

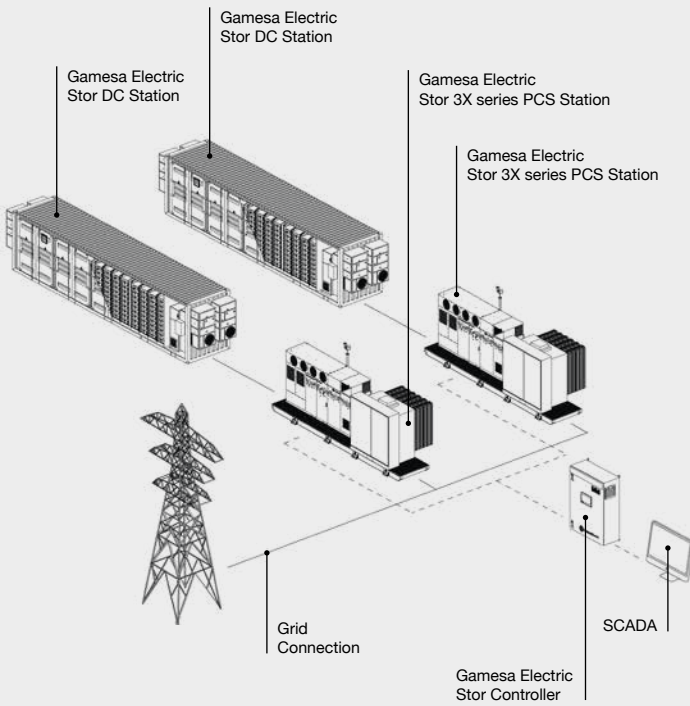


# Gamesa Electric Stor Controller

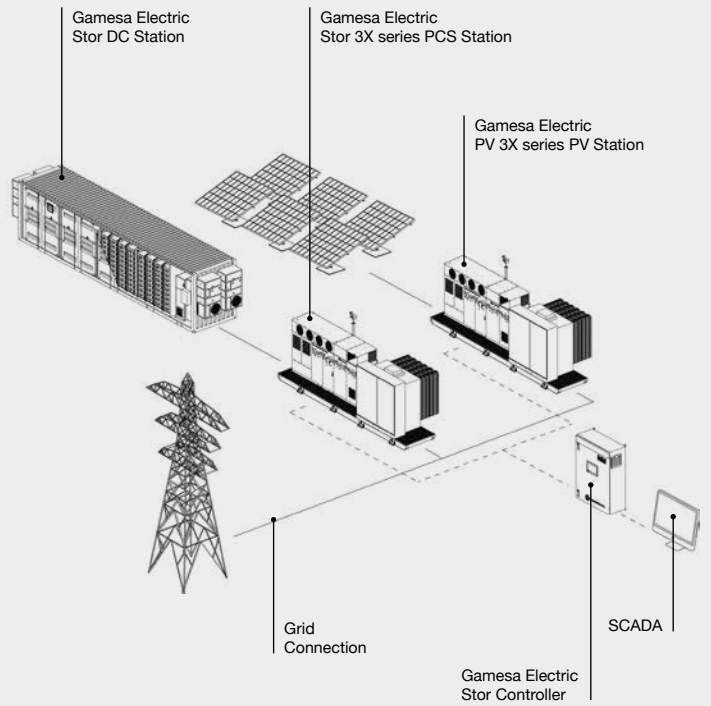
Battery Energy Storage System  
Control & Monitoring






