Energy management with the Fronius Wattpilot

Application guide

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Solar Energy

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1 Introduction

This document provides an overview of the possible applications of the Fronius Wattpilot in conjunction with Fronius inverters. On the one hand, it provides an overview of the possibilities of energy management in conjunction with the photovoltaic system and, on the other, the advantages of energy sector integration with a focus on the mobility sector.

Fronius presents the possibilities of integrating the Fronius Wattpilot into the overall solar system and shows the possibilities of holistic energy management on the way to 24 hours of sun.

1.1 Validity

This white paper covers the following inverter types:

- Fronius GEN24 / GEN24 Plus
- Fronius Verto / Verto Plus
- Fronius Tauro
- SnapINverter generation inverters (web server)
- Fronius Symo Hybrid
- and the Datamanager Box

The Fronius Argeno is only partially relevant for this white paper. It does not have a Solar API interface so that the Wattpilot cannot connect. There are two exceptions. The Wattpilot can be integrated into an Argeno system via Smart Meter IP. Secondly, as with any other third-party inverter, a Datamanager Box with smart meter could be installed.

2 Energy sector integration

Electromobility is a key aspect of the energy transition that can help to achieve current climate protection targets. The integration of electrically powered vehicles also makes it possible to store the uneven generation of renewable energy. This can increase self-consumption and minimize feed-in to the public grid. In addition to the obvious advantages, such as better air quality in cities, lower noise pollution or lower energy consumption, the spread of electrically powered vehicles also results in other advantages associated with the electromobility system. One of these additional benefits is the fact that every vehicle on the road can also be used as a mobile electricity storage unit for generating renewable energy. Energy sector integration is a key element in making the best possible use of this generation and relieving the strain on public grids. As a solution provider, Fronius offers the possibility of realizing energy sector integration in your own household.

All 3 sectors are included for this purpose:

- Electricity (Fronius hybrid inverter and stationary battery storage)
- Heat (Fronius Ohmpilot for hot water generation or heating)
- Mobility (Fronius Wattpilot for charging the electric vehicle)

3 Prioritization of the components

In order to provide the customer with the greatest possible individualization, Fronius energy management offers the option of prioritizing the individual system components. This allows the customer to decide for themselves what the available energy from the PV system should be used for. This chapter deals with the following 3 components that can be prioritized in energy management:

- Stationary battery storage
- Fronius Ohmpilot
- Fronius Wattpilot

Two limit values must be set in the Solar.wattpilot app for the configuration of prioritization. One limit value concerns the activation of the Ohmpilot and the other concerns the activation of the PV battery. Both limit values can be activated in the app in the Settings/Cost optimization menu and determine the charging behaviour of the Wattpilot in the event of a PV surplus.

PV battery limit value

If a battery is installed in the PV system, a limit value (in % of the SOC) can be set here. The SOC (state of charge) of the PV battery is constantly checked during operation. If the current SOC is below the set value, the PV battery is charged first. As soon as the current SOC of the PV battery rises above the set limit value, the energy is then used to charge the car. The SOC of the PV battery can still continue to rise slowly, as the car is regulated in whole ampere steps and any excess energy is stored in the PV battery. In the same submenu, you can also set the PV battery to discharge into the car at a certain time. Chapter 4 explains when this makes sense.

Limit value Ohmpilot

If a Fronius Ohmpilot is installed in the PV system, a limit value for the desired setpoint temperature (in °C) can be set here. The current temperature is constantly measured during operation.
If the current temperature is below the set limit, the available energy is used for heating.
If the temperature exceeds the set value, the available energy is used to charge the car. The temperature can still continue to rise slowly, as the car is charged in whole ampere steps and any excess energy is used for the Ohmpilot. To use the function with an available Fronius Ohmpilot, a temperature sensor must be connected to the Ohmpilot.

The possible settings are described below using use cases.
For more information on accessing the web interface of the inverter, please read the chapter, Accessing the web interface.

IMPORTANT: For correct prioritization, the settings must be made in the Solar.wattpilot app under "Settings" => "Cost optimization" and also in the web interface of the Fronius inverter.

