Technical Information

SMA Premium

Energy management powered by ennexOS

ENGLISH

SMA-Premium-TI-en-10 | Version 1.0

Table of Contents

1 Additional Information

Document	Link to information
"SUNNY PORTAL powered by ennexOS" – User Manual	User Manual
User Manual "Operation of the User Interface of Products powered by ennexOS"	User Manual

2 SMA Premium

Availability of SMA products in your country

Not all SMA products are available in all countries. For information on whether an SMA product is available in your country, contact your distributor or check the information on the product page at https://www.SMA-Solar.com.

SMA Premium is an expanded function package that enables the use of the Energy Maximizer and thus supports optimal operation of PV systems. SMA Premium gives users access to intelligent energy management functions that help to increase self-consumption, utilize dynamic electricity costs, automatically control loads (electricity storage system, SMA eCharger, SMA EV Charger Business), and improve the economic efficiency of the system.

Activation of SMA Premium is done using Sunny Portal powered by ennexOS or the SMA Energy App. After activation, the package can be managed with the SMA ID.

Also see:

- Energy Maximizer ⇒ page 5
- Energy Planner ⇒ page 5

3 Product overview

3.1 Energy Maximizer

The Energy Maximizer is an automated energy management system that provides intelligent optimizations to control energy flows across the entire system. The system uses forecast data and internal analytical algorithms to dynamically coordinate loads and storage and use energy efficiently. Code functions include:

- Automatic optimization of energy flows based on PV generation forecasts and tariff forecasts
- Consumption patterns and system sensors
- Proactive load shifting to increase self-consumption and avoid peak loads to reduce curtailment losses. Priority should be given to the use of electric current that is not remunerated, and, in the event of a negative feed-in tariff, grid feed-in should be prevented.

The Energy Maximizer operates completely autonomously and does not require no manual intervention. It minimizes the configuration effort and improves the energy efficiency of the entire system at the same time.

The product can be activated via SMA Premium to expand the basic functions of products powered by ennexOS.

Also see:

- SMA Premium ⇒ page 4

3.2 Energy Planner

The Energy Planner provides the basic functions that are always available for SMA energy management. The application allows you to configure the energy management manually and customize it to your needs.

The core functions include:

- Manual planning and control of energy flows within the system, with a focus on integrated batteries
- Configuration of peak load profiles and consumption profiles according to individual preferences or processes
- Fundamental visualization and analysis of the energy distribution in Sunny Portal powered by ennexOS
- Independent adjustment of operating parameters without automated intervention

The Energy Planner therefore serves as a flexible platform that enables basic energy management measures without relying on automated optimization mechanisms.

Also see:

- SMA Premium ⇒ page 4

3.3 Interaction of Energy Planner and Energy Maximizer

The Energy Planner makes the basic functions of the SMA energy management system available and enables the user to manually plan, configure and control energy flows. In contrast, the Energy Maximizer takes over the fully automatic optimization of the energy system by using forecast data, consumption trends and system sensors. While the Energy Planner is designed for custom settings and direct control, the Energy Maximizer works autonomously and proactively optimizes loads and the battery storage system. Using Energy Maximizer thus reduces configuration work and increases the energy efficiency of the overall system.
It is not currently possible to combine the Energy Planner and Energy Maximizer. It is, however, possible to switch manually between the two functions at any time.

3.4 Overview of the Energy Management Functions

Description	Energy Planner	Energy Maximizer	Sunny Home Manager 2.0
Intelligent energy management			

	Description	Energy Planner	Energy Maximizer	Sunny Home Manager 2.0
Increased self-consumption	System optimization based on PV generation and loads and the control of batteries and inverters to increase self-consumption.	✓	✓	✓
Optimization of dynamic electricity tariffs	The algorithm determines and calculates the most cost-effective approach based on the tariff data.	✓	✓	✓
• Charging with power from the grid	The energy management system charges the battery with power from the utility grid at an opportune time to save money.	✓	✓	✓
• Discharging power into the grid	The battery feeds power into the utility grid, if permitted, to optimize the economic operation of the system.	–	✓	-
• Power reduction due to negative electricity tariffs	In the event of negative feed-in tariffs, the flow of electricity at the point of interconnection is regulated to avoid penalty payments.	–	✓	-
Peak load shaving	Reduction of the maximum power consumption in the utility grid through battery discharge.	✓	✓	✓
• Time-based limitations	Reduction of the maximum grid-supplied power through battery discharges or load reductions.	✓	-	-
• Capacity forecast	The system determines how much energy needs to be reserved and adjusts accordingly, increasing the reserve if a high or long peak load is expected.	-	✓	-
• Limitation of the charging power for electric vehicles (from July, 2026)	Throttles the charging of electric vehicles to reduce grid-supplied power. The power will then be increased automatically.	✓	✓	✓
Intelligent battery control				
Optimization of the battery life	Charging to 100% will be kept as short as possible.	-	✓	-

