L'AUTOCONSOMMATION SOLAIRE **OPTIMISÉE**

JUSQU'À **70%** **D'ÉCONOMIES** SUR VOTRE FACTURE D'ÉLECTRICITÉ





CEDRES ENERGY CONNECT

Photovoltaic self-consumption

Today, self-consumption of the energy produced by a PV system helps to achieve not only a quicker **return on investment**, but also a **significantly reduced reliance on fossil fuels**.

Normally, the **production of energy** by a photovoltaic system generates a **"bell" curve**, in which peak output coincides with the middle hours of the day. By contrast, energy usage in the home generally follows a different pattern to that of photovoltaic production, with peak demand in the early morning and through the course of the evening.

The advantage of **4-noks systems**, which use Apps and smart technologies, is that they offer **simple and immediate solutions** for taking a virtuous route toward **"intelligent" and automatic self-consumption**, by shifting part of the usage to coincide with the hours when the system is producing energy.

Three ways to optimize the self-consumption of energy produced:

Reorganize electricity usage to occur mainly when the system is producing energy

Store excess energy for use at a later time, for example with a **hot water storage system**

Convert energy consumption from other sources **to electrical energy**, for example electric heating or an electric vehicle

- PV system production
- Daily household energy usage
- Energy purchased from the grid
- Surplus energy sold to the grid
- Self-consumption

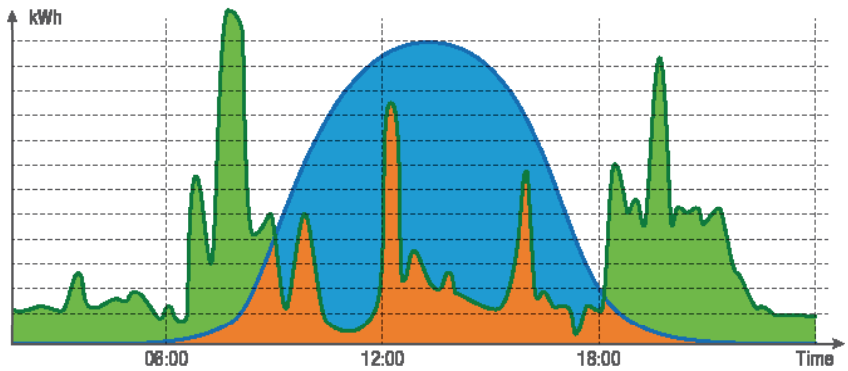


Fig. 1: graph showing production and use of electrical energy over 24 hours without 4-noks system

The green areas indicate the peaks coinciding typically with morning and evening hours, with no system available for the management of self-consumption.

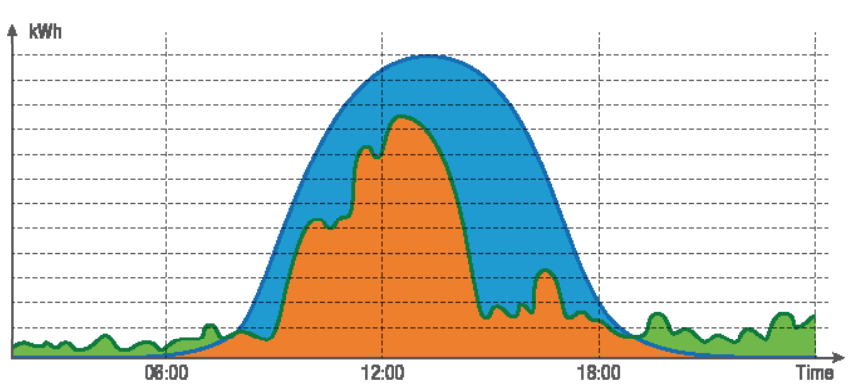


Fig. 2: graph showing production and use of electrical energy with Elios4you system and Power Reducer

The graph shows how 4-noks products offer the facility of maximizing usage during the hours when output from the PV system is highest: **a "smart" approach**, designed to exploit available energy to the maximum through **self-consumption**.

Savings on electricity bills guaranteed immediately and automatically, with no need for manual setting of household electrical appliance and water heating functions.

