Using solar energy to heat water: how and why Power Reducer can help

Problem: why are those "energy bills" not coming down?

Many residential users who have **photovoltaic panels and a hot water storage system** remain dissatisfied with the efficiency of their set-up: they are able to generate clean energy, but find they cannot significantly reduce the amount of **electricity and gas** they continue to **purchase** for the purpose of **producing domestic hot water**.

The need for hot water does not always coincide with the moment when photovoltaic energy is available for self-consumption.

Similarly, it often happens that the **clean energy produced** will not be utilized. Instead, it is **exported to the grid**, but at **considerable economic disadvantage** to the customer.
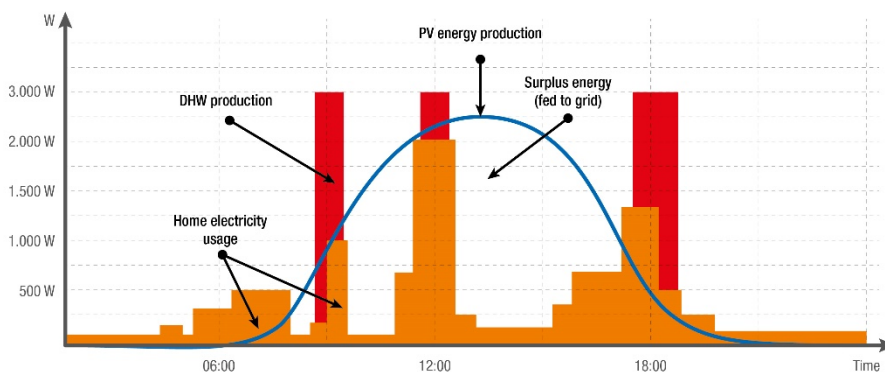

Fig. 1: Example of electricity usage for DHW with indication of energy produced by photovoltaic system and exported to grid.
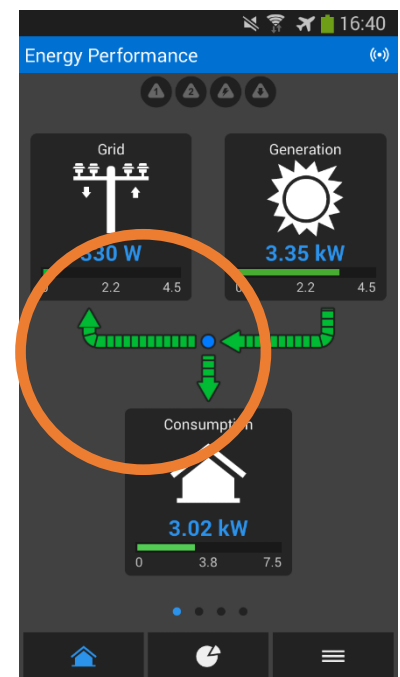

Fig. 2: "Elios4you" App shows energy exported to grid

## The solution: use Power Reducer

Self-consumption of surplus energy to **produce domestic hot water** is the ideal solution for this problem. Simply add a **Power Reducer** control device to the system (operating in conjunction with Elios4you).

The Power Reducer is connected to the heating element of the storage system. Once installed, it will **automatically** use any surplus photovoltaic energy to heat water, rather than allowing it to be supplied to the grid.

What's so special? With the Power Reducer, **all** available PV energy is used to heat water, so there is **no need** to **purchase energy from the grid**.

How do I configure the system?

