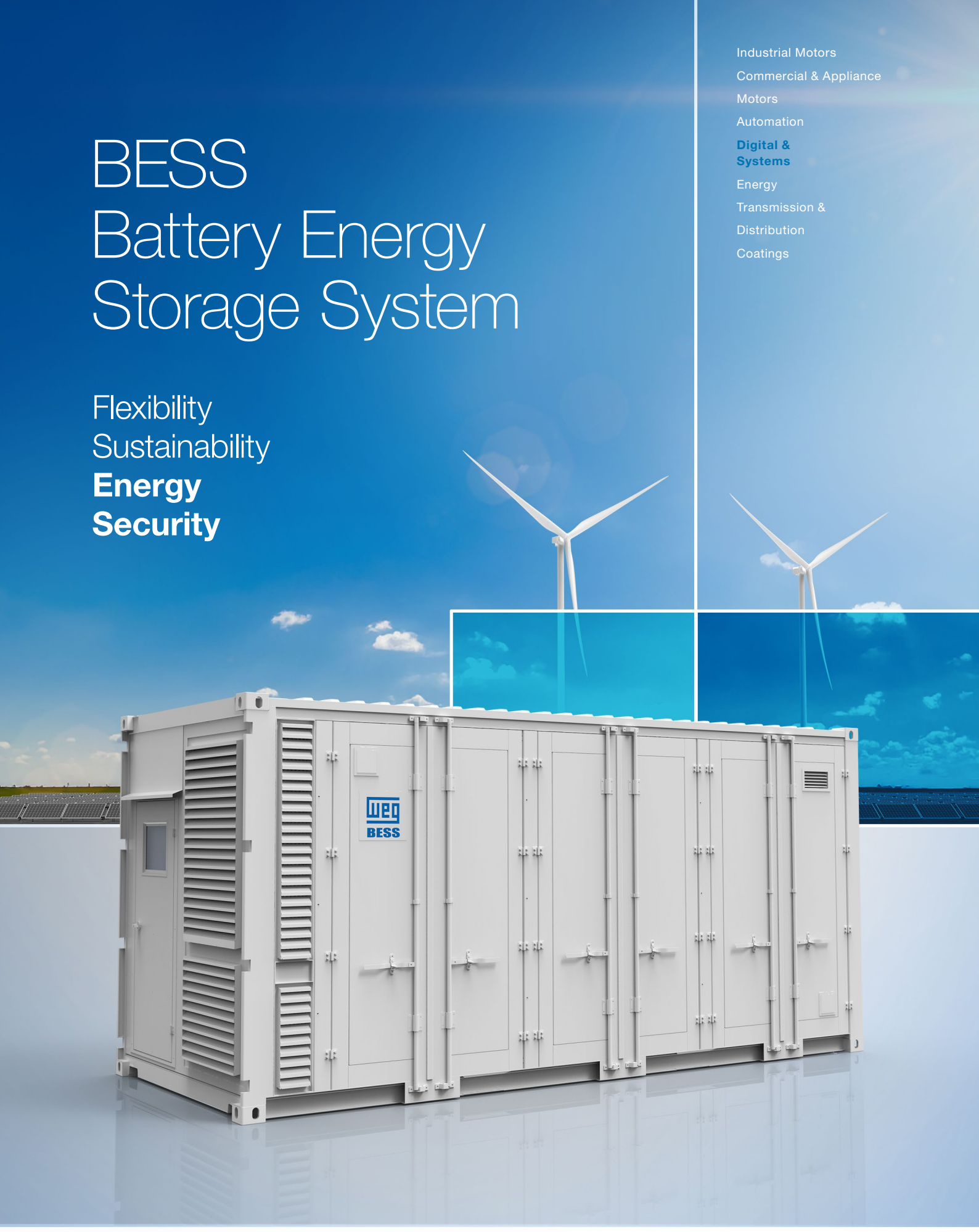
Industrial Motors
Commercial & Appliance Motors
Automation
Digital & Systems
Energy
Transmission & Distribution
Coatings

BESS Battery Energy Storage System

Flexibility
Sustainability
Energy
Security



Driving efficiency and sustainability

TABLE OF CONTENTS

This is WEG 04

WEG's global presence 05

Why store energy? 06

Energy and power under control from generation to consumption 07

Features 08

Operation examples 09

BESS topologies 10

One-stop shop for energy storage systems 11

BESS 12

Batteries 13

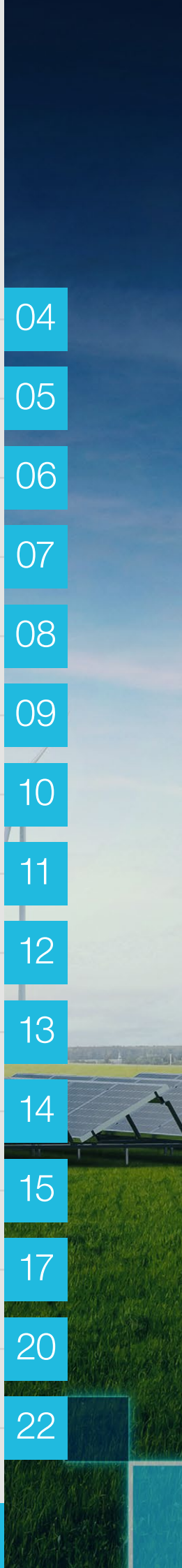
Bidirectional converter (PCS) 14

Automation and monitoring system 15

Integrated solutions 17

Technical data 20

WEG BESS Projects 22




BESS
BESS
BESS

This is WEG

WEG is a global leader in the production of electric motors and has a wide range of products. Its verticalization allows for the national manufacture of a variety of items, from motors to advanced solutions in automation and renewable energy.

