



Pacific Northwest
NATIONAL LABORATORY

PNNL researchers lead students on a wind farm tour as part of the Office of Science Reaching a New Energy Sciences Workforce (RENEW) initiative. (Photo by Graham Bourque | Pacific Northwest National Laboratory)



PNNL WIND ENERGY

High-Impact Accomplishments in FY 2023

Fiscal Year (FY) 2023 offered Pacific Northwest National Laboratory (PNNL) a wealth of opportunity to expand its support of various federal and state agencies' wind energy goals, including the Department of Energy's Wind Energy Technologies Office (WETO) mission to **deliver low-cost wind energy development while also supporting a reliable and resilient national electricity system.**

COST REDUCTION

A key impact of PNNL's FY 2023 research was its potential to make wind power more affordable. PNNL works to increase industry understanding of wind farm-atmosphere interactions and bring greater certainty to model parameters, which helps reduce risk for wind energy developers, thereby lowering associated costs.

For example, PNNL supports a multiagency [Wind Forecast Improvement Project](#), which has already saved utilities millions of dollars by collecting regional wind data and improving a national weather forecasting model. PNNL also [managed a research buoy stationed offshore of O'ahu](#) to collect wind resource, meteorological, and oceanographic data that will increase wind model certainty and reduce the cost of offshore wind energy off the coast of Hawai'i.

TRANSMISSION PLANNING

Through efforts such as the [West Coast Offshore Wind Transmission Study](#), PNNL continues improving wind power transmission. Researchers evaluate potential pathways under various conditions and

identify points of interconnection, thereby helping integrate wind while minimizing upgrade investment and supporting grid resilience. In FY 2023, PNNL helped develop recommendations for Atlantic offshore wind transmission related to:

- Partnerships and collaborations, such as increased information-sharing and cross-jurisdictional cooperation
- Planning and operations, such as preparation for system upgrades and new regulations
- Technologies and standardization, such as identifying common equipment for quicker transmission installation
- Economics and support initiatives, such as building consensus around project cost allocation and leveraging federal programs
- Siting and permitting, such as aligning requirements across jurisdictions and optimizing environmental review processes.

SITING AND PERMITTING SUPPORT

PNNL facilitates siting and permitting of new wind projects through research to better understand and mitigate potential environmental impacts. In FY 2023, PNNL advanced the state of the art for technologies and resources to monitor wildlife behavior, including radar systems, radio frequency tags, and thermal vision solutions to track bird and bat flight patterns. One such technology, PNNL's [award-winning ThermalTracker-3D system](#), was licensed by a private company.

In addition, PNNL's ongoing contributions to U.S. Offshore Wind Synthesis of Environmental Effects Research (SEER) help [synthesize key knowledge](#) about the environmental effects of offshore wind. Feedback received in FY 2023 indicates many offshore wind stakeholders are now incorporating SEER information into their own efforts to address environmental concerns.

COLLABORATION AND STAKEHOLDER ENGAGEMENT

PNNL collaborates with industry and community members to implement innovative deployment methodologies while developing the domestic supply chain, reducing costs for wind generation, supporting local workforces, and minimizing environmental impacts. FY 2023 examples include:

- [PNNL's work with PelaStar](#), which provides objective and quantified environmental, ocean co-use, and workforce impact analyses specific to PelaStar's design and installation methodologies, as well as its operations and maintenance processes

PNNL's annual distributed wind photo search supports efforts to highlight distributed wind technologies and the customers they serve. One of the selected photos for FY 2023, pictured below, highlights GW 87/1500 turbines in Ohio. (Photo submitted by One Energy Enterprises LLC)

- Gathering input from Gulf of Mexico stakeholders to guide additional research on offshore wind environmental impacts
- Engaging national and international distributed wind stakeholders and publishing the eleventh annual [Distributed Wind Market Report](#), which guides industry investments and decisions
- Launching a [Community Values and Ocean Co-Use capability](#) to address knowledge gaps in sustainable offshore wind development, enabling stakeholders to engage communities in collaborative decision-making.

DIVERSITY, EQUITY, INCLUSION, AND ACCESSIBILITY

Across all efforts, PNNL is committed to creating a safe, supportive, inclusive environment for staff and the broader community. Researchers consider the diverse experiences and perspectives of others, recognizing that this only improves the value and applicability of their work. They also assess the potential impacts of their work and develop meaningful engagement strategies to ensure equitable access to resulting information, tools, and benefits. FY 2023 efforts include:

- Engaging minority serving institutions to develop joint research proposals and recruit talent
- Mentoring Inclusive Energy Prize students researching equitable solutions around energy and climate
- Leading a [Reaching a New Energy Science Workforce summer school program](#) to engage students from Native American and Indigenous backgrounds
- Sharing project outputs and resources through public online repositories, such as the [Wind Data Hub](#) and [Tethys](#).

PNNL continues to deliver results that significantly advance WETO's mission and the nation's broader renewable energy policy objectives. [Learn more](#) about PNNL's wind energy research and [subscribe](#) to the [Wind@PNNL](#) newsletter for updates.