Increase self-consumption with “smart” energy management

With the **Elios4you Smart system** and **wireless accessories** for the automatic control of household appliances and electrical loads, **a proportion of energy usage can be moved with ease** to the time of day when PV energy is being produced, with **just a few simple settings on an App**.

With the 4-noks Elios4you system, users can:

- ✓ **use appliances** (e.g. washing machine*, tumble dryer*) during **daytime hours** when there is energy available from the PV system
- ✓ exploit the **heat pump*** to best advantage, using it only when surplus energy is produced by the PV system
- ✓ operate the pool **filter pump** "at no cost"
- ✓ heat the home using **electric radiators and towel rails** (e.g. bathrooms)
- ✓ **store hot water** using a system with electric heating elements
- ✓ **control everything directly from an App**, with the facility of **prioritizing activation** of the single electrical loads connected

* Functionality available only if supported by the household appliance connected to the system.

Applications



Elios4you
Operation of **heat pump** with **built-in relay**

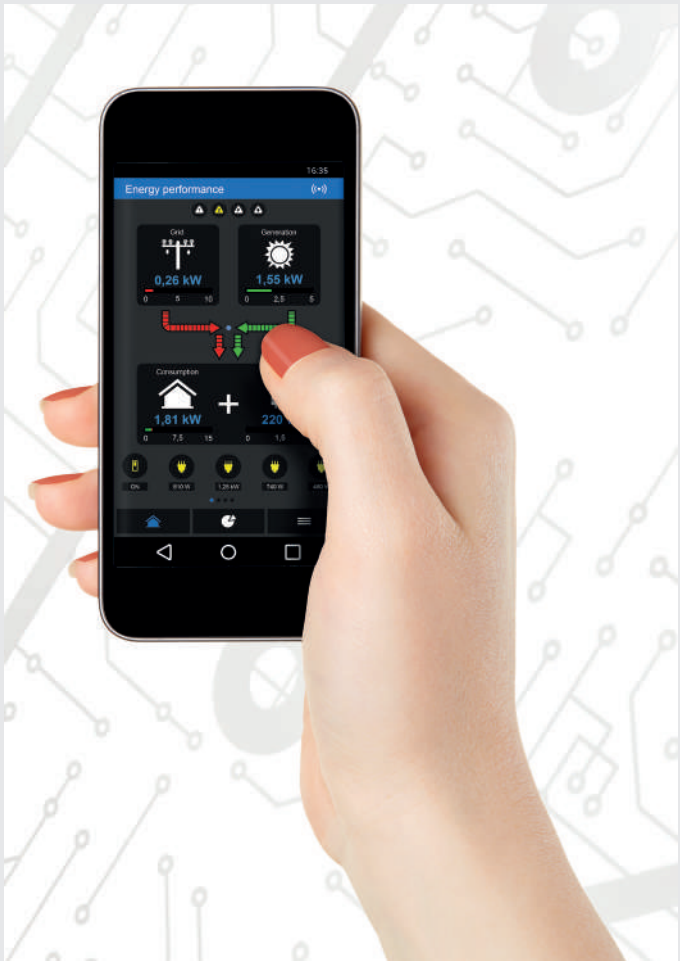


Smart Plug RC
Programming of household electrical appliances according to PV energy available



Smart Switch RC
Operation of **pool pump** or other electrical loads in self-consumption mode





Elios4you: guide to selection

Elios4you is the **energy manager** of the photovoltaic system.
Independently of the inverter, it measures both the energy **produced** by the system and the energy **consumed** by the user and traded with the grid — all in real time.

