



Totally Integrated Power

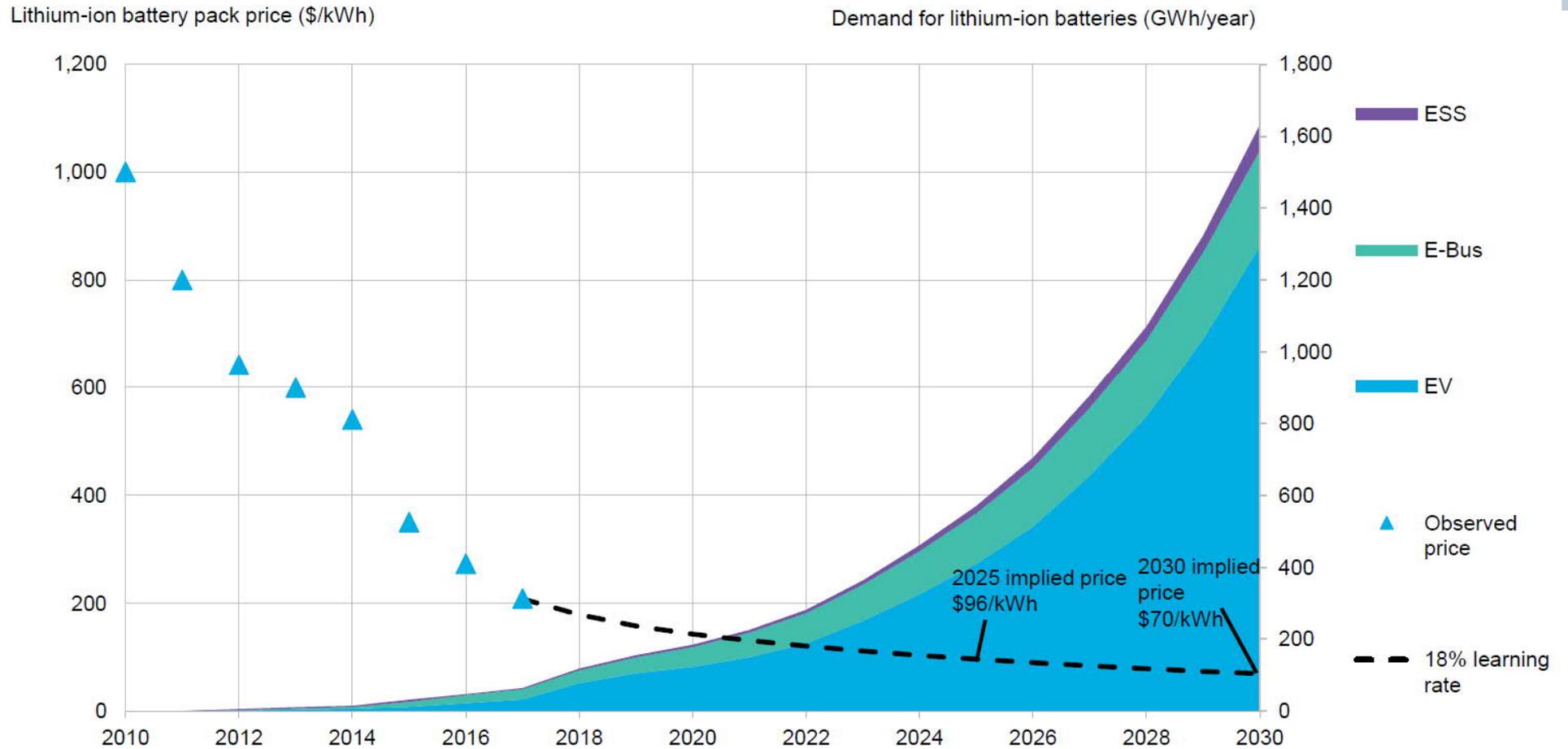
BESS: Battery Energy Storage System The Energy System Upgrade

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Unrestricted

BESS Precios y Mercado



Nota: estos son precios de baterías, sin sistemas de electrónica de potencia.

Why BESS is the best way to upgrade the Energy System?

The answer is, the BESS could give us a better ROI than traditions solutions.

Where could BESS be applied?



