

# VPP Revenue Strategies for Power Utilities

September 2023

## About Fusebox



**High  
automation**

**Cyber  
secure**

**Rugged  
scalability**

**Easy  
integration**

## The Problem



**Power utilities need to balance consumption** and production from scattered resources and intermittent renewables while making rapid decisions.

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### Electricity utilities face urgent challenges

 Complying with growing environmental issues

 Integrating intermittent renewables

 Reducing portfolio imbalance

 Low customer loyalty

**The solution is**  
a fully automatic and an easy to integrate  
**VPP system.**

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Fusebox is a software company offering a turnkey VPP-as-a-service with EMS capabilities giving energy companies a competitive edge

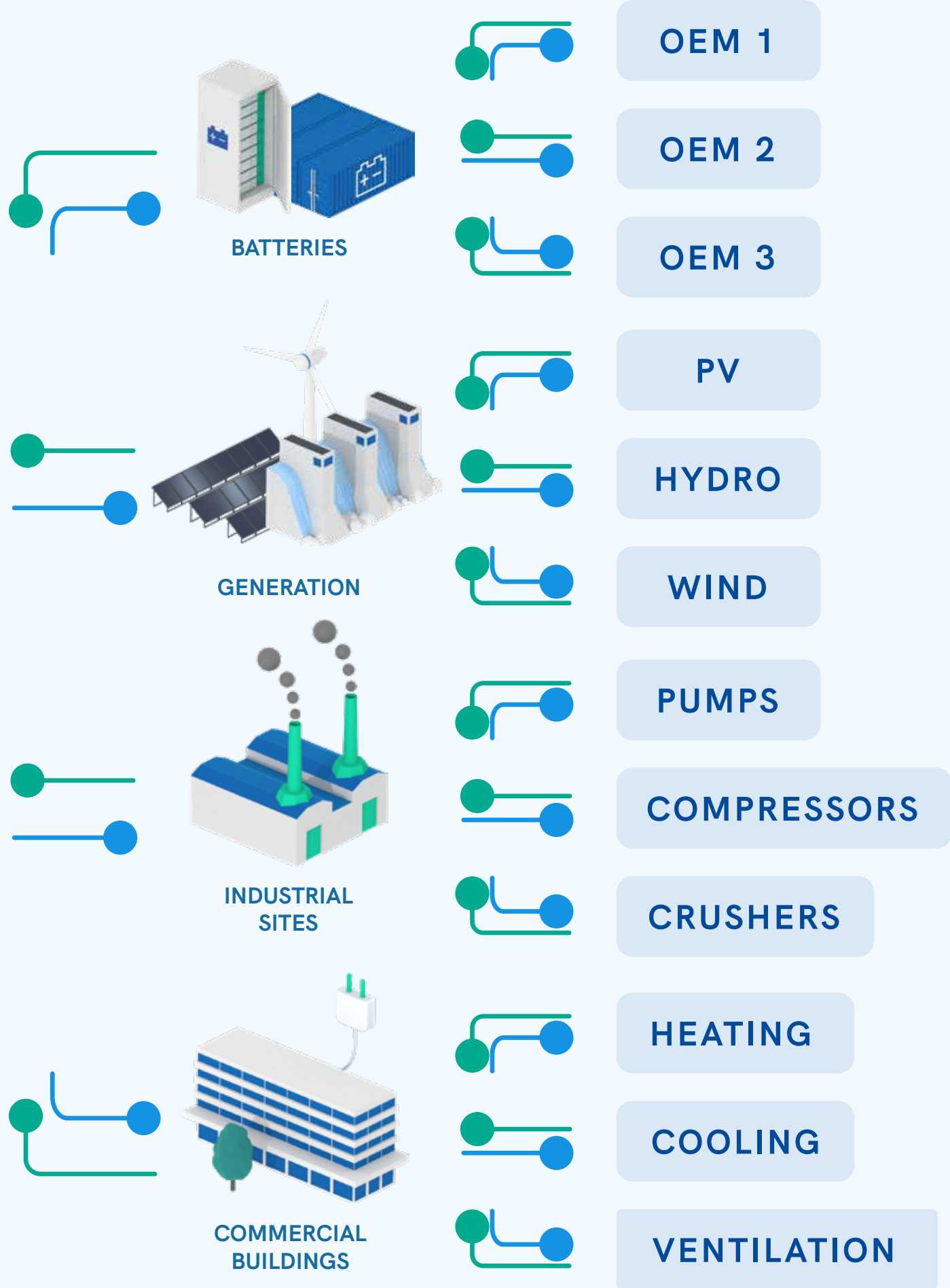
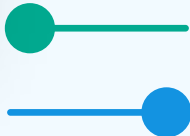


# What is a VPP?



TSO DATA EXCHANGE

BRP TRADING DESK



# Challenges & opportunities

Lessons and opportunities gained along the journey

## Challenges

- ⚡ Regulatory challenges
- ⚡ Accurate consumption & production prognosis
- ⚡ Cybersecurity risk
- ⚡ Asset digital integration
- ⚡ Intermittent renewables
- ⚡ Accessing multiple region ancillary markets

## Opportunities

- ⚡ Energy transition
- ⚡ Market volatility
- ⚡ New revenue stream through ancillary services
- ⚡ Centralized monitoring & management of DER assets
- ⚡ Innovative new services
- ⚡ Operational insight into consumption & production?

## Core Features



### Core Features

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- **Operational insight**, near real time telemetry
- MQTT & API communication
- Asset control capability
- Battery storage trading engine
- Grid congestion, energy diversion
- Asset optimization based on day-ahead price
- Loads shifting and shedding
- **Full readiness for the participation at Ancillary Services**

### Ancillary Services

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- **Fast connection** to Fusebox EMS sites
- mFRR up and down trading
- aFRR up and down trading
- FCR up and down trading
- FFR

# Business models

A large, stylized green lightning bolt icon pointing upwards and to the right.


## VPP Model 1

Creating revenue streams through the provision of ancillary services to TSO.

A large, stylized green lightning bolt icon pointing upwards and to the right.


## VPP Model 2

Reducing the imbalance in a power utility's production and consumption portfolio.

A large, stylized blue lightning bolt icon pointing upwards and to the right.

## EMS Model 3

Generating additional income through ancillary services and arbitrage, with revenue sharing for asset owners.

A large, stylized blue lightning bolt icon pointing upwards and to the right.