	Description	Energy Planner	Energy Maximizer	Sunny Home Manager 2.0
Oversizing on PV side	Takes into account that more PV power (DC) is connected to the hybrid inverter than it can convert on the AC side. The surplus energy generated as a result is put to good use by being used to charge the battery.	-	✓	-
Charging the battery / grid feed-in into the utility grid	Charges the battery with power from the utility grid or feeds energy into the utility grid.	✓	✓	-
Intelligent electric vehicle charging				
Fast charging	Charging vehicles with the highest possible charging power.	✓	✓	✓
Charging with surplus PV energy	Only charging the vehicle with surplus PV energy.	✓	✓	✓
Intelligent charging	Charging the vehicle to the desired level before departure, taking into account electricity tariffs, PV generation and loads.	-	✓	✓
Electricity rates				
Fixed-price tariff	Setting fixed electricity tariffs to accurately track costs.	✓	✓	✓
Time-dependent tariff	Enables basic cost tracking and system optimization based on changing electricity prices.	Manual	✓	✓
Dynamic electricity tariffs	Setting and monitoring dynamic electricity prices and optimizing systems based on the dynamic electricity tariff (also includes the StromWallet Dynamic Pro tariff from LichtBlick in Germany).	-	✓	✓
Evaluations / analysis				
Consumption, generation, feed-in revenue etc.	Illustrates how much money has been saved or generated through the use of solar energy and dynamic electricity tariffs.	✓	✓	✓
Load-control				

	Description	Energy Planner	Energy Maximizer	Sunny Home Manager 2.0
Reduction of PV feed-in power	Reduction of power generation by the grid operator to ensure grid stability and to reduce grid costs. In this process, battery capacity is reserved in favor of increasing generation output during times of expected curtailment.	-	✓	✓
Electricity storage system	Control of the battery system: charging, discharging, setting a specific SOC, SOC calibration, etc.	✓	✓	✓
EV Charger	Control of the EV Charger	Manual	✓	-
• SMA eCharger	The SMA eCharger is fully integrated into the SMA Energy Maximizer and can control the flow of energy.	✓	✓	✓
• SMA EV Charger Busi ness		✓	✓	-
• SMA EV Charger (EVCxx-10)		-	-	✓
Control via Modbus	Third-party systems can control SMA systems via Modbus at different control levels.	✓	-	✓
Heat pumps	Integration of heat pumps (e.g. EEBUS, SG Ready)	SG Ready only	Scheduled	✓
Sockets or relays (e.g. Shelly)	Third-party API integration for integrating sockets and relays (potentially smart home applications as well).	-	Scheduled	✓
End user settings in the SMA Energy App				
Electricity rates	End users can set electricity tariffs via the SMA Energy App.	✓	✓	✓
Energy management targets	The end user can define targets, such as for peak load shaving, the eCharger, sockets and relays	-	✓	✓
Technical requirements (in Germany)				
Article 9 Renewable Energy Sources Act (EEG)	The system supports Article 9 with an EEBUS connection.	✓	✓	✓
Article 14a German Energy Act (EnWG)	The system supports Article 14a via digital inputs or with an EEBUS connection.	✓	✓	✓

	Description	Energy Planner	Energy Maximizer	Sunny Home Manager 2.0
Settings via				
User interface powered by ennexOS	The settings can be made locally via the System Manager user interface integrated into the system.	✓	-	-
Sunny Portal powered by ennexOS	The settings can be made via Sunny Portal.	✓	✓	✓
SMA Energy App	The settings can be made via the SMA Energy App.	-	✓	-

4 System Requirements

- ☐ A device (e.g. Data Manager M, Sunny Boy Smart Energy, Sunny Tripower Hybrid X, Sunny Tripower X 25, Sunny Tripower X 60, Sunny Tripower Storage X, Sunny Island X, eCharger) must be registered and configured as the System Manager.
- ☐ The system must be registered in Sunny Portal powered by ennexOS.
- ☐ The System Manager must be configured.
- ☐ **No** Sunny Home Manager 2.0 can be configured as a main device in the system.
- ☐ An energy meter must be installed at the point of interconnection.
- ☐ Depending on normative requirements, the limitation at the point of interconnection must be correctly set.
- ☐ The system must be configured with self-consumption.