Generation BESS apps:

- Frequency & Voltage Support
- Spinning reserve
- Black Start
- Fast start
- Ramp up/Down
- Min. Environmental
- Reduction Diesel
- Reduction Operational time
- Switch Renewable Energy
- Renewable integration



T&D BESS apps:

- Frequency & Voltage Support
- Active and reactive Power support
- Peak Saving for Lines
- Stability services
- E-mobility integration



C&I BESS apps:

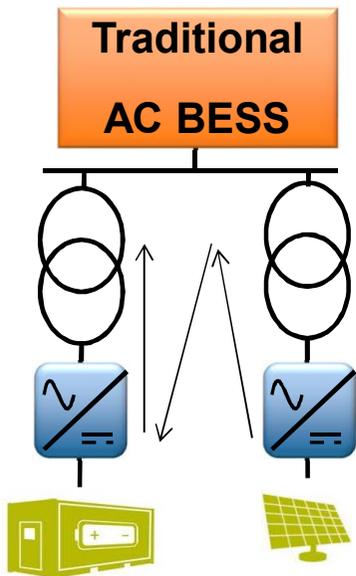
- Frequency & Voltage Support
- Peak Saving for TR/line/Genset
- MV UPS for Critical power
- Reduction penalties



SUNFLEX: BESS for PV Farms

SUNFLEX is the optimal BESS and PV inverter system in order to sale solar energy on not solar time.

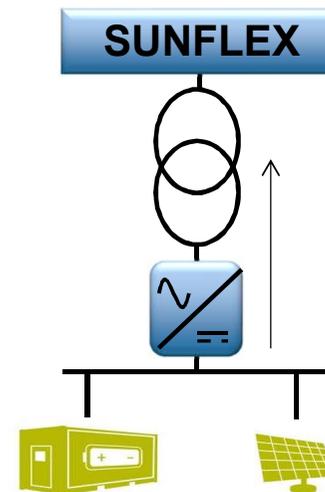
The SUNFLEX System could reduce between 5 to 7 % the DC/AC conversion losses, because SUNFLEX BESS is on the DC site and the energy will converter just one time from DC to AC.



Direct	Indirect
5 to 7% Reduction losses conversion DC/AC process	Mayor income per year
No PV Inverter clipping	
One AC conection assets	Less TR + Cable Capex
One BESS and PV inverter Supplier	Bankability.

STANDARDS AND CONFORMITY

- Inverter safety: UL1741
- Lithium battery safety: UL1642
- Battery module safety: UL1973
- Power conversion harmonics: IEEE519
- Interconnection of distributed resources: IEEE1547



