smartgridOne

ENIRIS

Technical Presentation - C&I + Utility - Europe Region - 22102025

Overview

- Introduction
- Our Solution
- Technology
- Market Access & Services
- Commissioning & Ease of Use
- Management & Monitoring
- USP’s
- Impact & Use Cases

Chapter 1

Introduction

Who we are

Eniris is an international company headquartered in Belgium, with branch offices in the Netherlands, Switzerland and Germany.

Founded in 2018, Eniris developed the SmartgridX platform for managing various energy assets. Building on this, Eniris BMS was developed to monitor buildings and their energy flows. In 2020, Eniris launched SmartgridOne, an advanced energy management system.

Today, Eniris connects over 135.000 residential and 13.200 commercial installations worldwide, covering more than 250 brands, establishing itself as a leader in energy monitoring and management.

+135.000 residential installations

+13.200 C&I installations

The challenges in the energy market

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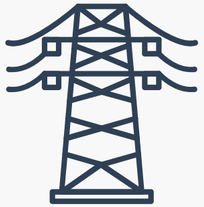
Lack of orchestration between energy technologies



Shortage of grid capacity

Inaccessibility to energy markets (eg. assets are too small)

Lock-ins from energy suppliers

Lock-ins from manufacturers

No brand identity

Suboptimal usage of renewables

High investment costs

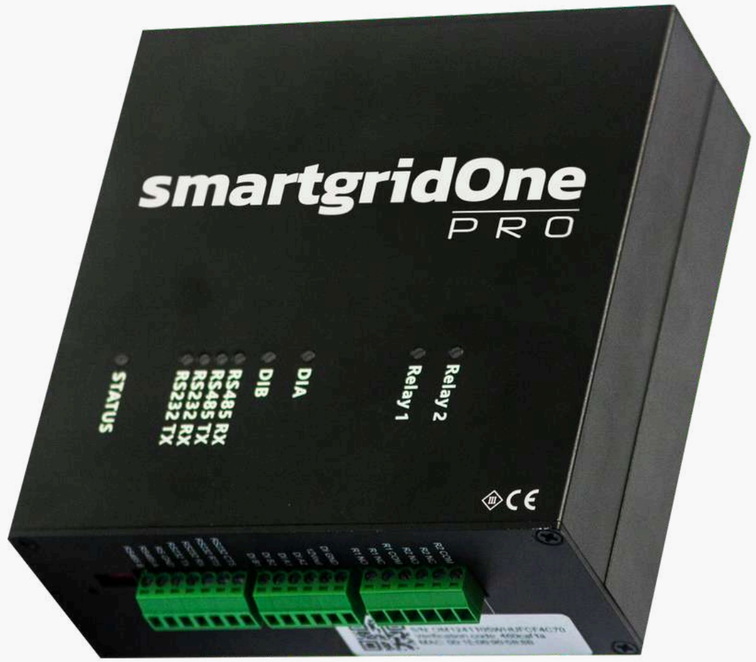
Chapter 2

Our Solution

What is SmartgridOne?

SmartgridOne is available either as a device or as a cloud-based solution, that optimizes all your energy devices.
It takes dynamic energy prices into account and enables self-consumption optimization, load balancing, and peak shaving - allowing customers to automatically maximize savings.

- Access to various energy markets, including imbalance, FCR, aFRR, mFRR, intraday, and day-ahead.
- Local optimization for peakshaving & self consumption based on AI forecasts
- Curtailment at negative energy prices
- VPP enablement
- Simultaneous control of multiple devices via RS485 or Modbus TCP.
- Whitelabel EMS, mobile app & web portal



Why SmartgridOne?

The Most Open EMS – Supporting Over 250 Integrations!

https://docs.eniris.be/category/overview/

Why SmartgridOne?

smartgridOne
ENIRIS

Access to various energy markets

ENGIE
epexspot
elia | Elia Group
SCHOLTenergy
bee
frank energie
EUROPEAN
Eneco
yuso
NIEUWE STROOM energie voor slimme ondernemers
edmij
luminus

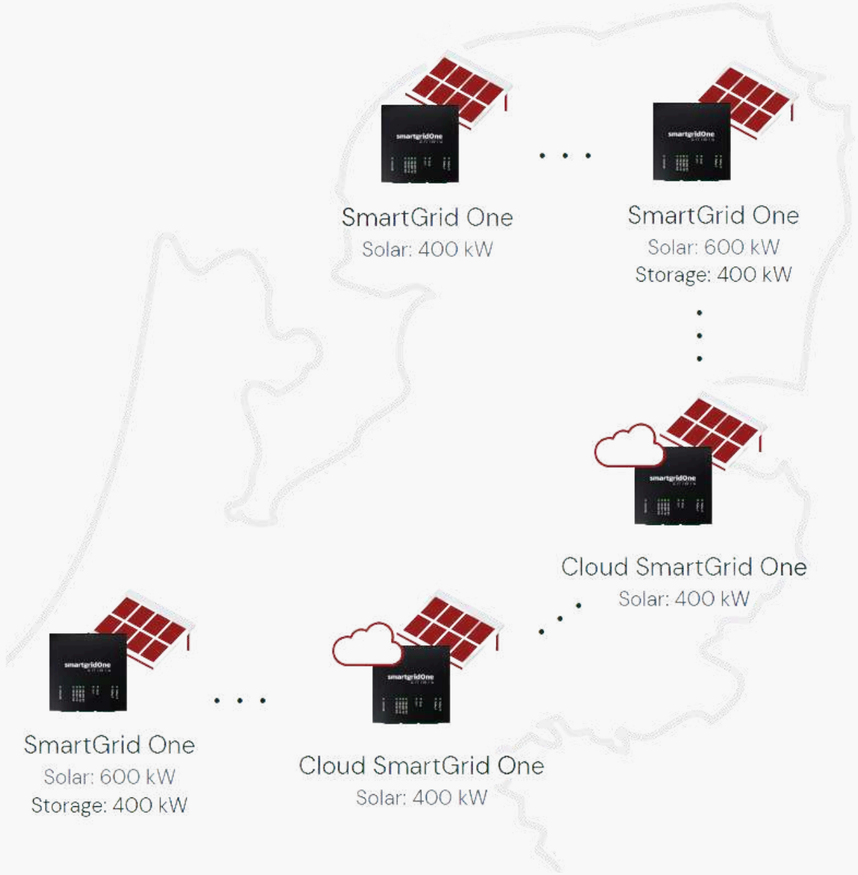
Unlock energy market revenue with your installations

- Day-Ahead Trading
- Imbalance Markets
- Ancillary Services

All profits go to you

Why SmartgridOne?

Virtual Power Plant

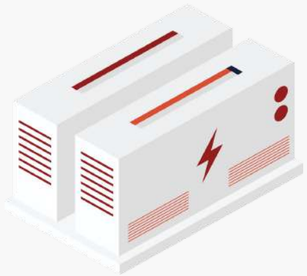


How it works

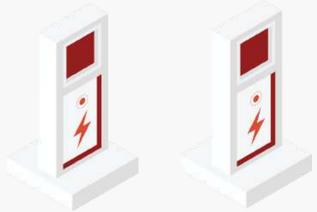
SmartgridOne

Online Portal & Mobile APP

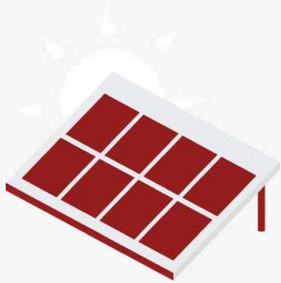
The Grid



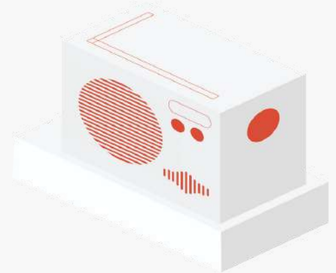
Home Batteries & BESS



Charging stations



Solar Inverters



Heat pumps
Air conditioners
Electric boilers

Innovation & recognition

Our company has been honored with the **Best Innovation Award** at Solar Solutions 2024 for our product, the Smartgrid Controller.

