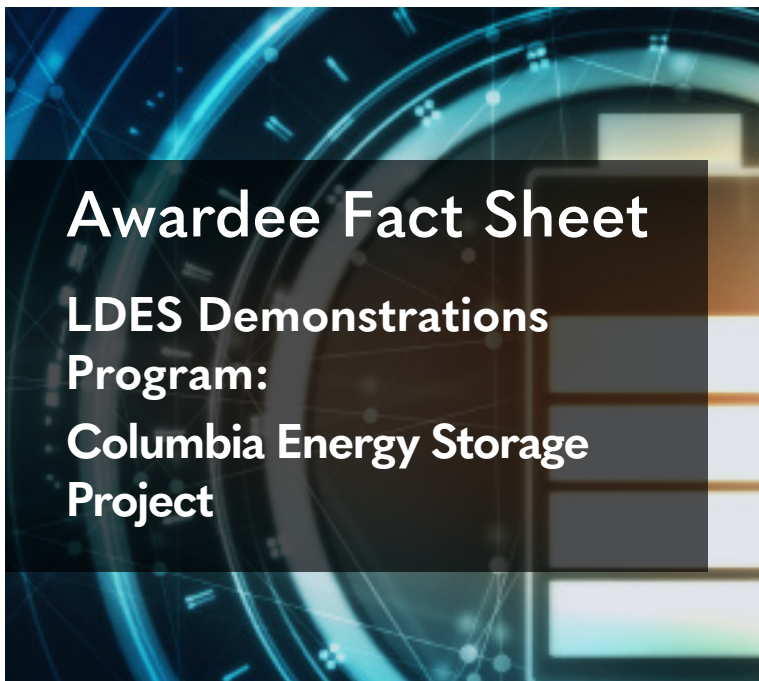




Long-Duration Energy Storage Demonstrations Program – Columbia Energy Storage Project

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 July 2024, OCED awarded the Columbia Energy Storage Project more than \$7 million to begin work in Phase 1. The Columbia Energy Storage Project will be located at the Columbia Energy Center in Pacific, WI.



Project at a Glance

- » **Total OCED Cost Share:** Up to \$30.7 million
- » **Phase 1 Total Project Amount:** \$15,356,884*
- » **Phase 1 OCED Award Amount:** \$7,200,865**
- » **Phase 1 Scope of Work:** Planning activities related to budgeting, permitting, procurement, community and labor engagement, workforce planning, and early development
- » **Phase 1 Timeline:** 16-22 months
- » **Recipient:** Wisconsin Power and Light Company, doing business as Alliant Energy, is a public energy company providing electricity to customers across Wisconsin
- » **Project Locations:** Pacific, WI
- » **Start Date:** August 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

Alliant Energy, in collaboration with technology provider Energy Dome, plans to construct a grid-tied compressed carbon dioxide (CO₂) LDES system at the Columbia Energy Center, a soon-to-be retired coal-fired power plant in Pacific, WI. The system is designed to discharge 18 MW of power for at least 10 hours. This facility would be the first of its kind in the United States and seeks to demonstrate the capability of the LDES technology to support renewable generation for the energy industry.

The Columbia Energy Storage Project plans to store excess energy from the grid by converting CO₂ gas into a compressed liquid form, which reduces the cost and complexity of storing energy. When needed, the CO₂ can be converted back into gas form, powering a turbine to create

electricity. Through the use of compressed CO₂, the system aims to improve efficiency compared to similar systems, as it produces less heat during the compression cycle and can be stored as a liquid. Energy Dome's modular system also offers flexibility that can support a more resilient power grid.

In July 2024, OCED awarded the Columbia Energy Storage Project more than \$7 million to conduct Phase 1 of the project, which is expected to last 16-22 months. During Phase 1, Alliant Energy and the project team will conduct foundational activities such as formalizing the project plan, signing partnership agreements, conducting interconnection studies, defining the permit plan, performing environmental planning, and conducting engineering and design work.

Columbia Energy Storage Project

Project Fact Sheet

Project Site

The Columbia Energy Storage Project will be located at the soon-to-be retired coal-fired Columbia Energy Center power station in Pacific, WI. Utilizing existing electric grid infrastructure, this installation represents a significant advancement toward a more reliable, resilient, and cost-effective energy future for the area.

Community Benefits Commitments

Community benefits commitments are a key component of the Columbia Energy Storage Project. These commitments are informed by and developed in consultation with local communities to help maximize local benefits and mitigate any potential negative impacts. The Columbia Energy Storage Project will implement these commitments through:

- Engaging with the Ho-Chunk Nation, the Midwest Tribal Energy Resources Association, other impacted communities, community-based organizations, and local labor unions through **public meetings and listening sessions**.
- Creating a **Community Stakeholder Working Group** composed of stakeholders from the impacted project area. This working group will assist with ensuring the use of appropriate community engagement and advisory mechanisms, assessing and ensuring equitable impacts, providing input for workforce and community agreements, and assisting with public data reporting.
- Partnering with local colleges and labor unions to **create workforce training and pre-apprenticeship opportunities** for local students.

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



Energy Dome CO₂ battery installation in Sardinia, Italy

Columbia Energy Storage Project

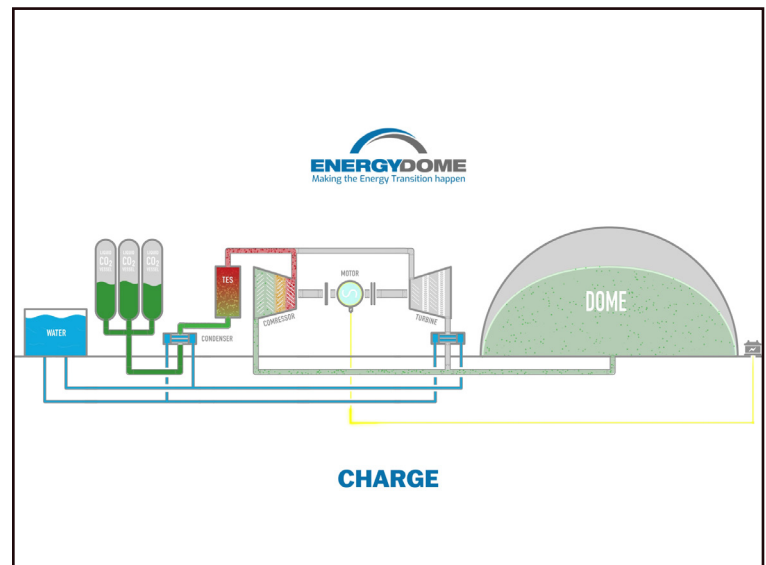
Project Fact Sheet

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. 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. Through these projects, OCED envisions the technology eventually being replicated all over the country, providing flexibility and reliability to the power system without creating emissions, supporting a more renewable-heavy future.



Rendering of Energy Dome for Wisconsin site



System illustration of CO₂ battery charging cycle (not to scale)

Contact

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Site-Specific Email: Columbia_LDES@hq.doe.gov

More Resources

Website: energy.gov/oced/lides

Office of Clean Energy Demonstrations:
energy.gov/oced

