

WEG BATTERY ENERGY STORAGE SYSTEMS



LST
LST Service Oy



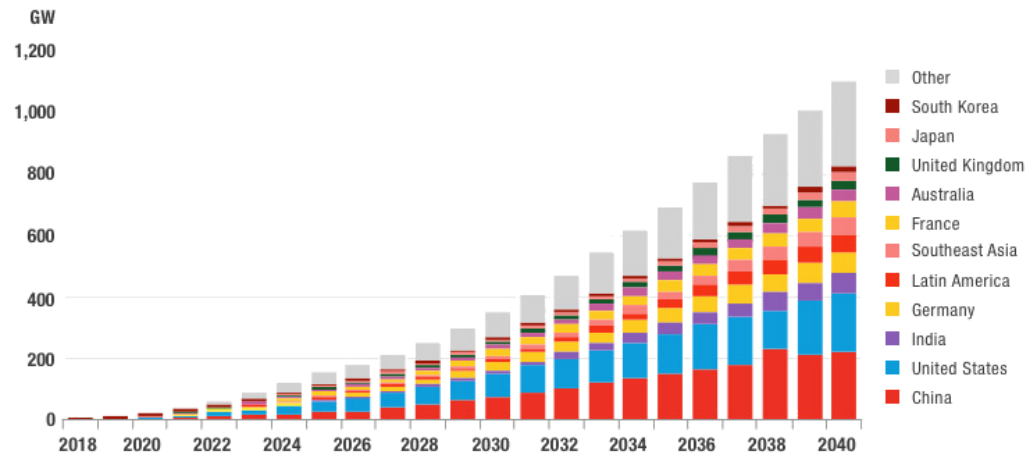
WHAT'S BESS?



BESS = Battery Energy Storage System

- Energy and Power under control
- Allows adjustment between Generation and Demand
- Strategic Business for WEG

GLOBAL CUMULATIVE ENERGY STORAGE INSTALLATIONS



Source: BloombergNEF.



BESS AT WEG'S TIMELINE

WEG Acquires a
UPS Company

First Li-Ion bank
supplied

First emobility
infrastructure BESS
CELESC - 50kVA/70kWh

ANEEL BESS R&D
Program started
in Brazil

WEG acquires US BESS business
First BESS Utility Scale deployed
VIRIDITY - 2MVA/5.3MWh

FEESC - 100kVA/150kWh
FURNAS - 300kVA/600kWh
ENGIE - 1MVA/1MWh

CPFL - 200kVA/430kWh
CEMIG - 915kVA/1.15MWh
CELPE - 100kVA/215kWh
BARRE - 5MVA/18MWh

IPIRANGA - 500kVA/2000kWh
FAXINAL - 250kVA/560MWh
TRANSPORTÁVEL - 1MVA/1MWh
ILHA DAS COBRAS - 75kVA /150kWh
CLA ALCÂNTARA - 1MVA/1MWh
DEER RUN - 5MW / 10MWh
PORTAGE - 5MW / 10MWh



