turbines, however loading is a concern.
- Opportunity to reduce hardware costs of small and medium wind turbines through efficiencies in manufacturing constrained by small batch runs and high upfront cost of advanced tooling and processes.

Stakeholders report Wind Resource Characterization & Assessment areas for improvement, but not top priority.

➤ **Quality of assessment varies greatly based on tool, user, and system size.**

- For smaller DW systems, typically desktop studies using publically available tools and onsite observations are used.
- Very little cost tolerance for resource assessment and siting seen in installers and developers.

Stakeholders suggest Distributed Grid Integration is well understood as a result of increased solar penetration, and requires limited attention from WWPTO.

Competitiveness Improvement Project

U.S. distributed wind industry needs to be revitalized and expanded to maintain leadership in domestic and international small and medium wind turbine markets.

- **Problem:** Unverified, unreliable technology; rising hardware costs; competition from other DG technologies
- **Solution:** Partner with U.S. small and medium wind turbine manufacturers to maximize system performance and reliability, while reducing hardware costs

① Component and Manufacturing Process Improvement

- a) Component and Whole System Optimization (20% cost share)
- b) Manufacturing Process Upgrade (50% cost share)

DW Cost of Energy competitive with retail electricity rates and other DG

② Turbine Testing

- a) Prototype Wind Turbine Testing (50% cost share)
- b) Wind Turbine Certification Testing (20% cost share)

By 2020, increase the number of certified small and medium wind turbines to 40 from 2010 baseline of zero.

- 2013 {
- **2 Contracts Executed**
 - Bergey Wind Power (Topic 1a)
 - Pika Energy (Topic 1b)

- 2014 {
- **5 Contracts Executed**
 - Endurance Wind Power (Topic 2a)
 - Pika Energy (Topics 1a,b)
 - Northern Power Systems (Topics 1a)
 - Urban Green Energy (Topic 2b)

The U. S. Department of Energy's (DOE's) National Renewable Energy Laboratory (NREL) has issued a Special Notice that it will release a request for proposals (RFP) during the first quarter of fiscal year 2015 (by December 31, 2014).

Certification Requirements

Adoption of distributed wind systems has been hindered by untested technologies, unverified claims about turbine performance, and high-profile equipment failures.

The U.S. DOE encourages you to seek out turbines certified for safety and performance by an accredited U.S. certification organization.

The U.S. DOE Wind Program has issued a guidance memo on quality assurance to 17 federal agencies encouraging that public funds only be expended on certified machines.

Certification and quality assurance requirements can help prevent unethical marketing and false claims, and can be adopted by local planning officials, utilities, banks, state energy offices, and federal agencies to ensure consumer protection and industry credibility.

As of November 2014, thirteen small wind turbine models are fully certified to the AWEA Standard with power performance ratings, sound level ratings and design and duration test compliance, and 2 medium wind turbine models have certified power performance and acoustics reports from accredited U.S. certification organizations.

Interstate Renewable Energy Council (IREC) now houses a list of certified small wind turbines:
<http://www.irecusa.org/credentialing/certified-small-wind-turbines/>.

