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DUALstorePLUS

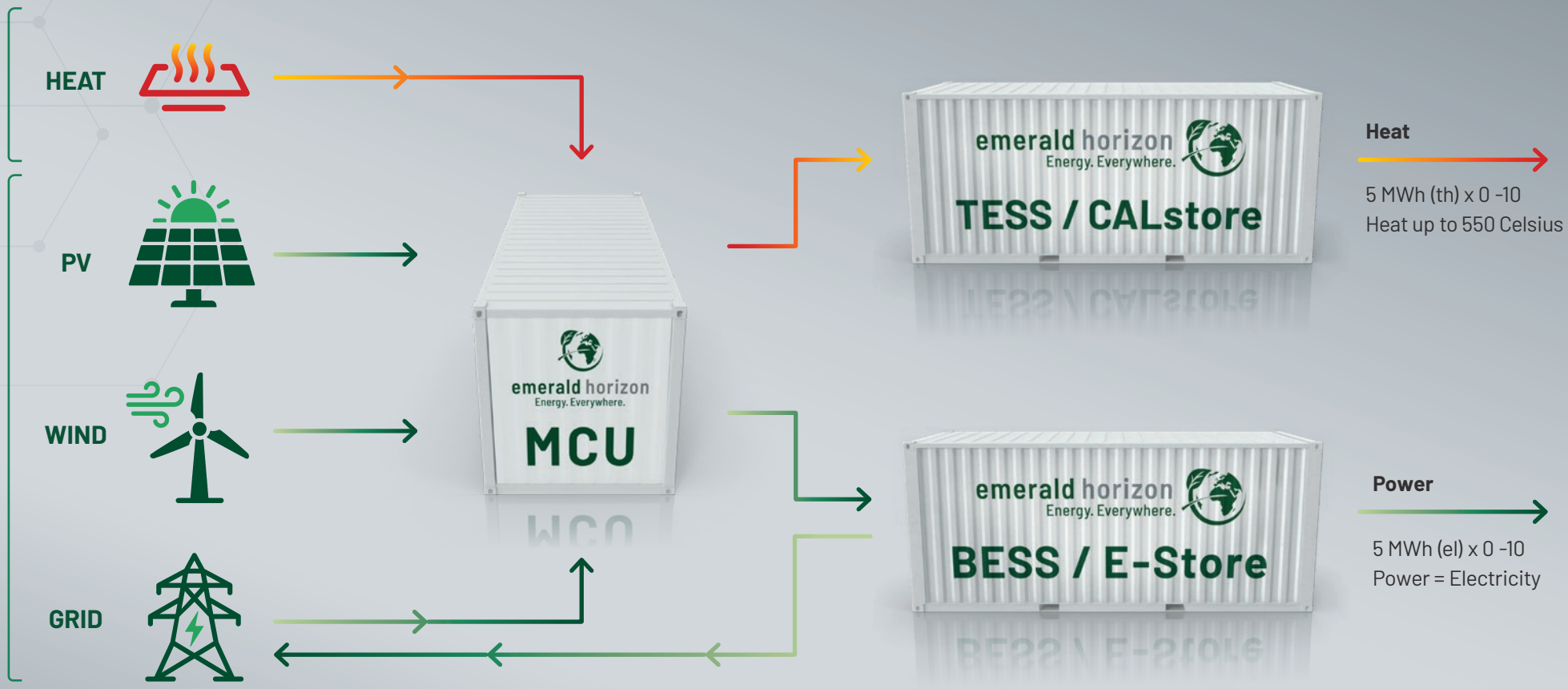
EFFICIENT ENERGY STORAGE, REDEFINED.



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DUALstore PLUS

HYBRID STORAGE. INTELLIGENTLY MANAGING POWER & HEAT.



DUAL INPUT | CONTROLLER / CONVERTER | STORAGE | DUAL OUTPUT

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DUALstore PLUS

DUALstore PLUS is a modular energy storage system with a capacity of 5 – 100 MWh
TESS / CALstore 0 – 50 MWh (th) + BESS / E-Store 0 – 50 MWh (el)

TESS / CALstore

Thermal Energy Storage System
Thermal storage for process heat, industrial heat, and district heating networks. Decarbonization with load shifting.

+

BESS / E-Store

Battery Energy Storage System
Electrical storage for flexibility, peak shaving, and grid services. Modular containerized design, scalable from single-site installations to multi-site clusters.

+

MCU +AI

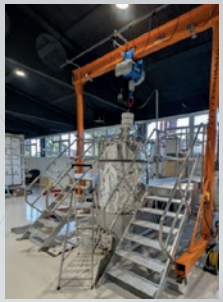
MCU (Multi Control Unit, AI Control) + PLUS Function
Optimizes power, heat, and grid — including optional revenue potential through intelligent feed-in.