Features common to all models:

- ✓ measurement of power, energy produced and traded with the grid (sell/buy), and home consumption
- ✓ **built-in voltage-free relay contact** programmable via App to switch loads on and off according to the level of energy available
- ✓ inputs for management of system **alerts**
- ✓ 0-10V output for control of **Power Reducer**
- ✓ **Smart versions** (single phase and three-phase): Elios4you allows the use of **wireless sockets and relays to increase self-consumption** simply and automatically

Products compared

	Single phase system up to 6 kW*		Three phase system up to 15 / 50 / 100 kW*	
	 **E4U** Elios4you	 **E4U-S** Elios4you Smart	 **E4U-PRO-xx** Elios4you Pro	 **E4U-PRO-xx + PRO-SMART** Elios4you [Pro] Smart
Monitoring of production and grid connection	•	•	•	•
Programmable relay with voltage free contact	•	•	•	•
Compatible with Power Reducer	•	•	•	•
Compatibile with Power Reducer RC	--	•**	--	•**
Control of RC wireless accessories	--	•	--	•

* Selection of the device depends on the maximum rated power of the overall electrical system, not of the PV only (e.g. with an electricity contract for 60 kW and a PV system rated 20 kW, the requirement will be for an Elios4you Pro device rated 100 kW).
** Power Reducer and Power Reducer RC cannot be connected simultaneously in the same system.

Wireless accessories for self-consumption

Up to four devices can be connected, programmable directly from an App, with self-consumption viewed instantaneously.

	**ZR-PLUG-EU-RC** Smart Plug RC	Schuko standard wireless socket for self-consumption, with activation of household appliances (e.g. washing machine, electric stoves, dehumidifiers, etc.) programmed on the basis of available energy
	**ZR-SWITCH-RC** Smart Switch RC	Wall-mounted wireless socket for powering and activating electrical loads connected via terminals (e.g. air conditioning, pool pump, well pumps, electric radiant panels)
	**ZR-REP-E230-HA** Radio Repeater	Radio signal repeater with 230V power supply, used to extend the range of RC smart accessories

Maximizing self-consumption with hot water

With the 4-noks **Power Reducer** control unit, the photovoltaic system can be used to **produce hot water for sanitary and heating use**, **achieving a significant reduction in** gas or other fuel bills.

With Power Reducer, not even a drop of energy is wasted

When water is heated using an electric element (such as in a water heater or a storage cylinder), it can happen that the supply of energy effectively needed to operate the heater at full power may not always be available.
Thanks to Power Reducer technology, this is not a problem, since the device is able to **divert only the energy available from the PV system to the heating element**, exploiting even as little as a few hundred watts, **without EVER drawing power from the grid**.

Applications



Power Reducer with **water heater** for producing sanitary hot water



Power Reducer with **electric hot water buffer tank / storage cylinder**



Power Reducer with **heat pump** for heating water by activating only the supplemental electric heater





Power Reducer: guide to selection

There are **three models** of Power Reducer available, to meet different installation and operating needs: **two versions connectable to an Elios4you system**, allowing full App-based control; and a **stand-alone version**, for photovoltaic systems without monitoring functionality.

Features common to all models:

- ✓ linear modulation of power drawn by the electric heating element
- ✓ maximum load: 3.0 kW @ 230Vac 50Hz
- ✓ **Boost function**: 100% activation of load, irrespective of how much power is available from PV energy production.
  This function can be used to force the production of hot water (with a weekly timer if so desired), for example to meet an increased requirement, or during a particularly rainy winter period.

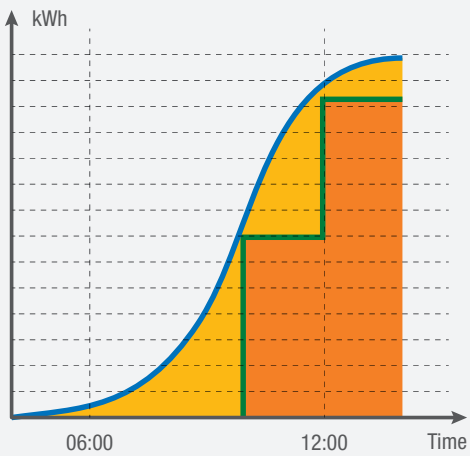
Products compared

	 **PR** Power Reducer	 **PR-RC** Power Reducer RC	 **PR-SA** Power Reducer SA
Compatible with **Elios4you** (E4U or E4U-PRO-xx)	•	•	--
Compatible with **Elios4you Smart** (E4U-S o E4U-PRO-xx + PRO-SMART)	--	•	--
Stand-alone use	--	--	•
Connection to Elios4you system	with cable	wireless	--
Power info available	from Elios4you device	from Elios4you device	with split core CT rated 70A (cable included, L = 3 m)
Display of data and programming (with weekly timer if needed)	"Elios4you" App	"Elios4you" App	not envisaged
Setting of parameters / thresholds	•	•	--