SOLARSOLUTIONS
BEST INNOVATION AWARD 2024

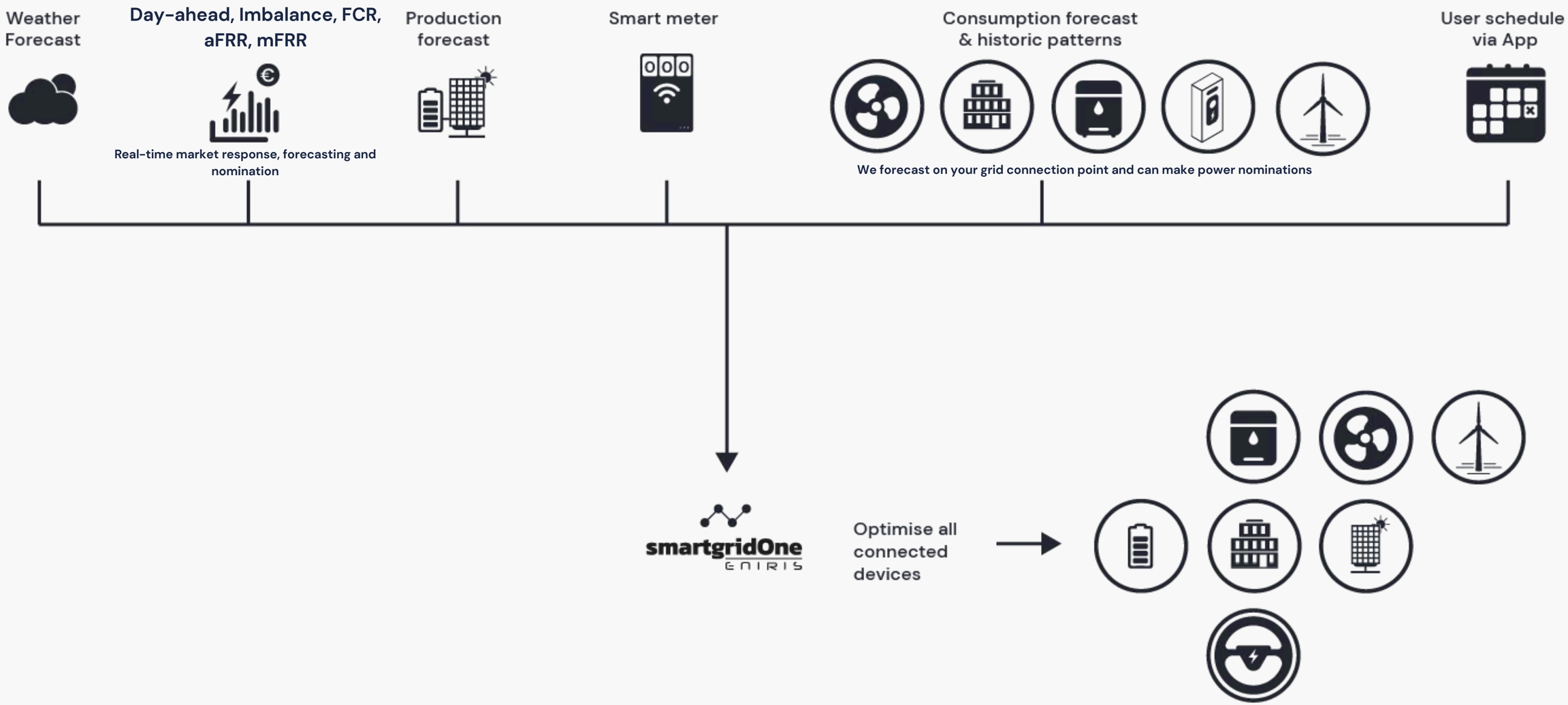
Chapter 3

Technology

Hardware

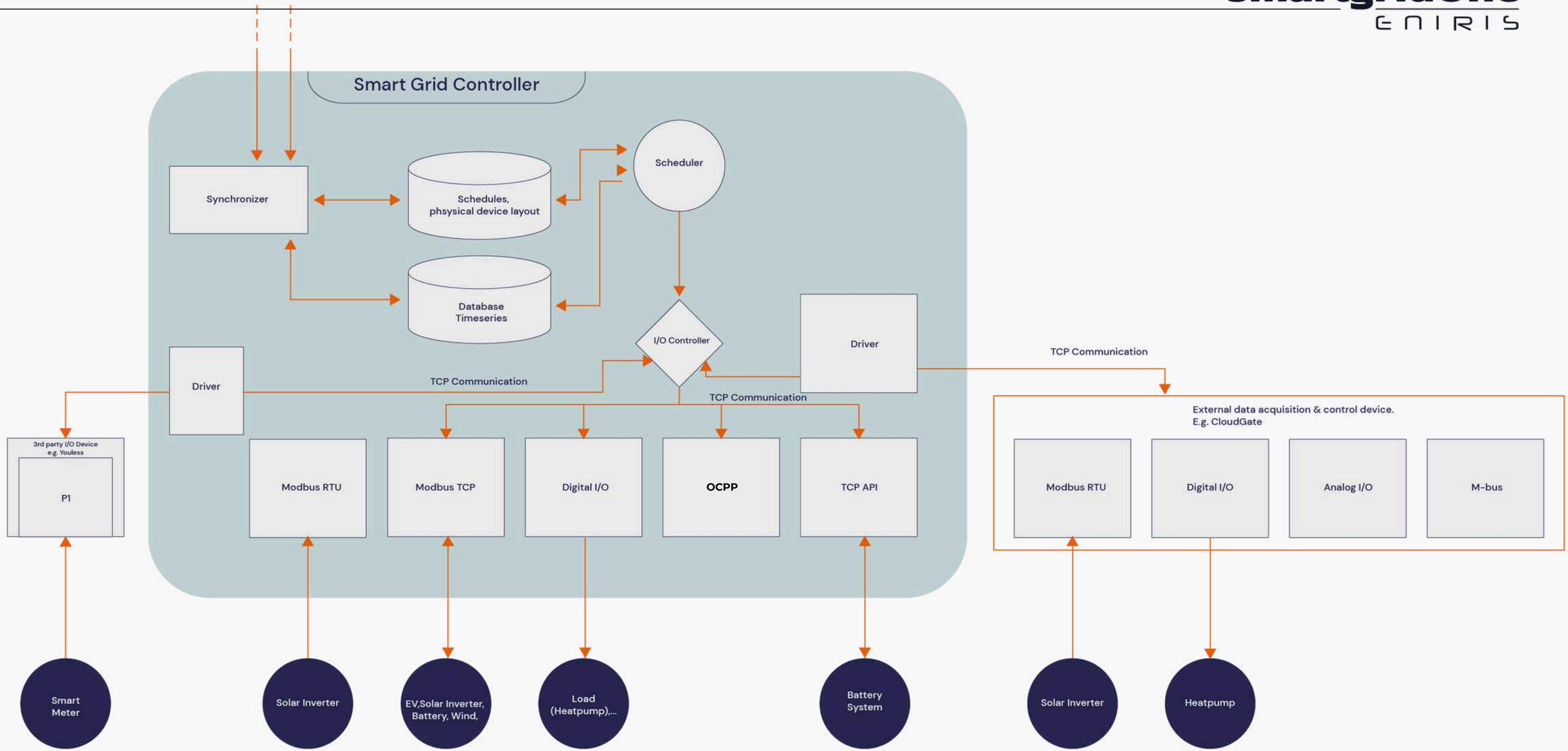
Specifications	
Housing	Suitable for DIN rail and wall mounting
Dimensions	127mm x 125mm x 51mm
Weight	350g
Ambient temperature	0°C -> +60°C Option: -40°C -> +80°C
Power supply	Via adapter 230V
Interface Charging station, Energy meter, Battery system, PV inverter and Heat pump	Modbus TCP over RJ45 RS232 / RS485 HTTP API OCPP 1.6
Interface Digital meter	With supplied RJ11 to USB cable
Network	2 x RJ45 gigabit ethernet (configurable as ethernet bridge or 1xWAN and 1xLAN port) Option: internal 4G modem with external RP-SMA connectors for the antennas

The Software – Framework

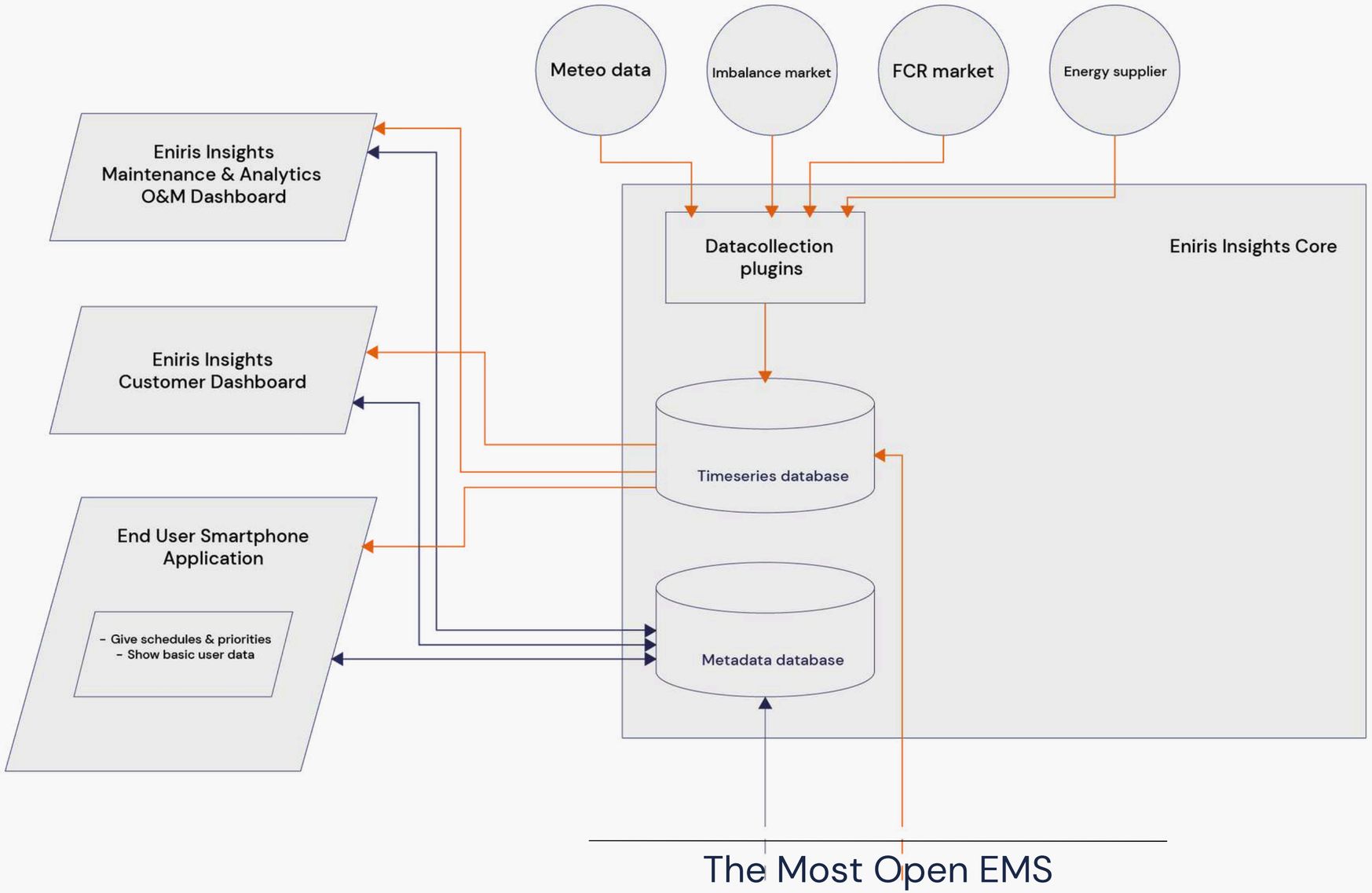


The Most Open EMS

The Software – Framework



The Software – Framework



- Reserve Markets (MFRR, AFRR, FCR)
- Power Markets (energymarkets)

The Software – Framework

Timeseries database

The timeseries database holds all historic and prediction data of the different devices that are connected to the Smart Grid Controller and things like weather prediction.
The data is stored in the Eniris Standard for the device type in question.

Metadata database

The metadata database holds all metadata related data. This includes:

- Physical device layout; which type of car, charging station, heat pump; which driver to use for communication
- Per device, which category of device it is (car, heat pump, solar installation, ...)
- Schedules for the devices.

Synchronizer

The synchronizer service is responsible for:

- Setting up and maintaining a connection with the server
- Synchronize data from the smart grid controller to the server and vice versa

The Software – Framework

Updater

Keep the smart grid controller and all services on it up to date.

Scheduler

The scheduler is responsible for live scheduling of when and how much to use each device. It holds the scheduling & control algorithms (**congestion management, curtailment,** …).

- Live scheduling of each device
- Tells the I/O controller which control commands to send to each device at any given moment.

I/O Controller

- Start & monitor drivers of devices
- Translate scheduler commands to driver commands, and push them to the driver.
- Requests monitoring data from the driver and stores this in the timeseries database.

The Software – Framework

Process monitor

Checks if everything runs fine and reboot the controller if necessary.

Drivers

Translate commands from the I/O controller to the lowest level necessary for communicating with a device or individual I/O. This may be:

- Implementing a serial protocol
- Implementing a TCP protocol
- Implementing an API
- Control digital & analog I/O's
- Implement communication with an external device on the same network.

API

Eniris also provides a Python package and a NPM package which implement the authentication flow and facilitate communication with the API.

https://authentication.eniris.be/docs/#/Authentication/accesstoken

- Access Metadata (Digital Twin)
- Access Measurements
- Control remote

Updates and new developements

- We are constantly working to improve and enhance our SaaS solution , Eniris EMS and the smart grid controller.

- One of the key benefits of our technology is that we automatically update and implement new developments as they become available. Whether it's new drivers for smart grid controllers or updates to our SaaS platform, we are dedicated to delivering the very best in technology and service.

Chapter 4

Market Access & Services

Market Access – Forecasting

Energy Demand & Weather

- We perform forecasts of consumption of your customers, utilizing specific characteristics of the connections in your portfolio as well as weather predictions.
- Our algorithms are continuously and automatically refined through the analysis of the discrepancies between predicted and actual consumption. Our goal is to provide the most accurate predictions possible, minimizing the costs of imbalances for your organization.

Market Access – Flexibility Services

Eniris enables real-time control and monitoring of flexible transactions in order to facilitate dynamic pooling.

Balancing services

- Frequency containment reserve (FCR)
- Automatic frequency restoration reserve (aFRR)
- Manual frequency restoration reserve (mFRR), directly activated mFRR (mFRRda), previously known as Noodvermogen

Wholesale

- We provide direct access to wholesale electricity markets (such as ICE, EPEX, ETPA, and the imbalance market) for the purchase and sale of electricity.

