



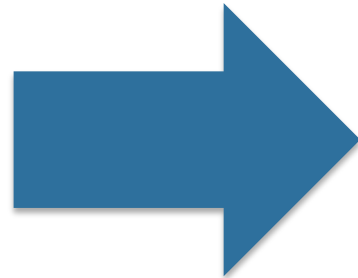
The Role of the Arctic Energy Office in Alaska

September 8, 2023

Dr. Erin Whitney
Director, Arctic Energy Office
U.S. Department of Energy
Alaska Wind Workshop



Changing Arctic → transition, resilience, cooperation



Arctic's uncertain future → Global opportunities & threats

Arctic Energy (AE) Office: A Critical Part of the DOE Mission

Department of Energy Mission:

Ensure America's security and prosperity by addressing energy, environmental and nuclear challenges through transformative science and technology solutions.

Department of Energy Goals:

- Combat the climate crisis
- Promote energy justice
- Facilitate energy transition
- Create Clean Energy jobs

Secretary of Energy
Deputy Energy Secretary

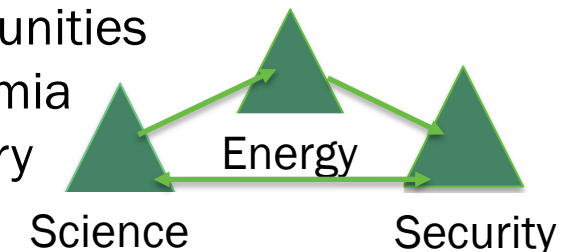
Under Secretary for Science and Innovation (S4)

Arctic Energy Office

AE Vision:

*To bring the Arctic to the Department of Energy (DOE), and DOE to the Arctic. We collaborate in innovative ways to meet the **energy, science and security** needs of the US and its Arctic allies.*

- Headquarters offices
- National laboratories
- Interagency
- Communities
- Academia
- Industry



Priorities of the Arctic Energy Office

- Facilitate partnerships, demonstrations, and deployments.
- Build community workforce and capacity to support energy transitions.
- Organize and disseminate information on DOE funding opportunities.
- Communicate value of Arctic energy projects to national priorities.
- Act as front door to DOE for external stakeholders and coordinate across DOE on all Arctic topics.



U/S Dr. Richmond speaks at the 2023 Arctic Encounter Symposium.



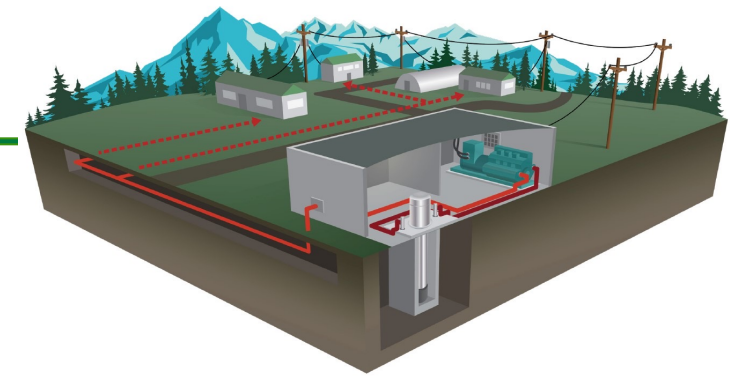
U/S Dr. Richmond tours a LNG-fueled vessel at Port of Alaska.



AE's Focus on Energy

AE advances existing DOE research and programs:

- **Electricity:** microgrids in rural Alaska
- **Efficiency:** capacity building, technical assistance to villages; partner with NREL Alaska, reducing energy costs
- **Fossil:** carbon capture & transport, use & storage on North Slope
- **Geothermal:** Pilgrim Hot Springs, Makushin
- **Hydrokinetics:** research on tidal and marine energy at Tanana River, Igiugig, Cook Inlet
- **Nuclear:** Nuclear Energy Working Group discussions on microreactor at Eielson AFB
- **Solar:** installations at Shungnak, Kotzebue, Deering, Noatak (upcoming), & agrivoltaics research
- **Transportation:** EPIC funding award to Launch Alaska advancing electric vehicle transportation in Alaska.
- **Wind, batteries:** ETIPP awards to Alaskan villages to explore energy solutions
- **Hydrogen:** Alaska Hydrogen Working Group, Alaska roadmap



Proposed microreactor, above; Solar panels at the Village of Deering, AK, middle; and hydrokinetic testing in Tanana River, below.



