



Hybrid EMS

Based on the blue'Log[®] XC



Efficiently manage energy flows within your system

Hybrid EMS (Hybrid Energy Management System) is meteocontrol's comprehensive control solution designed for managing and optimizing mixed energy systems, especially in commercial and large-scale applications. At its center, Hybrid EMS relies on the blue'Log[®] XC as its core component, which serves as the central platform for controlling and monitoring all energy flows. The Hybrid EMS orchestrates both active and reactive power to ensure grid compliance, maximize economic returns, and maintain system stability.

Your benefits

- ✓ Increase in self-consumption
- ✓ Reduction of peak loads and energy costs
- ✓ Participation in balancing markets for grid stability
- ✓ Manufacturer independent
- ✓ Scalable for standalone and hybrid applications
- ✓ User friendly & easy integration



Simple software upgrade: Use the hardware you already have and optimize your business case.

Wide compatibility: Already compatible with 4,900 devices today, and more are being added every day.

Reduce costs, maximize revenue streams

PV self-consumption

Increase self-consumption, reduce energy costs

Zero Feed-In

Comply with grid constraints, never inject power into the grid

Band shaving (e.g. peak shaving)

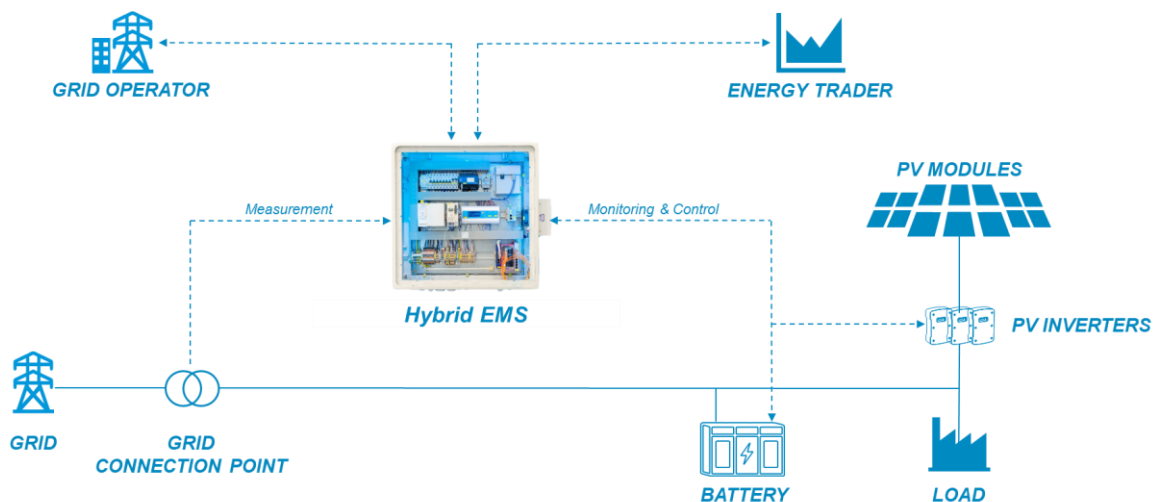
Reduce peak loads, lower energy costs

Balancing Services

Contribute to grid stability by providing balancing services such as FCR & FRR

Trading

Profit from market price fluctuations, increase profitability.

