



FENECON Industrial

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FENECON energy storage systems



FENECON Home



10 kW

8,8 – 66 kWh

Commercial 30



30 – 90 kW

31,5 – 357 kWh

Commercial 50



50 – 250 kW

70 – 1.400 kWh

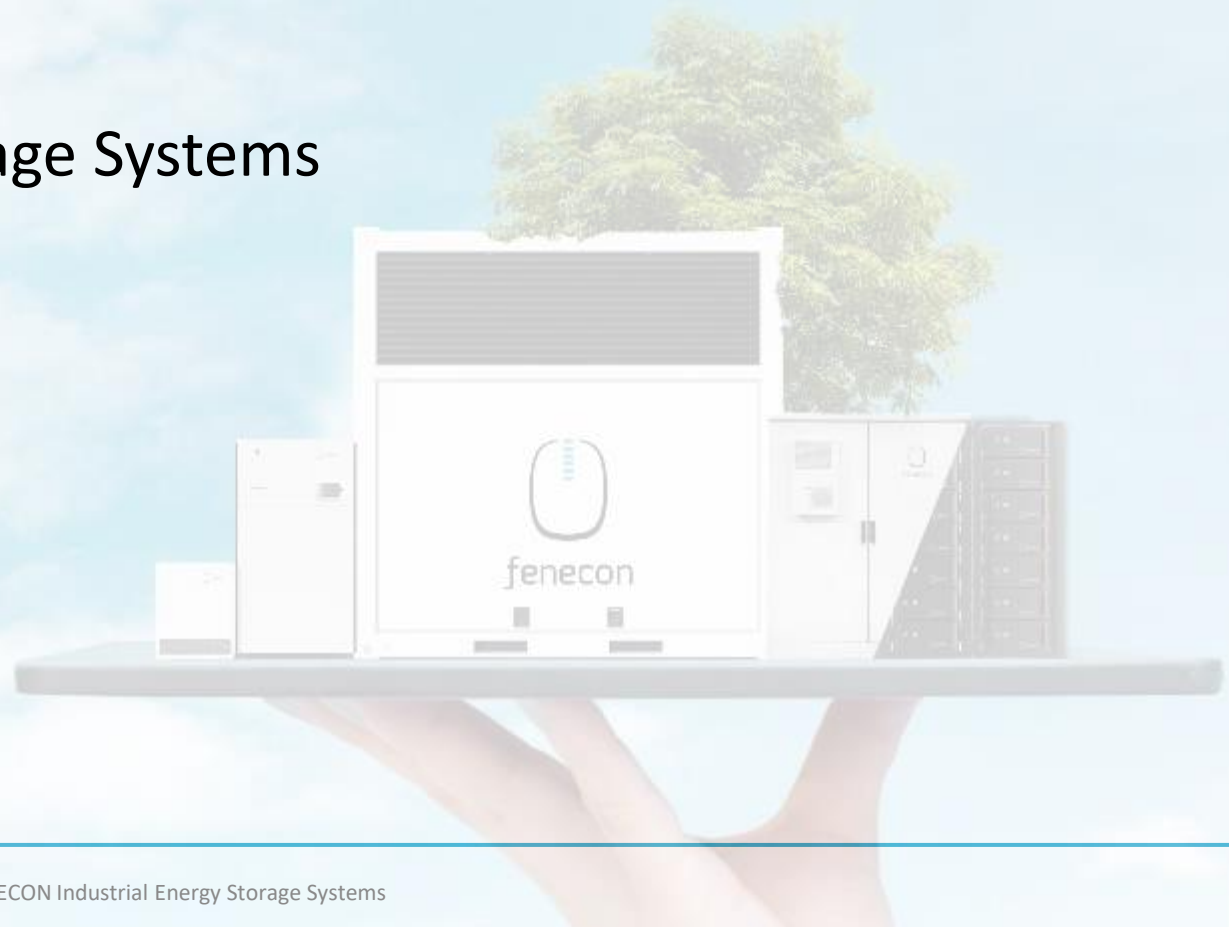
Industrial



88 kW – multi-MW

82 kWh – multi-MWh

The FENECON Industrial Storage Systems



FENECON Industrial family



MODULAR

- Modular system for the integration of batteries from the German automotive industry
- High-performance C rates from 0.25 to 1 C
- Capacities scalable into the multi-megawatt range



