

# ANALYSIS OF THE ADVANTAGES OF FINLAND'S BATTERY ENERGY STORAGE FIELD

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Is energy storage a viable option in Finland? This study reviews the status and prospects for energy storage activities in Finland. The adequacy of the reserve market products and balancing capacity in the Finnish energy system are also studied and discussed. The review shows that in recent years, there has been a notable increase in the deployment of energy storage solutions.



Is Finland a good place to invest in battery energy storage? In addition to that, Finland has a strong culture focusing on core business functions and there is always plenty of space for services. It is, however, noticeable that battery energy storage systems or services are demonstrated only by larger companies, which have got typically 30% investment support.



What factors influence the development of energy storage activities in Finland? Several parameters are influencing the development of energy storage activities in Finland, including increased VRES production capacities, prospects to import/export electricity, investment aid, legislation, the electricity and reserve markets and geographic circumstances.



Is the energy system still working in Finland? However, the energy system is still producing electricity to the national grid and DH to the Lempäälä area, while the BESSs participate in Fingrid's market for balancing the grid. Like the energy storage market, legislation related to energy storage is still developing in Finland.



Which energy storage technologies are being commissioned in Finland? Currently, utility-scale energy storage technologies that have been commissioned in Finland are limited to BESS (lithium-ion batteries) and TES, mainly TTES and Cavern Thermal Energy Storages (CTES) connected to DH systems.

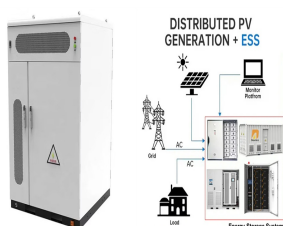
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How many battery installations are there in Finland? Today there are approximately 10 battery installations in Finland (see Table 1), which are providing services for different stakeholders in the energy value chain. First, the case studies are classified based on the framework presented above, and next, the main concerns raised in the interviews conducted are outlined.



Vantaa Energy plans to construct a 90 GWh thermal energy storage facility in underground caverns in Vantaa, near Helsinki. It says it will be the world's largest seasonal energy storage site by



Various storage technologies are used in ESS structure to store electrical energy [[4], [5], [6]] g.2 depicts the most important storage technologies in power systems and MGs. ???



The current research efforts mainly focus on 1) utilization of innovative materials, e.g., lead-antimony batteries, valve regulated sealed lead-acid batteries (VRLA), starting ???



With respect to Finland and Sweden, they are also references in terms of scientific productivity in the field of energy storage, Finland has contributed important research on the comparative analysis of the life cycle ???

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Swedish flexible assets developer and optimizer Ingrid Capacity has joined hands with SEB Nordic Energy's portfolio company Locus Energy to develop what is claimed to be Finland's largest and one of the Nordics' largest ???



Electricity storage systems play a central role in this process. Battery energy storage systems (BESS) offer sustainable and cost-effective solutions to compensate for the disadvantages of renewable energies. These systems ???



The economic attractiveness of the battery storage projects is evaluated considering the present and forecasted BESS costs and the electricity tariff levels in Finland and the conditions for ???