

# National Distributed Wind Network

Network Launch  
March 14, 2024

**S**TRATEGIZE  
**E**NGAGE  
**N**ETWORK  
**D**EPLOY  
*Distributed Wind*



**Pacific Northwest**  
NATIONAL LABORATORY



PNNL-SA-195872

*Photo by Dennis Schroeder / NREL*

# Welcome

Dr. Becca Jones-Albertus

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Acting Deputy Assistant Secretary for  
Renewable Energy,  
U.S. Department of Energy

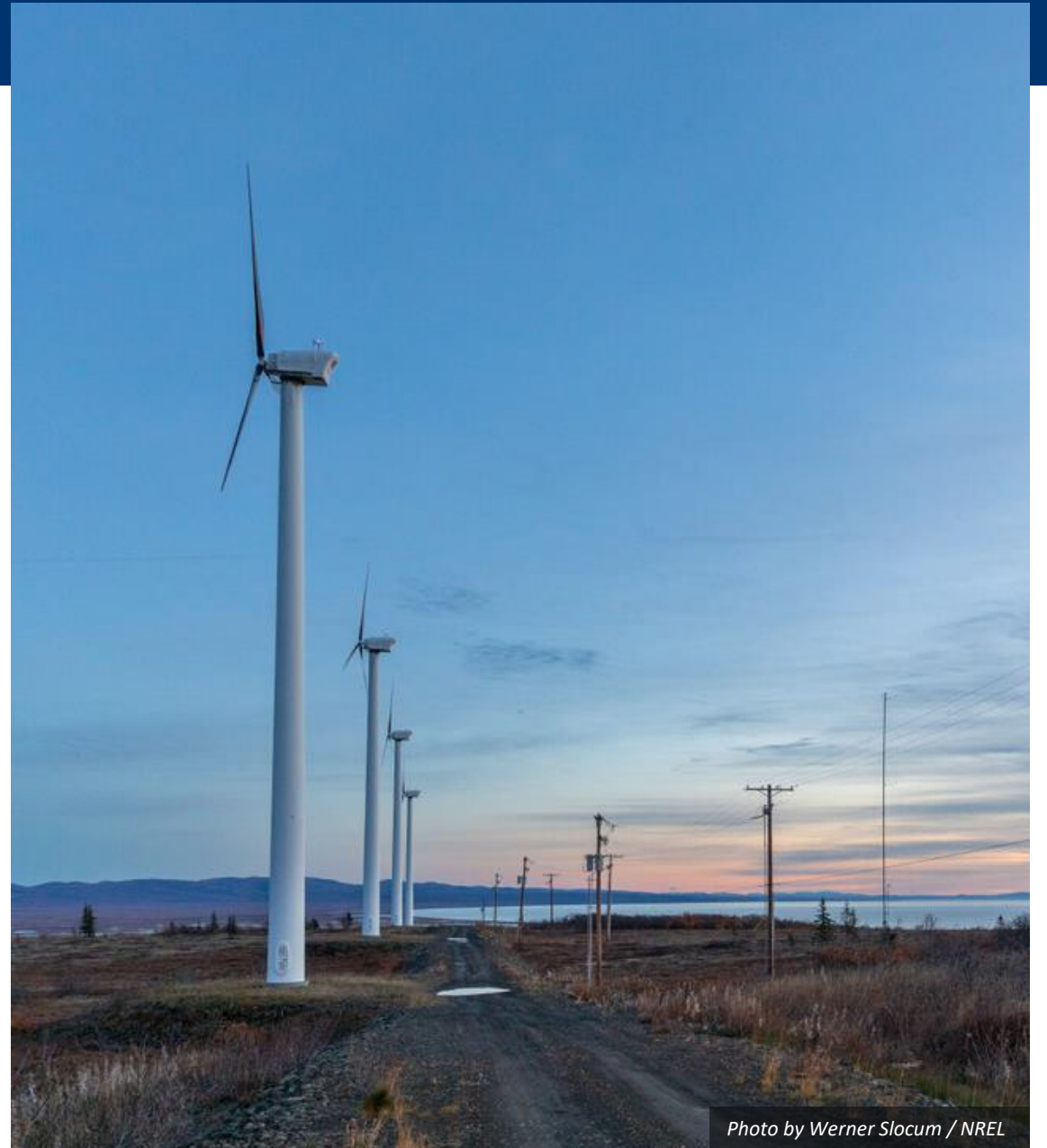


U.S. DEPARTMENT OF  
**ENERGY**



# Today's Agenda

- Welcome
- Overview of Distributed Wind
- Distributed Wind Bright Spots
- National Network Resources & Support
- Q&A



*Photo by Werner Slocum / NREL*

**What is distributed wind?**

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# Wind as a Distributed Energy Resource

- Distributed energy resources are technologies used to generate, store, and manage energy consumption for nearby energy customers
- Examples include:
  - Rooftop solar photovoltaics
  - Wind turbines
  - Battery storage
  - Batteries in electric vehicles that can export power back to the grid
- A wind turbine used as a distributed energy resource — also called **distributed wind** — is connected at the distribution level of an electricity delivery system (or in off-grid applications) to serve on-site energy demand or to serve local loads on the same distribution system



# There are four main applications for distributed wind deployments

These applications have different technical needs as well as different economic and value considerations



Photo Credit: Northern Power Systems

**As part of an isolated system** that is not connected to the rest of the electrical grid.  
Toksook Bay, Alaska, USA



Credit: Hand Doster, One Energy Enterprise LLC

**Installed on-site** to power a farm, business, or home.  
Ball Corporation, Findlay, Ohio, USA



Photo Credit: Michael Penev/ NREL : 27447

**Paired with solar, battery storage, or other technologies** in a hybrid system to provide expanded grid services. NREL, Golden, Colorado USA.



