MEMBER CASE STUDY

Powering the Japanese grid with clean air

World's first: unlocking new potential in Japan's infrastructure at Sumitomo Heavy Industries' liquid air storage plant

Impact

Synchronous power to grid providing **grid stability**

5MW / 20MWh **capacity**

Snapshot

In Hiroshima, Sumitomo Heavy Industries, Ltd. is building the **world's first commercial** liquid air energy storage plant. The system turns air and recycled industrial cold into clean electricity - showcasing a scalable, **zero-emissions alternative** to fossil-based backup power and supporting **Japan's 2050 carbon neutrality strategy.**

- **Location:** Hatsukaichi City, Hiroshima Prefecture, Japan
- **Owner:** Sumitomo Heavy Industries, Ltd.
- **Technology:** Liquid Air Energy Storage (LAES),
- **Capacity for the project:** 5 MW/20MWh

The Challenges

As the global shift to clean energy accelerates, the need for efficient and scalable long-duration energy storage (LDES) is more urgent than ever. Renewable sources like wind and solar are growing rapidly, but they must be better integrated into the grid to ensure consistent power, grid stability, and energy security. Japan, highly dependent on imported fossil fuels and exposed to extreme weather risks, faces particular pressure to make renewables reliable. To achieve net-zero targets and fully decarbonise electricity systems, renewable energy must be available around the clock, especially when the sun is down and the wind is unavailable.

Harnessing the power of air

Sumitomo Heavy Industries, Ltd. (SHI) is pioneering a new way to store clean energy: turning air itself into a battery. Liquid Air Energy Storage (LAES) **cools ambient air into liquid form and later expands it back into gas to drive turbines, delivering reliable,** zero-emissions power **when it's needed most.**

In Hiroshima, Sumitomo Heavy Industries, Ltd. (SHI) has built the **world's first commercial LAES plant** connected to a liquefied natural gas (LNG) terminal. By reusing the terminal's excess cold, the system boosts efficiency and **avoids emissions** that would otherwise come from gas-fired boilers. The facility will provide clean, reliable electricity while also delivering **grid stability** services such as inertia, reactive power, and short-circuit capacity.

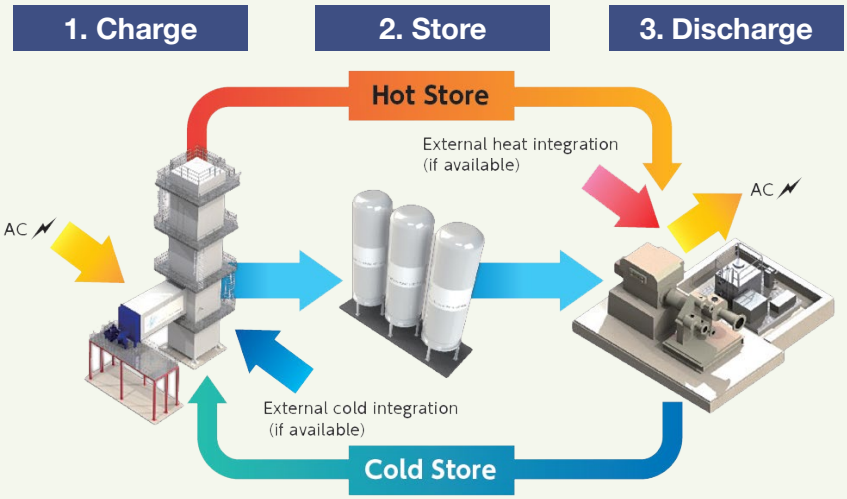
This effort supports **Japan's 7th Strategic Energy Plan**, which calls for long duration energy storage like LAES to integrate renewables and put the country on track for **carbon neutrality by 2050**.

HOW IT WORKS

How LAES Works

LAES harnesses the power of air to provide a reliable, flexible, and sustainable energy storage solution:

- Air is cooled into a liquid and stored in insulated, pressurised tanks.
- When needed, the liquid air is reconverted to a gas and used to generate electricity.
- Waste heat and cold from charging or discharging are reused to boost efficiency.



Liquefy surrounding air by refrigeration using an industrial air liquefier.

Store the cryogenic air at low pressure in standard insulated tanks.

Pump the air to high pressure, heat and release through a turbine generator.

Yoichi Kato
Vice President, Head of Energy & Environment Group

"The Hatsukaichi LAES Power Station project will show how LAES technology can unlock renewable integration while providing critical grid stability. The project, being the world's first LNG-integrated LAES plant, marks an important step toward our vision of realizing a clean, reliable and resilient energy infrastructure for a net-zero future. As a location-agnostic solution that can be deployed at scale directly at the point of need, LAES offers unique flexibility to meet energy system challenges wherever they arise."

Why it matters

By advancing this technology, Japan can harness the power of LAES to deliver clean energy at scale, even at the level of entire power grids. Sumitomo Heavy Industries' world-first project in Hiroshima delivers a solution that keeps the system stable, scales up easily, works almost anywhere, and produces zero emissions, making it a truly flexible tool for the future and a key step toward Japan's 2050 carbon neutrality strategy.

Sumitomo Heavy Industries, Ltd.

Sumitomo Heavy Industries, Ltd. (SHI) and its 100% subsidiary, Sumitomo SHI FW (SFW) are a global provider of solutions and services that drive the decarbonization of energy. Our solutions include energy from biomass and waste, long duration energy storage, sustainable fuels, carbon capture, waste heat boilers, as well as related services to digitalize, optimize, and decarbonize assets that we deliver to the global power and industrial markets. We strive to provide sustainable energy solutions for customers in a wide range of industries including energy, waste, chemicals, metal, sustainable fuels, cement and pulp and paper. Our excellence in delivering projects worldwide rely on our talented people, across 20 locations in 14 countries, with deep know-how and experience in the industry.

Visit us at www.shi-fw.com. Powering a decarbonized world for everyone.

LDES LONG DURATION ENERGY STORAGE COUNCIL

The Long Duration Energy Storage Council is a global organisation advancing decarbonisation by facilitating the accelerated deployment of LDES solutions. The LDES Council's global industry organisation provides fact-based guidance on the deployment of LDES. The LDES Council covers a wide range of LDES technologies, and its members operating in 22 countries span a spectrum of innovation, including mechanical, theramal, electrochemical and chemical solutions.

To learn more, visit www.ldescouncil.com