



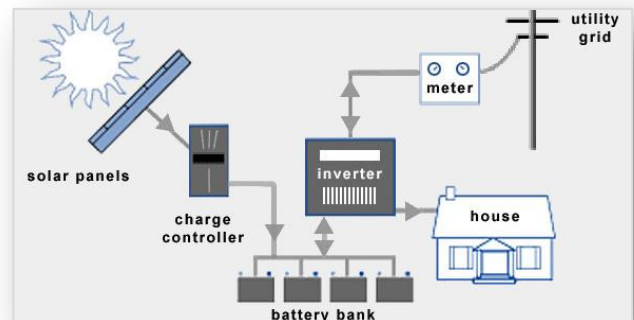
HYBRID HOME BATTERY SYSTEMS

Everything you want to know about HYBRID battery systems

A Hybrid Solar system is a grid-connected energy system designed to minimise your reliance on the grid.

A battery stores excess energy from the sun for use at night or during overcast or rainy days. Depending on the type of inverter used, the battery can also store energy purchased from the grid at off-peak prices (Time-of-use tariff required).

Some inverters have a UPS¹ function that allows using solar generated or battery energy when the grid goes down.



Most solar systems are DC coupled:

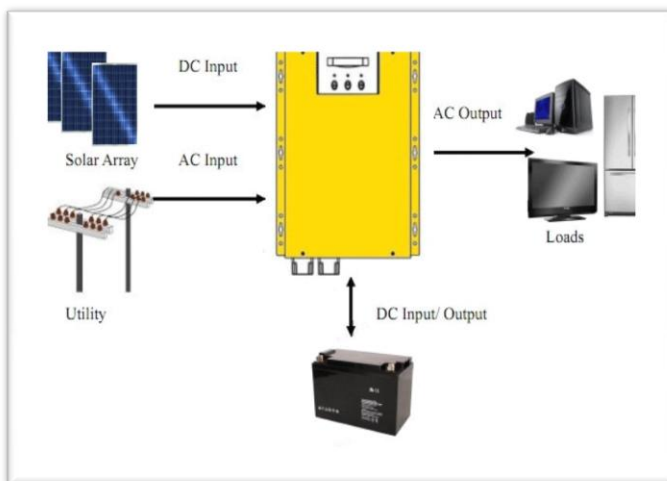
The panels or modules supply a DC voltage to the inverter, where it is converted into 240V AC for use in your home. The battery also requires DC Voltage for charging.

Some systems are AC coupled:

Every solar panel has its own "micro inverter" that turns DC into 240V AC right at the panel. The batteries are also AC batteries that can be added by plugging them into a standard power point. These types of systems have their pros and cons: The major setback so far has been the difficulty in incorporating a UPS function².

What are my options when adding batteries to existing solar panels?

Terms like 'plug and play', 'battery upgradable', 'battery ready' and 'battery compatible' are just some of the terms that are being thrown around, making the topic more than a bit confusing.



The role of the inverter in a traditional solar power system is to convert the DC from the panels into the alternating current (AC) commonly used in buildings (240V AC). Adding batteries into the mix, the inverter also has to act as a battery charger and provide DC (Direct Current) of the right voltage to the batteries.

This DC can come from the solar panels or from the grid (via a battery inverter) in form of cheaper off-peak energy.

This is important: Most solar inverters installed in Australia cannot perform this 'charging' function nor can they be upgraded.

'Plug and Play' battery systems are being promoted to overcome this obstacle. But even with these, some caution is required. For example, your inverter may be positioned in a location that is not well suited for adding batteries – relocating the wiring can cause significant costs on top of the battery costs.

¹ Uninterruptible Power Supply

² ENPHASE, the most common AC battery system, does not currently have a UPS function

What about my electricity meter?



With every solar installation a bi-directional meter is required. When you add battery storage and want to have the option of purchasing 'cheap' off-peak energy, the meter also needs to be a TOU meter (also called 'Interval' meter).

Interval meters (Or 'Smart Meters' when they can communicate both ways) measure your power consumption in intervals of 15 or 30 minutes and can be programmed to have different tariffs for different times of the day. They can also accommodate feed-in tariffs for surplus daytime power you might want to export.

Once you have solar power and battery storage, it becomes essential to have the Battery Management Software (BMS) that allows you to maximise self consumption, switch from one source of power seamlessly to another and communicate with your home computer network about your success in becoming more and more independent!

Let's have a closer look at some of the more common battery storage solution on the market.

Common battery storage systems

- **TESLA Powerwall.**

The Powerwall is a 7kWh (nominal) high voltage battery that in most cases can be directly connected to the strings of the solar array on your roof. It comes with a battery inverter (charger) and all control and communications gear (BMS). The Powerwall has UPS functionality and can accept charge from a solar array or the grid.

Most EXISTING solar inverters are likely NOT to work with the Powerwall and will need to be replaced at extra cost.

- **LG Chem RESU**

The LG battery provides 7kWh (nominal) and is charged with 48V DC. The required battery inverter (charger) is part of the package. Similar to TESLA, a new Hybrid Inverter such as the SMA 'Sunny Island' needs to be purchased separately. The RESU also offers UPS functionality.

Most EXISTING solar inverters are likely NOT to work with the LG RESU and will need to be replaced at extra cost.

- **SUNVERGE SIS**

Available in 6 sizes between 6 and 23kWh. The SIS is a high voltage 'Plug-and-Play' solution with integrated Hybrid inverter (Replaces your current solar inverter) and UPS functionality,

Questions to ask when considering HYBRID Solar Battery Systems

- ? Can I keep my existing inverter?
- ? How much will a HYBRID inverter cost me?
- ? Do I need to rewire my solar panel output cables to accommodate the battery?
- ? Does the system seamlessly switch between grid and battery/solar power (UPS)?
- ? Can the inverter limit or shut down export into the grid if the network provider requires that³?
- ? Does the quoted price include a Smart or (at least) Interval power meter?
- ? Can my existing meter be re-configured?
- ? Does the battery storage system support micro grids?



³ Where the grid infrastructure is poor and solar uptake is high, grid overload situations can occur. Some network providers require therefore inverters that can be directed remotely NOT to export.