## Standalone BESS



## Hybrid PV + BESS



# Gamesa Electric Stor Controller BESS control & monitoring

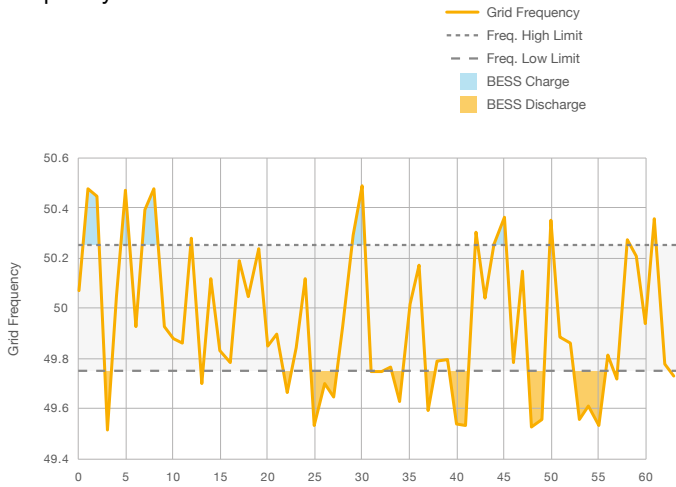
 <p><b>Broad &amp; Flexible Functionality</b></p>	<p>BESS standalone, renewables and conventional generation co-located, or Solar + Storage True Hybrid configuration</p>	<p>Power and energy oriented services, including frequency regulation, ramp-rate control, as well as time shifting, energy arbitrage, peak shaving and others</p>	<p>Local and remote control and monitoring compatible with different user objectives: plant operator, grid operator, plant owner, services team, etc.</p>
 <p><b>Grid Connection Robustness</b></p>	<p>Extensive grid code knowledge based on Wind, Solar and BESS experience in more than 54 countries</p>	<p>Robust and accurate grid code compliance proven in the most demanding grid codes, including Australia, Europe, Mexico, South Africa, USA, and others.</p>	<p>Fast frequency control, Voltage control as a standard with advanced features, such as Virtual Synchronous Machine (VSM) mode and black start mode as an optional</p>
 <p><b>Intelligent Battery Management</b></p>	<p>Virtual Battery Model (VBM) approach to allocate BESS power and capacity to different services</p>	<p>Smart multi-PCS and multi PV inverter coordination for maximum optimization of the battery usage</p>	<p>Modular design and full scalability from small to large utility scale projects</p>



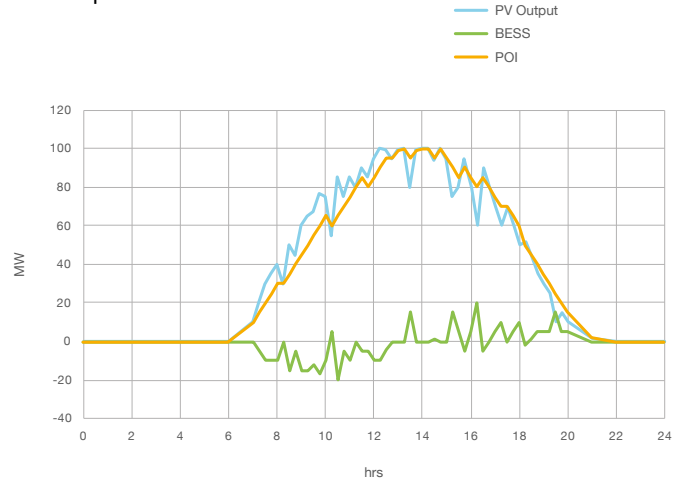
Gamesa Electric Stor Controller brings intelligence to the storage system optimising resources and maximising performance.

# Stor Controller functionalities & applications

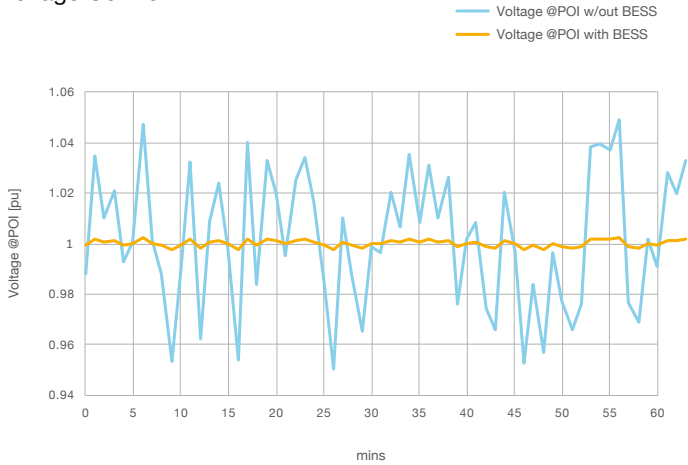
## Power Quality Applications Frequency Control



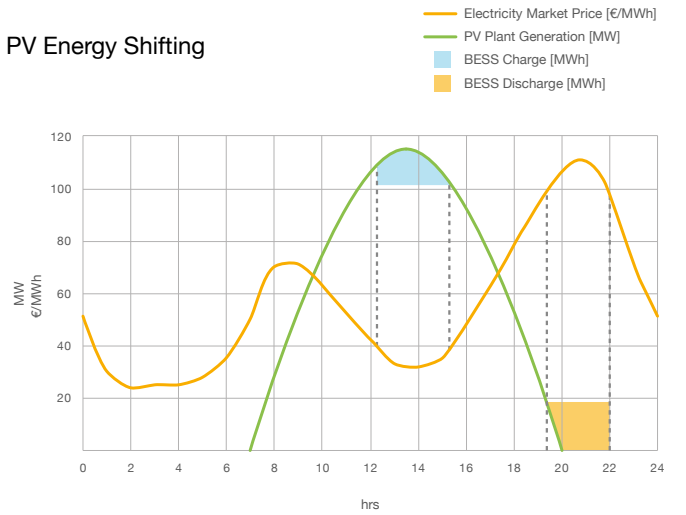
## Energy Management Applications PV Ramp Control