Example of operation

The amount of power consumed by the water heater will always reflect and remain **within the production curve of the photovoltaic system**, without generating the usage "peaks" typical of other household electrical appliances.

- PV system production
- Power consumed by household electrical appliances
- Energy diverted to water heating element
- Self-consumption for operation of household electrical appliances



Heat pump combined with photovoltaic energy

Why “give away” clean energy cheaply when it can be self-consumed for **air-conditioning and heating water, at no cost?**

All owners of a photovoltaic system who invest in a **heat pump** can use the energy provided by the solar panels permanently (and exclusively) to **produce hot water** for sanitary purposes, to **heat the home** and, in some cases, cool it in summer too... **Saving money!**

Advantages

- Maximizes power usage during the hours when there is most sunlight
- Increases **self-consumption** during the **winter months**, thanks to power modulation
- Optimizes use of the **heat pump**: activated only when there is energy available



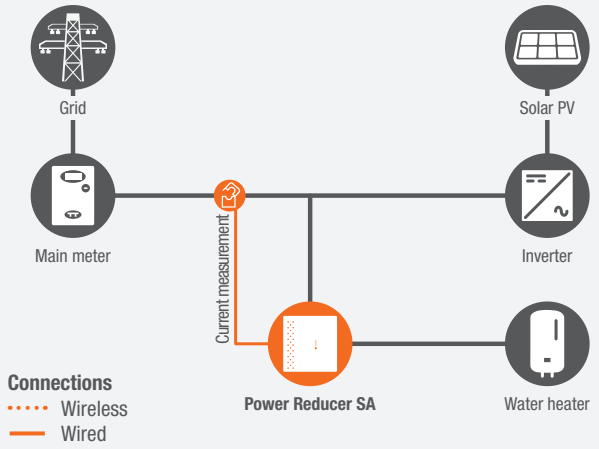


Examples of system configuration for heat storage

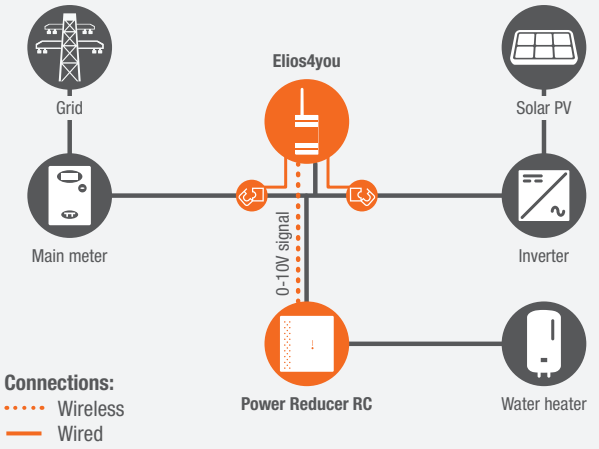
Production of hot water with electric heaters

Examples of connection designed to optimize self-consumption in applications with water heater or storage systems using electric heating elements.

