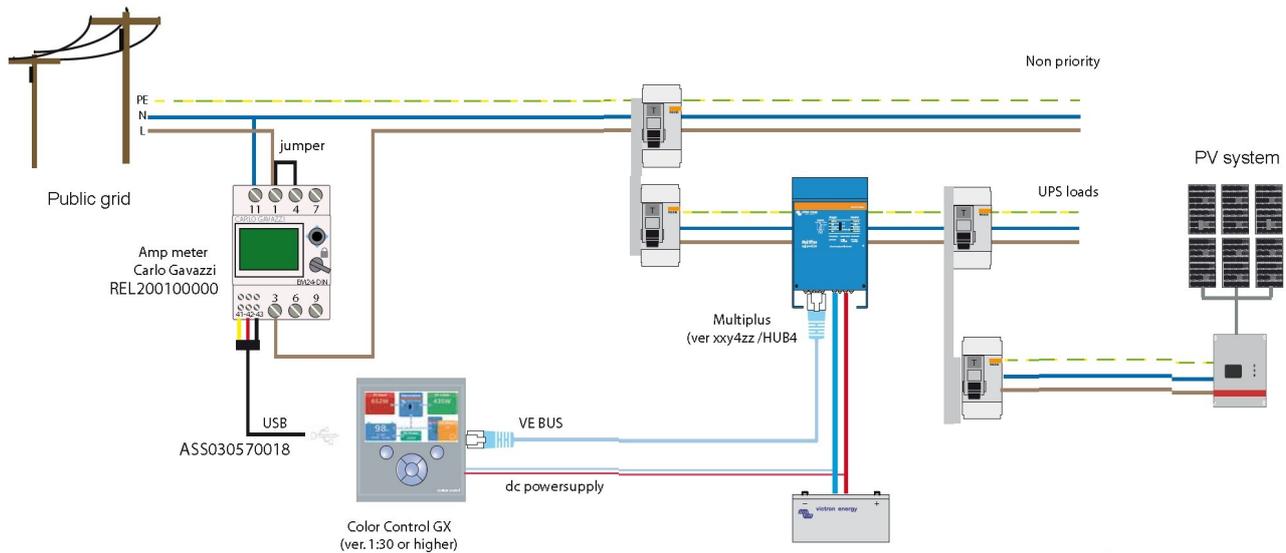


# SOLAR UK

## Battery Storage solution for excess PV production



### **Battery Storage Principle Operation**

The current flow to and from the Grid is monitored by the Carlo Gavazzi Amp meter.

If there is PV power being generated over and above what the household is consuming the excess would normally flow back onto the grid, however the Amp meter detects this and instructs the Multiplus to charge the battery bank.

Should the Amp meter detect current flowing in from the grid it will instruct the Multiplus to discharge the batteries.

If the household load exceeds what the PV and Batteries can supply, power will be drawn off the grid in the normal manner, likewise if the batteries are fully charged excess PV will go back on to the grid.

In the event of Grid failure the Multiplus will isolate the non-priority load but use the batteries to keep the priority loads (UPS) "live", so any household load on the protected supply will continue as long as there is Battery power which also can still be topped up from the PV.

This will give you an advantage of using your PV system to generate power during a power cut and also power critical loads i.e. freezer, heating controls.

<b>PV System Specifications</b>	3 KWP (12 PANEL) SOUTH FACING +1 KWP WEST FACING ON FRONIUS AND ENPHASE INVERTERS
<b>Battery Storage System</b>	VICTRON 3 KW MULTIPLUS WITH 4 X 200 AH GEL BATTERIES (9.6KWH CAPACITY GIVING NOMINAL 4.8KWH STORAGE)
<b>LOCATION</b>	SOUTH EAST
<b>KEY BENEFITS</b>	ESTIMATED 675 KWH OF EXCESS PV PRODUCTION THAT WOULD HAVE GONE BACK TO THE GRID HARVESTED AND UPS POWER AVAILABLE DURING GRID FAILURE
<b>COMMISSIONED</b>	MARCH 2016

The Property had an existing PV system claiming the Feed in Tariff and because the Victron Charge controller has it's own Inverter the connection is made on the AC side so does not change the PV production or Feed In Tariff payments.

The Current sensor on the incoming mains supply provides the information for the Charge controller to either divert power to the batteries or discharge power to supply power to the house (up to 3 KW with this particular charge controller) As the client has a hot tub that has a very high current draw the additional power is taken off the grid. Normal household use can be supplied purely from the Victron Charge controller.

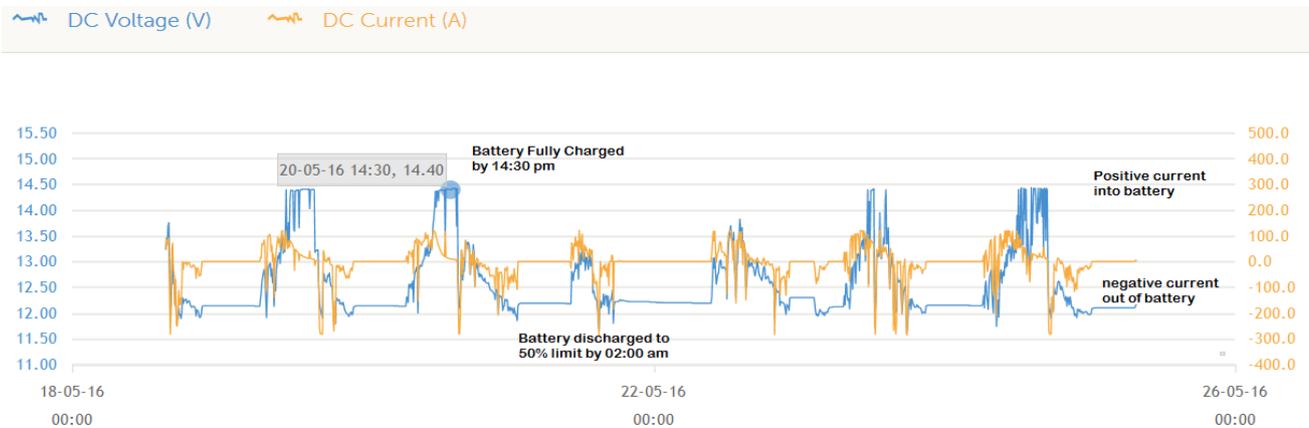


The Batteries, although being relatively heavy, are compact and more capacity can be easily added. The system does not change the FIT payments in any way because the PV energy has already passed through the generation meter before going to the batteries (unlike the DC Charge Inverter systems such as Growatt or Tesla)

Victron has extensive web based monitoring allowing data analysis of the system performance (such as the charge/discharge graph below). The Battery voltage and DC current flow from the graph below over a 6 day period in May show the PV system had fully charged the batteries with energy over and above the household usage by 2:30 pm so the PV and Battery system balance the power so no energy is taken from the grid (until the hot tub heater draws more than the

3KW load which is shown by the DC current spiking down to -270 amps discharge)

Although there is excess PV power available to charge more battery capacity there is a trade off in winter where the amount of excess PV production is limited and won't fully charge the existing size of battery. It is possible to charge the Batteries from the grid so if a cheap tariff is available it can be used to offset the peak time energy usage from the grid.



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