Energiavarastojen hybridiratkaisut

Sähköenergian varastointiratkaisut kunnallisina investointeina - keskustelutilaisuus

Lasse Autio

2025-01-16

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About Hitachi Energy

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~ 45,000 employees

90
countries with 200+ offices

~250
years' heritage combined

5,500
sales employees & field engineers

2,000
engineers & scientists in R&D

~ $13 billion USD business volumes

Four Business Units

Grid Automation	**High Voltage Products**
Grid Integration	**Transformers**

Customers

- Transport & Infrastructure
- Industry
- Utilities

Offering

- Services
- Software & Automation
- Systems
- Products

Geographies

- Asia, Middle East & Africa
- Americas
- Europe

% split based on FY 2022 orders

Hitachi Energy – Technology and market leader across all business units

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Grid Automation (GA)

Supporting 50% of the top 250 global electric utilities

Leading grid edge references & > 7,000 MW[1] grid integrated

Facilitates US$ 68B+ of wholesale market trades annually

Revenues Market share

Grid Integration (GI)

Global leader in HVDC[2]
>150 GW[3] of HVDC links integrated into the power system

4,000+ power quality systems operating globally, across 50+ countries

~15,000 systems operating globally, across 50+ countries

Revenues Market share[4]

High Voltage Products (HV)

Installed 1 out of 4 high-voltage switchgear in the world

>500k high-voltage circuit breakers installed globally

Leading EconiQ SF_6 –free high-voltage product portfolio

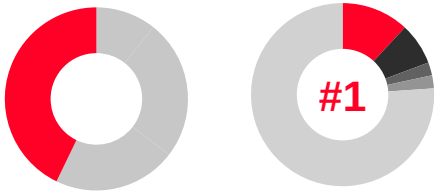
Revenues Market share

Transformers (TR)

Global leader across complete range of transformers, components & services

From distribution up to UHV[5] 1,200 kV AC[6] & 1,100 kV DC[7]

World's largest installed base and largest portfolio/applications



Revenues Market share

Driving innovation, pioneering technologies, and solutions while maintaining & modernizing the world´s largest installed base

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Masters of electrical power technology in Finland

More than half of wind power generated in Finland flows to consumption through our grid connections

In Finland, well over 50% of wind power flows to consumption through transformers and substations provided by Hitachi Energy.

Read more

MicroSCADA monitors the electricity supply for more than 10% of the world's population.

MicroSCADA, the star product of Finnish R&D was developed in Finland in 1983. Today, this software innovation is in use in more than 170 countries around the world.

Read more

Transforming the world: Finland's largest transformer factory 110 years!

The industrial production of transformers started in Finland in 1914. Today, Hitachi Energy's factory in Vaasa is Finland's largest and most significant transformer factory and an important part of the national security of electricity supply.

Read more

"We were needed when Finland was electrified and we are needed now, when we are building a sustainable energy system and working towards a carbon-neutral future."

Matti Vaattovaara, Managing Director, Hitachi Energy Finland

Hitachi Energy Park: Investoimme ~180 MUSD uuteen tuotanto- ja teknologiakeskukseen

Vikby, Mustasaari

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Vastaus asiakkaidemme, kasvavan markkinan ja vihreän energiasiirtymän tarpeisiin.

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01.

Tuplakapasiteetti

Mahdollistaa muuntajien tuotanto- ja testauskapasiteetin kaksinkertaistamisen Suomessa.

02.

Laajempi tuotevalikoima

Mahdollistaa muuntajien nykyisen tuotevalikoiman merkittävän laajentamisen kattamaan myös suurempien muuntajien tuotannon.

03.

Kasvua ja työtä

Rekrytoimme ~200 uutta tekijää

Mahdollistaa kaikkien liiketoimintojen kasvun.

Hybridityötä tukevat modernit toimistotilat.

04.

Tukee energiasiirtymää ja sähköistymistä

Turvallisuus, laatu, energiatehokkuus.

Asiakkaidemme, kasvavan markkinan ja vihreän energiasiirtymän tuki.

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Power Conversion

Products and solutions

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Hitachi Energy's Power Conversion Products at a glance

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Hitachi Energy leading power conversion products focus on grid-friendly energy storage and renewable integration.

Leading power electronics and control capabilities, combined with intense customer focus, make Hitachi Energy a preferred partner for demanding storage applications.