## EMS Model 4

Minimizing energy costs.



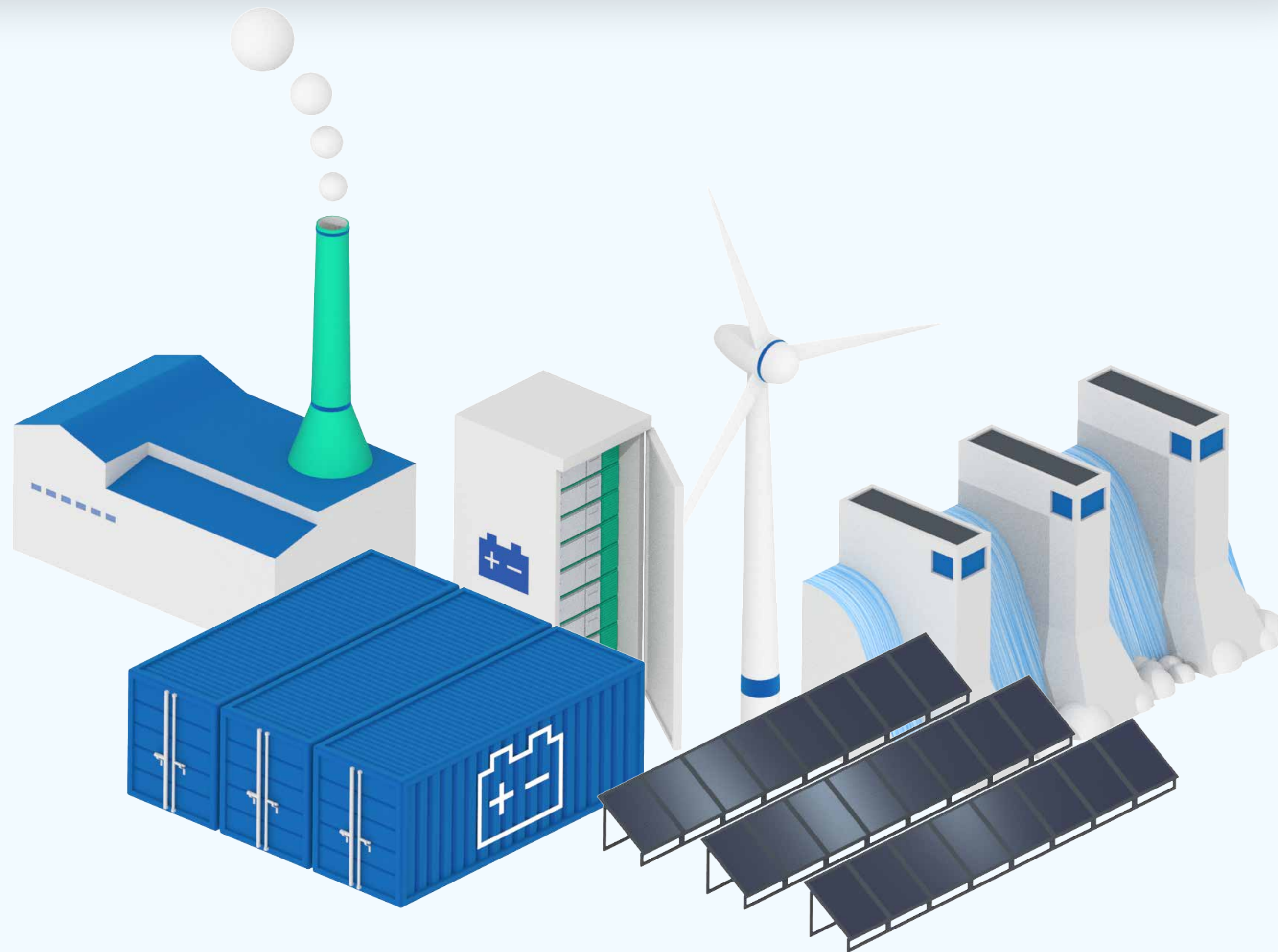
## Business case 1: Ancillary services to TSO



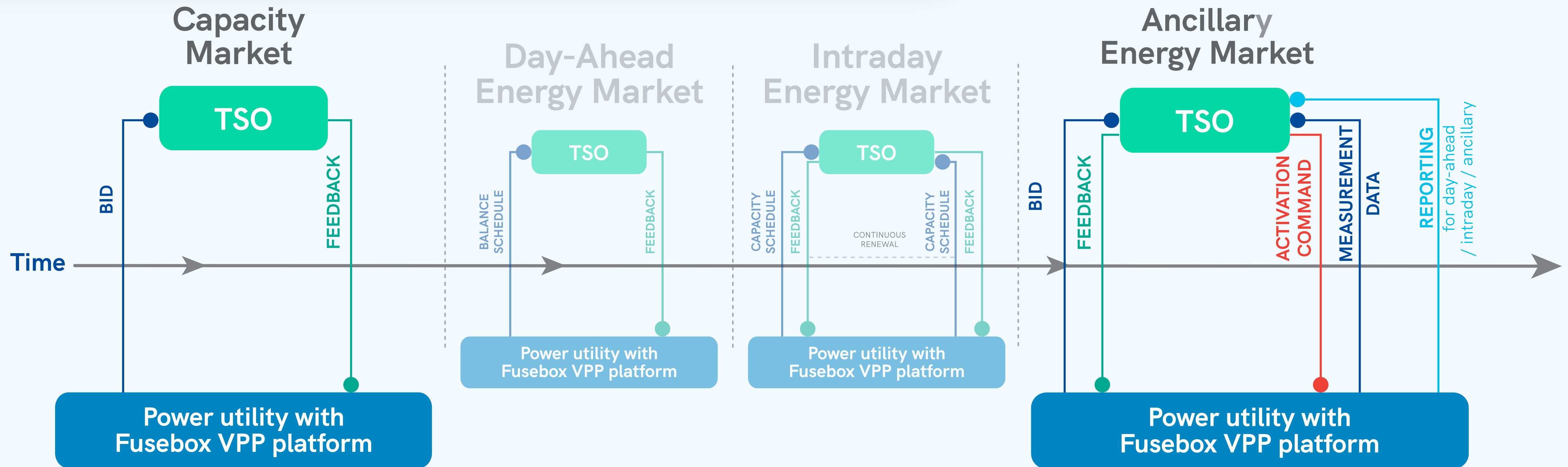
Creating revenue streams through the provision of ancillary services to TSO.