5 Activating SMA Premium via Sunny Portal

Requirements:

☐ The system must be registered in Sunny Portal powered by ennexOS.

☐ The System Manager must be configured.

☐ An energy meter must be installed at the point of interconnection.

☐ Depending on normative requirements, the limitation at the point of interconnection must be correctly set.

Procedure:

1. Ensure that no Sunny Home Manager 2.0 is configured as a main device in the system.
2. Make location settings. Go to [**System properties**] via [**Configuration**].
3. Maintain the details for **Location** and **PV system power**.
4. Activate the automatic updates of all SMA products.
5. Go to [**Energy management**] via [**Configuration**].
6. In the **Energy Maximizer** area, click the button [**Test for free**].
   ☑ You will be redirected to the SMA Online Shop.
7. Follow the instructions in the SMA Online Shop.
   ☑ The free trial period has been activated.

☑ SMA Premium is active and can be viewed under [**Configuration**] > [**Digital Products**]. After the trial period (90 days) ends, SMA Premium terminates automatically and does not convert into a subscription service. To continue using SMA Premium, a user with the role of "Owner" must actively purchase a paid SMA Premium subscription during or after the trial period.

6 Canceling SMA Premium

Requirements:

☐ The role **System owner** has been assigned to you.

Procedure:

1. Go to [**Digital products**] via [**Configuration**].
2. View the status of your SMA Premium subscription via [**Manage subscription**].
3. Open the active subscription under **Active subscriptions**.
4. Follow the instructions on the interface.
5. Alternatively, call up the SMA ID account at https://account.sma.energy/ and go to [**My subscriptions**] to manage SMA Premium.

