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Finnish innovation – the world’s largest sand-based thermal storage – inaugurated in Pornainen

CapMan Infra Press Release
28 August 2025 at 10:00 a.m.

History was made in Pornainen on 25 August 2025, when Finland’s Minister of Climate and the Environment, **Sari Multala**, officially inaugurated the world’s largest sand-based thermal storage, also known as a sand battery. The innovative solution, developed by Polar Night Energy and CapMan Infra’s portfolio company Loviisan Lämpö, marks a new era in thermal energy storage and the green transition.

Collaboration and smart technology at the core

The project was implemented by Finnish startup Polar Night Energy in collaboration with Loviisan Lämpö. The system is optimised using artificial intelligence by Elisa Industriq, enabling smart energy usage based on electricity market dynamics.

As the owner of Loviisan Lämpö, CapMan Infra brings a strong perspective on how sustainability and operational efficiency can go hand in hand.

"This project is a great and tangible example of how cost-efficiency and sustainability come together in our investments. The sand battery is a commercially viable investment for us, but we also wanted to boldly support an innovative solution that benefits customers, the municipality, and the entire electricity market," says **Sauli Antila**, Investment Director at CapMan Infra.

From an investor’s perspective, sand-based thermal storage has enormous potential: it enables participation in electricity reserve markets and reduces dependency on single energy sources in heat production. The project combines Finnish innovation, concrete climate impact, and circular economy principles.

Inauguration ceremony with ministerial guests

The inauguration event brought together energy experts, investors, and local stakeholders to celebrate a major step toward a carbon-neutral future.

Minister Sari Multala emphasised in her speech the significant potential of thermal energy storage in increasing energy system flexibility and reducing industrial emissions:

"Energy storage plays a key role in the energy transition, where we move away from combustion-based production toward a carbon-neutral society. The sand battery in Pornainen is a great example of how the clean transition can be advanced through the

electrification of district heating networks."

The municipality of Pornainen, involved from the beginning, also benefits from the project. A large portion of municipal buildings – including the comprehensive school, town hall, and library – are connected to the district heating network.

"It is especially meaningful that Pornainen is home to the world's largest sand battery. One of our strategic goals is carbon neutrality, and the sand battery plays a key role in achieving that," says **Antti Kuusela**, Mayor of Pornainen.

Pornainen's sand battery is a concrete example of how technology, investors, and local stakeholders can work together to build a more sustainable energy system. It shows that courage, collaboration, and innovation can make a change – one thermal storage unit at a time.

What is a sand-based thermal storage?

Sand-based thermal storage is sometimes mistakenly compared to an electric battery, but it is a fundamentally different way of storing energy. It stores heat generated from renewable electricity during periods of low market prices by transferring it into crushed soapstone. This allows the stored energy to be flexibly utilized as thermal energy even months after storage – particularly in district heating and industrial applications.

Key facts about the Pornainen system:

- 1 MW thermal output
- 100 MWh storage capacity
- Uses 2,000 tonnes of crushed soapstone, a by-product from Tulikivi's fireplace production
- Reduces district heating emissions in Pornainen by up to 70%
- Cuts oil use to zero and woodchip consumption by 60%

The thermal storage unit is approximately 13 meters tall and 15 meters wide, and it can cover nearly one month of heating demand in summer and about one week in winter in Pornainen.

More information:

Sauli Antila, Investment Director, CapMan Infra
+358 40 658 9708

About CapMan

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