7+
GW installed

180+
Projects deployed

30+
Countries

20+
Years of experience

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Battery Energy Storage Solutions

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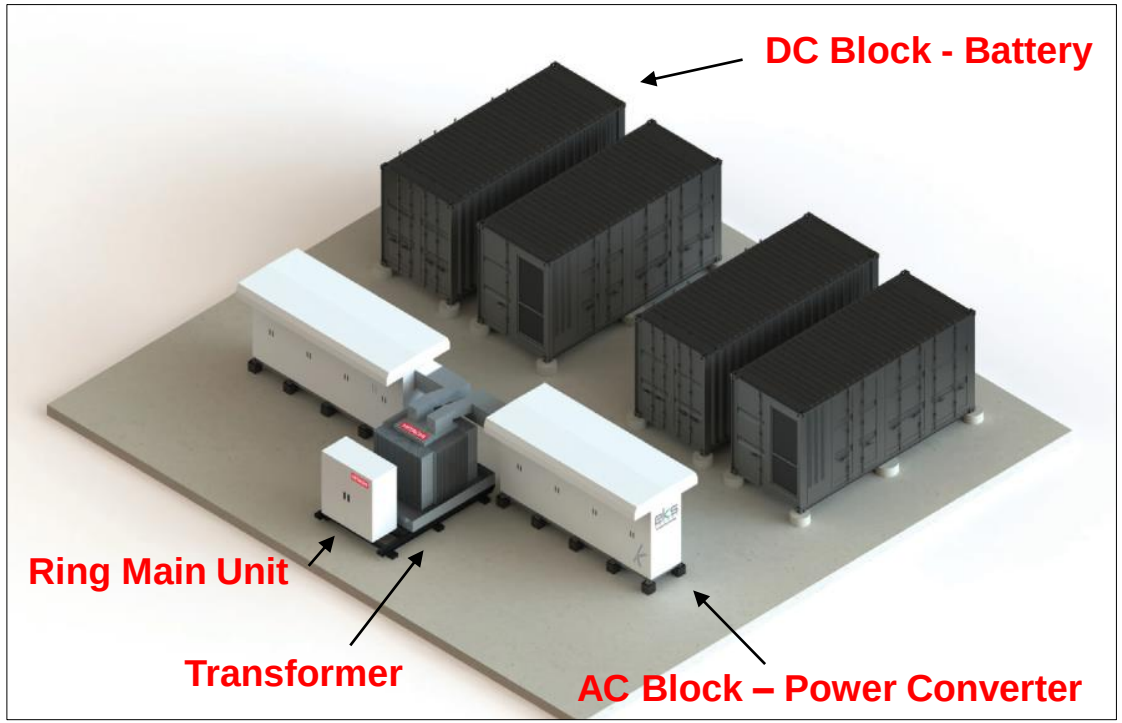
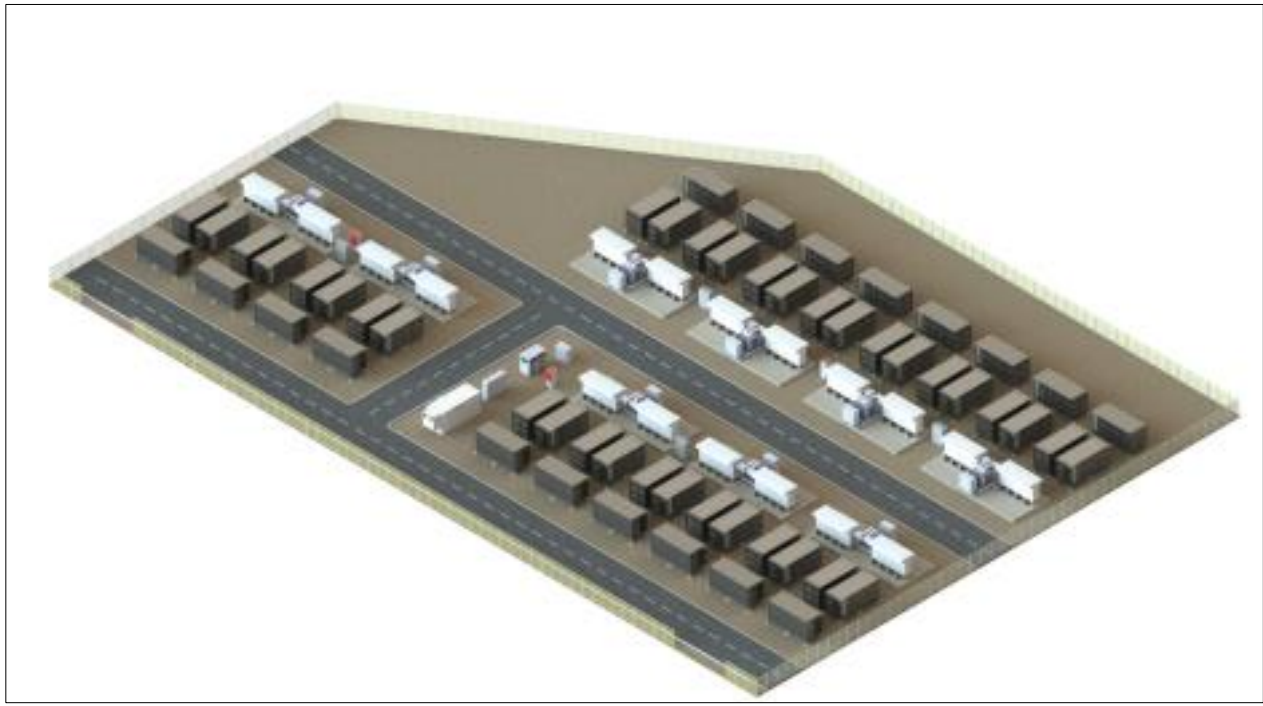
Modular BESS building block