NREL: 57714

**As part of a small wind farm** to provide power for a nearby community.  
Kaupuni Village, Hawaii, USA

# Wind Turbine Sizes

Distributed wind turbines can provide electricity for all types of customers



Photo from Bergey Windpower Co. Inc., NREL

## Small ( $\leq 100$ kW)

Homes  
Farms  
Remote applications (e.g., water pumping, telecom sites, ice making)



Photo from Tjaden Farms, NREL 13764

## Mid-scale (100–1,000 kW)

Village and hybrid power  
Community and distributed power  
Small commercial and industrial applications



Photo from Native Energy Inc., NREL 7593

## Large, land-based (1–3 MW)

Large commercial and industrial deployments  
Large distributed power  
Utility-scale wind farms



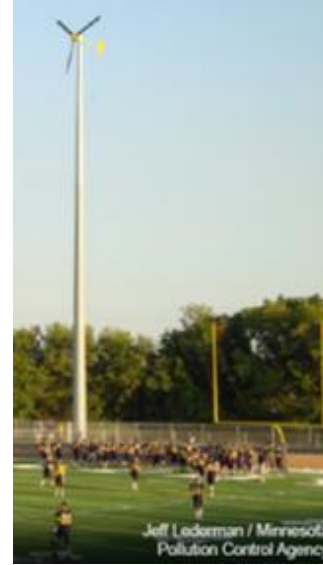
Photo from HC Sorensen, NREL 17855

## Large, offshore (3–7 MW)

Utility-scale wind farms, shallow coastal waters with transition to deep water

# Distributed Wind Customers

- **Agricultural** (farms, ranches, nurseries, vineyards)
- **Residential** (remote cabins, rural homesteads, suburban homes, multifamily dwellings)
- **Commercial** (office buildings, car dealerships, restaurants, distribution centers)
- **Industrial** (food processing plants, manufacturing facilities, mines)
- **Government** (federal agencies, municipal facilities, military sites, tribal governments)
- **Institutional** (schools and universities, houses of worship, local unions)
- **Distribution utilities** (investor-owned, publicly-owned, tribal-owned, and rural electric cooperatives)