AE's Focus on Science

AE supports DOE projects at national labs:

- **Atmospheric Radiation Measurement (ARM)** at Utqiagvik with instruments, uncrewed aircraft; AEO is working with Sandia National Lab to maintain DOE airspace at Oliktok Point
- **Energy Exascale Earth System Modeling (E3SM)** experiments on Arctic tundra, mid-latitude, tropical forests, oceans
- **Next-Generation Ecosystem Experiments (NGEE Arctic)** to improve predictions of carbon Arctic-rich processes and feedbacks to climate
- **Arctic Innovators Program** at the University of Alaska Fairbanks, multiple National Labs
- **First Arctic Embassy Science Fellow** in DOE history to Iceland



Atmospheric modeling at Utqiagvik, (above), Embassy Science Fellow, (left) and Arctic Innovators (right).



AE's Focus on Security

- AE helps ensure national energy security by:
 - Promoting STEM initiatives in the Pan Arctic (ARENA)
 - Participating in the Arctic Council / Arctic Circle Assembly
- Collaborated with U.S. State Department's Arctic Coordinator
- AE provided input to the Interagency Arctic Research Policy Committee's 2022-2026 Arctic Research Plan and the National Climate Strategy from the National Security Council.
- AE represents DOE at the White House Arctic Executive Steering Committee.
- Legacy nuclear site monitoring at Amchitka, Chariot and STEM program with the Ted Stevens Center



Arctic Circle Assembly (top),
AFN Alaska Day (bottom)

Arctic Lab Partnerships (ALPs)

- AE-led/coordinated via National Lab Chief Research Officers Council
- 12 national laboratories & University of Alaska
- 2020 workshop on Arctic research needs
- 2021 development of research white papers
- 2022 oversight of ArcticX InnovationX Lab webinar series and in-person conference



Argonne National Lab, Brookhaven National Lab, Idaho National Lab, Los Alamos National Lab, Lawrence Berkeley National Lab, Lawrence Livermore National Lab, National Energy Technology Lab, National Renewable Energy Lab, Oak Ridge National Lab, Pacific Northwest National Lab, Sandia National Lab, Savannah River National Lab

Wind Power Outlook from DOE

“As one of the cheapest energy sources nationwide, wind energy generates enough electricity to power more than 43 million homes and is creating good-paying jobs for the growing domestic wind energy workforce,” said **U.S. Secretary of Energy Jennifer M. Granholm**. “President Biden’s Investing in America agenda is expanding our nation’s domestic supply chain, increasing energy security, and growing the wind energy market to drive our clean energy future.”

According to DOE's new reports, wind power accounted for 22% of new electricity capacity installed in the United States in 2022, second only to solar, representing \$12 billion in capital investment, and employing more than 125,000 Americans.