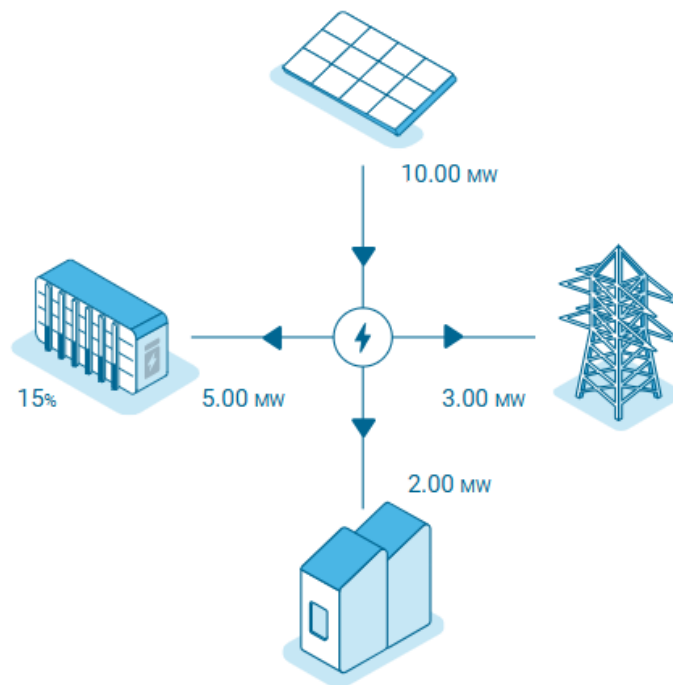


PV self-consumption

Increase self-consumption, reduce energy costs

In self-consumption optimization, the battery stores excess solar energy produced by the PV system for later use. This stored energy is then used when self-consumption exceeds PV generation, such as in the evening or at night. This maximizes the amount of self-consumed electricity, reducing energy costs and increasing independence from the grid.

Hybrid EMS ensures that the PV power is first used to meet local demand and charge the battery, before any excess is fed into the grid.



- ✓ **Optimization of self-consumption**

Energy is primarily used locally, grid consumption is minimized

- ✓ **Cost reduction**

Less grid consumption means lower electricity procurement costs

- ✓ **Smart feed-in control**

The PV system only feeds-in after local load is covered and battery fully charged

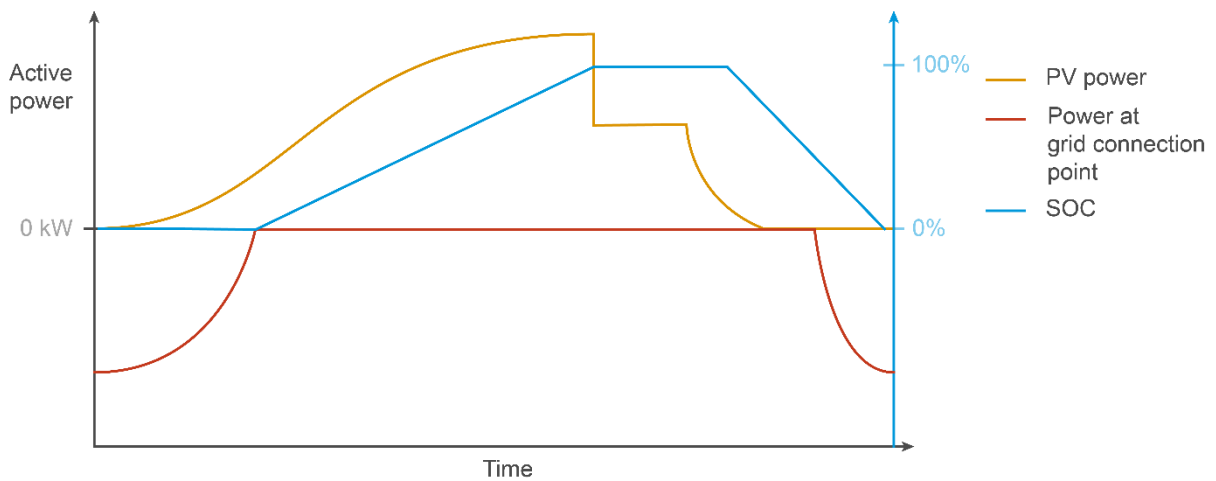
Zero Feed-In

Comply with grid constraints, never inject power into the grid

In areas with limited grid connection capacities, grid operators often require new plants to consume most or all of the electricity they generate. This restriction limits the amount of power that can be fed into the grid.

Hybrid EMS ensures compliance with this limit by charging the battery with excess PV power and curtailing PV only when the local load is covered and the battery is fully charged.

This approach enables efficient and cost-effective integration of solar power in regions with grid constraints.