Electric water heater with Power Reducer SA



Electric water heater with Elios4you Smart and Power Reducer RC

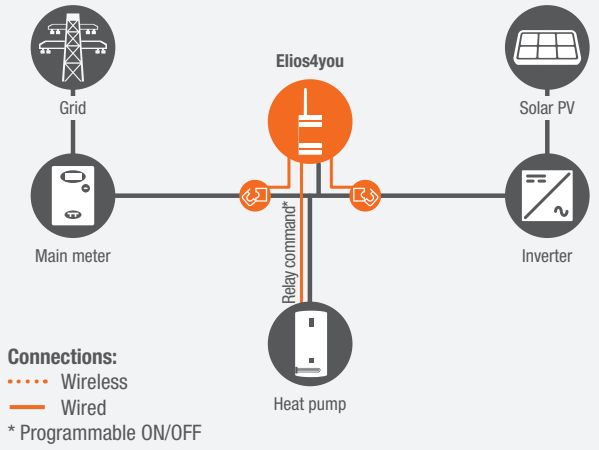


Production of hot water with heat pump

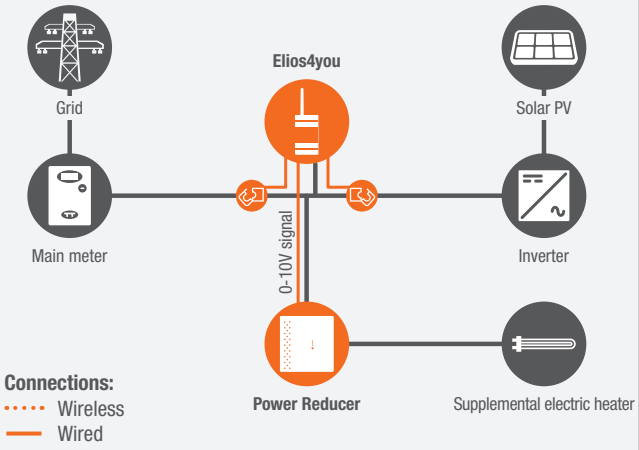
Examples of connection for **heat pump*** provided with auxiliary control input and/or **supplemental electric heater****.

* Solution viable only for heat pumps provided with digital auxiliary input. Check with the manufacturer that the product can be installed.
** Connect the Power Reducer directly to the supplemental electric heater of the heat pump. Check with the manufacturer that the product can be installed.

Elios4you connected to auxiliary input of heat pump



Elios4you and Power Reducer with supplemental electric heater



“Elios4you” Overview App

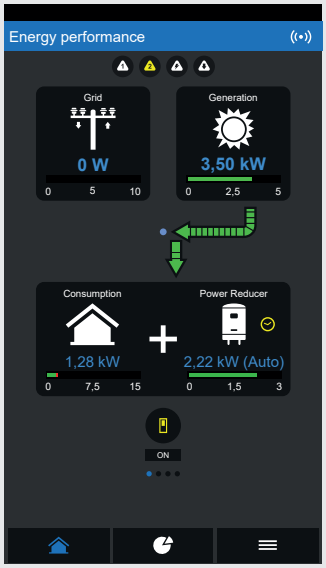
The **“Elios4you” App**, core element of the Elios4you system, allows the user to view the operation of the system **simply and clearly**, and in real time.

In addition, a quicker return on investment is achieved thanks to the facility of **setting detailed system parameters** and to the simple management of **self-consumption accessories.**

A **simple and intuitive graphic interface** gives the user full control over the system and the possibility of ensuring that the **energy it produces is managed virtuously.**

Download on the App Store GET IT ON Google Play

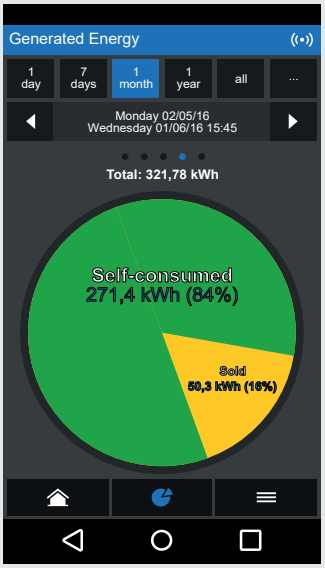
Free App providing local and remote control (no fee required for access to 4-cloud portal)



Home

At a glance, **in real time**, view key information that reflects how the photovoltaic system is operating:

- ✓ Power produced
- ✓ Power sold to / purchased from the grid
- ✓ Power used in the home
- ✓ Power used by devices connected to wireless accessories
- ✓ System alarms (external events, failed production, exceeded draw threshold, data)