7 Function Examples

7.1 Optimization of the Battery Life (example)

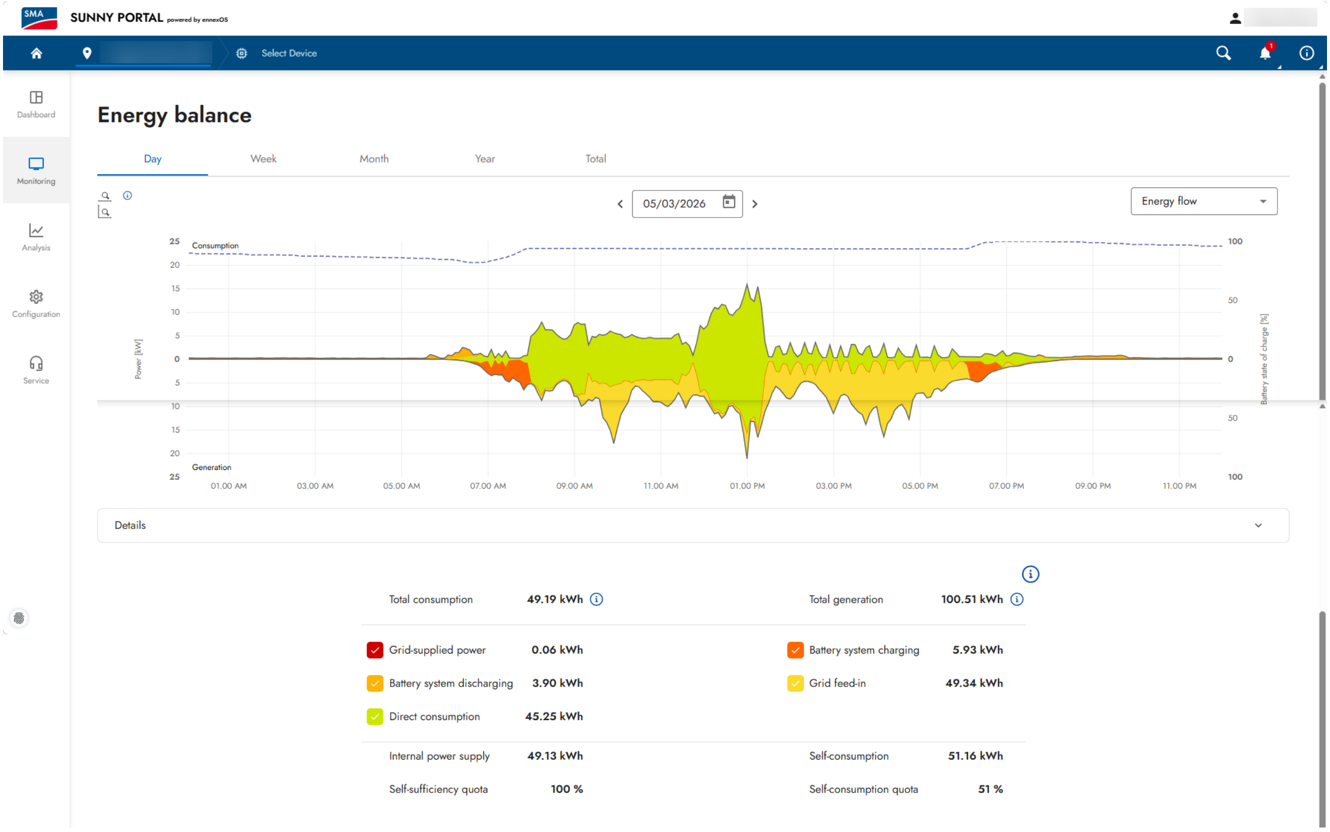

Figure 1: Visualization of the function Optimization of the Battery Life (example) in Sunny Portal powered by ennexOS under **Monitoring > Energy balance**.

The optimization of the battery life is primarily evident in how long and at what times the battery is kept at high states of charge, in particular at a state of charge (SOC) of 100%. It is precisely this range that puts a particularly heavy strain on lithium batteries. Although modern lithium-ion batteries already have a long service life and cycle stability, the Energy Maximizer can further extend their service life through its targeted operating strategy.

The figure shows that the battery is no longer fully charged early in the day, rather it is used in a targeted, conserved manner.

In detail:

- **Morning / midday**: As PV generation increases, the battery is charged, but the state of charge does not rise to 100%. Instead, the battery remains below its maximum state of charge for several hours. Excess energy is either consumed directly or fed into the utility grid.
- **Afternoon**: The figure shows that the battery is not being discharged to provide power to the loads. The state of charge (SOC) remains at an almost constant level.
- **Evening**: Targeted recharging up to 100% only takes place in the evening hours. The full charge is reached shortly before subsequent discharging to supply the loads.

The length of time that the battery is charged to a state of charge of 100% is limited by the Energy Maximizer. This automatically optimizes the charging and discharging times based on generation and consumption forecasts. This ensures that the battery is operated specifically outside the aging-critical upper charging range, which reduces cell aging and extends battery life.