Energy Shifting

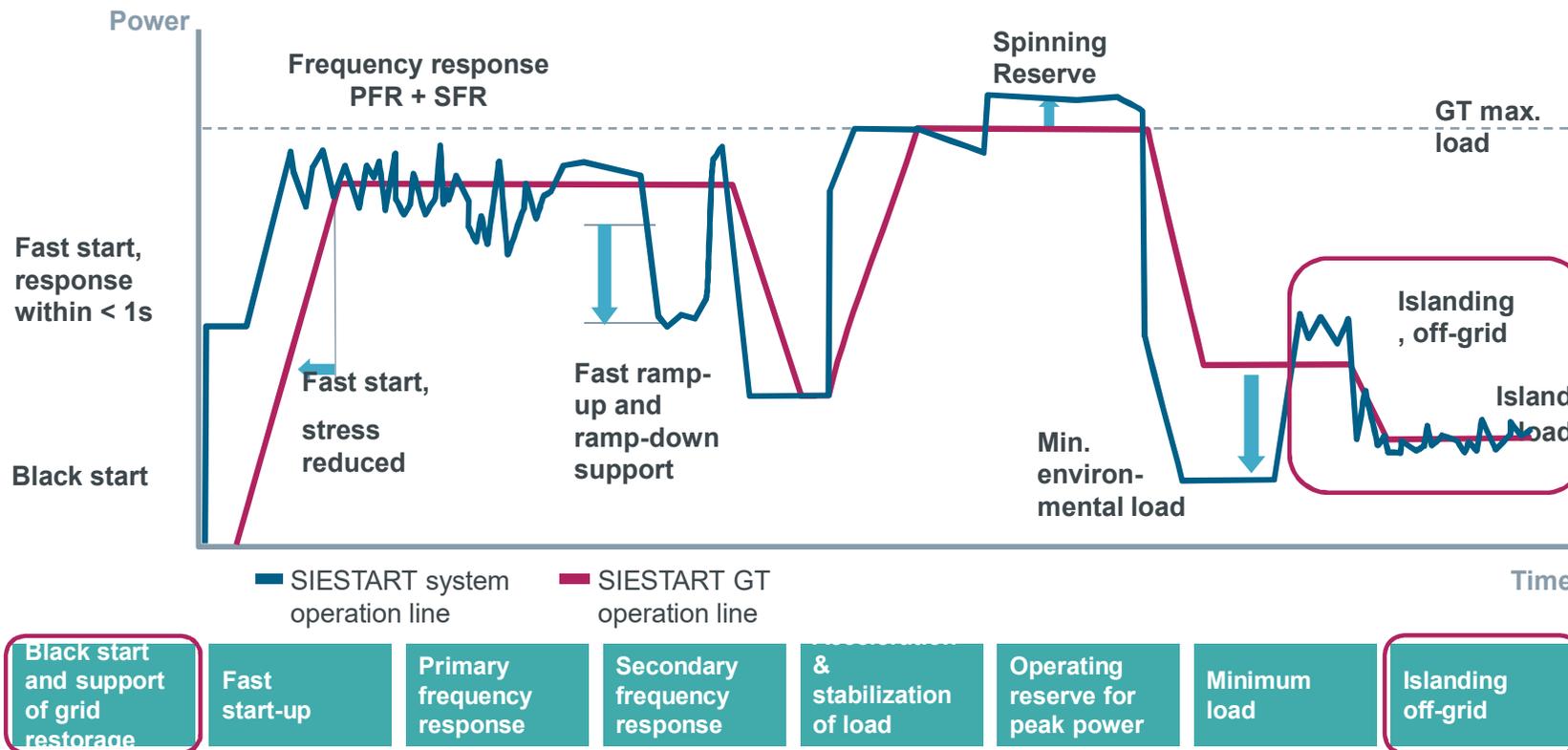
Firm Energy

Frequency Control

Voltage Control

Losses vs Sale Energy

SIESTART™: Optimized performance and new opportunities – for grid and ancillary services and turbine operation



Spinning Reserve: 3-7% additional income.

Blackstart: reduction capex and Diesel

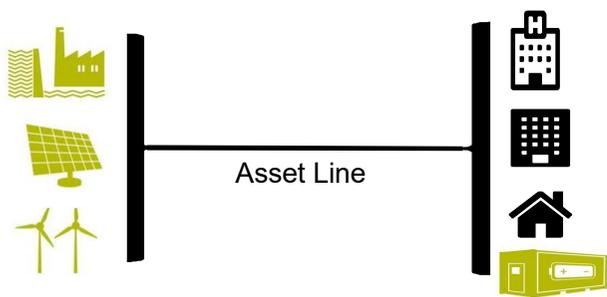
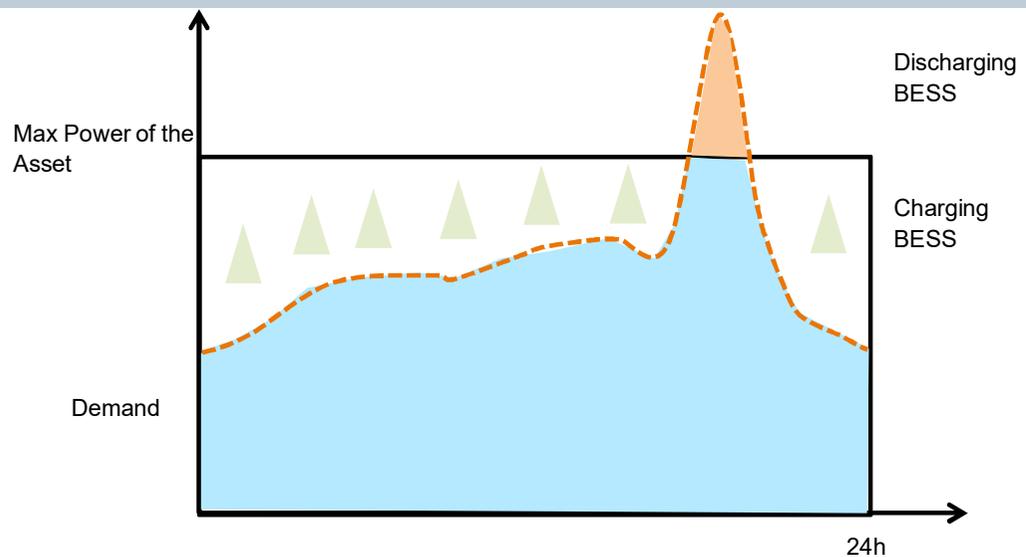
Frequency Response: directly payments from rules.

