U.S. DEPARTMENT of ENERGY | Office of Indian Energy Policy and Programs

Microgrids and Distribution Infrastructure

Tribal Energy Program Review Mini-Series

May 14, 2026

Webinar Logistics

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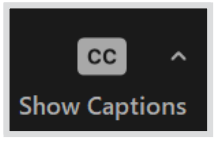

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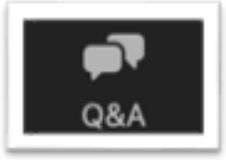

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Is this webinar being recorded?

Yes, this webinar is being recorded in and will be available on the IE website: https://www.energy.gov/indianenergy/webinars

Will the slides be shared?

Yes, a copy of the presentation slides will be shared via email with registrants and will be available on the IE website: https://www.energy.gov/indianenergy/webinars

Today's Webinar Will Cover

How microgrid projects are revolutionizing energy independence in three Tribal communities by showcasing advanced grid expansion and local power generation solutions that electrify essential buildings and significantly reduce costs.

Learn how these initiatives are enhancing resource security and fostering economic growth in their communities.

Office of Indian Energy Overview

Mike Vehar

General Engineer / Technical Project Officer

Office of Indian Energy Leadership

Office of the
Under Secretary of Energy

Office of Indian Energy

Eric Mahroum
Director

David Conrad
Deputy Director

Office of Indian Energy Mission

The Office's mission is in its Congressional authorizing statute:

- **Promote** Tribal energy development, efficiency, and use.
- **Reduce** or **stabilize** energy costs.
- **Enhance** and **strengthen** Tribal energy and economic infrastructure.
- **Electrify** Indian lands and homes.

The Office of Indian Energy was established by Congress in the Energy Policy Act of 2005 under 45 USC 7144e & 25 USC 3502(b).

The remote Native Village of Unalakleet, Alaska completed two rounds of technical assistance with the Office of Indian Energy, focused on energy efficiency and microgrids. Photo by Werner Slocum / NLR

Who the Office of Indian Energy Supports

The Office of Indian Energy supports **Indian Country,** specifically:

- Indian Tribes
  - Federally recognized Indian Tribes
  - Alaska Native Corporations
- Intertribal Organizations
- Tribal Energy Development Organizations

Eligible entities listed under (25 USC §3502(b)(2))

Fond du Lac Band of Lake Superior Chippewa (MN) Biomass District Heating System for its Brookston Community Center in 2025 Photo by Josh Gregory, DOE

Igiugig, AK installed its first RivGen in 2019 with support from DOE Water Power Technologies Office. In 2021 the Village began installing a second device co-funded by the Office of Indian Energy. Photo from ORPC

How the Office Supports Indian Country

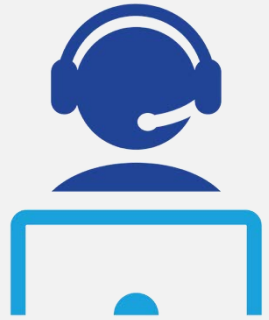
Financial Assistance

Cost-share leveraged funding to support Tribal energy development

Technical Assistance

No-cost planning, analysis, commerce, and engineering support for successful project outcomes

Capacity Building



Capacity building to enable Tribes to fully participate in unleashing American energy

Notice of Funding Opportunity (NOFO) Overview

Funding Opportunity Title	Unleashing Tribal Energy Development
Funding Opportunity Number	DE-FOA-0003548
Funding Instrument	Grants and Cooperative Agreements
Expected Total Available Funding	$50 million
Funding Opportunity Description	DOE's Office of Indian Energy is soliciting applications to advance affordable, reliable and secure energy in Indian Country.
Estimated Period of Performance	12 – 48 months
Topic Areas	**Topic Area 1** (p. 15) • Tribal community energy deployment projects **Topic Area 2** (p. 17) • Tribal community energy project planning, assessment, and feasibility **Topic Area 3** (p. 23) • Large scale planning, assessment, and feasibility for Tribal energy projects
Application Deadline	**July 24, 2026 5pm E.T.**

NOFO Application Details: https://ie-exchange.energy.gov/

Native Village of Port Heiden: Powering Unelectrified Tribal Buildings

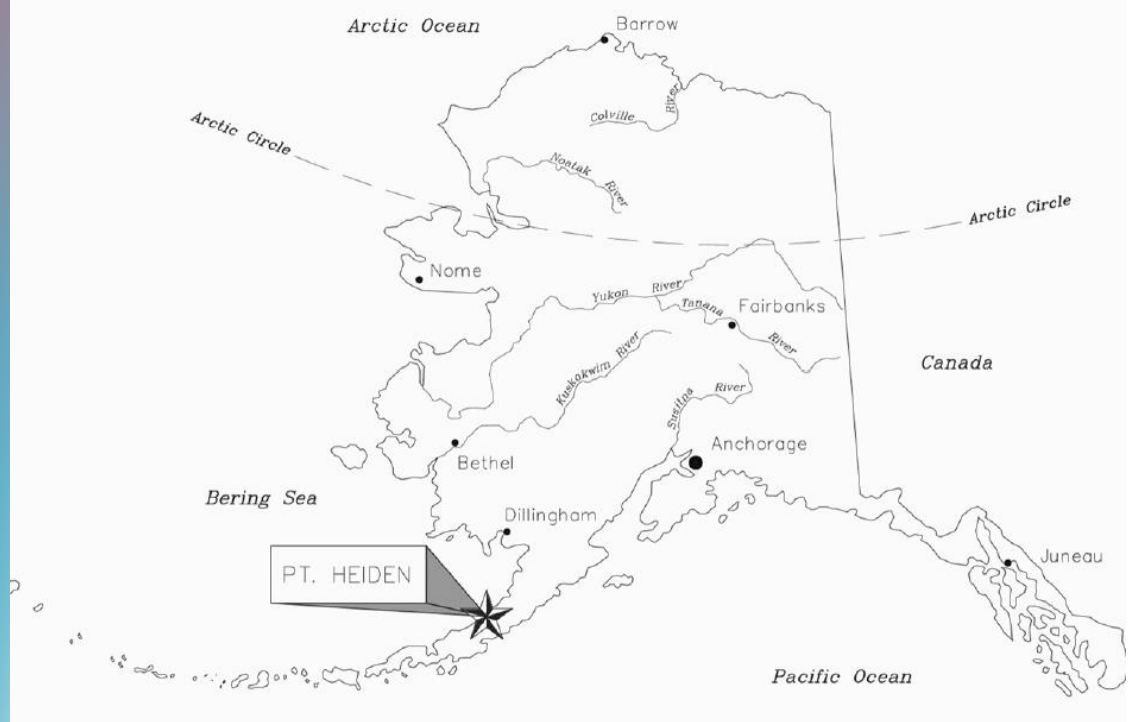
Tatum Christensen

Native Village of Port Heiden

Project Manager

Native Village of Port Heiden

Powering Tribal Facilities in Port Heiden, Alaska



Native Village of Port Heiden

Port Heiden is a rural, costal community on the north side of the Alaska Peninsula. It is home to about 100 year-round residents; majority identify as Alaska Native.