Market Access – Flexibility Services

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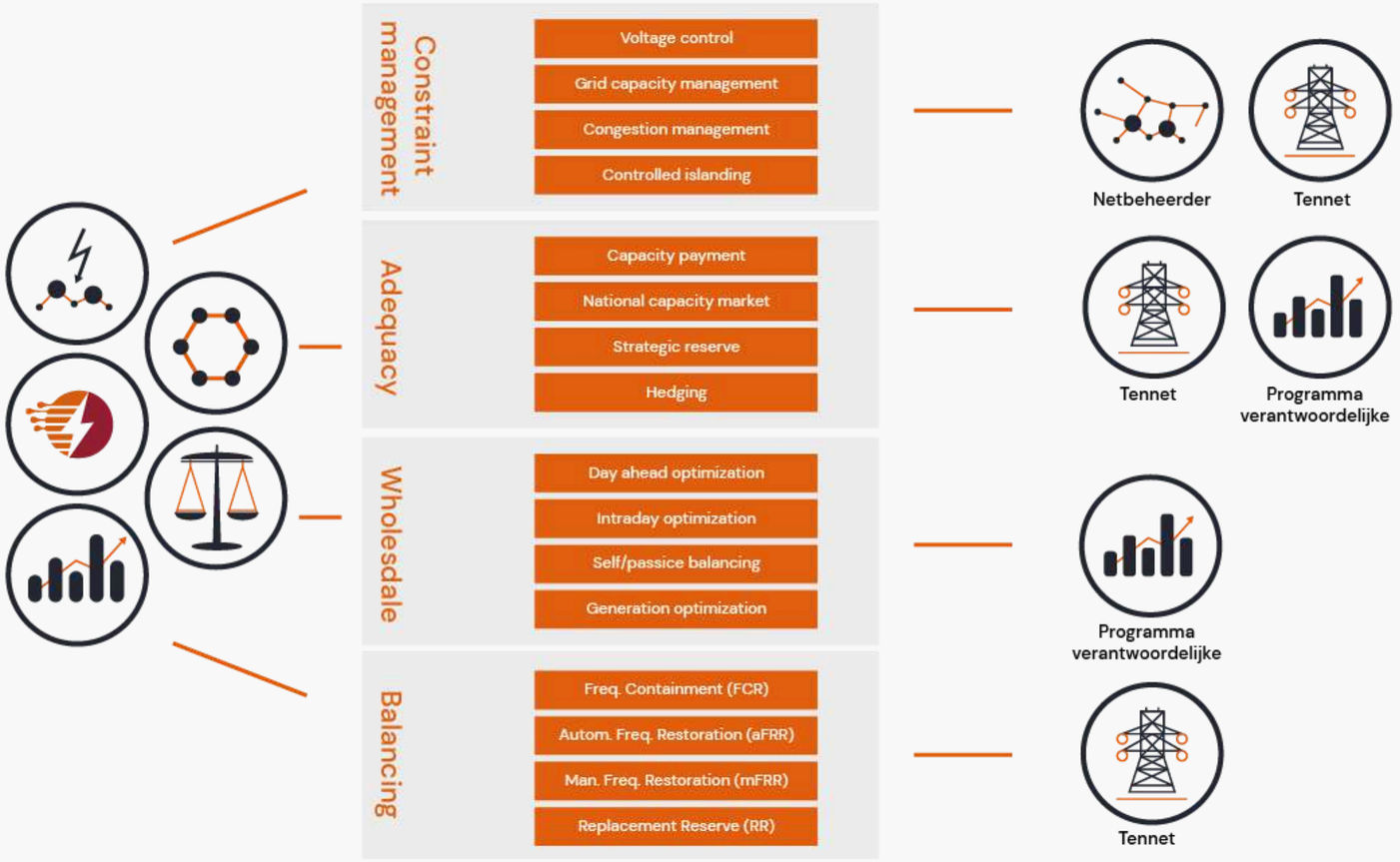

Market Access - Flexibility Services

Eniris enables real-time control and monitoring of flexible transactions in order to facilitate dynamic pooling.

Transaction processing

- We handle all transactions made on the market on your behalf. However, you may also be engaging in transactions with third parties, which we allocate to your portfolio and incorporate into the E-program sent to TenneT.

Market Access

Direct Marketing

For communication between **direct marketers** and **PV plants**.

The Smart Grid Controller can receive reduction commands from the direct marketer and report the current production.

#energy supplier #direct marketing

Feed-in Management

Active and reactive power commands and response signals are processed.

For ex. some grid operators use Modbus TCP for feed-in power management.

#curtailment

Chapter 5

Commisioning tool

Commissioning Tool

The commissioning tool is the tool used by installers on-site or can be accessed remotely by your team to configure and commission installations, making them ready for use.

Commissioning Tool

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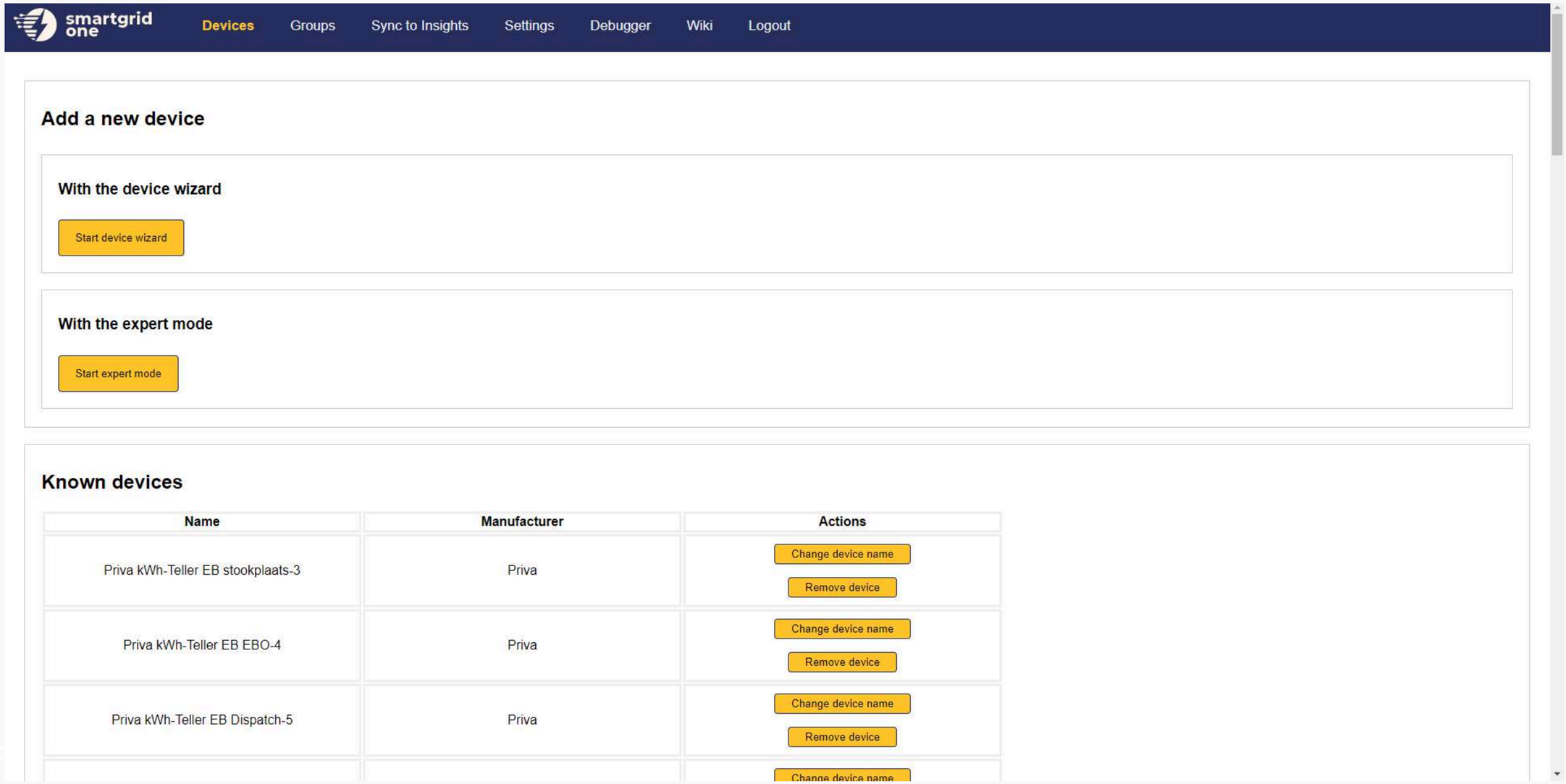

Userinterfac

Commissioning Tool

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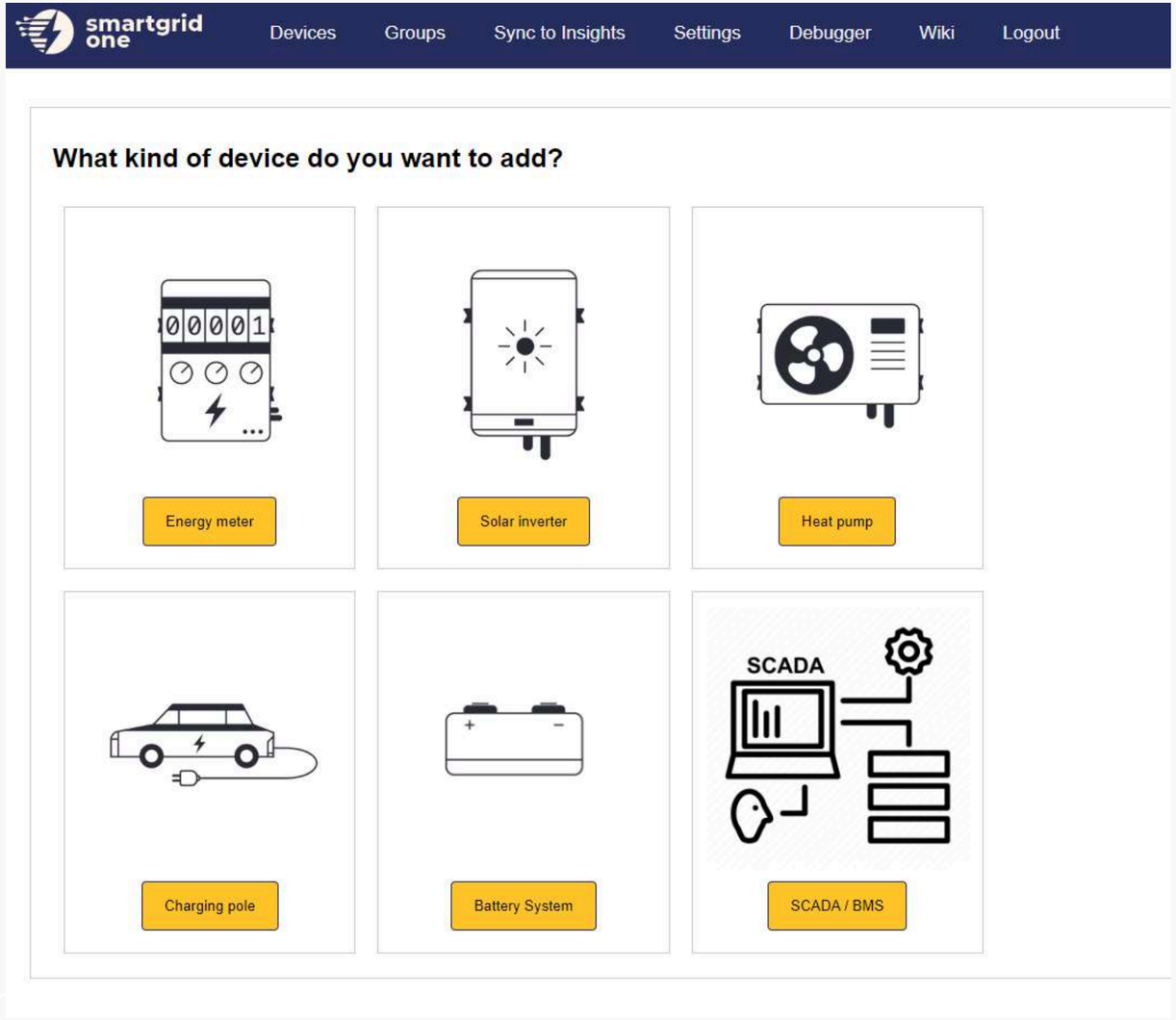
ENIRIS