Present in more than 135 countries, WEG offers turnkey solutions for various industrial applications. Since its foundation, the company has diversified its product line, including electrical components, industrial automation, transformers, coatings and clearcoats.

Committed to excellence and innovation, WEG is a pioneer in energy efficiency and sustainability. Its products and services drive global progress, transforming the world around us.

Largest low voltage electric motor factory in the world

+1 million m²

Product portfolio with more than

1,500

product lines

59,3%

of revenue from products launched in the last 5 years

+45,000

employees worldwide

MORE THAN

1,400

Technical Assistance Centers worldwide

Distributors/agents in



+120

countries

+12k

hectares of reforestation, **50%** of renewable resources and **50%** of native forest

US$

847 million

of investments (CAPEX)

2,3%

of net sales invested in R&D

19 million

of motors produced per year

63

industrial sites in **17 countries** and **40 commercial** operations in **4 continents**

Sales to



+135

countries

WEG's global presence



Industrial sites related to BESS

Batteries

Jaraguá do Sul – SC Brazil
Built-up area 6,000 m²
140 employees

Panels

Jaraguá do Sul – SC Brazil
Built-up area 944,231 m²
14,155 employees

Cota – Colombia
Built-up area 15,069 m²
282 employees

Johannesburg (Robertsham) – South Africa
Built-up area 10,000 m²
112 employees

Cape Town – South Africa
Built-up area 8,102 m²
32 employees

Transformers

Blumenau – SC Brazil
Built-up area 264,611 m²
1,440 employees

Gravataí – RS Brazil
Built-up area 162,414 m²
352 employees

Betim – MG Brazil
Built-up area 32,500 m²
321 employees

Itajubá – MG Brazil
Built-up area 11,800 m²
350 employees

Sabaneta – Colombia
Built-up area 6,864 m²
195 employees

Washington – MO USA
Built-up area 6,628 m²
132 employees

Washington – MO USA
Built-up area 16,343 m²
227 employees

Washington – MO USA
Built-up area 14,700 m²
115 employees

Tizayuca – Mexico
Built-up area 29,099 m²
583 employees

Johannesburg (Wadeville) – South Africa
Built-up area 45,000 m²
95 employees

E-houses

Betim – MG Brazil
Built-up area 5,000 m²
33 employees

Panels and Transformers

Huehuetoca – Mexico
Built-up area 219,536 m²
2,313 employees

Panels, Transformers and E-houses

Itajaí – SC Brazil
Built-up area 222,971 m²
1,054 employees

Heidelberg – South Africa
Built-up area 39,816 m²
90 employees

Why store energy?

Energy storage is essential to optimize the use of electrical resources in a world increasingly dependent on electricity. It facilitates smarter energy management by ensuring a rapid response to fluctuations in energy demand and supply. Additionally, energy storage provides operational flexibility, enhances the balance between supply and demand, and simplifies the integration of intermittent renewable energy sources like solar and wind power, thereby contributing to the stability of a clean energy mix. Moreover, energy storage serves as a reserve power system during emergencies, addressing system instabilities or power line failures. This capability strengthens the infrastructure of the electricity sector, ensuring reliability and resilience in energy supply.