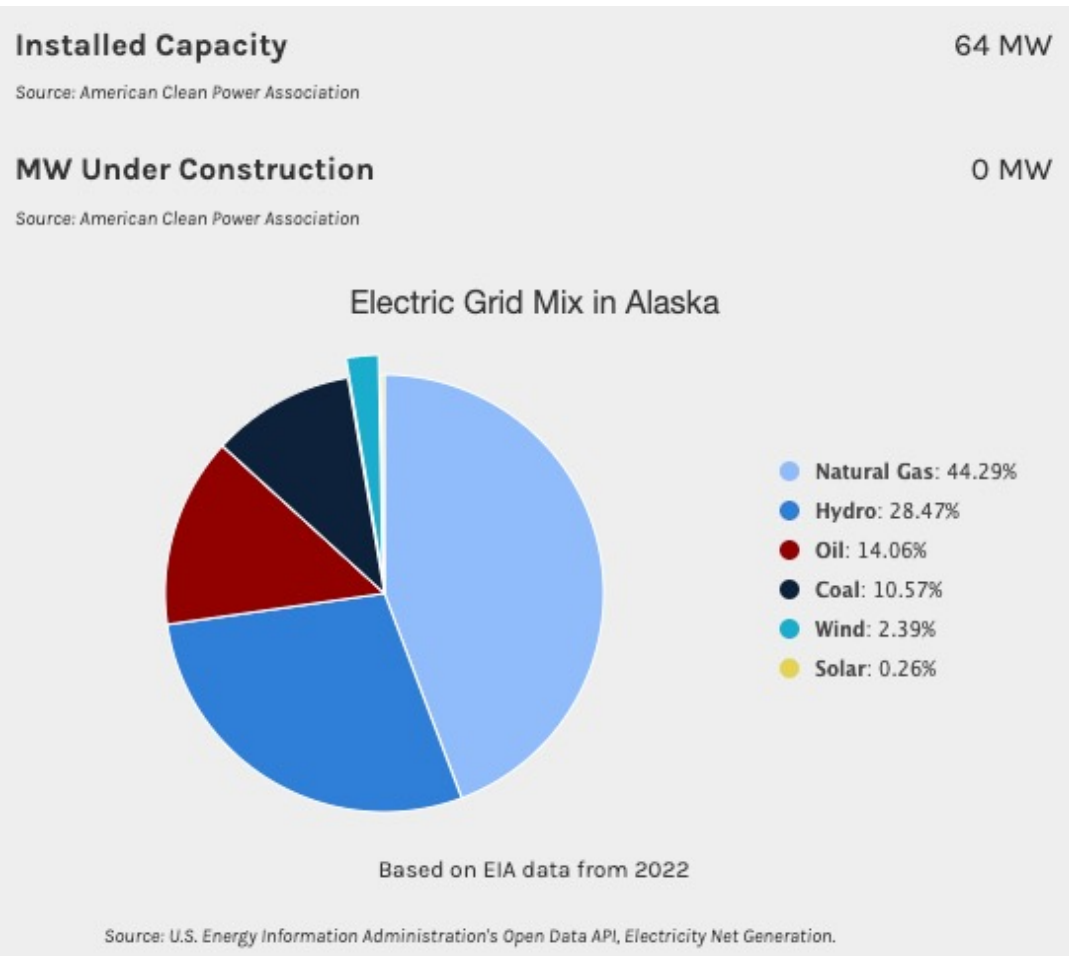
The reports found that transformative tax incentives in President Biden’s Investing in America agenda—a key pillar of Bidenomics—have led to significant increases in near-term wind deployment forecasts and are helping keep wind power prices competitive with other sources of energy like natural gas.

U.S. DEPARTMENT OF ENERGY PROJECTS STRONG GROWTH IN U.S. WIND POWER SECTOR

Three New Wind Energy Market Reports Highlight Growth in Wind Energy Deployment and Domestic Supply Chain, Creating Good-Paying Jobs Thanks to President Biden’s Investing in America Agenda



Wind Energy in Alaska



Modeling & Analysis

1) DOE Funding to AEA

- Determine best performing wind energy systems. Upgraded HOMER wind-diesel-solar hybrid modeling. Long term tower studies for icing impacts for turbines. LiDAR wind detection system.

2) DOE Funding to UAF

- Support development of sustainable, resilient, cost-effective wind-diesel systems for isolated communities.

3) DOE Funding to NREL

- Quantify Alaska's offshore wind resource capacity.