2011

2015

2016

2017

2018

2019

2020

2021

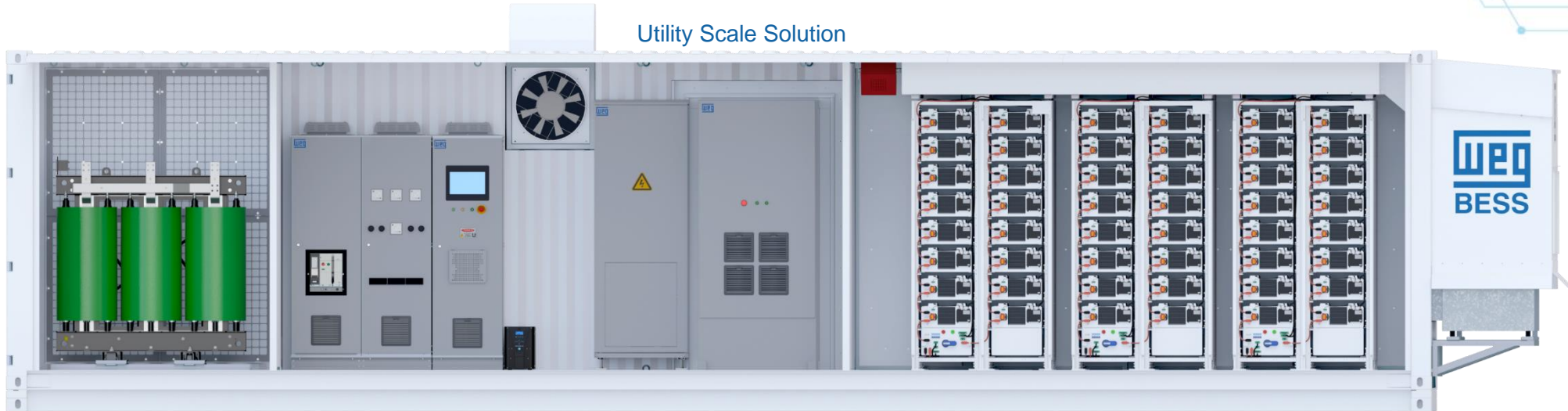


Cidade Azul – Engie (Brazil)