INTELLIGENT

- Open source based Energy Management System FEMS
- Remote access to the entire system
- Can be integrated into existing EMS
- Use case optimized applications

Application-oriented

- All-in approach reduces on-site installation to a minimum
- Coordinated hard- and software
- Competent service
- Outdoor capable

FENECON Industrial variations



Industrial S



92 kW – 184 kW
-
82 kWh – 164 kWh

Industrial M



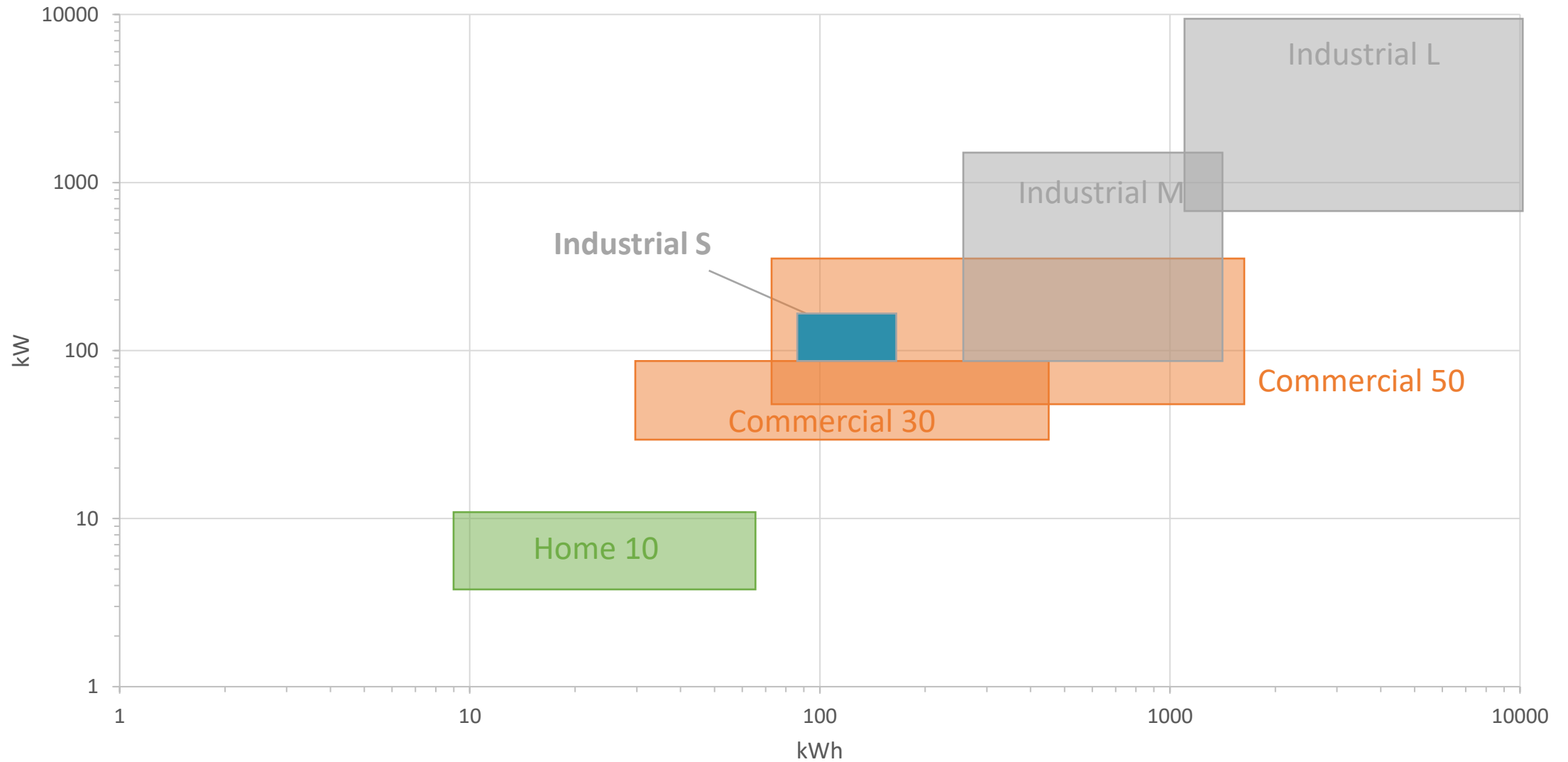
88 kW – 704 kW
-
246 kWh – 656 kWh

Industrial L

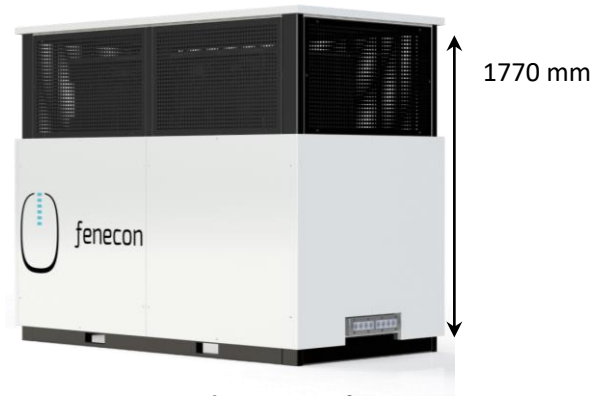


736 kW – multi-MW
-
1,1 MWh – multi-MWh

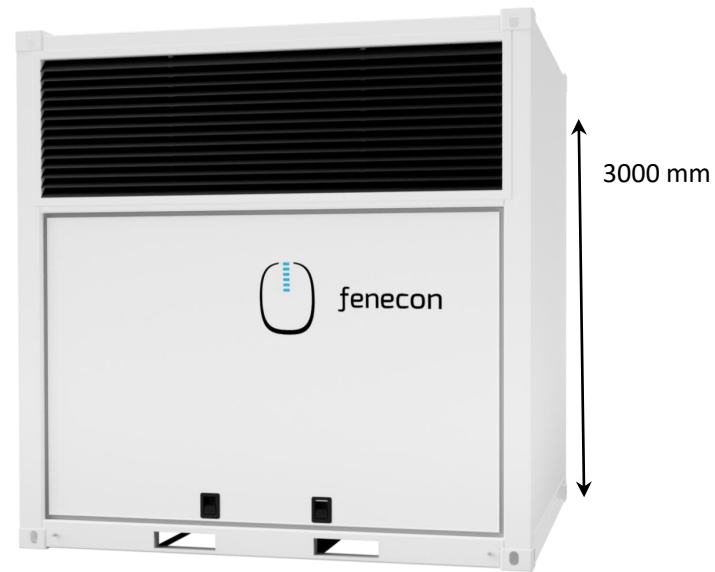
FENECON Industrial variations



FENECON Industrial variations



Industrial S



Industrial M



Industrial L

FENECON Industrial M



FENECON Industrial M



- Modular design of the container
- High power, scalable up to multi-MW range
- Power: 88 – 704 kW
- Capacity: 82 – 656 kWh
- Plug & Play to the low voltage grid
- Possibility to rent



FENECON Industrial M – System configuration



from

3h-variant (0,3 C) 88 kW / 246 kWh
4h-variant (0,25 C) 88 kW / 328 kWh

up to

1h-variant (1C) 704 kW / 656 kWh
2h-variant (0,5 C) 352 kW / 656 kWh
3h-variant (0,3 C) 176 kW / 492 kWh
4h-variant (0,25 C) 176 kW / 656 kWh

FENECON Industrial M - Technical details



FENECON Industrial M - Housing



- Robust enclosure based on 10' HC container dimensions
- Dimensions: L: 2991 mm / W: 2438 mm / H: 3000 mm
- Weight: 5 - 10 t
- Floor space: 7,3 m²
- Transport by forklift or crane
- Worldwide transport
- Installation almost everywhere without building permit
- Fully installed safe for transport