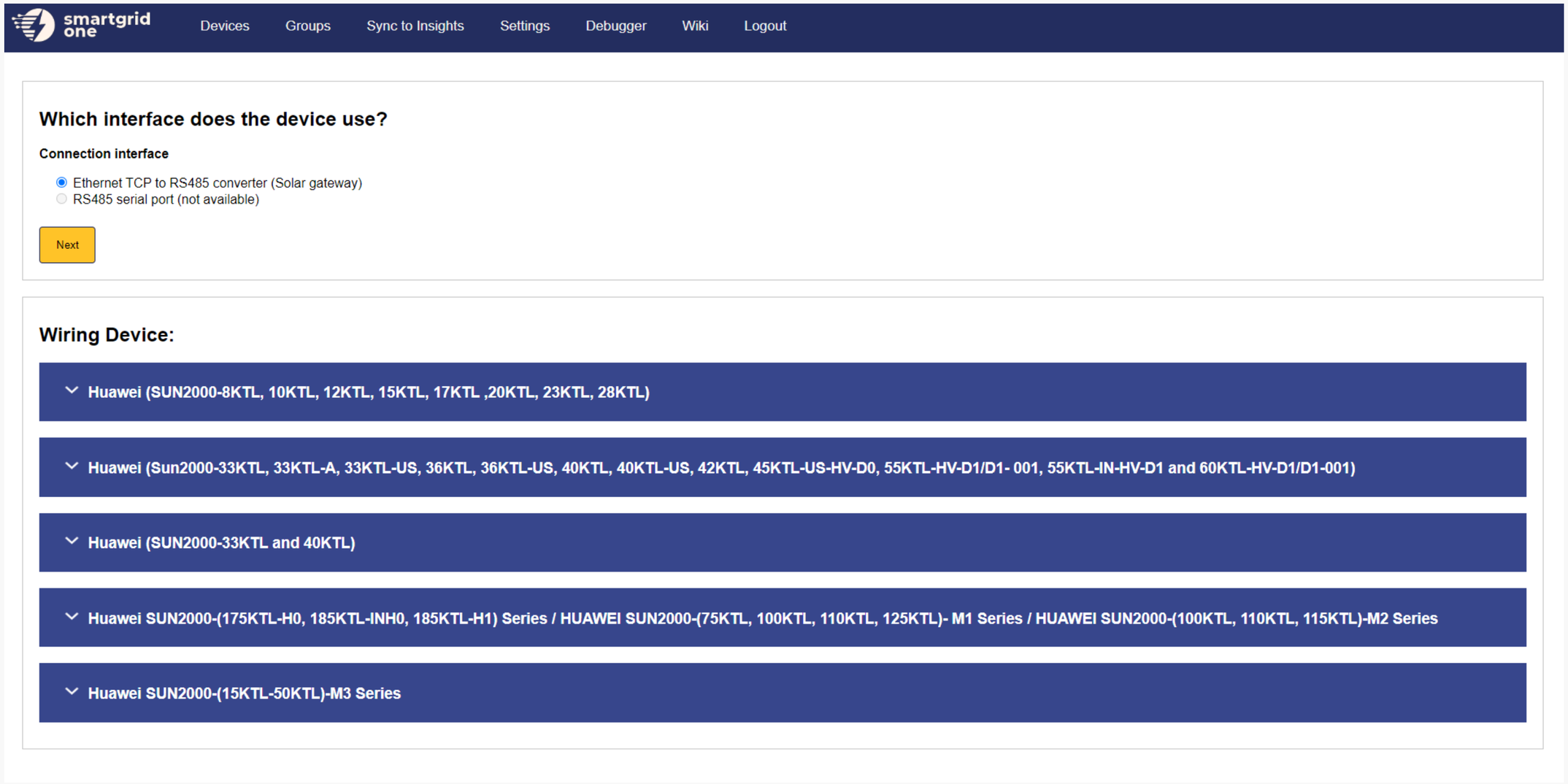
Userinterface developped for Energy Ki

Commissioning Tool

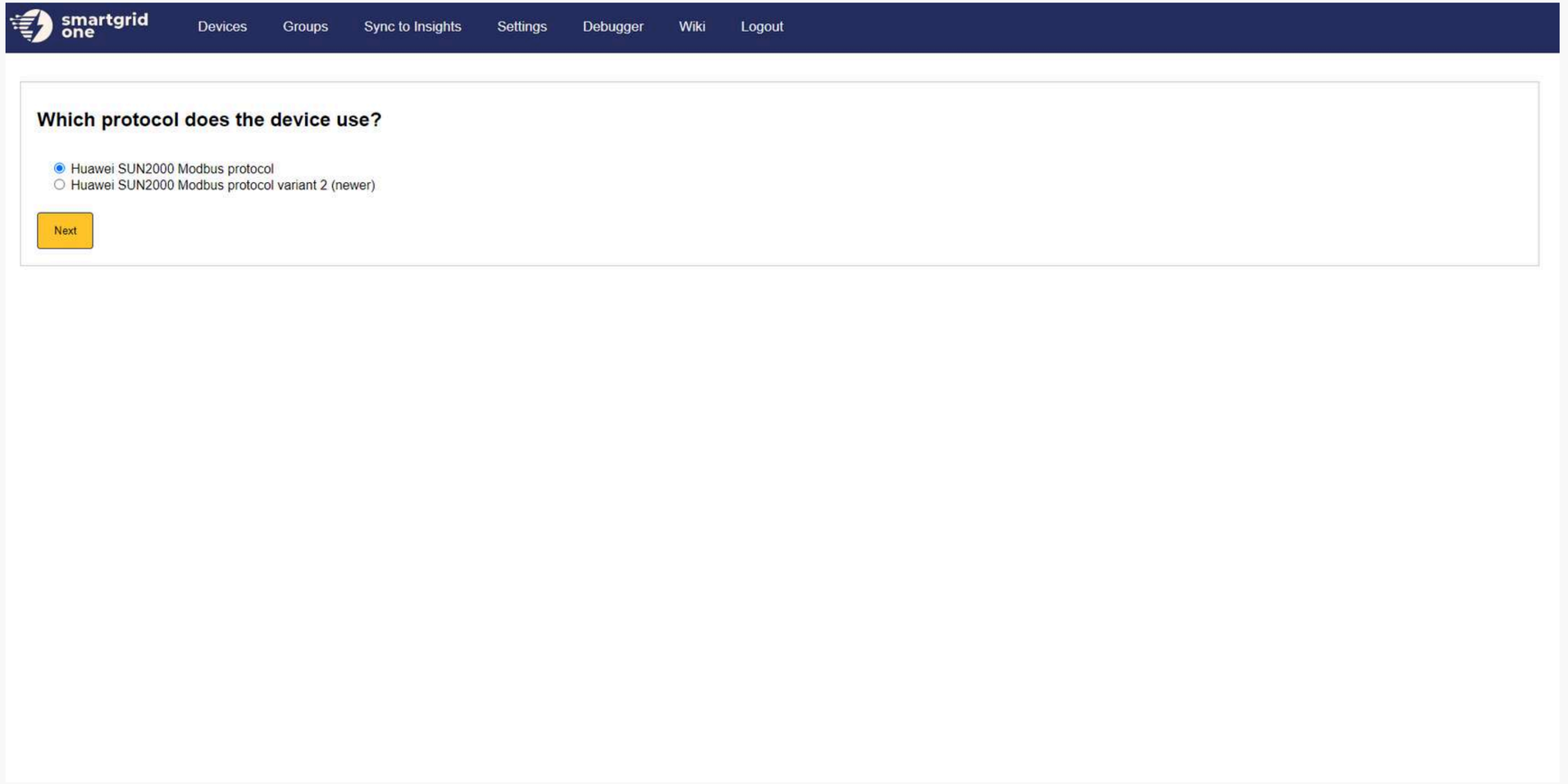
A summary of our current integrations can be found at: https://docs.eniris.io/category/overview/