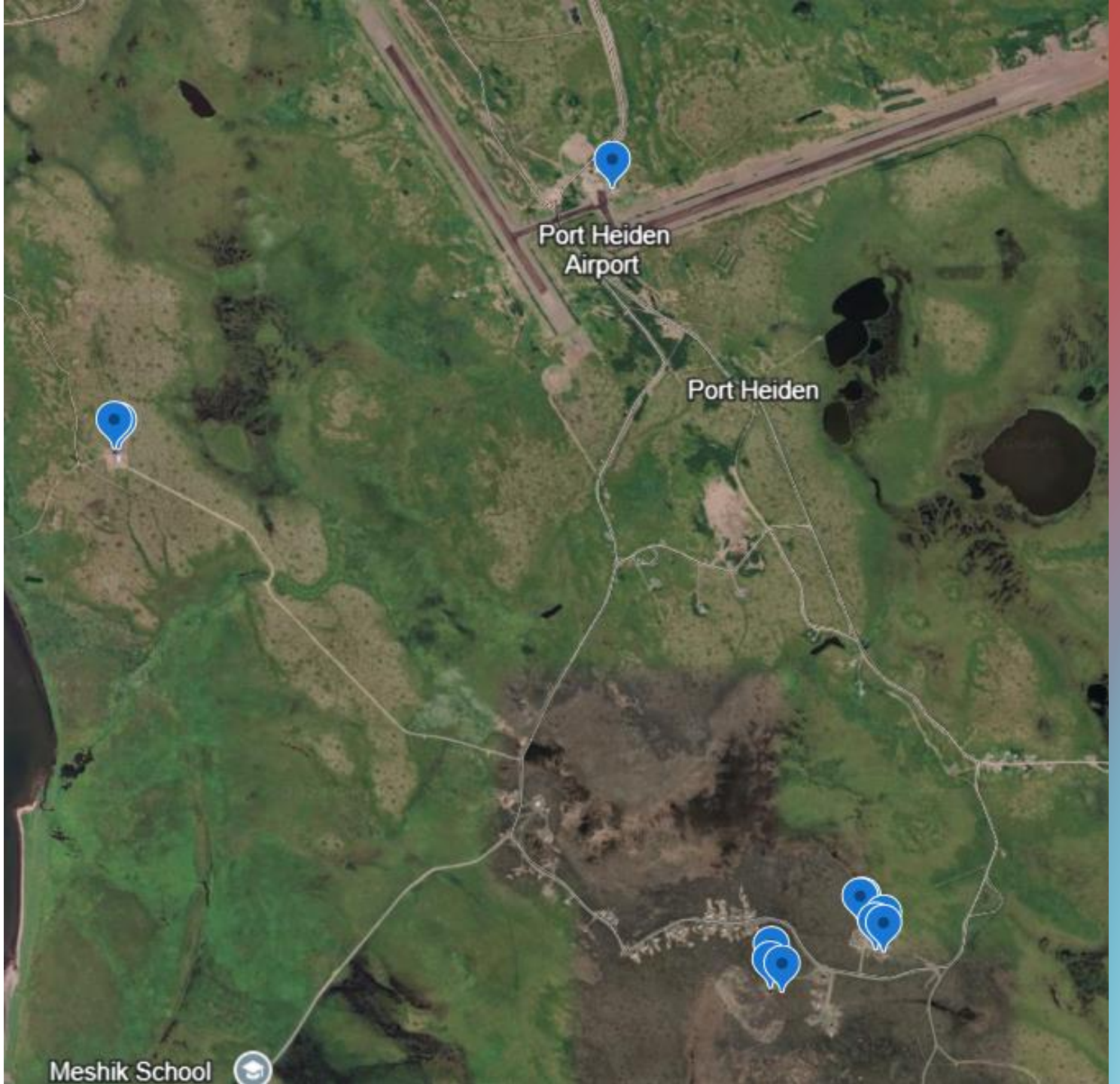
Its thriving Tribal community has historically practiced a subsistence and commercial fishing lifestyle.

Native Village of Port Heiden

- Climate change and changes to the commercial fishing industry has forced lifestyle changes that have impacted the residents.
- With strong traditional values of adaptability, we practice self-determination, independence, and improve resilience within the community, which includes providing safe, reliable power service

Native Village of Port Heiden

This project will connect 14 unelectrified Tribal facilities to the existing community electrical distribution system



Native Village of Port Heiden

Contractor working on the project Attention to Detail Power Solutions

Materials ordered and manufactured

Shipping

Scope of work to be completed

Inspection and testing

Native Village of Port Heiden

1. Tribal Airport terminal
2. Fish Processing Facility
3. Vocational School
4. Rays Place Equipment storage B
5. Rays Place barge shipping & storage C
6. Short term housing
7. Tribal Food Bank
8. Meshik Tribal Store front
9. Meshik Tribal Farm building
10. Meshik Tribal Farm Processing Center
11. Temporary Housing & Isolation Unit 1,2,3,4

Native Village of Port Heiden

Approximately 9,215 ft of trenching	200’ bore shot under creek, install conduit for bore shot	Approximately 25,240 ft of buried cable	Installing 3 transformers with bases
Installing 6 meter bases, 1 double meter base	Rewire existing meter base	Install 600 amp main disconnect	Install wire into transformer, label conductors
Install 4, 3 phase sectionalizing cabinets	Install CT cabinet	Cut in single phase sectional cabinet	845’ secondary triplex

Native Village of Port Heiden

- Budget Total
- 1,038,799

- DOE portion
- 934,919 90%

- Port Heiden portion
- 103,880 10%

- Contractor/ATD
- 1,005,417

Native Village of Port Heiden

Provide facilities with grid supplied electric power.

Power will be provided, year-round, twenty-four hours per day to most facilities.

Aligns with our vision of a reliable, sustainable community that provides most of its food locally and is powered significantly by renewable energy.

