

 An isometric illustration of a smart city on a blue background. The scene includes various buildings of different heights and styles, some with windows and balconies. A central street runs through the city, with a signpost that reads "SMART CITY". Several battery icons are scattered throughout the scene, some floating in the air and others on the ground, symbolizing energy storage and smart infrastructure. The overall aesthetic is clean and modern, with a focus on urban development and sustainable technology.

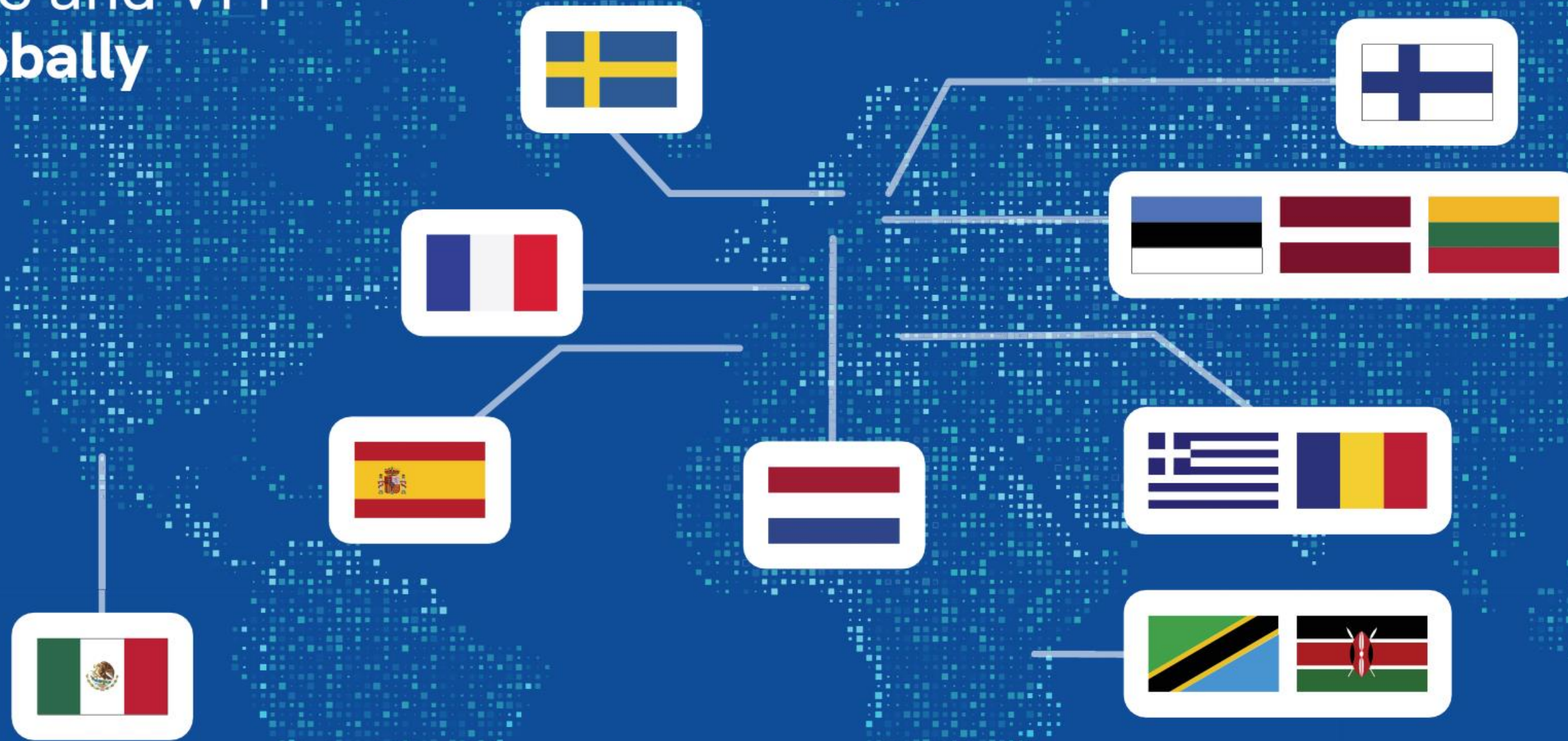
Monetizing Batteries: Proven Use Cases

January 2025

About Fusebox



Offering EMS and VPP solutions globally



Experts in C&I size asset aggregation

10+ years of asset control expertise

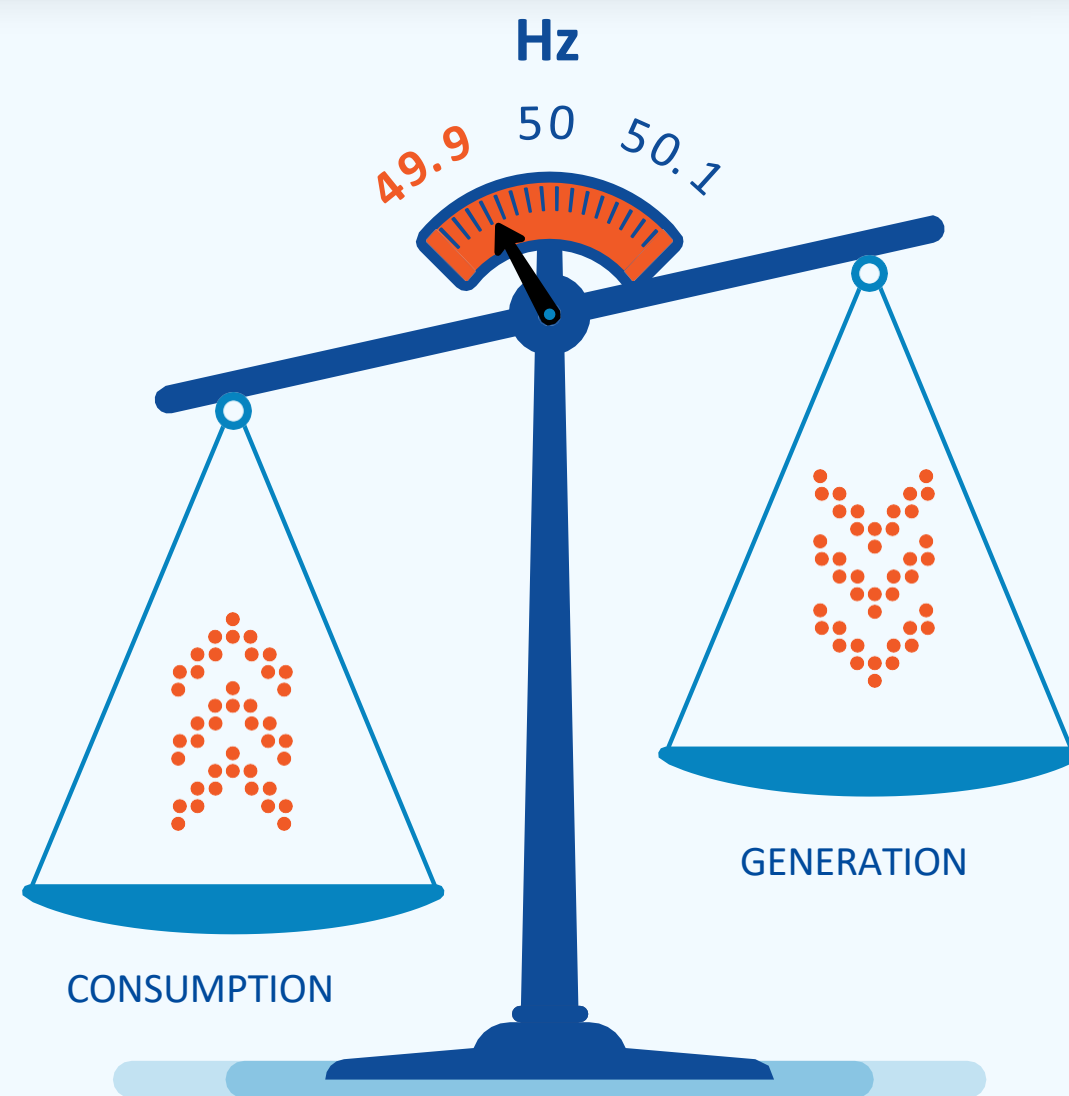
Market integration with 8 TSOs

Cross-market / platform solutions

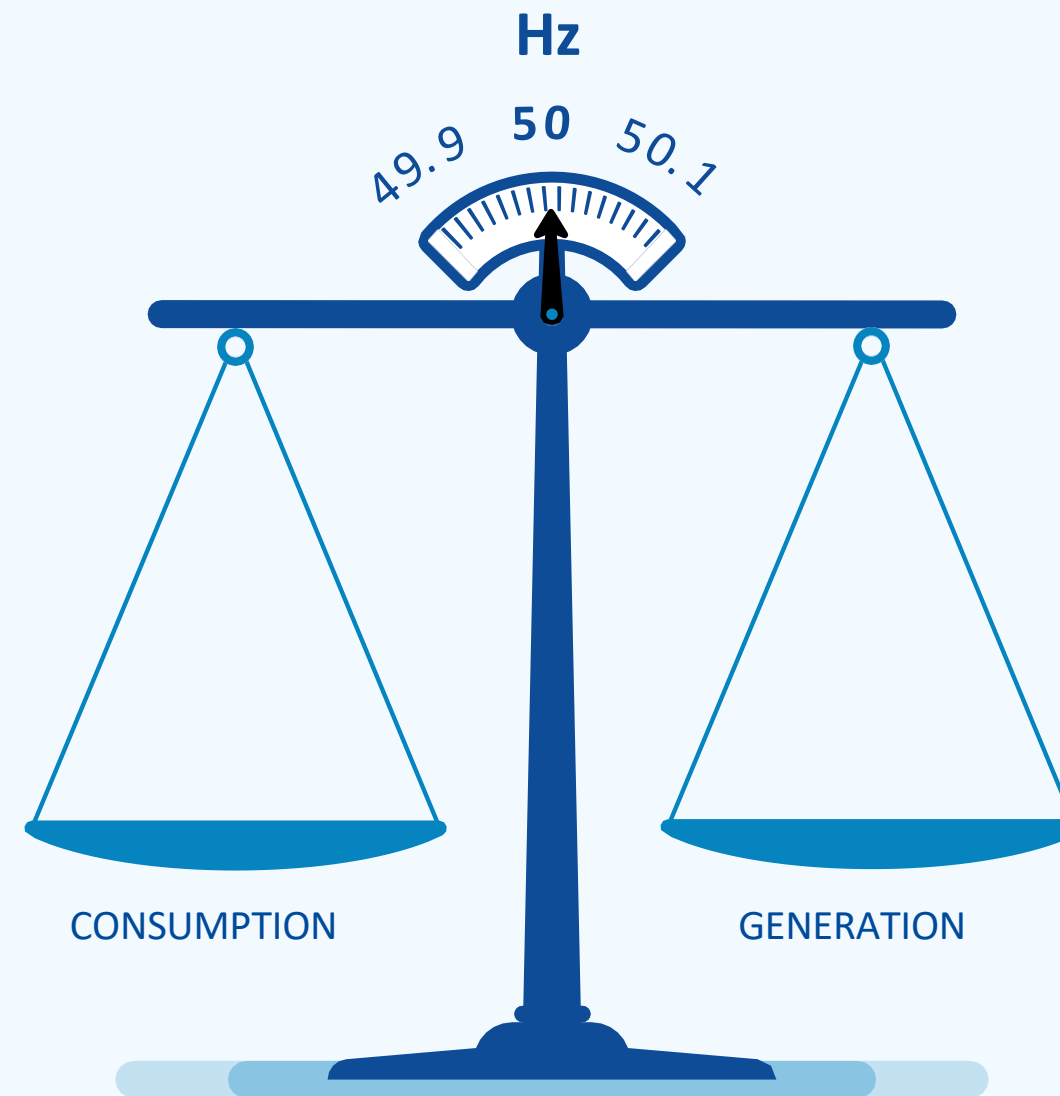
Electricity Balancing

Market

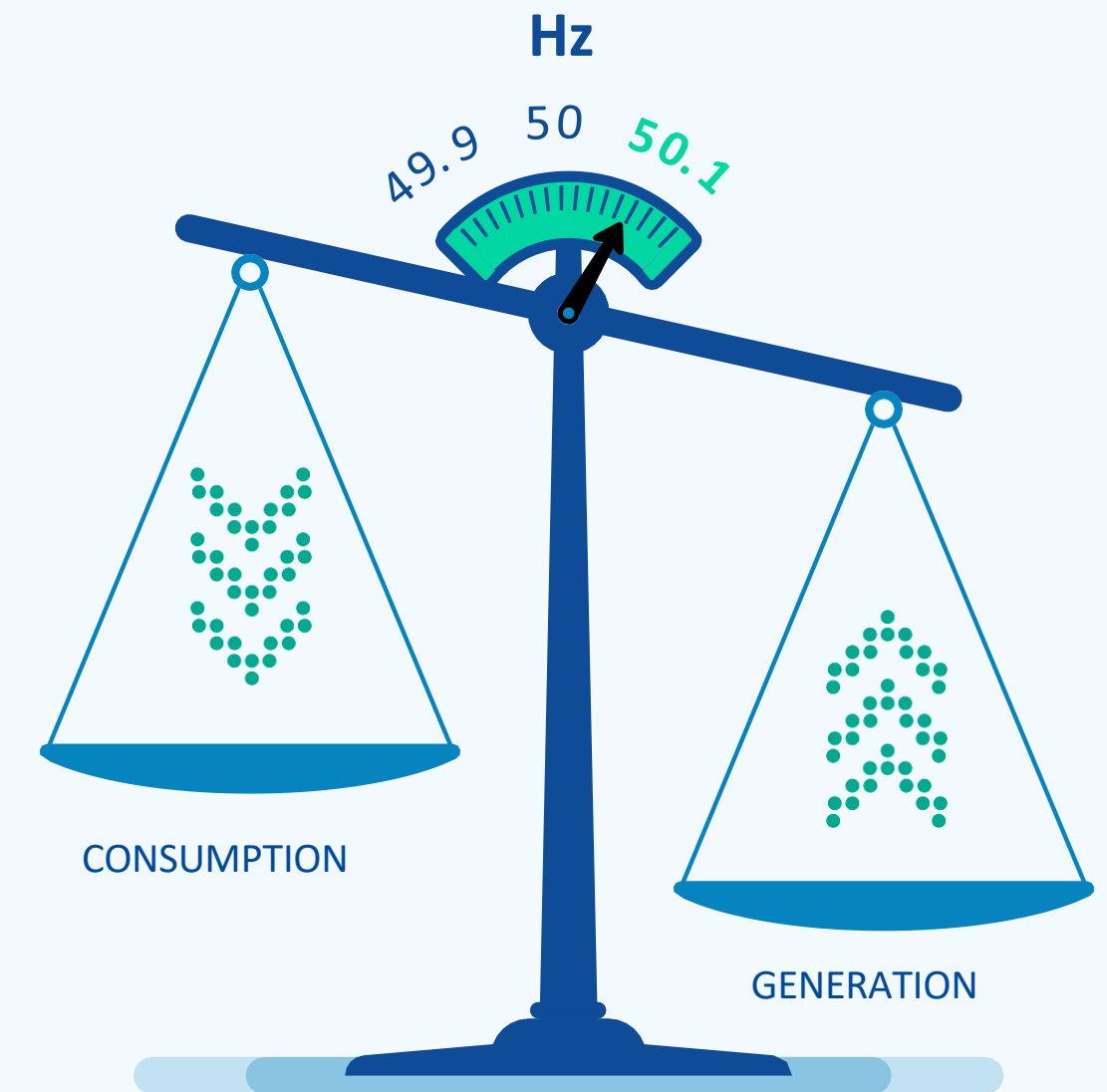
Balance between electricity generation and electricity consumption