Commissioning Tool

smartgridOne
ENIRIS

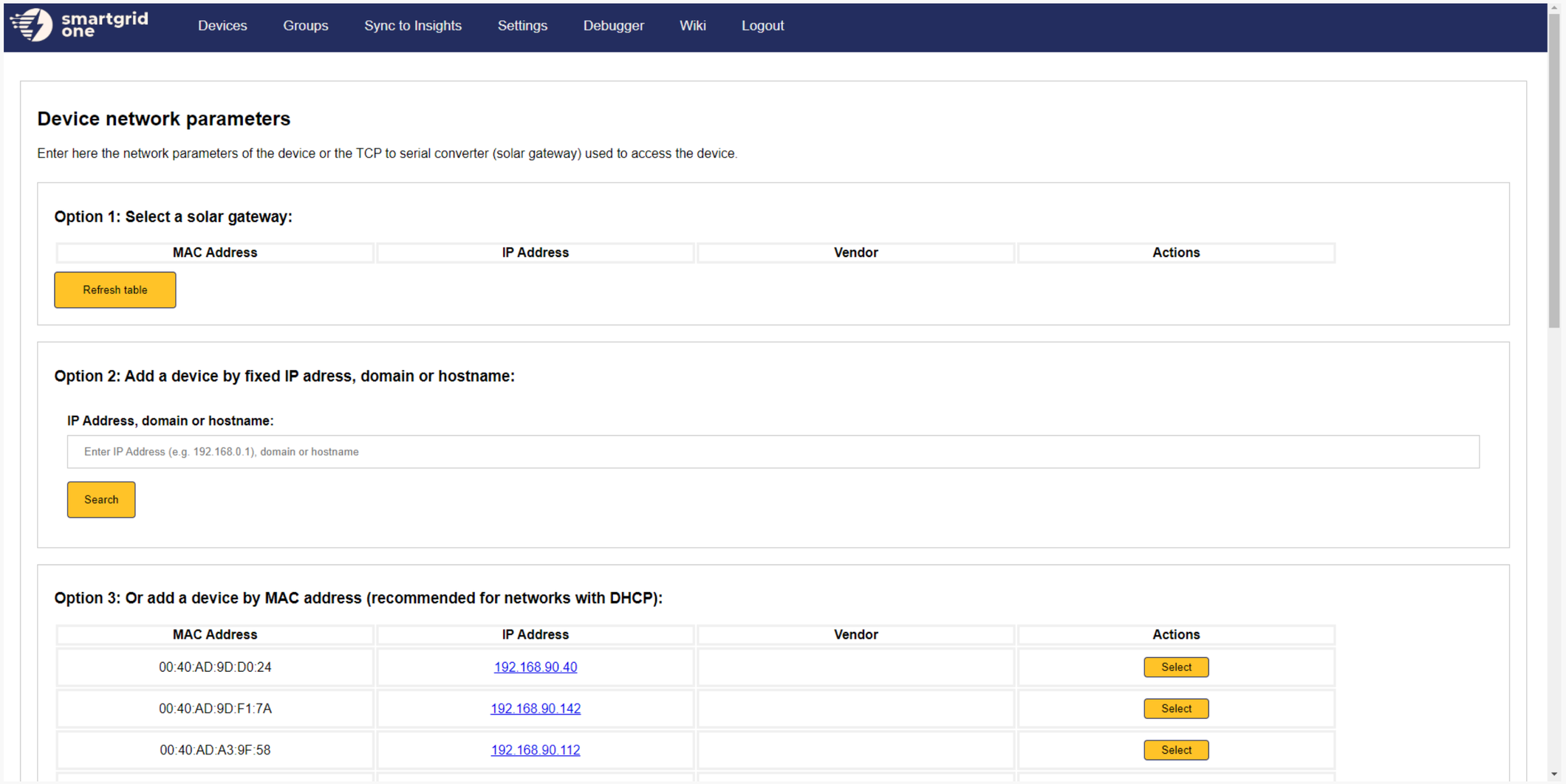


Commissioning Tool

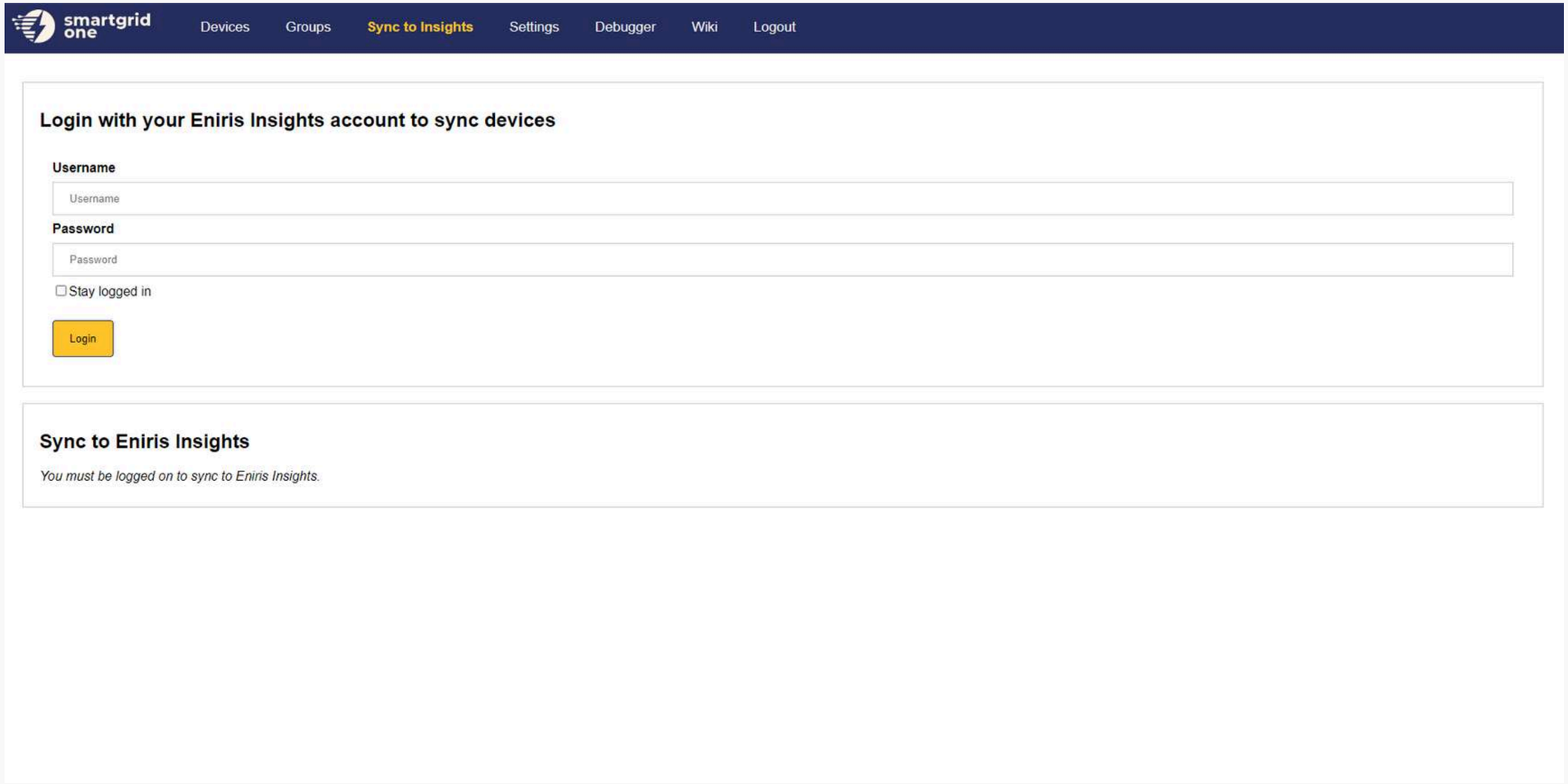


Commissioning Tool

smartgridOne ENIRIS



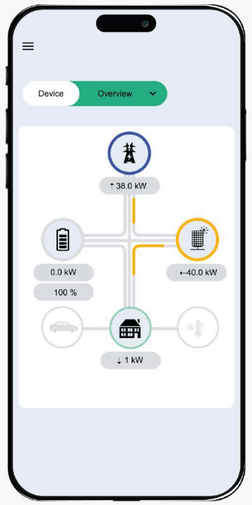
Commissioning Tool



Chapter 6

Dashboard & APP

User dashboard, APP



Mobile APP

Reports

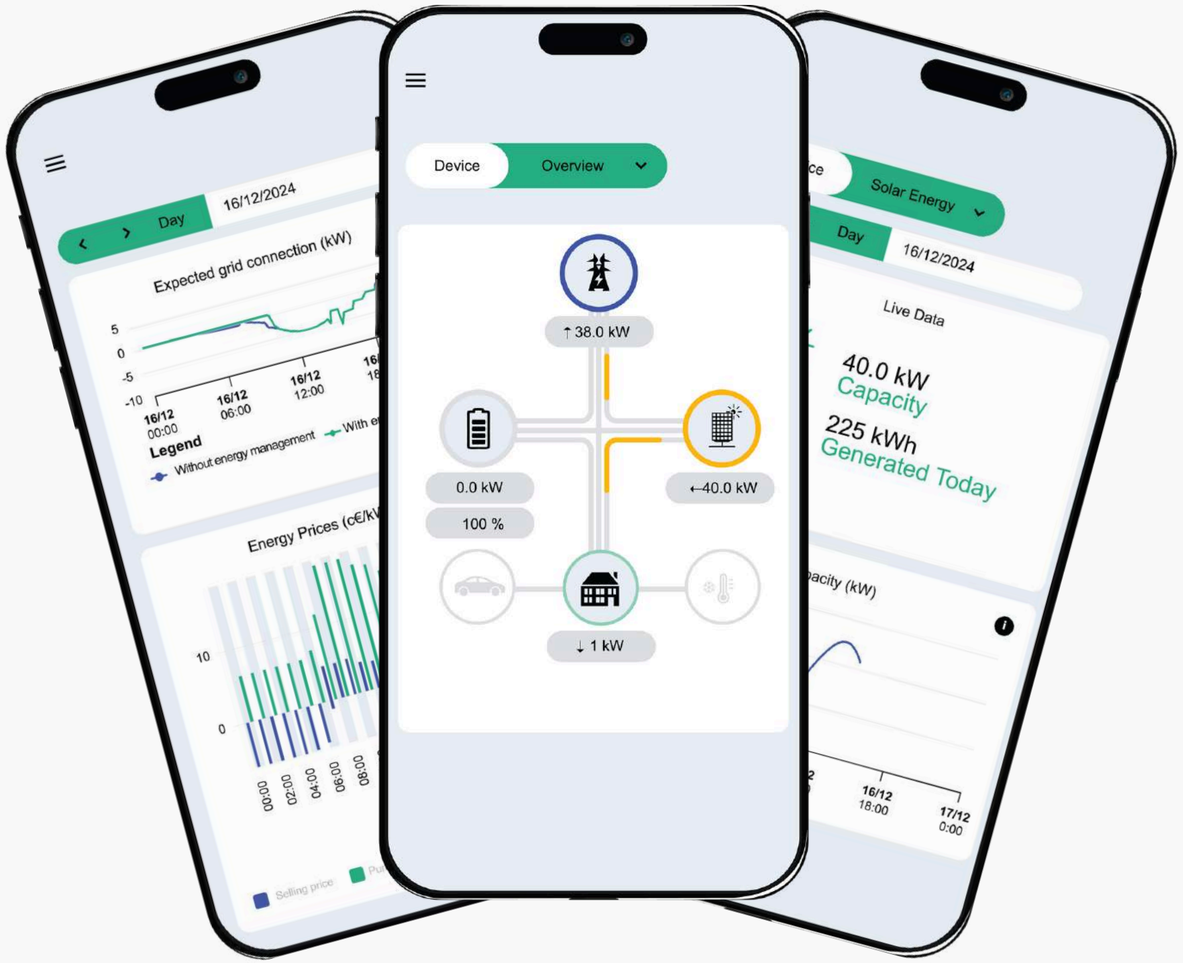
Online Portal

Narrowcasting

- Track your savings or set your preferences via the app
- Get monthly reports via mail
- Manage your whole portfolio of energy techniques as O&M-manager
- Show your impact on the big screen with our narrowcasting solution

User dashboard, APP

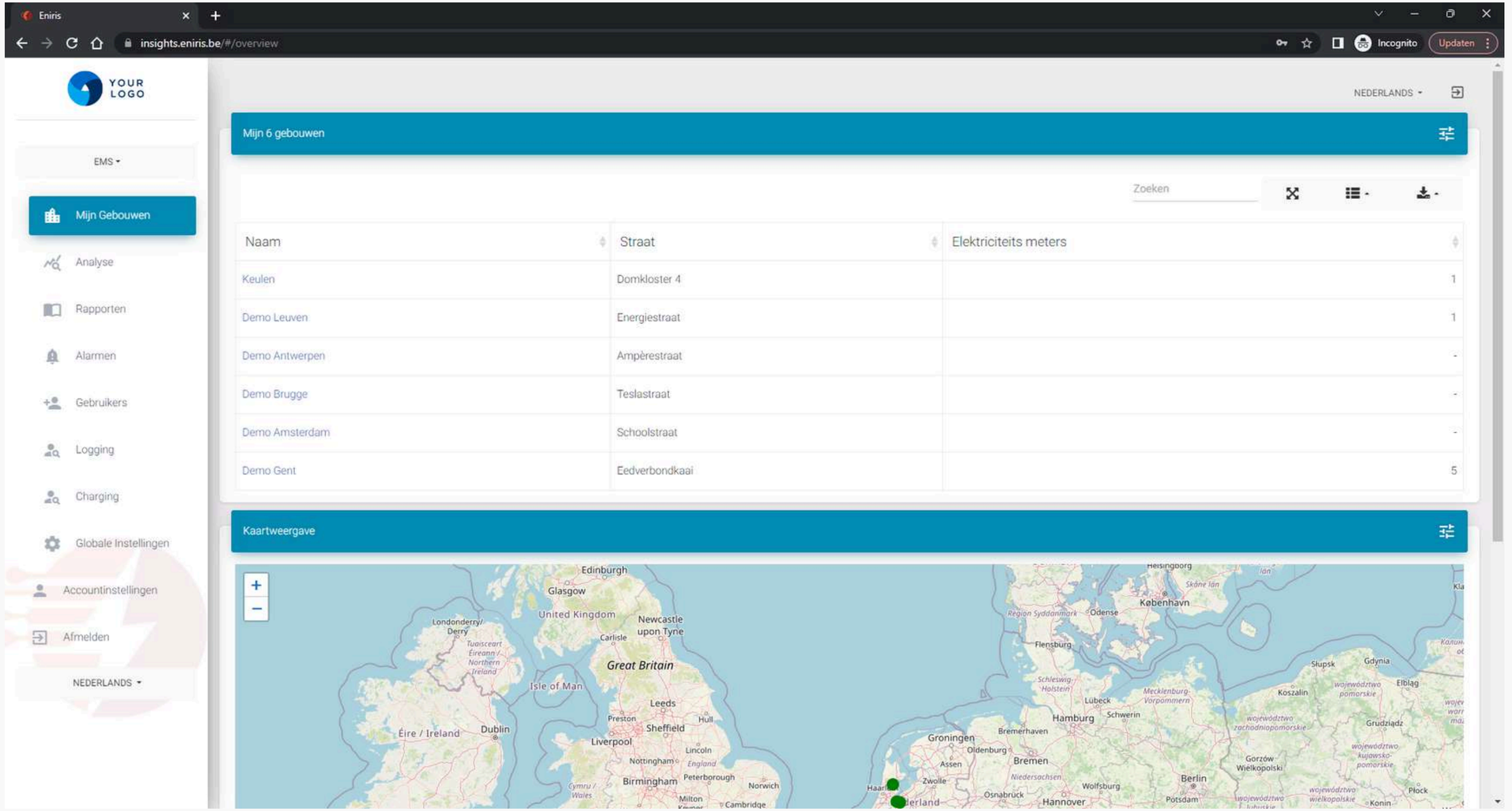
User interface (on a smartphone – iPhone & Android)