Min Environmental load: reduction penalties.

Fast Start, Ramp up & Down: reduction gas & maintenance time.

In hybrid case the BESS could reduce up 15% of Gas, reduction operation time of genset up 55%

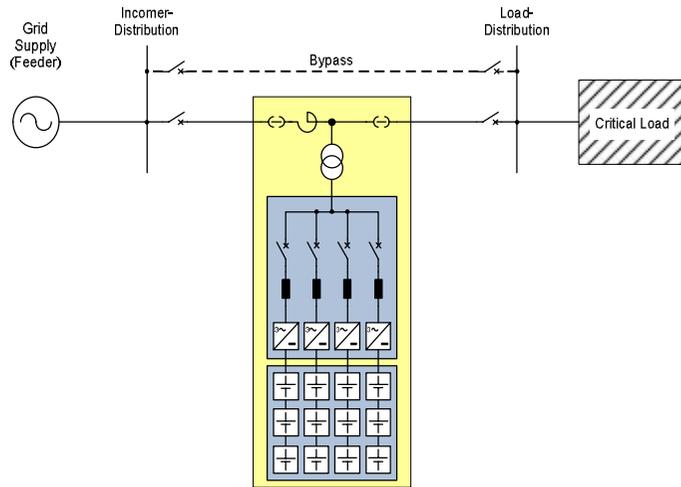
Peak Shaving BESS for Assets



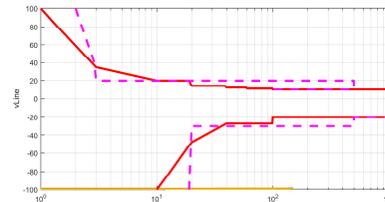
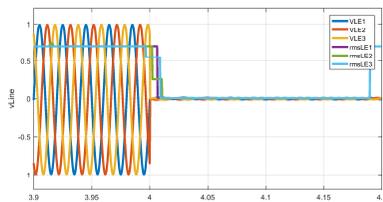
- Peaks on transmission or distribution line, Generators and power transformers could be support by Peak saving BESS.

- You couldn't increase the capacity or build a new asset if the demand peak will be in a few minutes of the year.
- The peak demand will be achieved by the asset + the BESS and the BESS will be charged by the same asset on the valley time.
- when the demand have big peak in short time.
- T&D application need tariff payments rules, but not Industry sector, Industry sector need business case base on the saving.

BESS as MV UPS or Critical Power - prototype

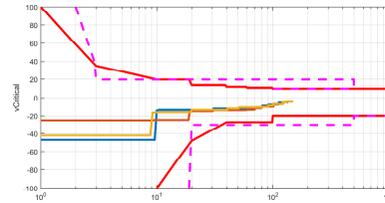
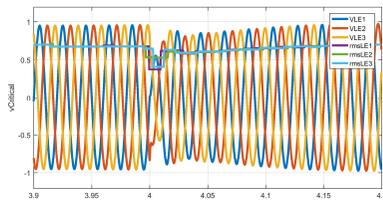


W/O
BESS



IEC 62040-3: 2011 (DIN IEC 62040-3; VDE 0558-530: 2011)

With
BESS



- Reduction production loss by no continuous power supplier.
- Ideal for high demand energy and critical power process as Steel producer, Mining, Oil & Gas Sector
- Design and integration on E-house by Siemens
- Typical back-up time of 5-15 minutes; other back-up times upon request
- Can be used to deliver peak-shaving functionality as well for improved economics.