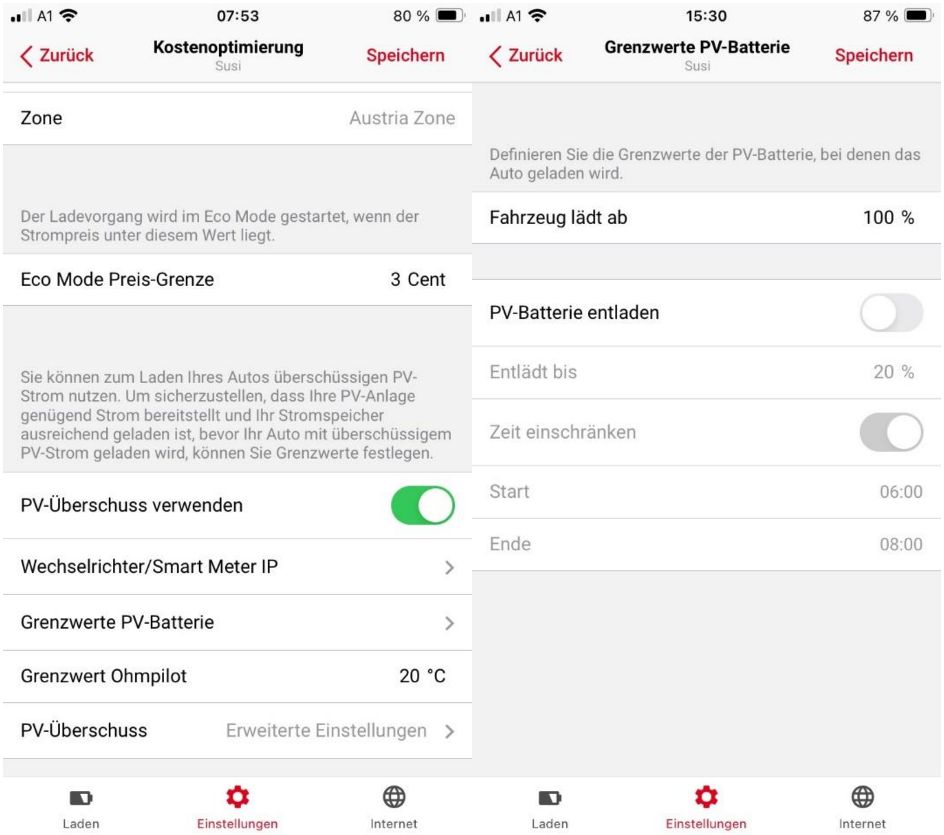
3.1 The customer has a stationary battery and a Wattpilot

3.1.1 Use case 1: The PV battery has top priority

In the first use case, the PV battery is preferred and should be given priority over the e-car charging. The following settings are made for this:
Settings in the web interface of the Fronius inverter: PV battery storage set to highest priority.

Note: As there is only one PV battery and no other components in the system in this case, the ranking is invalid.

Settings in the Solar.wattpilot app: The "PV battery" limit value is set as high as possible (100%). This means that the surplus from the PV system is only used for charging if the state of charge of the 'PV battery' is 100% or if there is still a PV surplus despite the PV battery being charged.

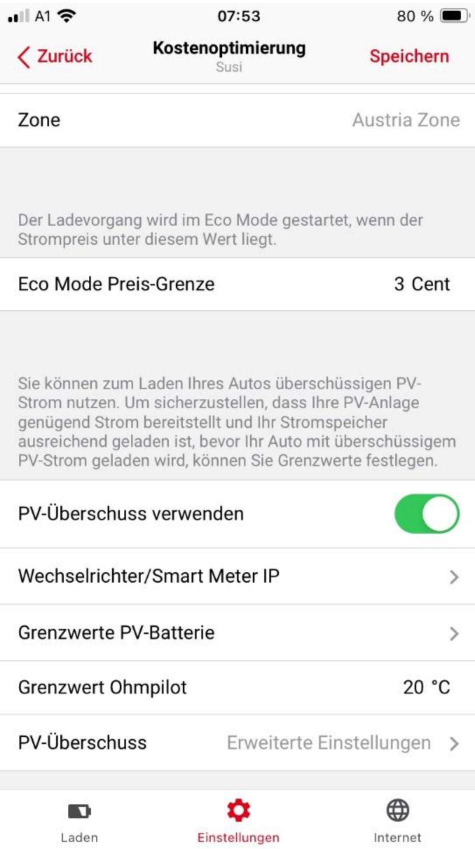


3.1.2 Use case 2: The Wattpilot has top priority

In the second use case, electric car charging is preferred and should be given priority over the PV battery storage system. The following settings are made for this:

Settings in the web interface of the Fronius inverter: PV battery storage set to highest priority. Note: Since in this case there is only one PV battery and no other components in the system, the ranking is invalid.