FENECON Industrial M - Batteries



- Full-packs of BMW e-cars as a battery
 - Cooling and heating directly at the modules
 - Integrated BMS
 - Safe system
- Based on Samsung SDI cells
- Up to 16 batteries per container
- Can be upgraded at the factory as power demand grows



FENECON Industrial M – Power electronics



- Latest inverters from REFU, or KACO
- Efficiency thanks to state-of-the-art technology
- High redundancy due to decentralized concept as AC cluster
- Demand-dependent control of the individual inverters
- Compact design
- Modularly expandable
- AC mains connection 400 V 3 phases



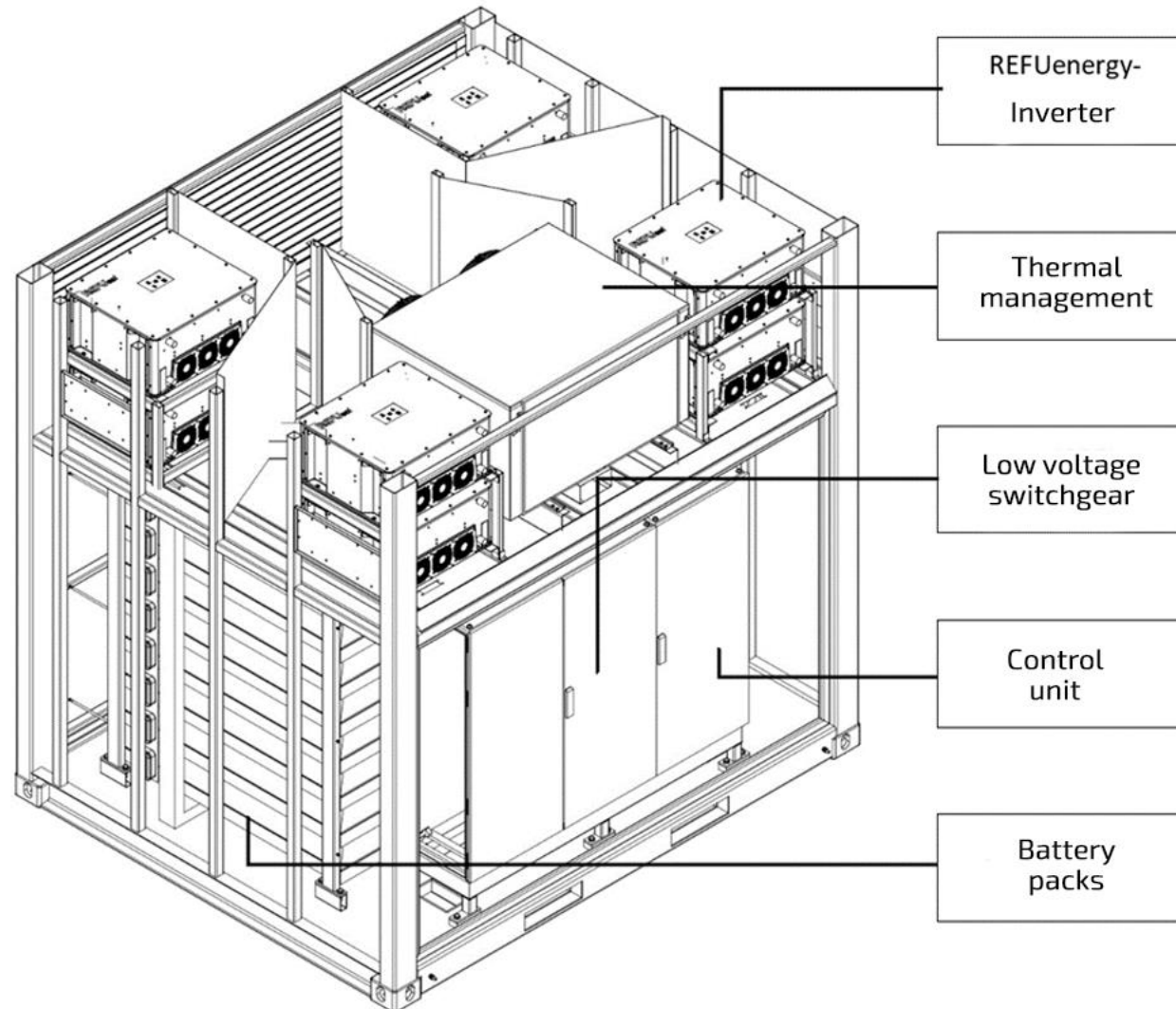
FENECON Industrial M – Thermal management