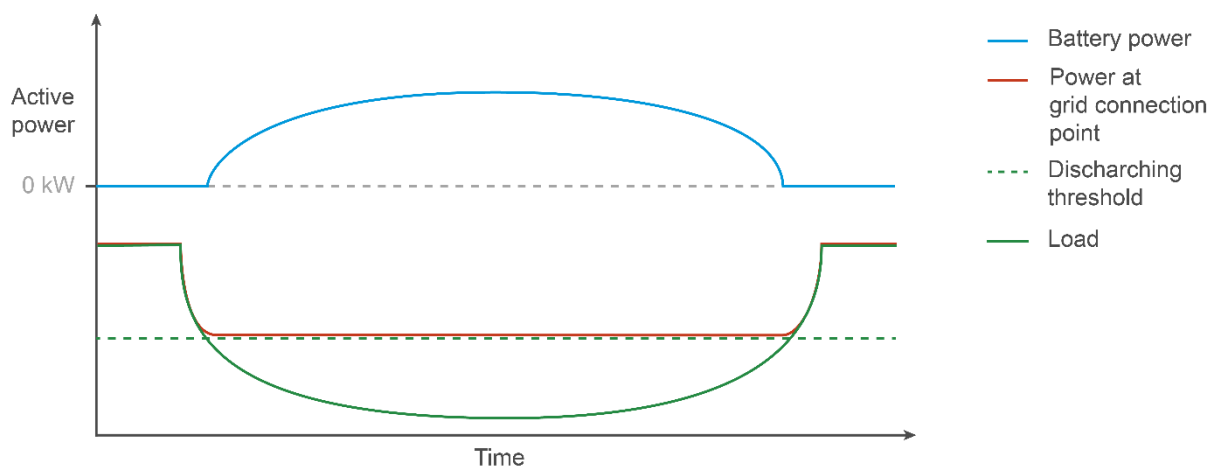


- ✓ PV electricity is consumed entirely locally
- ✓ Reduces dependency on the public grid and lowers electricity costs
- ✓ Ensures regulatory compliance with grid operator requirements

Band shaving (e.g. peak shaving)

Reduce peak loads, lower energy costs

In commercial and industrial applications, power-based electricity prices can drive up the total cost of electricity. To guarantee low electricity costs, Hybrid EMS discharges the battery once the power at the grid connection point falls below a certain predefined threshold. Similarly, you can also manage the maximum feed-in power by configuring a threshold beyond which the battery will store excess PV power.



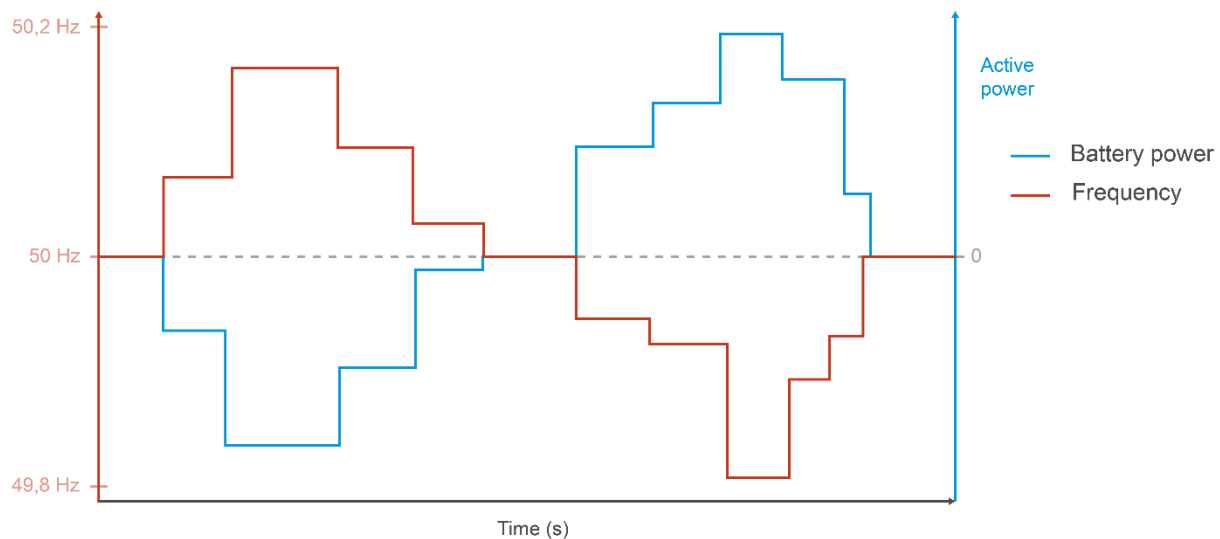
- ✓ Limits the grid import and reduces peak loads
- ✓ Reduces dependency on the public grid
- ✓ Lowers electricity costs