Reliable power supply for sustainable steel plant operation incl. black start capability

SIEMENS

Customer
**Vulkan Energiewirtschaft
Oderbrücke GmbH**

Location
Eisenhüttenstadt, Germany

Date
2013

**Secure
power supply
(on- and off-grid)**

Project specific requirements

- Black start capability for an industrial gas turbine
- Grid stability (frequency, voltage)
- Islanding and off-grid services
- Smart peak load management

Solution

- Existing GE gas turbine and generator
- SIESTORAGE Li-Ion battery storage system (2,8 MVA / 1,2 MW, 1,080 kWh)
- Integration of components to existing unit control system

Customer benefits

- Siemens turnkey solution with 57 MW_{el} and steam generation of 180 t/h, 120 bar, 540° Celsius
- Secure power supply through black start capability for sustainable steel and rolling mill operation



**Independence from
public power grid**

**Grid services
(frequency, voltage)**

Reliable power supply for an off-grid island in Italy

SIEMENS

Customer
ENEL

Location
Ventotene, Italy

Date
2016

**Secure
power supply
(on- and off-grid)**

Project specific requirements

- Off-grid electrification of a geographical island
- Black start capability in case of a power outage
- Primary and secondary frequency regulation
- Flexible management of users and renewables power input

**Grid services
(frequency, voltage)**

Solution

- SIESTORAGE Li-Ion battery storage system (500 kW / 600 kWh)
- Microgrid Controller
- Integration with four existing diesel generators (480 kW each)

**Turnkey solution
(one-stop-shop)**

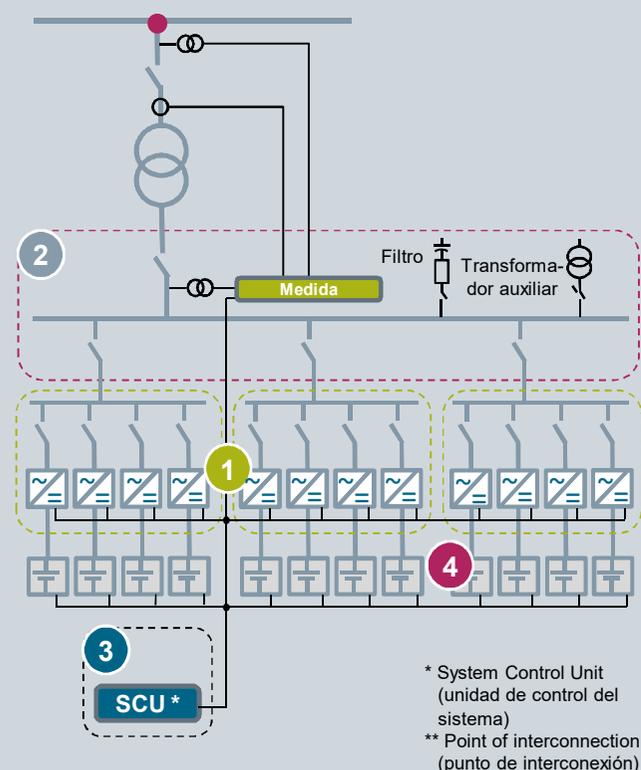
Customer benefits

- Up to 15% diesel fuel savings
- Approx. 55% savings in diesel generator operating hours
- Reduction of CO₂ emissions and maintenance costs
- Improved grid stability



BESS Design and Concept

Energy Distribute by Bloque System



- 1 Convertidores DC/AC
- 2 conexión a la red
- 3 Armario de control
- 4 Armario de baterías
 - Potencia: 90 kW
 - Energía: 45 kWh
 - * Dependiente del proveedor

