



ECOmulti

A simple wall mounted energy storage solution



Nighttime

During the night the **ECOmulti** is disconnected from the grid. The home is powered by energy stored in the battery. The **ECOmulti** will reconnect the grid when the battery is discharged.



Battery charging

The next day, when the PV array produces sufficient power to supply the loads and to start charging the battery, the **ECOmulti** will regulate charge current to absorb nearly 100% of the surplus PV power.



Discharging during the day

When PV output is reduced by clouds or when a power hungry load is switched on, resulting in no surplus PV power available, battery charging will stop. Insufficient PV power will be supplemented by power from the **ECOmulti**. In case of overload power will be imported from the grid to supplement power from the **ECOmulti** (GridAssist function), and system shut down due to overload will be prevented.



Battery fully charged

Once the battery is fully charged, additional loads (for example the water heater) can be switched on, or surplus power will be exported to the grid.



End of the day

The **ECOmulti** disconnects from the grid about 10 minutes after PV power has become insufficient to provide any charge current. In order to prevent false disconnections due to lack of sun during the day, the inverter/charger also uses an internal timer to predict the end of the day.

UPS function

When the grid fails, the **ECOmulti** will continue to power the home.

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Sizing the PV array

Sufficient energy must be harvested to recharge the battery and to power the home, even on a reasonably clear winter day.

At roughly 50 degrees latitude (Seattle, London, Amsterdam, Berlin, München) the two person energy conscious household will need a 2,5 kWp array. A four person household would need a 5 kWp array.

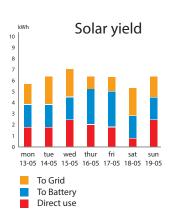
At roughly 30 to 40 degrees latitude (Los Angeles, Marseille, Sevilla) a 1 kWp resp. 2 kWp array will do.

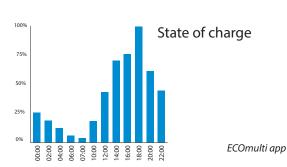
A larger PV array will increase feedback into the grid, but not substantially increase battery utilization and self sufficiency.

Increasing storage capacity

More battery storage capacity will reduce feedback into the grid and increase self sufficiency, especially during the summer season.

To increase self sufficiency during wintertime both the battery and the PV array have to be enlarged.







Why 2,3 kWh?

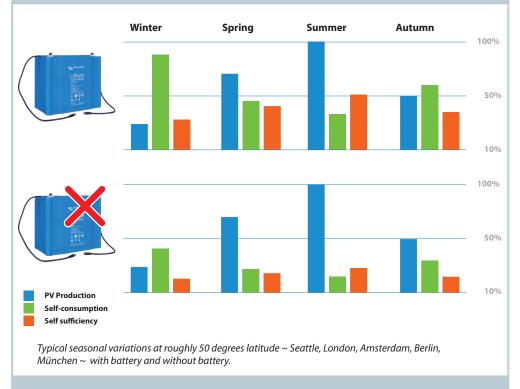
Whenever PV output exceeds consumption, storing excess output for later use will increase self-consumption.

However

- PV harvest will fluctuate from season to season, from day to day and also within the day.
- Electricity consumption is likewise fluctuating: working days, weekends and holiday periods will all result in different consumption patterns.

A 2,3 kWh Li-ion battery is an efficient solution for a two person energy conscious household. Energy consumption from dusk to dawn will be 2 kWh or more, even when no energy hungry appliances like a dishwasher or clothes dryer are used. A fully charged 2,3 kWh battery will therefore be discharged before the sun starts shining again.

The average household with two children would fully utilize a 4,6 kWh Li-ion battery; one additional battery module.



Two person energy conscious household

Consumption: 2500 kWh per year PV array: 2,5 kWp Battery: 2,3 kWh Li-ion

Two person energy conscious household

Consumption: 4500 kWh per year PV array: 5 kWp Battery: 4,6 kWh Li-ion





A simple wall mounted energy storage solution

The **ECOmulti** can be wall mounted, is easy to install, easy to program and easy to operate.

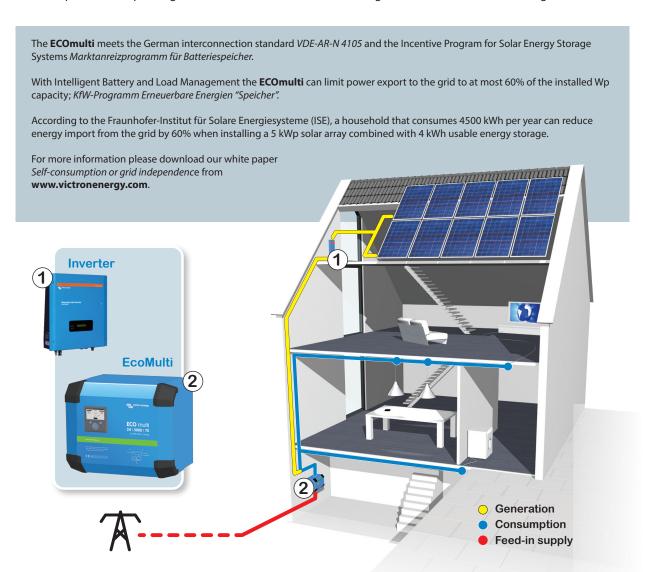
Extremely flexible

- Energy storage can be increased by adding battery modules.
- AC power can be increased by paralleling **ECOmulti** modules.
- Three **ECOmulti** modules can be configured for three phase operation.

More self-consumption, more independence

With 2,3 kWh Li-ion storage capacity and a 3 kVA bidirectional inverter, the **ECOmulti** reduces dependence on power from the grid.

The growing interest in self-consumption is driven by increasing retail electricity prices and simultaneously decreasing feed in tariffs. Feed in tariffs are decreasing a. o. because it becomes increasingly difficult, and expensive, to ensure stability of the grid as more solar and wind power comes on line. Simultaneously, the retail price of electricity is increasing, to cover these same costs plus the cost to keep conventional power plants in hot standby to back-up renewable power generation in case the sun is not shining and/or the wind is not blowing.



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