

PROPRIETARY SMART ENERGY ECOSYSTEM • HARDWARE & CLOUD

The Charge Grid | GEMS

Grid Energy Management System — We design, own, and operate the complete energy management stack. From the on-site GRID-EMS DIN-rail Edge Controller to the enterprise GRID-EMS-SERVER cloud platform for dynamic tariffs, peak shaving, and EV charging depots.



GRID-EMS & GRID-EMS-SERVER: • On-Site DIN-Rail Edge Controller | • Cloud EPEX Spot Trading | • Solar, BESS & EV Dispatch

Sub-Second Dynamic Load Balancing

100% autonomous local breaker protection across AC & DC fast chargers, even during complete internet outages.

Automated EPEX Spot Trading

Charge batteries and EVs during low or negative wholesale prices and discharge during peak tariff hours automatically.

Millisecond Peak Shaving

Flatten demand spikes instantly with BESS battery injection to eliminate capacity penalties and costly grid upgrades.

Universal & Hardware-Agnostic

Native Modbus RTU/TCP, SunSpec, P1/DSMR, OCPP, MQTT & SG Ready for inverters, batteries, heat pumps, and EVSE.

• 100% Owned Hardware & Cloud • Autonomous Offline Fail-Safe

SOLAR PV • BESS • EV DEPOTS • EPEX SPOT

One Unified Ecosystem for All Energy Assets

6 INTEGRATED MODULES

Solar & Inverters

Battery Storage (BESS)

EV Charging Depots

Heat Pumps (SG Ready)

SIX INTELLIGENT MODULES WORKING IN HARMONY

1. Solar & Inverters

Smart zero-export feed-in regulation, automatic curtailment during negative electricity prices, and maximum self-consumption.

2. Battery Storage (BESS)

Automated state-of-charge scheduling for commercial and residential batteries: price arbitrage, backup reserve, and peak shaving.

3. EV Charging Depots

Dynamic power distribution across dozens of AC and DC chargers based on real-time building load and vehicle departure times.

4. Heat Pumps & HVAC

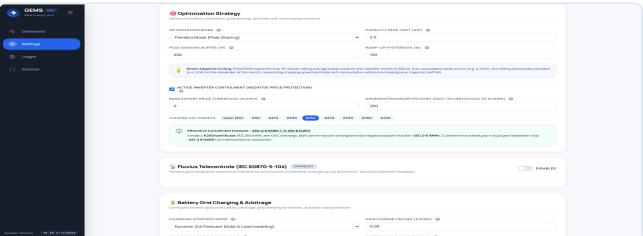
SG Ready integration converts excess solar generation or low-priced grid electricity into thermal storage automatically.

5. Real-Time Monitoring

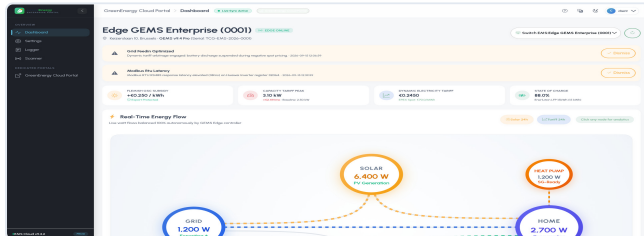
Live power-flow telemetry, 15-minute peak analytics, CO₂ savings reports, and financial ROI tracking via web and mobile.

6. Meteodata & AI Forecasting

Hyper-local weather irradiance modeling and historical load profiling proactively optimize daily battery and EV schedules.



GRID-EMS: Peak Shaving, Curtailment & Battery Arbitrage Strategy



GRID-EMS-SERVER: Cloud Enterprise Portal & Live Power Flows

TECHNICAL SPECIFICATIONS & SYSTEM INTEGRATION (GRID-EMS & GRID-EMS-SERVER)

On-Site Edge Hardware	GRID-EMS DIN-Rail Controller — Industrial enclosure, 24V DC power, diagnostic LEDs (Power, Cloud, RS485, Ethernet)
Hardware Interfaces (I/O)	2× RJ45 Ethernet (LAN / Modbus TCP), RS485 (Modbus RTU), P1/DSMR smart meter port, 4× Digital In, 2× Relay Out (SG Ready)
Cloud Orchestration	GRID-EMS-SERVER — Live telemetry, multi-site enterprise dashboard, EPEX Spot trading engine, OTA updates & REST API
Supported Protocols	Modbus RTU, Modbus TCP/IP, SunSpec, OCPP 1.6J / 2.0.1, P1/DSMR, MQTT, HTTP/REST, SG Ready dry contacts
Compatible Hardware	All major PV Inverters (Solis, SMA, Fronius, Huawei, SolarEdge), BESS (Easyway, BYD, Pylontech) & multi-brand AC/DC EVSE
Resilience & Security	Sub-second local control loop (< 250 ms), 100% autonomous offline operation during internet loss, TLS 1.3 encrypted sync
Target Applications	SMEs & Corporate Offices, Logistics & EV Fleet Depots, Retail Parks, Industrial Microgrids, Multi-Tenant Buildings

Ready to maximize the ROI of your grid connection, battery storage, and EV charging hub?