## Voltage Control



## PV Energy Shifting



	Stor Controller Functionalities	BESS Standalone	Hybrid PV + BESS
<b>Power Quality</b>	Grid Code Compliance (LVRT, HVRT, etc.)	Yes	Yes
	Primary Frequency Control (FFR, EFR, PJM RegD, etc.)	Yes	Yes
	Secondary Frequency Control / Spinning Reserve	Yes	Yes
	Plant Ramp Control	Yes	Yes
	PV Ramp Control		Yes
	Automatic Generation Control	Yes	Yes
	Voltage Control (Qref, Vref, PFref)	Yes	Yes
<b>Energy Management</b>	Energy Arbitrage	Yes	Yes
	Peak Shaving / Load Shaving	Yes	Yes
	Transmission and Distribution Deferral	Yes	Yes
	PV Energy Shifting		Yes
	PV Curtailment		Yes
<b>Advanced Features (Optional)</b>	Grid Forming	Yes	Yes
	Virtual Synchronous Machine Mode	Yes	Yes
	Synthetic Inertia	Yes	Yes
	Black Start	Yes	Yes

Energy Management Functionalities are executed either upon an external P/Q reference or as part of a time scheduled event. Stor Controller has the option to include time based charge-discharge scheduling.

General Data	
Plant Configuration*	BESS Standalone / Hybrid PV + BESS
Inverter Compatibility <sup>(1)</sup>	Gamesa Electric Stor PCS 3X series Gamesa Electric PV 3X series Gamesa Electric PV 2X series
Main Characteristics	
Dimensions (H / W / D)	800 x 600 x 300 mm [31.5 x 23.6 x 11.8 inch]
Weight	45 kg [99.2 lb]
Standard Protection Class	IP20
Power Supply <sup>(2)</sup>	250W, 1ph, 230Vac 50/60Hz
Cooling	Forced air
Mounting System	Wall / Support structure mounted
Certification	CE Marking
Environmental Conditions	
Temperature Range – Operation <sup>(3)</sup>	0°C / +60°C [32°F / 140°F]
Temperature Range – Storage	-10°C / +60°C [14°F / 140°F]
Relative Humidity	5 – 95% (non-condensing)
Maximum Altitude <sup>(4)</sup>	2000 m
Corrosion Protection <sup>(5)</sup>	C4
Grid Metering	
Integrated Direct Analog Readings <sup>(6)</sup>	3 x CTs and 3 x VTs
Grid Analyzer	Optional
Communications	
PV Inverter / PCS	Modbus TCP/IP / Profinet
SCADA*	Modbus TCP/IP
Grid Operator*	Modbus TCP/IP
Websserver	Included

Optionals
Grid Analyzer
Low Temperature Kit up to -20 °C [-4°F]
High Altitude Kit up to 4,000 m [13,123 ft]
Protection Against High Corrosion C5
Power Supply Kit 250W, 120 Vac, 1ph, 50/60 Hz
Power Supply Redundancy
Cold Swap Redundancy
Hot Swap Redundancy
Communication Switch Redundancy

\* Please consult Gamesa Electric for different configurations

<sup>(1)</sup> Possibility to connect additional compensation devices, such as capacitor banks or similar

<sup>(2)</sup> Optional Power Supply Kit 120 Vac, 1ph, 50/60 Hz

<sup>(3)</sup> Low temperature kit for temperatures up to - 20°C [-4°F]

<sup>(4)</sup> Up to 4,000 m [13,123 ft] with high altitude kit

<sup>(5)</sup> Increased corrosion protection available upon request

<sup>(6)</sup> Optimum for solutions where the Stor Controller is located in a near proximity of the POI measurement (<10m [32.8ft])

#### Additional Information

##### Grid Code Analysis Support

- Grid code analysis on project by project basis
- Grid integration, grid impact and Grid Performance Standards (GPS) support
- PSS/E, PSCAD and DigSILENT models available upon request

##### Data Logging:

- Plant performance at the POI
- Battery performance
- Local & cloud based options
- Websserver and SCADA visualization