Native Village of Port Heiden

NEXT UP for NVPH

2 Wind Turbines

Battery back up

Installed

Fall/Winter 2026/27


Thank You

Unalakleet Native Corporation: Energy Infrastructure Project

Reese Huhta

Unalakleet Valley Electric Cooperative

General Manager

Leah Olsen

Deerstone Consulting

Engineer

Unalakleet Microgrid Optimization

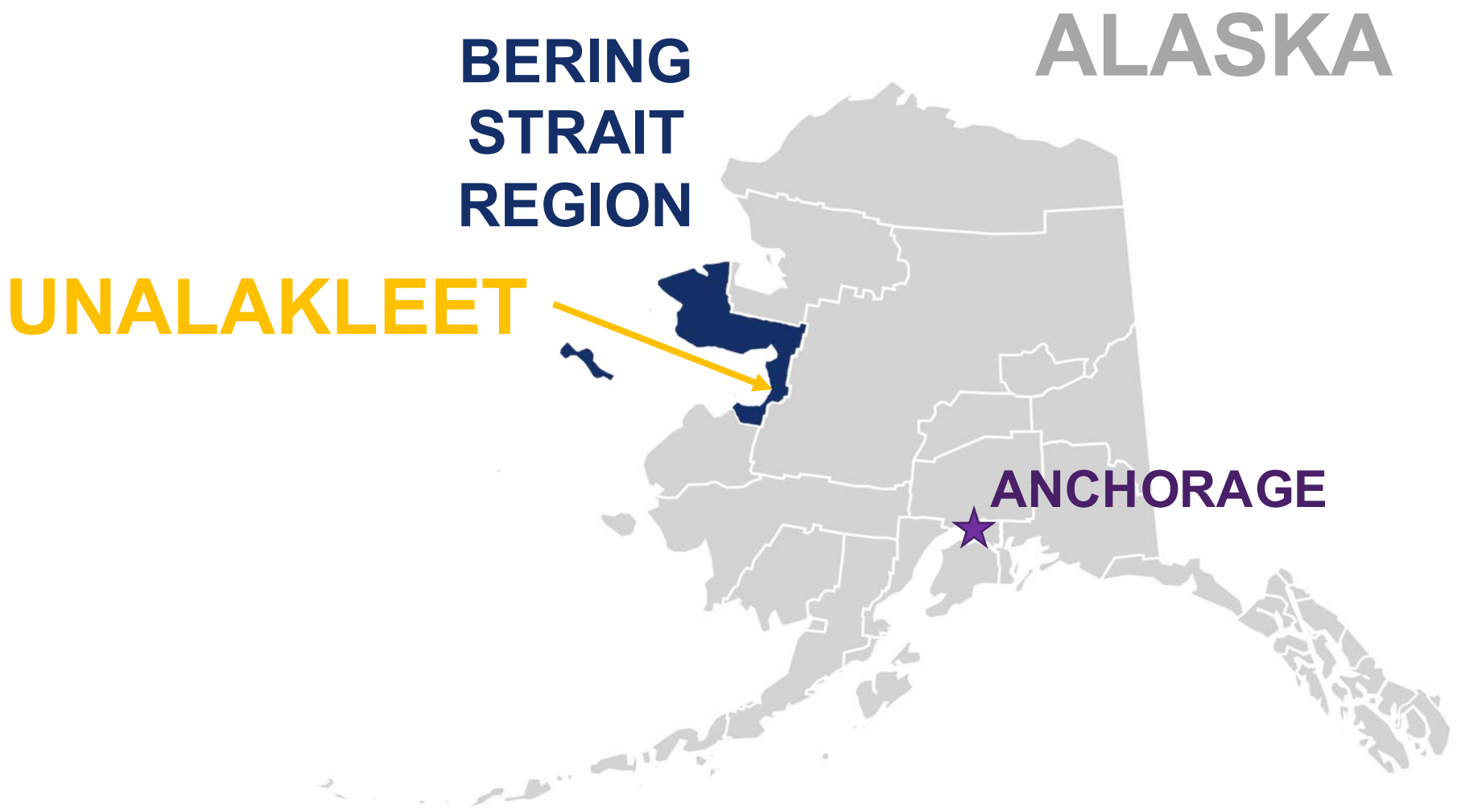
U.S. Department of Energy

Office of Indian Energy

Tribal Energy Program Review

May 14, 2026

Unalakleet Location



Unalakleet Demographics

- 745 Residents
- 78% Alaska Native
  - Inupiat
  - Yupik
- 400 miles from road system
- 150 miles southeast of Nome

Project Partners

- Unalakleet Native Corporation
  - Primary Applicant
- Unalakleet Valley Electric Cooperative
  - Electric Service Provider

UNALAKLEET VALLEY ELECTRIC COOPERATIVE EST. 1961

UNALAKLEET
NATIVE CORPORATION

Wind Development & Integration

- UNC & UVEC goal to reduce diesel fuel consumption
  - 2009 - Install 100 kW wind turbines (x6)
  - 2010 - Install 300 kW electric boiler and recovered heat system
- Predicted Benefits
  - Displaced diesel fuel: 113,000 gal/year
  - Turbine production: 1,500,000 kWh/year
- Actual Benefits
  - Displaced diesel fuel: 50,000 – 70,000 gal/year
  - Turbine production: 750,000 – 1,000,000 kWh/year

Barriers – Power Line Capacity & Reactive Power

- Reactive power
  - Reactive power consumption: 20 – 40 kVAr/turbine
  - Power factor: as low as 0.5 with high wind turbine production
  - Must run second genset to satisfy reactive power needs
  - Transmission line capacity constraints led to a demand for reactive power at the wind farm
- High voltage at wind farm
  - At peak output, voltage drop of 25%
- Line loss
  - At peak output, line loss >28%
- Wind curtailment

Barriers – SCADA, Genset Control & Trending

- System control
  - Woodward GCP genset controllers have limited control capabilities
  - PLC CPU and PLC software have limited control capabilities
- Data collection & historical data trending
  - Cannot evaluate alarms and power data when outage occurs
  - Multiple SCADA screens required to view power data for all equipment

Project Goals & Challenges

Objective

- Optimize integration and performance of existing equipment
- Achieve single genset operation
- Pave the way for the incorporation of additional renewables and energy storage

Project Summary

Tasks

- Upgrade SCADA system and historical data trending
- Replace genset controllers
- Modernize demand control logic for all assets
- Replace 4,160 V power line with 12,470 V between power plant and wind turbines
- Replace and upsize transformers

