

# RETHINKING ENERGY STORAGE:

## A New Approach to Shorten Installation and Simplify Logistics

**08**  
JUNE  
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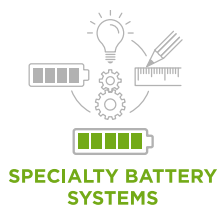
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## Rethinking Energy Storage: A New Approach to Shorten Installation and Simplify Logistics

8<sup>th</sup> June 2021

**swb**



# Agenda

- ▶ What are the challenges of energy storages
- ▶ How can we solve them
- ▶ Example with the project Hyrek in Bremen, Germany

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Lead Battery Storage and  
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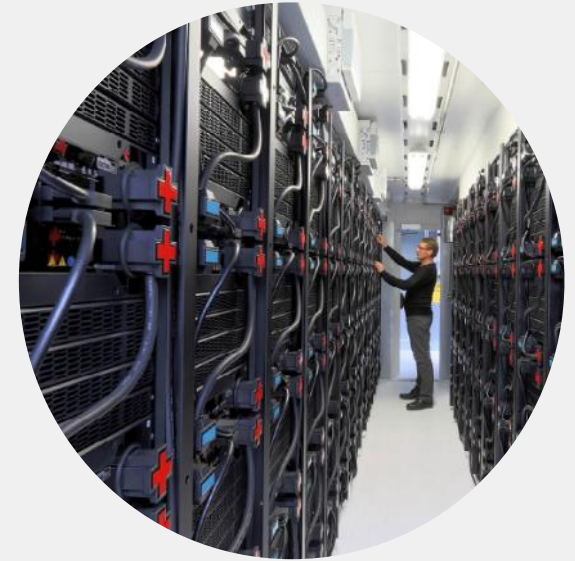
# World leading provider of high-quality energy storage solutions



**E-Transport solution**



**Specialty Battery Systems**



**Stationary solution**



**110**

Years of existence



**280**

employees



**130 MWh**

Installed capacity of  
stationary solution

# Our value proposition



**E-Transport**



**Specialty**



**Cells**



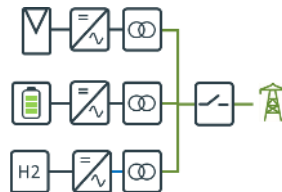
**Customized battery system**



**Rack for Marine application**



**Stationary solution**

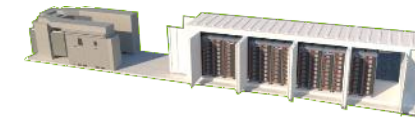


**Sizing  
Engineering**

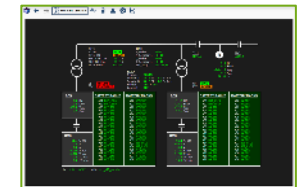


**RETURN**

**Business model  
PPA contracting**



**Integration of 3<sup>rd</sup>  
party equipment**



**EMS  
development**



# The main challenges for Battery Storage System

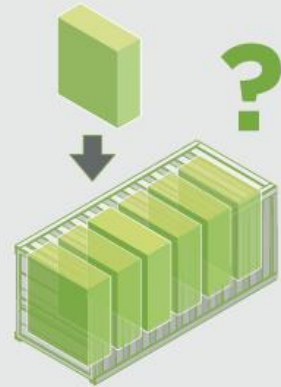
Logistics and installation are **expensive** and take **too much time**



Battery projects have a high **carbon footprint** and environmental impact



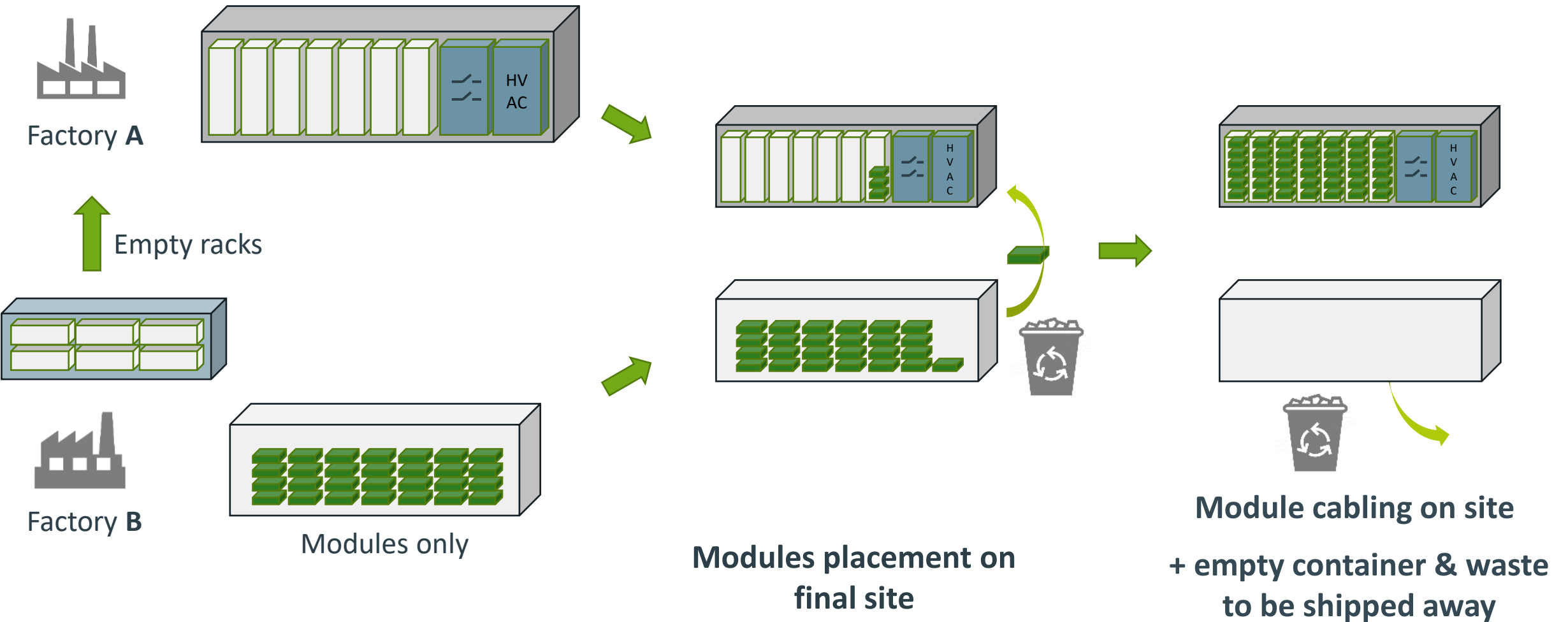
Maintaining the capacity over the year requires complex reconfiguration