Balancing Services

Contribute to grid stability by providing balancing services such as FCR & FRR

A battery storage system can generate revenue by taking advantage of price fluctuations in electricity markets such as the Day-Ahead and Intraday market, charging when prices are low and discharging or selling when prices are high. At the same time, the BESS can support grid stability by providing frequency control services like Frequency Containment Reserves (FCR) and Frequency Restoration Reserves (FRR). The Hybrid EMS manages and prioritizes these operations, considering both market signals from the trader and grid operator requirements.

Frequency Containment Reserves (FCR)

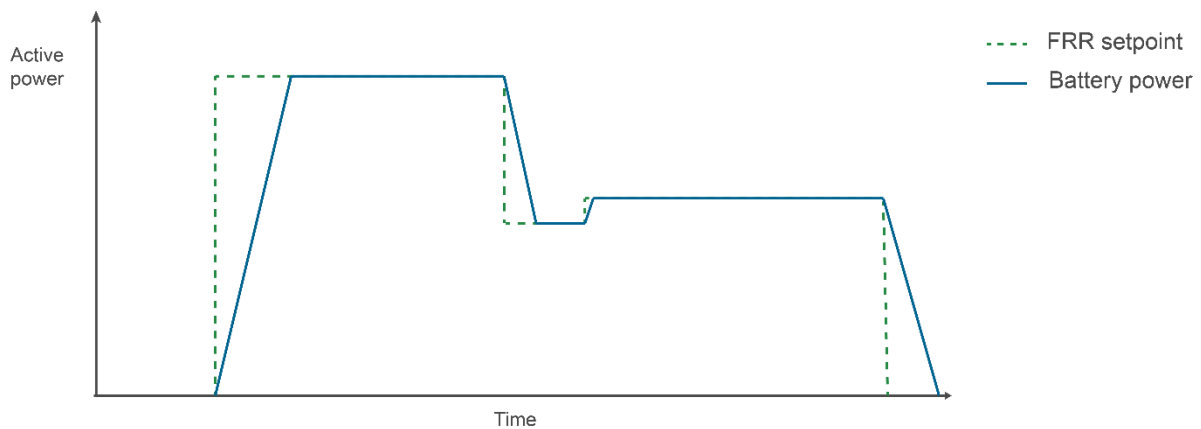


The provision of FCR serves to automatically stabilize the grid frequency in the power system. Hybrid EMS locally continuously measures the current frequency and reacts immediately to deviations from the nominal value of 50 Hz. In the case of underfrequency, additional power is injected into the grid, for example by discharging a battery storage system. In the case of overfrequency, power is absorbed, such as by charging the battery.

- ✓ Participation in the FCR market to support grid stability
- ✓ Automatic adjustment of active power output based on frequency measurement
- ✓ Immediate response to frequency deviations of ± 200 mHz

Frequency Restoration Reserves (FRR)

The provision of FRR is used to restore the nominal grid frequency after a disturbance. Unlike FCR, which reacts locally and immediately, FRR is centrally dispatched by the trader. Hybrid EMS receives the setpoints indicating the required power adjustment. The power must typically be delivered with a defined ramp rate (gradient), which the Hybrid EMS accurately implements to ensure smooth and compliant activation.