Energy Storage of **modular** and **prefabricated battery energy storage solutions** make faster, simpler and more efficient to be integrated.



Project based BESS Solution

Modular and upgradeable BESS offering, which can be customized to all applications and industry needs.



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Three product lines from one modular converter station

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PCS
Power Converter Station for BESS integration

AMPS
Advanced Multiport Power Station for combining BESS and solar

PVI
Photovoltaic Inverter AC coupled for solar integration

Ready for the next generation of energy storage and renewable energy systems

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Advanced Multiport Power Stations (AMPS)

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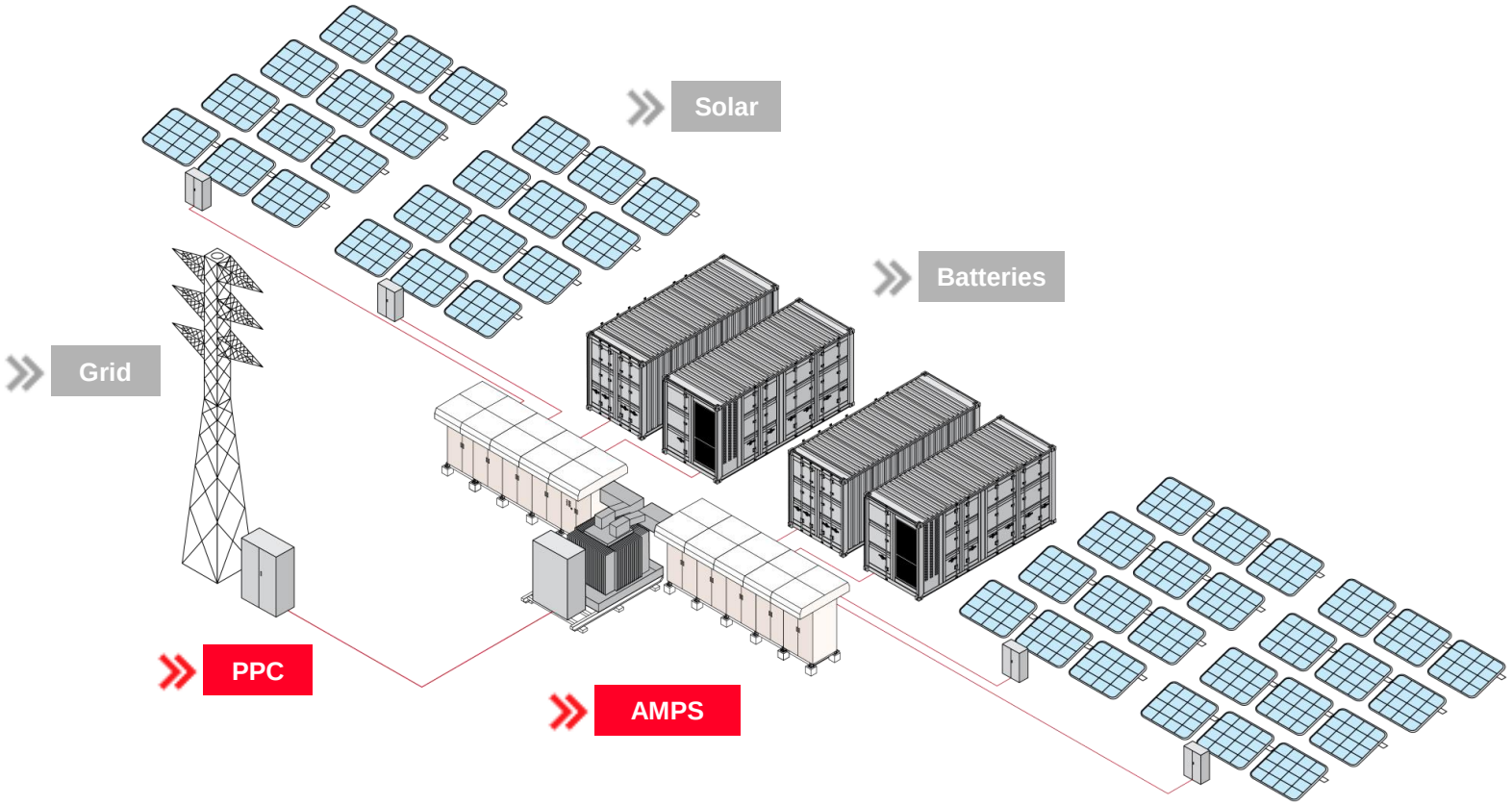
Integrating BESS and Solar