Report found that the technical offshore wind resource area in Alaska is larger than all the other coast U.S. states COMBINED

[Link: Wind Energy Exchange](#)

Spotlight: St. Mary's, Alaska

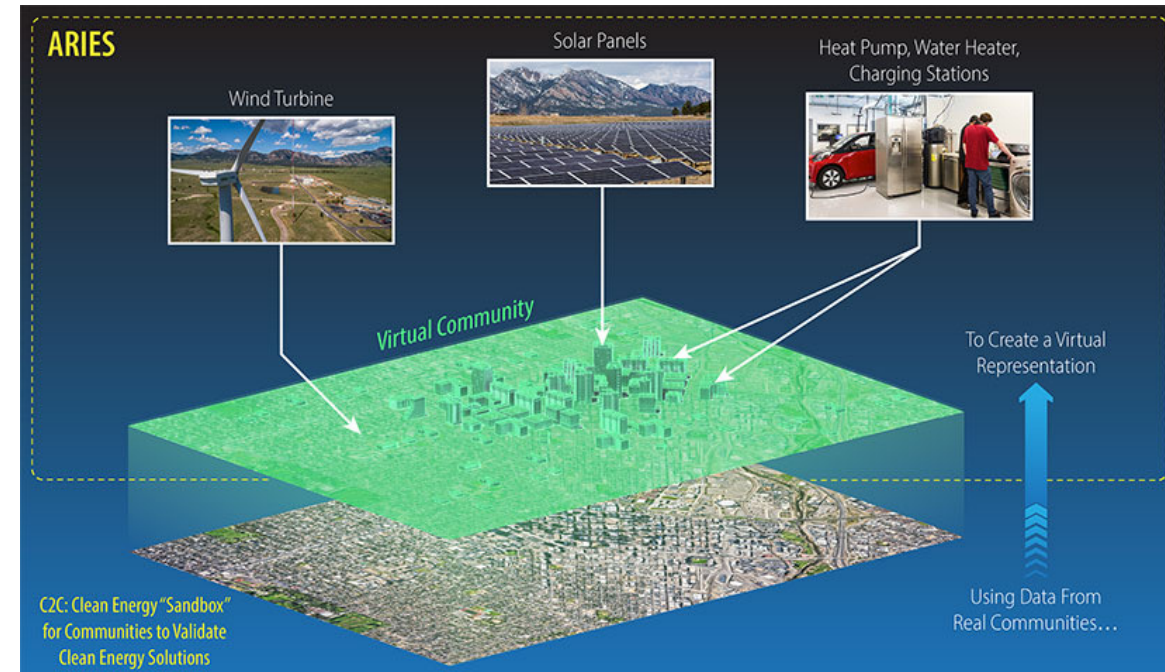
- St. Mary's installed a single 900-kilowatt wind turbine in 2019. That turbine produces about 50% of their power, offsetting about \$355,000 in fuel costs annually.
- A lack of awareness of distributed wind energy's economic value, clean energy value, and energy resilience could have contributed to its slow adoption.
- Now, thanks to the 4-year Microgrids, Infrastructure Resilience, and Advanced Controls Launchpad (or MIRACL) project, those data exist and confirm distributed wind energy could be a cost-effective source of clean power to many communities, especially those in remote and rural areas, as well as a key component in reliable and resilient energy systems.
- Working with the Alaska Center for Energy and Power and the local power cooperative for St. Mary's, the Alaska Village Electric Cooperative, the MIRACL team also identified hybrid system technology advances to increase fuel savings.



[Read more in their blog.](#)

Spotlight: Golden Valley Electric Association

- Golden Valley Electric Association (GVEA), is the local utility that serves Fairbanks and other Interior Alaska communities.
- GVEA's 6,000-mi² service area includes hospitals, mines, and four critical military bases.
- Through the C2C program, the utility has been working with the NREL team to create a detailed analysis of the current generation plan
- Central to the plan is shutting down a 50-MW coal plant by 2025 and replacing it with three sources: new wind generation, new energy storage, and imports of additional power from Southcentral Alaska.
- Using tools like the Simulation and Emulation for Advanced Systems software, NREL figured out how large-scale wind power could be added to the grid without affecting its performance.



[Read more in their blog.](#)

Prize: Wind Turbine Materials Recycling

STATUS: Apply by Sept 29.



During the first phase, *Initiate!*, competitors will prepare a submission package that highlights a concept for wind material recycling focused on economic and environmental sustainability. Up to 20 winners will be selected to receive \$75,000 in cash each and an invitation to compete in the second phase of the competition.

