

Plug-in storage and backup power

John Rogers describes his simple backup battery system.

Shortly after upgrading my 6kW rooftop solar system in 2019 to 13kW, I installed a 10kWh DC-coupled LG Chem battery. At that time, I chose not to install equipment to allow the battery to provide backup power in the event of a power outage as blackouts were so rare and the cost to do so was not justified. My reasons for having a battery was to avoid importing power from the grid during overcast periods during daytime and to power the house overnight.

After further upgrading my solar panels to 15kW I found that I could charge a battery larger than my current 10kWh battery—which frequently did not last all night in winter. I enquired about upgrading my battery and was advised that this was no longer possible. As my battery had been replaced under warranty after five years, replacing a one-year-old battery was even less responsible than it would have been prior to its being replaced.

On investigating purchasing a battery—the type also known as a solar generator or power station, that could simply plug into one of the house's power outlets—I discovered that there were many brands available, such as Bluetti, VoltX, EcoFlow and DJI.

I then investigated my house's times of power usage to see if I could identify appliances that could be moved onto separate circuits so as to run off a power station independent of the existing house battery. The refrigerator/freezer, modem and video projector all fitted the criteria. As well as reducing the overnight load on the existing battery, powering the refrigerator/freezer and modem from the power station would also provide backup power to these appliances in the event of a power outage.

The power station could, of course, be placed next to the relevant appliance. However, I was fortunate in that placing the power station and its two expansion batteries in my garage positioned them next to my modem and on the other side of the kitchen wall where the refrigerator/freezer was located. Another happy coincidence was the unused 15 amp power outlet at this location which could be used to charge the power station from my solar panels. Although not absolutely necessary, having its own circuit simply meant that kitchen appliances etc could not accidentally overload the power station's circuit. In order to power the appliances from the power station, the appliances can be plugged into the power station via extension leads. Alternatively, an electrician could run cables from male inlet sockets adjacent to the power station to new regular power outlets adjacent to the relevant appliances. The power station would then simply plug into the new male inlet sockets via short extension leads.

My new 5kWh power station plugs into a power outlet via a timer plug which currently charges the power station between 11.30am and 6.30pm. I delay charging the power station until 11.30am so as to maximise exporting solar power to the grid in the morning. Likewise, I delay charging the house battery until midday from October 1 until March 1 and until 11.00am in March and September. From April 1 until August 31, charging the battery all day is prioritised over exporting power to the grid.

I chose to install a DJI Power 1000 and two DJI Power Expansion



The left power outlet powers the video projector etc and the right outlet powers the modem and refrigerator/freezer. Image: John Rogers.

Batteries (of a maximum of five) which gives me a total of 5kWh extra storage. Hopefully in the future, those without an existing PV system could choose a DJI Power 2000 unit, as this unit is capable, in approved countries such as Germany, the UK and Utah in the USA, of also exporting to the grid via the power station's charging lead (this isn't legal in Australia). In this configuration, solar panels are plugged into the DJI Power 2000. When this 2kWh base unit, and up to ten expansion batteries for this larger unit, is coupled to a handful of solar panels, it is described as plug-in solar. Such a system would be ideal for apartments with balconies and for renters.

Although I could have plugged DJI's solar panels into my power station, I chose to leverage my existing 15kW of panels to charge the additional 5kWh storage unit. Naturally I am keen to see how my 15kW of panels and 15kWh [in total] of batteries perform in winter.

Exporting to the grid via a DJI Power 2000 is explained at youtu.be/NvmMT_bq_RM. Exporting via the EcoFlow system can be seen at youtu.be/tSnYETHGpIU

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John became environmentally aware in the early 1970s and has been energy conscious ever since. He lives in his all electric, energy efficient home in Tarneit, Victoria with a 15kW PV system, cool roof, battery and EV.