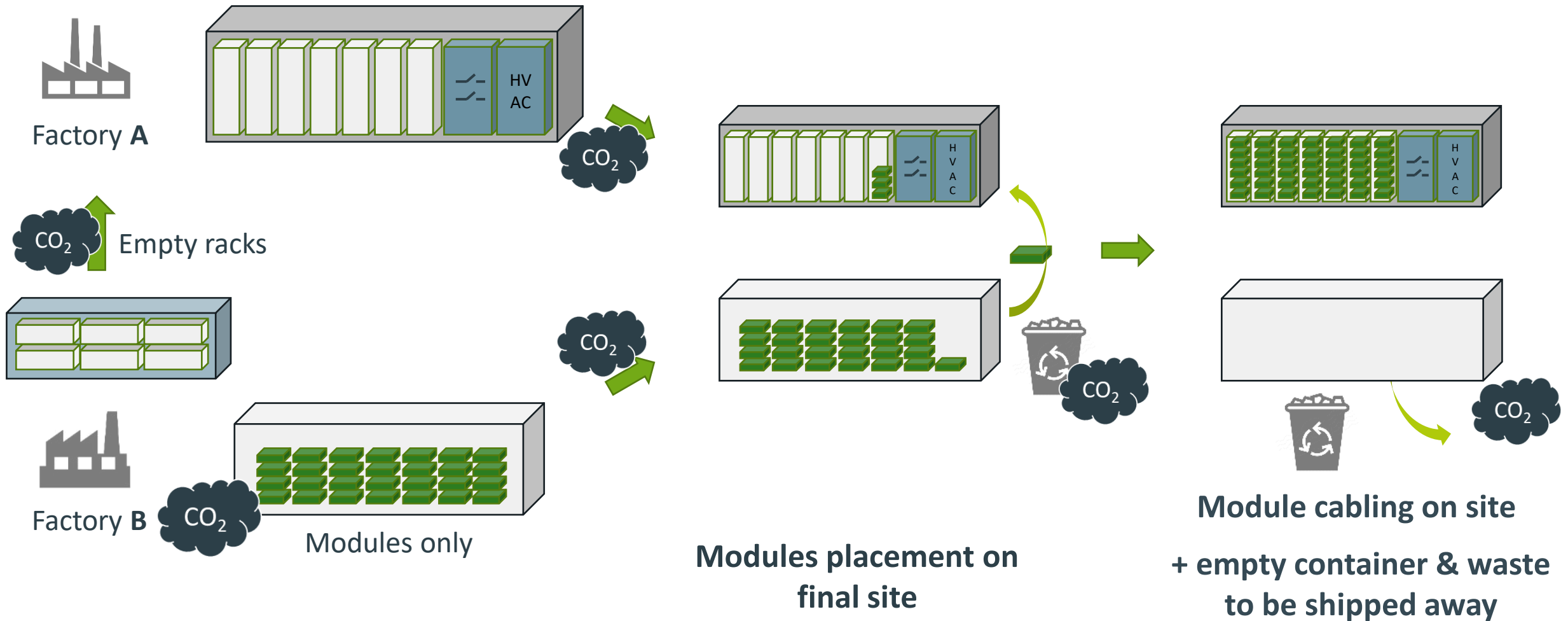
Maintain high level of safety



# Logistics and Installation with containers



# Logistics and Installation with containers





# New BESS Integration concept





# Our Experience with different system integrations



Cremzow, Germany 34.8 MWh



Graciosa, Azores 3.2 MWh



Oakville, Canada 4.9 MWh



Basin, Canada 13.8 MWh



Bremen, Germany 14.4 MWh



Marengo, USA 20 MWh

- ▶ Modular and scalable concept
- ▶ Plug & Play: easy to interconnect
- ▶ Simplified logistic
- ▶ Fast installation on site
- ▶ Integrated Battery Auxiliaries
- ▶ Reduced Carbon Footprint
- ▶ Optimized LCOE



Modular



Simplified  
logistic



Fast installation  
on site



Easy  
augmentation



Lower TCO



Minimal  
environmental  
footprint



# Different Blocks to build LeBlock™



## BatteryBlock

- High density lithium-ion batteries including fire suppression system.
- 744 kWh with LFP technology.