Schedule a technical demonstration or custom ROI simulation with our Smart Energy engineering team at www.thechargegrid.com.

THECHARGEGRID.COM

The Power of Owned Hardware & Cloud

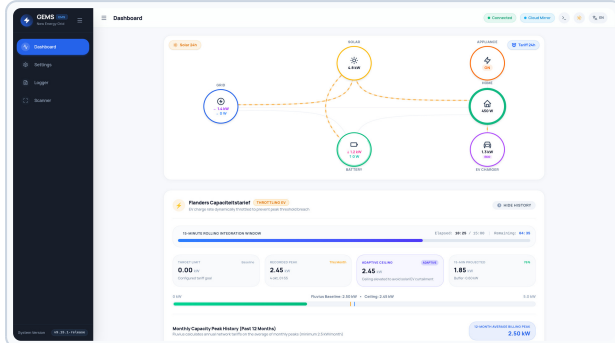
DUAL-LAYER ARCHITECTURE

Sub-Second Local DLB

100% Offline Fail-Safe

EPEX Spot Arbitrage

Multi-Site Cloud Dashboard

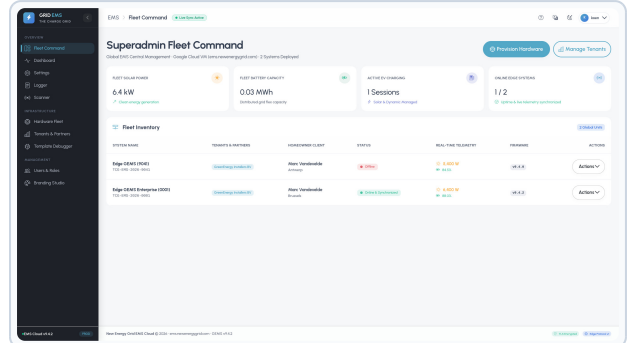


LAYER 1 • ON-SITE DIN-RAIL HARDWARE

GRID-EMS — Real-Time On-Site Intelligence

Installed directly on your electrical DIN rail, our industrial edge controller protects your main grid connection 24/7 with zero cloud dependency.

- 🔍 **Sub-second Dynamic Load Balancing (DLB)** across AC charging hubs and high-power DC chargers.
- 🔍 **Multi-protocol hardware I/O:** Modbus RTU (RS485), Modbus TCP, SunSpec, P1/DSMR, MQTT & SG Ready.
- 🔍 **Autonomous offline fail-safe:** uninterrupted main breaker protection during internet outages.
- 🔍 **Direct BESS & PV dispatch:** battery charge/discharge control and automatic negative-price curtailment.



LAYER 2 • CENTRAL CLOUD PLATFORM

GRID-EMS-SERVER — Fleet Orchestration & Arbitrage

Our cloud platform connects directly to wholesale energy markets, coordinates multi-site depots, and forecasts solar yield and load with AI.

- 🔍 **EPEX Spot Day-Ahead & Intraday:** automated daily charge/discharge schedules calculated at 13:00.
- 🔍 **Multi-site fleet aggregation:** unified enterprise dashboard across all offices, depots, and BESS assets.
- 🔍 **Predictive AI weather modeling:** high-accuracy solar irradiance and site consumption forecasting.
- 🔍 **Enterprise connectivity:** secure Over-The-Air (OTA) firmware updates, REST APIs, and live WebSockets.

WHY CLIENTS CHOOSE GEMS — IMMEDIATE OPERATIONAL & FINANCIAL ROI

1. Dynamic Tariffs Trading

Automatically charge batteries and EVs when EPEX wholesale prices are low or negative, and discharge stored power during expensive peak hours.

- Day-ahead & intraday optimization
- Negative feed-in price protection

2. Peak Shaving & Grid Capacity

Avoid high capacity tariffs and expensive grid connection upgrades. GEMS injects battery power within milliseconds when demand spikes.

- Cut peak capacity charges by up to 40%
- Run more chargers on existing grid capacity

3. Smart EV & Depot Charging

Switch between 100% Solar-Only charging and departure-time fleet scheduling with priority boost for VIP and commercial fleet vehicles.

- Priority VIP & fleet departure queues
- Active 3-phase load balancing