

Battery ready solar inverters

A **'hybrid'** inverter is so called because it does two jobs. It manages both the solar panels AND a storage battery.

If you were told by a solar sales rep that the system you were buying from them was 'battery ready' but when it came time for the battery to be bought and plugged in, they said that you would have to buy another inverter, costing about \$3,000, do you think you would feel you had been deceived?

Would you still feel tricked if you couldn't see the extra inverter you were buying, because it was hidden inside the battery cabinet?

The undeniable truth is that if the **inverter** doesn't have a positive and negative input on the underneath of it labelled 'Bat' or 'Battery' then it is NOT battery ready and never will be. The inverter pictured below IS battery ready. (Continued next page...)



In this picture the inverter is the little box on the right (Huawei) and the silver box on the left is the battery (LG Chem)

Popular inverter models available in 2020 that are NOT 'battery ready'.

Fronius Primo, Fronius Symo

SMA Sunny Boy, SMA Tri-Power

Goodwe models that don't contain the letter 'E'

Growatt TL-X, TL-3

Sungrow KTL-D, KTL-MD

Popular inverter models available in 2020 that ARE 'battery-ready'

Huawei SUN2000 M0, SUN2000L

Fronius Symo Hybrid

Goodwe models containing the letter 'E' (e.g. ET, ES, EM, EH)

(although Goodwe EH models require you to buy an extra unlock code as explained later).

Sungrow SH5K

Coming soon...



Fronius have announced that they will be releasing their Primo GEN24 'hybrid' inverters in 2020.

Single phase only. Price and release date unknown at this time but price expected to be \$2,500 - \$3,000.

What do you do if you buy a non-hybrid inverter and later want a battery connected?

- (1) Replace your existing inverter with a hybrid.
- (2) Buy an additional battery inverter and plug batteries into that.
- (3) Buy a Tesla Powerwall 2 or Sonnen batterie which has the additional inverter in the box.

How much will that cost?

On average, between \$2,000 and \$5,000 more than if you had a hybrid inverter and simply plugged a battery into it.

Communications

All safe, approved, solar storage batteries are much more than just the battery cells. There's a computer management system too. This management system talks continuously with either the hybrid inverter or the additional battery inverter. The reason for all this communication is partly to do with safety, but mostly to do with making sure the batteries are treated correctly so they deliver a bare minimum of ten years effective operation.

The Achilles heel of hybrids.

In almost every way, hybrid inverters are a superior choice. The end price you'll pay once you get batteries is likely to be thousands of dollars less.

You can add more panels to your solar installation AND claim the Government discount on them when you connect a battery to a hybrid. This extra 'oversizing' is allowed, encouraged even, because the additional panel production goes straight to the battery.

Your reporting is fully integrated for solar and battery.
You only need one warranty.

The potential Achilles heel of hybrids...

If you buy a hybrid today, that's designed to work with specific batteries, then will those exact same batteries still be available if you delay buying a battery until many years later?

The answer to that is most likely no. The inverter manufacturer will release firmware upgrades for new batteries during the lifetime of their support for that inverter, but will they continue to do that once that model has been superseded?

It's something we, and many other solar installers, are talking to the manufacturers about.

What have you got to lose?

Hybrids give you the choice to either connect their approved batteries, or else connect a second battery inverter if you want a different battery. Best of both Worlds. You can go either way, but what has it cost you to buy that hybrid in the first place?

Take Huawei. Single phase hybrid 5kW model, \$1,600. Three phase hybrid, \$1,900
Popular non-hybrid Fronius Primo 5kW, \$2,000, non-hybrid three phase Symo, \$2,200
Same 10 year parts and labour warranty, so in that case, you've lost nothing.

However, Goodwe non-hybrid 5kW single phase is \$1,120 but their most popular ES model hybrid is \$1,630 more expensive. (\$2,750).

Why is the Goodwe hybrid SO much more expensive than the Huawei hybrid?

Huawei, 5kW single phase inverter is \$1,600, but to connect a battery you need their smart meter as well so add on \$220, and if you want an emergency back-up circuit, that's going to cost another \$600 (when available later in 2020). In total, \$2,420.

Goodwe have the smart meter and back-up built-in, so the difference is only \$330, not the \$1,150 it initially looked like. Goodwe can justify that extra \$330 because they also support a larger range of batteries (LG Chem, BYD, Pylontech) whereas presently Huawei connects to LG Chem only.

Continued....

What is a 'back-up' circuit?

Some metro areas are very prone to power cuts, others almost never get them.

If you live in an area where the power isn't very stable then having a backup circuit is a good idea.

Many people think that when they have solar, if the power cut happens in the day then they will still be able to power their home from the solar panels. Wrong. The solar inverter is required by law to instantly shut down if the mains power fails.

"That's ok" they say, because when I've got a battery the house will run off the battery.

Wrong again.

The only things that WILL be able to run during a power cut are whatever is connected to the 'backup' circuit of the inverter.

Open your switchboard and you'll see all your circuits, probably with helpful labels next to them explaining what they control.