Negative Balancing Energy
More Consumption than Electricity
Generation

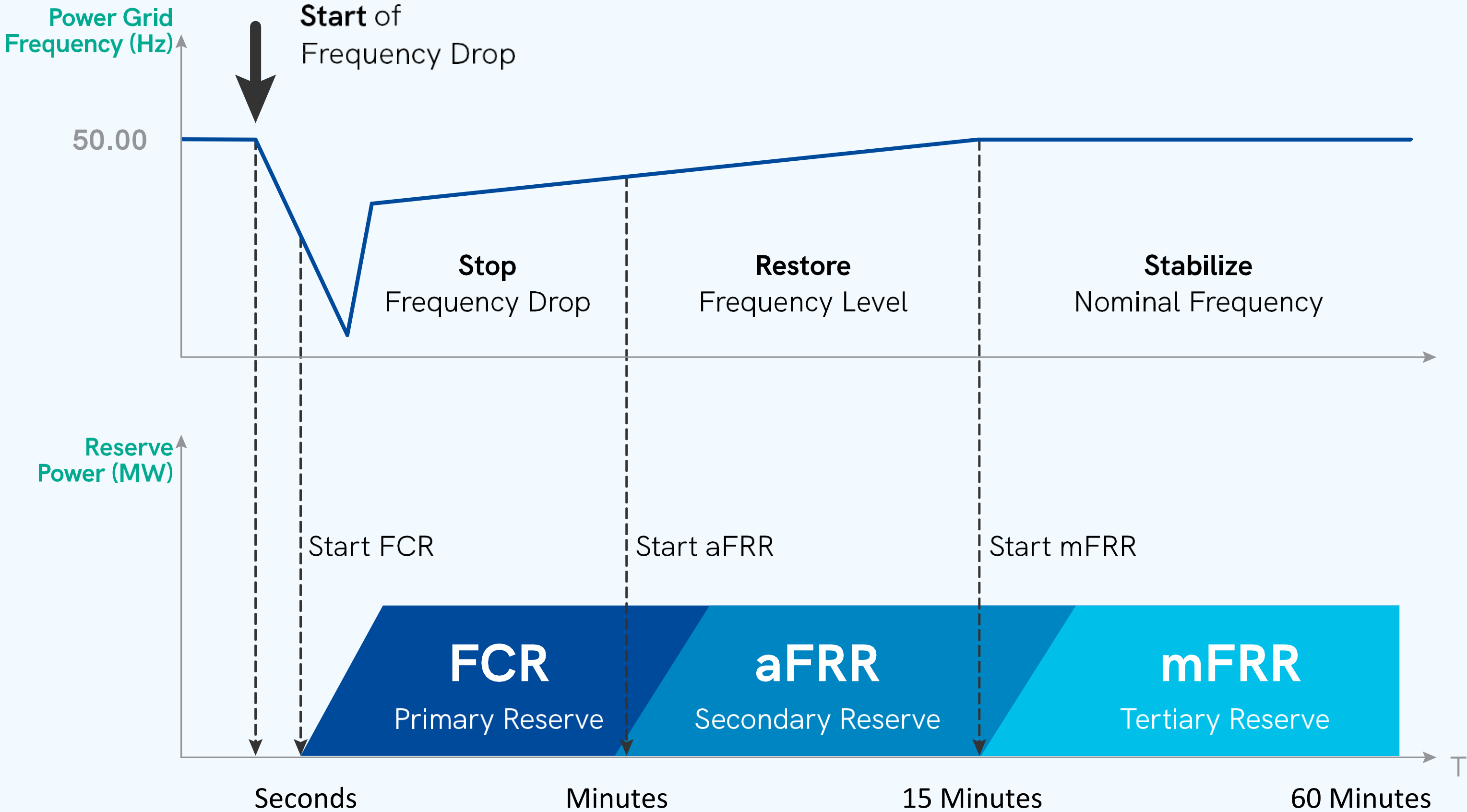


Balanced Electricity
Generation and Consumption
are in Balance



Positive Balancing Energy
More Electricity Generation than
Consumption

Understanding the Balancing Market



Why it is Beneficial to Participate

in Balancing Market

Balancing energy prices

TIME PERIOD: 2023-08-21 00:00 - 2023-08-22 00:00
TIMEZONE: EET / EEST

Table | Chart | Description

EUR/MWh	Estonia	
Timestamp	Upward	Downward
2023-08-21 00:00	50.000	50.000
2023-08-21 01:00	929.370	929.370
2023-08-21 02:00	929.370	929.370
2023-08-21 03:00	163.700	163.700
2023-08-21 04:00	59.700	59.700
2023-08-21 05:00	929.370	929.370
2023-08-21 06:00	929.370	929.370
2023-08-21 07:00	929.370	929.370
2023-08-21 08:00	1022.310	1022.310
2023-08-21 09:00	1022.310	1022.310
2023-08-21 10:00	1022.310	1022.310
2023-08-21 11:00	929.370	929.370
2023-08-21 12:00	929.370	929.370
2023-08-21 13:00	850.000	850.000
2023-08-21 14:00	50.000	50.000
2023-08-21 15:00	50.000	50.000
2023-08-21 16:00	50.000	50.000

NORD POOL

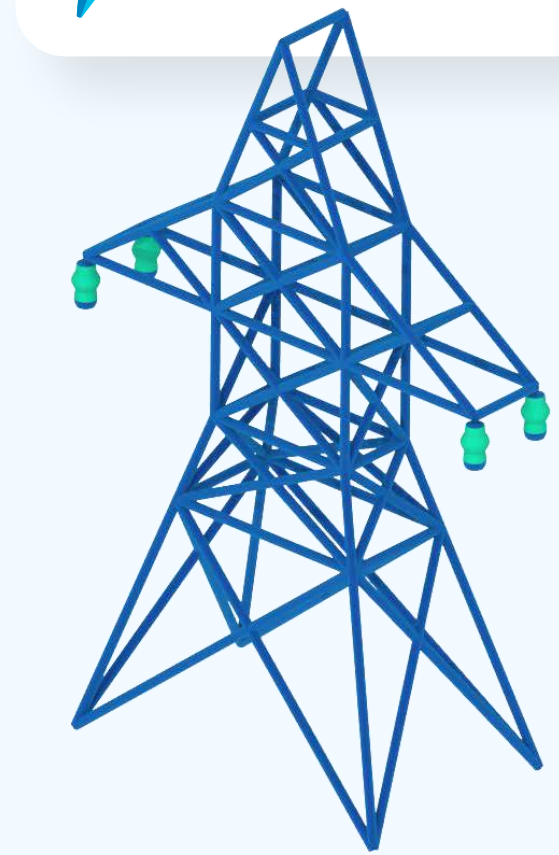
Day-ahead overview

	22-08-2023	21-08-2023
00 - 01	113,69	111,95
01 - 02	104,91	101,67
02 - 03	103,43	98,71
03 - 04	103,50	95,10
04 - 05	105,84	97,44
05 - 06	140,07	117,89
06 - 07	161,58	350,00
07 - 08	250,01	325,09
08 - 09	250,00	549,92
09 - 10	231,43	250,08
10 - 11	250,00	483,02
11 - 12	401,49	250,09
12 - 13	240,00	250,07
13 - 14	123,94	250,05
14 - 15	105,09	343,92
15 - 16	103,60	300,04
16 - 17	149,98	150,00
17 - 18	159,08	300,04
18 - 19	170,07	549,95
19 - 20	202,27	250,07
20 - 21	212,38	204,39
21 - 22	172,45	169,00
22 - 23	145,80	136,01
23 - 00	80,10	115,00

Charge batteries at lower D-A prices and participate in mFRR

Earn profit with mFRR

Reduce CO₂



Heating, ventilation, and

conditioning (HVAC)