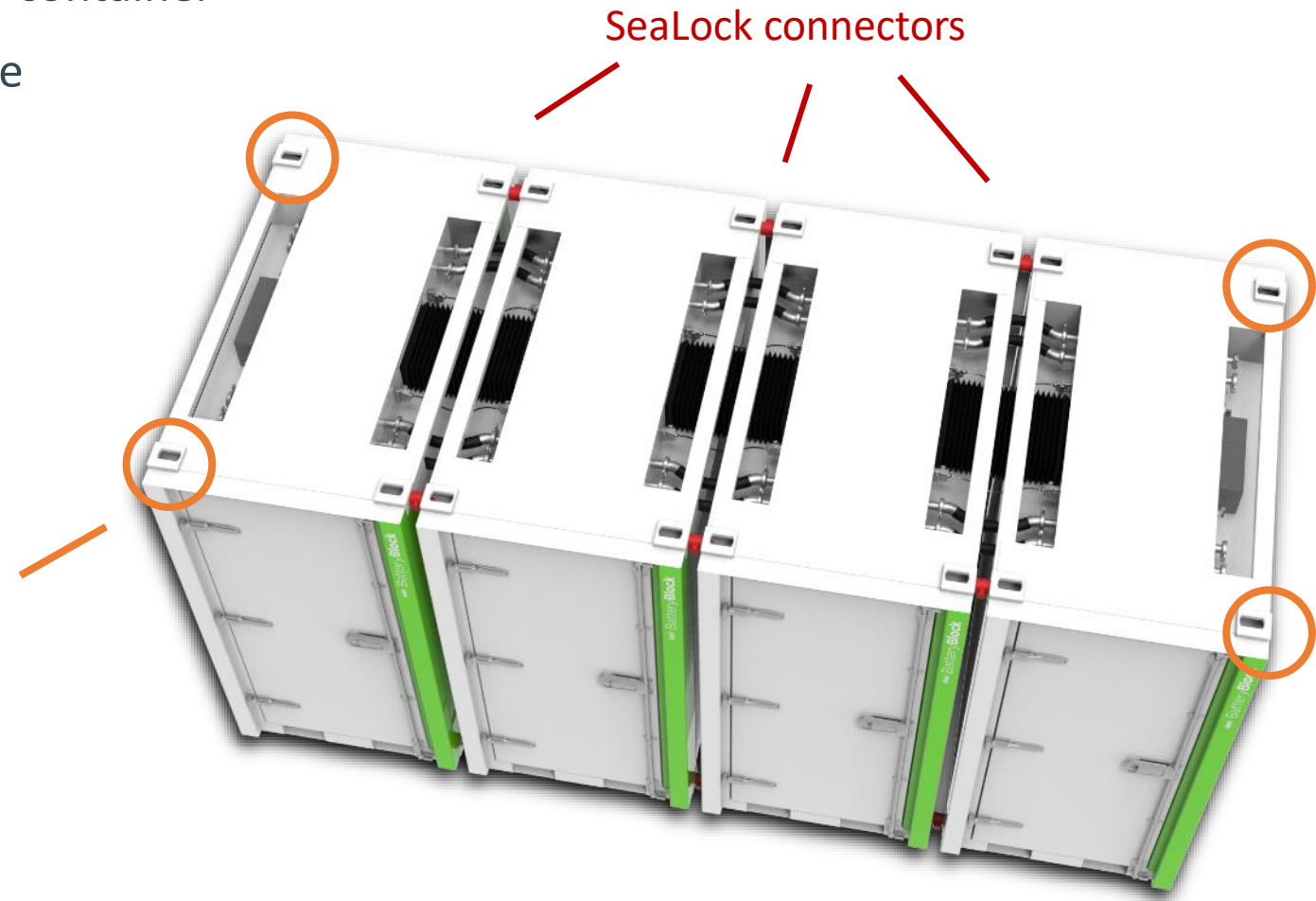
## CombiBlock

- Interconnection and protection of the batteries
- High efficiency temperature management for the batteries

# LeBlock™: Transportable as an ISO Container

- ▶ 4 Blocks interconnected becomes a 20-ft ISO container
- ▶ Equipped with valid CSC safety approval plate

Corner fittings and strength standardized by international standardization organization (ISO)



# Block Interconnections

Simplified plug & play interconnection  
with liquid cooling pipes and flexible  
bus bars









# Our Approach to Safety

## Fire Resistant Construction

High fire resistance

## Certification

UN38.3, UL9540A, IEC62933, NFPA 855, NFPA 68

## Deflagration Panel

To direct the force of any internal pressure upwards.

