IEA Wind TCP Task 41

Enabling Wind to Contribute to a Distributed Energy Future

Photo courtesy of Aegis Renewable Energy, Waitsfield, VT

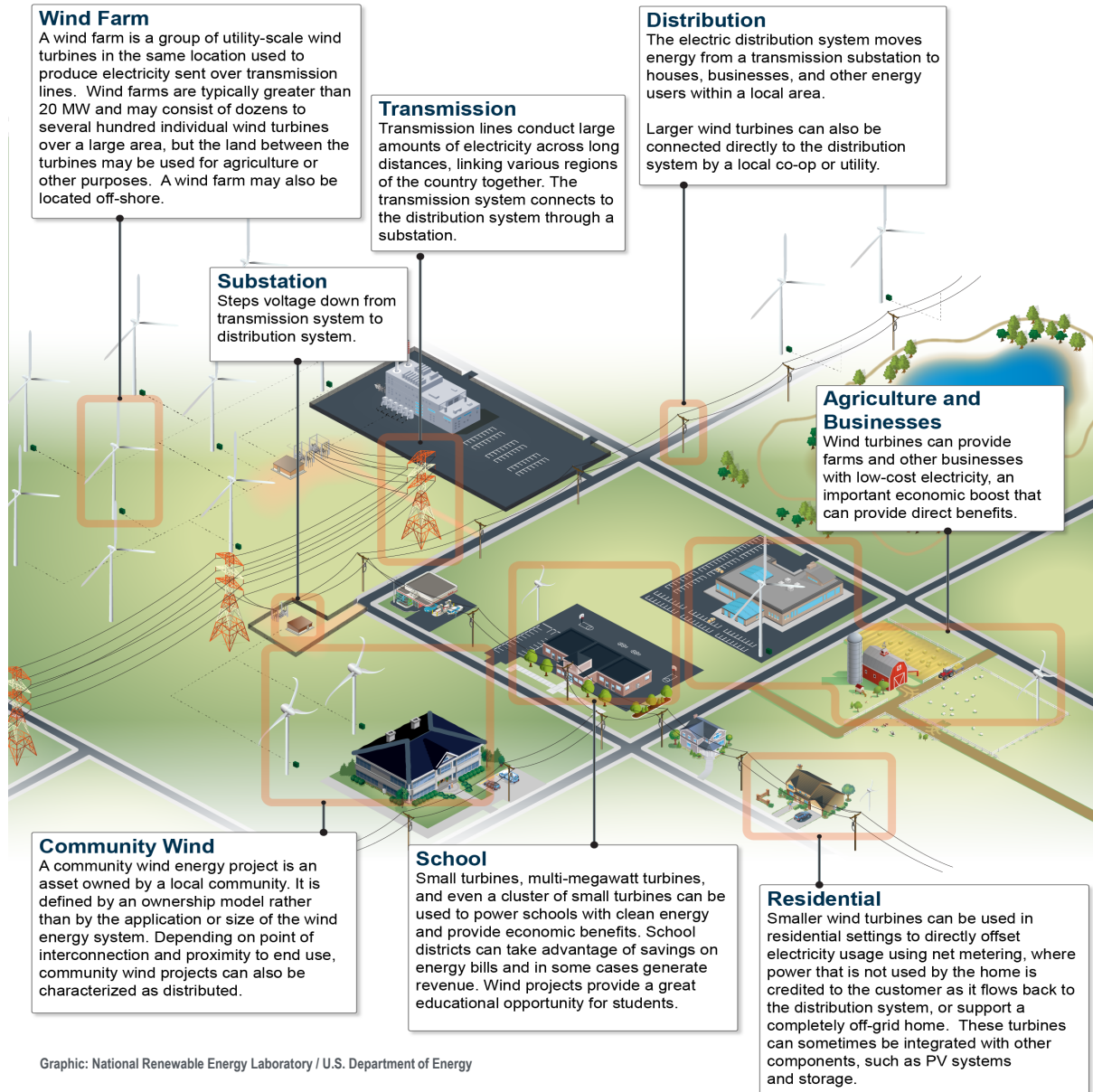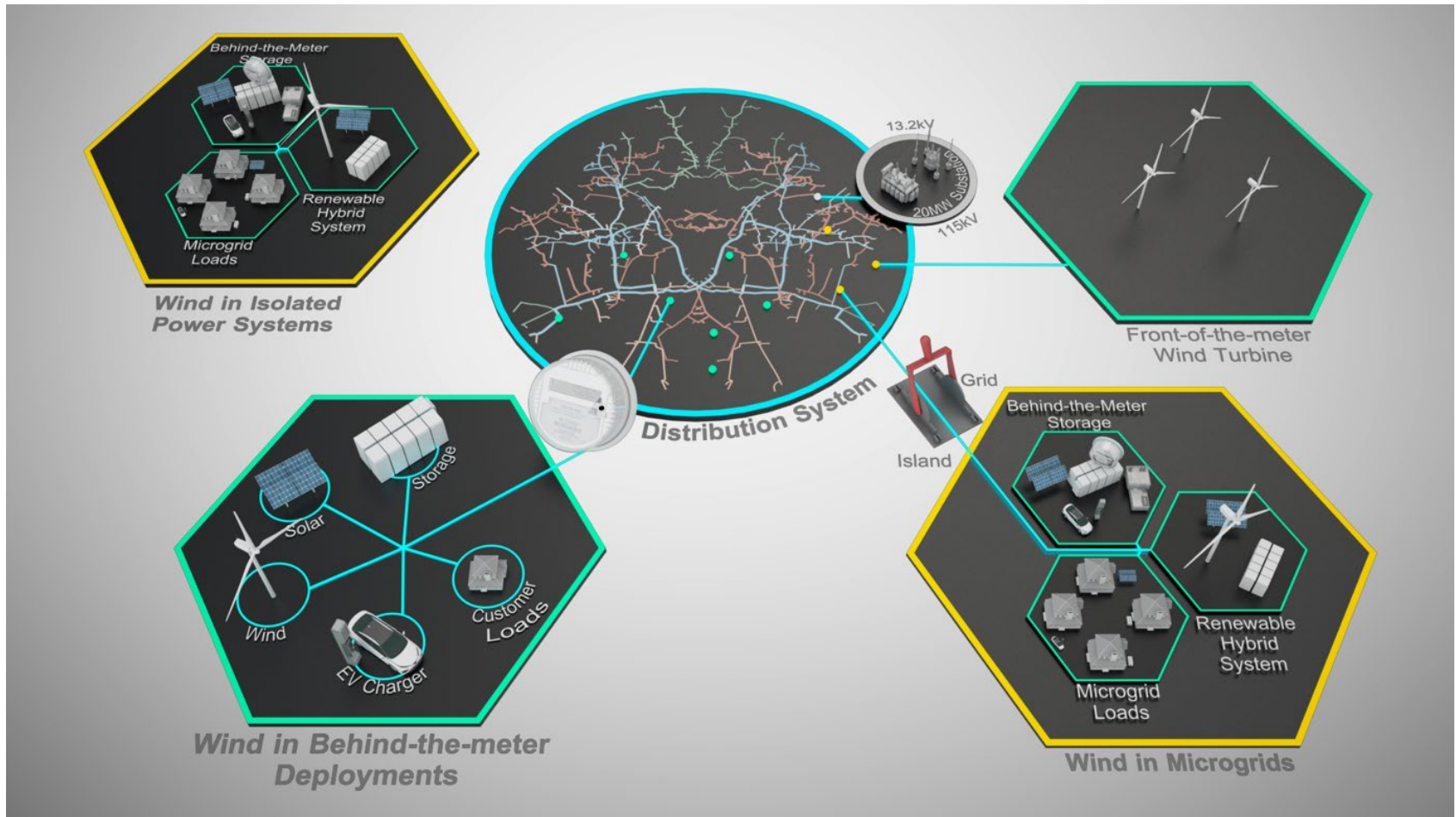**Ian Baring-Gould - Co-Operating Agent**