- Highly efficient thermal management directly on the battery modules
- Setting of the ideal operating temperature range
- Integrated heating in the battery with very high efficiency
- Very high-power availability
- Optimizes service life



FENECON Industrial M - Building



FENECON Industrial M – Low voltage main distribution



FENECON Industrial M - Batteries



FENECON Industrial S



FENECON Industrial S



- Compact container
- Modular structure of the container
- Power from 92 to 184 kW
- Capacity from 82 to 164 kWh
- Plug & Play to the low voltage grid
- Compact unit - ideal for temporary use
- Possibility to rent
- Available for order from October



FENECON Industrial S – System configurations



1h-variant (1 C)	92 kW / 82 kWh
1h-variant (1 C)	184 kW / 164 kWh
2h-variant (0,5 C)	92 kW / 164 kWh

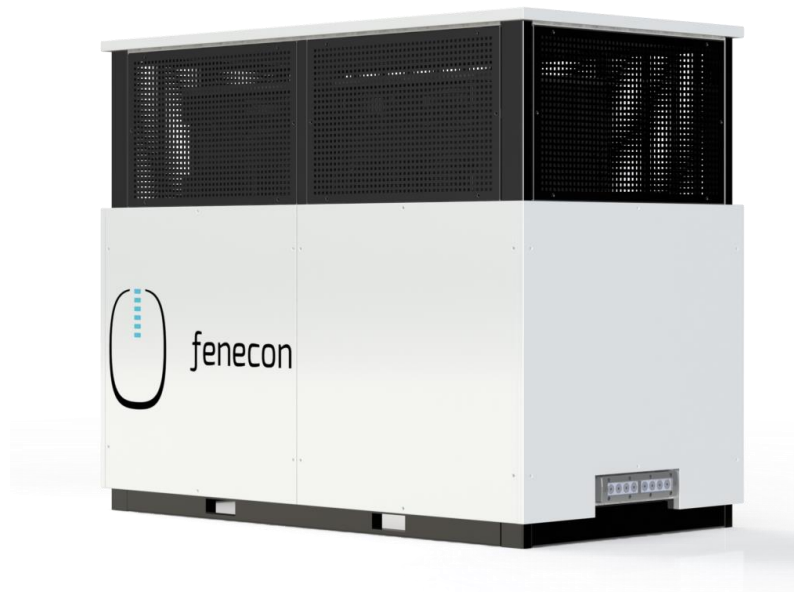
Industrial S - Technical details



Low voltage switchgear

Control panel

Thermal management



Housing

Cell- and pack design

Power electronics

FENECON Industrial S - Housing



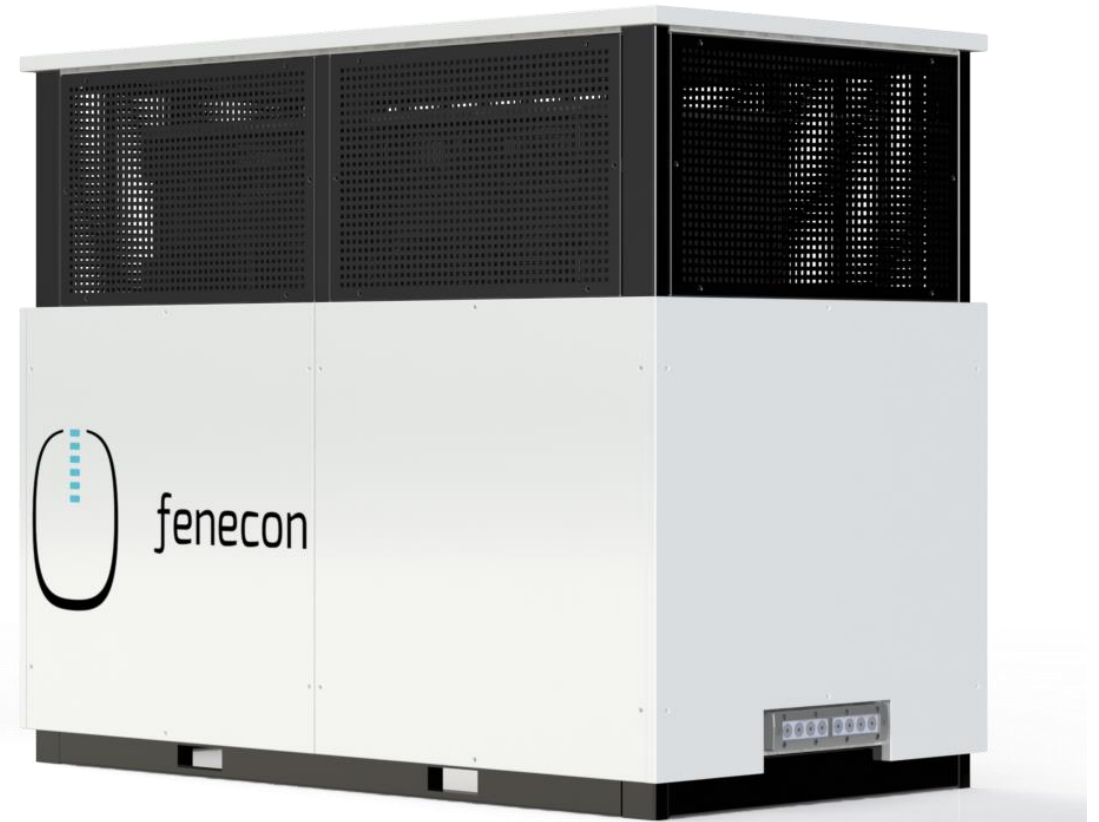
- Robust enclosure for frequent transport
- Dimensions: L: 2640 mm / H: 1755mm / W: 1210 mm
- Weight: approx. 2 ,4 t
- Floor space: 3,2 m²
- All around accessible thanks to removable enclosure panels
- Easy transport with forklift
- Worldwide, cost-efficient transport
- Fully installed safe for transport



FENECON Industrial S - Batteries



- Full-packs of BMW e-cars as a battery
 - Cooling and heating directly at the modules
 - Integrated BMS
 - Safe system
- Based on Samsung SDI cells
- Up to 4 batteries per container
- Can be upgraded at the factory as power demand grows



FENECON Industrial S - Power electronics



- Latest inverters from KACO
- Efficiency thanks to state-of-the-art technology
- Redundancy through decentralized concept
- Demand-dependent control of the individual inverters
- Compact design
- Modularly expandable
- AC mains connection 400 V 3 phases



FENECON Industrial S - Thermal management



- Highly efficient thermal management
- Temperature control directly at the battery modules
- Setting of the ideal operating temperature range
- Integrated heating in the battery with very high efficiency
- Very high-power availability
- Optimizes service life



FENECON Industrial L



FENECON Industrial L



- High performance and capacity with low specific price
- Power from 736 to multi-MW
- Capacity from 1.1 to multi-MWh
- High capacity, scalable to multi-MW range
- Project solution for multi-megawatt projects at PV parks, innovation tenders and other areas
- Project specific components possible
- Available for order from October