## Fire Detection & Suppression System

Gas, smoke and heat detection

## Emergency Stop Function

Automatically triggered by internal safety features

## Isolation monitoring

To detect any failure to ground and disconnect the batteries

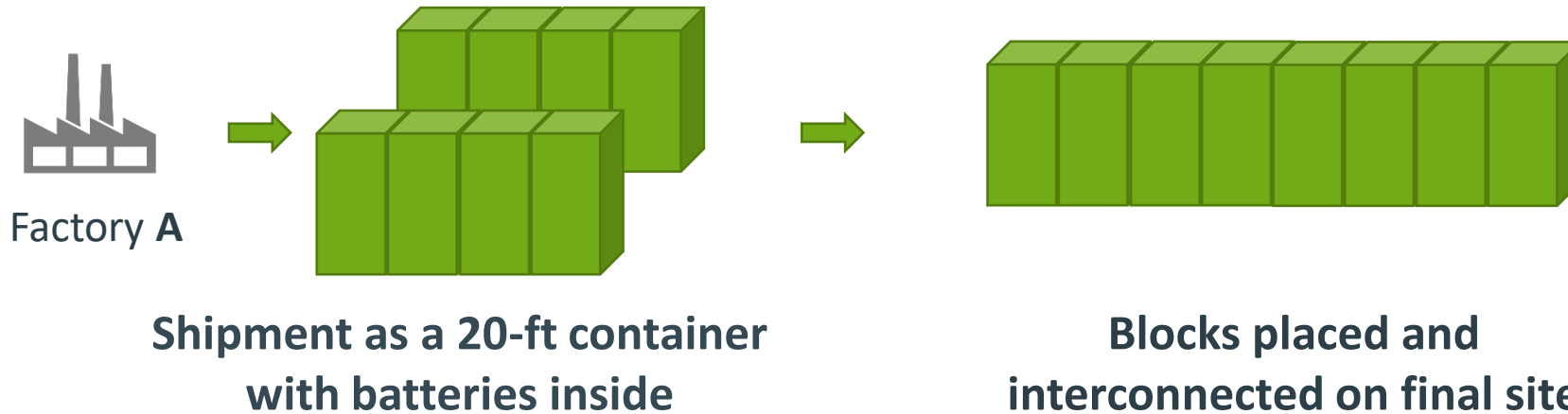


# Addressing the main challenges with the LeBlock concept





# Logistics and Installation with LeBlock

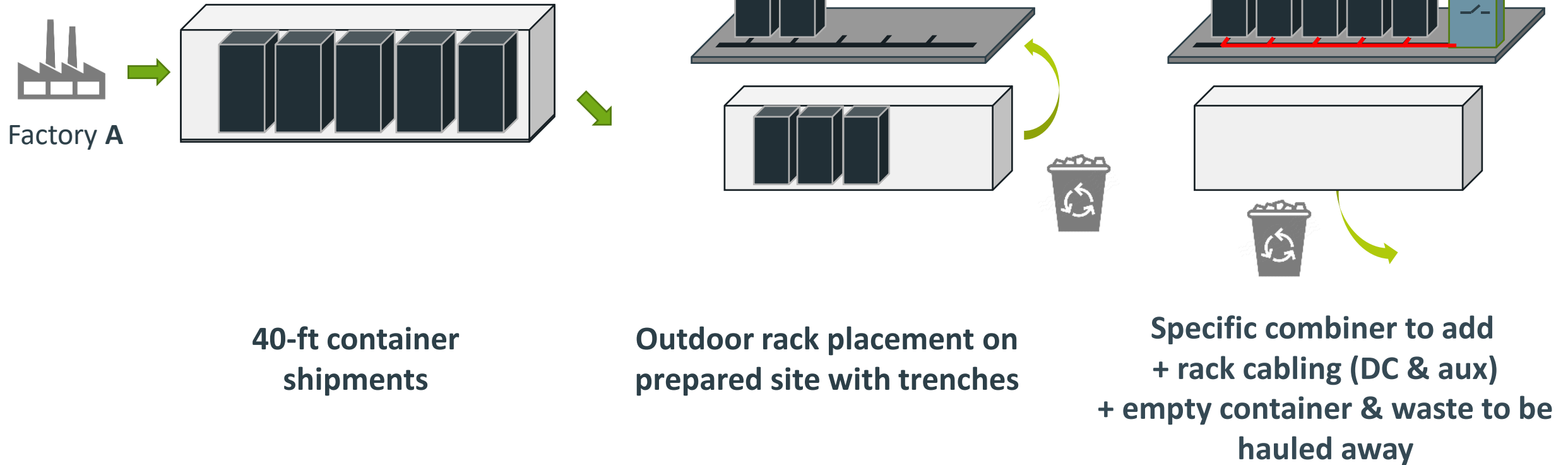


- ▶ Standard transportation: all equipped as 20-ft containers
- ▶ No trenches needed
- ▶ No cabling on site
- ▶ No empty container
- ▶ No specific combiner to add and connect on site