7.2 Preventing Derating Losses (example)

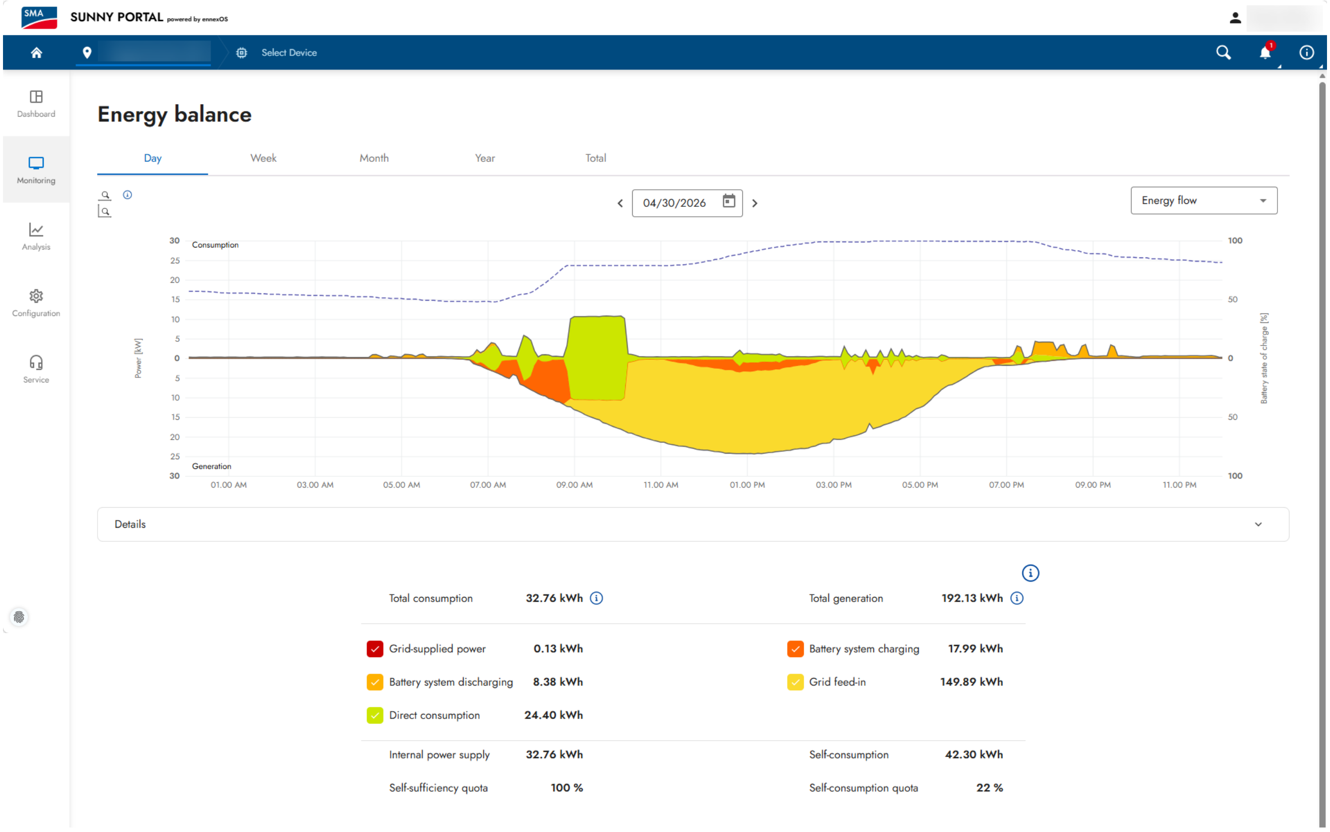

Figure 2: Example of preventing derating losses through targeted battery charging when the export limitation is exceeded (Sunny Portal powered by ennexOS, **Monitoring > Energy balance**).

The energy balance illustrated shows that PV generation is sometimes higher than the sum of self-consumption and permissible feed-in power. To prevent derating losses, the battery system is only charged when the maximum permitted feed-in power would be exceeded. On days with predicted energy surpluses, the Energy Maximizer deliberately plans for free battery capacity in order to store otherwise curtailed energy. This is represented in the figure by the premature termination of the battery charging process shortly before 9:00 a.m.

In this case, the battery system acts as a buffer: As soon as the generated PV power is higher than the permissible kW power fed into the utility grid, the excess energy is automatically used to charge the battery. This prevents PV power from being curtailed and remaining unused due to export limitations.

If the feed-in limit is not reached, the battery is not charged with excess power because utility grid feed-in is prioritized. Only once the export limitation is reached will battery charging begin. This operating strategy ensures that the available PV energy is used efficiently and derating losses are effectively avoided.

7.3 Peak Load Shaving at the Point of Interconnection (example)

Figure 3: Visualization of peak load shaving in Sunny Portal powered by ennexOS (**Monitoring > Energy balance**).

In this example, the Energy Maximizer is active and peak load shaving is configured with a grid-supplied power limit of 4 kW. The Energy Maximizer controls battery usage in such a way as to best support compliance with this limit at the point of interconnection.

Two short-term consumption peaks occur at around 11:00 a.m. The Energy Maximizer detects these load peaks and automatically makes additional power available from the battery. As a result, the grid-supplied power (red area) remains below 4 kW, and the battery discharges (yellow / orange areas).

The Energy Maximizer also takes the limit set for peak load shaving into account when the battery is being charged with power from the utility grid. During these phases, no more than 4 kW of grid power is used either.

The Energy Maximizer therefore maximizes self-consumption, reduces peak loads and ensures that the configured grid power limit is reliably adhered to.