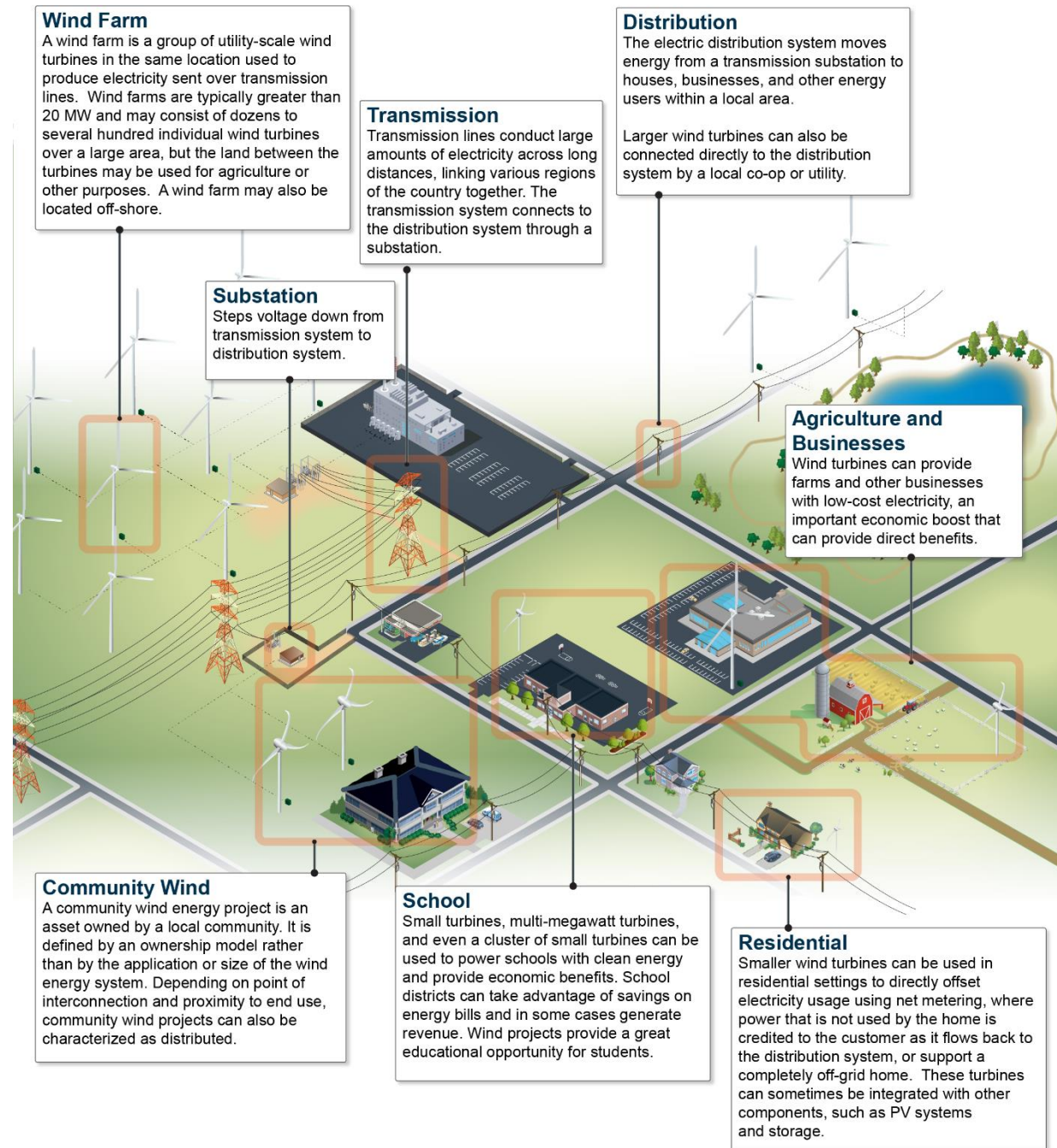


**Why should we be thinking  
about distributed wind?**

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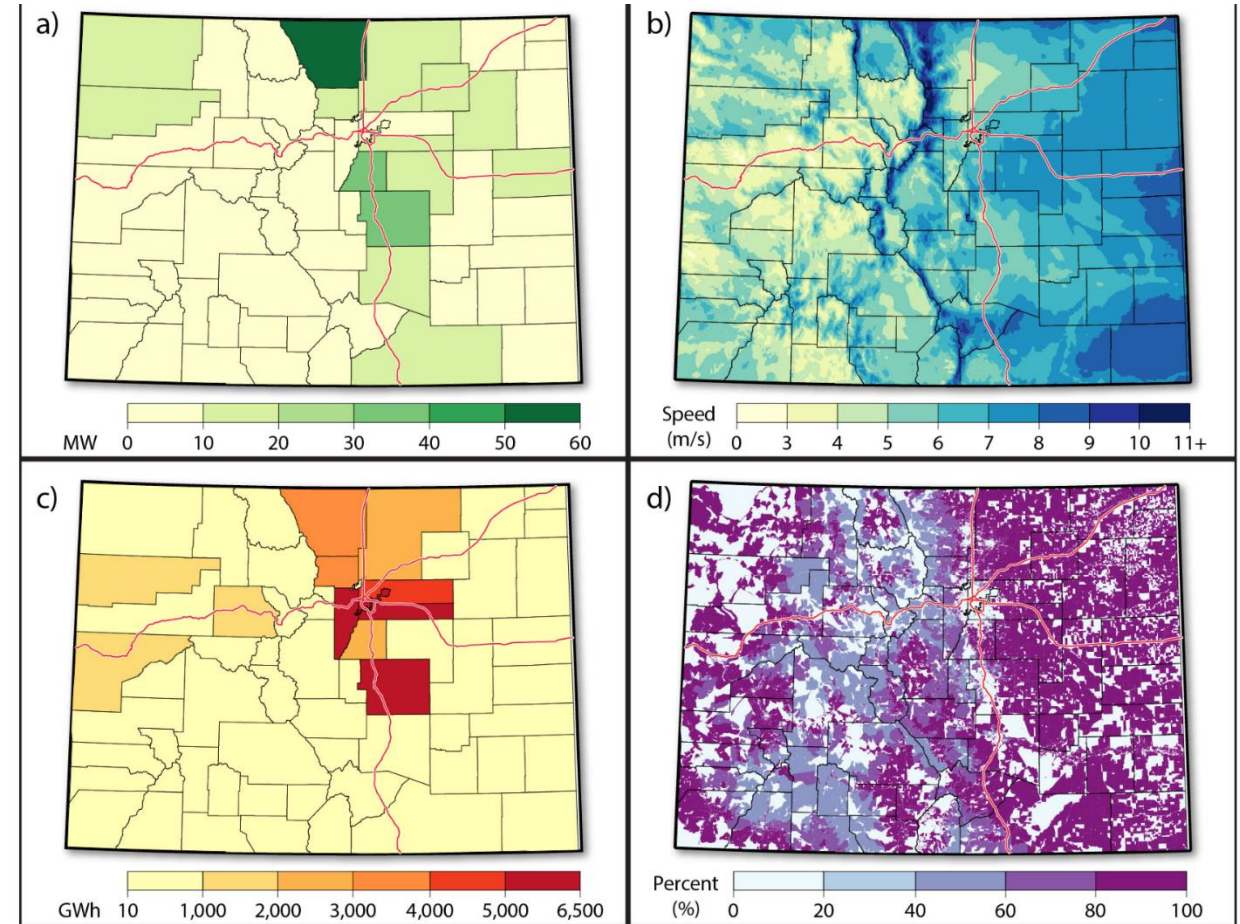
# There are many ways to use distributed wind technologies

There is no one-size-fits-all solution; we need renewables deployment in many applications to meet current and future needs



# Distributed wind economic potential differs from those for wind farms

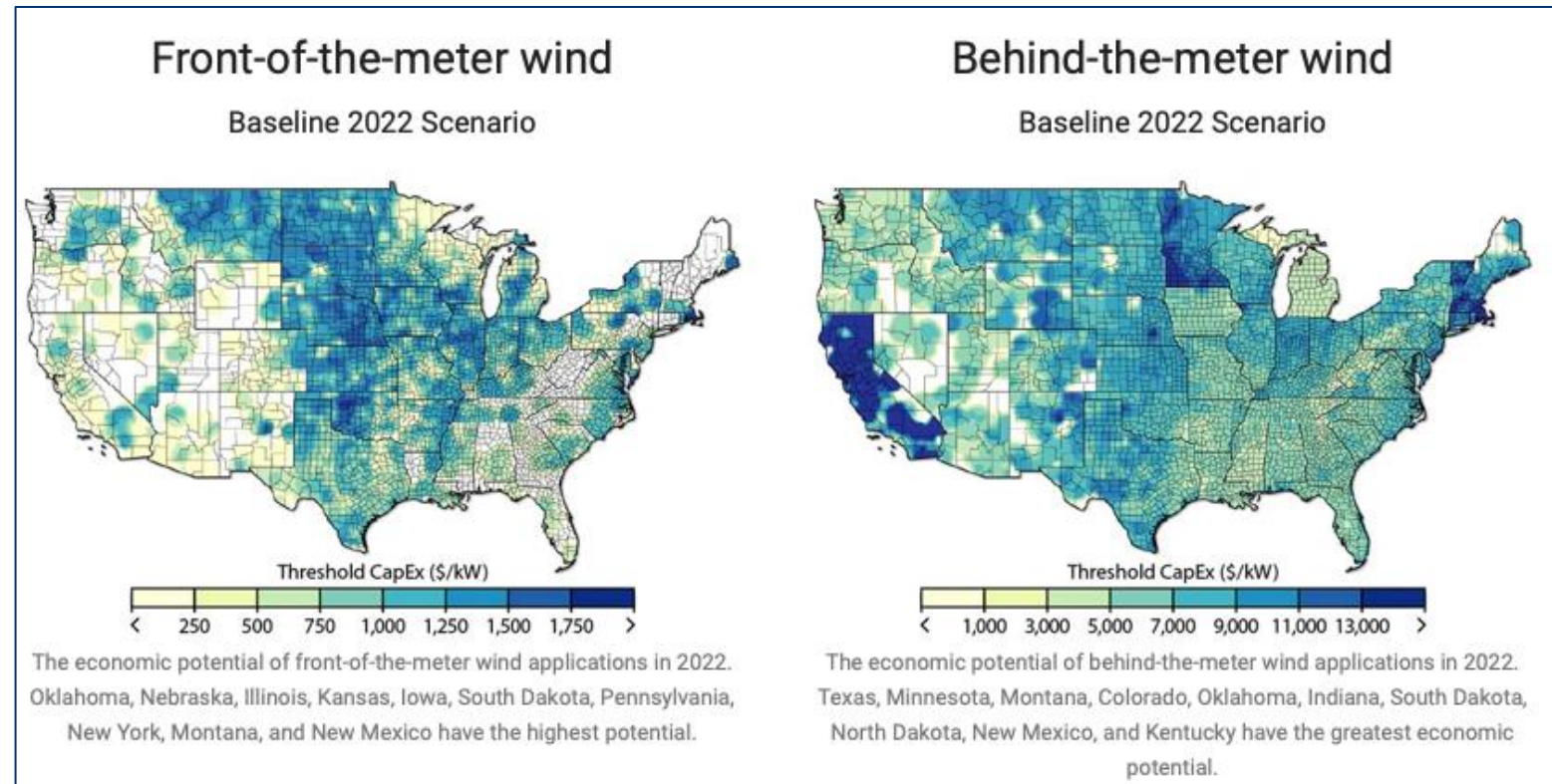
Areas with good wind resource, addressable siting requirements, development areas and access to the grid or local loads have strong potential for wind development