Advantages

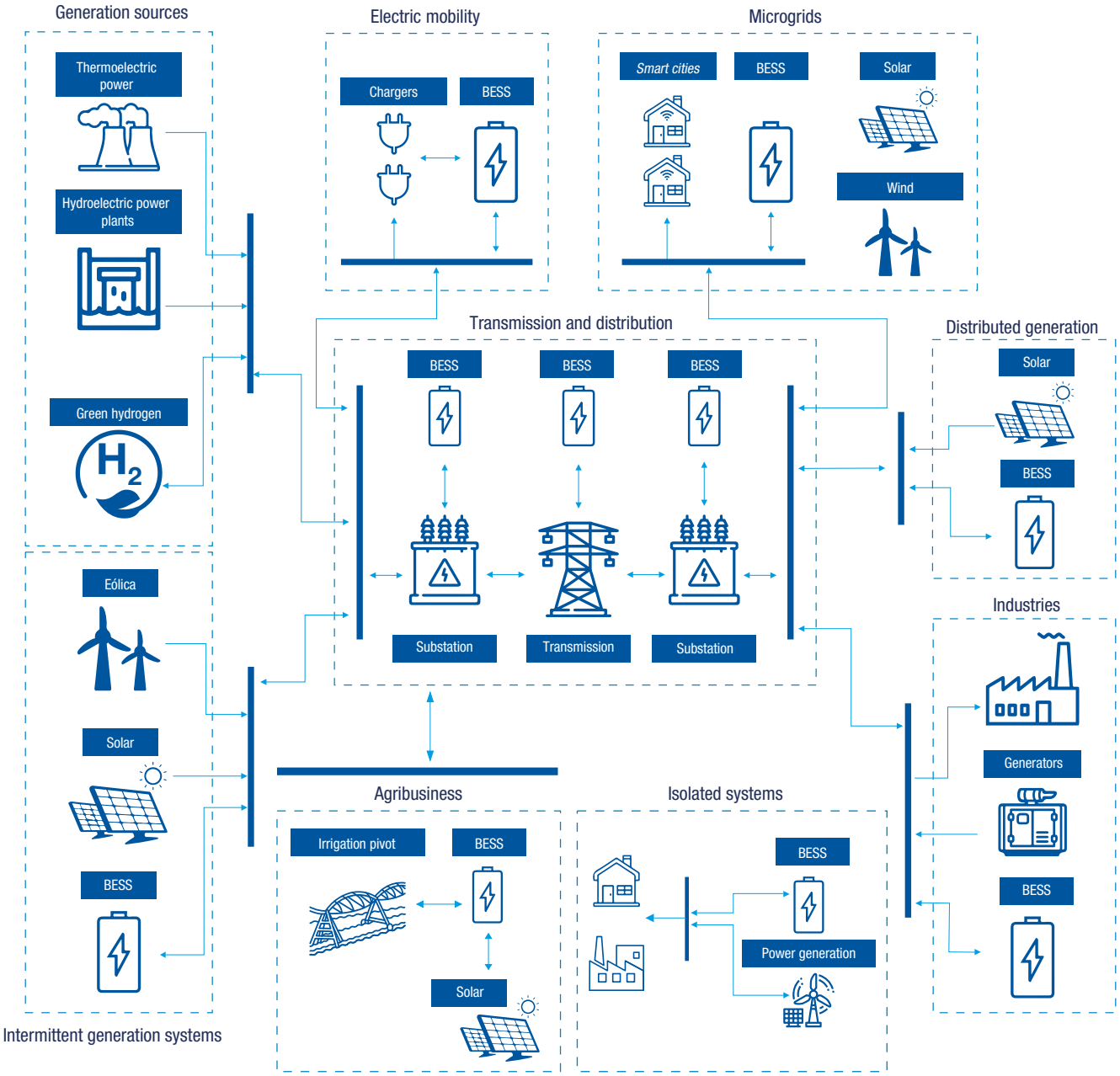


1 - Modular system
2 - Parallel operation with multiple energy sources
3 - On-grid and off-grid operation
4 - Remote control and monitoring
5 - Complete energy management
6 - Real-time operation setup
7 - No pollution generation
8 - Easily integrated into existing electrical systems
9 - Available and dispatchable energy
10 - High energy density
11 - High storage capacity
12 - High charging and discharging power
13 - Extended service life
14 - Low maintenance
15 - High safety level
16 - Cutting-edge technology
17 - Generation optimization by storing surplus energy

Energy and power under control, from generation to consumption

The Battery Energy Storage System (BESS) is a complete, flexible and efficient solution that offers a range of essential functionalities. From stabilizing intermittent power sources to performing ancillary services in substations, BESS is designed to meet the dynamic demands of the electricity sector.
This system integrates advanced energy control and management technologies, ensuring optimized operation. It enables the storage of energy from the power grid generated by renewable sources and its use when required for backup power, the reduction of costs though energy shifting, and the integration of multiple generation sources.

Connection points



Features

Main applications



Power generation

Connection in parallel with intermittent generation sources

- Voltage regulation
- Frequency regulation
- Power stabilization
- Power supply reliability
- Load leveling



Transmission and Distribution (Utility company)

- Voltage regulation
- Frequency regulation
- Reduced peak demand
- Postponement of investments
- Elimination of grid overloads
- Load balancing
- Capacity reserve



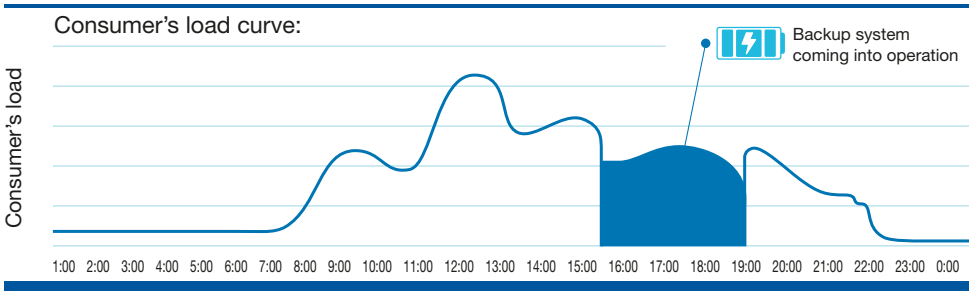
Commercial and Industrial (C&I)

- Microgrids and isolated systems
- Reduced consumption
- Distributed storage
- Energy backup
- Passive demand response
- Energy management
- Enhancing electric vehicle charging stations for the transportation sector.

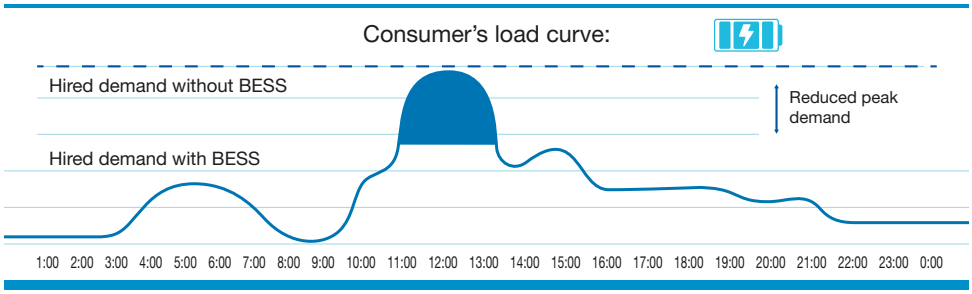
Note: the operating modes of each system will be defined according to the specific needs of each application.