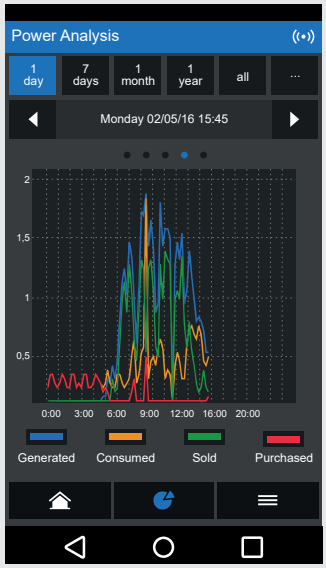


Energy produced / consumed

View of total energy produced during the selected period and proportion of energy self-consumed (as absolute and percentage value).

Viewing options:

- ✓ 1 day
- ✓ 7 days
- ✓ 1 month
- ✓ 1 year
- ✓ all

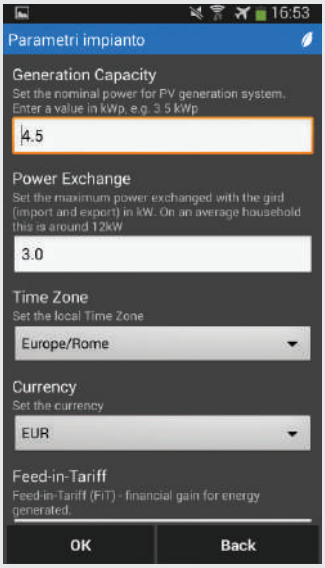


Power graph

The curve indicates how much power is produced, consumed, supplied to and drawn from the grid, over a period of time.
This is especially helpful in identifying usage habits and verifying improvements on the self-consumption front.

Viewing options:

- ✓ 1 day
- ✓ 7 days
- ✓ 1 month
- ✓ 1 year
- ✓ all

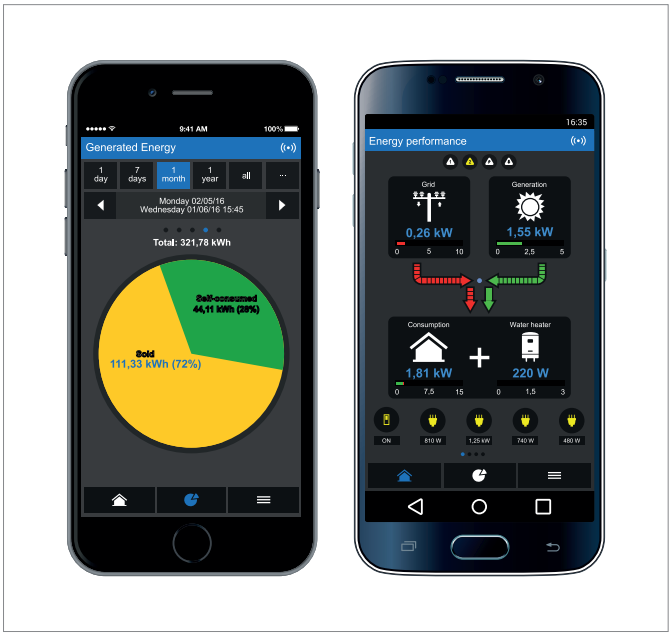


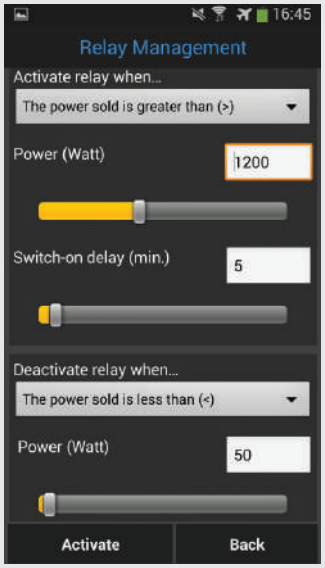
System parameters

Configuration of maximum power that can produced by the PV system, maximum power traded with the grid, and the production tariff of the system.
These settings allow graphs and operating statistics of the system to be generated correctly.