Potential distributed wind development installations (upper left) is driven by wind resource (upper right), electricity costs (lower left), and lot size of potential users (lower right).

The United States currently has the potential to profitably deploy hundreds of gigawatts (GW) of distributed wind energy capacity

This capacity equates to more than half of the nation's current annual electricity consumption



Distributed wind deployments in front-of-the-meter (wholesale) and behind-the-meter (retail) have extensive national potential, even at current electricity rates.

# Distributed wind technologies are also seeing steady cost reductions

Recent federal legislation further reduces costs – in some cases up to 90% capital cost subsidies

Working with the Department of Energy, companies are providing a wide range of turbine options with unsubsidized costs between 40.0¢/kWh (for under 1kW) to 7.0¢/kWh for large turbines (300 kW).



Credit: Primus WindPower, / NREL 44229



Credit: Bill Schwankl, Alternative Energy Services



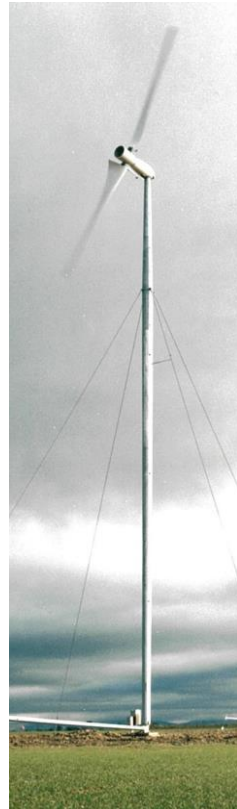
Credit: Dennis Schroeder / NREL 49381



Credit: QED Wind Power



Credit: Eocycle



Credit: Carter Wind Turbines

The distributed wind industry has also developed a rigorous certification process to help ensure turbine reliability

# Unprecedented Policy Support

## Infrastructure Investment and Jobs Act, \$1 trillion Bipartisan Infrastructure Law:

- Provides \$100M for Wind Energy R&D in addition to annual appropriations
  - Distributed wind focus on addressing permitting and interconnection process innovation and assistance
- Establishes new DOE Office of Clean Energy Demonstrations
  - Provides \$1B for demonstrating Energy Improvements in Rural and Remote Areas

## Inflation Reduction Act, \$370 billion included to address climate change:

- Provides long-term clean energy policy and incentives
  - Includes additional \$2.025B for the USDA Rural Energy for America Program (REAP) with specific focus on underutilized technologies, including distributed wind
- Leveling and expanding tax incentives
  - Leveling Investment Tax Incentive (ITC) to include commercial applications of distributed wind
  - Direct pay option of credits for tax-exempt applicable entities

# Distributed Wind Benefits & Characteristics

- People use distributed wind to:
  - Offset potentially volatile retail or wholesale electricity costs
  - Support local loads and grid operations
  - Provide energy security and resilience
  - Provide electricity to remote locations not connected to the existing electricity network
  - Meet renewable energy goals and mandates
  - Provides a method to deploy large amounts of wind energy quickly, bypassing transmission constraints
- Key characteristics of distributed wind include:
  - Small footprint that enables land co-use
  - Different seasonal and daily resource availability compared to solar technologies
  - Fast and easy deployment
  - High domestic content with potential for local manufacturing
  - Different grid operational characteristics



*Photo by Brent Summerville / NREL*

# Distributed Wind Bright Spots

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# Distributed Wind Bright Spots

## USDA Perspective

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Clare Sierawski, Office  
of the Under  
Secretary for Rural  
Development



## Agricultural Perspective

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John Hansen,  
Nebraska Farmers  
Union



## Local Government Perspective

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Deb Perry,  
International City/  
County Management  
Association



## Industry Perspective

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Padma  
Kasthurirangan,  
Buffalo Renewables



# Distributed Wind Bright Spots

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Development





# Clare Sierawski Senior Counselor for Rural Energy

# USDA DOE RAISE INITIATIVE

## **RURAL AND AGRICULTURAL INCOME & SAVINGS FROM RENEWABLE ENERGY (RAISE) INITIATIVE**

- ❑ Collaboration Effort Between USDA & DOE
- ❑ Goal to Assist 400 Farmers to Cut Costs & Increase Income
- ❑ Creating Jobs & Energy Independence for Rural Communities
- ❑ Focused on Underutilized Technologies (Wind, Geothermal, Hydropower, Biomass-Based)