Settings in the Solar.wattpilot app: The "PV battery" limit value is set as low as possible. In this case, excess PV is used to charge the car as soon as the SOC of the PV battery is more than 8%.



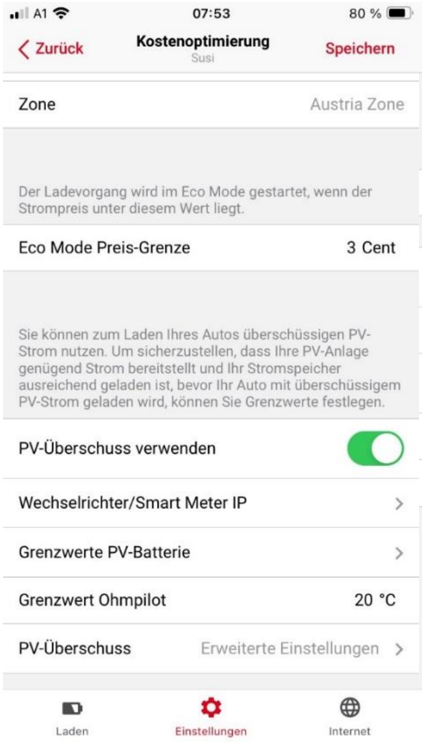
3.2 The customer has a PV battery, a Wattpilot and an Ohmpilot

3.2.1 Use case 1: The PV battery has top priority

In the first use case, the PV battery is given priority over the e-car charging and the Ohmpilot. The following settings are made for this:

Settings in the web interface of the Fronius inverter: PV battery storage set to highest priority, Fronius Ohmpilot behind it.

Settings in the Solar.wattpilot app: The "PV battery" limit value is set as high as possible (100%). The "Ohmpilot" limit value can be ranked accordingly. In this case, the PV battery storage is charged first until the SOC has reached a value of 100%. The Ohmpilot is then operated with surplus PV energy until the temperature reaches 20 °C. Once these conditions are met, the energy is used for the Wattpilot.

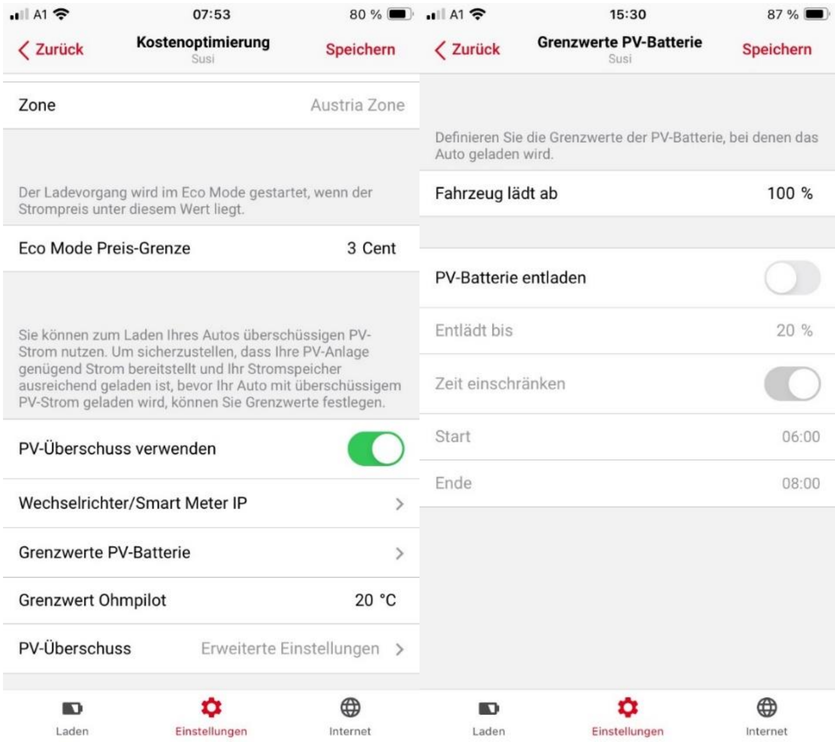


3.2.2 Use case 2: The Wattpilot has top priority

In the second use case, electric car charging is preferred and should be given priority over the stationary PV battery storage and the Ohmpilot. The following settings are made for this:

Settings in the web interface of the Fronius inverter: PV battery storage and Ohmpilot can be sequenced accordingly.