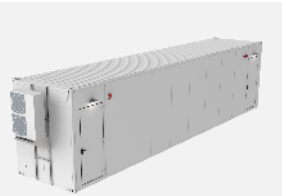




**Up to 50 % time reduction**  
**Up to 40 % cost reduction**

# Logistics & Installation with fully decentralized battery system

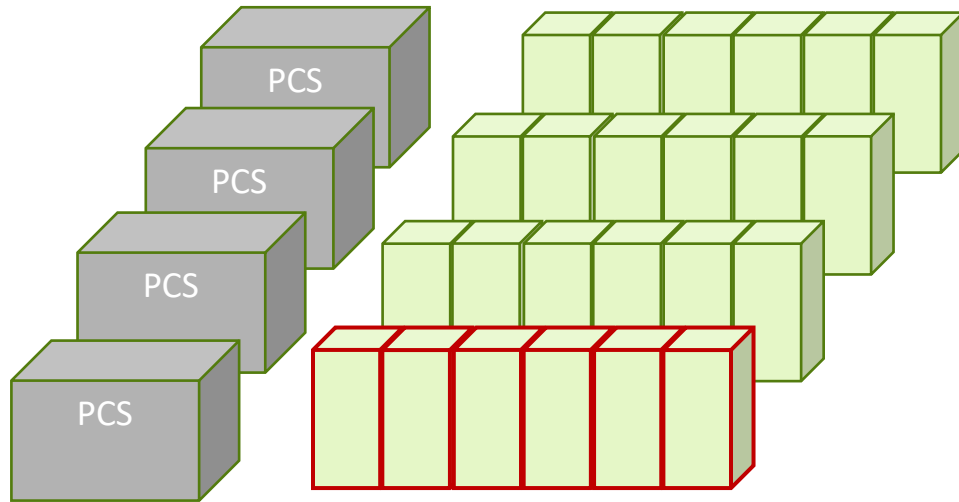


# Logistics & Installation: LeBlock beyond standards

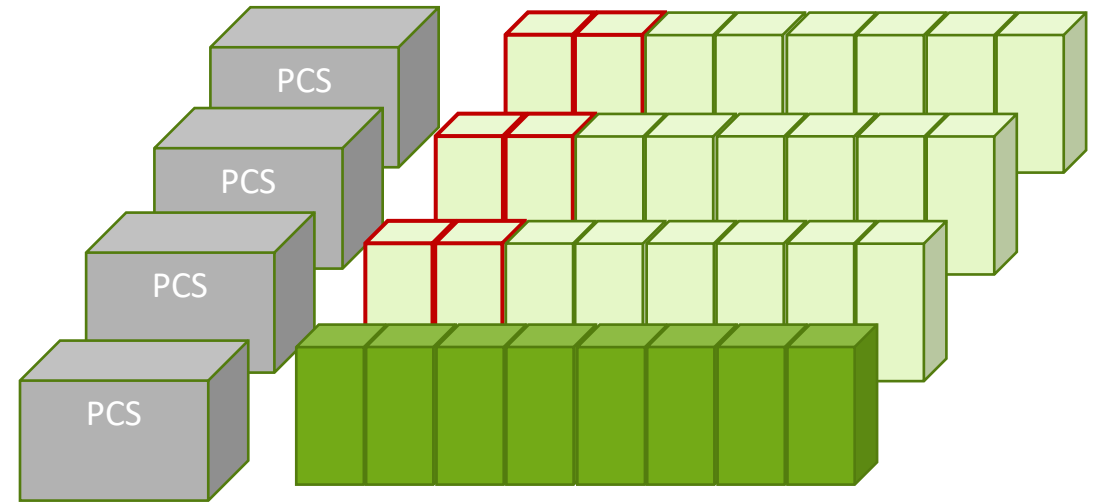
	Transportation			Installation on site				
	Rack	Module	Enclosure	Unloading of batteries from a container	Module mounting & connection	Battery cabling on site	Waste management	Empty container to send back
	€ CO <sub>2</sub>	€ CO <sub>2</sub>	€ CO <sub>2</sub>	€	€		€ CO <sub>2</sub>	€ CO <sub>2</sub>
	€ CO <sub>2</sub>	Single Transportation		€		€	€ CO <sub>2</sub>	€ CO <sub>2</sub>
	€ CO <sub>2</sub>	Single Transportation						



