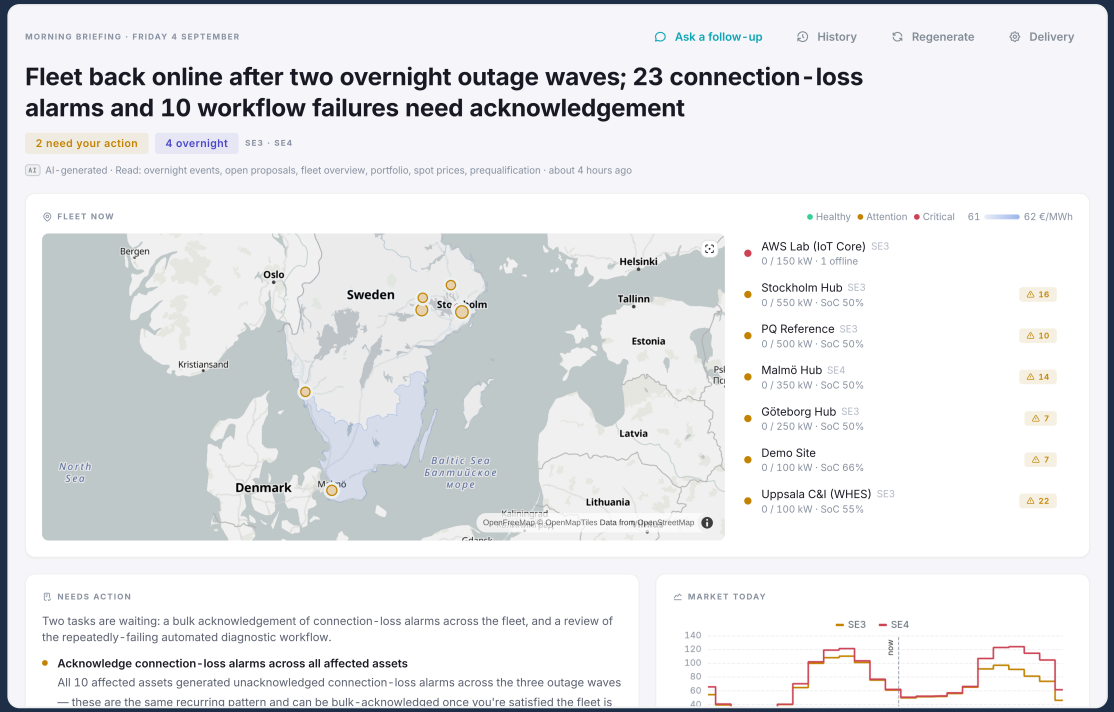
Evora EMS

Neutral control layer and operations platform for flexible energy assets

Evora EMS connects battery storage, PV and metering to energy markets through one controller the asset owner controls. Any optimizer or balancing service provider submits schedules through a single API; the Evora edge executes them inside operator-owned safety limits, keeps delivering through cloud outages, and reports back what was actually delivered.

The platform automates integration, prequalification testing and day-to-day operations so a site is market-ready in a fraction of the usual time, while the owner keeps full choice of trading partners.



2 s
local control loop, safety-clamped on every setpoint

72 h
offline telemetry buffer with zero-loss backfill

< 100 ms
dispatch delivery after link recovery

5
prequalification programs: FCR-N, FCR-D, FFR, aFRR, mFRR

30+
device register maps across seven asset classes

ENERGY MANAGEMENT STRATEGIES

What the controller runs

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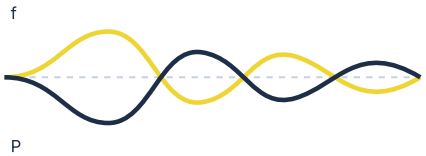
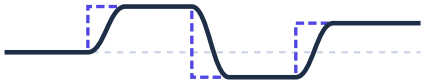
Every strategy runs on the edge inside the operator's safety envelope. Services stack where the asset allows it and are curtailed by priority when it does not; the same controller executes market services, tariff optimisation and third-party schedules.