##### External Control and Monitoring Interfaces:

- Customer Control Centre
- O&M Support Centre
- Grid Operator / Dispatch Centre
- Asset Operator
- System Aggregator / Bidding Operator

##### Battery iStor Management Features

- Distributed PCS and BMS management for maximum system safety
- Virtual Battery Model (VBM) for multi-application management
- Multi-PCS and multi-SOC management
- Intelligent Battery Rack Reconnection





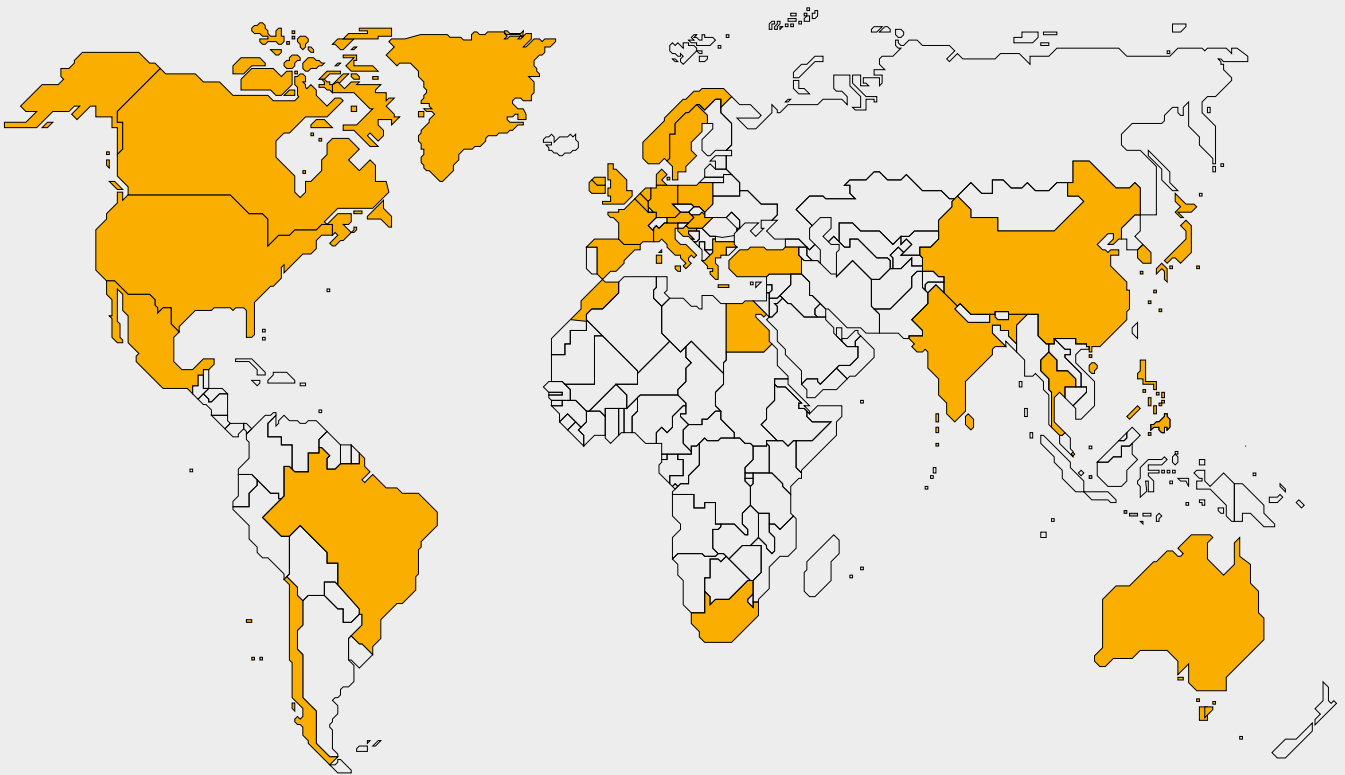
+2.7 GW  
SOLAR ENERGY



+100 GW  
WIND POWER



+90  
COUNTRIES



**Worldwide presence**

Australia  
Austria  
Belgium  
Brazil  
Canada

Chile  
China  
Croatia  
Denmark  
Egypt

France  
Germany  
Greece  
Hong Kong  
Hungary

India  
Ireland  
Italy  
Japan  
Korea

Mexico  
Morocco  
Netherlands  
Norway  
Philippines

Poland  
Singapore  
South Africa  
Sri Lanka  
Sweden

Thailand  
Turkey  
UK  
USA