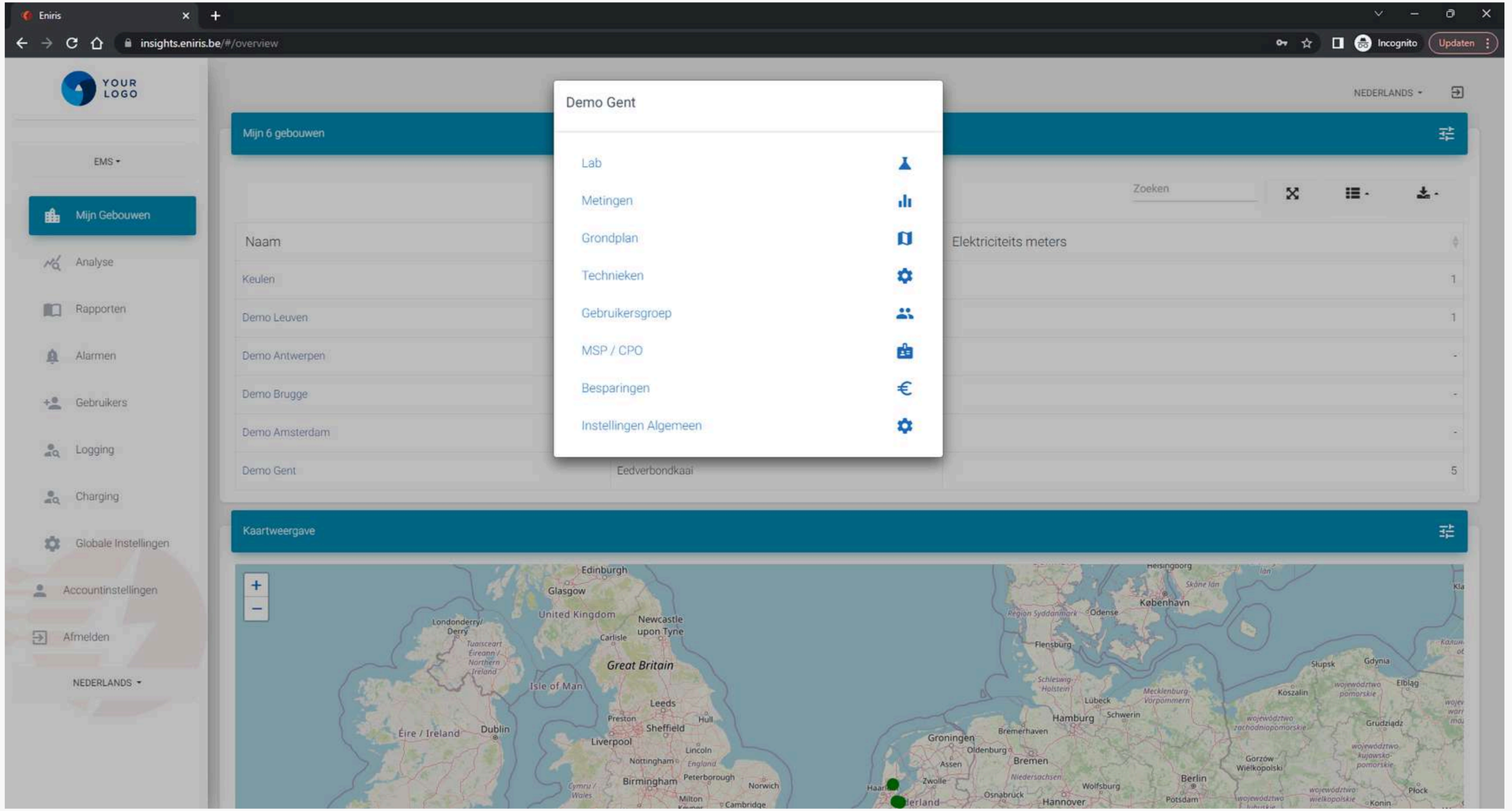
Link to Apple App Store

Link to Android Play Store

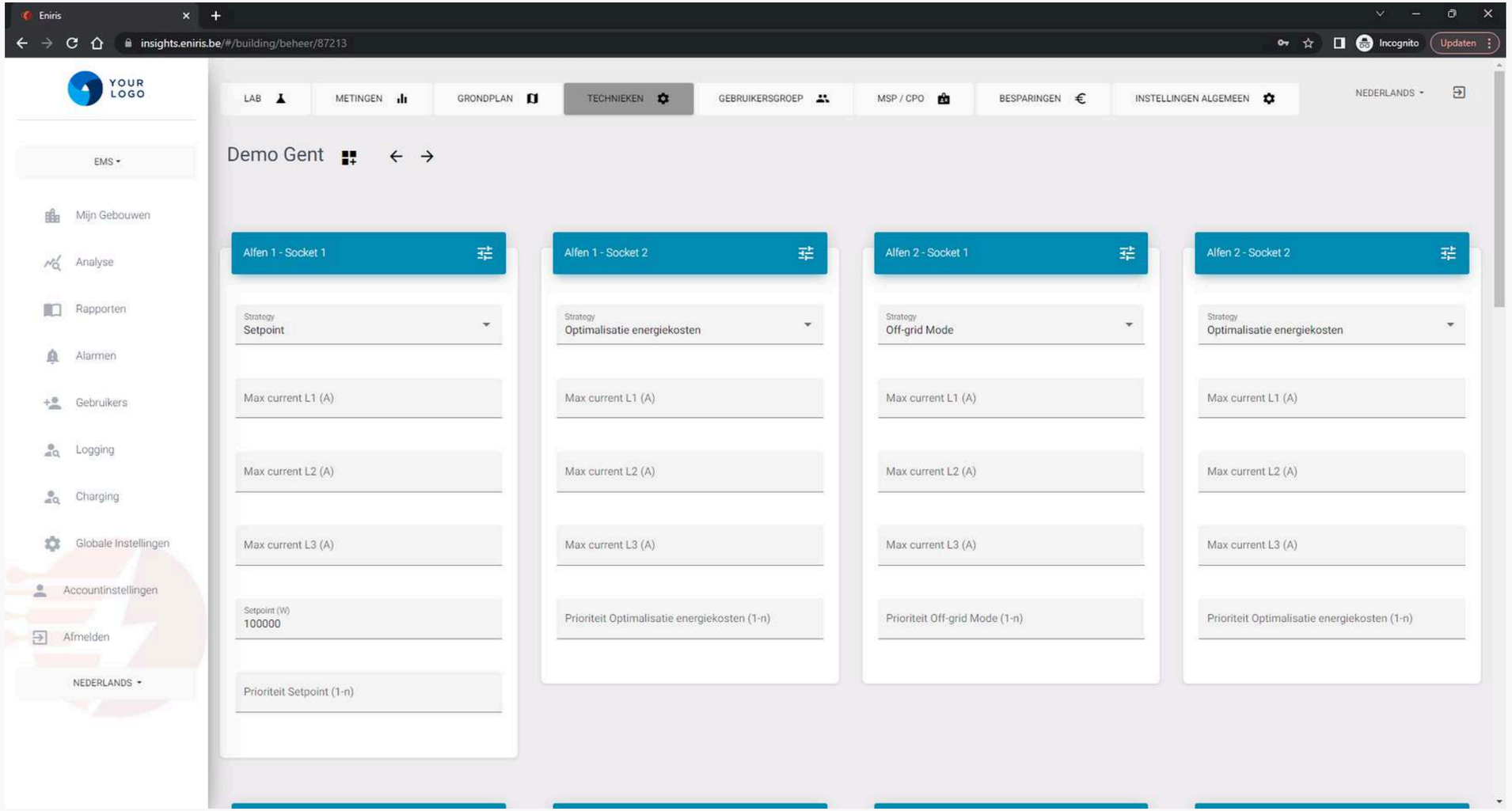
User dashboard – Multi-site management



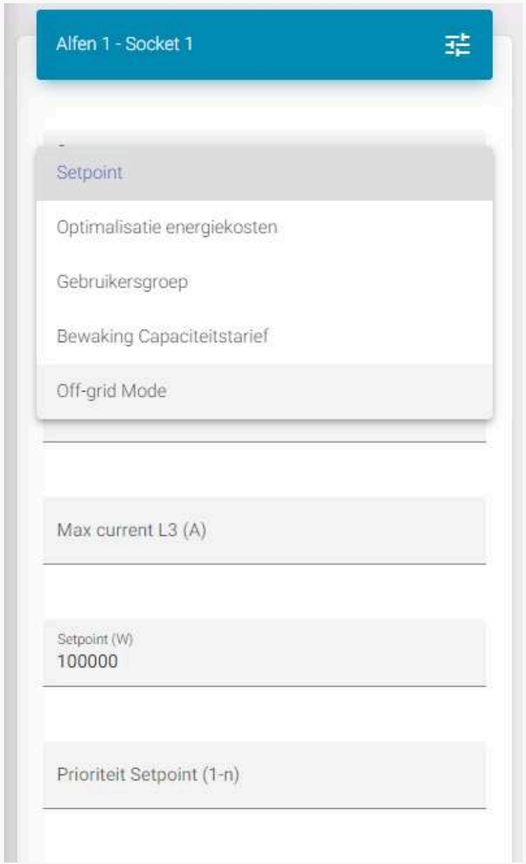
User dashboard – site access



User dashboard – Asset Commisioning



User dashboard – Asset Commisioning

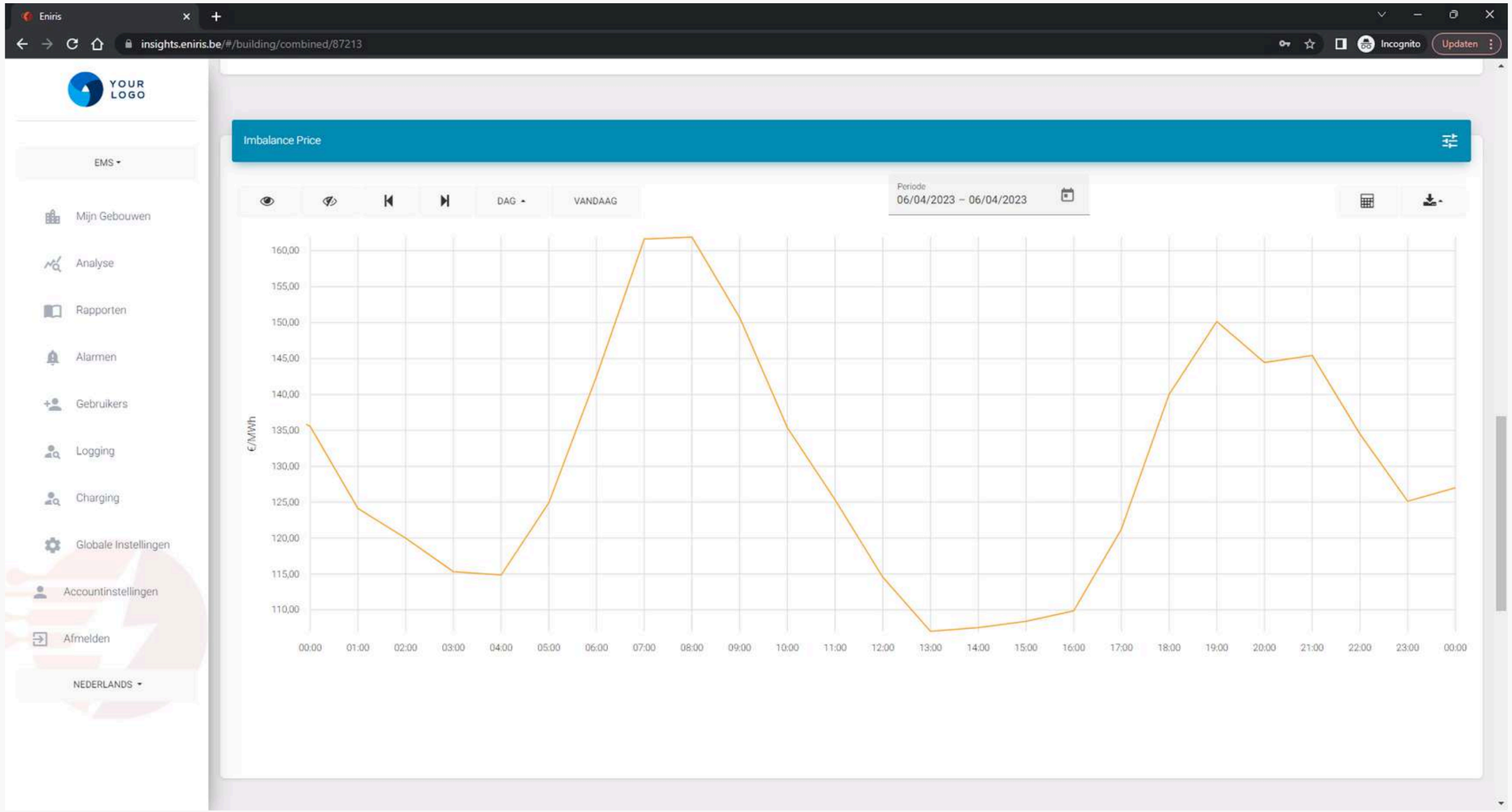


For each asset, an individual strategy can be chosen. This allows for optimization based on energy costs (trading), offering a fixed setpoint, linking to user groups, setting capacity rates (upper and lower limits for injection or consumption), or off-grid operation.

