July 2019

IEA Wind TCP Task 41

Distributed Wind Task Overview
IEA Wind TCP Task 41
Enabling Wind to Contribute to a Distributed Energy Future

Task Overview

July 2019
The International Energy Agency Cooperation in the Research, Development, and Deployment of Wind Energy Systems
How Does Task 41 Define Distributed Wind?

- **Wind turbines connected at a distribution voltage (nominally 70 kV or lower) in a behind-the-meter, in-front-of-the-meter, or off-grid application.**

- **Distributed wind is inclusive of all sizes of wind turbines and is agnostic to business model.**
Wind energy technologies (of all size classes) are used as distributed energy resources on the distribution grid, on the customer side of the meter, or at an isolated off-grid location to support local loads or grid operations. Distributed wind systems are often used to self-generate power in remote communities or offset a portion of energy costs for grid-connected retail power customers.
Task Motivation: Costs

- There have been large cost reductions in distributed energy resources, such as solar PV and energy storage, but limited cost reductions in turbine technologies less than 1 MW in size used in distributed and remote applications.
Task Motivation: Evolution of the Grid

- There are large potential distributed energy resource markets across the globe, particularly as grids evolve and the need for low-cost clean energy expands.
  - Distributed energy resources provide expanded grid diversity and resiliency.
  - There is expanded potential for distributed energy resources in areas of the world with weak transmission networks.
  - There is huge potential in energy access markets in developing nations (US$113 billion through 2030) and for isolated energy systems (micro-grids), both of which are currently dominated by solar PV.
From grid-following controls

The idea of what constitutes a grid is changing, especially in places with limited existing transmission infrastructure.
Task 41 Goals

• Enable wind technology as an economically competitive and reliable distributed energy resource option.

• Expand collaboration around and understanding of wind technologies as a distributed energy resource.
IEA Wind TCP Task 41 Work Packages

- WP1: Progressing Distributed Wind Technology Design Standards for Small and Mid-Size Wind Turbines
- WP2: Data Information Catalog
- WP3: Expand Learning and Support of the Integration of Distributed Wind into Evolving Electricity Systems
- WP4: Outreach and Collaboration with Other R&D Activities
- WP5: Innovation and Downscaling of Utility-Scale Technology
Work Package 1: Standards

Support distributed wind technology design standards for small and mid-size wind turbines to allow for accelerated innovation and improved consumer confidence

- Convene industry stakeholders to identify issues with current standards as they relate to small and mid-size turbines in distributed wind installations through forums in the United States, Europe, and Asia.
- Report on recommendations for potential changes to the existing standard IEC 61400-2.
Work Package 2: Data Catalog

Develop an information-sharing catalog for distributed wind research and data

- Identify potential data contributors and users; what shared resources are needed; what data are available on key topics; and recommended practices for data collection, reporting, accessing, and storage.

- Catalog and make available metadata about distributed wind data sets so researchers can contact data owners directly about using the data.

- Consider including a catalog of data processing tools and decision support tools.
Work Package 3: Integration

Work with distributed wind and distributed energy resources industry players to expand integration of wind into grid and off-grid power systems for expanded controllability, cybersecurity, and advanced grid services

• Develop a best practice guide for the design of isolated power systems.
• Report on state of the industry for isolated microgrid power systems.
• Research the value wind can provide in supporting high variable renewable grids.
• Review how wind is represented in distributed grid and microgrid systems tools and models.
• Summarize national and international electrical standards to support external standards development.
Work Package 4: Outreach and Collaboration

Support expanded collaboration with ongoing research efforts and with the wider distributed energy resources community

- Identify and engage with industry and government research efforts.
- Expand engagement with other distributed energy resources industries (PV, storage, grid) to expand understanding of wind, including in areas such as energy access, energy system resiliency, and community power.
- Help define and coordinate larger distributed wind research and encourage opportunities for research collaboration.
- Engage with other IEA tasks that can inform Task 41.
Work Package 5: Down-scaling

Expand collaboration and research on utility-scale technology innovation for applicability to reduce lifecycle costs of energy (LCOE) for small and mid-sized turbines

• Assess advances in cost reductions and performance enhancements at utility scale for application to small and mid-size wind turbine technology
• Summarize international LCOE cost reduction roadmaps
• Share LCOE reduction best practices and experiences
Participants

U.S. Department of Energy; National Renewable Energy Laboratory; Pacific Northwest National Laboratory

CIEMAT

Chinese Wind Energy Association, China General Certification; Goldwind; Inner Mongolia University of Technology

Natural Resources Canada

Denmark Technical University; Nordic Folkecenter for Renewable Energy

Dundalk Institute of Technology

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New Energy and Industrial Technology Development

Windtak
Thank You!

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