About 85%–90% of the mass of a wind turbine is made of materials that can already be commercially recycled. The bulk of the unrecycled materials are fiber-reinforced composites (carbon fiber and fiberglass). These materials can be found in various forms in wind turbine blades, nacelle covers, and the cover for the hub that connects the blades to the wind turbine. The wind energy industry also depends on [critical minerals](#), such as rare earth elements (including neodymium and dysprosium used in generators), which do not currently have domestic commercial-scale recycling options.

Funding: Rebates for Transformers and Critical Equipment

STATUS: Open until Dec 31 or funds run out. [Website Link](#)

\$20 million to support the installation of energy efficient distribution transformers and extended product systems that use equipment with electric motors, such as pumps, air compressors, and fans. This funding, made possible by the President's Bipartisan Infrastructure Law, will be distributed through two rebate programs, one focused on transformers and another on extended product systems. **Office of Manufacturing and Energy Supply Chains.**

The rebate programs aim to help domestic manufacturers, utilities, tribes, hospitals, schools, and other operators finance equipment upgrades, which will conserve energy and reduce costs while slashing greenhouse gas emissions across multiple sectors.

Replacing aging grid infrastructure and accelerating the deployment of modern technologies is essential to deploying affordable, reliable, and clean electricity around the nation and critical to achieving the Biden-Harris Administration's ambitious clean energy and climate goals.

Notice of Intent: Marine Energy Research @ Colleges/Univ.

The [Water Power Technologies Office](#) (WPTO) published a [notice of intent](#) on August 31 to issue a \$14.5 million funding opportunity to support marine energy research at U.S. institutions of higher education, including minority-serving institutions. Foundational research is critical to advancing novel and new technologies like marine energy and floating offshore wind. WPTO expects to release this funding opportunity in fall 2023 in partnership with WETO—the two offices are collaborating on a topic over assessing and advancing potential synergies between floating offshore wind and/or marine energy and aquaculture development.