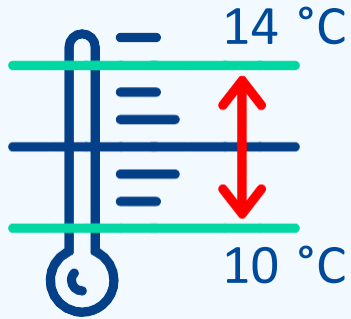
Room temperature
24 °C

> 12 °C

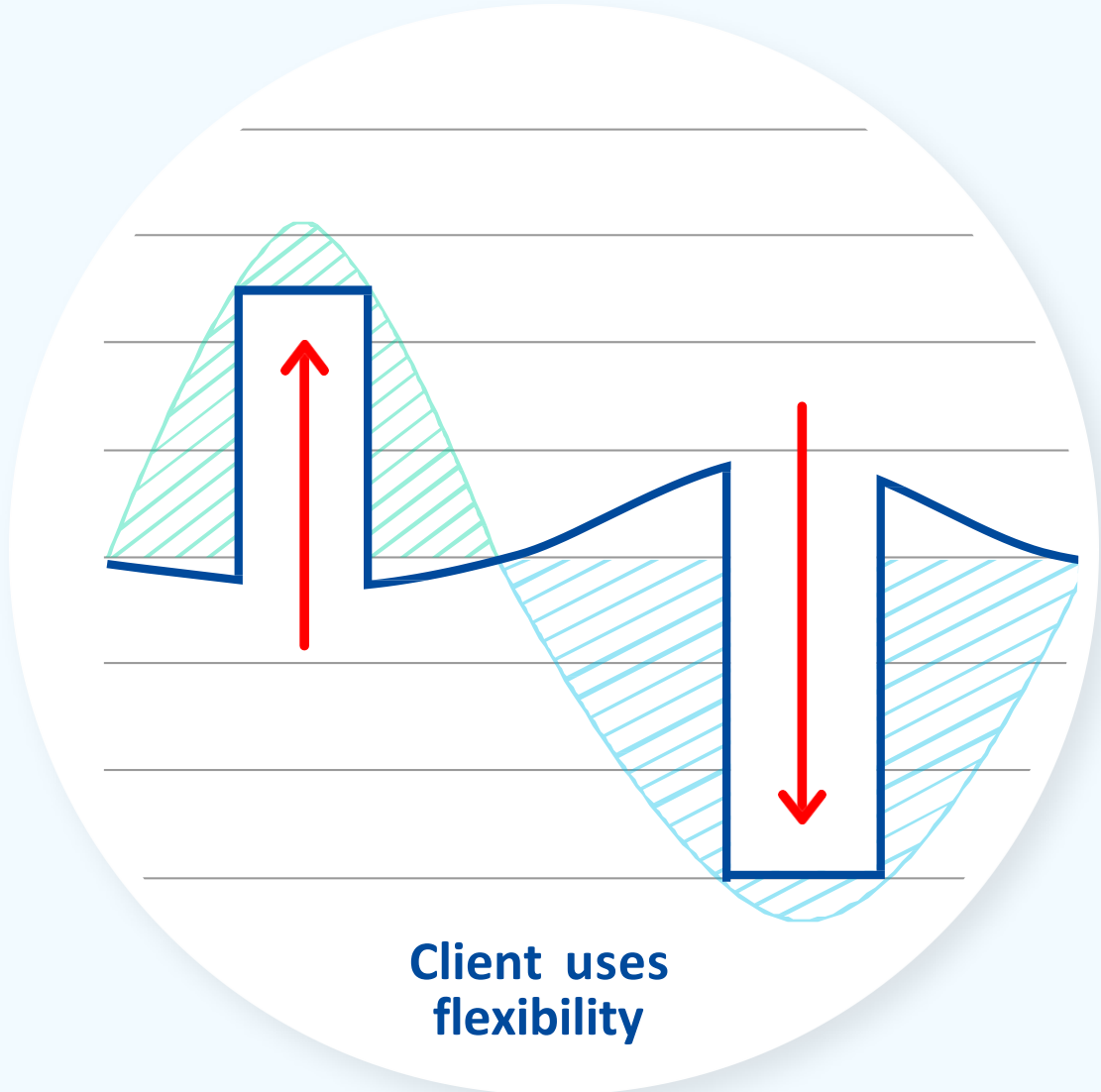
Cooling liquid
temperature



12 °C



Automatic
software-based
regulation

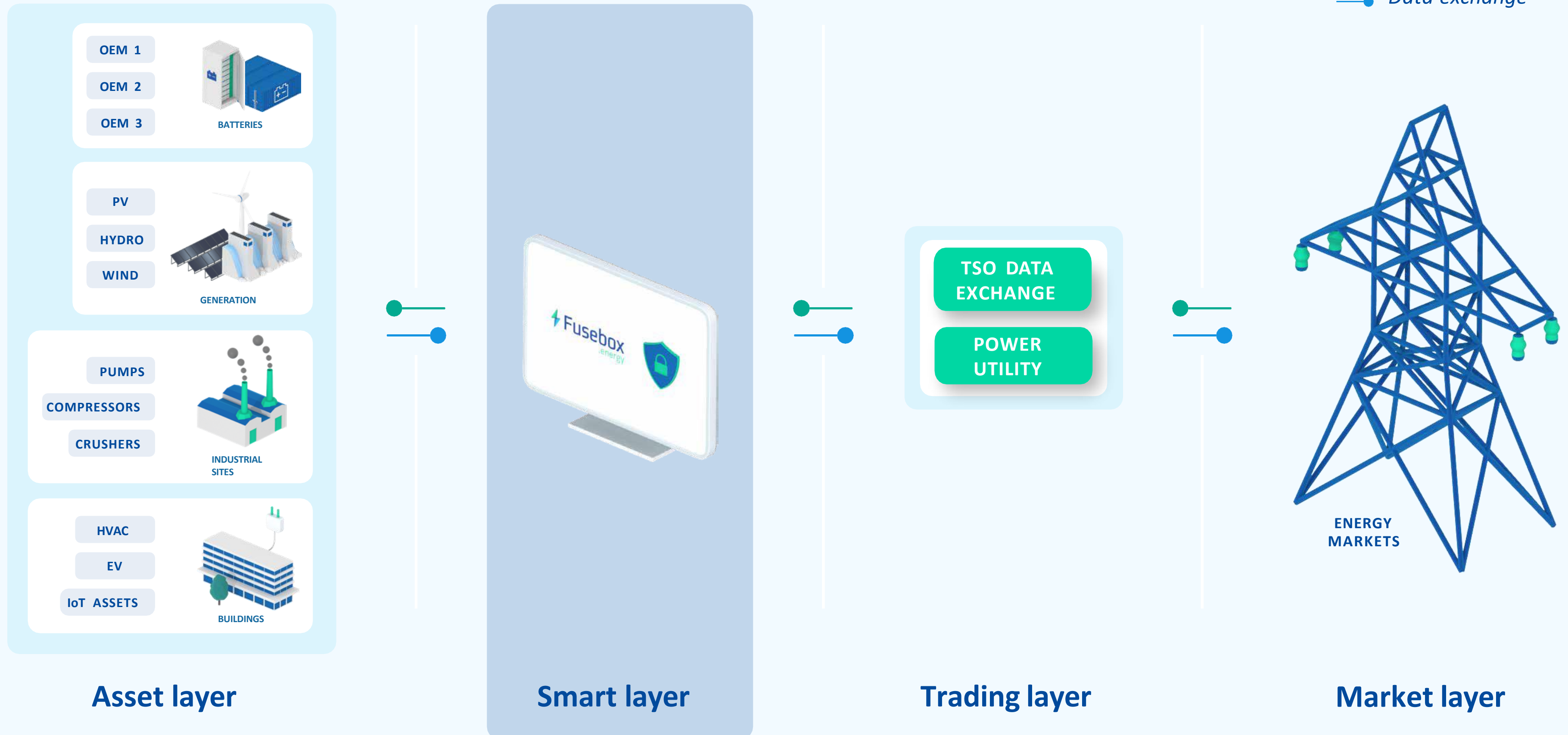


Client uses
flexibility

End-to-End Value



 Data exchange



Energy Management System (EMS)

Connecting & managing complex energy sites



Case Study 1



PV + Battery + Consumption

Client description

Asset owner in Estonia, operates a fuel station complex with fast EV chargers, wind generation, and PV parks. To optimize the performance of this hybrid energy site, they installed a battery energy storage system to manage all assets as a single, integrated unit.

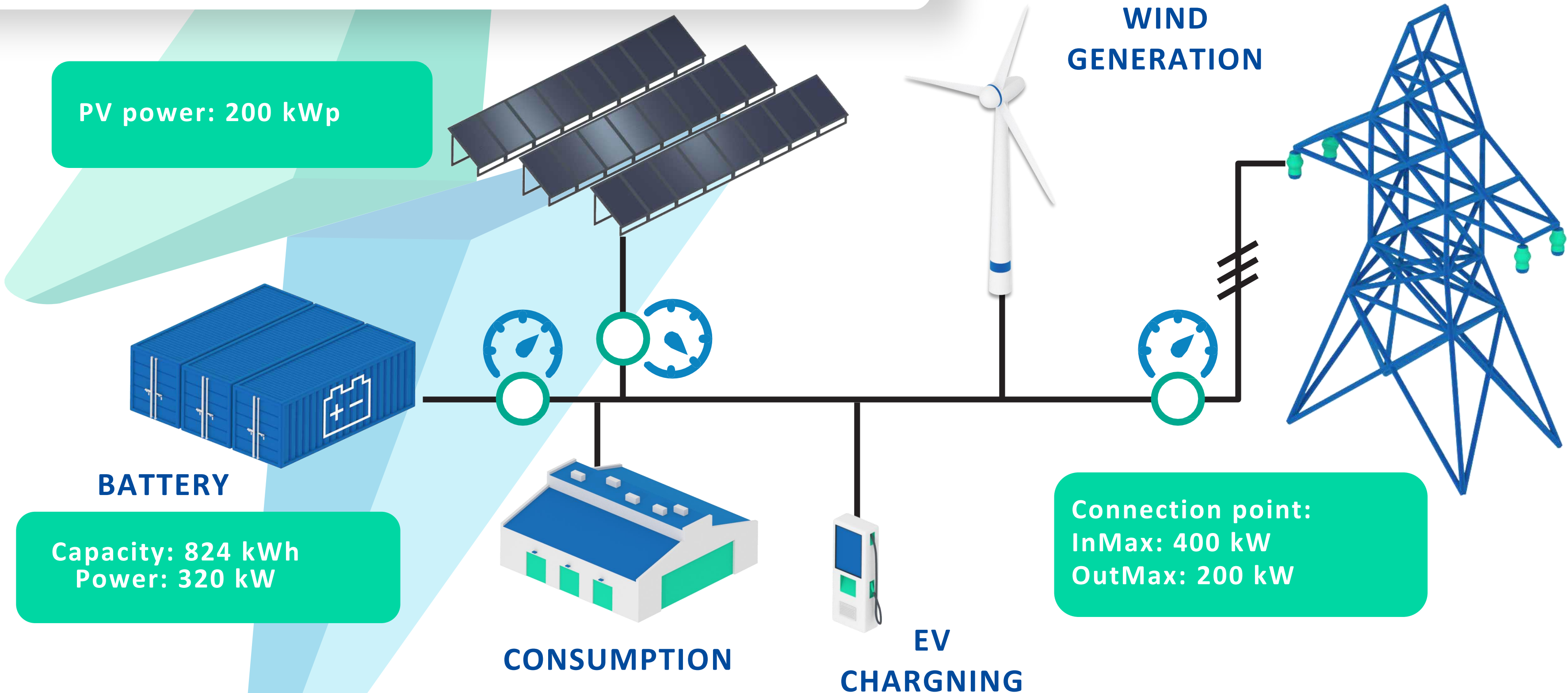
Client challenges

- Maximizing zero from/to grid
- Energy Price Volatility
- Complex Site Management
- Managing Grid Limits