Frequency containment

● AVAILABLE

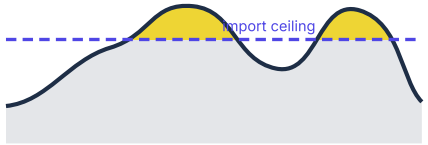
FCR-N, FCR-D up and down, and FFR run as local droop regulators on the edge with Nordic energy management (NEM/AEM) built in. Frequency is read on site every control tick; delivery does not depend on the cloud link.



aFRR and mFRR

● AVAILABLE

Setpoint-following aFRR and order-driven mFRR activation with configurable preparation and ramp profiles. Sub-MW assets take part through aggregated groups across sites in one bidding zone.



Peak shaving

● AVAILABLE

Holds site import below a ceiling from the grid meter, discharging only what the load demands. Built for capacity-based tariffs such as the Swedish power tariff in force from 2027, and stackable with market services outside peak hours.

Optimizer schedules

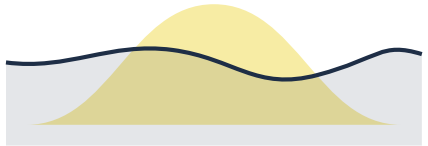
● AVAILABLE

Day-ahead and intraday plans from any optimizer are submitted through one API under an exclusive lease with scope and power caps. The edge executes, the platform acknowledges, settles every interval and flags deviations.

PV curtailment

◑ PILOT

Active-power ceiling on PV inverters from the same register library, for feed-in limits and grid-connection constraints. Rig-tested on a 110 kVA string inverter map.



Self-consumption

○ ROADMAP

Charging surplus generation and discharging into local load. Planned on top of the peak-shaving controller and the site meter path.

EVORA PLATFORM

One platform from register to market

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The Evora portal is the operator's view of every site: live telemetry and device registers, dispatch and schedule history, prequalification evidence, and the AI-assisted operations layer on top.

Monitoring

Fleet map with health and zone prices, per-asset telemetry, live device registers, cell-level battery health, alarms and event history.

Control & safety

Operator-owned safety envelope, stale-schedule fallback, emergency stop, device watchdog and a full command audit trail.

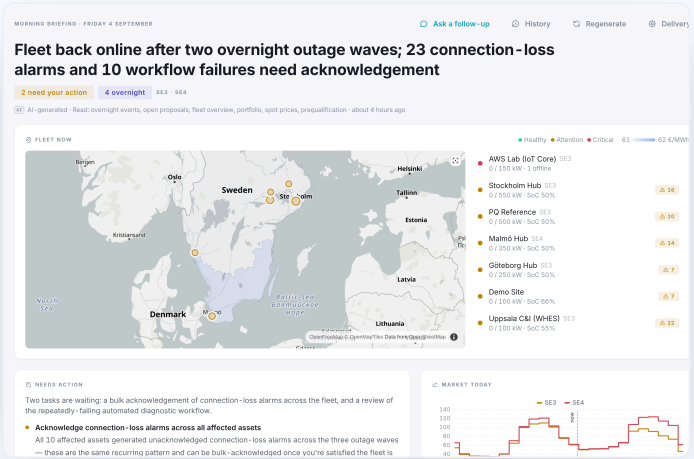
Markets & prequalification

Spot and ancillary market data, automated prequalification campaigns with TSO-format evidence, and the optimizer API with leases and settlement.