Ion Lithium Advantage for BESS

Charge or Discharge Disponibility

2 to 4 time more Energy Capacity

High Eficency

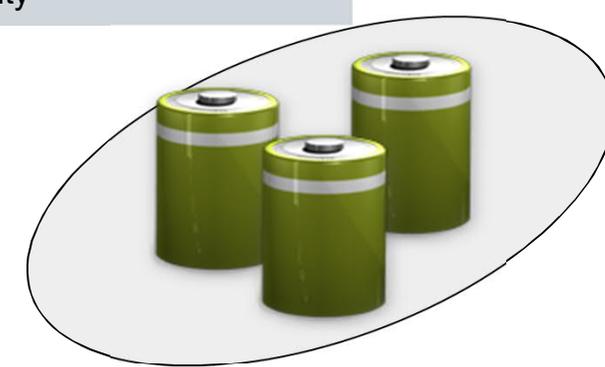
Low AutoDischarge

No Memory Effect

Services Temperature 0 °C to 40 °C

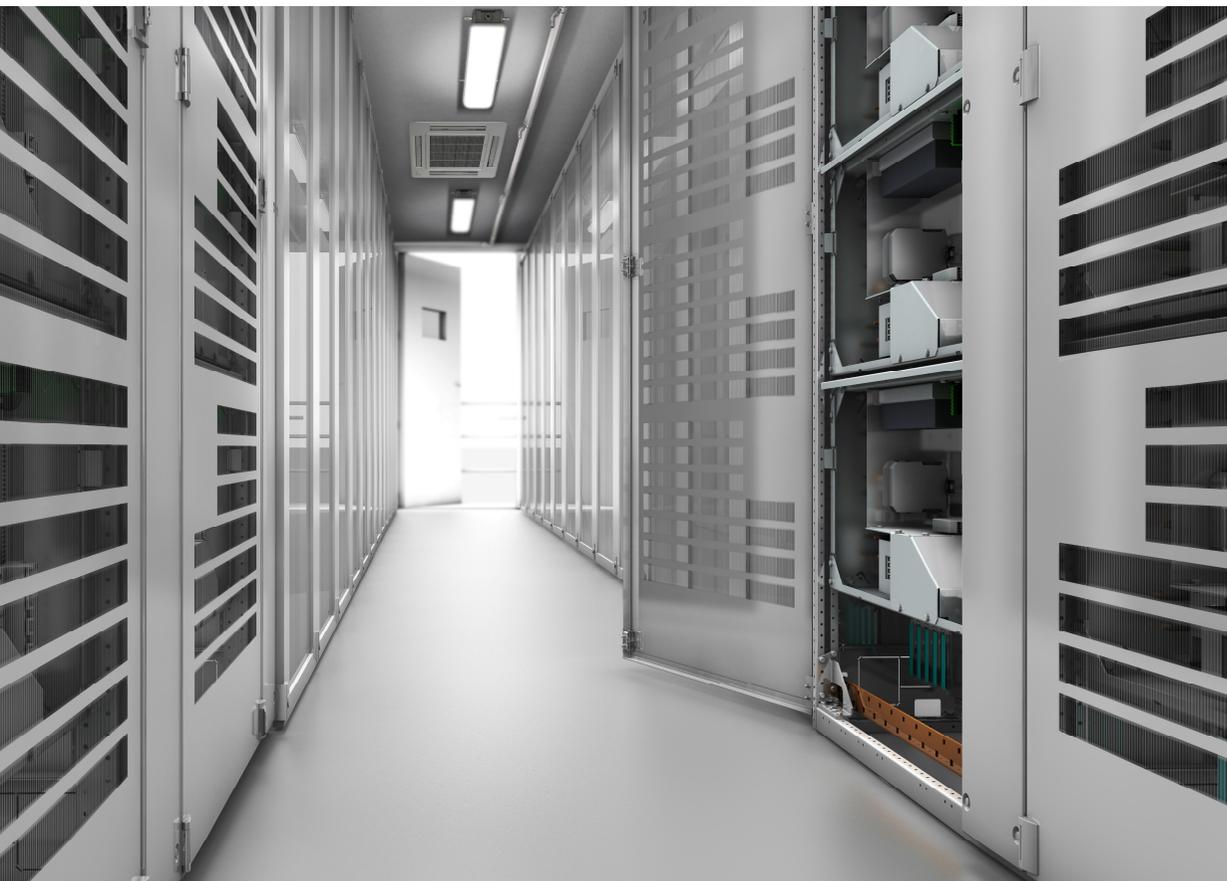
High Density Energy Storage (space and weigh)

Fast Current answer Connected and Disconnected (ms)



Contact

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