Settings in the Solar.wattpilot app: The "PV battery" and "Ohmpilot" limit values are set as low as possible. In this case, the battery is charged with excess PV energy until the SOC has reached a value of 8%. As soon as this condition is met, the energy for the Ohmpilot is used until 20 °C is reached. If these conditions are met, the energy is used for the Wattpilot.

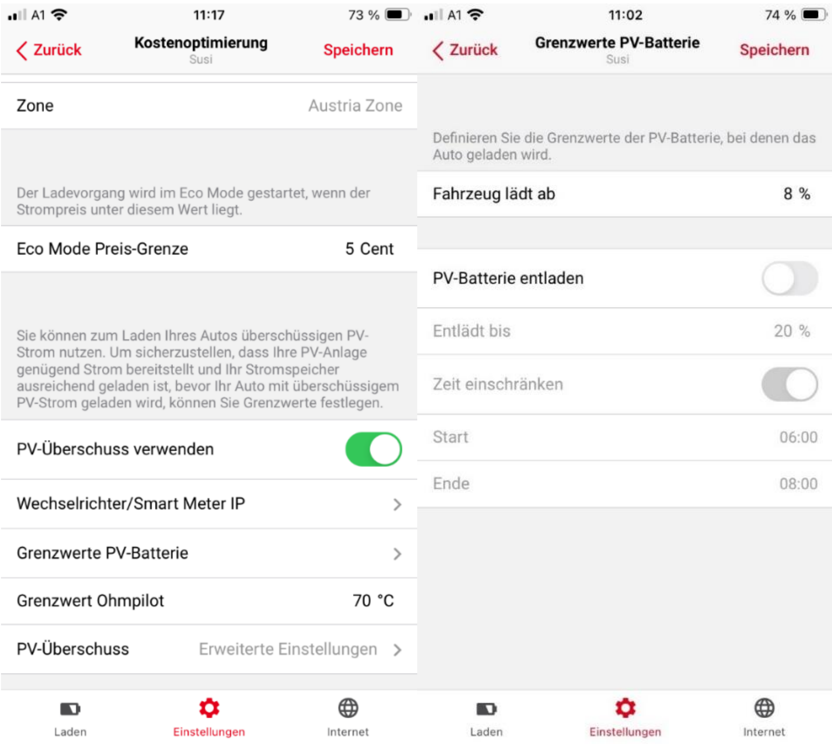


3.2.3 Use case 3: The Ohmpilot has top priority

In the third use case, the Ohmpilot is preferred and should be given priority over the stationary PV battery storage and e-car charging. The following settings are made for this:

Settings in the web interface of the Fronius inverter: Fronius Ohmpilot set to highest priority, battery storage behind it.

Settings in the Solar.wattpilot app: The "Ohmpilot" limit value is set as high as possible (e.g. 70°C). The "Battery storage" limit value can be ranked accordingly. In this case, the Ohmpilot is operated first until 70 °C is reached. The PV battery storage system is then operated with surplus PV energy until the SOC has reached 8%. As soon as this condition is met, the energy is used for the Wattpilot.



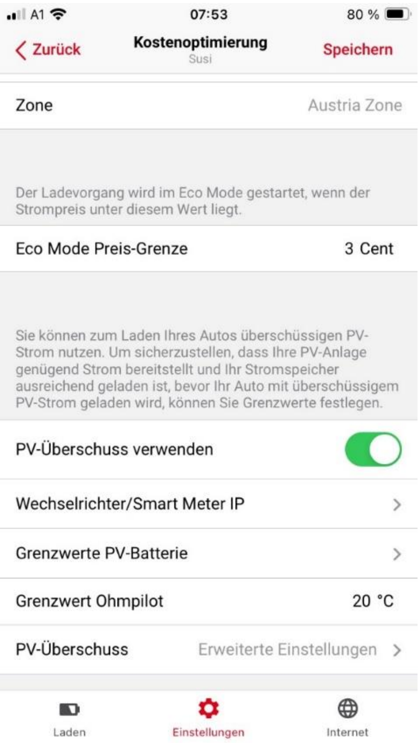
3.3 The customer has a Wattpilot and an Ohmpilot