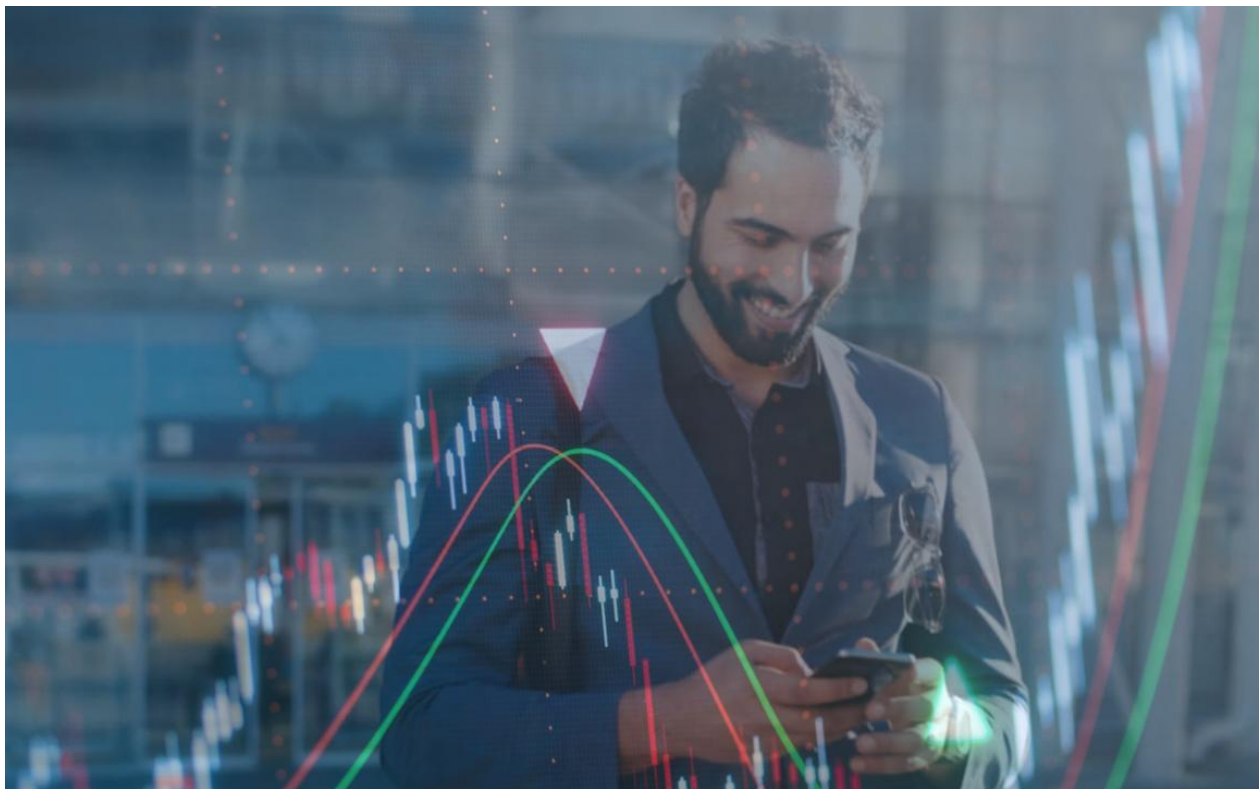


- ✓ Participation in the FRR market to support grid stability
- ✓ Contribution to restoring system frequency back to 50 Hz
- ✓ Ramp rate limiting of dispatched FRR market setpoint

Trading

Profit from market price fluctuations and increase profitability

A battery storage system can earn money by taking advantage of price fluctuations in both the Day-Ahead and Intraday markets. It charges when prices are low and discharges or sells when prices rise, capitalizing on both short-term and forecasted price differences. Energy traders can remotely control the battery storage system via the Hybrid EMS.



- ✓ Participation in day-ahead and intraday market
- ✓ Profit from price fluctuations
- ✓ Aggregation of cross market optimization signals



meteocontrol GmbH

Pröllstraße 28
86157 Augsburg

Telephone +49 821 34 66 6-0

Mail vertrieb@meteocontrol.com

meteocontrol.com