Case Study 1

PV + Battery + Consumption



Case Study 1



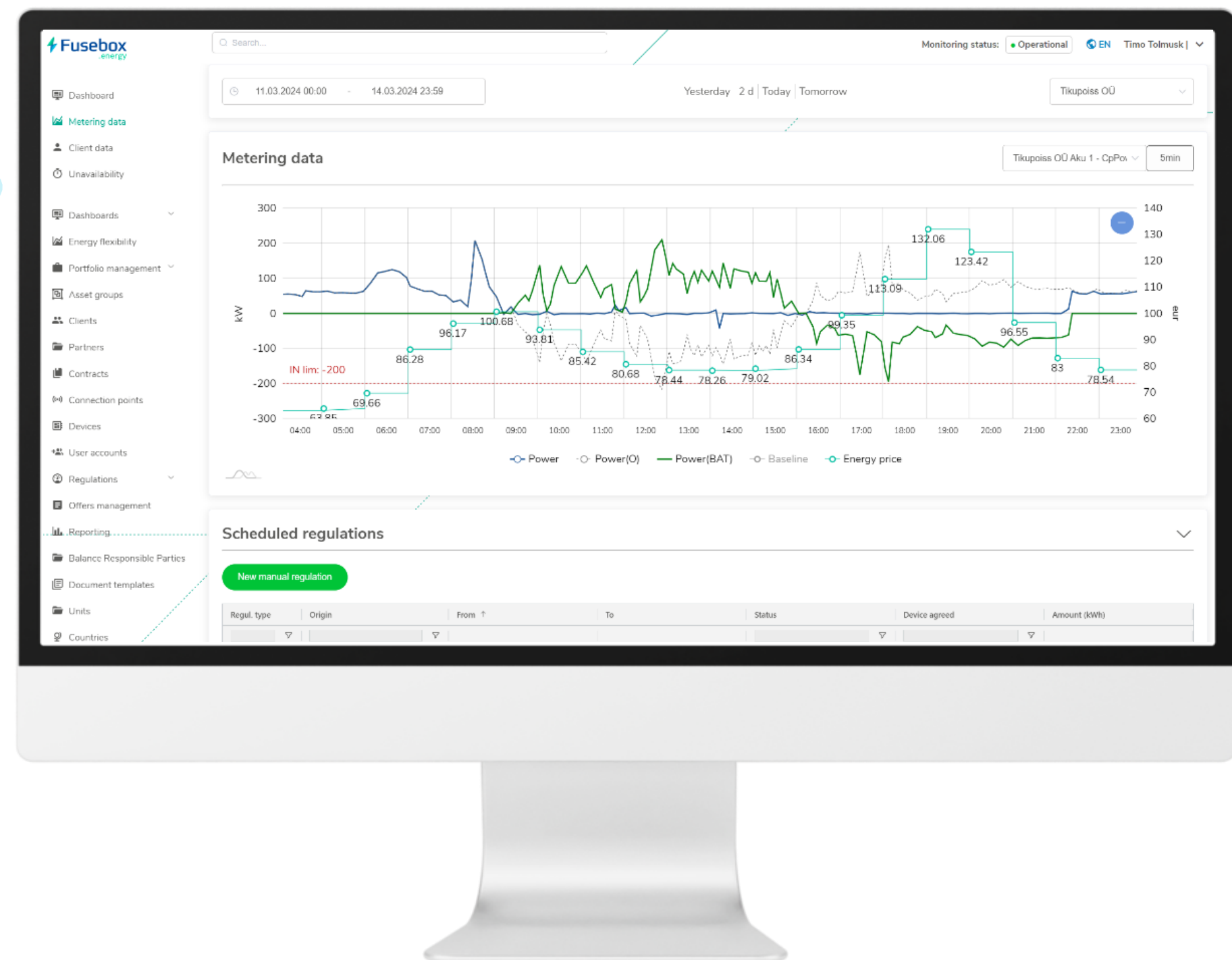
PV + Battery + Consumption

Fusebox Solution

- Grid congestion management
- Maximizing zero from/to grid
- Energy price optimization
- Custom restrictions (temperature, SOC)
- Alarm and Notifications
- TSO Flexibility market Participation

Outcome

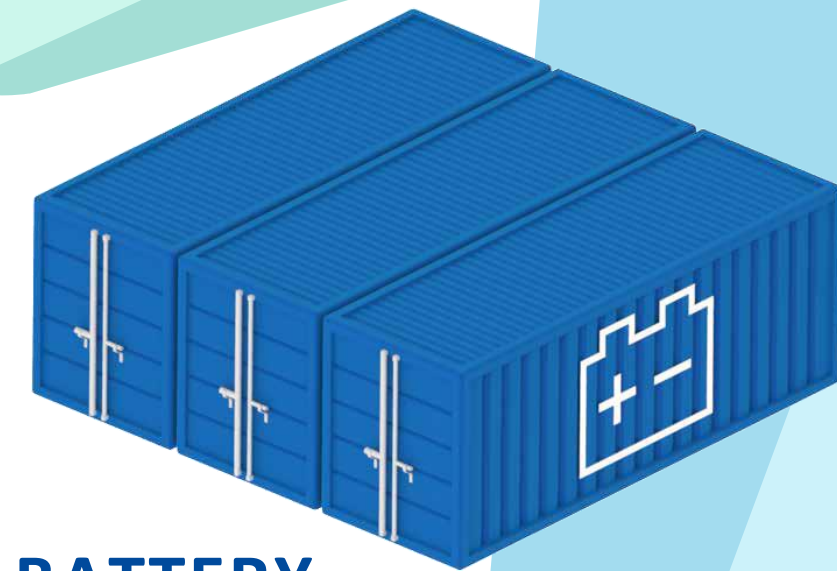
- 25 757 €** Yearly Profit from Energy Arbitrage
- 24 625 €**/Year from Flexibility Market
- Reduced Financial Losses
- Improved Operational Efficiency