Used in conjunction with Elios4you, the Power Reducer can be connected to:
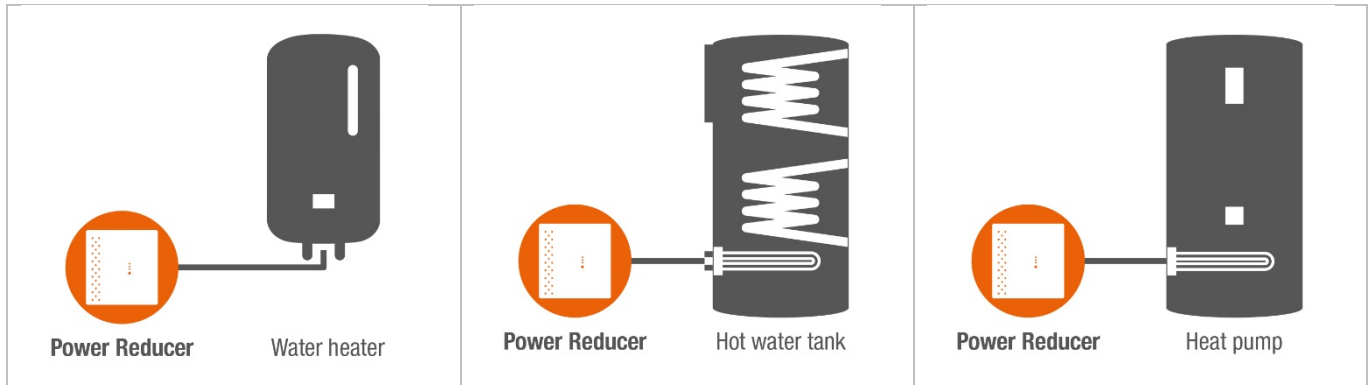
How does it work?

The Power Reducer **regulates the amount of electricity supplied to the element of the water heater in real time**, according to how much energy is actually available. This means that the storage tank operates only in self-consumption mode.
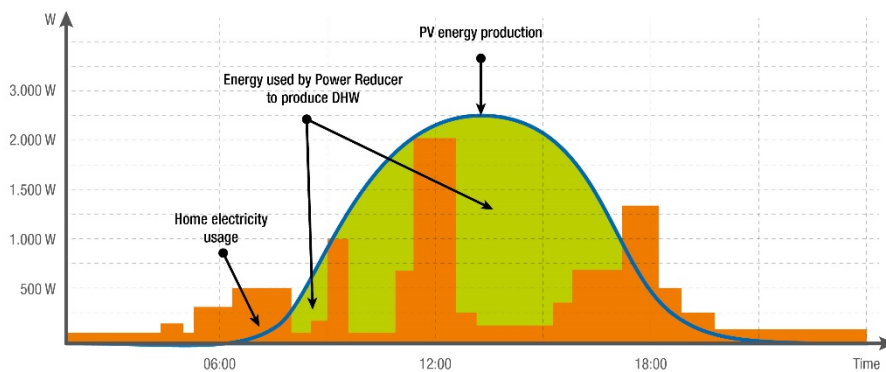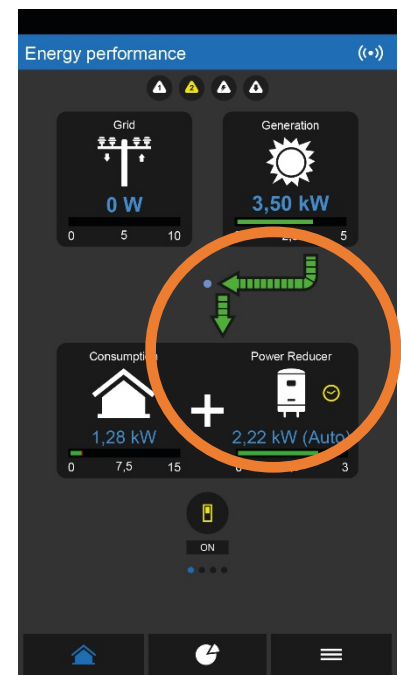

Fig. 3: How energy is used with the Power Reducer

Fig. 4: "Elios4you" App shows self-consumption energy used to heat water in storage tank

Fig. 3: in the example illustrated, even the small amount of clean energy available between 07:00 and 08:00 is used to heat water.

Result: lower bills

Using the Power Reducer, it becomes possible to **cut spending both on electrical energy and on gas**.

Why is less electrical energy used?