- Our AMPS DC-coupled solution makes grid integration of utility-scale solar + storage systems fast and easy, ensuring high performance and availability.
- Interfaces with, and controls, multiple energy assets to maximize renewable energy integration.
- Provides advanced active power management under highly demanding grid requirements.
- The DC-coupled station enables a higher system DC/AC ratio, reducing CAPEX and levelized cost of energy (LCOE), making it a very competitive solution for our customers.



Our solution is the ONLY fully integrated utility-scale DC-coupled power station in the industry

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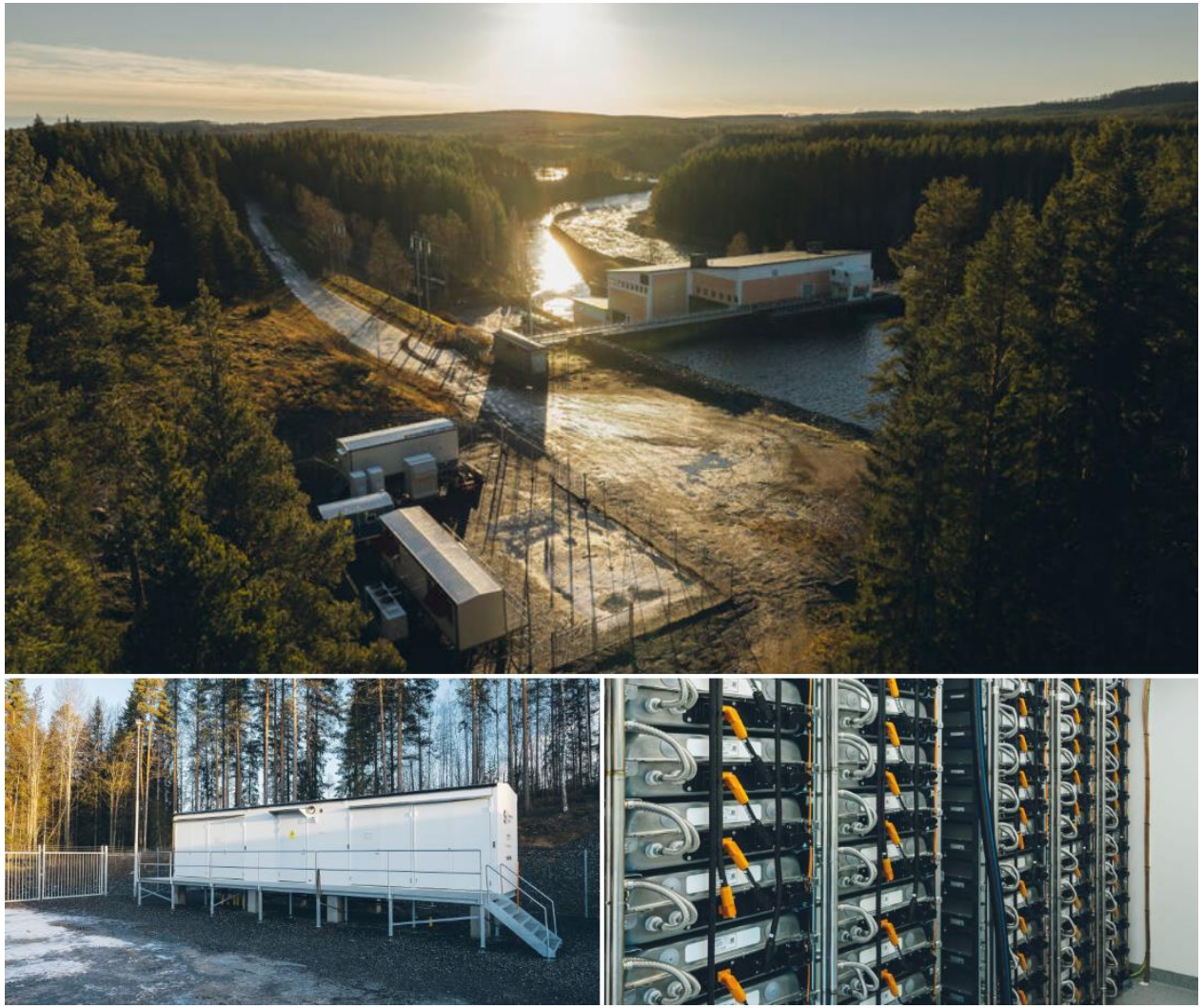
Hydropower plant with BESS - Case Skellefteå Kraft