Operation examples

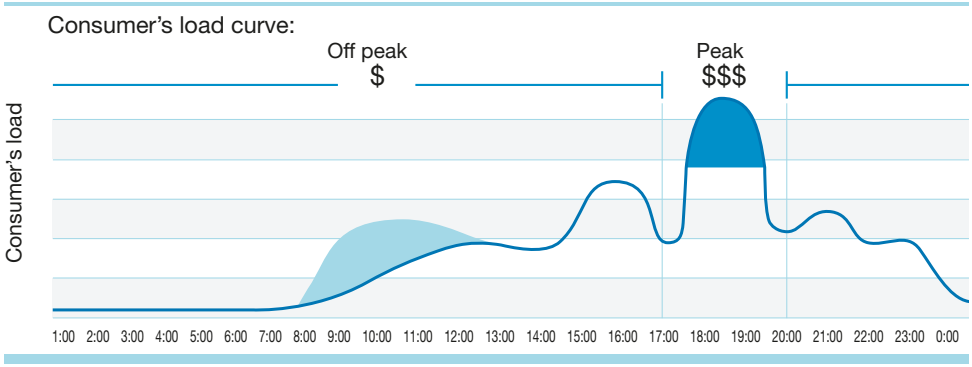
Backup



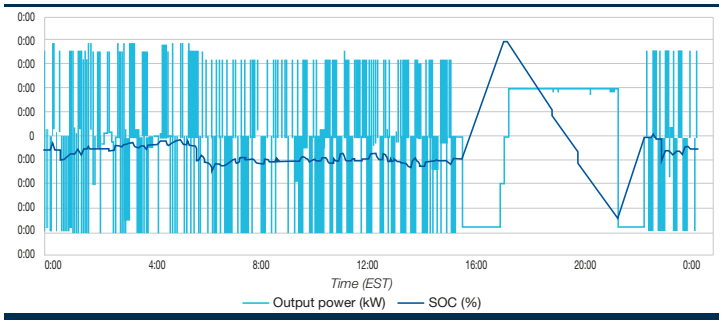
Reduced peak demand



Consumption schedule management



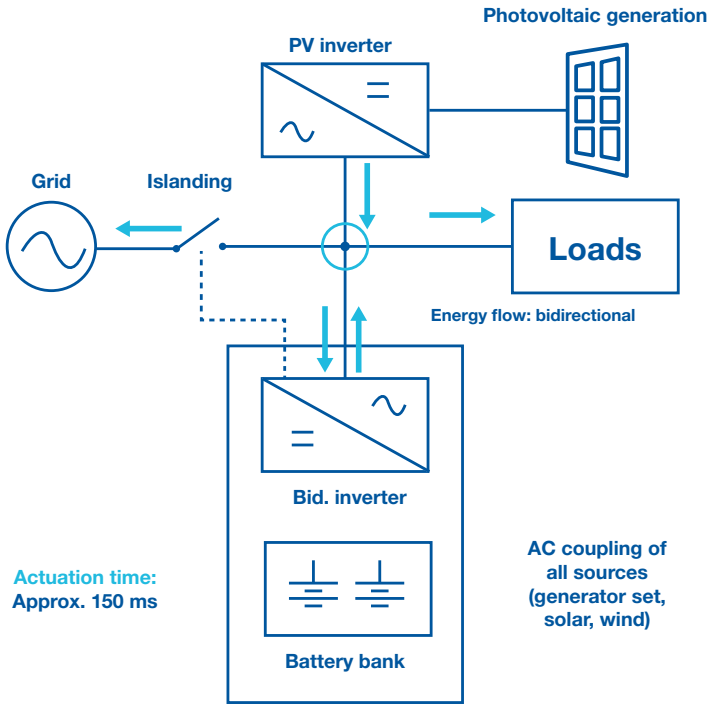
Transitioning between modes: frequency regulation and load scheduling



Notes: The modes presented above are real BESS application cases.
The curves obtained in this project may differ from other projects that consider the same operating modes, since factors external to BESS directly influence the operation and control of the BESS system.

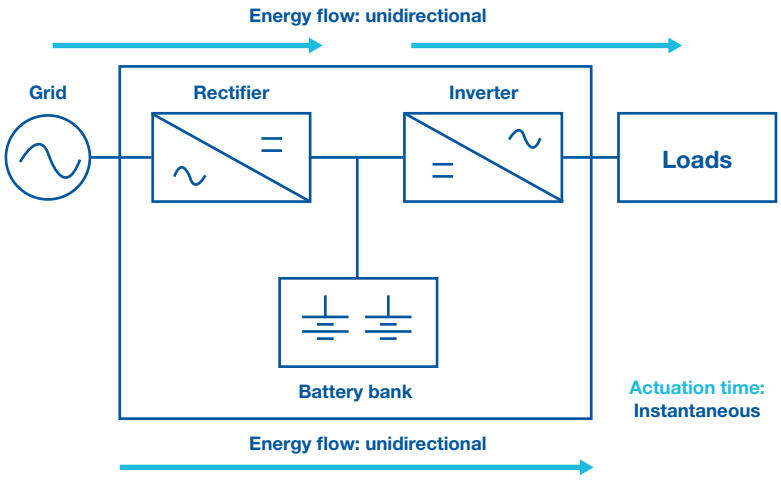
BESS topologies

Multiple connection topologies are available for each mode of operation. In the classical topology, BESS operates in parallel with loads and energy sources, whether they come from renewable sources, generator sets or the electrical grid itself. This configuration is suitable for most applications, in which a short commutation interval is acceptable.



Classical bidirectional BESS

Alternatively, the BESS can be connected in series with power sources and loads. In this connection topology, it is capable of responding instantaneously to faults and fluctuations in the power grid. This configuration is particularly useful for sectors with sensitive or critical loads, where even the briefest interruptions in the power supply can lead to significant production losses.



Double conversion BESS

One-stop shop for energy storage systems

WEG oversees the entire process, from design to commissioning. We provide assistance in selecting the system that most effectively meets each project's specifications, ensuring involvement at every stage. With extensive experience in various battery chemistries and energy storage technologies, WEG is well-equipped to handle even the most diverse requirements.