Outcomes

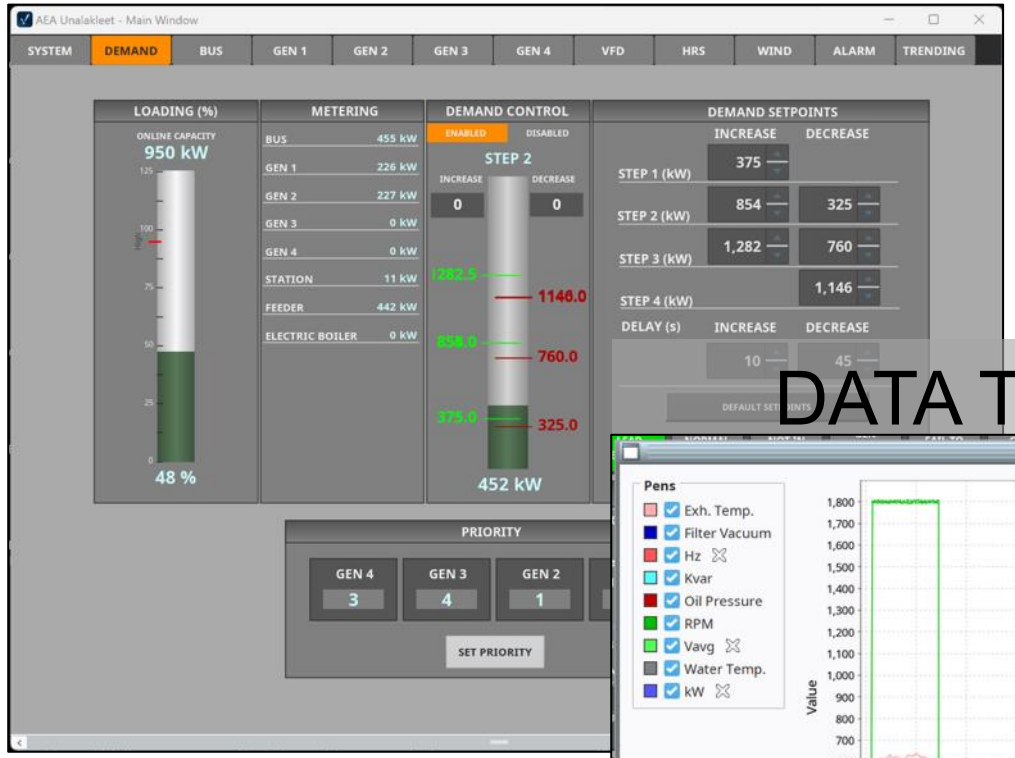
- Enhance ability to operate and analyze power system data
- Optimize control of gensets, wind turbines and electric boiler secondary load
- Reduce wind turbine reactive power needs
- Operate single genset or in diesels-off (with future storage) during high wind events
- Reduce line capacity constraints
- Reduce line loss and voltage drop

SCADA Upgrades – Complete

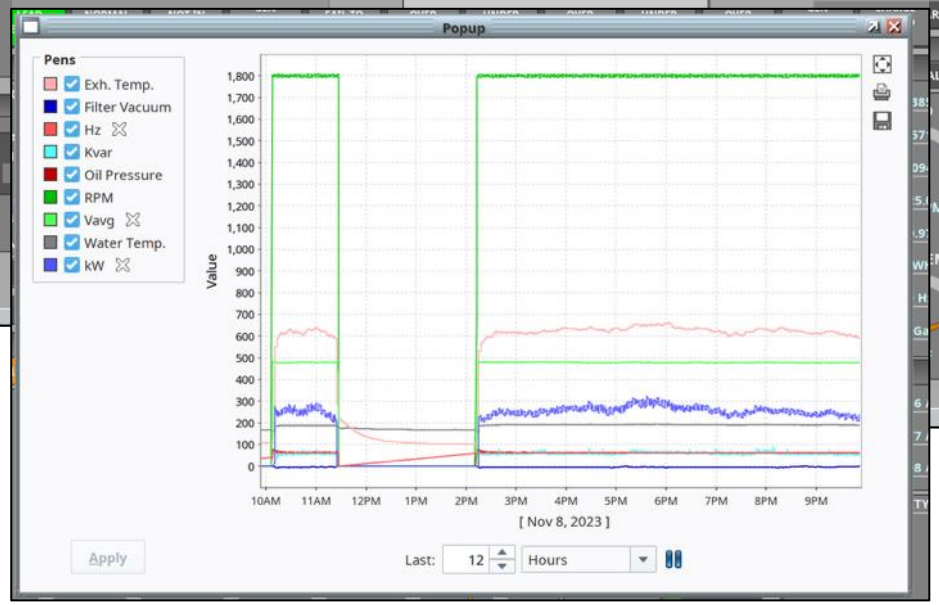
- Genset controllers to Woodward 3200XT (x4)
- PLC CPU & Programming
- SCADA to Ignition 8.1
  - Trending & alarm historian
- Panel-mount PC on switchgear
- Power meters to Shark 250s