Locally produced battery cells are the heart of a new facility at Skellefteå Kraft's hydropower plant in Båtfors. A power plant located in the Skellefteälven – whose energy was used when the batteries were manufactured. The project is a collaboration between Skellefteå Kraft, Northvolt and Hitachi Energy.

Hitachi Energy contributes intelligence to the solution, which connects technology and expertise that integrate the battery system to the electricity grid and qualifies the entire system for Svenska kraftnät's support services. The core of Hitachi Energy's battery storage system (BESS) is the innovative control system, e-mesh™, which helps Skellefteå Kraft integrate, automate and optimize its energy use.

Power Plant Controller (PPC)

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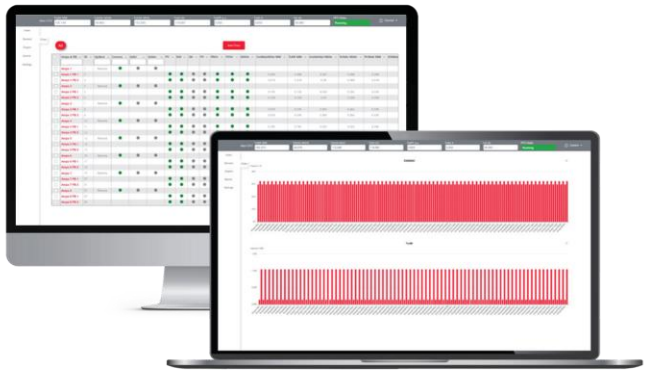
Overview

Monitoring and control solutions based on a **solid experience** as energy integrators with a **new vision** that combines the use of specific control algorithms and the latest data processing technology.

Main customer benefits

- Grid code compliance
- Seamless integration and compatibility
- Advanced power control functions
- Superior performance
- Energy optimization



Reliability

Extra modules provide built-in redundancy for reliable operation

Scalability

Designed for diverse topologies of plants with different rated powers

Flexibility

Multiple parameters provide responsiveness to the grid code changes or updates

Simplicity

A streamlined design ensures easy changes and upgrades through the lifespan of the plant

Modularity

Adaptable implementation of multiple control functions: voltage regulation, reactive power control, power factor control, etc.

Unparalleled renewable and storage power management

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e-mesh portfolio

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Applications
SaaS Apps for improved performance