Main equipment

- Power conversion systems
- Battery systems (rack, container or skid)
- Power transformers (dry-type or oil)
- Low voltage distribution panels
- Medium voltage switchgears
- Energy management systems

Special services

- Support to the customer in BESS projects
- Support to develop construction sites
- Support to obtain licenses
- Support to prepare the construction site
- O&M contract and warranty management
- LTSA

Main services

- Project and construction site management
- Civil works and installation
- Commissioning
- Engineering services (site layout diagram, single-line diagrams, electrical and automation studies, system design and executive project)

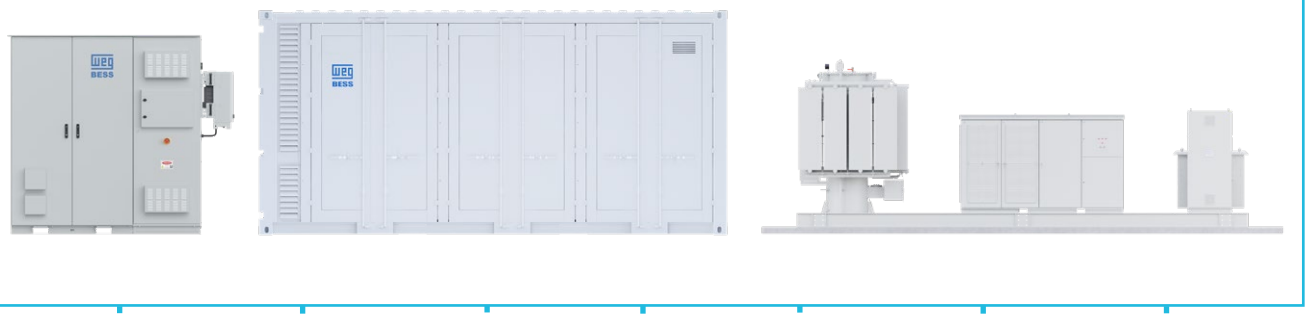
Note: Product and service offerings may vary by region. Please, consult your local representative.



BESS

Providing solutions from a few kWh to hundreds of MWh with a focus on meeting the customer's requirements, WEG uses its own high-quality products with options to meet the UL, IEC and CE markets.

Modular systems





Power conversion system



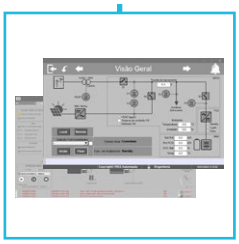
Technical support



BOP - Balance of the Plant



Complete turnkey solutions



Energy management system



Auxiliary cooling and fire-fighting systems



Battery systems

Main components of BESS

BESS is a modular, scalable solution that can be configured for different applications. The components are individually designed and manufactured to meet the specific demands of each installation.

- Special e-houses for BESS
- Bidirectional converter
- Battery bank
- Power transformer
- DC switchgear
- AC switchgear
- HVAC
- Fire fighting and control system
- Automation and monitoring system (EMS)

The main components are the battery system, bidirectional converter and energy management system.

Batteries

WEG's battery bank solutions for energy storage systems integrate advanced battery technology with high efficiency, managed by a sophisticated Battery Management System (BMS). It utilizes Lithium Iron Phosphate (LFP) cells, known for their minimal environmental impact, outstanding performance, and superior safety standards.

The selection of the optimal battery bank is tailored to the specific requirements of the project, taking into account factors such as application, storage capacity, charge/discharge power, and lifespan. To maximize the service life of the batteries, either liquid or air-cooling systems are implemented, depending on the desired solution.

The illustration below demonstrates the modular structure of the battery system: individual battery cells are grouped into packs, which are subsequently assembled into racks that form the battery bank.



Advantages

- **Modular structure** that ensures easy operation and maintenance.
- **Flexible arrangement** for various voltage levels and storage capacities.
- **Multi-level Battery Management System (BMS) (pack, rack and bank)** that enables comprehensive control and monitoring of the system.
- **High safety** thanks to the LFP technology.
- **Extended service life.**
- **Optimized dimensions** for high energy density.
- **Lower maintenance costs** in comparison to other battery chemistries.

The combination of these advantages makes the energy storage system a highly efficient and dependable option for a wide range of applications.

Bidirectional converter (PCS)

WEG bidirectional converters of the BIW family deliver a complete and modular solution for energy storage systems. Available in a wide range of power ratings, these converters are engineered for seamless integration and dependable performance for both on-grid and off-grid systems. They support multiple communication protocols and include advanced features such as reactive power compensation and compatibility with all battery types.

The BIW family features models starting with a minimum power rating of 85 kW to options scalable to several megawatts. These models are distinguished by their modular design and easy servicing, offering a versatile and high-performance solution to energy storage challenges.







Advantages

- **Compact, efficient, flexible, scalable and comprehensively configurable.**
- **Highly efficient integrated cooling system.**
- Integrated AC and DC busbar connections **reduce the overall installation costs.**
- Converter control with a dynamic stability model that **complies with the main national and international standards.**
- The control technology options provide **simplified stabilization for on-grid systems,** with additional capabilities such as black start, islanding and network resynchronization.
- **An interface designed to meet major network standards,** incorporating features such as power compensation (VAR), frequency response, voltage regulation and operation during overvoltage and undervoltage periods.