# Ready for Future Fast and Easy Augmentation Plan



4 battery banks with same aging



3 battery banks with same aging  
+ one new battery bank

No complete re-cabling

# Significant improvement with LeBlock

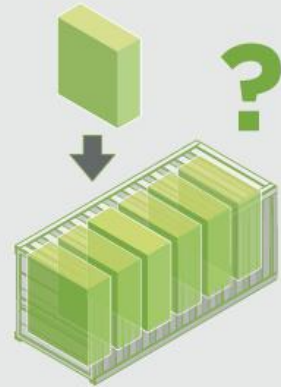
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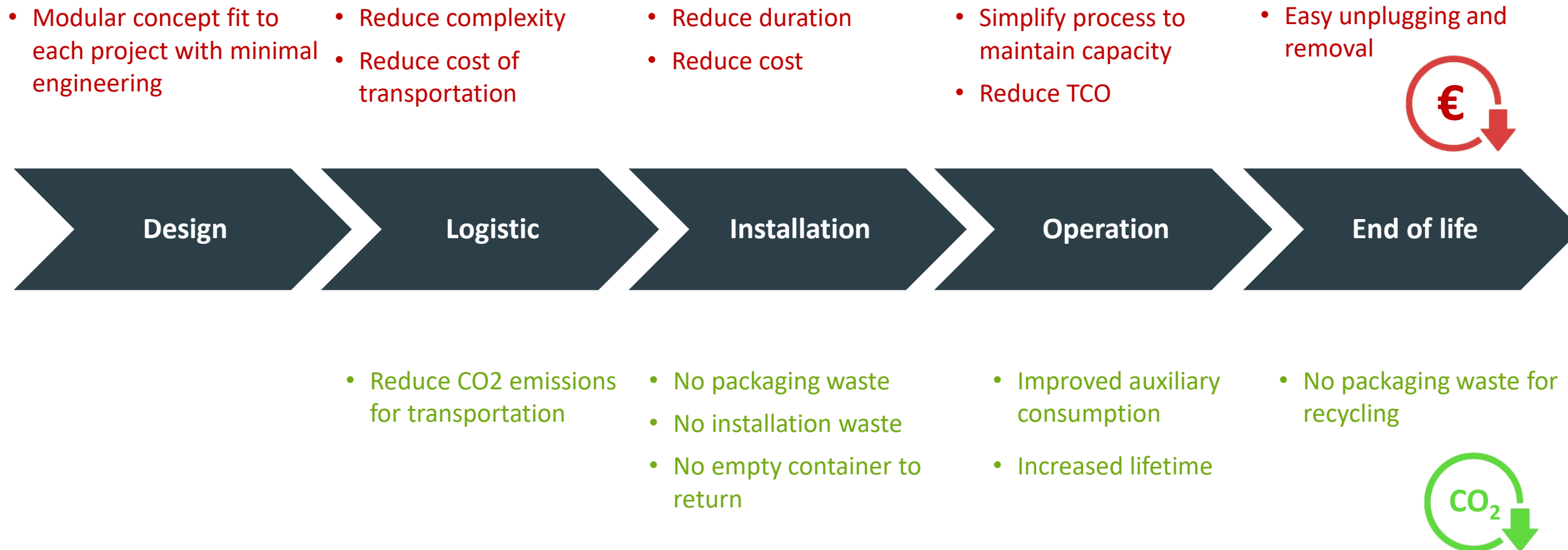
Maintaining the capacity over the year requires complex reconfiguration



Maintain high level of safety



# LeBlock™ : Reduce **Cost** and **CO<sub>2</sub>** Over the Entire Life





## Configure your modular solution

### CONFIGURATOR

#### Power required (MVA)

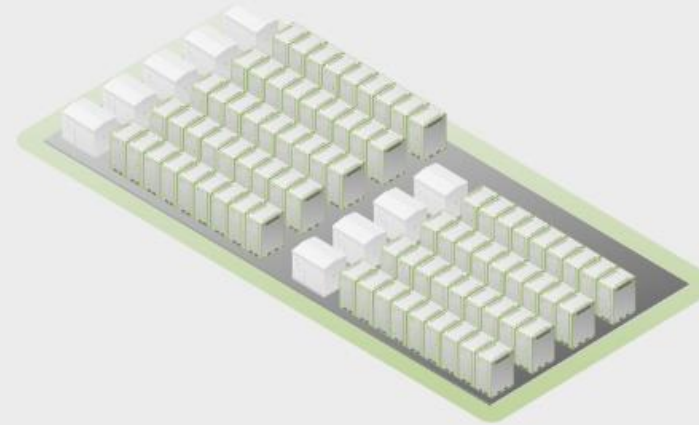


#### Energy nameplate required (MWh)



#### Application

- ☐ Power required (MVA)
- ☐ Microgrid
- ☐ Solar + Storage AC coupling
- ☒ Solar + Storage DC coupling



Required surface **1'240m<sup>2</sup>**

# Leclanché

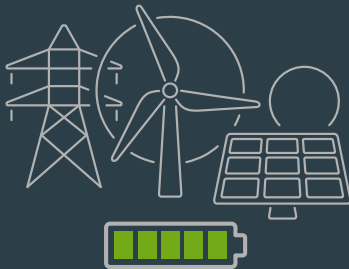
## Energy Storage Solutions

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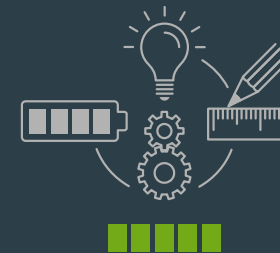
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**STATIONARY  
SOLUTIONS**