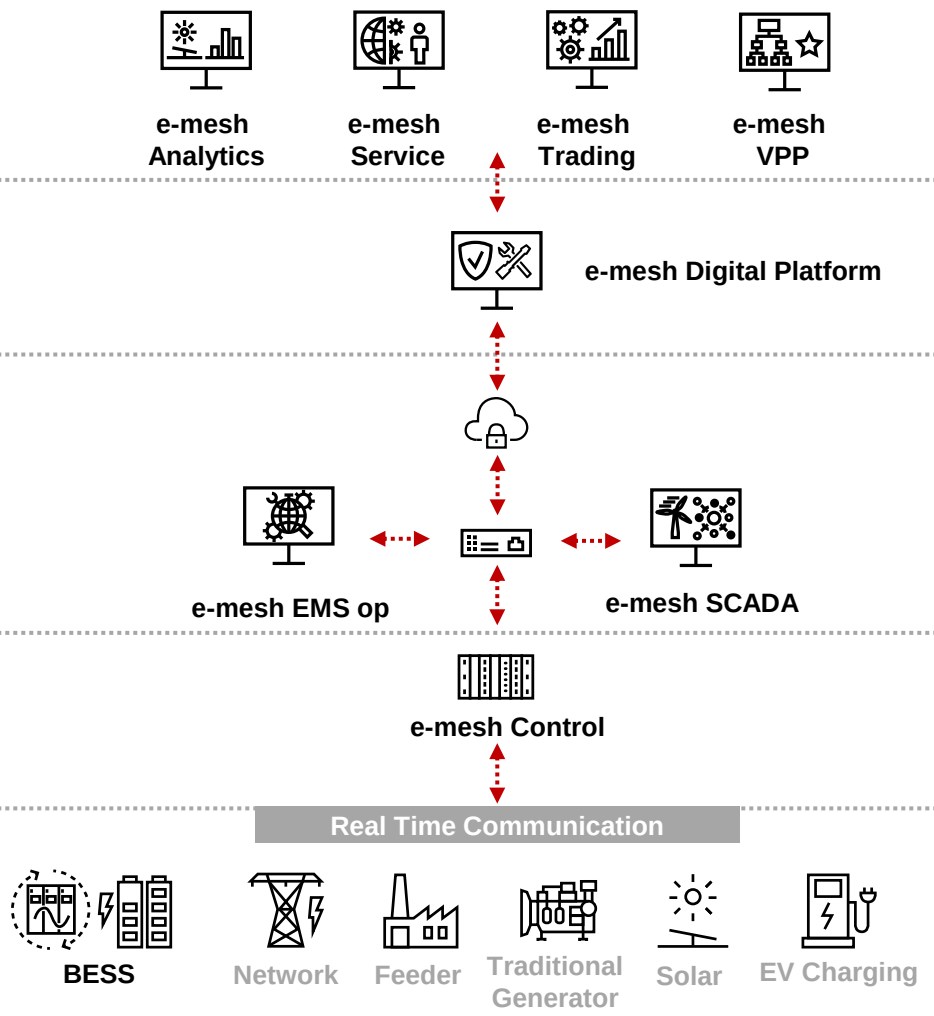
Digital Platform
Cloud enabled

EMS
On-premises energy management solution

SCADA
On-premises plant automation solution

Control
Intelligent and efficient power management

PowerStore
Smart battery energy storage solution



- Energy forecast, production and optimization planning
- Business KPI dashboards and reports
- Improved productivity and profitability

- Monitoring and control
- Bi-directional data flow
- Remote access

- Monitoring & control
- Optimal energy production
- Operational & maintenance cost reduction

- Renewable power generation grid code compliance
- Network voltage control
- Feeder & Load demand management

- Smart battery energy storage solution
- Support for various applications including islanding, seamless transition, black start, spinning reserve, etc.

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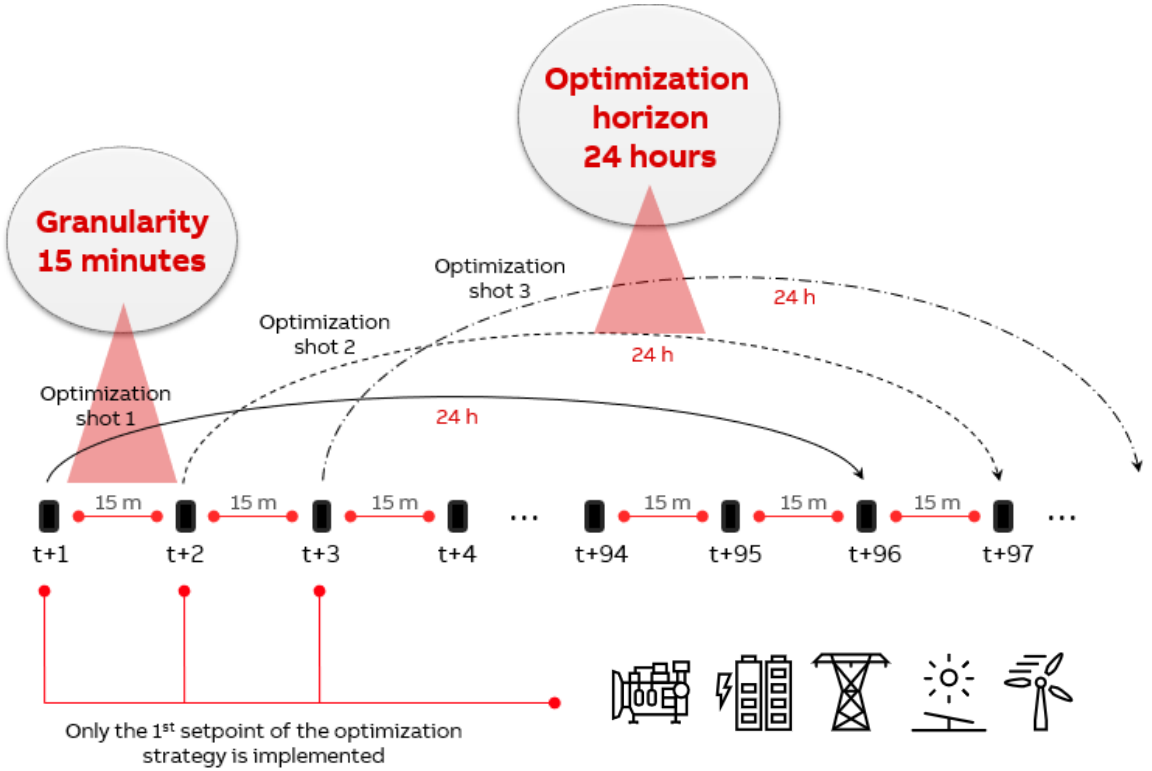
Benefits