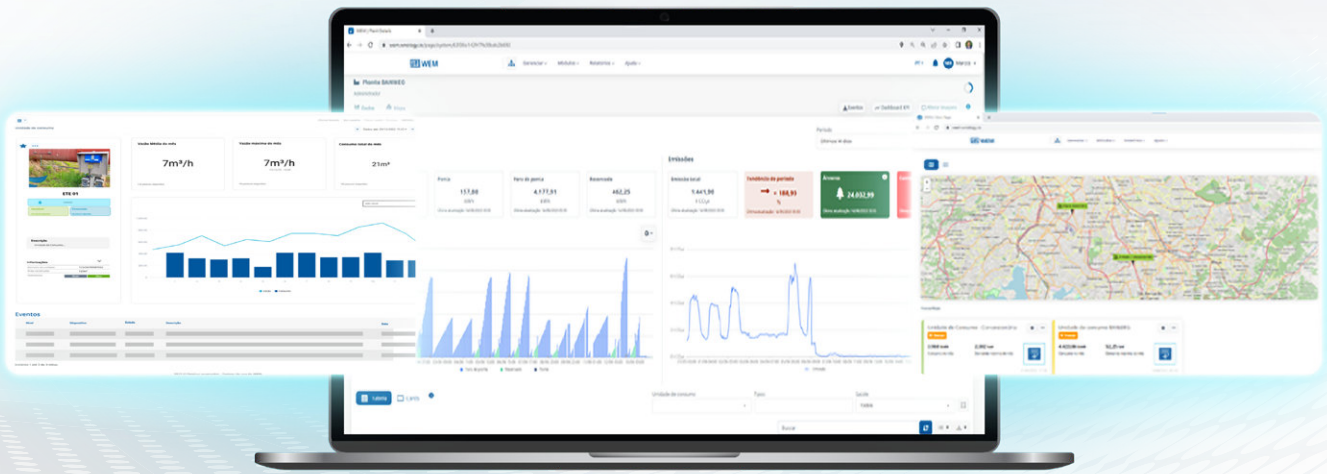
Automation and monitoring system

EMS (Energy Management System)

WEG's Energy Management System (EMS), enabled by PLCs and a communication network, is essential for the control and monitoring of the energy storage system.

It oversees key components such as the PCS and BMS, while providing local access through SCADA and an integrated HMI for real-time monitoring and control. Additionally, it enables remote access through the internet, ensuring flexibility and convenience in system operation and management.

- 100% WEG
- Scalable / modular
- Virtual security
- WEG cloud
- Data report
- Verticalized control
- Compatible with multiple technologies
- Experienced support team
- High reliability
- Connection to all generation sources

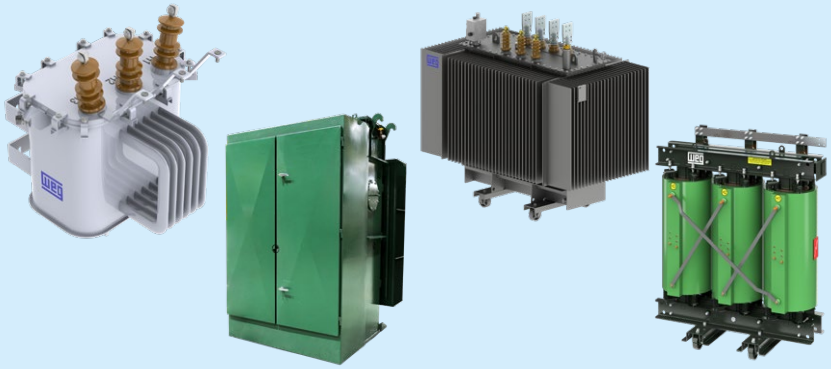


Transformers

A wide portfolio for all use cases and project requirements.

Check out the catalog

or click here



Low voltage and medium voltage switchgears

Development and manufacturing of low and medium voltage panels according to the required standards and tests.

Check out the catalog

or click here

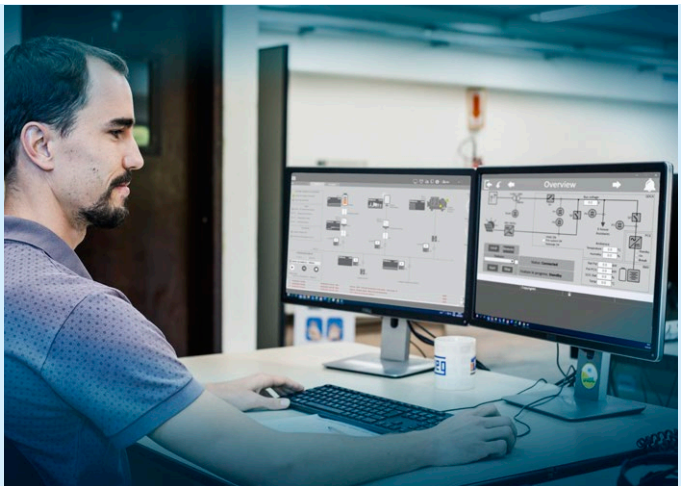


Energy management system

Complete EMS for the energy storage plant, developed entirely by WEG's specialized software team, managing all subsystems from the battery bank to the cloud system.

Check out the catalog

or click here



Engineering and services

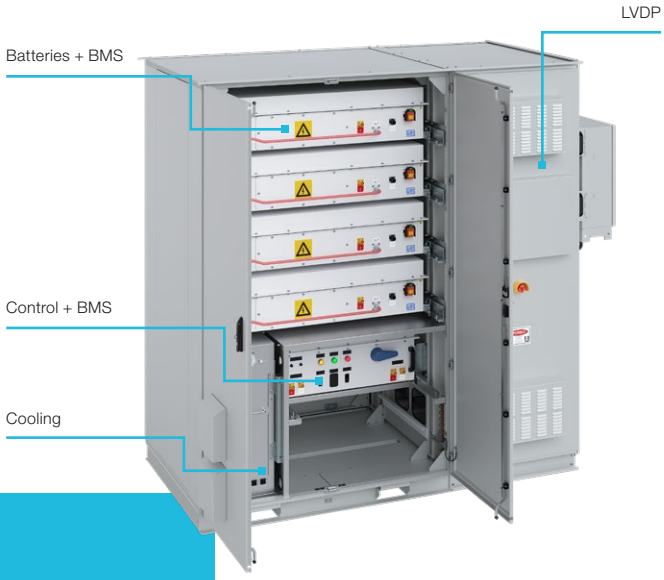
- Engineering to support and develop the specification of the customer's BESS requirements.
- Development of the site layout, single-line diagrams, electrical studies, interconnection drawings, automation diagrams, systems design and project.
- Civil works, electrical installation, commissioning and O&M contract.