7.4 Functional Overview of the Energy Maximizer and Configured Dynamic Electricity Tariff on a Winter Day (example)

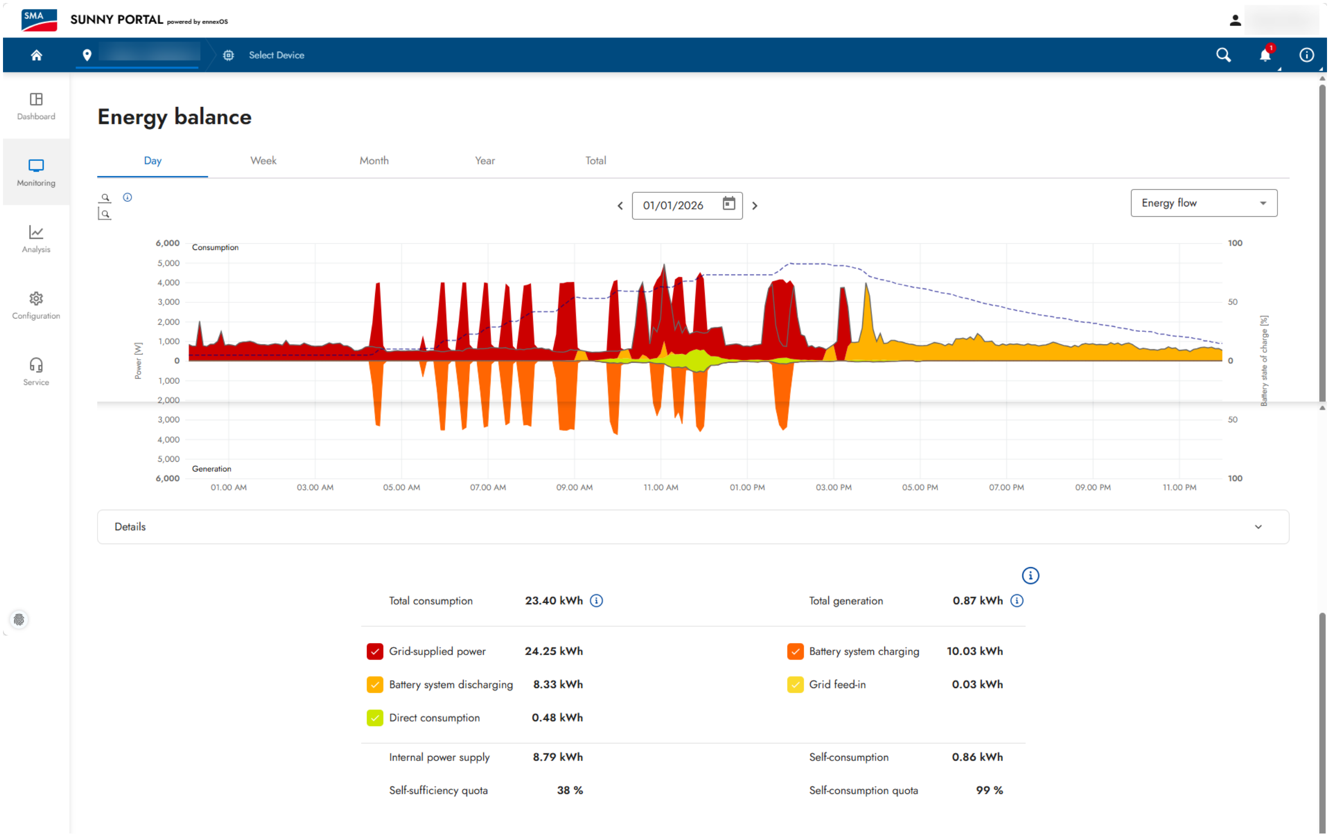

Figure 4: Visualization of the energy balance on a winter day with Energy Maximizer activated and dynamic electricity tariff configured in Sunny Portal powered by ennexOS (**Monitoring > Energy balance**).

This energy balance shows a typical winter day with a very low PV generation level of just 0.87 kWh and a total consumption level of 23.40 kWh. The Energy Maximizer controlled the battery storage system primarily to ensure grid-price optimization that day.