### Prerequisites

- **Integration with TSO:**
  - mFRR, aFRR and FCR bidding
  - real-time telemetry capabilities
- **Integration with Assets:**
  - real-time telemetry



# Business case 1: Ancillary services to TSO



## VPP platform technical capabilities *(fully automated)*

- Price strategy, bidding, market result monitoring, and scheduling
- Dispatch and regulation
- Reporting, settlement, and billing
- Support & training

## Results

- New revenue stream
- Expanded market options

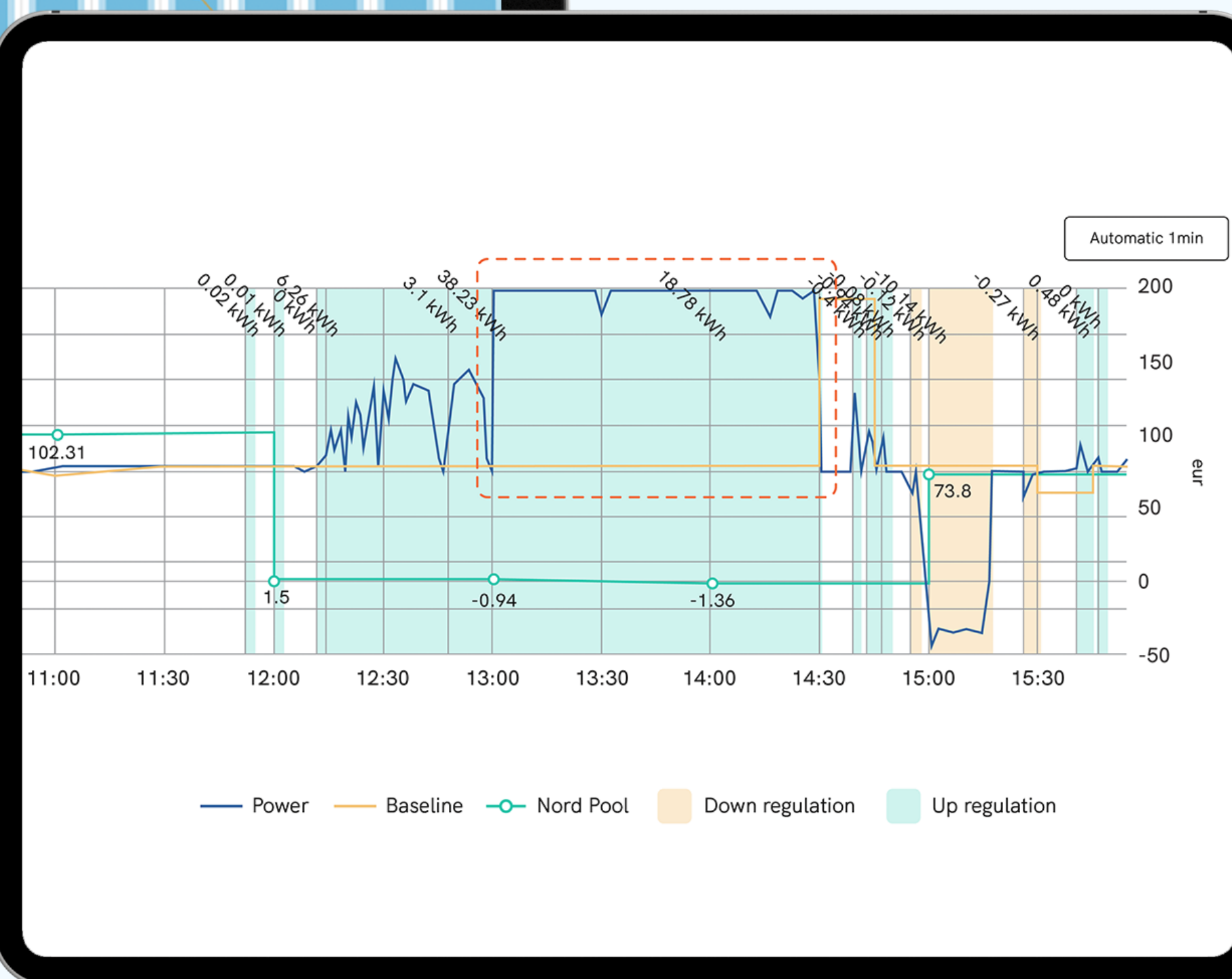
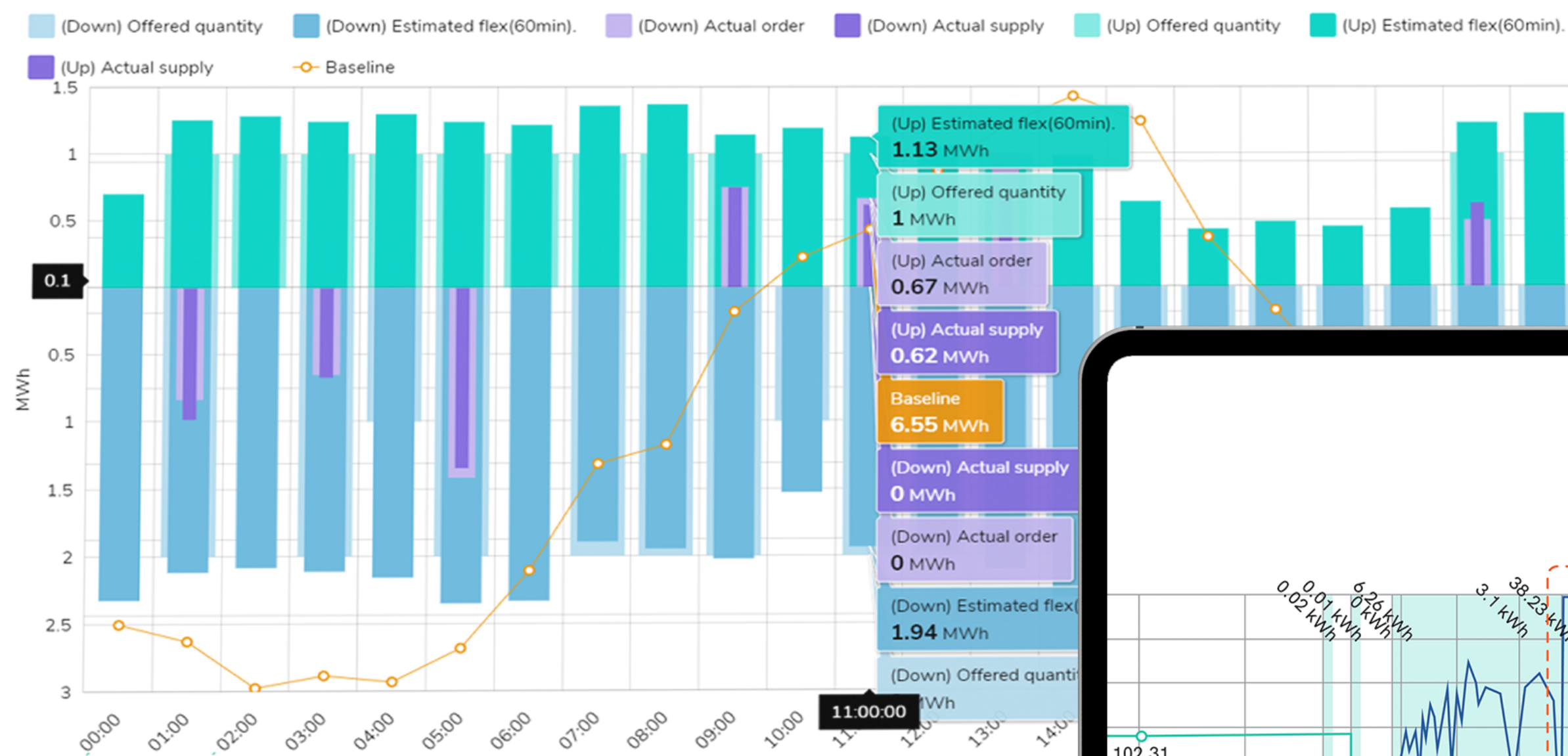