HYBRID POWER & HEAT STORAGE WITH SMART CONTROL

What exactly is TESS / CALstore?

TESS / CALstore is a modular 5 MWh high-temperature molten salt storage system housed in a 20-foot HC container.







With its **modular molten salt technology, TESS / CALstore** sets new standards in energy storage. Thanks to its container-based design, the system can be **flexibly expanded** and adapted to different storage and power requirements. Surplus energy is stored **efficiently and reliably made available on demand** – for a stable and sustainable **energy supply.**

Energy capacity:
bis zu 5 [MWh] thermal

Thermal charge/ discharge rate:
500 [kW]

Electrical charging rate:
500 [kW]

Efficiency:
>95 % Heat-to-Heat
>98 % Power-to-Heat

Service life:
20 years (low degradation)

Technology:
Modular high-temperature molten salt storage, pressure-free, water-free

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TESS / CALstore – Molten salt storage

What makes molten salt special?

An energy storage system for storing heat from:

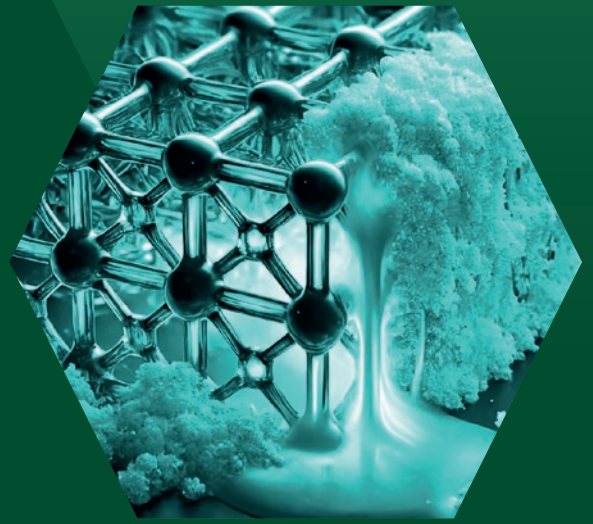
- **volatile energy sources such as wind and PV systems**
- **direct storage of waste heat from combustion, chemical, and other industrial processes**

Comparison of Heat Storage Media

Storage medium	Temperature range	Energy density	Notes
Water (hot-water boiler)	20–100 [°C]	approx. 60-80 [kWh/m^3]	Boiling point limits range, high storage pressure
Molten salt (e.g. solar salt)	200–550 [°C]	approx. 150-200 [kWh/m^3]	High energy density and temperature differential, no pressure

HOW IT WORKS

- **Power-to-heat or heat-to-heat for storing energy/heat.**
- **Direct heat utilization via heat exchanger.**
- **Optional: heat-to-power to reconvert thermal energy into electricity.**



TESS / CALstore Design Parameters

- Standardized 20 [ft] container
- Up to 5,000 [kWh] thermal storage capacity
- Modularly expandable
- High-quality materials, high reliability, water-free salt technology
- Maximum safety, long service life
- Low maintenance requirements, low operating costs
- Efficient heat transfer via heat exchanger for storage and discharge

Maximum safety through advanced storage technology

All information can be found on our website.

TESS / CALstore's innovative molten salt technology operates entirely water-free. This inherently eliminates any risk of steam pressure or explosion and ensures maximum operational safety in energy storage.



1

Water-Free Technology
— TESS / CALstore uses water-free salt mixtures that pose no risk of steam pressure or explosion.

2

Modular and Scalable
The modular design of TESS / CALstore allows for easy adaptation and scalability as needed.

3

Minimal Maintenance
Low maintenance requirements ensure low operating costs and high reliability.

4

Efficient Heat Transfer
State-of-the-art heat exchangers ensure efficient storage and retrieval of energy.

5

Durable Materials
High-quality materials and technologies guarantee a long service life and maximum safety.

TESS / CALstore applications

TESS / CALstore ensures maximum safety through innovative, water-free molten salt technology. This prevents steam pressure and explosion risks and guarantees safe energy storage.



Power becomes heat
Surplus electricity is converted via power-to-heat and stored as heat. This energy is later available as heat or — optionally via external heat-to-power conversion — as electricity again.



Industry
The scalability of TESS / CALstore secures the supply for industries with high and growing heat demand (e.g. the chemical industry and drying processes).



Storage of thermal energy
Heat energy from heavy industry, such as steel production, or from other energy sources such as ADES, can be stored and used at a later time.