BESS INTEGRATED SOLUTIONS



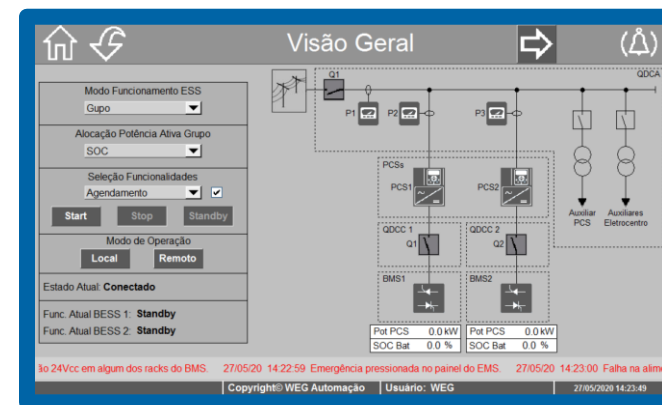
Utility Scale Solution



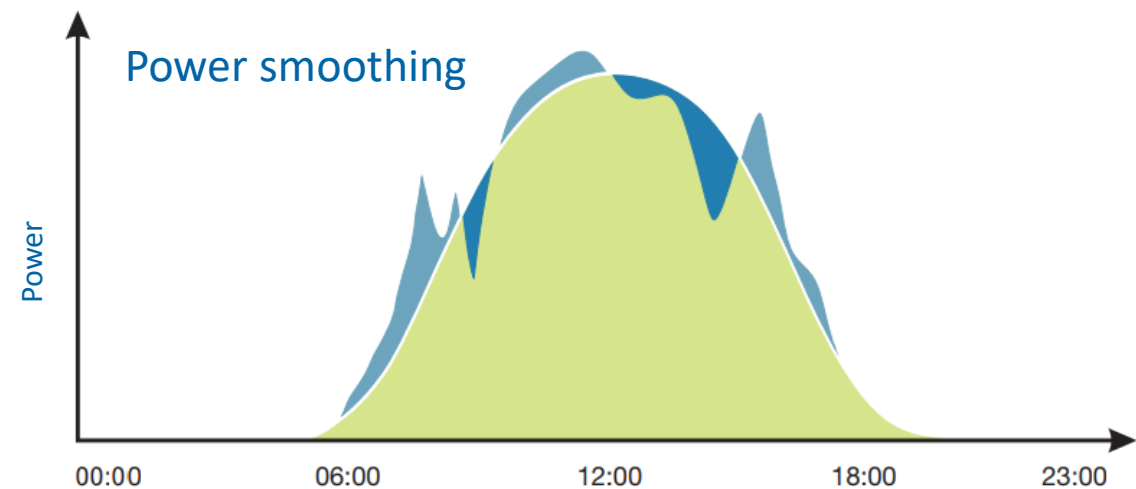