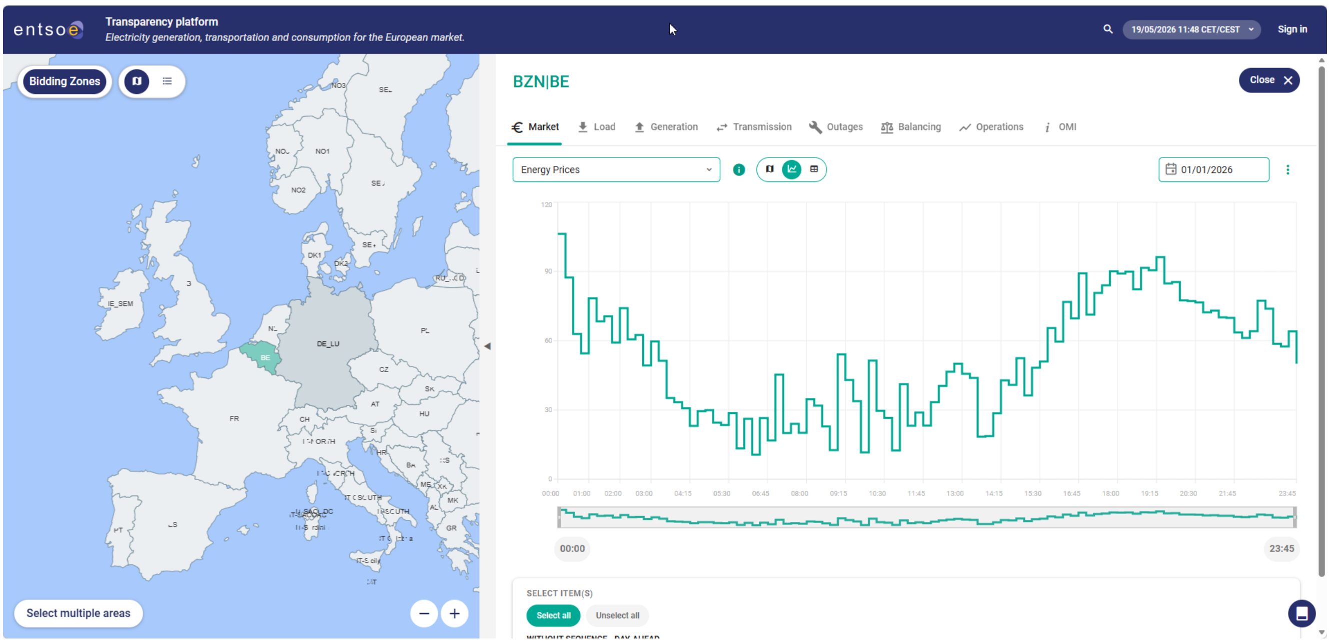

Figure 5: Electricity prices in Belgium on January 1, 2026, as displayed on the ENTSO-E Transparency Platform (https://transparency.entsoe.eu/).

During periods of low electricity prices, in particularly at night and during short-term downward price fluctuations (e.g. in 15-minute intervals), the battery storage system was charged specifically with power from the utility grid (10.03 kWh). Based on forecasts, the Energy Maximizer can also reserve free battery capacity to ensure the optimum utilization of additional favorable price periods. In the same periods, loads can be supplied temporarily straight from the utility grid instead of being supplied via battery discharge. This represents a significant difference to classic increased self-consumption and also takes into account the efficiency losses of the battery. As a part of this, discharging is only performed if it will result in a significant price advantage. During the day, as well as in the afternoon and evening hours when consumption increases and electricity prices are higher, the Energy Maximizer provided stored energy (8.33 kWh) to reduce the level of grid-supplied power.

The low amount of available PV energy was almost entirely used directly by the company (self-consumption quota 99%). Practically no power – just 0.03 kWh – was fed into the utility grid. A total of 8.79 kWh of the daily consumption was able to be covered internally through PV generation and the battery storage system.

This example shows that even with minimal solar generation, the Energy Maximizer enables cost-optimized and predictive system operation through price-dependent charging and demand-based discharging of the battery storage system.