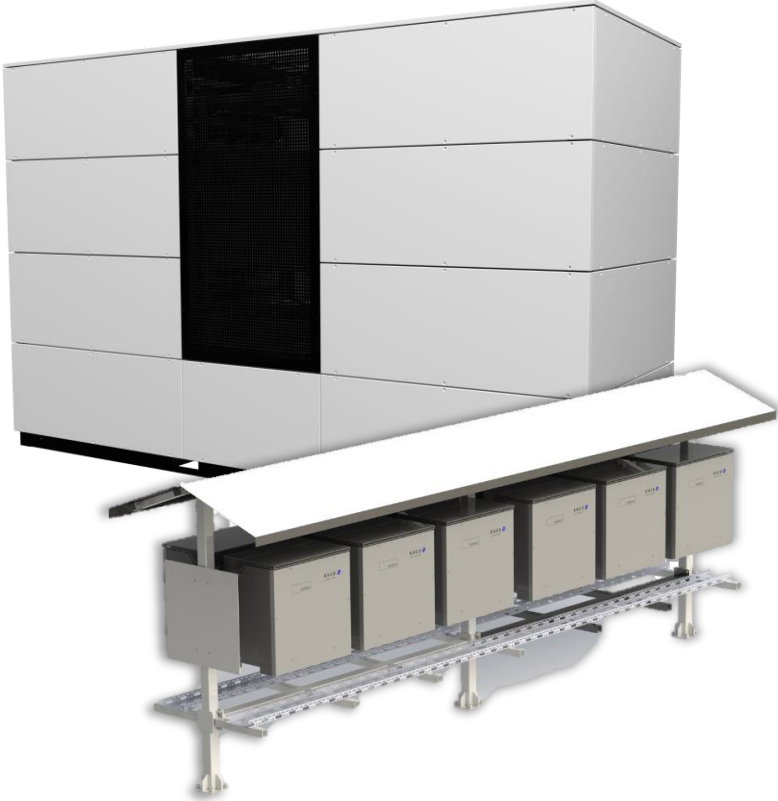


FENECON Industrial L – Technical details



Control panel

Thermal management



Housing

Cell- and pack design

Power electronics

FENECON Industrial L - Housing



- Hybrid system with external inverter mounting
- Battery container: L: 4,598 mm / W: 1,668 mm / H: 2,896 mm
- Floor space: approx. 15 m² per unit
- Weight: approx. 10 t per unit
- Inverter rack: L: 5,508 mm / W: 1,312 mm / H: 2,023 mm (in optional mounting rack)
- Weight: approx. 1.5 t (inverter with optional mounting rack)
- Accessible from all sides thanks to removable cover plates
- Easy transport by crane and forklift truck



FENECON Industrial L - Batteries



- Battery modules from the automotive industry
- Cooling and heating lines integrated in the module
- Based on CATL cells
- 24 drawers per container
- Flexible drawer system for integration of different module types



FENECON Industrial L – Power electronics



- Latest inverters from KACO
- Efficiency thanks to state-of-the-art technology
- Redundancy through decentralized concept
- demand-based control of the individual inverters
- 400V 3-phase connection to the inverters
- Modularly expandable
- Freestanding mounting
- Mounting on PV racks



FENECON Industrial L – Thermal management



- Highly efficient thermal management
- Integrated in the battery modules
- Setting of the ideal operating temperature range
- Liquid cooling and heating system
- Very high-power availability
- Optimized lifetime