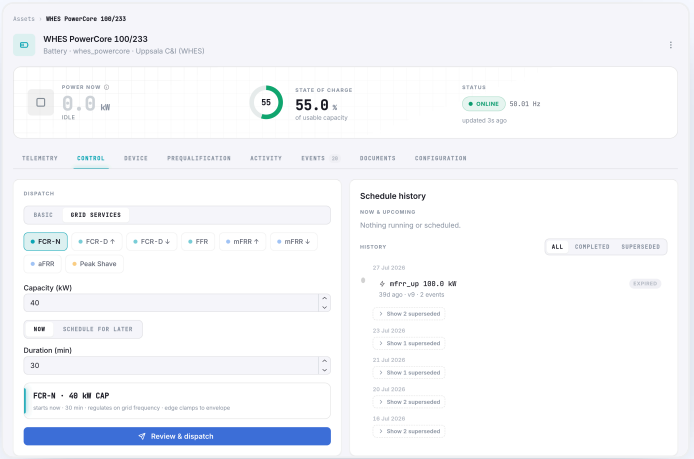
Operations & AI

Dashboards and workflows with AI builders, chat agents, daily briefings, document vault with extraction, notifications and signed webhooks.

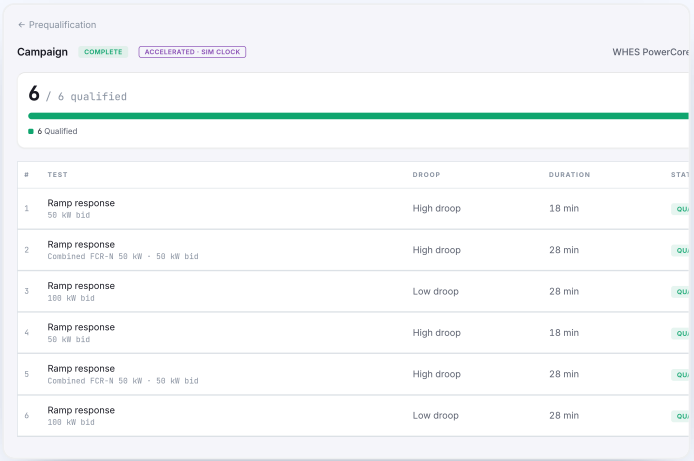
Screens captured from the Evora platform running against simulated battery assets.



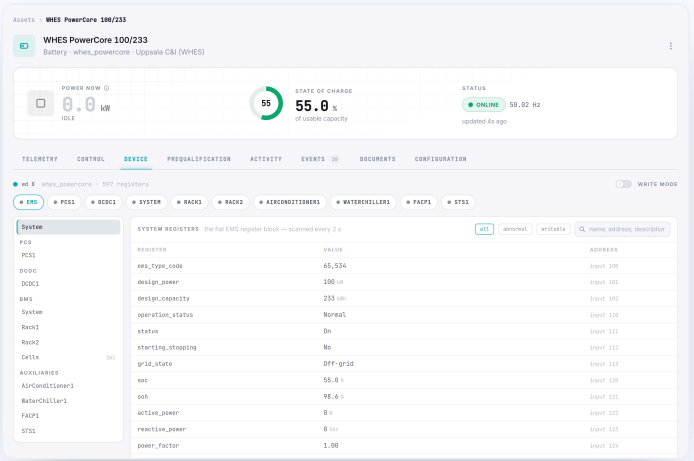
FLEET MONITORING



DISPATCH AND SCHEDULE HISTORY



PREQUALIFICATION EVIDENCE



LIVE DEVICE REGISTERS

FUNCTIONALITY SHEET

Evora EMS capabilities

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1. General & control

● **System overview**
Vendor-neutral control layer for battery storage, PV, meters and load banks over Modbus, with a cloud platform for operations and market access.

● **Local control loop**
2 s control tick on the edge; active services are summed, curtailed by priority, then clamped. Runs autonomously through cloud outages.

● **Safety envelope**
Operator-owned kW and SoC limits clamp every setpoint from any schedule or command; out-of-bounds values are clipped, flagged and reported, never applied raw.

● **Fail-safe behaviour**
Stale schedule falls back to a safe default; emergency stop; device heartbeat watchdog re-armed by the edge so power stops on comms loss.

● **Offline resilience**
Store-and-forward buffer for telemetry and events, 72 h / 200 MB, drop-oldest; zero-loss backfill verified in link-cut drills.

● **Configuration**
Cloud-pulled site configuration with last-known-good cache; edits staged and applied on restart.