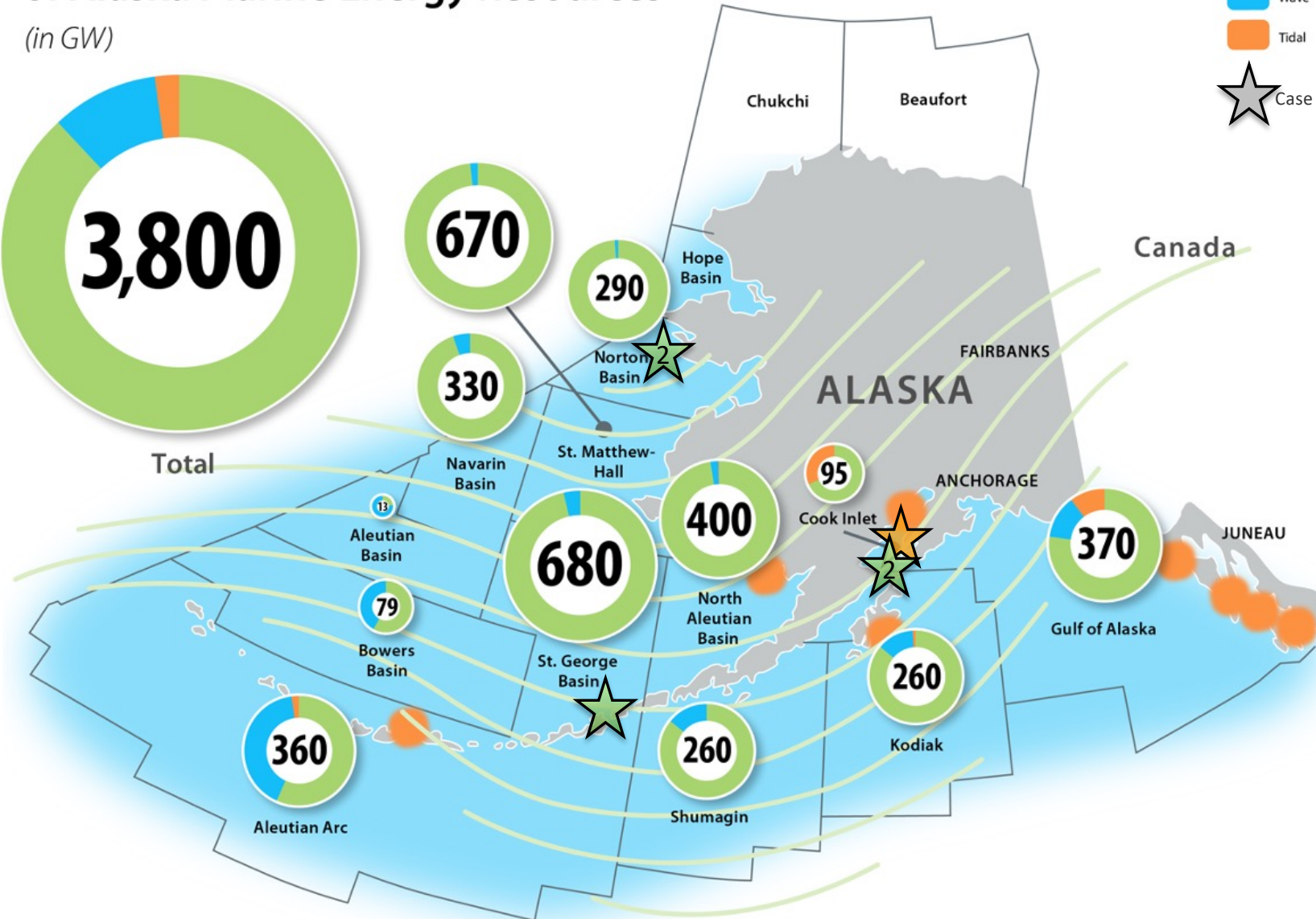
Resource Assessment

Technical Power Potential of Alaska Marine Energy Resources

(in GW)