3.3.1 Use case 1: The Wattpilot has top priority

In the first use case, electric car charging is preferred and should take precedence over the Ohmpilot. The following settings are for this

Settings in the web interface of the Fronius inverter: Fronius Ohmpilot set to highest priority. Note: Since in this case there is "only" one Ohmpilot and no other components in the system, the ranking is invalid.

Settings in the Solar.wattpilot app: The "Ohmpilot" limit value is set as low as possible. In this case, the limit value entered is 20°C.

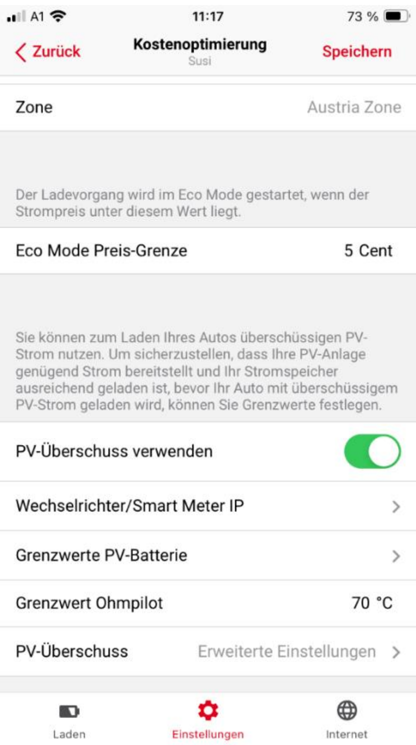


3.3.2 Use case 2: The Ohmpilot has top priority

In the second use case, the Ohmpilot is preferred and should be given priority over the e-car charging. The following settings are made for this:

Settings in the web interface of the Fronius inverter: Fronius Ohmpilot set to highest priority. Note: Since in this case there is only one Ohmpilot and no other components in the system, the ranking is invalid.

Settings in the Solar.wattpilot app: The "Ohmpilot" limit value is set as high as possible. In this case, the limit value entered is 70°C.



3.4 Special case load management with the 4 digital I/Os

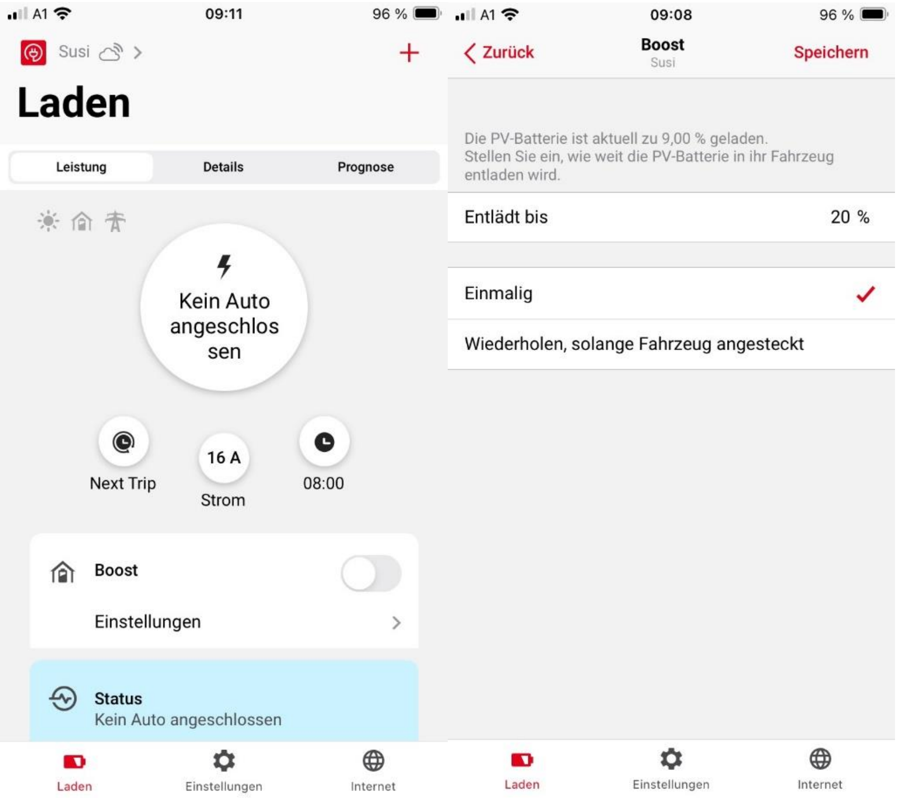
Special behavior applies to the rudimentary load management with the 4 digital I/Os on the Fronius inverter in combination with the Fronius Wattpilot. Fronius does not recommend operating the digital I/Os in parallel with the Fronius Wattpilot. The inverter - and therefore the energy management of the system - does not know the connected power that is to be controlled via the digital I/Os. This can therefore lead to undesirable behavior, especially with larger loads such as heating elements, as no prioritization is possible between the load management (digital I/Os) and the Fronius Wattpilot. The switching processes can therefore not be controlled.
When using the Fronius Wattpilot, the digital I/Os can at best be used for very small loads (e.g. pump with 500 W), where control is of secondary importance and does not affect the charging behavior of the Wattpilot.