Integrated solutions

Commerce & Industry (C&I)

WEG's Integrated C&I systems are tailored to deliver scalable and flexible energy storage solutions, customized to meet each customer's unique requirements. These systems can be configured to supply up to 340 kW of nominal power and a capacity of up to 624 kWh. The solution is available in both single-phase and three-phase configurations.





C&I Light

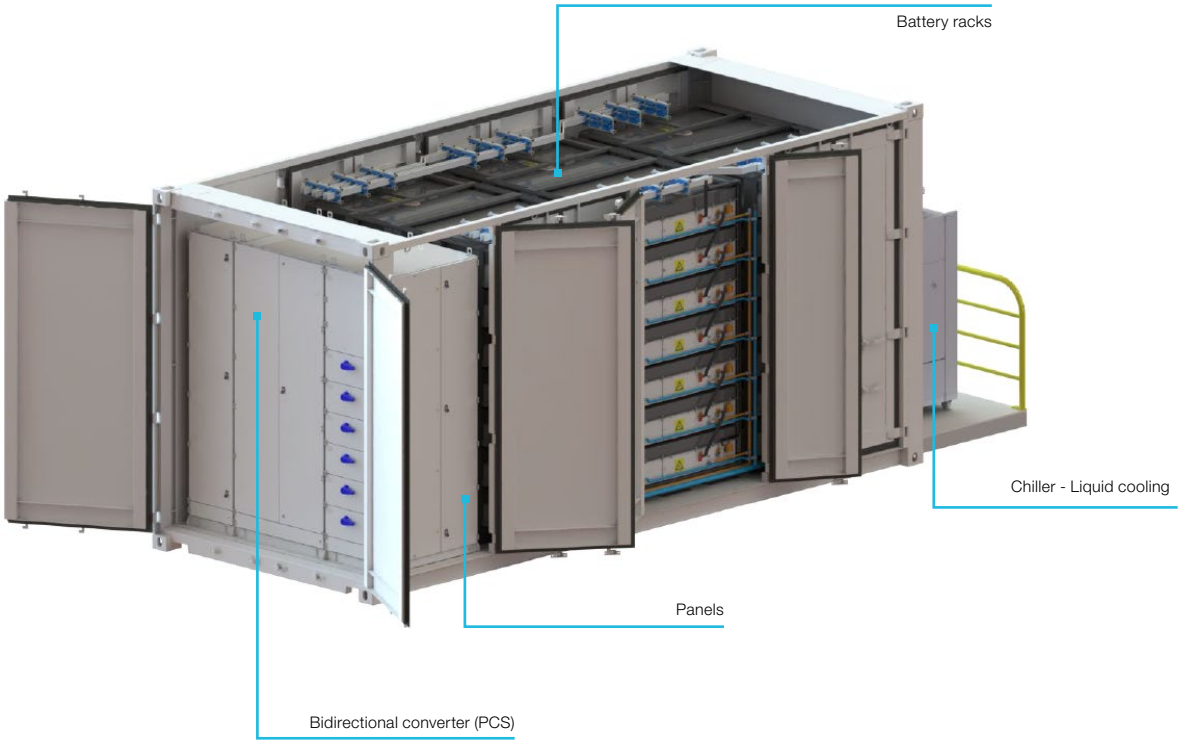




Integrated solutions

Integrated container

The Integrated all-in-one BESS container features liquid cooling and a modular capacity that can scale to multi-megawatts of power. It is optimized for space efficiency within a 20-foot e-house and represents a 100% WEG-designed solution.



Special applications

The mobile BESS solution offers the flexibility to deliver temporary power during scheduled maintenance or unexpected emergencies in multiple sites. This solution ensures that clients remain connected and productive, avoiding disruptions caused by power outages. By combining mobility with efficiency, WEG's integrated solution is the perfect choice for maintaining the reliability of your electrical system.

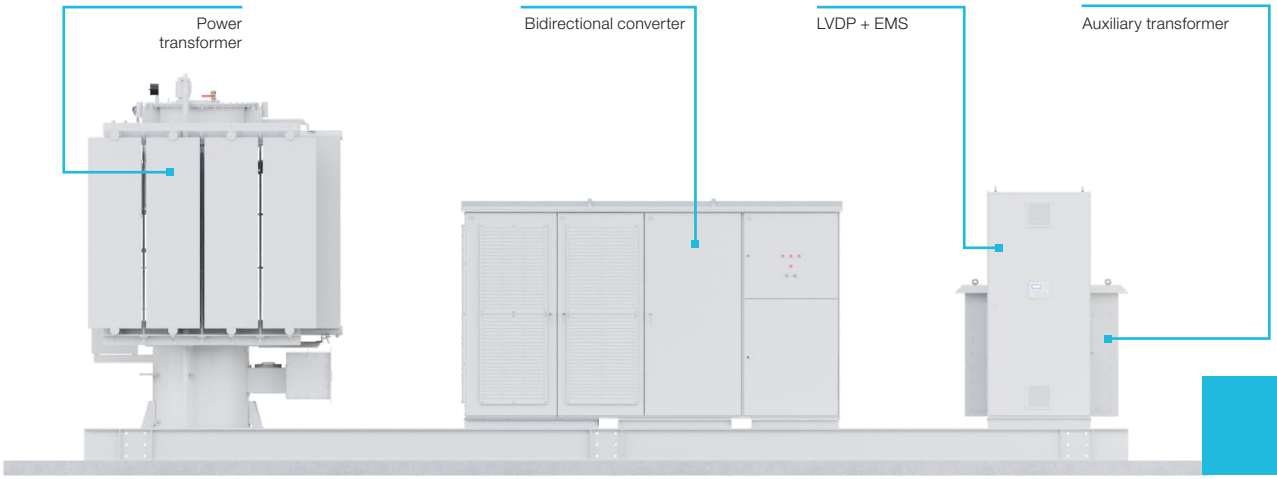




Integrated solutions

Power skid

The power skid offers the option to integrate MV switchgears, transformers, PCS units and auxiliary supply systems, to simplify the civil and electrical installation and reduce its costs.