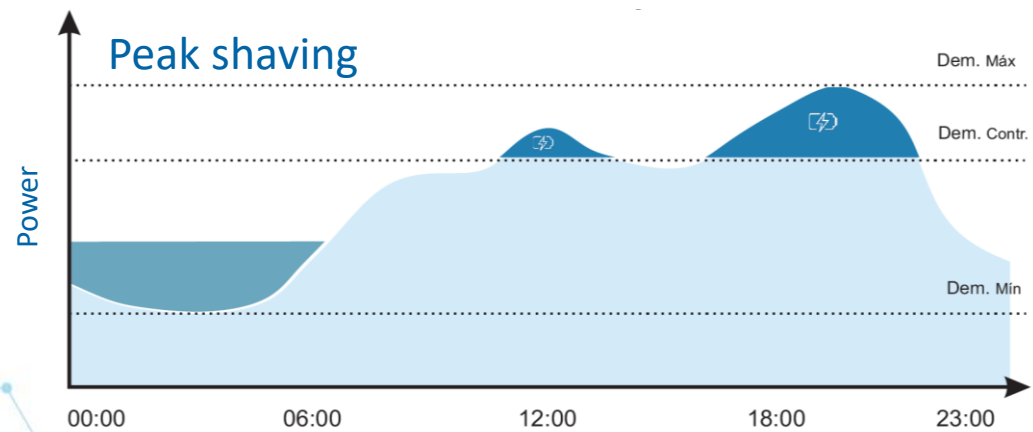
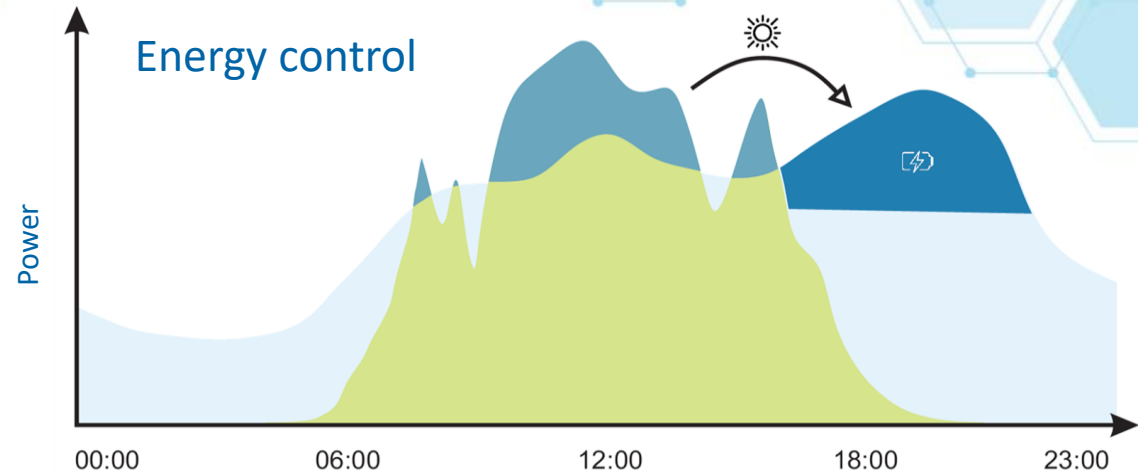
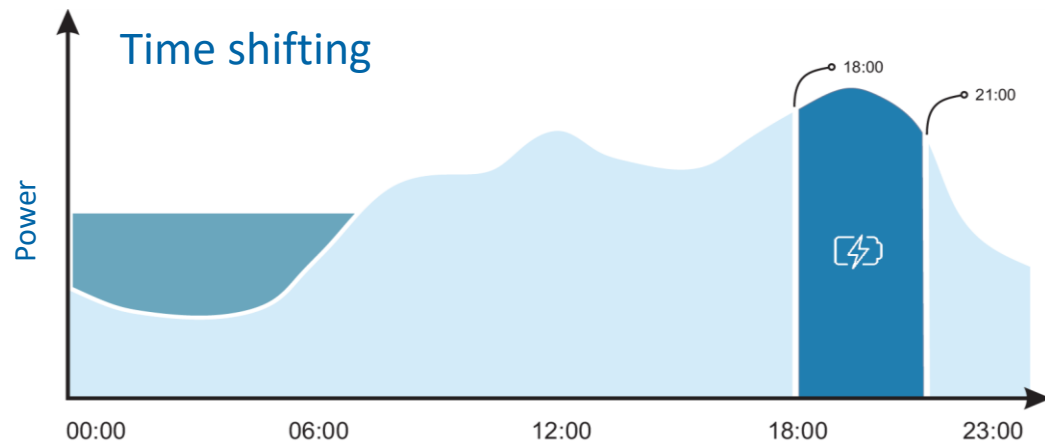
Commercial and Industrial Solution (C&I)