IMPORTANT: Fronius advises against using the Digital I/Os and the Fronius Wattpilot at the same time, as the loads cannot be prioritized.

4 Prioritization of the components

4.1 Use case 1: Activate boost

The boost can be activated on the Wattpilot start page. If this is activated, the PV battery discharges into the car up to a set value. In the boost settings, you can specify the value up to which the PV battery should discharge. In this case, this value is 20%. If the "Repeat as long as vehicle is plugged in" option is activated, the Wattpilot is prioritized via the PV battery as long as the car is plugged in. With "Once", the PV battery discharges once up to the set value. The boost is then deactivated again.

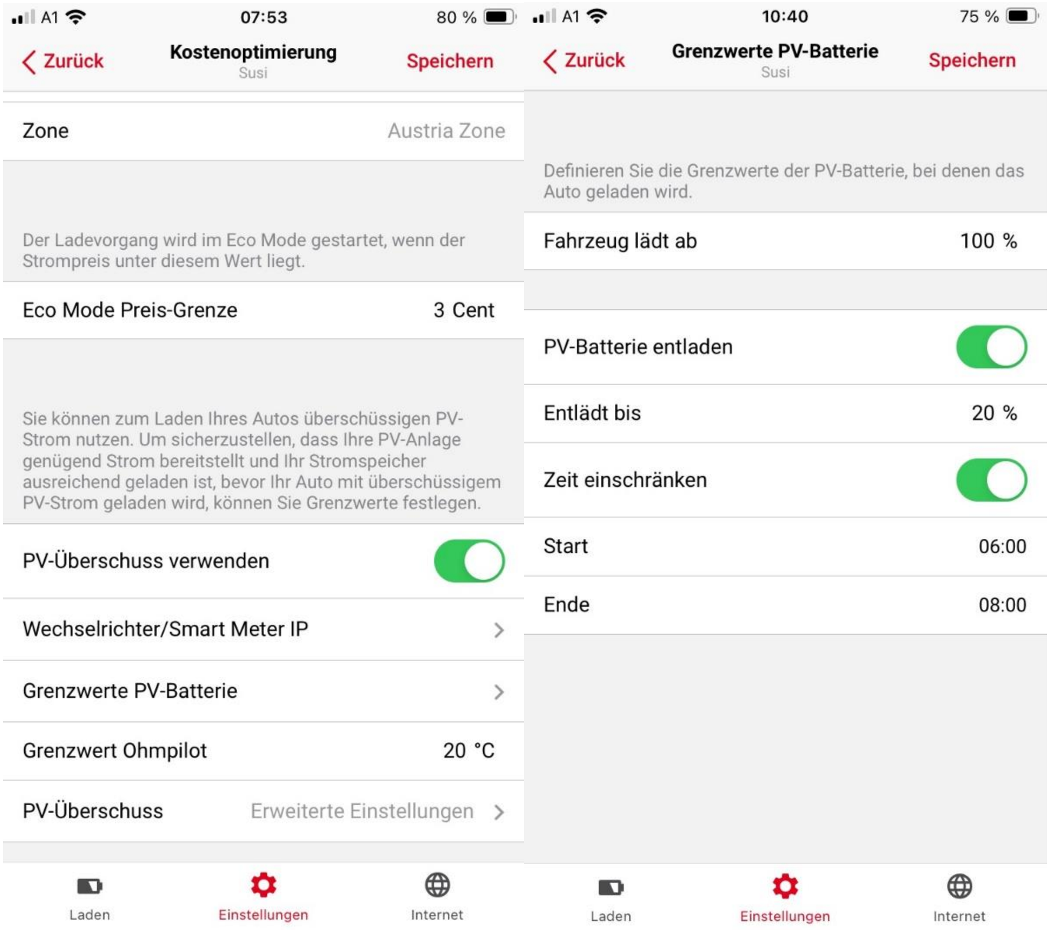


The boost is always useful when there is a surplus in rough quantities and the PV battery is quickly recharged. Let's assume it's summer and the customer has a doctor's appointment at 10 am. He activates the boost after getting up at 7 a.m. and the PV battery discharges completely into the vehicle before the journey begins. Due to the summer weather, there is enough surplus so that the PV battery is fully charged again before the customer gets home. The energy in the PV battery has been used efficiently without having to draw additional power from the grid and the PV battery is sufficiently charged again for night-time consumption.

The "Repeat as long as vehicle is plugged in" option is useful if the departure time is further in the future and the car should be fully charged if possible, but at the same time there is still enough time to charge the PV battery sufficiently for night-time consumption.