Large scale storage

WEG also offers large-scale storage solutions, seeking to meet high power demands and guarantee stability and quality to the energy used by end customers.



Technical data

BESS Utility

Power conversion system	
Output (AC)	
Apparent power (-10 °C to +40 °C)	500 kVA to 4,800 kVA
AC operating voltage	600 V to 730 V
Rated frequency	50 Hz or 60 Hz
AC overvoltage category (IEC)	III
Maximum efficiency	98,50%
Input (DC)	
Maximum DC voltage	1,500 V
DC voltage range	874 V to 1,500 V
DC overvoltage category (IEC)	II

Battery system		
	Indoor use	Outdoor use
Battery chemistry	LFP	
Capacity by rack (plate, BOL)	157 kWh to 430 kWh	
Rated power (C rate)	0,25 to 1.7C	
Cooling	Air / liquid	
Rack protection	Included - control box	
Protection rating	IP42	IP54
Estimated service life	Approx. 6,000 cycles at 0.5C, 25 °C	
Integrated BMS	Yes	
Other features		
Structure	Skid base, outdoor panel, 20' or 40' e-House	
PCS cooling	Air-water exchanger	
Battery cooling	Liquid or air cooling	
Fire detection and suppression system	Included	
Lightning protection system	Included	
HVAC	Included	
Lighting and emergency system	Included	
Grounding system	Included	
Power transformer	Optional	
DC connection panel	Included	
EMS (Energy Management System)	Included	
EMS communication protocols	Modbus-TCP/IP (standard), customizable	
UPS	Included (10 min standard), customizable	

Technical data

C&I BESS

Power conversion system	
Output (AC)	
Maximum apparent power	92,6 kVA to 370 kVA
Maximum AC voltage	456 V
Rated AC voltage	380 V
AC overvoltage category (IEC)	III
Maximum efficiency	>98.5%
Input (DC)	
Maximum DC voltage	1,000 V
DC voltage range	610 V to 950 V
DC overvoltage category (IEC)	III

Batteries	
Battery chemistry	LFP
Capacity by rack (plate, BOL)	157 kWh to 215 kWh
Rated power (C rate)	0.25C to 1C
Cooling	Forced air/liquid – chiller
Rack protection	Included – control box
Estimated service life	Approx. 6,000 cycles at 0.5C, 25 °C
Integrated BMS	Yes

Cabinet	
Installation	Indoor or outdoor
Protection rating	IP42 or IP54
Color	RAL 7035, customizable
Cooling	Forced air/HVAC or liquid (battery rack)
Humidity (%)	0 to 95% (without condensation)
Fire detection and firefighting system	Included (battery system)
EMS (Energy Management System)	Included
UPS	Included (10 min standard), customizable
Communication interface	Modbus-TCP/IP / Ethernet and 3G Modem

WEG BESS Projects

With extensive knowledge and experience in delivering and implementing solutions across various industrial and energy markets, WEG enhances its portfolio with Battery Energy Storage Systems (BESS), offering specialized equipment and integrated solutions tailored to meet the most diverse project requirements.

WEG's BESS solutions address a wide range of applications, ensuring energy efficiency, operational reliability and sustainability.



















Notes

Notes

Notes

Global Presence
is essential, as much as understanding what you need.

Global Presence

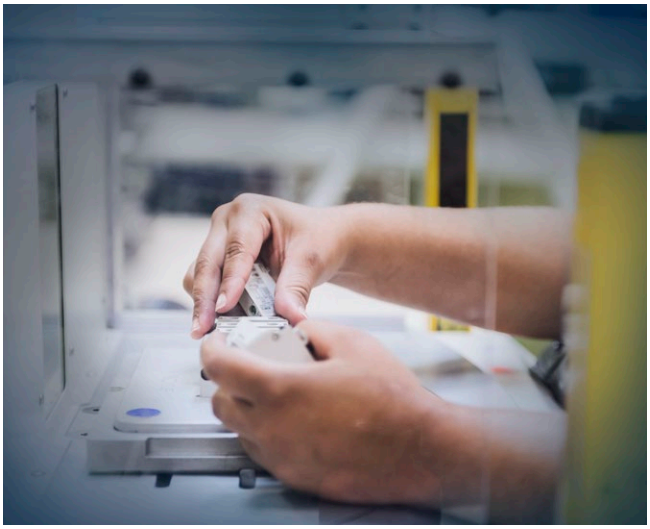
With more than 45,000 employees worldwide, we are one of the largest electric motors, electronic equipment and system manufacturers in the world. We are constantly expanding our product and services portfolio with specialized technical expertise and market knowledge. We develop customized and integrated solutions that range from innovative products to complete after-sales support.

With WEG's expertise, ***BESS - Battery Energy Storage Systems*** are the ideal choice for your applications and business needs, offering unparalleled safety, efficiency, and reliability.

Availability is to have a global service network.

Partnership is to create solutions that suit your needs.

Competitive edge is to unite technology and innovation.





Learn +

High performance and reliable products to improve your production process.



Excellence is to develop a thorough solution that improves our customers' productivity, with a complete line for industrial automation.

Visit: **www.weg.net**

youtube.com/wegvideos

The scope of the WEG Group's solutions is not limited to the products and solutions contained in this catalogue.
To see our portfolio, contact us.

Learn about WEG's global operations

www.weg.net

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Code: 50100618 | Rev: 01 | Date (m/y): 03/2025.
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