# Business case 1: Ancillary services to TSO

## Energy flexibility

2023-09-21

Yesterday | Today | Tomorrow





## Business case 2: Imbalance reduction



Reducing the imbalance in a power utility's production and consumption portfolio.

### Prerequisites

- **Scalable integration** with monitorable assets
- **Real-time** telemetry of assets

### Optional

- **TSO integration** for improved schedule accuracy



# Business case 2: Imbalance reduction



Fusebox

energy

Client

Dashboard

Metering data

Client data

Admin

Dashboards

Energy flexibility

Portfolio consumption

Clients

Partners

Contracts

Connection points

Devices

User accounts

Regulations

Scheduled regulations

Realtime regulations

Offers management

Reporting

Balance managers

Document templates

Search

Scheduled regulations

New regulation

Origin

Manual

Country

Estonia

Regul. type

Down

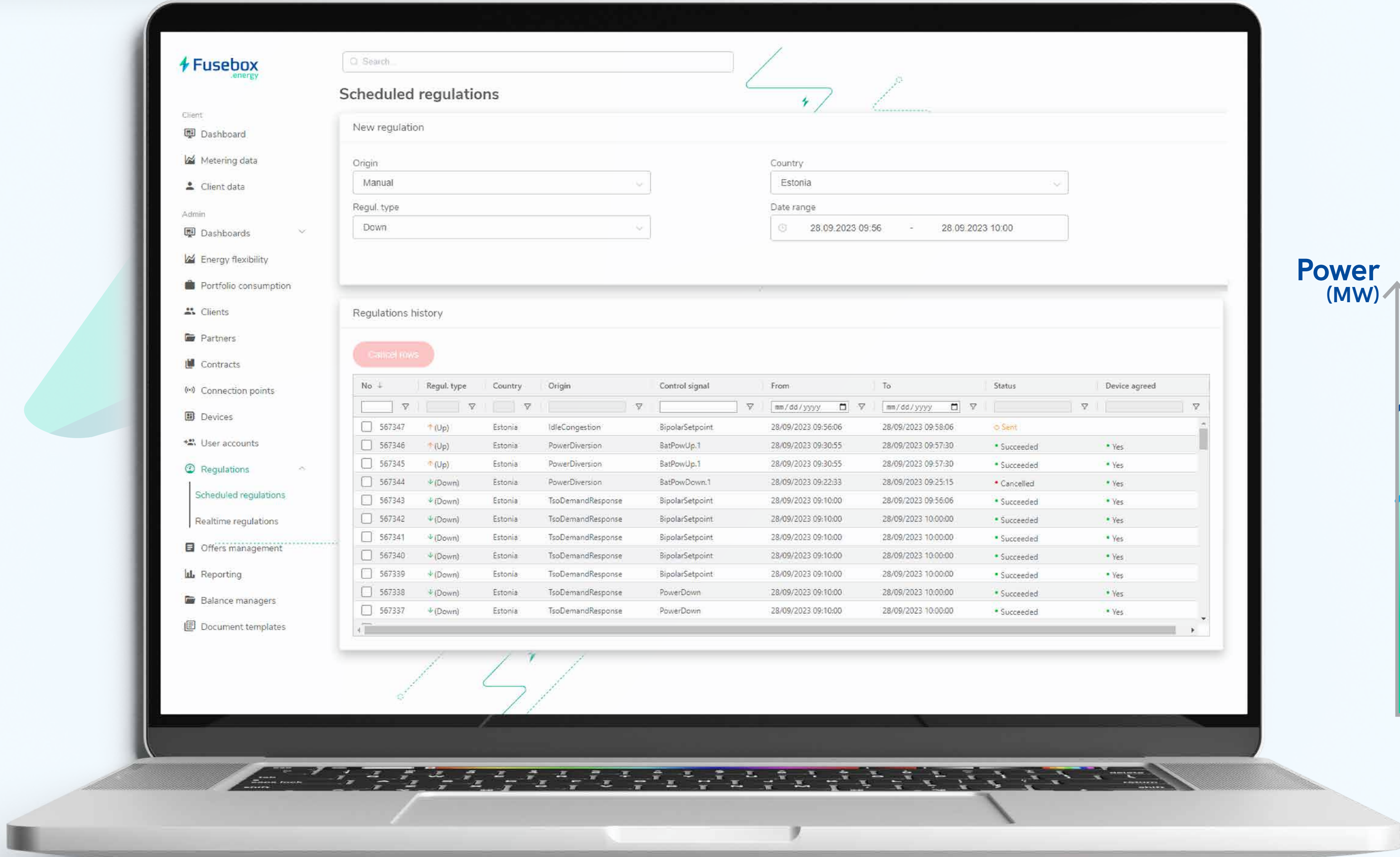
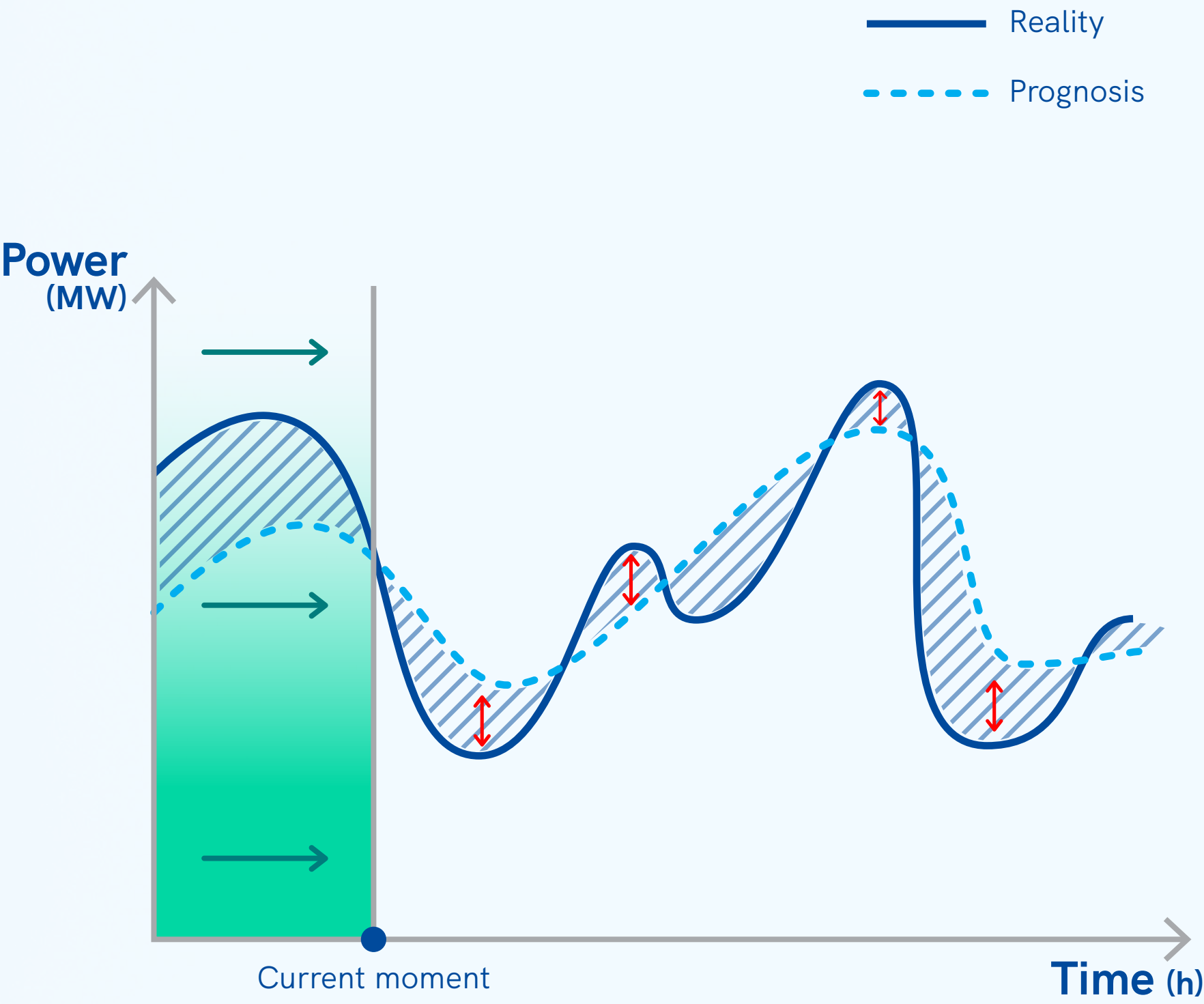
Date range

28.09.2023 09:56 - 28.09.2023 10:00

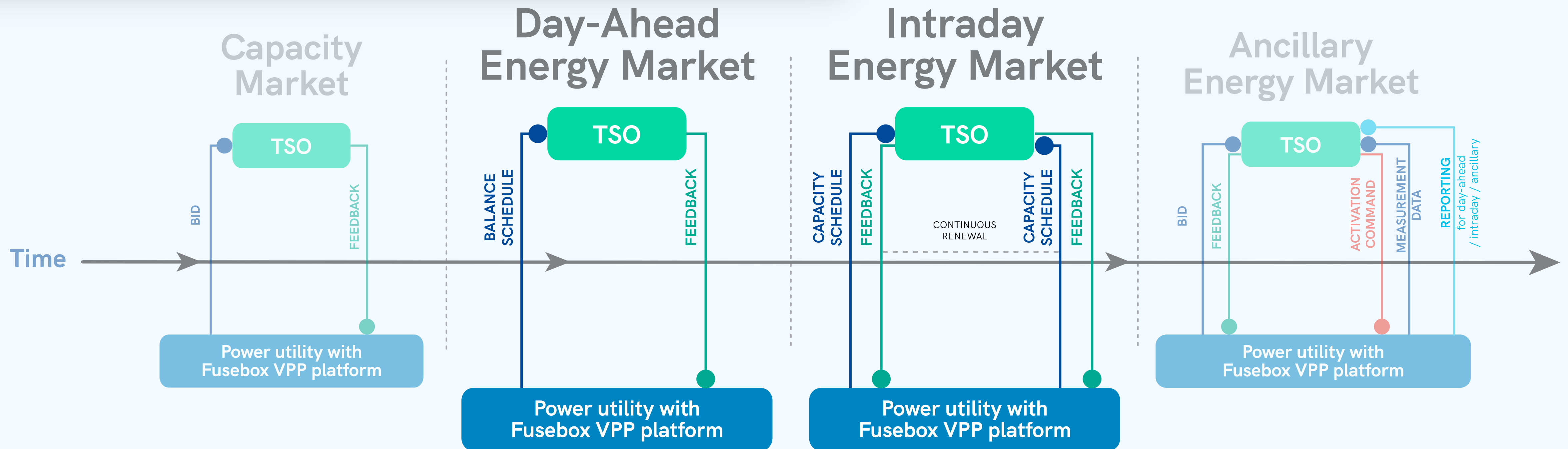
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Cancel HWS