The inverter (hybrid, or secondary battery inverter, it makes no difference) can't deliver more than it is designed for, which usually is a maximum of 5kW of power or about 20 Amps. If it were a 10kWh battery, then that's going to be exhausted in two hours. Furthermore, if you turn on your Air Con, boil a kettle, put something in the oven etc, you are going to exceed that 5kW limit and then it will trip and shut down the battery completely.

Therefore, you need a circuit to be created of essential loads that do not draw too much current. Lights, and a few power outlets. This new circuit is then wired back to the backup circuit of the inverter, and from there on, your lights and outlets on that circuit run through the inverter. When everything is hunky dory those circuits are powered by the grid and your solar, but when the mains power fails, the inverter switches to backup mode and powers the circuit from the battery.

Just creating the new circuit typically takes an electrician two or three hours. The electrician should also install a manual three-way switch with one side going to the inverter and the other going to your old circuit breakers in your switchboard. If your inverter is faulty, then you go out to your switchboard and switch over so that your circuits are getting their power from the grid until your inverter gets fixed. It's certainly not cheap to create a back-up circuit.

Inverter Smart meters.

With hybrid inverters, the smart meter is installed in your switchboard, with a data cable wired back to the inverter and a clamp going around your phase cable(s). The clamp measures the current going through the cable and reports back to the inverter so that it knows whether to store surplus solar power in the battery or else release some battery power for use in the house.

If you have bought a non-hybrid inverter with a smart meter, e.g. Fronius Primo, then that will never work with the additional inverter and battery you buy. You will need a second smart meter for that. Your Fronius smart meter is only for reporting self-consumption of solar, imports & exports.

(Continued...)



Pictured left, Huawei smart meter for single phase.

Three phase smart meter is twice as wide.

Even without a battery, the reporting you get from an inverter smart meter is excellent.

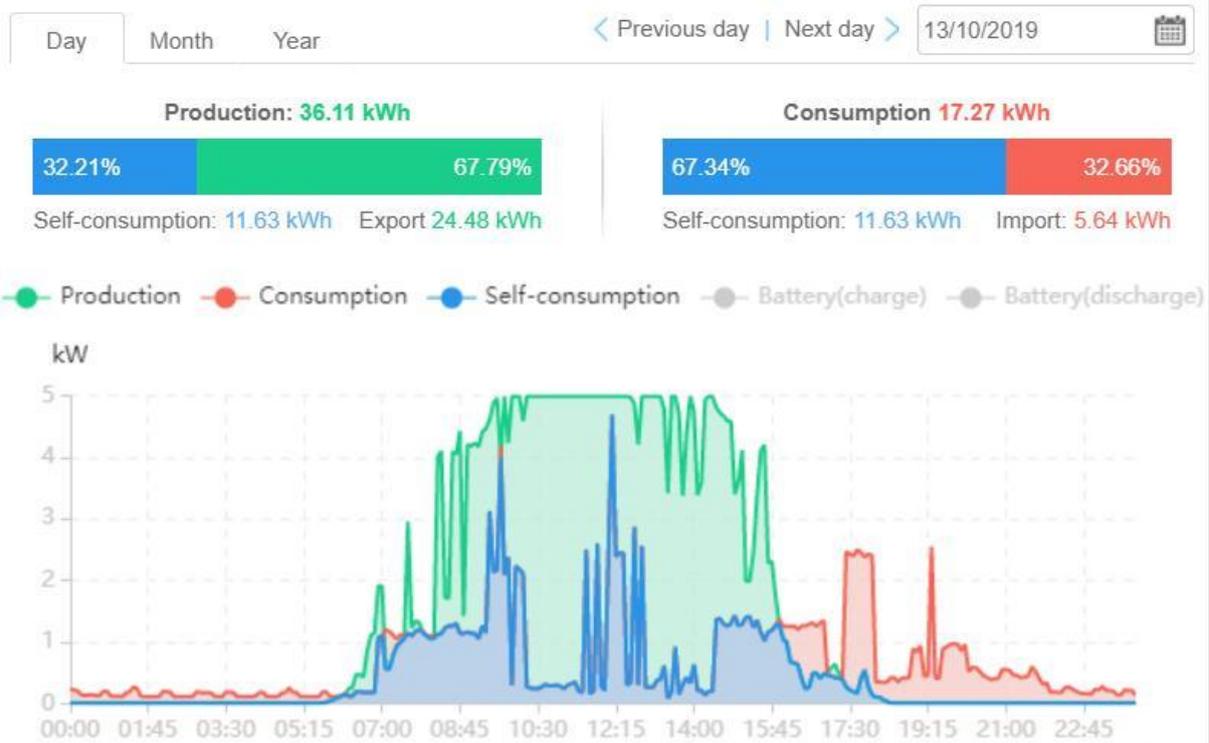
See graph below.

Red is power bought from Synergy

Blue is self-consumption of solar

Green is export of solar.

If a battery was connected, there would be a black line for battery charging and discharging.



Hybrids that aren't hybrids... yet

In a particularly tricky marketing move, a manufacturer is releasing a single-phase hybrid that is cheap; very cheap, but to get a battery to work you have to buy an 'unlock' code.

Watch out for this if you are quoted a Goodwe 'EH' model.

We thought 'EC' would be a better model name...'Extra Charge'.

Captive market, you've already bought the inverter, so the charge will no doubt be steep.