2. Markets & optimizer access

● **Services**
FCR-N, FCR-D up/down, FFR, aFRR, mFRR up/down, peak shaving.

● **Prequalification**
Automated test campaigns, validators, TSO-format evidence CSVs and application-form values for FCR-N, FCR-D, FFR, aFRR and mFRR across SE1–4, FI, NO1–5, DK1–2 and RO.

● **Market data**
Spot and ancillary prices, procured volumes, grid frequency and tariffs for SE1–4, FI, NO1–5, DK1–2 and RO; public explorers without login.

● **Optimizer API**
Schedule submission with versions and idempotency, exclusive leases with scope and power caps, acknowledgement tracking, per-interval settlement, deviation webhooks, public OpenAPI reference.

● **Register access for lease holders**
Read any register, write those named in the lease, every write read back and audited.

3. Portal

● **Fleet & sites**
Fleet map with health status and zone price tint, site and asset pages, guest invites with roles.

● **Dashboards & workflows**
Drag-and-drop dashboards and a workflow builder, each with an AI builder that proposes changes for review before they apply.

● **AI operations**
Chat agents including an operations agent with tool access, and a daily morning briefing per tenant.

● **Notifications**
In-app feed, email, and signed webhooks for events, deviations and lease changes.

● **Access control**
Tenant isolation, role-based access, scoped API keys, rate limits.

4. Service & maintenance

● **Register explorer**
Live view of the device register surface with gated writes, immediate read-back and an audit trail.

● **Device health**
State of health, cell voltage and temperature extremes, rack SoC spread and energy counters polled from the device map.

● **Warranty envelope**
Cycles per day, C-rate and operating days monitored against the warranty terms of the installed product.

◑ **Site Brain**
Vendor document library with page search and tighten-only limit proposals into the edge configuration.

● **Document vault**
Typed uploads, AI extraction with human review, warranty checks inside workflows.

◑ **Remediation**
Catalogue of approved healing actions with a durable ledger and operator approval.

◑ **Updates**
Over-the-air updates on a read-only dual-partition OS with automatic rollback; remote terminal for diagnostics.

● **Alerts**
Faults and alarms decoded from the device map, staleness, curtailment and emergency stop, debounced into raised/cleared pairs.

5. Security & hosting

● **Site link**
Outbound-only MQTT over mutual TLS 1.2 with a per-device X.509 identity and policy. No inbound ports, no VPN.

◑ **Hardware root of trust**
TPM 2.0, secure boot and a hardware watchdog on the gateway; read-only OS with signed updates.

● **Hosting**
Hosted on AWS in the Stockholm region (EU); GDPR compliant.

● **Protocols**
Modbus TCP, Modbus RTU (RS485), MQTT 3.1.1 over TLS, HTTPS REST/JSON; vendor cloud APIs for EV chargers, heat pumps and PV.

○ **Certifications & standards**
ISO 27001 and NIS2 alignment; IEC 60870-5-104 and SunSpec on the protocol roadmap.

HARDWARE DATASHEET

Evora Edge Gateway

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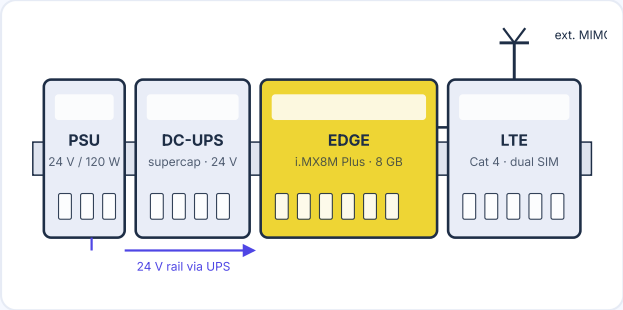
EG-1 (standard) · EG-1C (critical)

A DIN-rail module set for the customer's BESS or site control cabinet: an industrial ARM64 edge computer running the Evora edge agent, a dual-SIM LTE router with the site switch built in, a DC-UPS for ride-through and clean shutdown, and a 24 V supply. The two models differ only in the UPS energy store.