HMI/Automation

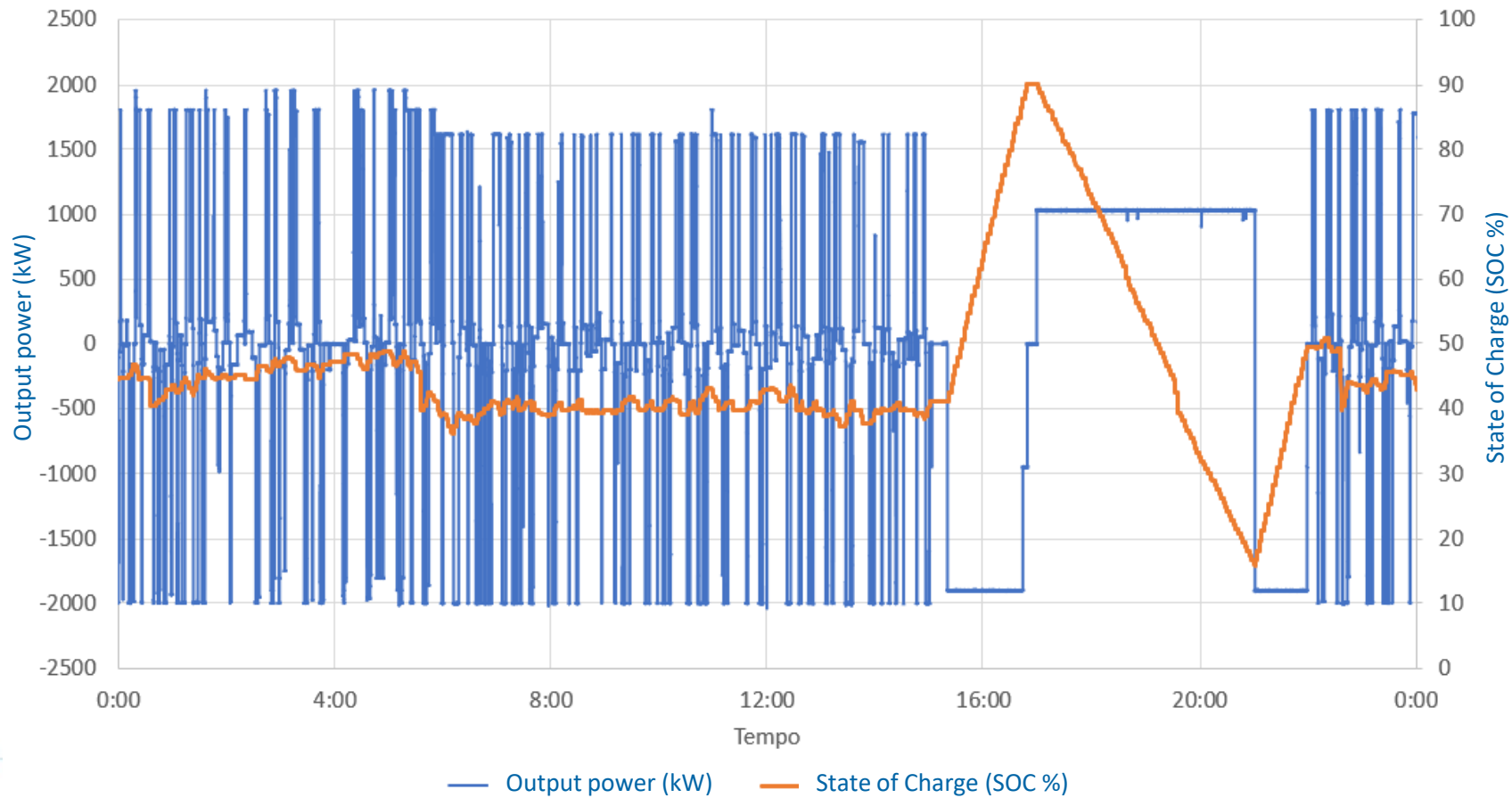


LOW-END BESS APPLICATION



...plus Backup, Investment Deferral and others.

HIGH-END BESS APPLICATION



Ancillary services:

Fast switching between operating modes

Frequency regulation:

New command every 4 seconds
High power (maybe high energy)

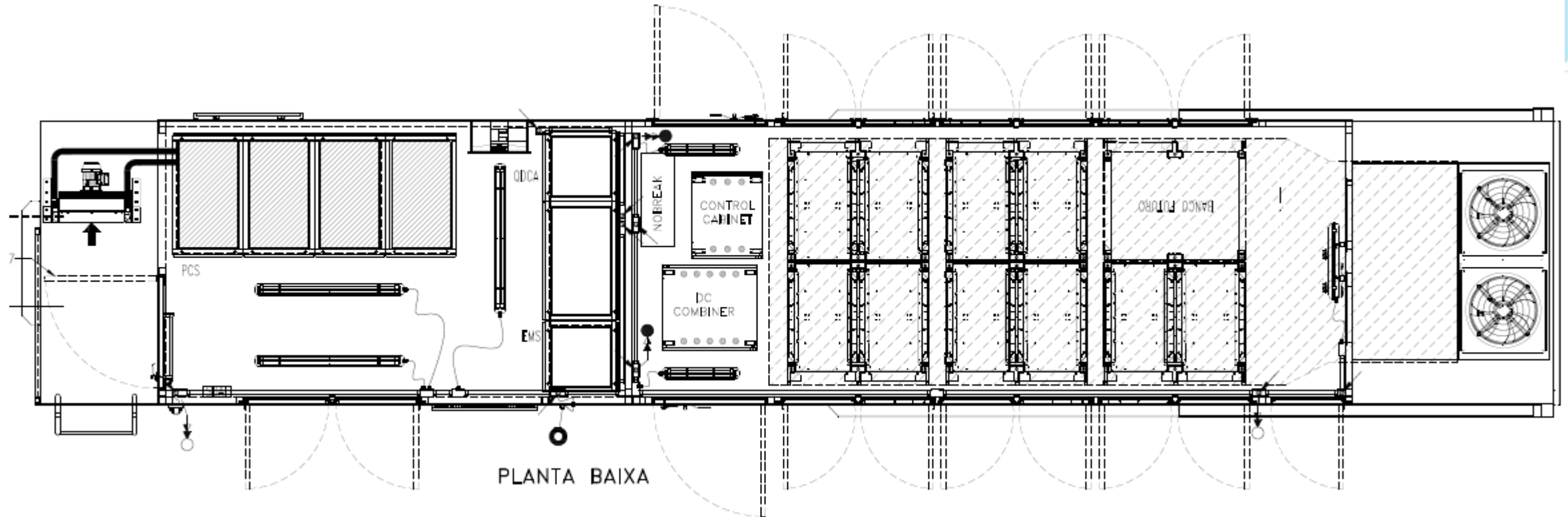
Peak shaving, Voltage Support, and other remunerated services