Case Study 2

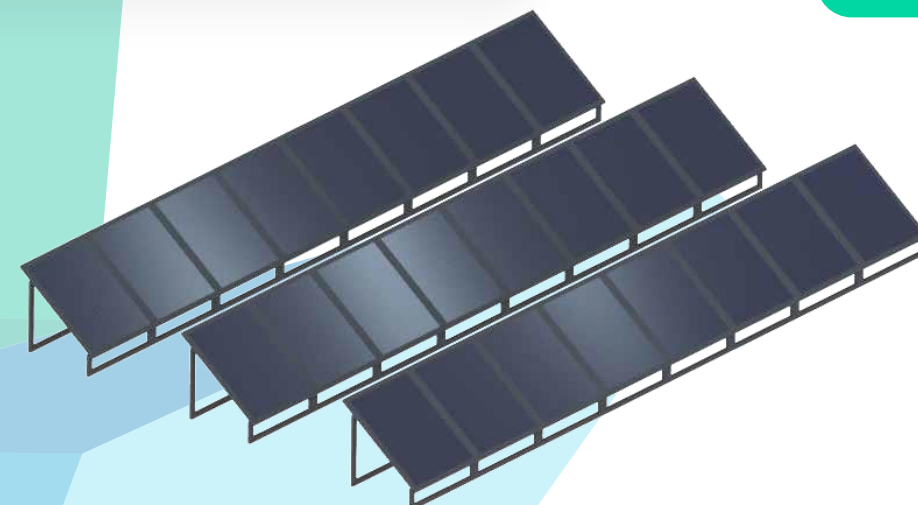
PV + Battery

PV power: 528 kWp

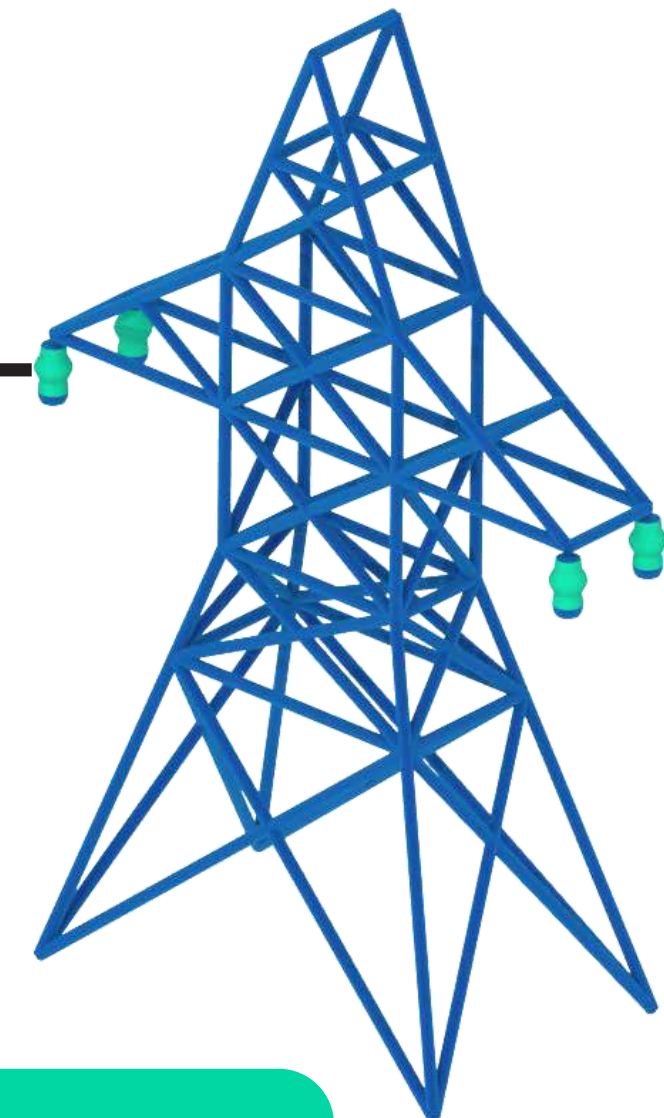


BATTERY

Capacity: 1104 kWh
Power: 500 kW



Connection point:
InMax: 200 kW
OutMax: 200 kW



Case Study 2



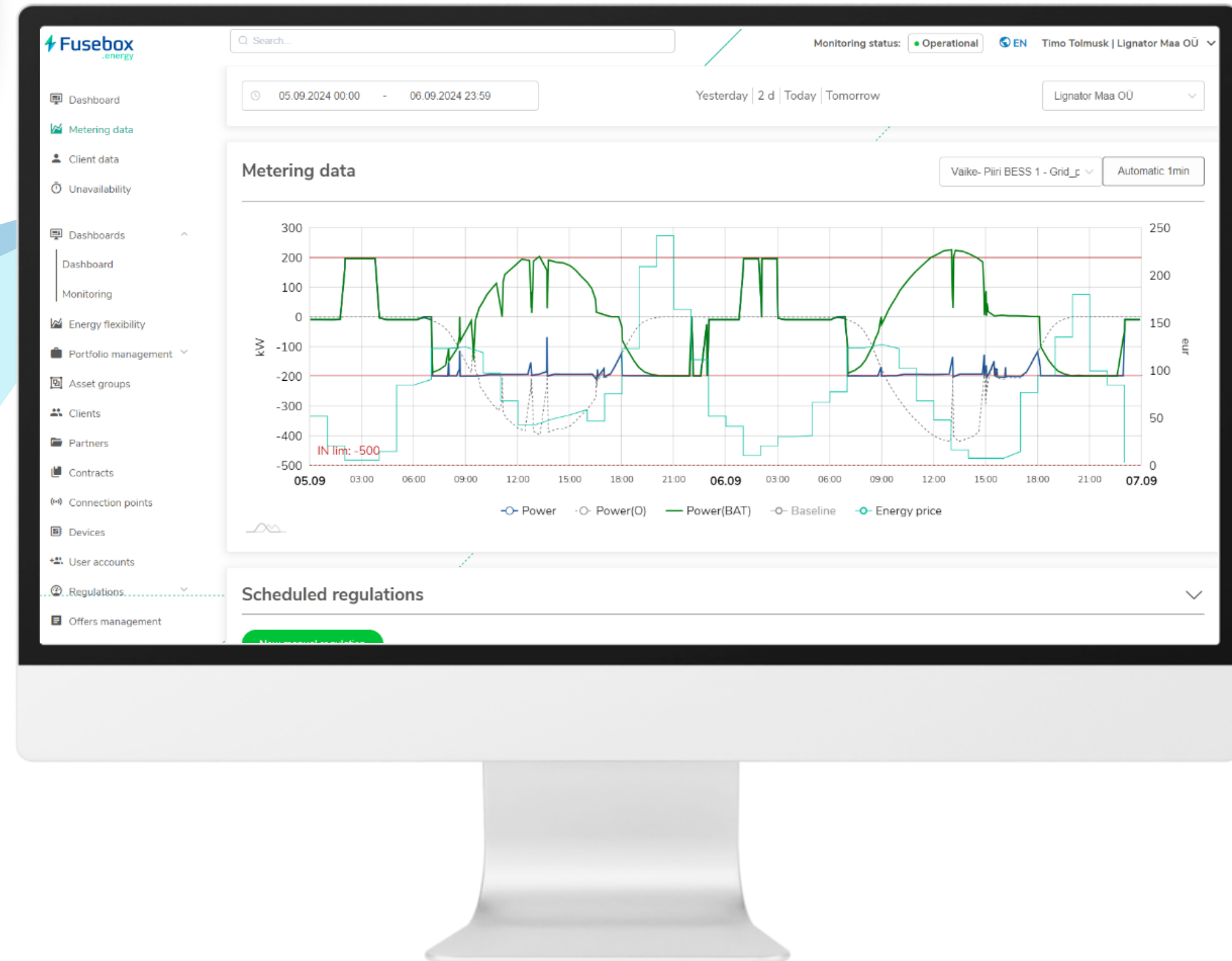
PV + Battery

Fusebox Solution

- Grid congestion management
- Energy price optimization
- Energy arbitrage
- Alarm and Notifications
- TSO Flexibility market Participation

Outcome

- 31 258 €** Yearly Profit from Energy Arbitrage
- 29 884 €**/Year from Flexibility Market
- 17%** Increase in PV Production
- Reduced Financial Losses
- Improved Operational Efficiency



Case Study 3

PV + Battery

Client description

Estonian renewable energy investor, owns multiple sites is planning to installed a battery solution at a key photovoltaic (PV) park to enhance energy storage and optimize performance

Client challenges

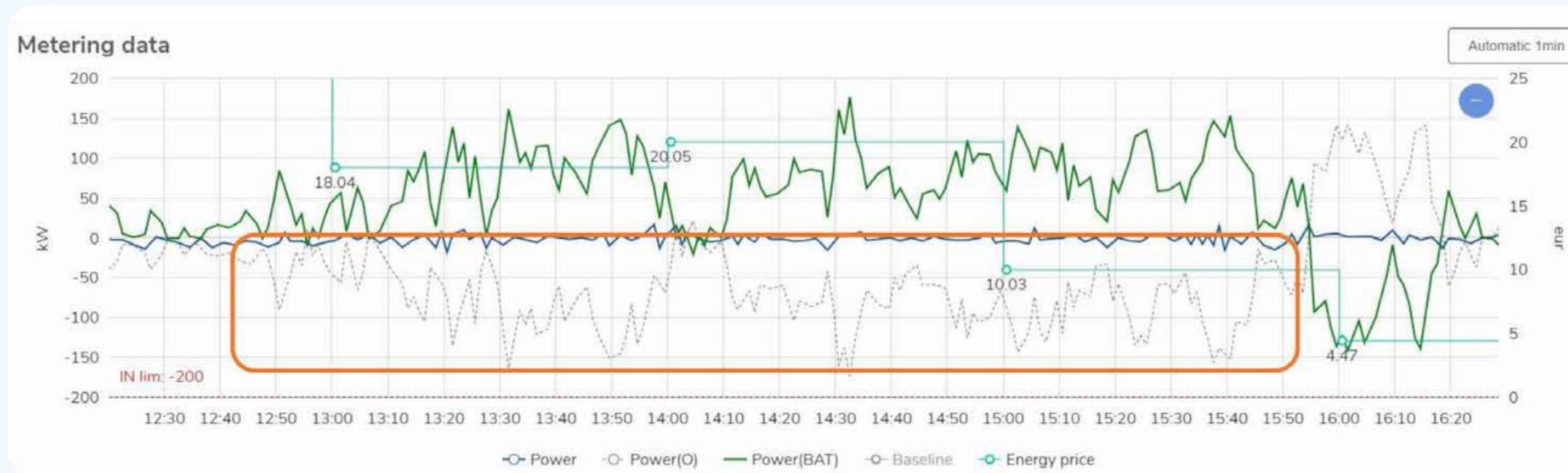
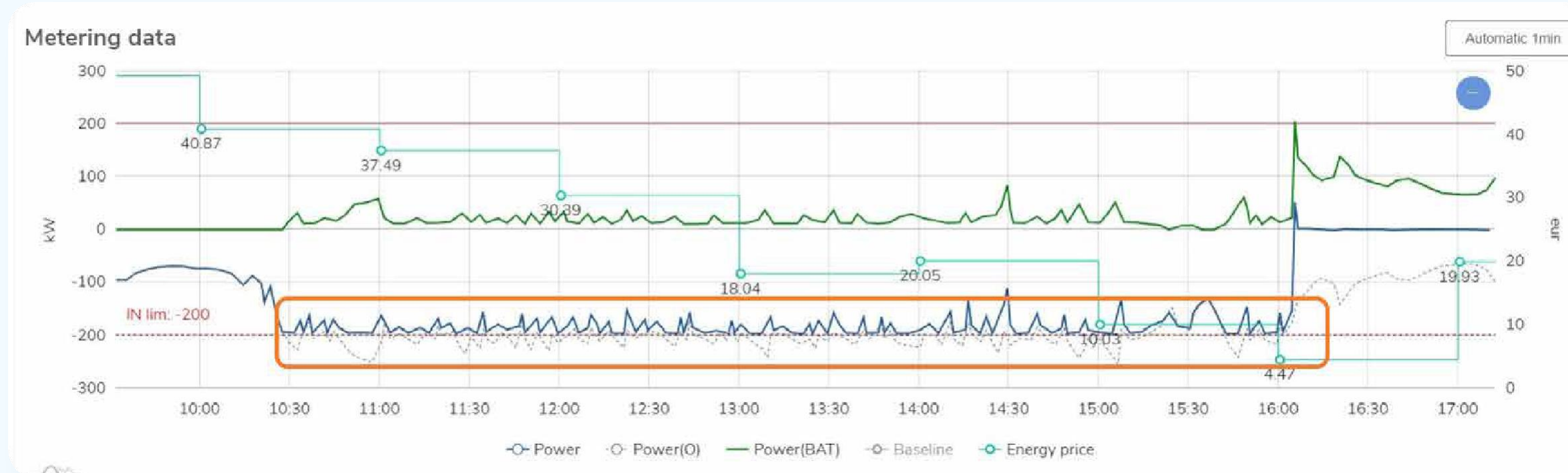
- Negative energy prices
- Energy price volatility
- Over-dimensioned PV system