4.2 Use case 2: Discharging the PV battery correctly in summer

If you want a discharge threshold for the PV battery that does not have to be activated manually but is activated regularly, you can set this setting under "Cost optimization". If "Discharge PV battery" is activated, a time period can be set in which the PV battery is to be discharged to a target value. In this case, the PV battery discharges to 20% between 6:00 and 8:00 in the morning.



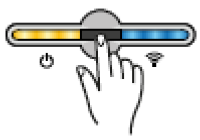
The aim is to make better use of the PV battery, charge the residual energy from the night into the electric car and thus create space for excess PV again. Because there is a lot of surplus energy in summer, the PV battery will be fully charged again by midday. This setting also has no influence on the prioritization of other PV components. Regardless of whether Ohmpilot, Wattpilot or the PV battery is charged first, the PV battery discharges into the e-car between 6:00 and 8:00 in the morning.

5 Settings on the Fronius inverter

5.1 Access to the web interface

Fronius GEN24 (Plus)/Verto (Plus)/Tauro

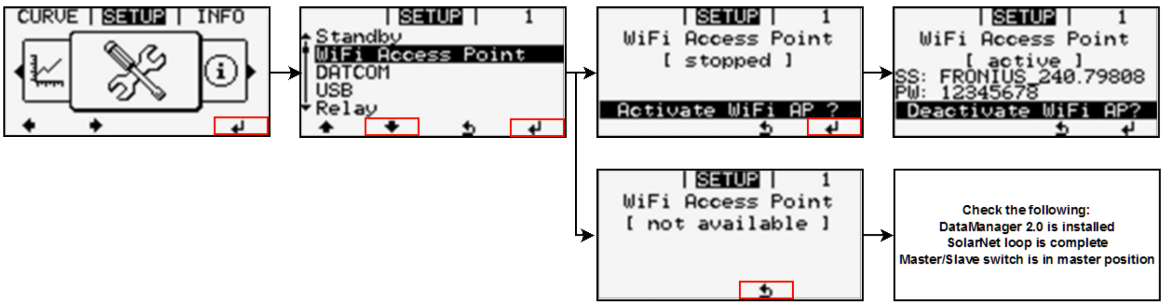
1. Open the inverter's access point by pressing the sensor➔ Right LED flashes blue.



2. Connect to the access point .
3. Open the browser and call up the web interface with the IP 192.168.250.181.

Fronius SnapINverter, Symo Hybrid and Datamanager Box 2.0

1. Activate access point.



2. Connect to the access point .
3. Open the browser and call up the Datamanager web interface in the address line with the IP 192.168.250.181.