



Long-Duration Energy Storage Demonstrations Program – Pumped Thermal Energy Storage in Alaska Railbelt

The Long-Duration Energy Storage (LDES) Demonstrations Program, managed by the U.S. Department of Energy's (DOE) Office of Clean Energy Demonstrations (OCED), aims to validate new energy storage technologies and enhance the capabilities of customers and communities to integrate grid storage more effectively. As part of this program, OCED sought applications for LDES projects from a range of different technologies intended to overcome technical and institutional barriers to full-scale deployment of LDES systems in diverse geographies. OCED selected nine projects to begin award negotiations for a total of up to \$286 million. Following negotiations, in June 2024, OCED awarded the Pumped Thermal Energy Storage in Alaska Railbelt (POLAR) project with nearly \$5.5 million to begin work in the first project phase. The POLAR project will be located in Healy, AK.

Awardee Fact Sheet

LDES Demonstrations Program: Pumped Thermal Energy Storage in Alaska Railbelt

Project at a Glance

- » **Total OCED Cost Share:** Up to \$50 million
- » **Phase 1 Total Project Amount:** \$10,973,787*
- » **Phase 1 OCED Award Amount** \$5,486,893**
- » **Phase 1 Scope of Work:** Planning activities related to budgeting, permitting, procurement, and early development activities
- » **Phase 1 Timeline:** 18-24 months
- » **Recipient:** Westinghouse Electric Company, LLC is a global supplier of carbon-free nuclear energy technology with efforts dedicated to the development of thermal energy storage (TES) technology
- » **Project Locations:** Healy Power Plant; Healy, AK
- » **Start Date:** June 2024

*Represents the total project cost for Phase 1.

**Represents OCED's cost share for Phase 1. Additional funding for this project is subject to future award negotiations at the end of each project phase.

About This Project

Westinghouse Electric Company, LLC (WEC), in collaboration with technology provider Echogen Power Systems and construction partner ASRC Energy Services - Houston Contracting Company, Inc., plans to design and build a Pumped Thermal Energy Storage (PTES) system with a 1200 MWh capacity, capable of a minimum continuous output of 50 MW for 24 hours at the Healy Power Plant. Power from the POLAR project will fill a critical gap in electricity generation for the region, as one of the units from the power plant is expected to retire. The POLAR project's PTES system will work with a new wind power system that will be installed by the Golden Valley Electric Association (GVEA), a local utility cooperative interconnected along Alaska's Railbelt region, offering reduced electricity prices and improved air quality.

The PTES system operates by converting electricity to thermal energy, then storing the energy in large reservoirs of ice, water, and oil/concrete. When needed, the system can then deploy the stored energy by reversing the process, offering a source of dispatchable backup power when demand is high or when supply is low.

In June 2024, OCED awarded the POLAR project nearly \$5.5 million to conduct Phase 1 of the project, which is expected to last 18-24 months. During Phase 1, WEC and the project team will conduct planning activities related to budgeting, permitting, procurement, community and labor engagement, partnership development, and workforce planning.

Pumped Thermal Energy Storage in Alaska Railbelt Project Fact Sheet

Project Site

The POLAR project is planned for co-location with the existing Healy Power Plant in Healy, AK. Owned and operated by GVEA, the existing plant currently houses two coal-fired generation units, one of which is planned to be retired. The POLAR project aims to develop a portion of the brownfield site into an energy storage system that will be combined with a separate deployment of clean wind energy, improving the air quality and filling a gap in power generation for the Alaska Railbelt communities.

Community Benefits Commitments

Community benefits commitments are a key component of the POLAR project, informed and developed in consultation with local communities, which aim to mitigate potential adverse impacts of this project and maximize local community benefits. The POLAR project will implement these commitments through:

- Creating an **advisory committee** composed of stakeholders from the impacted project areas. This committee will assist with ensuring the use of appropriate community advisory mechanisms, assessing and ensuring equitable impacts, providing input for workforce and community agreements, and assisting with public data reporting.
- Engaging with the community, including Alaska Native villagers, community-based organizations, and other impacted groups, through **community meetings and public forums**. In coordination with the local school district, businesses, and universities, WEC will also provide educational opportunities for the community on the PTES system.
- Creating **quality jobs**, investing in workforce education and training, and pursuing Collective Bargaining Agreements and Project Labor Agreements. WEC will develop employee mentoring and apprenticeship programs, provide opportunities for professional growth, and support educational opportunities from underrepresented groups.
- Promoting **project transparency** for all impacted communities throughout the life of the project.

More details on the POLAR project's community benefits commitments can be found in the [Community Benefits Commitments Fact Sheet](#).



Rendering with Cutaways of a Generic Westinghouse Pumped Thermal Energy Storage Facility



Healy Power Plant

The U.S. Department of Energy established OCED to help scale the emerging technologies needed to tackle our most pressing climate challenges and achieve net-zero emissions by 2050. OCED's mission is to deliver clean energy demonstration projects at scale in partnership with the private sector to accelerate deployment, market adoption, and the equitable transition to a decarbonized energy system.

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LDES Demonstrations Program Goals

More than 335 million residents in the United States depend on our energy grid to reliably generate an average of 4 trillion kilowatt hours of power annually. During times of high demand, especially during inclement weather when it's more difficult to generate power, it's essential to have energy stored that can be deployed to meet demand, keep prices down, and ensure the lights stay on. Long-duration energy storage is one key option, storing energy that can be discharged over long periods of time that's ready for dispatch when needed. The DOE defines LDES as systems capable of delivering electricity for 10 or more hours. The LDES Demonstrations Program features projects with a range of intraday (10 to 36 hours) and multiday (36 to 160+ hours) storage solutions, which can minimize the frequency and length of power interruptions caused by events such as severe weather or cyberattacks on the grid. These projects will help effectively demonstrate the commercial viability of innovative LDES technologies and facilitate wider commercial adoption. OCED envisions LDES technology eventually being replicated across the country, providing flexibility and reliability to the power system without creating emissions, supporting a more renewable-heavy future.



Rendering of a Generic Westinghouse Pumped Thermal Energy Storage Facility



Future siting of the POLAR Project at GVEA's Healy Power Plant

Contact

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More Resources

Website: energy.gov/oced/LDES

Office of Clean Energy Demonstrations:
energy.gov/oced