- Reduce operational costs and CO2 emissions depending on the strategy

Features

- A new optimization is executed every 15 minutes on a 24 hours optimization horizon
- Optimization outputs 96 active power dispatch setpoints for all assets – only the 1st control action is applied
- Optimization can be executed in background without sending setpoints to the field – advisory mode



Intra-day optimization

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Customer stories

Supporting the stability of Finland's energy network

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> With this investment in battery energy storage, we are helping to ensure uninterrupted electricity supply in Finland.

Sami Jakonen
Technical Director
TVO

Challenge

Support the entire energy network, in a potential production disturbance in the Olkiluoto 3 plant unit, thus minimizing the effect of power fluctuations on the grid

Solution

e-mesh™ 90 MW / 85 MWh energy storage solution as well as an intelligent digital e-mesh Manager, substation expansion and maintenance support

Impact

About 30 percent of Finland´s electricity is expected to come from the island and support the transition of Finland's electricity production towards carbon neutrality in 2035

World’s largest Battery Energy Storage System

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> “This project aims to ensure a secure, reliable, and affordable energy supply to homes and businesses across Sydney, Newcastle, and Wollongong while new renewable energy zones are completed.
>
> **Marie Jordan**
> Transgrid Executive General Manager of Network

Challenge

New South Wales aging, coal-fired power plants are expensive, inefficient, hazardous to the environment, and require costly ongoing maintenance.

Solution

The 850MW/1680MWh Waratah Super Battery (WSB), with 288 Energy PCS, acts as “shock absorber” for the electrical grid and improves system reliability.

Impact

Enable the 2880 MW coal-fired Eraring Power Station closure in August 2025, seven years earlier than previously scheduled, while maintaining network security.

Advancing renewable energy in the Andes region

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> Represents a great contribution and solution to alleviate congestion problems in transmission lines and resulting discharge of renewable energy. We will continue to grow with new projects.
>
> **Javier Dib**
> CEO of AES Andes

Challenge

The Andes region, characterized by rugged landscapes, is primarily reliant on fossil fuels, posing environmental challenges and contributing to climate change.

Solution

eks Energy's 130MW/650 MWh Solar + Storage DC-coupled system reduces congestion in transmission lines.

(Storage as a transmission asset)

Impact

By reducing reliance on fossil fuels, the project contributes to preserving the Andes' pristine natural environment and safeguards biodiversity.

Helping the Faroe Islands aim for 100% renewable energy

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> SEV is owned by all the Faroese municipalities, and thereby owned by the people.
> SEV's profit from the electricity sale is mostly spent on future extensions of the system.
>
> **Hakun Djurhuus**
> Chief Executive Officer
> SEV

Challenge

Integrate the 6.3 MW Porkeri wind farm, to reduce both diesel consumption and CO2 emissions, while improving power quality

Solution

e-mesh™ 6 MW / 7.5MWh Battery Energy Storage (BESS) solution to maximize the use of available wind energy and help it move closer to its long-term sustainable energy goal

Impact

By harnessing energy sources like wind, hydro and solar, SEV's network strategy not only achieves present goals, but also protects the area's vital resources for future generations

Accelerating sustainable mobility in Denmark

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> “Our partnership with Clever underscores our efforts to provide access to electricity at speed and scale, delivering innovative solutions that benefit people both globally and locally.
>
> **Massimo Danieli**
> Managing Director of Grid Automation
> Hitachi Energy

Challenge

Ensure that Denmark’s world-leading EV adoption, with the goal of adding at least 775,000 EVs or hybrid vehicles by 2030, is powered by 24/7 renewable electricity