SCADA – Ignition 8.1

DEMAND CONRTOL



DATA TRENDING

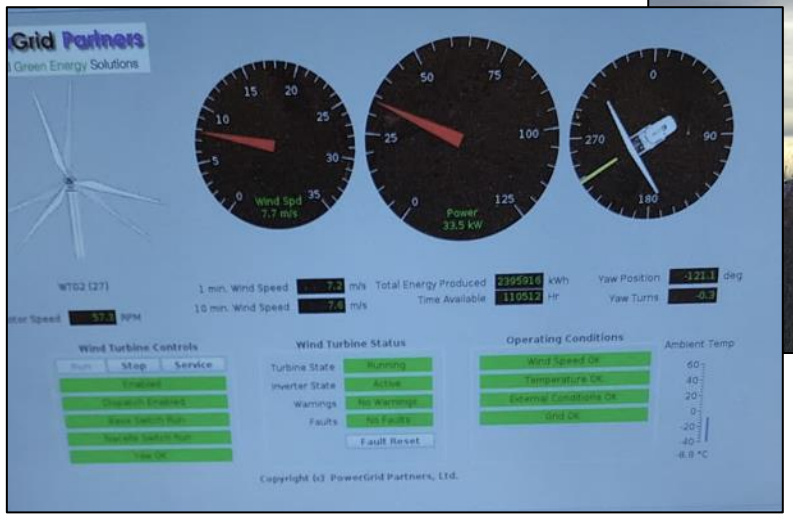


POWER DATA

Wind Turbine Controls Upgrade – Complete

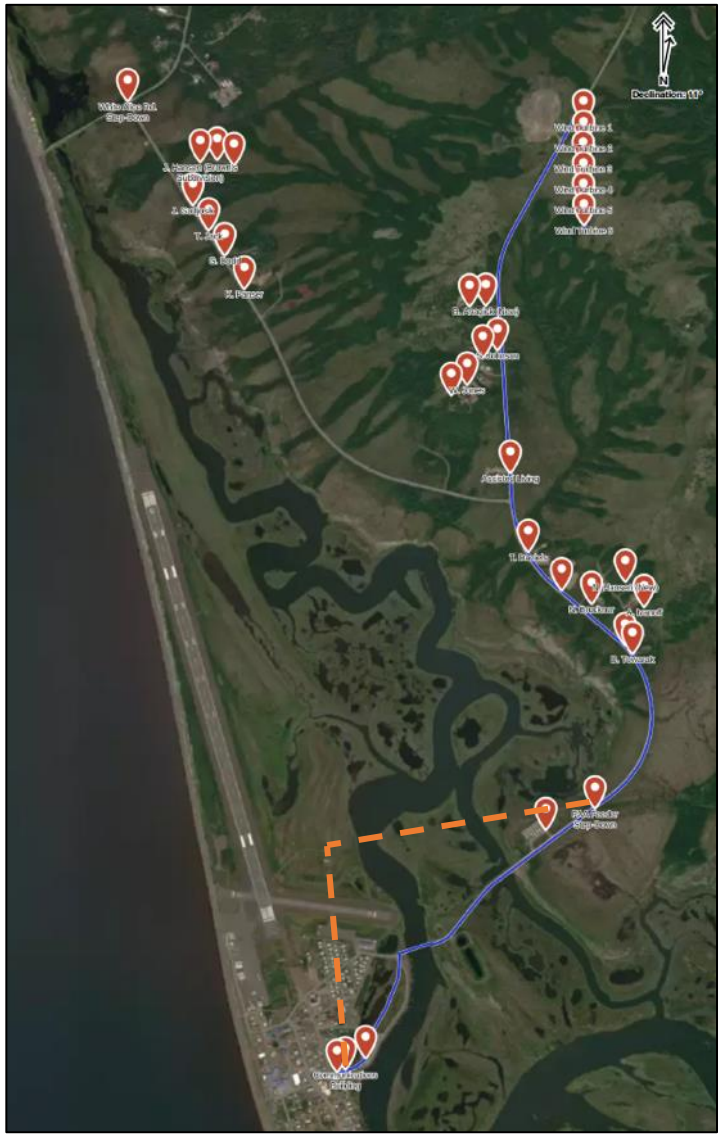
Northwind Reactive Power Settings

- Historically: Line voltage compensation mode
- Now: Power factor mode
  - Turbine generates or consumes VArs to achieve PF of unity
  - PF at power plant changed from ~0.5 to ~0.9



High Voltage Line Upgrades – Complete

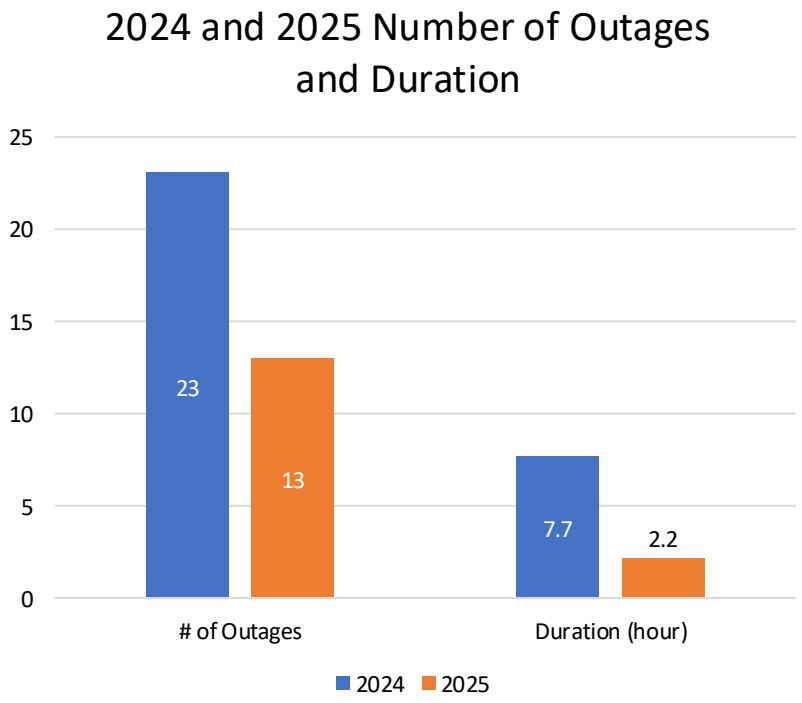
Distribution Resiliency Upgrades – Complete