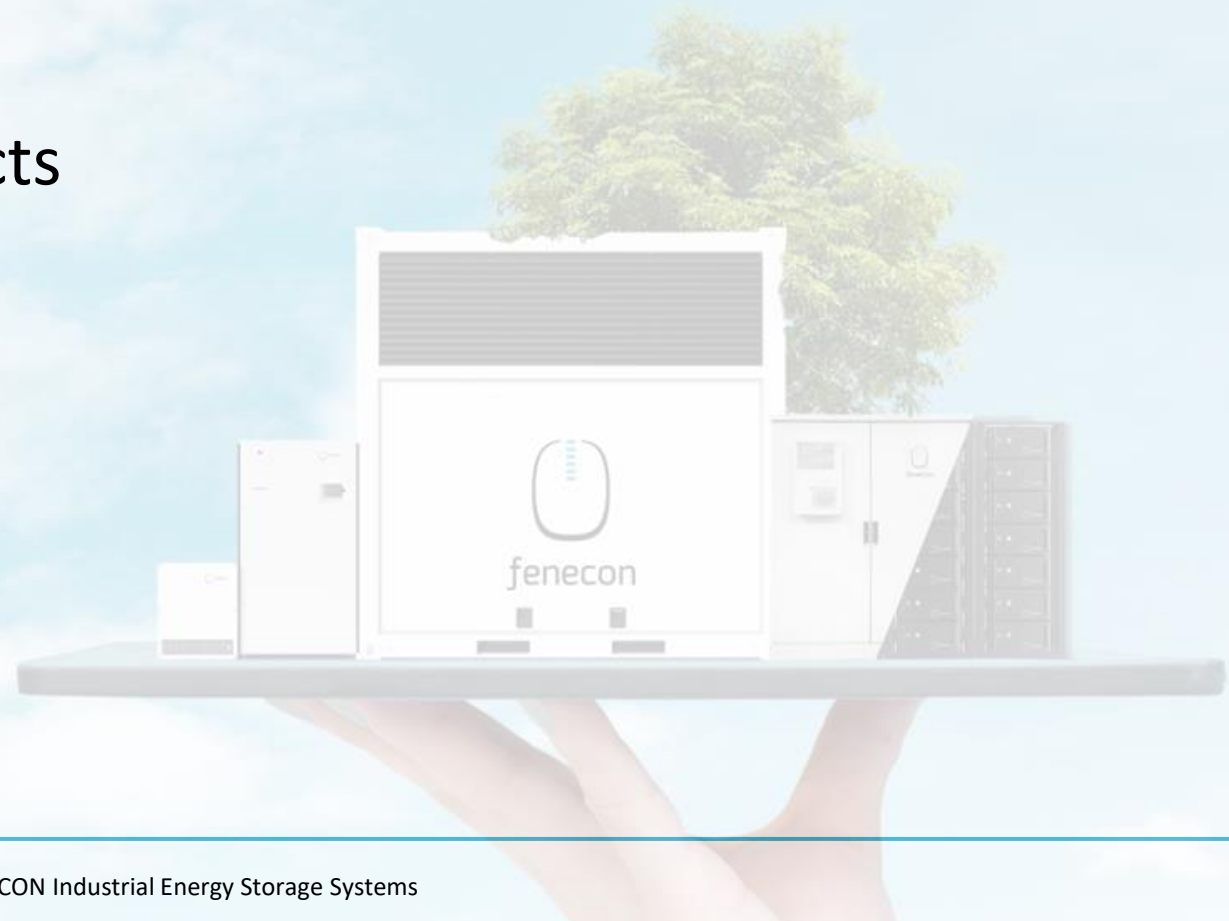


Industrial Energy Storage Systems



Industrial	S	M	L
Own consumption optimisation	++	++	++
Peak shaving	+	++	+
Charging stations	+	++	+
Temporary applications (construction sites, events)	++	++	
Grid services		++	++
Avoid grid expansion	+	++	+
Innovation proposal PV		+	++
Modular upgradeable	++	++	
Scalable		++	++

FENECON Industrial projects



Advanced battery storage project

Project name	Advanced battery storage
Place of execution	Germany
Battery storage size	8 units each 2.8 MW / 2.9 MWh
Description	<p>In 2019, FENECON was awarded the contract to integrate Renault Zoe car batteries into a stationary storage system that will be used to stabilise the grid. The first storage with 3 MWh went into operation in a former coal-fired power plant in Elverlingsen, North Rhine-Westphalia, in 2020.</p>



Project: Frequency stabilisation



Project name	Frequency stabilisation
Place of execution	Hungary
Battery storage size	704 kW / 656 kWh
Description	The battery storage system is used to provide a frequency stabilisation reserve (FCR) to the Hungarian transmission system operator.

Project: Multi use project

Project name	Multi use project
Place of execution	Austria
Battery storage size	451 kWh
Description	<p>The FENECON Industrial works in the customer's microgrid in various areas. Several charging points are intelligently supplied with power, the self-consumption of the local photovoltaic system is increased and the local grid is stabilised by power balancing. The system is integrated into the customer's higher-level control system via the Modbus/TCP interface. In this way, charging and discharging commands can be received and information and data points can be read out from the system.</p>



Project: Reverse Peak Shaving

Project name	Reverse Peak Shaving
Place of execution	Israel
Battery storage size	888 kWh
Description	FENECON worked with the client to develop a solution to limit the amount of energy fed into the grid according to the utility's constraints by adding storage systems that store the excess energy during off-take hours and discharge it later to maximise the yield. Installation of the energy storage system has enabled the construction of additional solar and wind systems at the site.



Thank you for your attention!



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