No	Regul. type	Country	Origin	Control signal	From	To	Status	Device agreed
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567346	↑ (Up)	Estonia	PowerDiversi...	BatPowUp.1	28/09/2023 09:30:55	28/09/2023 09:57:30	Succeeded	Yes
567345	↑ (Up)	Estonia	PowerDiversi...	BatPowUp.1	28/09/2023 09:30:55	28/09/2023 09:57:30	Succeeded	Yes
567344	↓ (Down)	Estonia	PowerDiversi...	BatPowDown.1	28/09/2023 09:22:33	28/09/2023 09:25:15	Cancelled	Yes
567343	↓ (Down)	Estonia	TsoDemandResponse	BipolarSetpoint	28/09/2023 09:10:00	28/09/2023 09:56:06	Succeeded	Yes
567342	↓ (Down)	Estonia	TsoDemandResponse	BipolarSetpoint	28/09/2023 09:10:00	28/09/2023 10:00:00	Succeeded	Yes
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567337	↓ (Down)	Estonia	TsoDemandResponse	PowerDown	28/09/2023 09:10:00	28/09/2023 10:00:00	Succeeded	Yes



## Business case 2: Imbalance reduction



### VPP platform technical capabilities *(fully automated)*

- Situational overview of production and consumption assets that usually contribute to imbalance
- Asset group scheduling and control capability
- Automated data exchange with TSO for sending balancing and capacity reports

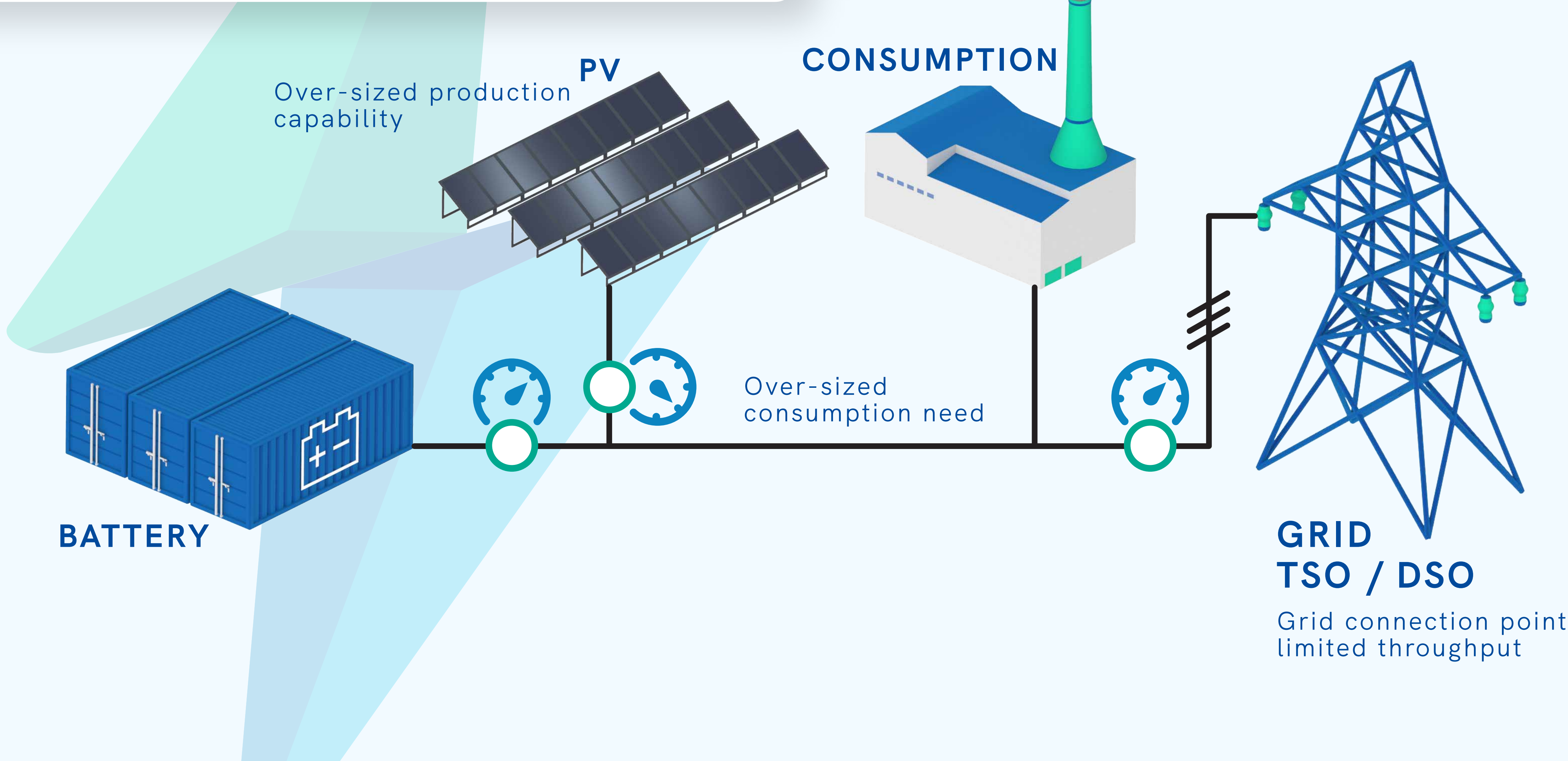
### Results

- Reduction of imbalance costs
- Continuous overview of portfolio's consumption and production



# Business case 3: Energy arbitrage

Behind the meter model



## Business case 3: Energy arbitrage



Generating additional income through energy arbitrage, with revenue sharing for asset owners.