Tailored solutions
The adaptable, modular TESS / CALstore system offers tailored solutions. It leverages the high energy density of salt for efficient energy storage.

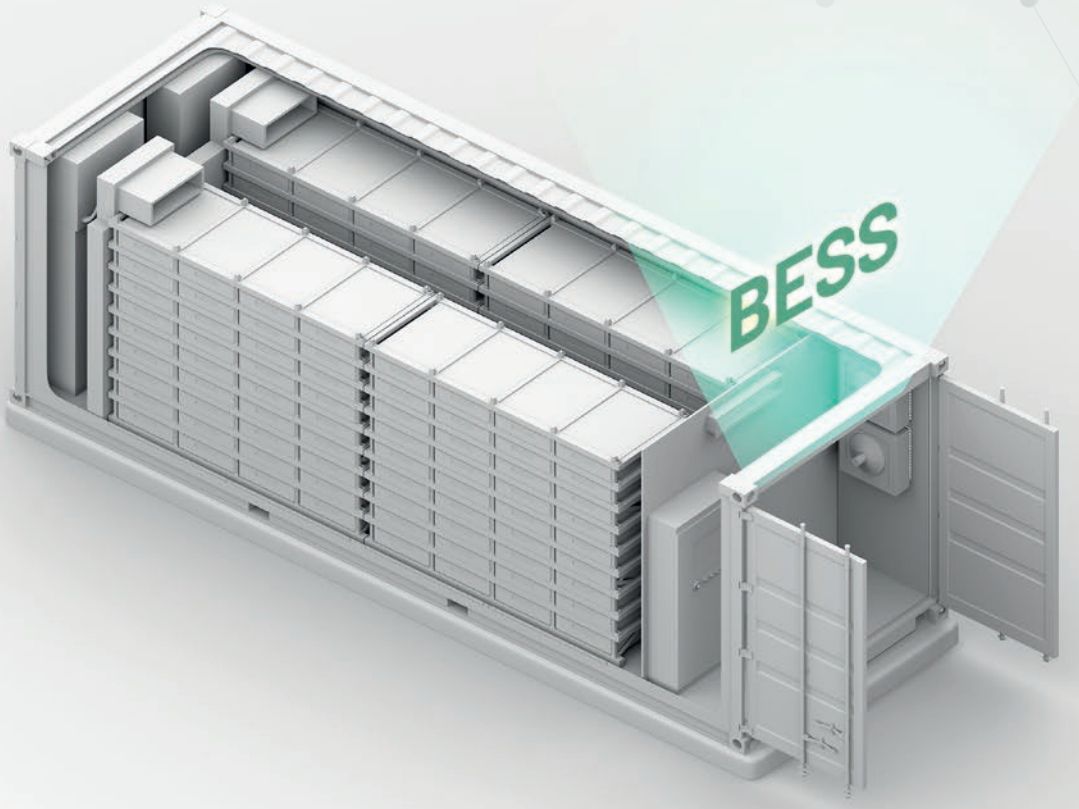


Supplying SMEs
The compact design enables smaller businesses (e.g. bakeries) to store heat for daily operations and during energy shortages

YOUR ENERGY STORAGE SOLUTION FOR EVERY INDUSTRY

What exactly is BESS / E-Store

5 MWh LFP battery, 20-foot HC container



Data

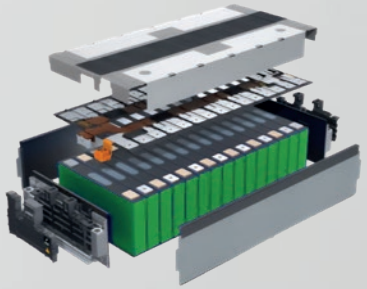
- **Battery capacity:** 5.016 MWh
- **Cycle life:** ≥ 8,000 cycles at 25°C
- **Efficiency:** Up to 94% (round-trip)
- **Charge/discharge rate:** ≤ 0.5 P
- **Dimensions:** 6,058 × 2,896 × 2,438 mm
- **Weight:** ≤ 43,000 kg

Electrical Parameters

- **Cell chemistry:** LFP – 314 Ah
- **Cell configuration:** 52S1P (8S × 12)
- **Nominal DC voltage:** 1,331.2 V
- **Voltage range:** 1,123.2 – 1,497.6 V
- **Cooling:** Water