# USDA DOE RAISE INITIATIVE

## RURAL DEVELOPMENT REAP FUNDING

- ❑ \$144.75 Million Technical Assistance REAP Grant Funding  
[Technical Assistance Awards | Rural Development \(usda.gov\)](#) - FY23 TAG Recipients
- ❑ Rural Energy for America Program Renewable Energy Systems & Energy Efficiency Improvement (REAP) Loans & Grants  
[Rural Business-Cooperative Service State Energy Coordinators \(usda.gov\)](#) – State Energy Coordinators

# Distributed Wind Bright Spots

## Agricultural Perspective

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John Hansen,  
Nebraska Farmers  
Union



# Distributed Wind Bright Spots

## Local Government Perspective

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Deb Perry,  
International City/  
County Management  
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# Distributed Wind Bright Spots

## Industry Perspective

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Padma  
Kasthurirangan,  
Buffalo Renewables





# Industry Perspective



**BUFFALO**  
RENEWABLES INC.

- Mid-size distributed wind and solar PV project development, installation and maintenance company
- Turnkey systems provider
- Target Customers – mid to large farms, rural small businesses, commercial and industrial sites



# Triad Recycling & Energy – Now Casella Waste Management System

- Zero landfill recycling facility
- WT1 installed in December 2016
  - Funded by NYSERDA
  - 30% investment tax credit (ITC)
- Industrial zoning
- Reclaimed brownfield
- Existing interconnection infrastructure

## Windnavigator Compass

Latitude: 42.97692 Longitude: -78.93051

Elevation: 181.2m Roughness: 0.30 m

## Wind resource data at 37.0m height:

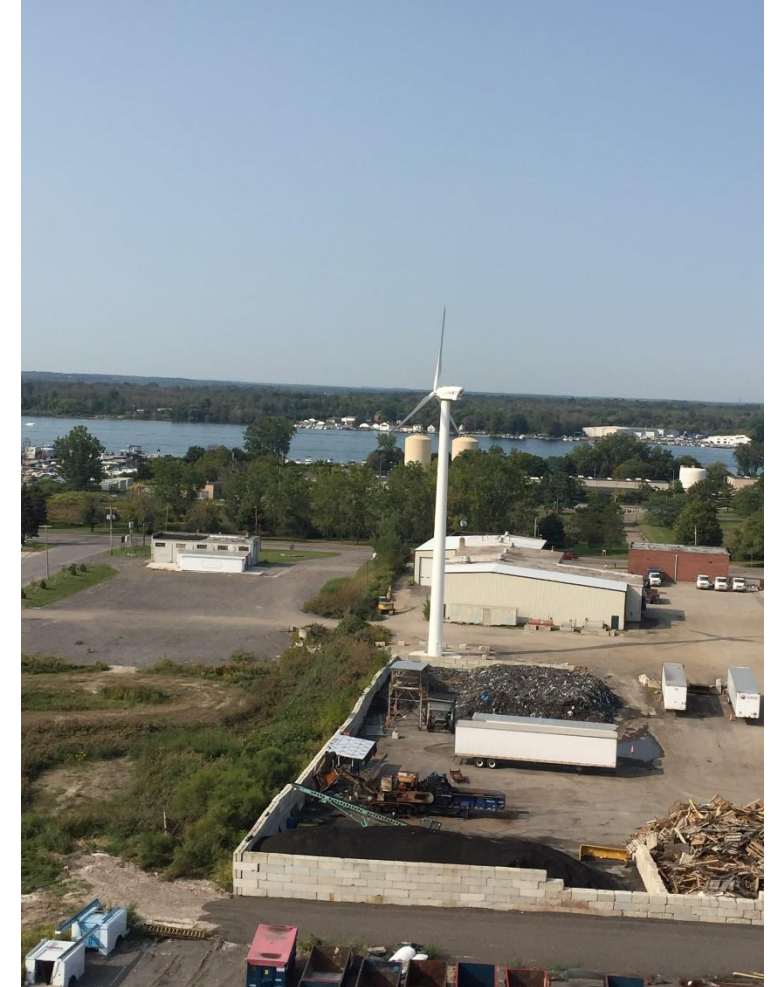
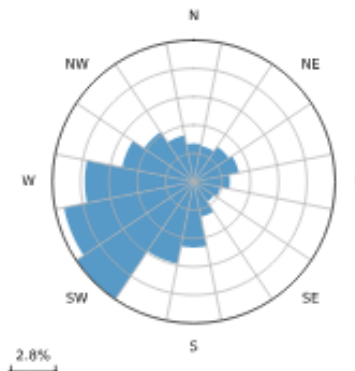
Air Density: 1.223 kg/m<sup>3</sup>