EMS functionality examples

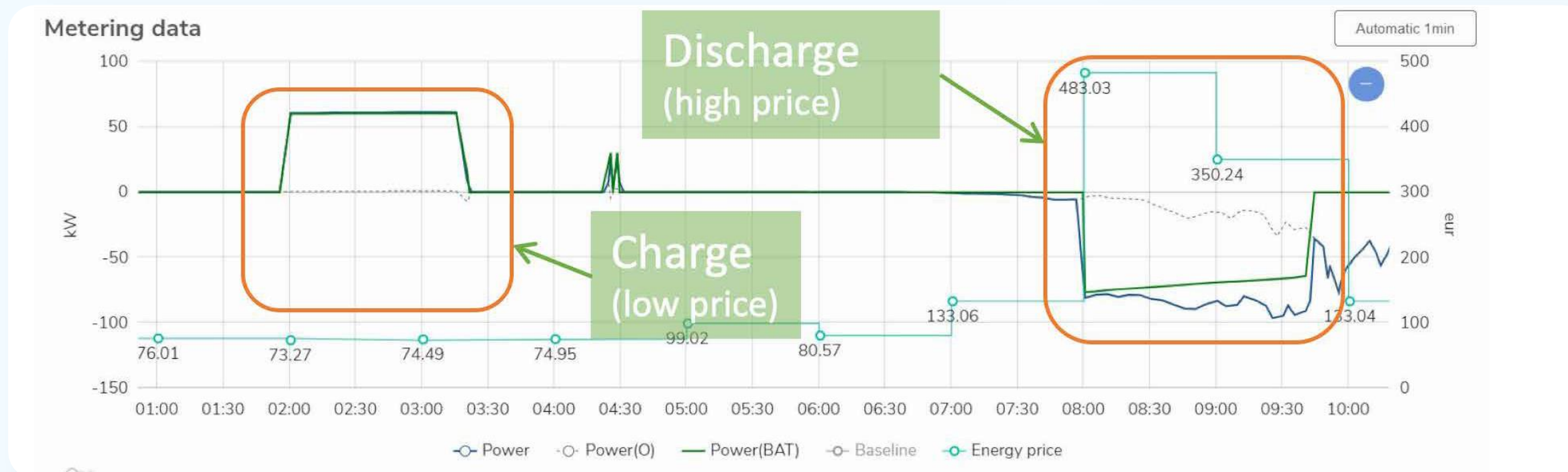
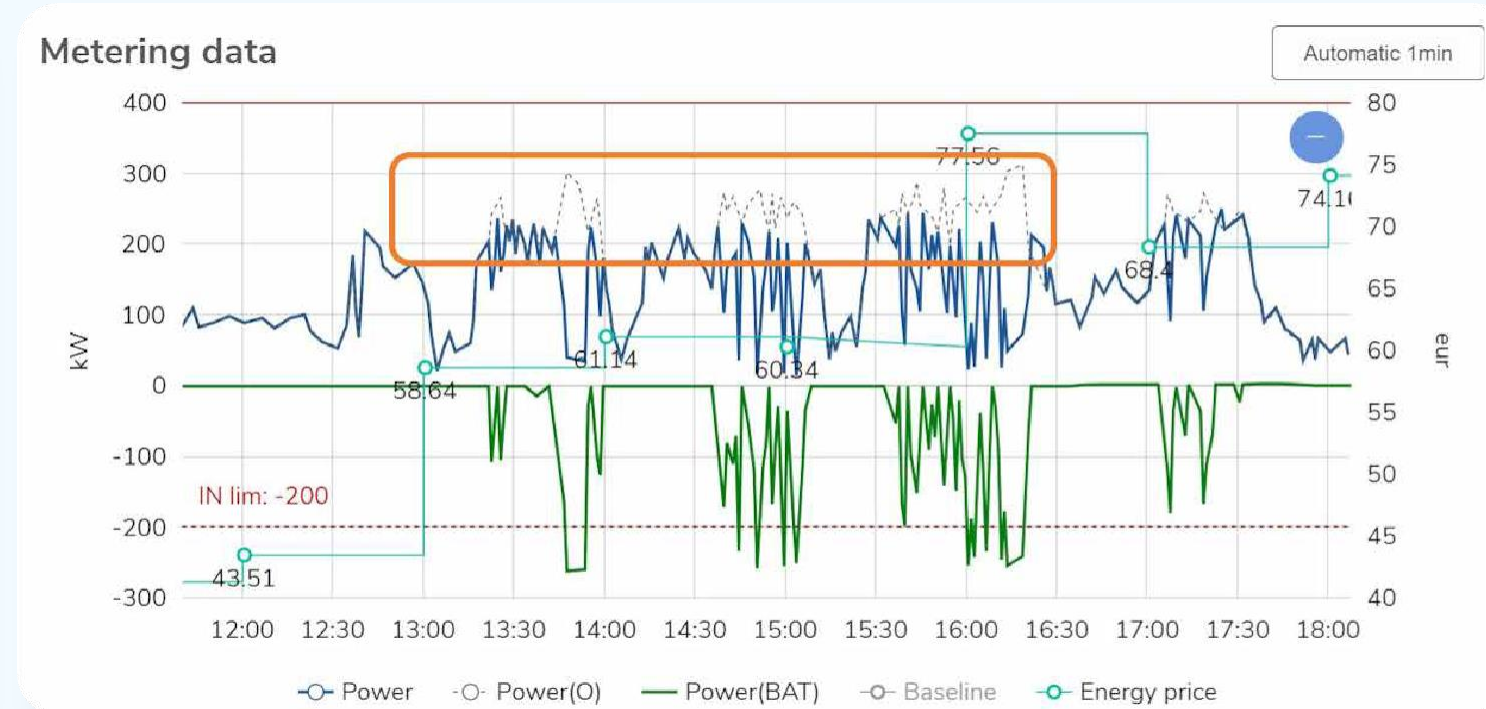
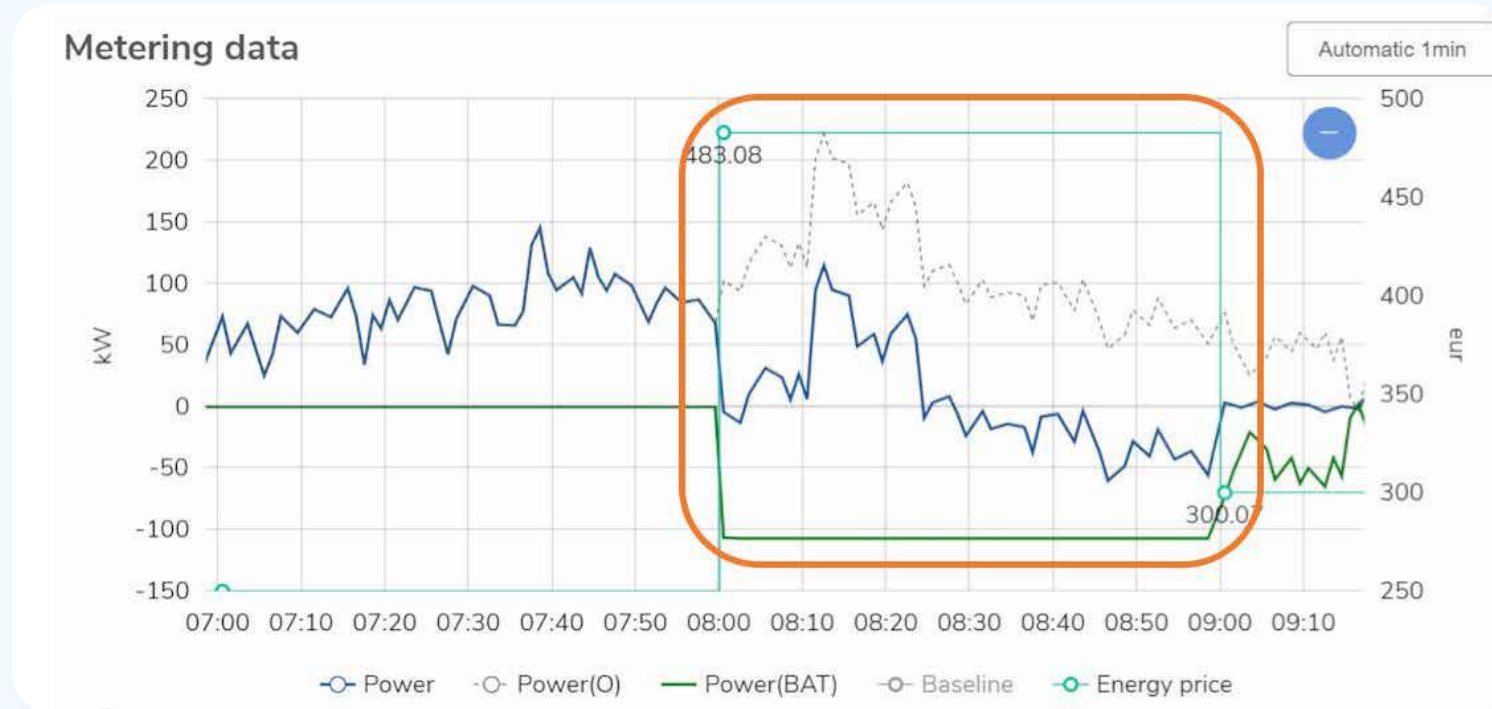
Grid congestion:
avoid exceeding
the connection
point limits