Total



Notice of Intent: Reduce Costs of High Voltage Transmission

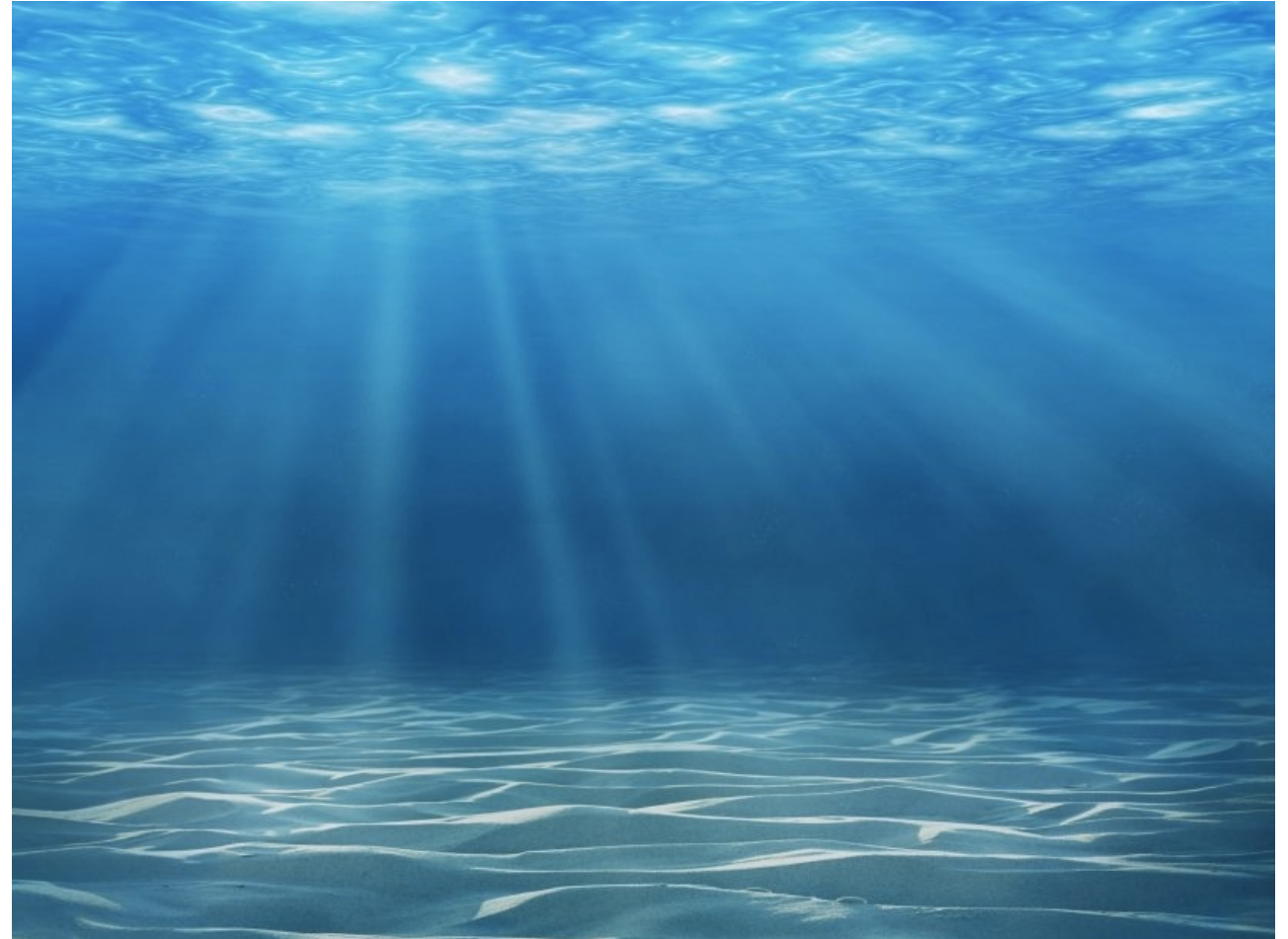
The U.S. Department of Energy's (DOE) Wind Energy Technologies Office (WETO) and Office of Electricity (OE) [plan to fund research](#) to drive innovation and reduce costs of high-voltage direct current (HVDC) voltage source converter (VSC) transmission systems. HVDC transmission systems are more efficient than traditional alternating current (AC) transmission systems for transmitting electricity over long distances while minimizing power losses. Many renewable resources are in remote locations on land, or planned far from shore (e.g. offshore wind), and HVDC transmission provides a cost-effective solution for renewable integration onto the grid.



Notice of Intent: Improve Offshore Wind Energy Deployments

DOE's [Wind Energy Technologies Office](#) (WETO) and [Water Power Technologies Office](#) (WPTO) and the Department of the Interior's (DOI) Bureau of Ocean Energy Management (BOEM) and Bureau of Safety and Environmental Enforcement (BSEE) announced that they intend to collaborate and [jointly fund research](#) to further support durable and environmentally responsible U.S. offshore wind energy and marine energy deployments.

The goals of this [upcoming funding opportunity announcement \(FOA\)](#) are to improve the reliability of mooring lines, which are used to attach floating offshore wind and marine energy systems to the seafloor and to reduce noise associated with installing fixed-bottom offshore wind energy foundations. This funding opportunity will target technologies with applicability to offshore wind and marine energy deployments in all regions.



Funding: Energy Futures Grant

Status: OPEN: **Deadline: Sept 30.** [Link to Apply.](#)

\$27 million in financial assistance to support local, state, and tribal government-led partnership efforts that will advance clean energy program innovation.

Goal: enhance energy affordable and access for communities, esp flow to disadvantaged communities, via the **Office of State and Local Energy Programs.**

EFG will provide support for at least **50 multi-jurisdictional teams.** Teams should be ideally **comprised of 3-4 or more state, local, and/or tribal government partners** joining together on a planning project.

Partners can include academia, think tanks and/or utilities positioned to turn innovative (novel or early action) ideas into solutions that **address barriers to clean energy deployment.** A successful project will have equitable program innovation and seek to leverage DOE and other resources to speed and scale deployment of best practices by region or nationwide.

Thank You!

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