Ian.Baring-Gould@nrel.gov

https://iea-wind.org/task41/

iea wind

How Does Task 41 Define Distributed Wind?

Wind Farm
A wind farm is a group of utility-scale wind turbines in the same location used to produce electricity sent over transmission lines. Wind farms are typically greater than 20 MW and may consist of dozens to several hundred individual wind turbines over a large area, but the land between the turbines may be used for agriculture or other purposes. A wind farm may also be located off-shore.

Transmission
Transmission lines conduct large amounts of electricity across long distances, linking various regions of the country together. The transmission system connects to the distribution system through a substation.

Substation
Steps voltage down from transmission system to distribution system.

Distribution
The electric distribution system moves energy from a transmission substation to houses, businesses, and other energy users within a local area.

Larger wind turbines can also be connected directly to the distribution system by a local co-op or utility.

Agriculture and Businesses
Wind turbines can provide farms and other businesses with low-cost electricity, an important economic boost that can provide direct benefits.

Community Wind
A community wind energy project is an asset owned by a local community. It is defined by an ownership model rather than by the application or size of the wind energy system. Depending on point of interconnection and proximity to end use, community wind projects can also be characterized as distributed.

School
Small turbines, multi-megawatt turbines, and even a cluster of small turbines can be used to power schools with clean energy and provide economic benefits. School districts can take advantage of savings on energy bills and in some cases generate revenue. Wind projects provide a great educational opportunity for students.

Residential
Smaller wind turbines can be used in residential settings to directly offset electricity usage using net metering, where power that is not used by the home is credited to the customer as it flows back to the distribution system, or support a completely off-grid home. These turbines can sometimes be integrated with other components, such as PV systems and storage.

Graphic: National Renewable Energy Laboratory / U.S. Department of Energy

- 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.

Task 41: Distributed Wind Use Cases

Task Objectives and Expected Results

Project Objectives and Outcomes

- Expand international collaboration to lower the costs and deployment barriers for distributed wind technologies
  - Update domestic and international distributed wind turbine standards
  - Develop research and data catalog for distributed wind
  - Publish state-of-the-industry report on the integration of distributed wind systems
  - Identify downscaling opportunities for distributed wind

- Promote expanded engagment in the wider distributed energy research and deployment markets
  - Produce best practice guide for high-renewable-contribution isolated power systems
  - Expand collaboration across IEC TCPs on wind deployment and integration

Target Audience

- Wider distributed wind and distributed energy industry
- IEA wind and wider TCP research efforts
- Domestic and international investment and development community

Term: Jan 2019-Dec 2022. Working on Extension 4-year extension (2026)

Work Package Overview

WP0: Management and Coordination

- International distributed wind university research collaboration

WP1: Characterization, Testing and Loads for Distributed Wind Standards Development for Small- and Mid-Size Wind Turbines

WP2: Human Dimensions of Distributed Wind

WP3: Integration of Distributed Wind

- Isolated hybrid power systems (less than 1MW)
- Front or behind the meter integrated power systems

WP4: Global Outreach and Collaboration

WP5: Design Collaboration for Distributed Wind