With the “Elios4you” App, the user can:

- ✓ control the production, usage and grid-connection of PV energy **in real time**
- ✓ see how much benefit self-produced energy is delivering
- ✓ manage the **activation of electrical loads in self-consumption**
- ✓ view **alarms** indicating malfunction or failed production

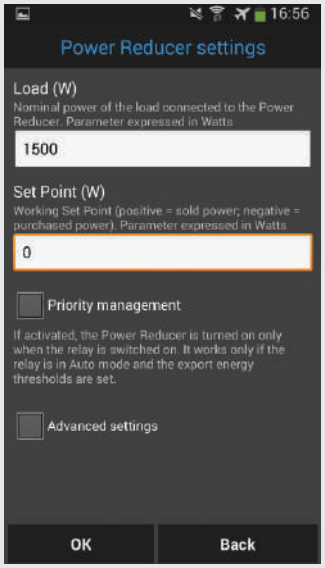




Built-in relay, Smart Plug RC, Smart Switch RC

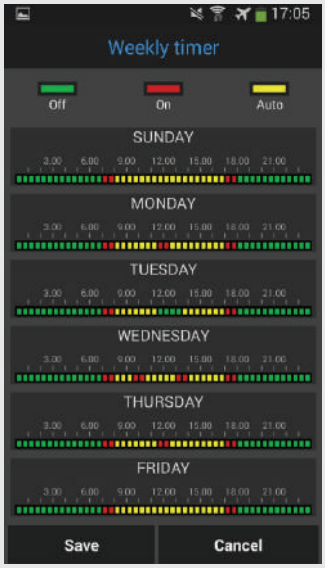
Activation and/or automatic shutoff can be programmed and controlled on the basis of:

- ✓ thresholds of power (W) put into or purchased from the grid
- ✓ delay in activation/shutoff (min) to avoid frequent and continuous changes of status
- ✓ configuration of a minimum operating period (min) to allow completion of the work cycle by the controlled load or device



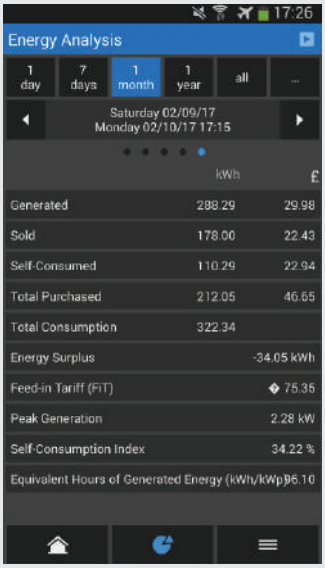
Power Reducer, Power Reducer RC

Whichever version of the Power Reducer is selected, wired or wireless, its use can be optimized so as to exploit all of the PV energy produced without supplying any to the grid, adjusting the amount diverted to the electric heater in real time.



Weekly timer

A timer allowing the user to plan slots over the course of a week when a load is to be switched on arbitrarily (regardless of whether or not photovoltaic energy is available), or in self-consumption mode (activated when free photovoltaic energy is available)



System data summary

- ✓ Analysis indicating operation of the system, energy usage and calculation of effective savings through self-consumption
- ✓ Configuration of time periods on which analysis is conducted; easy comparison for purposes of optimizing self-consumption

Our customers' choices

Detached property with single phase photovoltaic system rated 4.5 kW

Antonio: "With two electric panel heaters in the bathrooms and two in the bedrooms, I stay comfortable even in spring and autumn, without using the gas boiler".

Products Antonio bought:

Product	Code / Name	Description
	**E4U-S** Elios4you Smart (1x)	Monitoring and self-consumption device
	**ZR-PLUG-EU-RC** Smart Plug RC (4x)	Wireless socket for programmed activation of **panel heaters**
	**ZR-REP-E230-HA** Radio Repeater (1x)	Radio signal repeater with 230V power input



Terraced house with single phase system rated 3.8 kW and heat pump

Marco: "Warm in winter, cool in summer, and with savings too, as the heat pump operates entirely in self-consumption mode".