**e-TRANSPORT  
SOLUTIONS**



**SPECIALTY BATTERY  
SYSTEMS**

**swb Services**

**swb Hyrek**

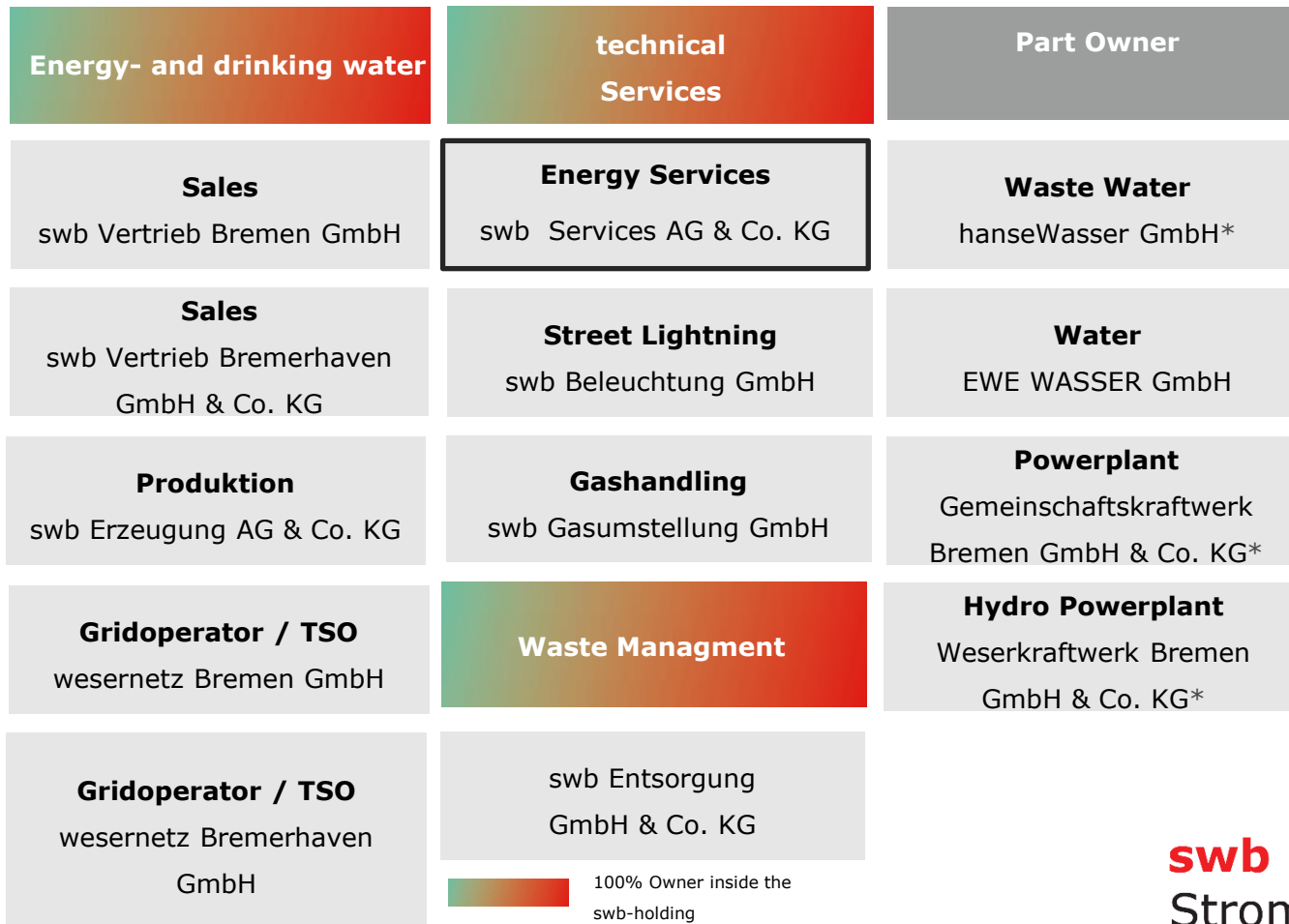


Clemens 08.06.2021

**swb**   
Stromspeicher



# swb AG



# Overview swb Services AG



**Comprehensive energy solutions for different customer requirements and use cases in the field of Energy, Steam, heat, cooling and compressed air supply**

Energy Concept

Generation of Energy

Energy Supply

operational management  
and monitoring

concession projects

combined heat and  
power systems  
(CHPs)

Storage

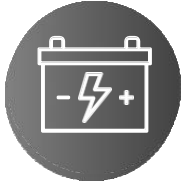
Own engergy  
produktion  
(PV-Generator)

**15 MW FCR BESS with 15 MW P2H unit in 3 units.  
Each unit with 8 battery inverter Systems  
installed in 21 containers**



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Stromspeicher



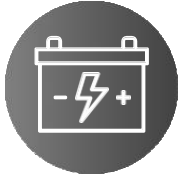


# Lessons Learned Installation

- 6 months installation and 2 months Commissioning
- 26km cable inner-system-connection
- 5km piping ways
- 21 fundaments
- 3 fire-resisting wall systems
- wide System with a large size ratio
- 20 trucks' ,6 cranes und 3 Merlo's
- No pre commission possible, the system tested on side .
- high manpower
- Low energy density ( $15\text{kW}/\text{m}^3$ ) ( $14,4\text{kWh}/\text{m}^3$ )