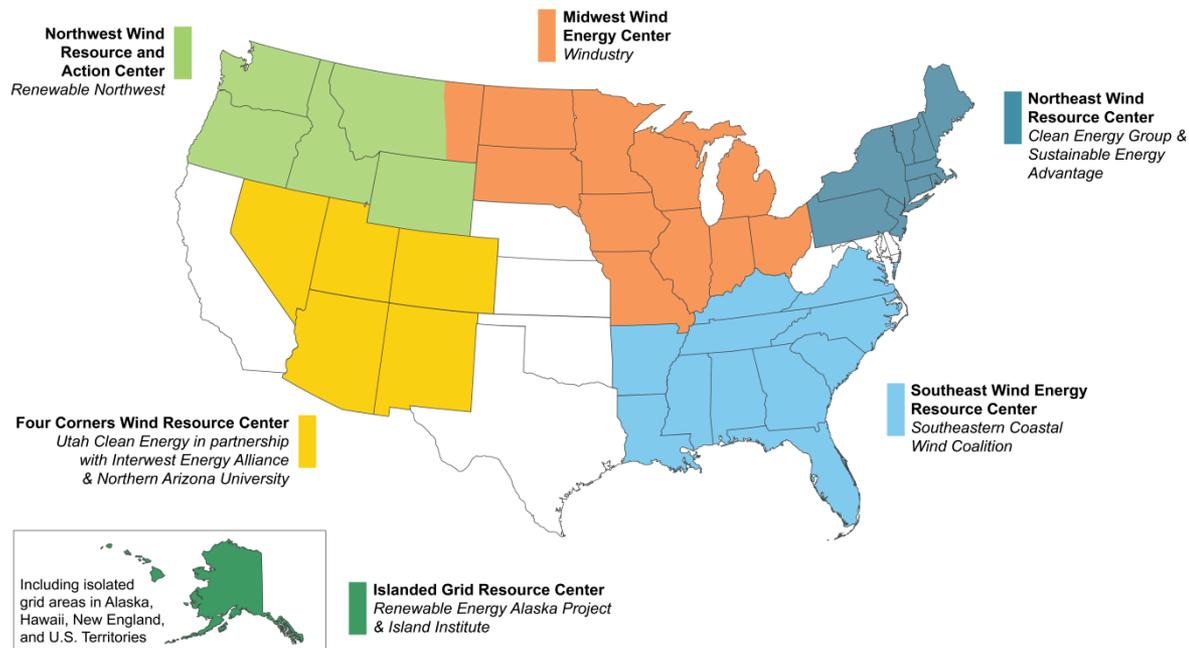
Regional Resource Centers

Provide direct engagement with states on regional wind deployment issues

- Provide technical expertise and tools, ensuring smart and informed decision-making.
- Conduct regional outreach on key challenges, hosting meetings, trainings, and other direct outreach.
- Form working groups on issues relevant to that region and messaging specific to states within that region

RRCs will prioritize activities to those promising the largest regional impact.

- Maximize the local implementation of national outreach priorities.
- Work with regulators and decision makers, providing science-based information.
- Educate communities about the impact of wind development (e.g., JEDI).
- Provide DOE guidance on issues and regional priorities, to inform national priorities.



Web Address: <http://wind.energy.gov/windexchange/>



Energy Efficiency & Renewable Energy

Northeast Wind Resource Center

Clean Energy Group (offshore) and Sustainable Energy Advantage (land based)



Identified Challenges:

Landscape is complex as it varies by state but includes regulatory complexity, legal complications, unclear policy frameworks, DW project economics and costs, project siting, and public acceptance

Specific Activities:

- Revive regional stakeholder engagement organizations including WWG's, NEWF and NEWEEP to create a partner network
- Implement an information clearinghouse to contain house published information on a host of siting related issues
- Conduct public acceptance outreach including local workshops, presentations, a regional focused web site, training and engagement with local media

Midwest Wind Energy Center

Facilitated by Windustry



Identified Challenges:

- Public acceptance and a lack of informational resources
- Local decision makers that lack knowledge and resources to make informed decisions on wind development
- Fragmented utility market with many small municipal utilities

Specific Activities:

- Provide basic education and objective information around wind energy
- Facilitate and improve state and local planning, permitting, siting and policy for wind energy
- Conduct outreach and support educational activities to state and local decision makers
- Expand multi-state dialog around wind energy

Four Corners Wind Resource Center

Implemented by the Utah Clean Energy Alliance, Interwest Energy Alliance, and Northern Arizona University



Identified DW Challenges:

- Many installations are cost-prohibitive in comparison to grid power.
- Inability of the general public to accurately estimate the cost/benefit.
- Local ordinances limitations, especially on small property parcels.
- Utility or local regulations preventing the installation of a community-scale turbine unless it serves only one user.
- A general lack of information on distributed wind

Specific Activities:

- Implement a Regional Wind Working Group
- Develop a regionally focused web presence
- Educate state public utility/service commissions, other utility regulatory agencies, and utilities with up-to-date wind data and information
- Educate state, local, and tribal stakeholders and contribute to drafting processes for wind permitting ordinances and energy development plans
- Provide accurate information to members of the public

Islanded Grid System Center

Renewable Energy Alaska Project & Island Institute – very strong focus on community wind

Identified DW Challenges:

- Technology availability and integration
- Lack of wind resource information and other data
- Larger project permitting
- Project financing & development models
- Project management and long term O&M support

Specific Activities:

- Operating best practices for off grid power systems
- Connect technical experts with islanded grid operators
- Connect operators with existing wind systems to technical experts and to decision makers
- Ensure decision makers are actively engaged and aware of where to get good information about wind
- Connect Affiliate groups and Partner Organizations with the RRC to encourage collaboration and information sharing of those working with islanded grid systems

Northwest Wind Resource and Action Center

Renewables Northwest (Lead), Northwest SEED (DW)
and Oregon Department of Energy (Offshore)

Identified Challenges:

- Constrained markets, especially with low cost PV and low cost power
- Poor examples of operating systems and negative public perceptions
- Wind assortment of permitting processes across jurisdictions
- Need for improved financing packages for small and community projects

Specific Activities:

- Distributed/community wind advisory group / regional wind working group
- Providing fact-based information to counteract any negative misperceptions about distributed wind technology
- Implementing permitting and zoning best practices in targeted jurisdictions
- Promoting information on current financing options
- Provide testimony when possible at state PUC hearings

Southeast Regional Resource Center for Wind Energy

Lead by the Southeastern Wind Coalition and a host of other organizations including NC State University and James Madison University



Identified DW Challenges:

- Limited current market
- Limited understanding of market potential
- Limited ordinances and ordinance experience

Specific Activities:

- Activities focused around State specific work with focus on VA and NC currently.
- Very limited regional activities due to the state of the market.