1. **With no Power Reducer**, hot water is produced by means of a heating element in simple **on/off** mode, often requiring the purchase of electricity from the grid
2. **With a Power Reducer**, the electric water heater draws a level of power **variable between 0 and 100%** of its maximum rating
3. This means that water can be heated **without purchasing electricity from the grid** and using only electrical power produced by the photovoltaic system

How are savings on gas achieved?

1. **With no Power Reducer**, hot water is produced **entirely** by the **gas boiler**, which must raise the temperature of the water **from 20 °C to 70 °C**, for example.
2. **With a Power Reducer**, the water is stored at a higher temperature: all available watts of photovoltaic energy are used to heat the water, thereby creating a **hot water storage** facility
3. The gas boiler is required only to provide the final stage of heating: for example, raising the temperature **from 50 °C to 70 °C**. And to do this, it **uses less gas**.

Can water be heated even when there is no photovoltaic energy available?

Yes. Using the **"Boost" function**, the heating element of the hot water storage system can be activated at its maximum rated capacity: 100%. This means that the water will be heated at full power, whether or not there is photovoltaic energy available.

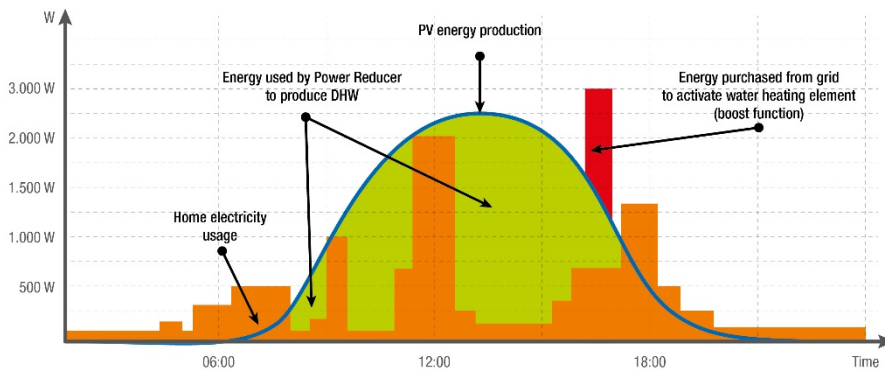The Boost function comes in handy during winter, for example, or in adverse weather conditions.

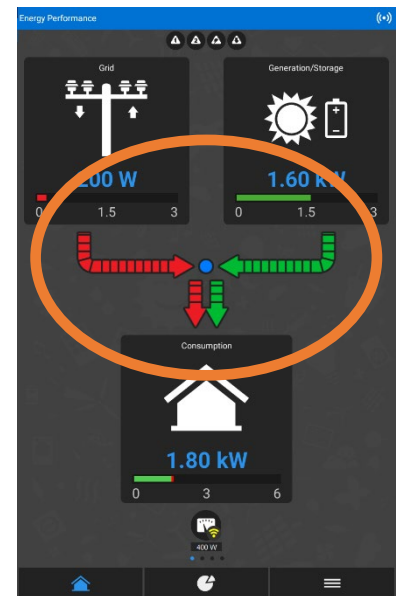*Fig. 5: Activation of heating element forced by way of "Boost" function*
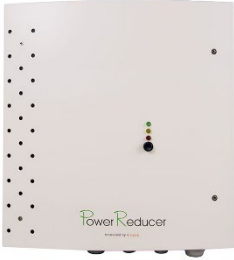

Fig. 6: "Elios4you" App shows energy self-consumed and drawn from grid by activating "Boost" function

"Boost" mode can be activated directly from a control on the Power Reducer device, or by way of the "Elios4you" App (timer function also available).

Models available

The Power Reducer is available in three models:

Power Reducer (standard version) for wired connection to Elios4you (single phase/three-phase)	**Power Reducer RC** (wireless version) for RF connection to Elios4you Smart (single phase/three-phase)	**Power Reducer SA** (stand-alone version) can be installed without Elios4you but provides no remote control