

Advanced energy storage system: Poland's Wind Farm using the best of both worlds

Lead and lithium batteries provide up to 4.5 hours of power and help integrate wind power into Poland's energy matrix

ABOUT THE CASE STUDY

This hybrid energy storage (ESS) system made of advanced lead and lithium batteries is currently the largest of its kind in Poland.

Strategically situated to enhance the Bystra Wind Farm in Northern Poland, this facility maximizes renewable energy usage and stabilize local energy supplies.

Through efficient energy time-shifting, the system provides a reliable power source during peak demand periods, lowering energy costs for industries and residents. It focuses on low-carbon technologies and high recycling rates, setting a new standard for energy solutions in the region.



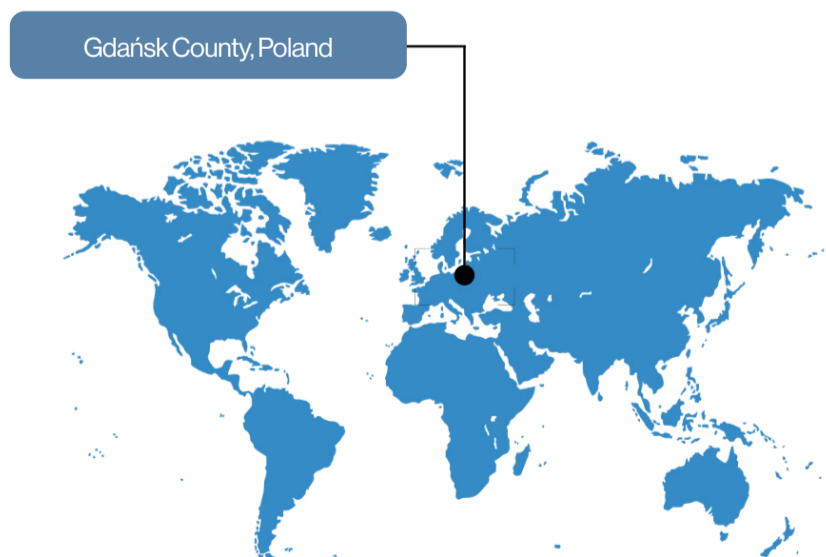
Poland's largest hybrid battery energy storage system. Source: Sumitomo Mitsui Banking Corporation.

TECHNICAL SUMMARY

Project launch	October 2019
Construction time	12 months
Size of the system	advanced lead batteries: 26.9 MWh energy; 5 MW power lithium batteries: 0.47 MWh energy; 1 MW power; 4.5-hour system
Battery type	2 V advanced lead-carbon AGM batteries** and lithium batteries
Battery provider	Showa Denko Materials
Owner	NEDO, Ministry of Climate of the Republic of Poland
Application	voltage support, time-shifting, price arbitrage, lead balancing

* AGM = Absorbent Glass Mat

LOCATION



MARKET OPPORTUNITY

Advanced lead batteries are well suited for applications such as this, demonstrating significant enhancements in energy density, charge acceptance, depth of discharge and cycle life¹.

Hybrid ESS systems are redefining the energy storage landscape. Market opportunities for front-of-the-meter (FTM) applications are expected to exceed 600 GWh by 2035².

Such dual chemistry systems are yet to be commonplace, making this project a pioneering effort in the energy sector. Comparable setups illustrate the growing acceptance and implementation of these large-capacity hybrid systems. The potential for market expansion is immense, promising significant returns on investment as these technologies become more mainstream.

SUSTAINABILITY AND IMPACT

The hybrid system combines the performance strengths of two different battery technologies, resulting in a highly efficient and cost-optimized solution.

With around 70% of electricity still produced by coal in Poland, investments are ramping up towards renewable energy and energy storage deployment. The successful demonstration of this FTM system contributes to the further integration of renewable energy in Poland by ensuring the stable operation of the electricity grid and minimizing investment in transmission infrastructure.

Hitachi (distribution control system provider) and Showa Denko Materials follow best practices in lead battery manufacturing. In Japan (place of manufacturing) and Europe (place of use), over 99% of lead batteries are collected and recycled. Over 80% of the content in these lead battery products is from recycled streams. Furthermore, these batteries are made in state-of-the-art facilities with the lowest carbon footprint for battery production.



1. Consortium for Battery Innovation (2021): Technical Roadmap
2. KPMG (2024): Global Energy Storage Report: Executive Summary

Find out more

More information about the case study and other case studies of CBI available on our [WEBSITE](#).

Contact information

Dr. Matt Raiford | Technical Director
matt.raiford@batteryinnovation.org
www.batteryinnovation.org