### Prerequisites

- Energy storage capability
- Real-time telemetry connections with (TSO and) assets

### Optional

- Cooperation between renewable and demand-side resources (small & medium-scale assets)
- TSO integration for improved arbitrage via ancillary services for increased price difference



## Business case 3: Energy arbitrage



### VPP platform technical capabilities *(fully automated)*

- Activate energy arbitrage scheduling based on prices
- Implement reporting and billing
- Consider PV and wind production in operation choices

### Results

- Increase revenue
- Maximized earnings by managing energy market volatility and balancing services
- Revenue-sharing with asset owners
- Reduce client churn
- Attract new customers

## Business case 4: Minimizing Energy costs

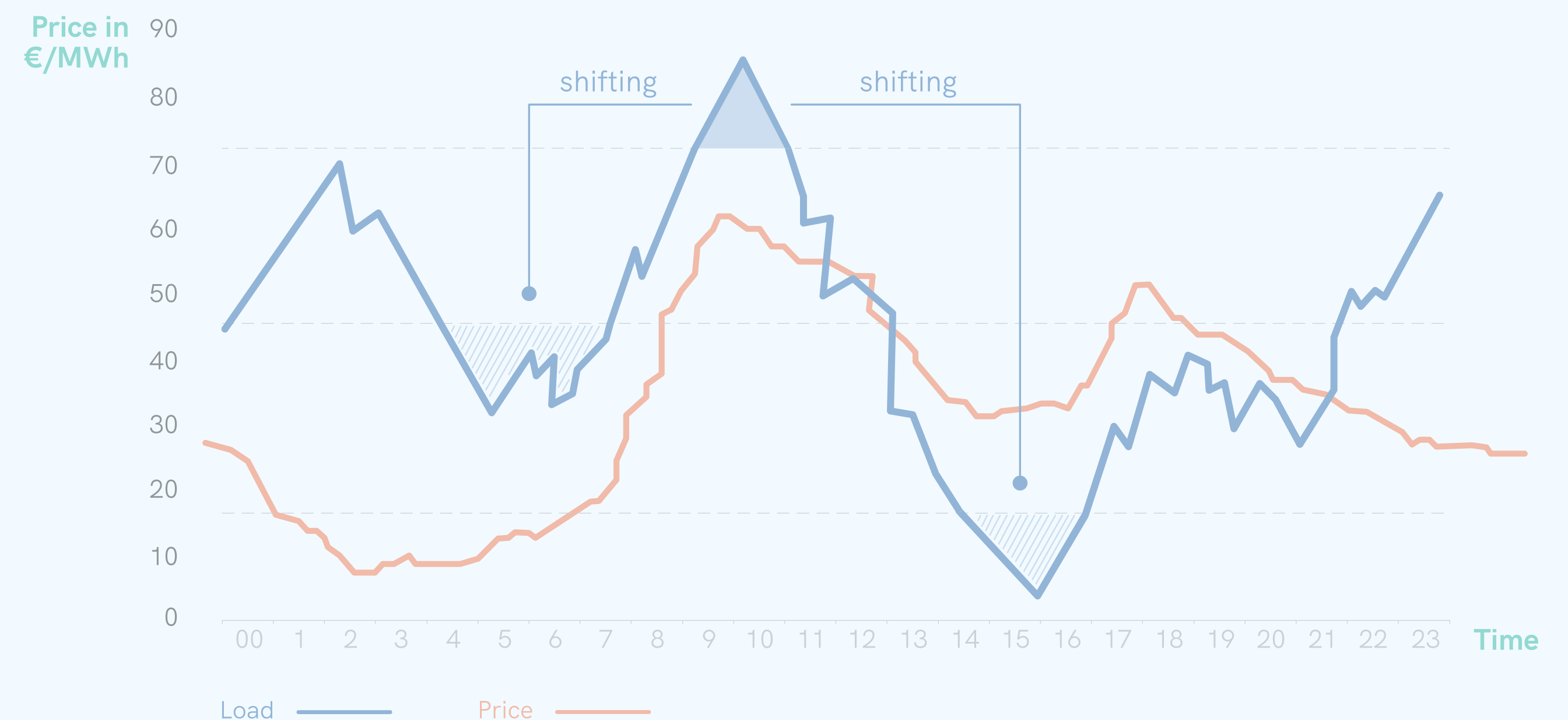


### VPP platform technical capabilities *(fully automated)*

- Optimization module considers energy prices and technical constraints
- Utilizes energy price data
- Manages power flows and curtailment
- Automates reporting and billing