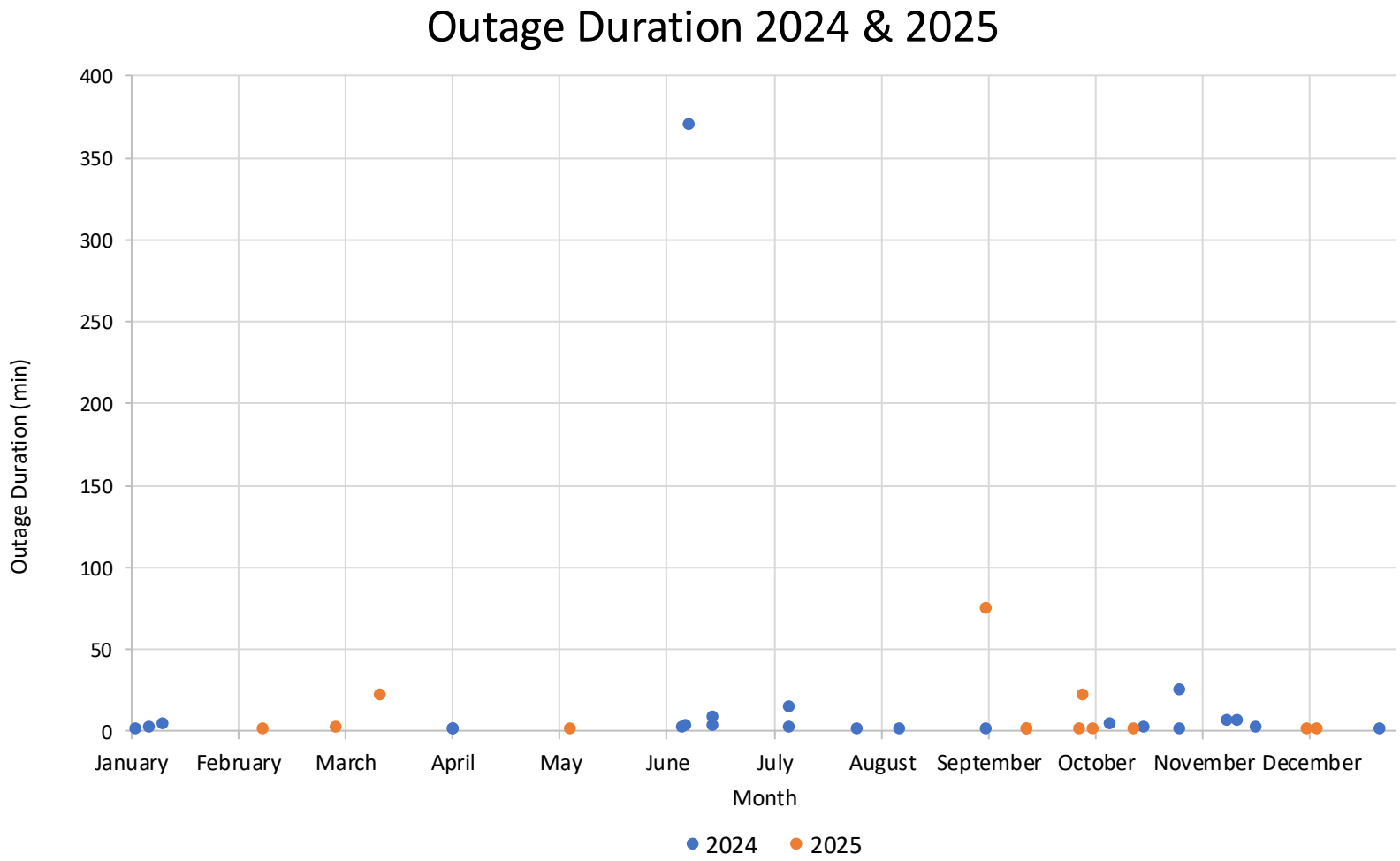


Outages

Takeaway:

- Fewer outages in 2025
- Shorter outage events in 2025

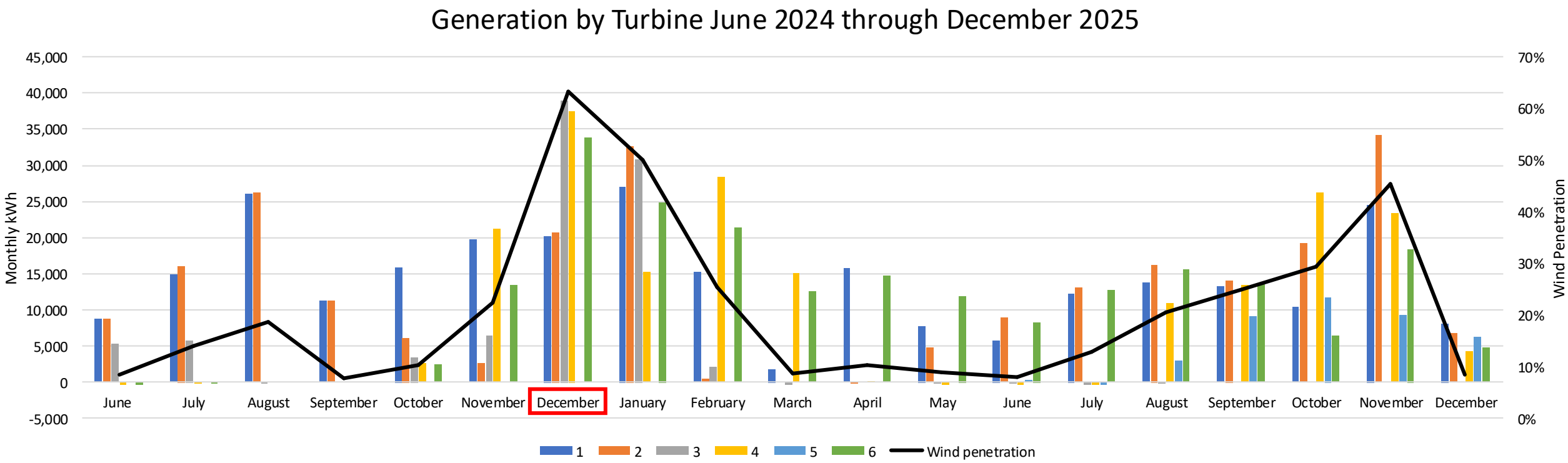




Wind Turbine Usage

Takeaway:

- Updates completed in Dec 2024
- Increased wind penetration in winter 2025
- More turbines sending kWh to grid in 2025

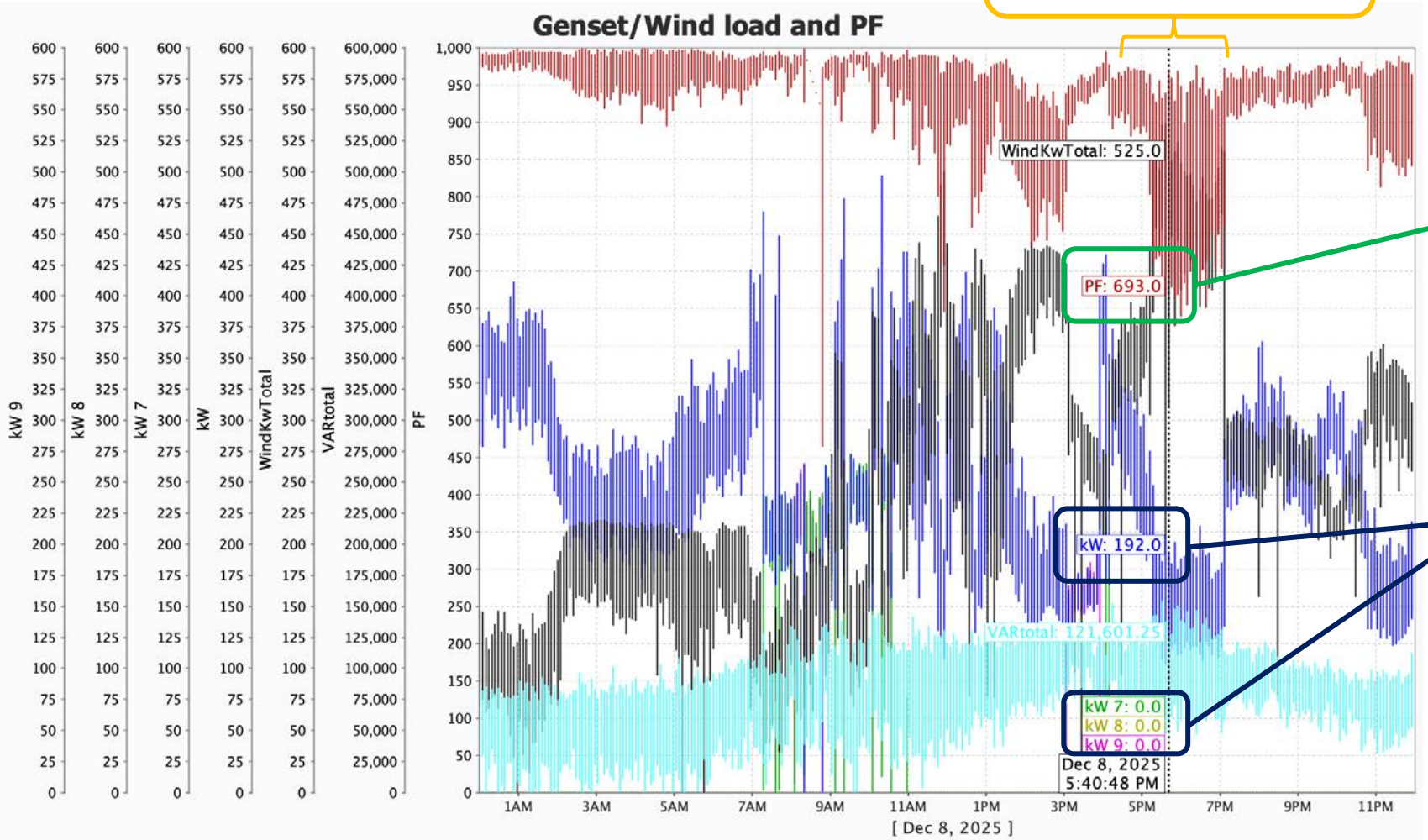


Outcomes: High Wind Comparison

Takeaway:

- Wind generation is high
- Only 1 genset most of the time

Outcomes: November 2025



High wind event and low power factor

Power Factor of 0.693 - low

Generators – only one is on

Questions?

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Colusa Indian Community Council: Reese Housing Power Project

Ken Ahmann

Colusa Indian Energy

Chief Operating Officer

Colusa Indian Community: Reese Road Housing Power Project & Packer Ranch Solar PV Project

DOE Annual Program Review 2026

Presented by Ken Ahmann

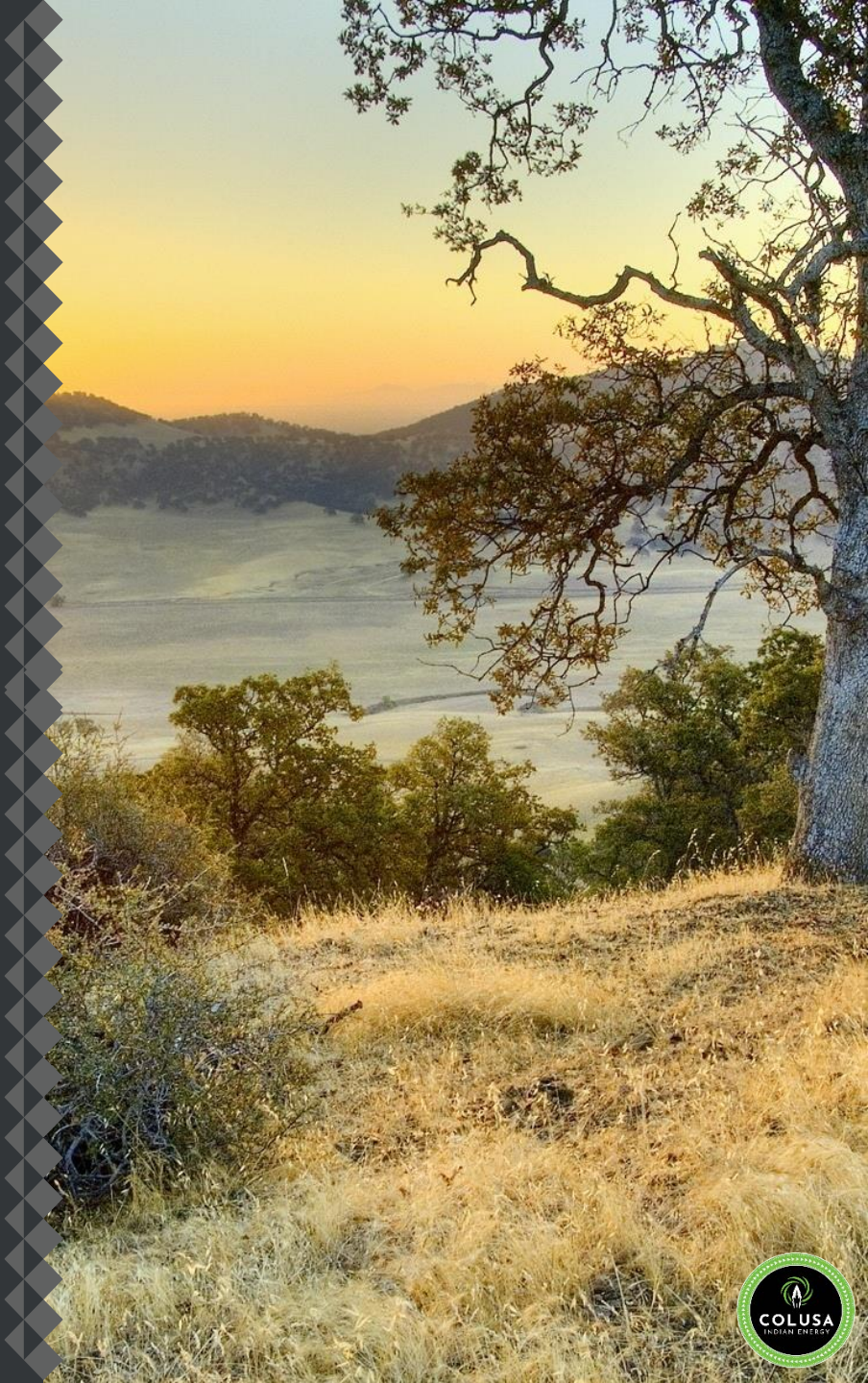
Presentation Outline

- Summary of Colusa Indian Community
- History of CIC-Tribal Utility Authority
- Reese Road Housing Power Project
    - Project Objective & Summary
- Packer Ranch Solar PV Project
    - Project Objective & Summary

Colusa Indian Community

The Colusa Indian Community consists of 115 members of the Cachil DeHe Band of Wintun Indians and a total of 160 residents. The Tribe resides in the heart of Northern California's agricultural land on a 520-acre reservation along the Sacramento River with 14,010 acres of fee land and 4,627 of those acres pending trust.

The Colusa Indian Community owns and operates the Colusa Casino Resort, which is powered, heated, and cooled by the Tribal Utility Authority's cogeneration power plant. The TUA's 9.1 MW microgrid hasn't had a power outage in over 14 years.