BILL OF MATERIALS

Component	EG-1	EG-1C
Edge computer	Compulab IOT-DIN-IMX8PLUS · i.MX8M Plus Quad · 8 GB · 64 GB eMMC · industrial grade	same
Router	Teltonika RUT956 · LTE Cat 4 · dual SIM · 4× Ethernet	same
DC-UPS	Bicker UPSI-2406DP2 · supercapacitor · 24 V / 4 A	Bicker UPSI-2406DP3 · LiFePO4 · 24 V / 6 A
Power supply	24 V DC / 120 W DIN-rail PSU	same
Antenna	External MIMO LTE antenna, 3 m cable, magnetic or bracket mount	same
Connectivity	Roaming multi-network IoT SIM, Evora-managed; customer SIM accepted	dual roaming SIM

Specifications below are component vendor data. Package-level power draw, ride-through and rail length will be measured on the bench rig and updated in Rev 1.0.

COMPUTE

Processor	NXP i.MX8M Plus Quad · 4× Arm Cortex-A53 1.8 GHz + Cortex-M7 800 MHz · NPU 2.3 TOPS
Memory / storage	8 GB LPDDR4 / 64 GB eMMC, soldered
Security	TPM 2.0 · secure boot · hardware watchdog · battery-backed RTC
Software	Evora edge agent in a container on a managed read-only OS with A/B updates and automatic rollback

INTERFACES

Ethernet	2× 1 GbE (gateway) + 4× 10/100 (router: 1 WAN, 3 LAN)
Serial	2× RS485 (1 isolated) · 2× RS232 (1 isolated) · 1× CAN (isolated)
Digital I/O	4 DI / 4 DO
USB	1× USB 3.0
Cellular	LTE Cat 4, 150/50 Mbps, 3G/2G fallback, dual SIM auto-failover, GNSS
Wi-Fi	802.11, maintenance access only, disabled by default

COMMUNICATION

Device protocols	Modbus TCP · Modbus RTU
Cloud link	MQTT 3.1.1 over mutual TLS 1.2, outbound only · HTTPS
Measurement inputs	Grid frequency and site power from the PCS or a Modbus power meter; meter not included
Device library	30+ register maps: battery systems, PCS, BMS, PV inverters, plant controllers, meters, load banks

POWER

AC input	100–240 V AC, 50/60 Hz via kit PSU
DC input	24 V DC direct (22.5–30 V) as an alternative
Consumption	≤ 15 W typical maximum (gateway ≤ 8 W, router ≤ 7 W)
Ride-through	EG-1: ≈ 3–5 min at 10–20 W · EG-1C: ≈ 2 h at 15 W (33 Wh)

ENVIRONMENT

Operating temperature	EG-1: −20 … +65 °C · EG-1C: −20 … +50 °C (full output 0 … +40 °C)
Storage temperature	−30 … +55 °C
Humidity	≤ 95 %, non-condensing
Altitude	≤ 4000 m
Ingress protection	IP20, for installation in an enclosure
Cooling	Passive, fanless

MECHANICAL

Mounting	DIN rail EN 50022, ≈ 350 mm rail length
Module dimensions (W×H×D)	Gateway 110×30×95 mm · router 110×50×100 mm · UPS 63×120×100 mm · PSU ≈ 40×125×114 mm
Weight	≈ 1.8 kg module set, excluding antenna

COMPLIANCE & COMMERCIAL

Certifications	Components: CE, FCC, UKCA, RCM · EN 55032/55035 · EN 61000-6-2/-3 · EN/IEC/UL 62368-1. Kit-level assessment on the roadmap
Reliability	Gateway MTTF > 200,000 h
Warranty	Kit 2 years; gateway component 5 years
Support	Remote diagnostics, OTA updates and email support included; SLA-backed response times optional
Licensing	Evora EMS per site per year; contact for pricing
Software-only deployments	Any 64-bit Arm or x86 Linux host with Docker, ≥ 4 GB RAM, ≥ 32 GB storage