WEG BESS OPERATION IN BRAZIL



- Highly vertical operation – WEG produces from breakers to MV transformers;
- Local Engineering - Products and projects are developed in Brazil;
- Local Production: PCS, EMS, TRANSFORMERS, PANELS, E-HOUSES and BOP, including substations;
- Local Support:
 - Strong Service Team – Plus than 200 qualified field technicians/engineers
 - Authorized service network – Plus than 100 authorized repair centers for WEG Automation;
- Strong Turnkey capabilities with certified partners.

OWN ENGINEERING



Bidirectional Inverters

Switchboards

Batteries Room

HVAC & Fire Combat

SAFETY



LFP

VS

NMC



WEG selected LFP as official chemistry due to its safety and stability.

WEG BATTERY RACKS



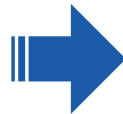
LFP CELL



Qualified
Suppliers



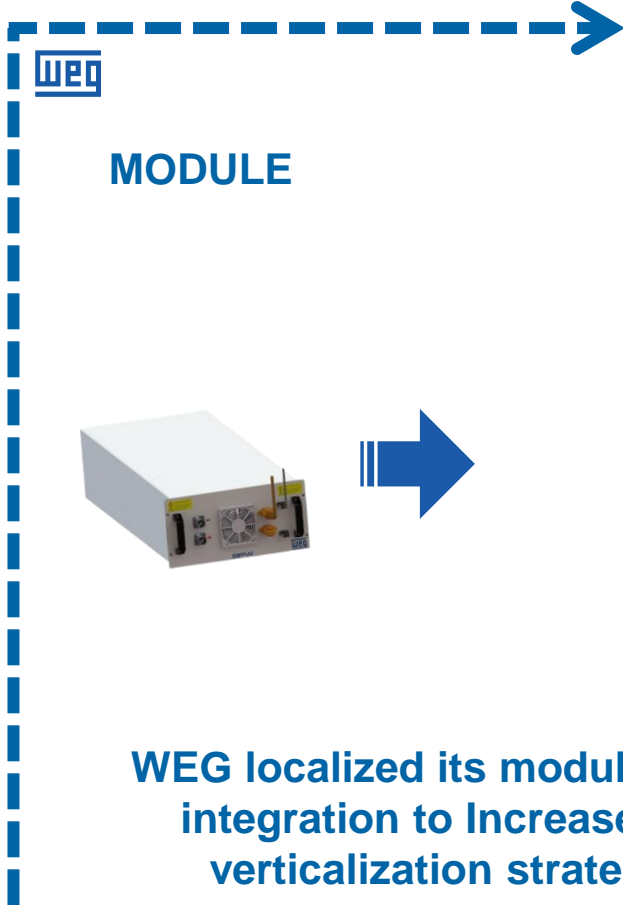
MODULE



RACK



WEG localized its module/rack
integration to Increase its
verticalization strategy