7.5 Functional Overview of the Energy Maximizer on a Summer Day (example)

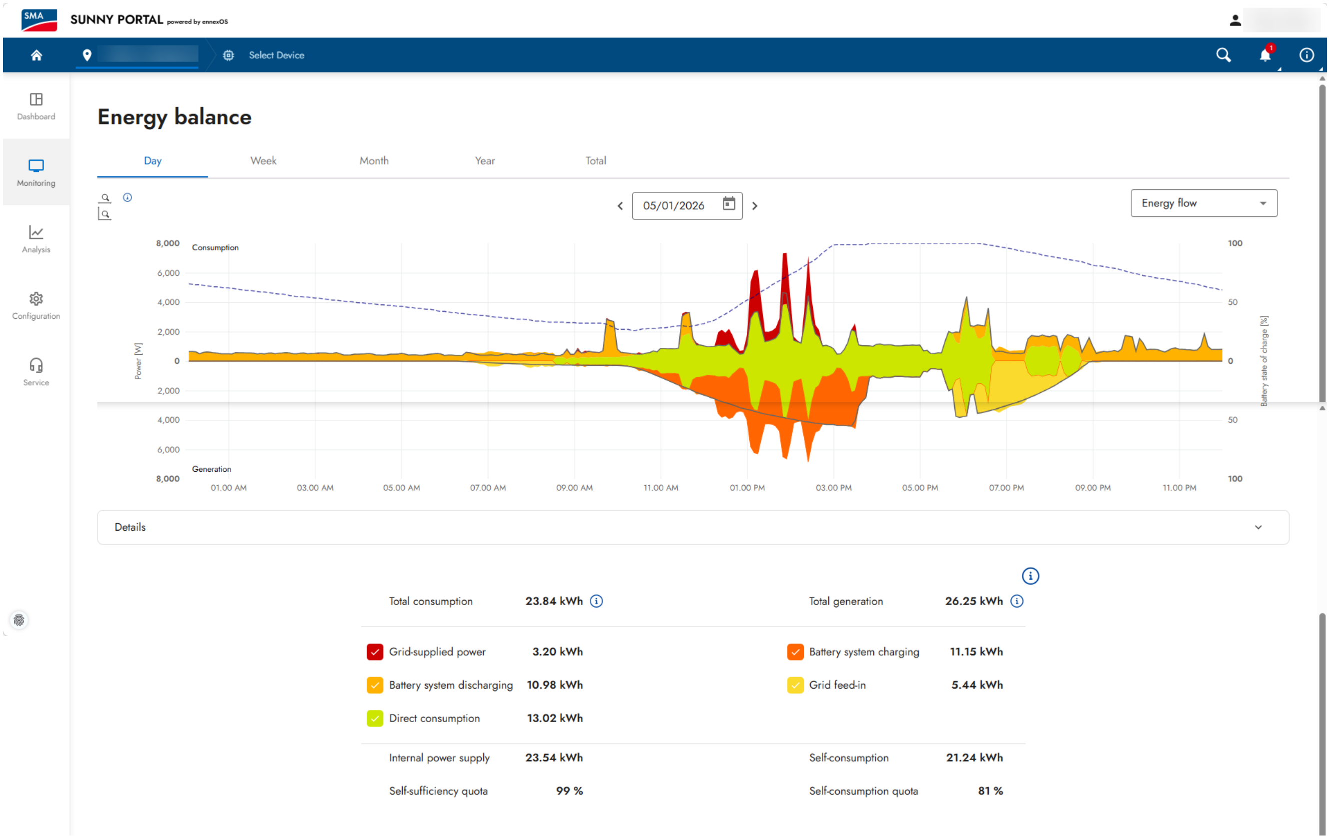

Figure 6: Visualization of the energy balance on a summer day with Energy Maximizer activated in Sunny Portal powered by ennexOS (**Monitoring > Energy balance**).

On the summer day depicted, the Energy Maximizer controlled the energy flows based on PV generation, battery state of charge and consumption. No PV power was generated during the night. The power consumption was predominantly covered by the battery, which can be seen in the diagram by the orange consumption area above the zero line and the continuously decreasing battery state of charge (blue dashed line). The level of grid-supplied power remained low.

PV generation started to increase from the morning hours onwards. The Energy Maximizer initially used the solar power to supply the loads directly. At the same time, it started to charge the battery, which is shown by the increasing state of charge.

PV generation reached its maximum around midday. During this phase, the Energy Maximizer prioritized battery charging. On days with very low or even negative electricity prices, not only is PV generation used, but additional energy is also drawn from the utility grid specifically for charging the battery.

As soon as the battery reached its maximum state of charge in the afternoon (around 4:00 pm in the example shown), the feed-in of PV power into the utility grid was temporarily stopped to avoid economic disadvantages due to negative electricity prices. Grid feed-in was only permitted again once this price phase ended (around 6:00 pm). In total, the battery state of charge increased to almost 100% during the day.

The amount of PV power generated decreased throughout the afternoon and into the evening. At this point, the Energy Maximizer resumed covering consumption with power from the battery. This reduced grid-supplied power and maximized self-consumption until the battery state of charge dropped again towards the end of the day.