History of CIC
Tribal Utility Authority

- Electrical Department created in 2003
- Co-Gen commissioned in 2005
- TUA created in 2021 to unify resources and leadership of both departments
- Team includes director, managers, technicians, operators, journeyman electricians, welders, pipe fitters, fabricators, and apprentices

2004-2005

- Resort expanded and hotel was built
- Reservation experienced 50+ power outages per year from local utility
- Co-Gen was built to power the resort and Tribal administration campus
- Originally consisted of 4MW of Jenbacher gas engines and two Thermax absorption chillers

2013-2014

- DOE Office of Indian Energy grant funded solar PV project completed
- 500kW solar canopy installed
- 100kW rooftop solar installed

2017-2018

- Original Jenbacher gas engines replaced at 80,000 operating hours
- Two additional Jenbachers added for total gas engine capacity of 6MW
- The new engines are 100% hydrogen ready

2019

- DOE Office of Indian Energy grant funded solar project completed
- Four additional solar canopies installed, bringing total PV capacity up to 1.1MW
- Solar PV now accounts for ~1/3 of annual power production for the microgrid

2020

- DOE Office of Indian Energy grant funded micro-grid expansion project
- TUA replaced PG&E across entire reservation, including member housing, all Tribal businesses, water treatment plants, medical clinic, gas station, and more

2022

- Absorption chiller expansion project complete
- Resort now gets its cooling from absorption chillers totaling 1400 tons of capacity and electric backup chillers totaling 400 tons of chilled water capacity
- UPS expansion project began

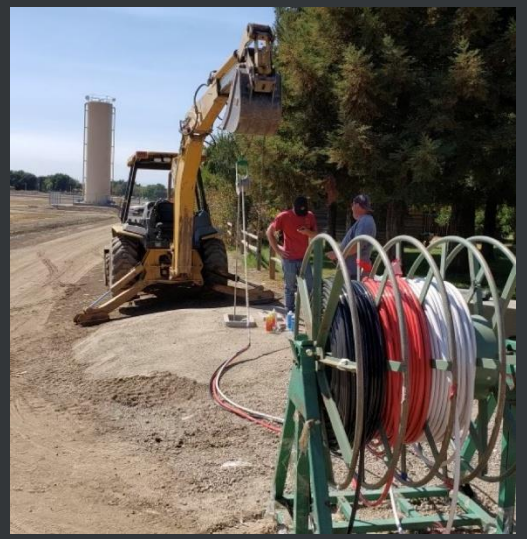
Reese Road Housing Power Project

Office of Indian Energy grant funded microgrid expansion

Reese Road Project Objective

- Expand existing medium-voltage distribution to seven new households with the addition of medium-voltage cabling, step down transformers, smart meters, and street lighting for the new development.

- Utilize the Tribe's existing microgrid to supply the new homes with highly reliable power and at a reduced rate compared to the local utility.



Reese Road Project Summary

- $1,157,354 total project cost with 57% being grant funded
- Construction began October 2023 and was completed August 2024
- 7 new homes on Reese Road are now powered by the TUA's microgrid and 10 new streetlights have been installed

Packer Ranch Solar PV Project

Office of Indian Energy grant funded grid-tied solar PV arrays

Packer Ranch Solar PV Project Objective

- Install two separate grid-tied solar PV arrays, one rated at 855kW-DC and the other at 34kW-DC.
- Interconnect larger array to local utility under a NEM-A (net-energy metering aggregation) agreement to allow the solar PV to offset the electric bills of 8 ag well pumps on fee lands.
- Interconnect smaller array to offset usage for 1 home and 1 shop.
- Reduce energy costs and reliance on fossil-fuel burning power sources.
- Increase Tribal self-reliance and Tribe-owned power generating assets.

Packer Ranch Solar PV Project Summary

- $1,767,000 total project cost with 90% being grant funded
- 5-year ROI (before grant)
- Project awarded to Colusa Indian Energy (CIE) for large array and to CMCO for residential array

Packer Ranch Solar PV Project
Current Project Status

CIE PORTION COMPLETE

1,383,008

kWh generated — powering crop / farm irrigation

100%

of usage offset by solar — reducing reliance on fossil-fuel power

Construction Timeline

- Started June 2025
- 4 months to build
- 6 months to AHJ final (long lead time on new main service install)

Interconnection (Large Array)

- All interconnection documents submitted to PG&E
- Awaiting PG&E to finish work on their side
- Interconnect and Permission To Operate (PTO) will follow

Contact
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Thank You

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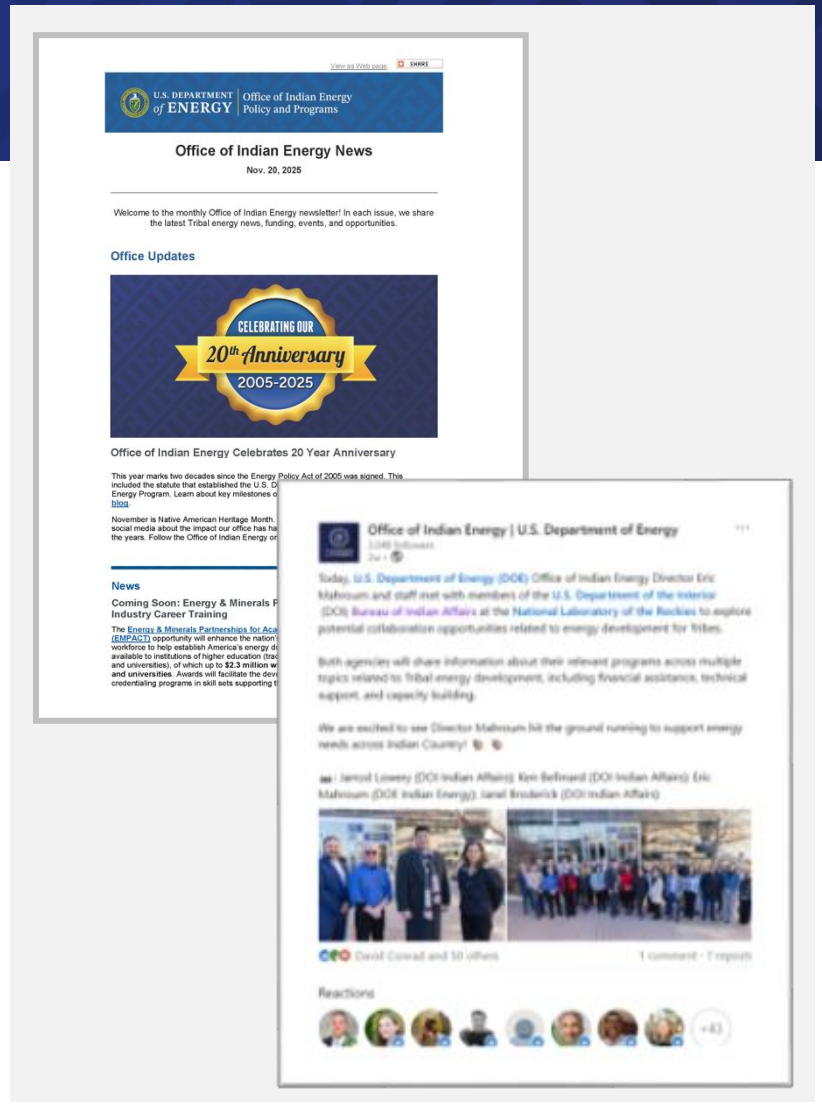

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