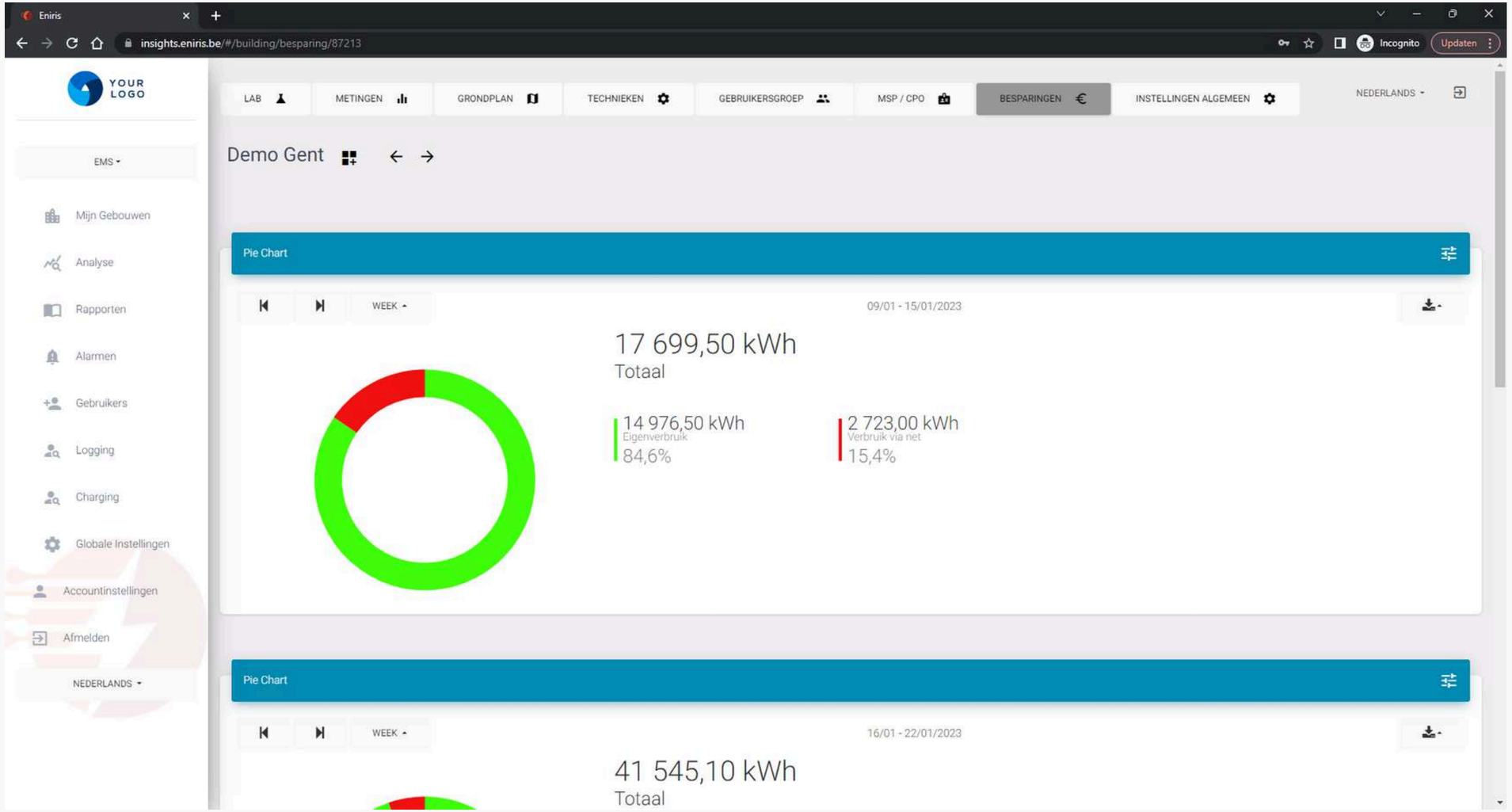
Cases:

- Wind & Solar Curtailment
- Battery Charging & Discharging, Charging Stations based on revenue geenration & predicted generation & consumption
- V2G
- Capacity rate (15min base) vs grid capacity

User dashboard – Link to energy markets



User dashboard – Widgets Library



Chapter 7

USP’s

Experience

- Some of our collaborations

T&P TECHNOLOGY	Control of Heatpumps
fudura	Monitoring & Control of Batteries
GREEN CHOICE	Monitoring & Control of PV and batteries
DSG WE BUILD ENERGY.	Monitoring & Curtailment of PV
POWERLAND POWERING MOBILITY	Monitoring & Control of charging stations
MarEtec ENERGIE VAN DE ZON	Monitoring & Curtailment of PV
ProfiNRG Renewable Energy Professionals	Monitoring of PV installations
SAMAN	Monitoring & Curtailment of PV

Key Differentiators

Brand independent

+250

Integrations

Solar, Heatpumps, Battery Systems, Charging Stations

Current state of the market:
Competitors only allow devices within their own ecosystem. Controllers are an accessory to increase the turnover of traditional products and to build customer loyalty. Devices outside the ecosystem are excluded

Open marketplace for hardware integrations

End users and companies can develop plugins for their own equipment and distribute them.

Current state of the market:
This is hardly available anywhere.

Auto-respond to dynamic energy prices

Current state of the market:
Residential users can only respond to energy prices manually.

Forecasting energy consumption and production

By means of a hybrid model based on different machine learning algorithms, whereby we presuppose a minimal predictive error.

Current state of the market:
Prediction is applied to a limited extent based on inflexible traditional algorithms.

See addendum for a complete comparison

Key Differentiators

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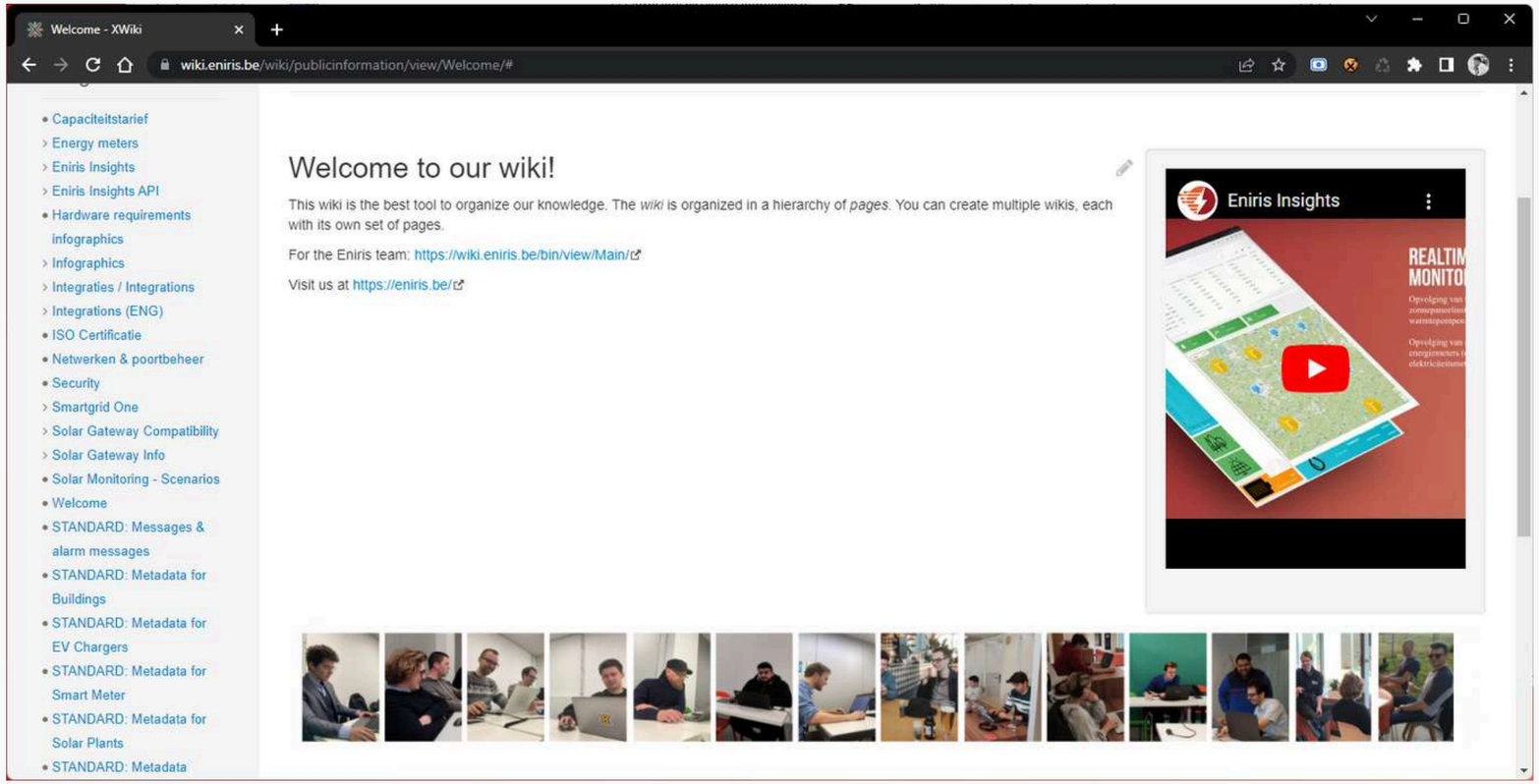
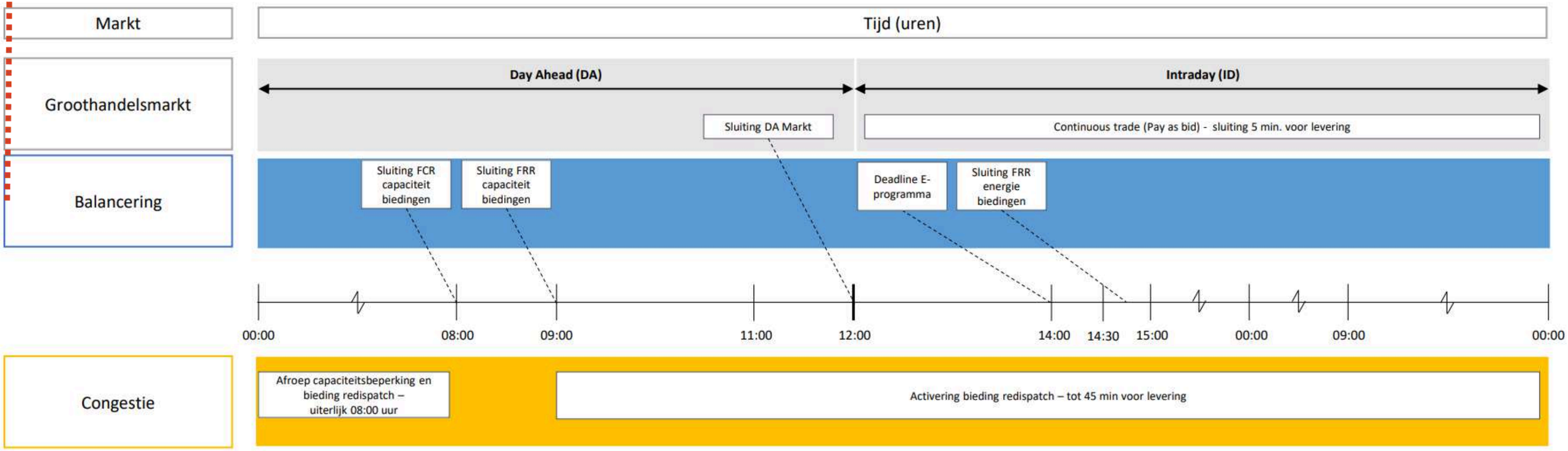
Documentation: https://docs.eniris.io/category/overview/

- Integrations
- Tutorials
- Guidelines



Energy Markets



FCR = Frequency Containment Reserve
aFRR = automatic Frequency Restoration Reserve (voorheen regelvermogen)
mFRRsa = manual Frequency Restoration Reserve, schedule activated (voorheen reservevermogen)
mFRRda = manual Frequency Restoration Reserve, direct activated (voorheen noodvermogen)

Chapter 8

Use Cases

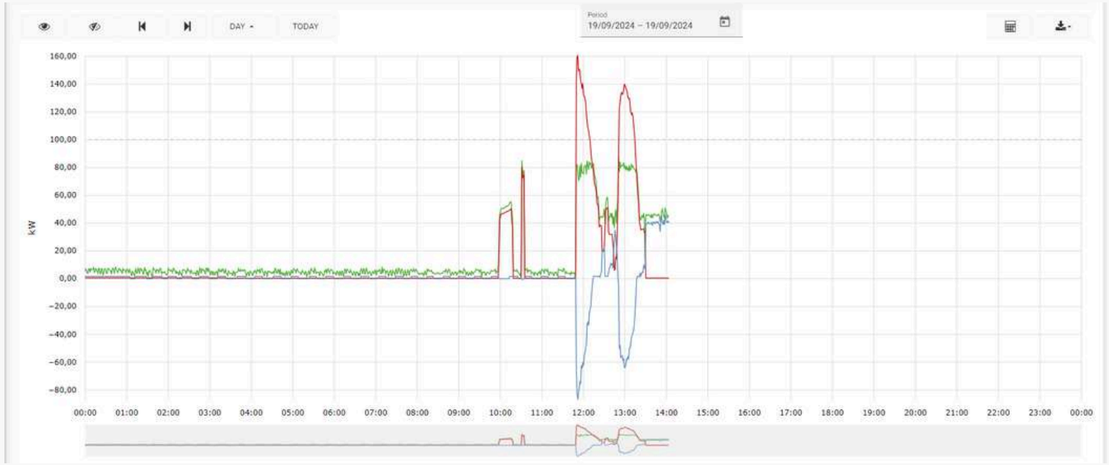
Use Case: SmartgridOne for a Limited Grid Capacity

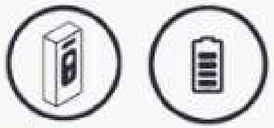
In this scenario, the charging stations are equipped with our EMS and a battery, with a focus on controlling peak power (**three times higher than the available grid capacity**) and limiting the load on the grid.