Mean Wind Speed: 5.10 ± 0.35 m/s

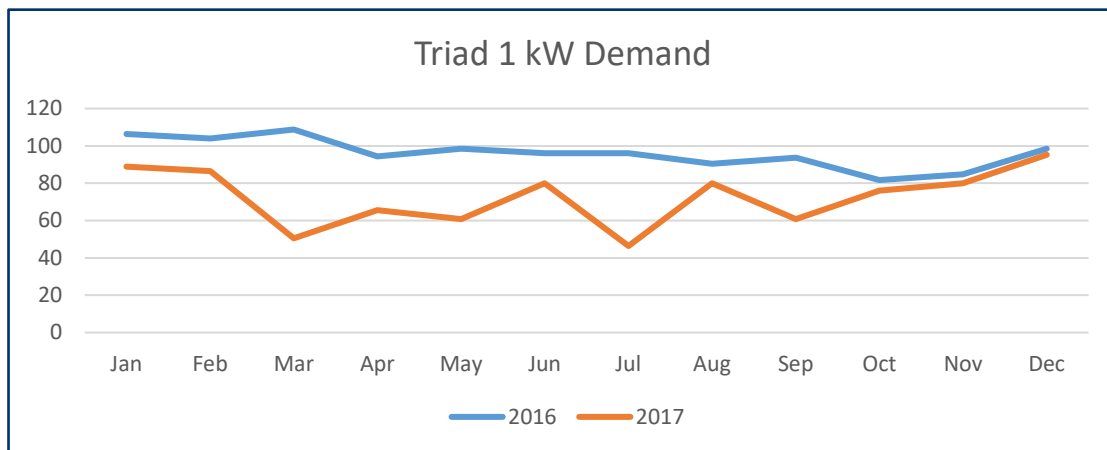
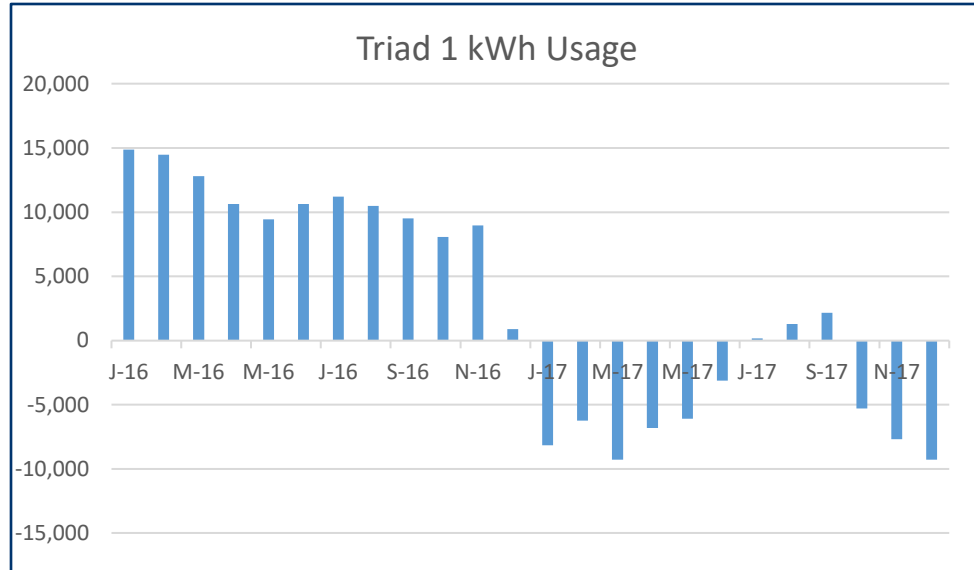
Mean Wind Power Density: 164 W/m<sup>2</sup>

Weibull A: 5.74 m/s Weibull k: 1.864

## Wind Rose Monthly Speeds



# The First Year After Install



# Commercial Distributed Wind in a Post-IRA World

- Federal investment tax credit - 30%
- Domestic Content Bonus - 10%
- Energy Community Bonus - 10%
- Low Income/Disadvantaged Community Bonus - 10-20%

## Additional benefits:

- Energy Cost Savings
- Demand Cost Savings
- Renewable Energy Credits



# National Distributed Wind Network and Deployment Resources

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## What is the Network?

As the clean energy transition accelerates, distributed wind is not on the radar of many stakeholders.

Where it is, stakeholders need more robust support to address their questions and concerns.

**Entry Point**

**Trusted  
Source for  
Fact-Based  
Information**

**Clearinghouse**

**Key Source of  
Insight**

# Virtual & In-Person Convenings

**Summer 2024:** Stakeholder-specific workshops (e.g., farmers, states of interest: California, Minnesota, Oklahoma, New York)

**September 2024:** Virtual Summit



# Informational Materials & Tools

## Distributed Wind Energy Resource Hub on WINDEXchange

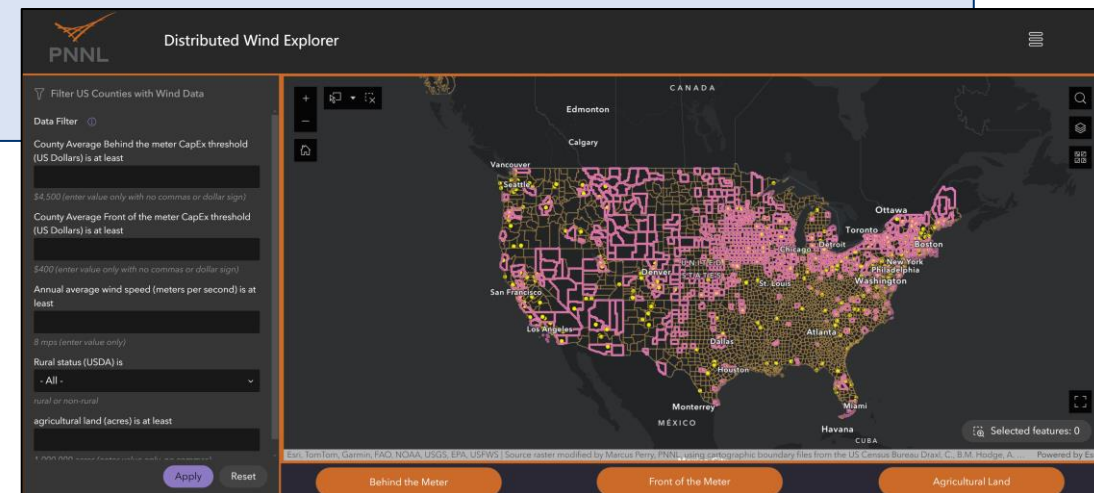
- Educational fact sheets and two-pagers
- Curated slide decks
- Funding & technical assistance opportunities
- Distributed Wind Guidebook