CABINET



OR

CONTAINER

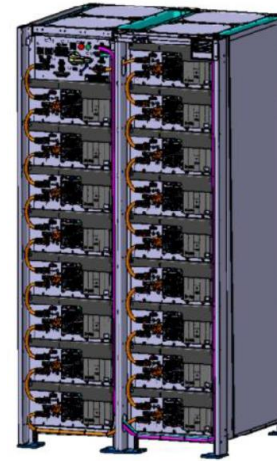


CURRENT BATTERY OPTIONS FOR BESS

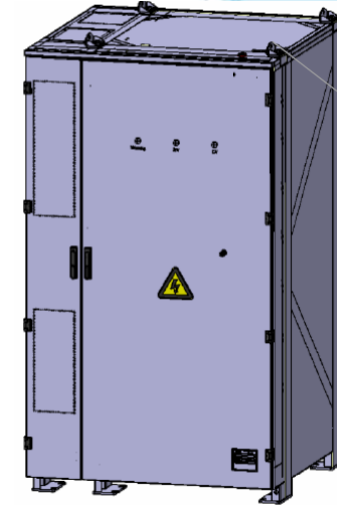


- ✓ World class manufacturers (**BYD, CATL, SUNWODA, NARADA**)
- ✓ Geometry: Prismatic
- ✓ Chemistry: LFP or NMC
- ✓ Capacity: 280 to 320Ah
- ✓ Voltage: 3.2V
- ✓ 6,000 to 10,000 cycles
- ✓ Expected lifespan: 15 Years
- ✓ Supplied with BMS, racks and switchgears
- ✓ Options: Indoor racks, outdoor cabinets or containers
- ✓ Cost-Sensitive projects

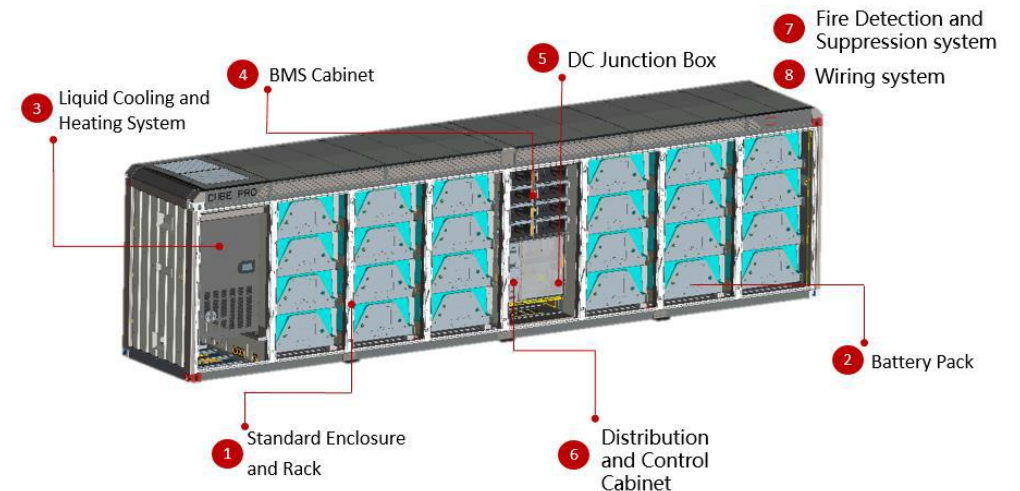
Indoor rack



Outdoor rack



Complete container set



WEG RENEWABLES IN BRAZIL



SOLAR: 4.0 GW+



Coremas Solar Power Plant - Coremas PA/Brazil



Solar Warehouse - Itajaí SC/Brazil

WIND: 1.5 GW+



Wind farm Campo Largo 2 - Campo Largo BA/Brazil



WEG HQ - Jaraguá do Sul - SC/Brazil

TRACK RECORD PANORAMA BRAZIL



Major Utilities developed BESS R&D projects with WEG in the past 5 Years.

Huge R&D Experience

Multiple scenarios were faced

Microgrids, on-grid and off-grid solutions

Due to regulation delay first commercial projects are being sold

Solid participation in regulation, tributary and market definitions

Major BESS reference

TRACK RECORD PANORAMA UNITED STATES



Biggest scenario for BESS in the world

Commercial applications at Utilities

Investors and Utilities as major BESS
contractors

Paid Ancillary Services already regulated



AT **WEG**
WE ALWAYS
BELIEVE
IT IS POSSIBLE
TO DO BETTER.

THANK YOU!



LST

LST Service Oy

www.weg.net

www.lst.fi