**Zero to/from grid -
Power diversion: Self
consumption –
reduce grid tariffs**



EMS functionality examples

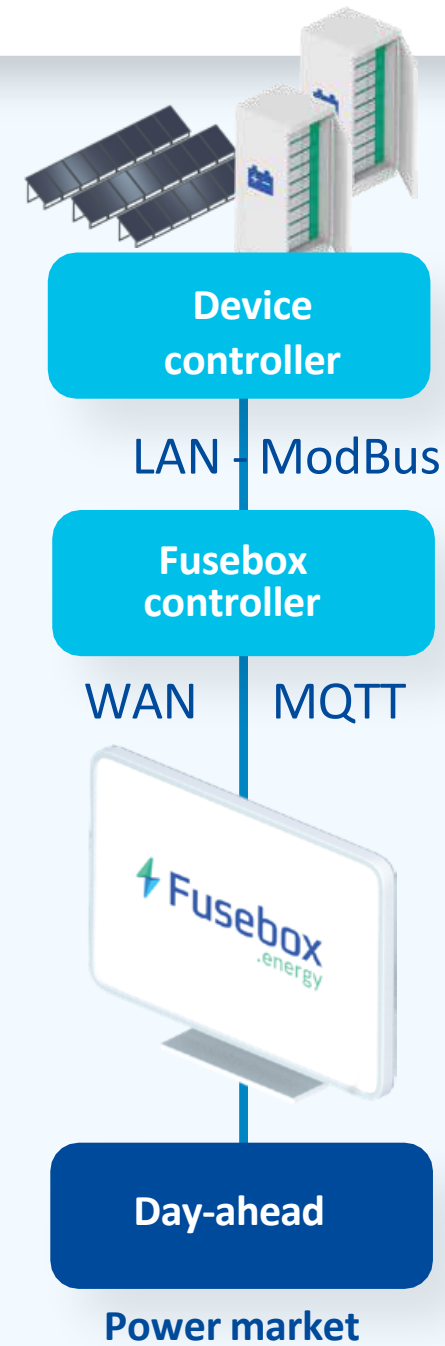
Peak price shaving: (Price / Connection Point power)



Price arbitrage – charge/discharge BESS, according to day-ahead price

How Fusebox connects

to your system

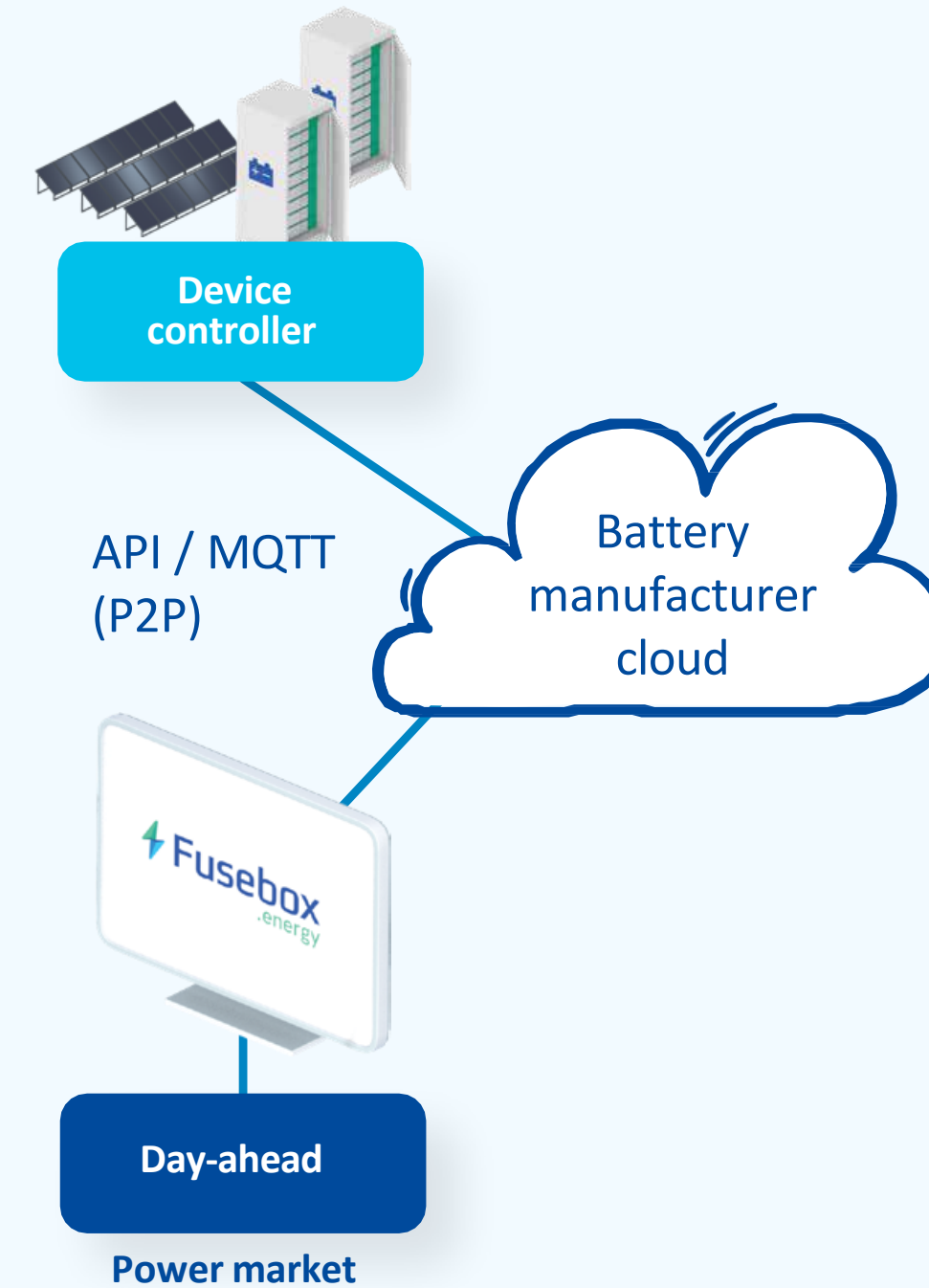


Option 1 - controller

Offline management possibility



Option 2 - OEM



Option 3 - P2P

Sample Profits

Baltics

- Annual profit estimates based on a 0.5MW/1MWh battery
- Prices based on 2023 historical data




BATTERY + CONSUMPTION

- EMS profit: 28 572€
- VPP profit: 27 316€
- TOTAL: 55 888€**



BATTERY + PV

- EMS profit: 26 862€
- VPP profit: 25 682€
- TOTAL: 52 544€**



BATTERY + CONSUMPTION + PV

- EMS profit: 31 258€
- VPP profit: 29 884€
- TOTAL: 61 142€**

Sample Profits

Finland

- Annual profit estimates based on a 0.5MW/1MWh battery
- Prices based on 2023 historical data

BATTERY + CONSUMPTION

- EMS profit: 29 930€
- VPP profit: 110 000€
- TOTAL: 139 930€**

BATTERY + PV

- EMS profit: 28 139€
- VPP profit: 110 000€
- TOTAL: 138 139€**

BATTERY + CONSUMPTION + PV

- EMS profit: 32 744€
- VPP profit: 110 000€
- TOTAL: 142 744€**

EMS Benefits



TURNKEY SOLUTION FOR CUSTOMER

- White label
- Client site management automation
- Simulator for demonstrations

REALTIME OVERVIEW OF THE ASSETS

- Asset real-time monitoring and management
- Asset health status monitoring
- Notifications (e-mail, SMS)

MANAGE ASSETS AND SITE LIMITATIONS

- SoC
- Connection point power
- Temperature
- Other regulation conditions

EASY ASSET INTEGRATION

- Inhouse controller
- Equipmentless connection through MQTT
- Platform to Platform

EASY CLIENT MANAGEMENT

- Add client with different permissions
- Partner/installer adding possibility
- Client site unavailability

EMS UPGRADE POSSIBILITY TO VPP PLATFORMS

Thank you!

Interested to know more?



DROP US A LINE

Donatas Braziulis

Head of Portfolio

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