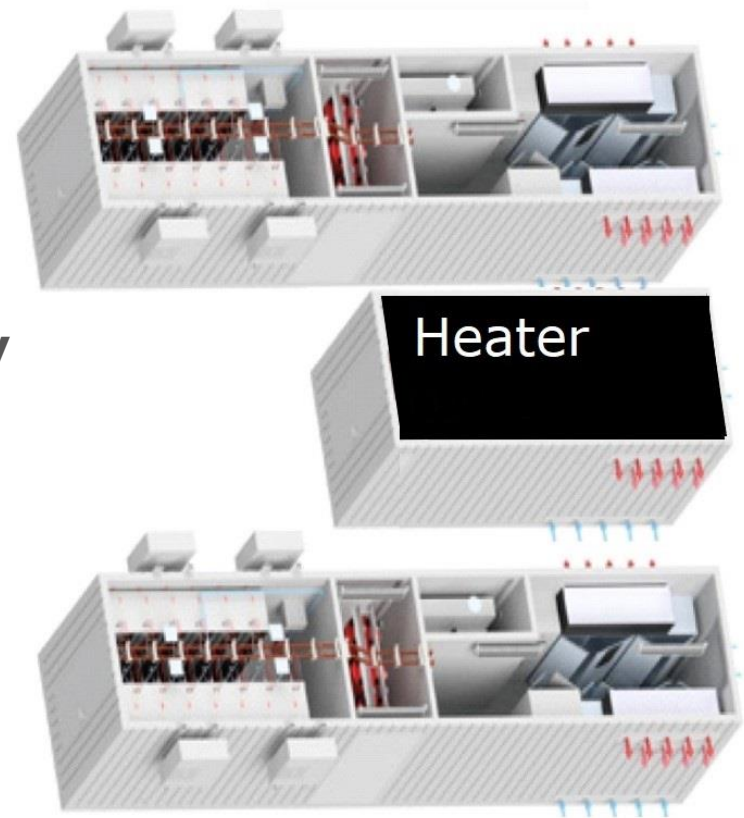
⇒ Target create a compact system

- Easier to install
- Shorter cable ways
- Pre test possible in factory



## 3 MW/3MWh Unit

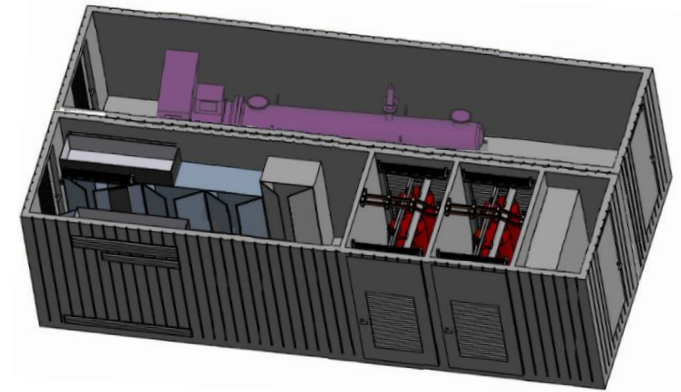
- 3 basement
- 3 containers
- no fire resisting wall
- Heater connection with busbar
- 2,5 MWh Limited battery capacity
- 2 day installation
- 1 week connection time
- 1 week battery installation
- with high manpower
- 1 week commissioning
- Pre test only with 2 times battery installation
- Medium energy density  
(17,8kW/m<sup>3</sup>)(17,4kWh/m<sup>3</sup>)





## 2.5 MW Hyrek modular

- 2 basement
- 2 containers (9m length) & 1 Leblock
- no fire resisting wall
- Heater connection with busbar
- Leblock connection with busbar
- unlimited battery capacity
- 2 day installation
- 5 days connection time
- 2 days battery installation
- 2 days commissioning
- Pre test in factory
- high energy density  
( $18,6\text{kW}/\text{m}^3$ )( $18,4\text{kWh}/\text{m}^3$ )



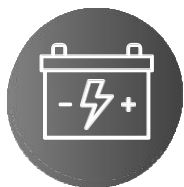


# 15 MW/15MWh Unit

- 6 x 2.5MW Hyrek Modul
- 12 basements
- only MV cable connections
- 1 week installation
- 3 weeks cable installation
- Total factory test
- 10 days commissioning



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# Installation

	previous project	New version with LeBlock and 1500 V conversion	
	Hyrek 1	Hyrek 2	
Overall installation time	6 months	3 months	-50%
ESS installation time	45 days	15 days	-30%
Number of days of crane renting	21 days	7days	-66%
Number of container needed in total	21 Containers	12 Containers + 6 LeBlock Clusters	-14%
Cable length	26 km	6 km	-76%
Cable installation time	4 months	4 weeks	-75%
Number of truck needed	20	12	-40%
Number of fire resistant wall	3	0	-100%

Questions ????????