Products Marco bought:

Product	Code / Name	Description
	**E4U** Elios4you (1x)	Monitoring and self-consumption device connected to the heat pump
	**PR** Power Reducer (1x)	Power Reducer connected to the element of the **storage water heater**



Two-storey, two-family dwelling with single phase system rated 5.5 kW

Maia: “I replaced the solar heating system with a PV system. Now I spend less on heating the water and on electricity in general: when I run the washing machine, it costs nothing!”

Products Maia bought:

Product	Code / Name	Description
	**E4U-S** Elios4you Smart (1x)	Monitoring and self-consumption device
	**ZR-PLUG-EU-RC** Smart Plug RC (1x)	Wireless socket for programmed activation of washing machine dependent on energy available
	**PR-RC** Power Reducer RC (1x)	Wireless Power Reducer connected to hot water storage and used for solar heating



Villa with outdoor pool and three-phase system rated 12 kW

Michele: “At my house, I know the pool is always clean and the basement free of damp, and with PV there's no cost”.

Products Michele bought:

Product	Code / Name	Description
	**E4U-PRO-15 + PRO-SMART** Elios4you [Pro] Smart (1x)	Monitoring and self-consumption system for three-phase PV system
	**ZR-PLUG-EU-RC** Smart Plug RC (2x)	Wireless sockets connected to **dehumidifiers** installed in the basement
	**ZR-SWITCH-RC** Smart Switch RC (2x)	Wall-mounted wireless socket used to power and activate the **pool pump**



Our customers' choices

Farm holiday structure with swimming pool, spa bath and three-phase system rated 18 kW

Nicoletta: "On my premises, with a Power Reducer and hot water storage tank installed, I can heat the pool all year round at no cost".

Products Nicoletta bought:

Product	Code / Name	Description
	**E4U-PRO-50 + PRO-SMART** Elios4you [Pro] Smart (1x)	Monitoring and self-consumption system for three-phase PV system
	**PR** Power Reducer (1x)	Power Reducer connected to the element of the **storage water heater**
	**ZR-SWITCH-RC** Smart Switch RC (3x)	Wall-mounted wireless socket used to power and activate **air conditioning** in communal areas



Middle school with sports facility and photovoltaic system rated 70 kW

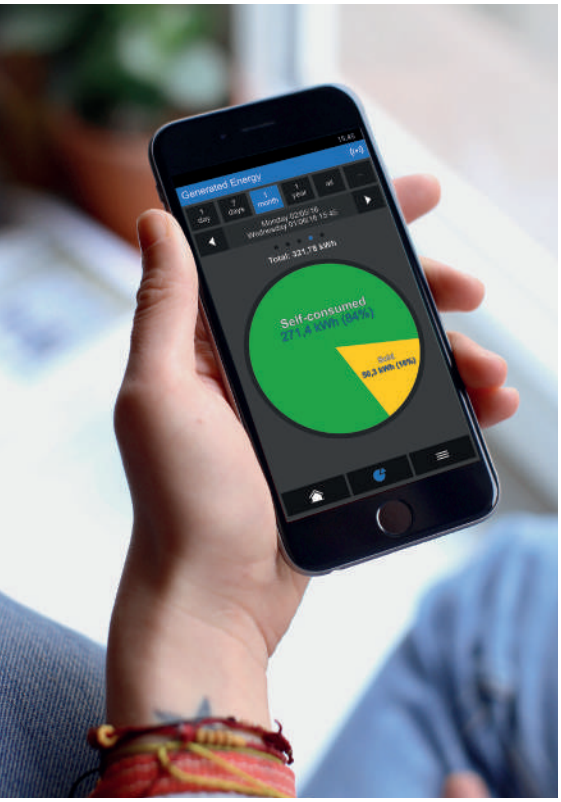
The Head Teacher: "After training, free showers for all the students, courtesy of solar energy and 4-noks technology"

What products were bought:

Product	Code / Name	Description
	**E4U-PRO-100** Elios4you Pro 100 kW (1x)	Monitoring and self-consumption system for three-phase PV system
	**PR** Power Reducer (3x)	Power Reducer connected to the element of the **storage water heater**



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