

Energy Storage for RES installations

The most natural application area for an energy storage are renewable energy installations. Renewable energy is characterised by high variability, depending on the time of day and weather conditions. A stable and efficient transition to a renewable-based electricity generation and distribution model requires the safe storage of energy.

The solution is an energy storage with a dedicated control and supervision system designed to operate in renewable energy installations (PV farms and wind turbines).

The purpose of the energy storage is to collect energy during the hours of its production by RES and to return it to the grid (sell it) during the hours of increased demand, as well as to temporarily stabilise generation.

The use of the storage unit makes it possible to scale and stabilise RES energy production and to increase production without increasing the connection power.

The energy storage can also provide services related to the stabilisation of the operating parameters of the mains (voltage balancing and stabilisation, reactive power compensation), thus reducing the switching on and downtime of RES installations caused by voltage increases in the grid.

The storage system is equipped with a dedicated control and supervision system that enables efficient use of available

Energy Management System (EMS)

energy, implementation of various operating modes depending on the adopted financial models, archiving and visualisation of measurement data, and integration with external control and supervision systems.

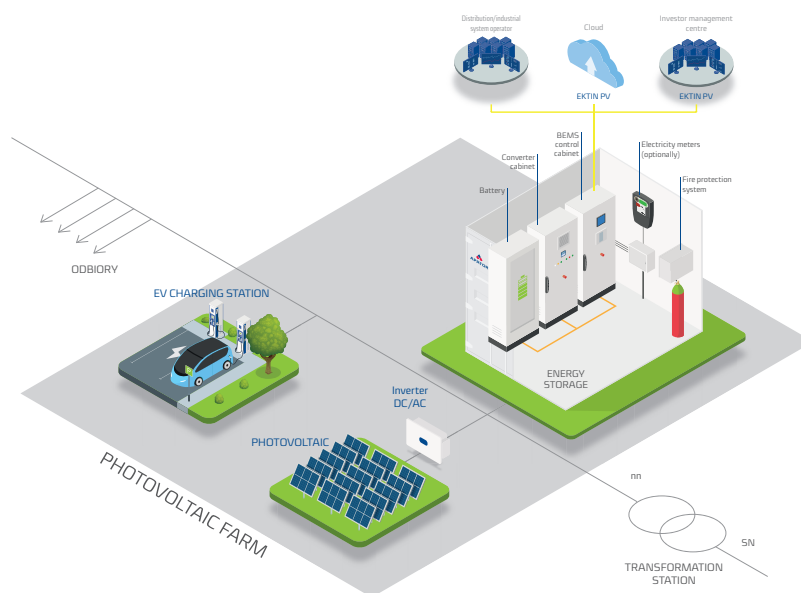


Energy storage – benefits for RES installations

- Improved control of RES, easier integration into the electricity system, stabilisation of the operation of individual RES-based generation units
- Aggregation of renewable energy from sources with different production profiles (e.g. PV farms and wind power plants) and mitigation of undesirable dynamic states (cable pooling)
- Offsetting surpluses and deficits of energy produced by large RES installations (support for local microgrids or national electricity systems and support for the balancing market)
- Increasing the cost-effectiveness of installations - storage of surplus energy for resale at the most profitable moment, increasing the capacity of installations without increasing the connection power
- Provision of additional services related to the stabilisation of electricity grid parameters

Energy storage parameters

1	Capacity and power rating range	from 250 kWh to 10 MWh / from 250 kVA to 10 MVA
2	Supply voltage	3 x 400V / 3 x 600V / 3x 800V / MV
3	Design	free-standing – containerised
4	Battery technology	LiFePO4, NMC, flow, hybrid
5	Galvanic isolation	AC transformer
6	Functionality	<ul style="list-style-type: none"> NC RFG implementation peak-shaving, charging storage during peak production and returning energy to the grid at a different time cable pooling (integration of various renewable energy sources) hourly scenario operation, connection to energy market, weather data prediction limiting the required connection power or maintaining it at the current level while increasing the farm's generation capacity – power guard system frequency control improving the quality of energy in the distribution grid (voltage balancing, P and Q regulation, reactive power compensation, harmonic compensation) response time to load change 500 μs, change dynamics 50 kW/s energy storage efficiency >85% operating temperature -25°C – + 50°C input voltage frequency 50 Hz, +/- 10% compatibility with NC RFG certified power guard 4-leg topology enabling independent control of active and reactive power for each phase of the supply voltage and voltage balancing of the grid galvanic isolation between the grid and the battery via a high-frequency transformer of the DC/DC converter



Optional:

EKTIN – digital system for RES supervision

System for the supervision and management of photovoltaic farms and wind power plants. It provides access to detailed information on the operation of the investment and facilitates the control of its components.

Visualisation and monitoring of energy storage operation

The digital supervision system displays the basic operating parameters of the energy storage: the amount of energy generated by the sources, energy taken from the grid, from RES and the energy storage. Information on the basic parameters of the grid, storage battery and inverter, as well as its state of charge.