Cell(s) / Modules



Module / Racks

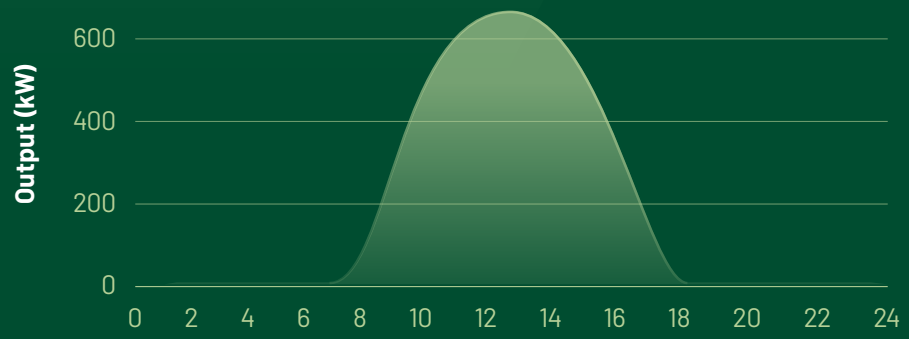
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Simple sector coupling with BESS/E-Store

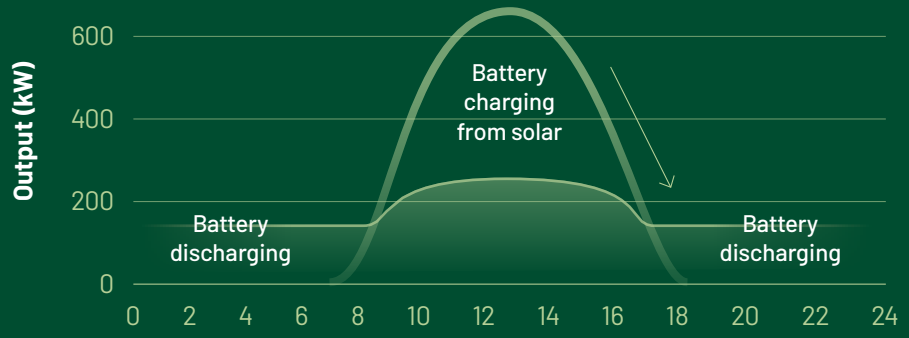
A prescursor to DUALstorePLUS

Connects energy stakeholders and balances energy/time profiles.

PV only = daytime solar



PV + storage = dispatchable solar



BESS / E-STORE APPLICATIONS

- **Electricity storage –** Storing surplus energy from wind power, photovoltaics, and hydropower.
- **Peak shaving –** Reducing power peaks [kW]/[MW] to lower grid fees, connection costs, and demand charges.
- **Self-consumption optimization (PV/Wind) –** Temporary storage of locally generated renewable energy to maximize self-consumption and minimize feed-in losses.
- **Balancing power & system services –** Providing FCR(s), aFRR(min), and mFRR(h) through fast, precise power control for grid stabilization.
- **Grid support & congestion management –** Relieving local distribution grids by shifting the timing of consumption and feed-in (congestion relief).
- **Emergency power & UPS function / blackout –** Supplying critical loads during grid outages, including black-start capability and uninterrupted operation.
- **Energy arbitrage / market optimization –** Charging at low or negative electricity prices and discharging at high prices to economically optimize energy trading (value enhancement).

What does the MCU do?

MCU (Multi Control Unit, AI control) + PLUS function. Optimizes power, heat, and grid — including optional revenue potential through intelligent feed-in.





MCU/CPS container (20-foot or 40-foot HC)

Power management BESS / E-Store (standalone)

- **CPS –** Bidirectional control of charge/discharge power (power-to-power), including ramps and SoC management;
- **Grid interface & grid services —** Provision of balancing power, peak shaving, black-start preparation, island and grid-parallel operation;
- **Protection & safety —** DC/AC protection concepts, short-circuit, overload, and insulation monitoring in accordance with grid and battery safety standards;

Extended MCU — TESS / CALstore integration

- **Power-to-Heat (P2H) —** Converting electrical energy into high-temperature heat to charge the TESS / CALstore (load and price optimization);
- **Heat-to-Heat (H2H) —** Controlled thermal intake and/or discharge from TESS / CALstore to processes, district heating, or industrial consumers;
- **Optional: Heat-to-Power (H2P) —** Reconverting thermal energy into electricity for supply on demand or for grid services;

System & grid integration transformer

- **Holistic DUALstore PLUS energy management —** Holistic DUALstore PLUS energy management across BESS / E-Store + TESS / CALstore, including DC/AC conversion, medium-voltage grid connection (AT: 10 kV / 20 kV), and metering, communication, and forecasting functions.


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MCU
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TESS
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BESS
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Emerald Horizon AG
Karl-Huber-Gasse 15
A-8041 Graz | Austria | EU
office@emerald-horizon.com
www.emerald-horizon.com