Grid Limit:
The grid limit is set at 200 kW, a safety margin of 10 kW is in place to protect the system from fluctuations in consumption.

Charging Stations:
The charging stations operate in peak shaving mode, meaning they are only active when consumption approaches the set grid limit. The expected maximum load from the charging stations is 600 kW, which is significantly higher than the available grid capacity.

The Battery:
The battery is configured to operate exclusively in peak shaving mode. When grid consumption reaches 200 kW, the battery begins discharging to prevent exceeding the grid limit. Once grid consumption drops to 100 kW, the battery stops discharging.

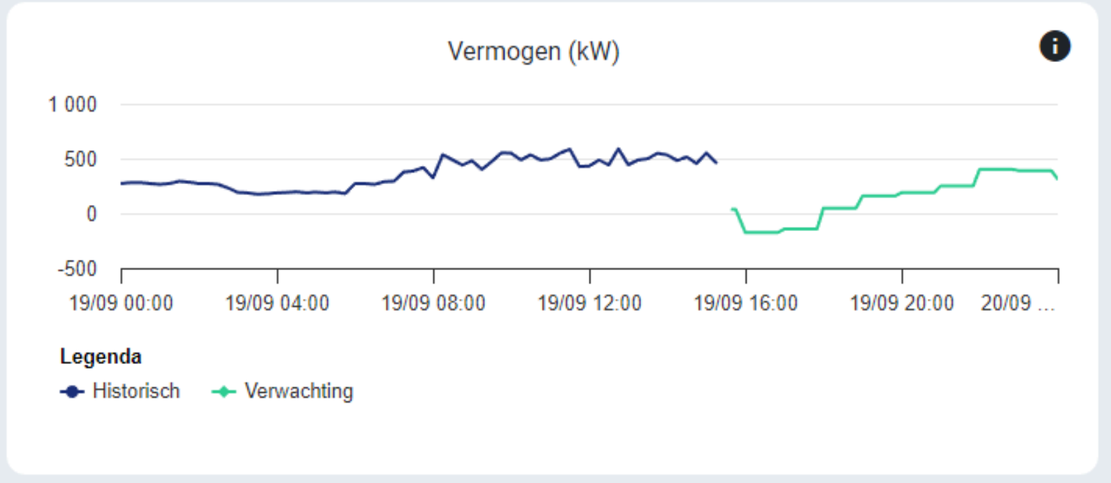




Use Case: SmartgridOne making nominations

SmartgridOne always generates forecasts for both consumption and production at the level of the grid connection point. In this case, the predicted consumption data is provided to the energy supplier every quarter-hour, which in turn leads to nominations.

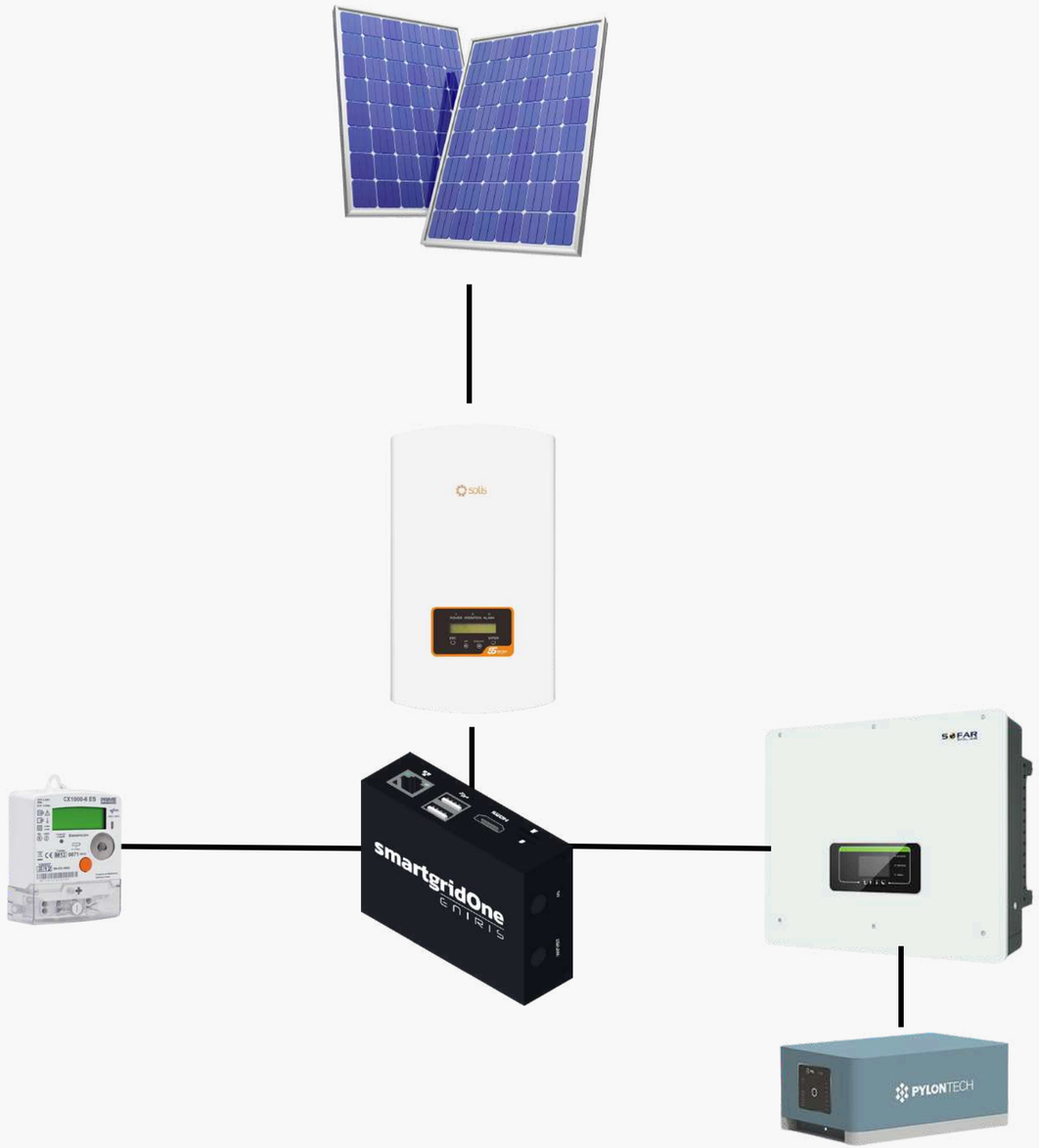
On the other hand, the smartgridOne module monitors the imbalance price from TenneT to purchase energy at the imbalance price for the battery system.



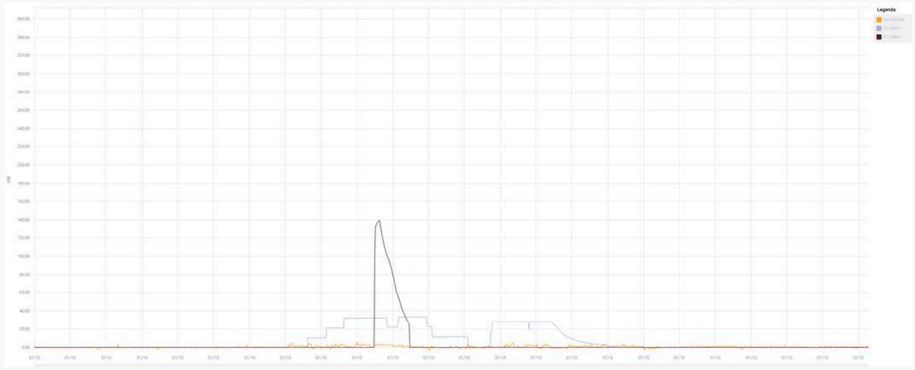
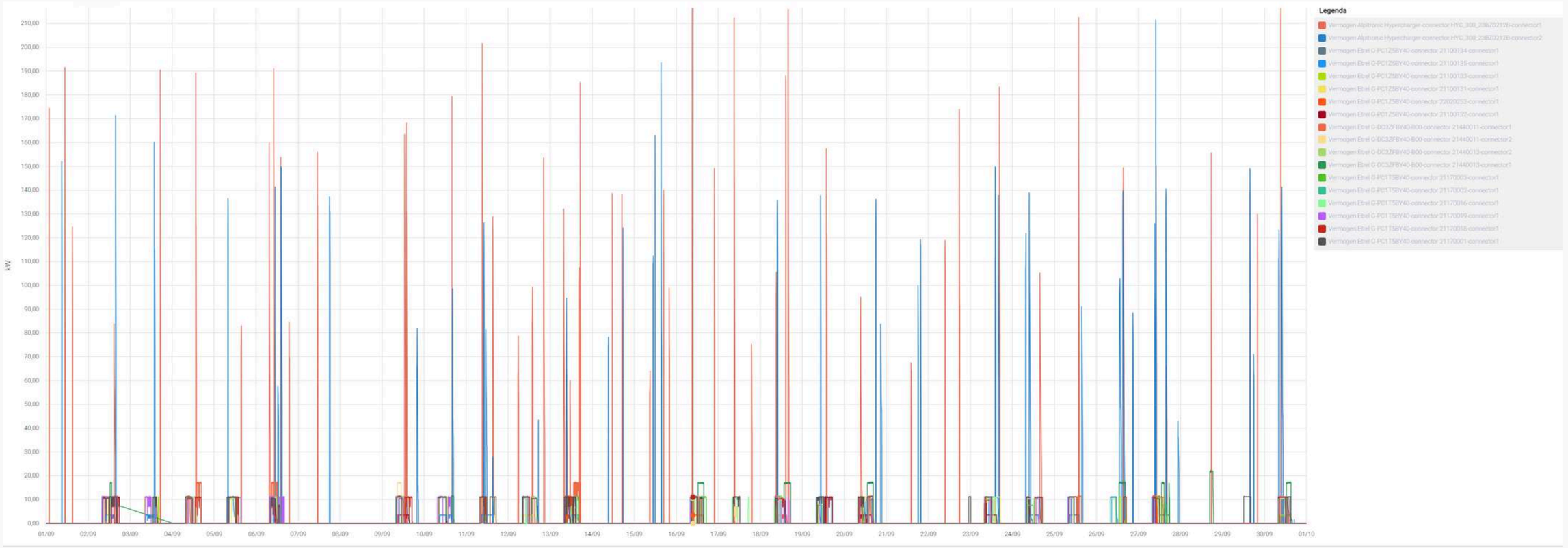
Use Case: Feed-in limitation

This case study focuses on the integration of two inverters—a Solis PV inverter and a Sofar hybrid inverter. The customer faces a 0 kW feed-in limitation, meaning no excess energy can be fed back into the grid.

In this setup, the PV panels are connected to the Solis inverter, meanwhile, a battery is connected to the Sofar hybrid inverter.
At the heart of this system lies the smartgridOne EMS, which synchronizes the two inverters. Without the EMS, these systems would operate independently, leading to a problem regarding the grid limitation. The EMS prioritizes the charging of the battery when surplus PV energy is generated.
Additionally, the EMS forecasts solar production, allowing it to anticipate and manage energy flows efficiently.



Use Case: Charging Stations



372kW limit, but we only peak at 140kW during the month