Solution

Ground-breaking EV fast-charging station combines renewable energy with advanced energy management and optimization solutions and battery energy storage system

Impact

When the Køge station opens it will be able to simultaneously charge 16 electric cars across 8 stations, as part of Clever’s impressive footprint

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Summary

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Serving customers across the energy value chain

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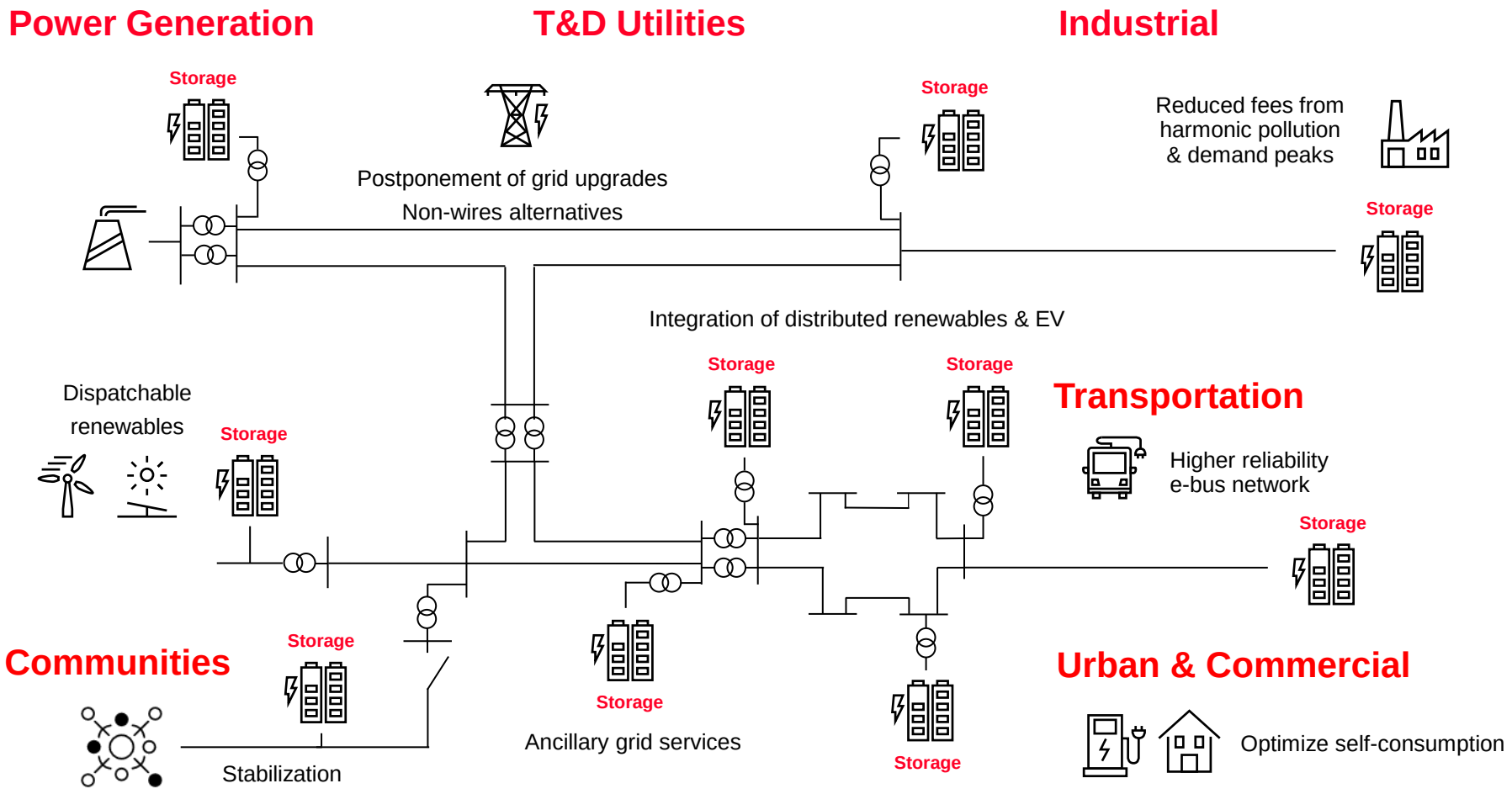
Main business Objectives

- **Transform through low-carbon technologies and digital solutions**
- **Accelerate the shift to renewable power generation**
- **Strengthen the transmission and distribution grid**
- **Decarbonize through electrification**



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