Scan here to see  
the Resource Hub



<https://tinyurl.com/fwtrbtas>

## Distributed Wind Tools

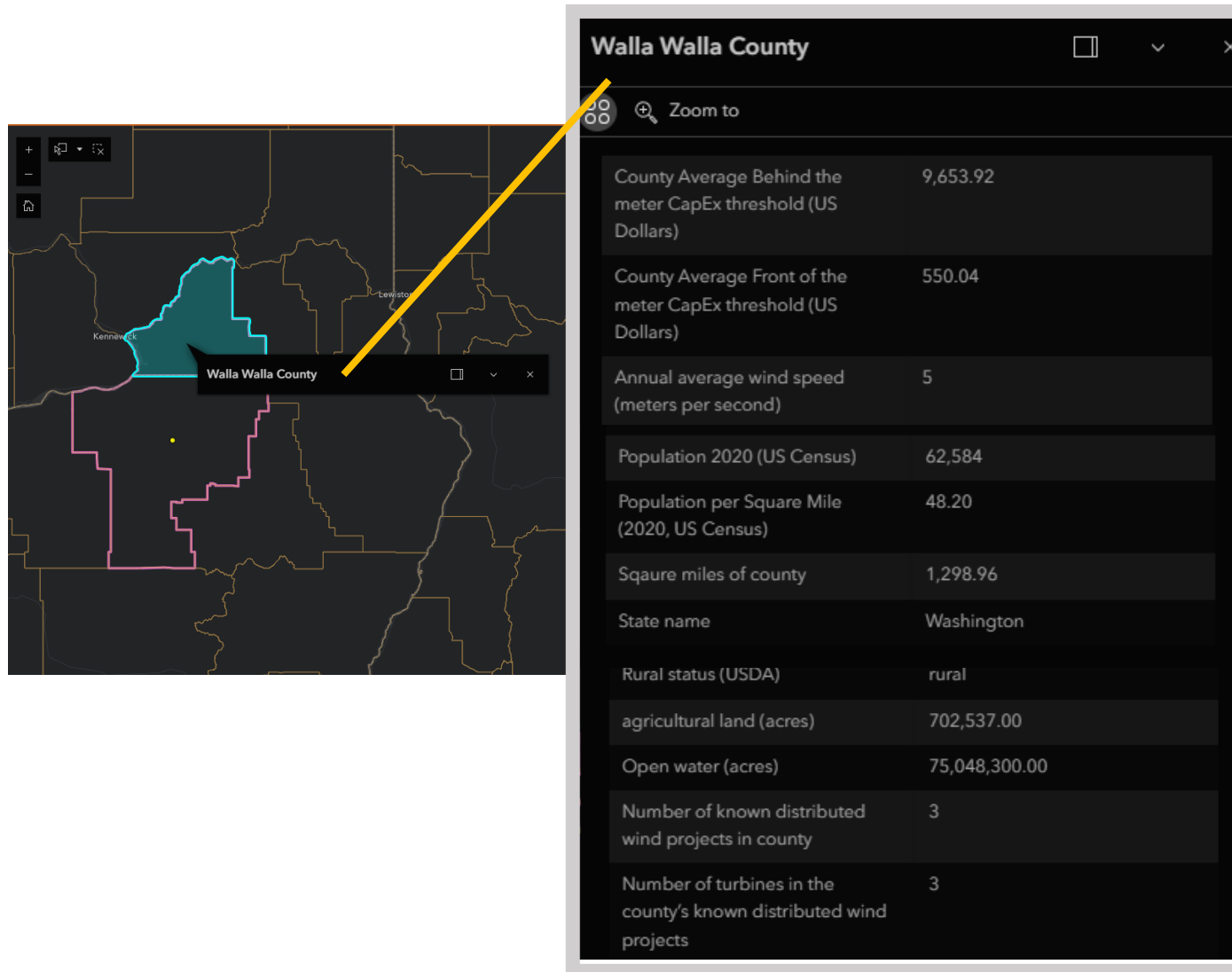






# Distributed Wind Explorer

*Coming Soon!*

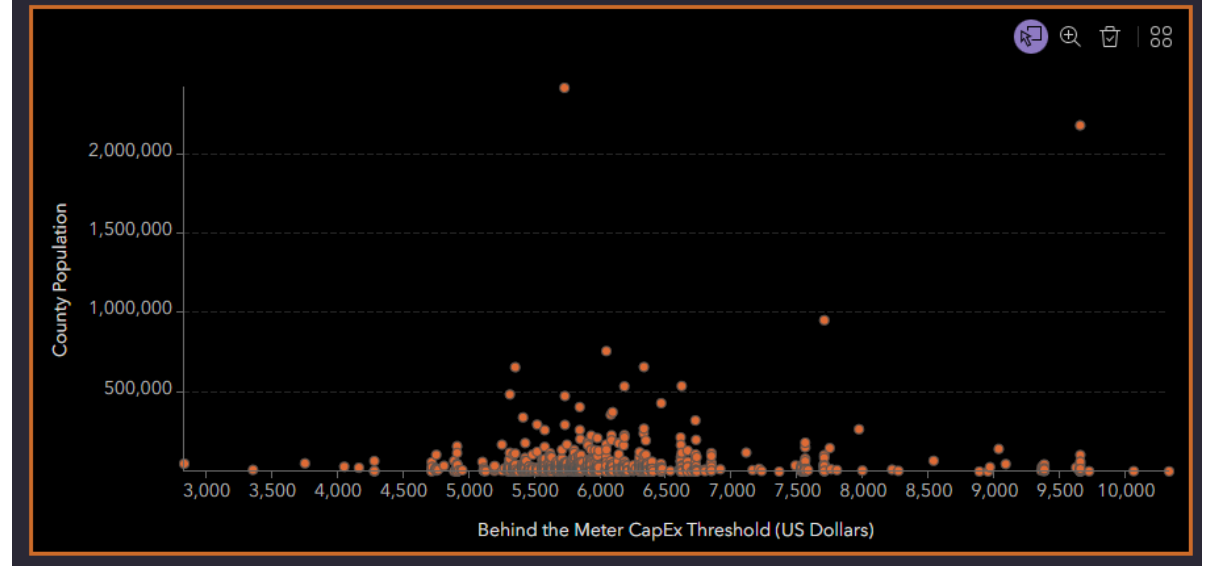
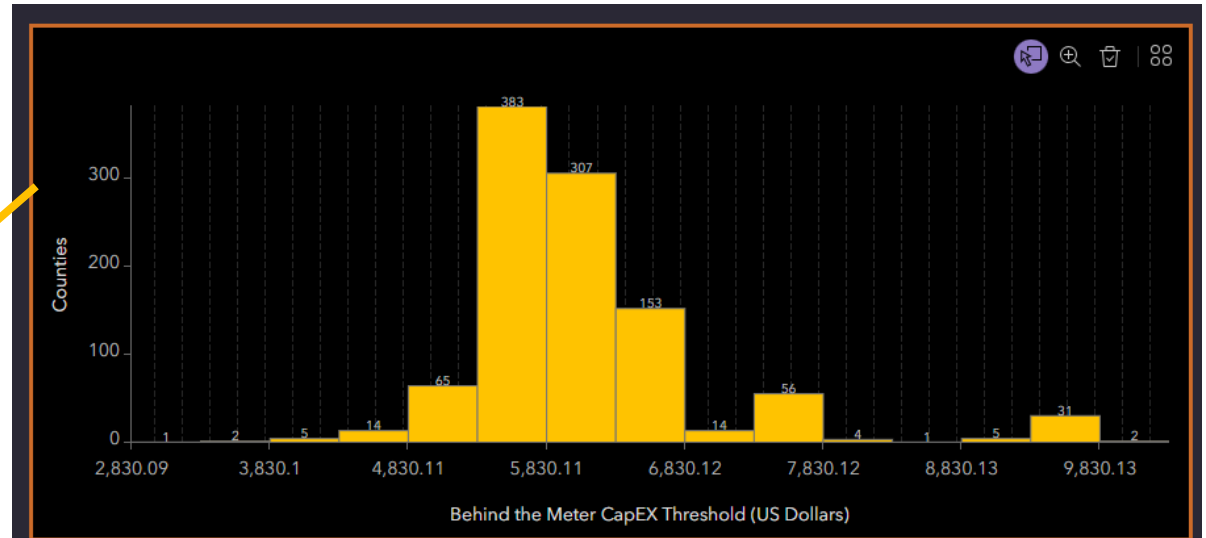
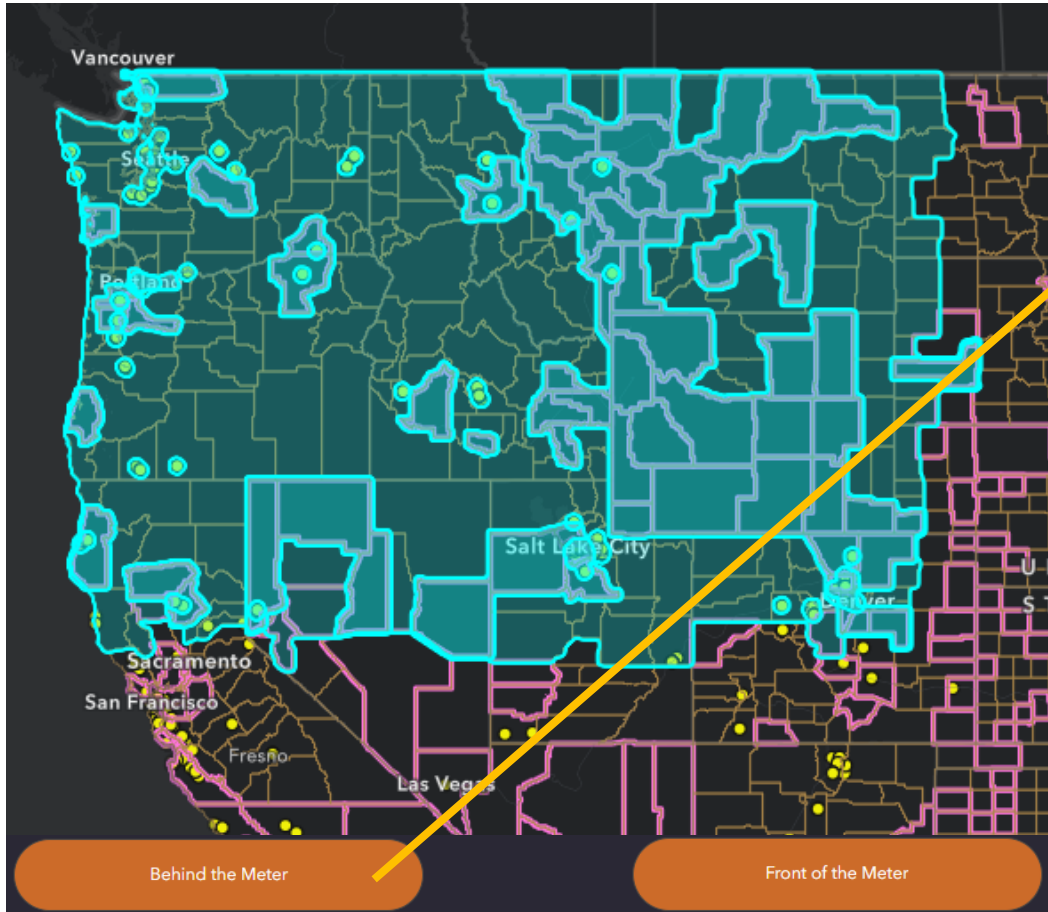


## County Level Data

- Economic potential
- Annual average wind speed
- Demographics and community characteristics
- Known existing deployment
- Amount of agricultural land

# Distributed Wind Explorer

*Coming Soon!*



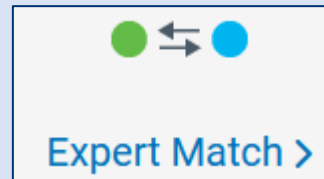
# How to Get Involved

Visit the Resource Hub



<https://tinyurl.com/fwtrbtas>

Request free assistance from national labs to explore local opportunities for distributed wind through the Clean Energy to Communities Expert Match Program



<https://tinyurl.com/33hamh4v>

Apply to provide or receive technical assistance through USDA's Rural Energy for America Technical Assistance Grant Program (TAG)

Completed applications due **March 21st**

<https://tinyurl.com/3x6yuu3v>

Share your distributed wind story with us



<https://tinyurl.com/2yd3vph5>

# Q&A

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A silhouette of a wind turbine is positioned on the left side of the frame, with the sun shining through its hub, creating a starburst effect. The background is a clear blue sky. A dark blue rectangular box is centered in the upper half of the image, containing the text "Thank You!".

**Thank You!**

STRATEGIZE, ENGAGE, NETWORK, DEPLOY *Distributed Wind*