### Results

- Cost savings
- Reducing client churn
- Attracting new customers





## Business case 4: Minimizing Energy costs

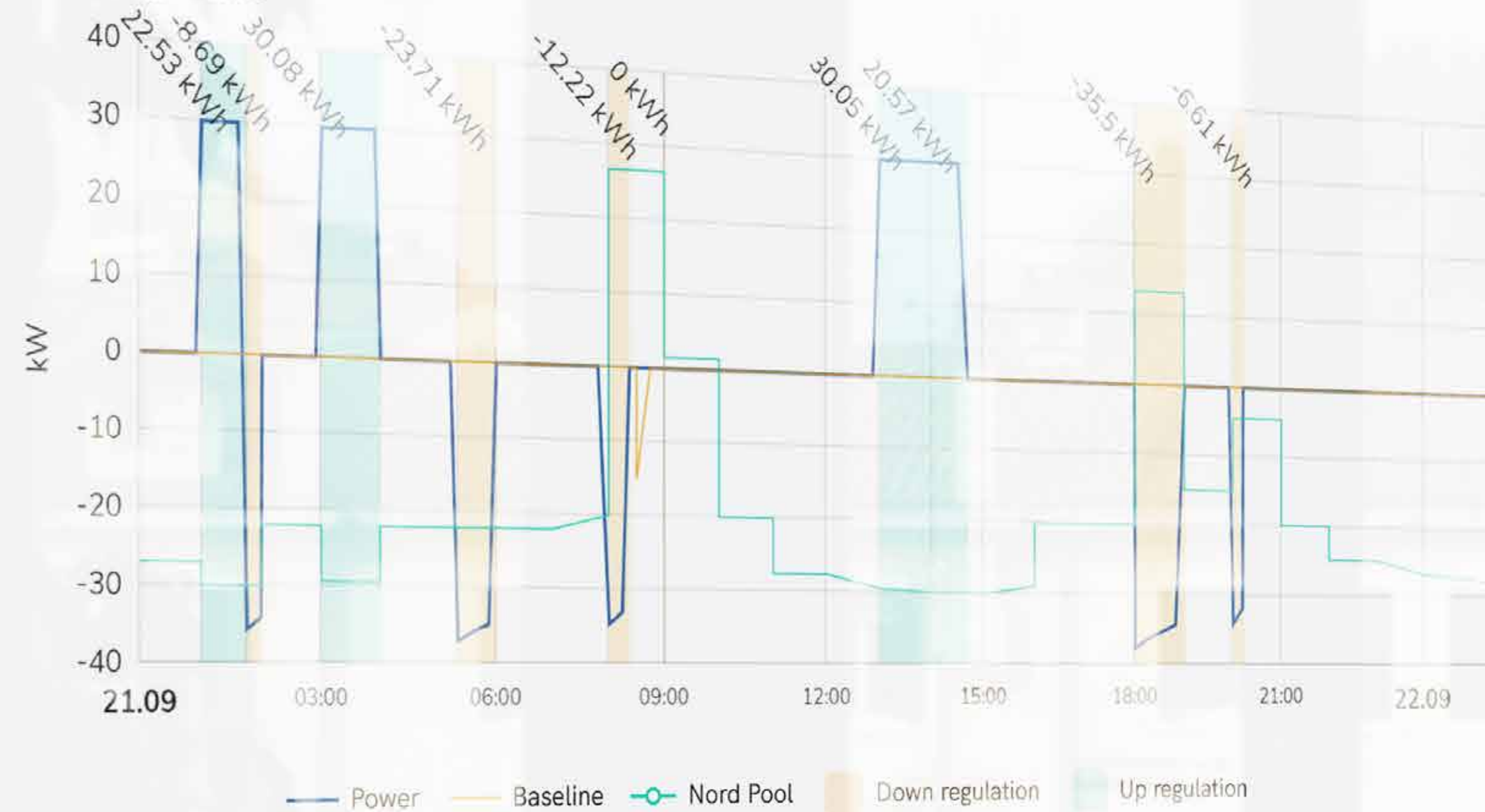


Minimizing energy costs by peak shaving and load shifting (demand response).

### Prerequisites

- Utilization of Controllable demand side Assets (Medium and Small-Scale)
- Real-time Telemetry Integration with Assets

## Metering data



Business case 4:  
Minimizing Energy costs

# Integration alternatives

## Fusebox Industrial and Residential Gateway Controllers

(LAN, 4G, WiFi)

- ⚡ Process controller independent
- ⚡ Communication over secure MQTT protocol
- ⚡ Supports industrial fieldbuses (e.g. ModbusTCP)

## Cloud-to-Cloud Building Management System (BMS)

- ⚡ Schneider
- ⚡ Siemens
- ⚡ Fidelix
- ⚡ ARE Cloud
- ⚡ ABB
- ⚡ ... and many others

## OEM API integration

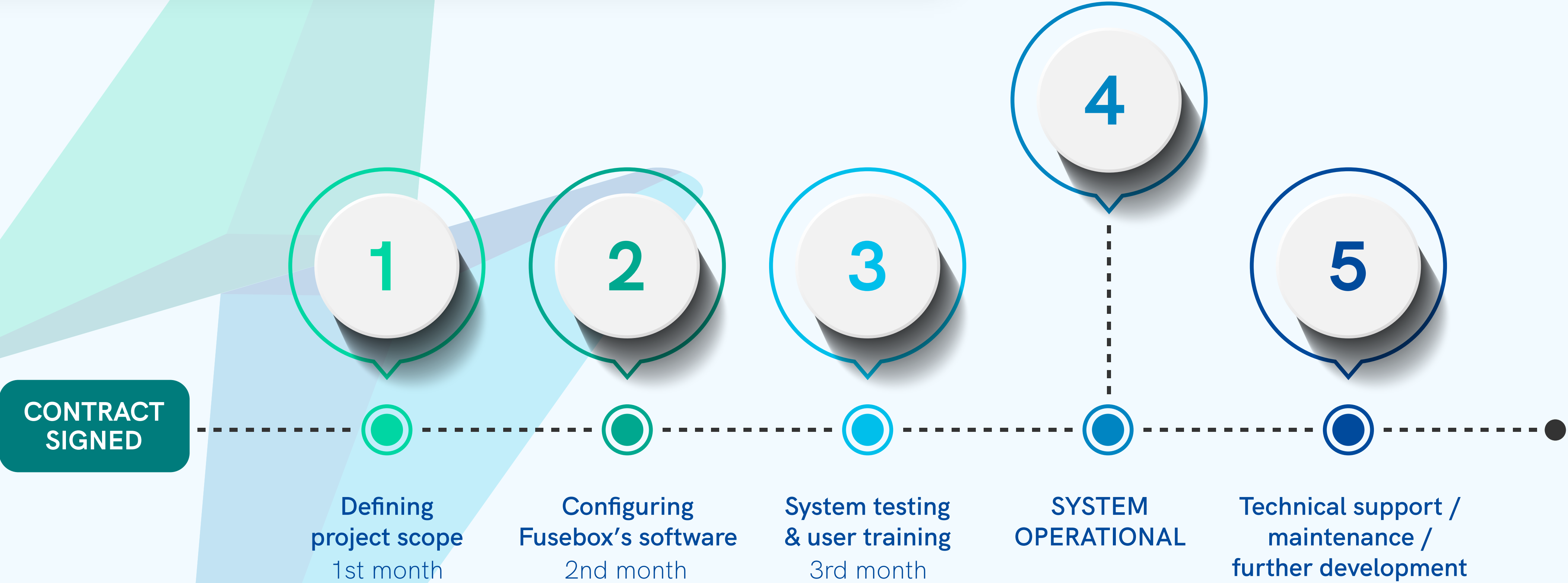
- ⚡ Manufacturer specific API
- ⚡ E.g. Huawei, SolarEdge, GoodWe

## API aggregator integration

- ⚡ eNode
- ⚡ Telematica
- ⚡ EV Energy
- ⚡ ... and many others



# Onboarding process timeline step by step



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# Norway Grants „Green ICT“ program

This project aims to reduce energy sector carbon intensity while increasing the energy system's efficiency.

**Project name:** Demand response combination with energy storage systems for Denmark

**Amount of support:** 149 019,49 €

**Implementation period:** 01.02.2023 – 30.04.2024

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**Project aim:** To introduce Fusebox SaaS platform for energy market operations in Danish market through a pilot, to unlock their flexibility and lower/postpone energy consumption to balance the grid.

By utilizing energy storage and client demand flexibility the project aims to reduce energy sector carbon intensity while increasing the efficiency of the grid



**Fusebox**

**Thank you!**

**Interested to know more?  
Drop us a line**

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