WATTSTOR™

ENERGY STORAGE CATALOGUE

Lithium battery system budget pricing for commercial and residential properties

INDEX

How does an energy storage system work?

The main purpose of a battery system is to store electricity whenever on site energy generation exceeds consumption, preventing export to the grid. This stored power is then accessed when the on site generation is lower than consumption.

What does a battery system consist of?

Most energy storage systems consist of a battery array, an inverter charger, energy meters and monitoring/control equipment. Where the system also provides some or all back-up power during a power cut then additional equipment such as switchgear panels or extra distribution boards may be needed.

I have generation on site, can I use the same inverter?

An inverter used for the renewable generation is not the same as one used to charge batteries. Inverters used for energy storage are usually called “inverter-chargers” to differentiate the products. Another type of inverter called a “hybrid-inverter” can accommodate both PV generation and battery systems and these can be most economically applied in new builds or anywhere the generation and battery systems are installed at the same time. For retrofit projects, where there is a generator already installed with a functioning inverter in place, then a proposed battery system will require a separate inverter-charger.

Do I need to change or modify any existing generators?

The new inverter-charger for a battery system will be installed separately without any need to touch the generation installation in place.

What is the typical ESS capacity needed for a standard household?

A typical household will need an energy storage system from 5 to 15kWh. The inverter-charger will be sized to suit the application and in particular, the maximum power required from the battery system. Normally households will use an inverter-charger ranging in size from 3 to 5kVA.

When will I need a larger inverter-charger?

Larger inverter-chargers will be used if the system is intended to provide full back up in case of a power-cut, or if the premises or site has a large load consumption profile. Energy storage can be installed in single phase, three phase or split phase systems. Depending on the customer requirements and the nature of the site, a larger system can be designed, utilising multiple single phase inverter-chargers or larger three-phase inverter-chargers.

I am planning to install PV and an energy storage system at the same time, should it be combined?

When installing storage and generation at the same time, there are two design routes:

1) Using two separate inverters, one for generation and another for charging capabilities. This de-couples the systems and allows large design flexibility such as a large generator to be specified and as much energy storage as the site requires.

2) Using either a hybrid-inverter or an inverter-charger plus MPPT (maximum power point tracker). This means only one inverter will be needed and accordingly the electricity will only suffer one transformation and make the system more energy efficient. A single inverter unit also provides a cost advantage. The only limitation is that both systems must be designed with inter-compatibility in mind and to the limits of the selected inverter-charger.

What are the different installation configurations for a storage system?

An energy storage system can be installed in grid-connected and off-grid settings. The following system types may typically be specified, based on client objectives:

1) Parallel system: the system will be installed in parallel with the electrical supply to the property, providing power when needed but not during a power-cut.

2) Part back-up system: the system will be installed in parallel with the electrical supply to the property but in the case of a power-cut, the inverter will feed critical loads via a dedicated secondary circuit and fuse board.

3) Full backup system: the system will be installed in series with the electrical supply with all the energy used passing through the inverter. In the case of a power-cut, the energy storage system will backup the whole property through the main distribution board. The user will not notice there is a power-cut until the batteries are depleted. These systems will typically be designed with more capacity and larger inverters to provide the resilience required.

Can I have power from my batteries in the event of a power-cut?

It will depend on the installation configuration selected. If your system was designed with a partial backup, your critical loads will still be powered by the battery. If your system is full backup, your entire property will make use of the battery stored energy. The requirement for grid power-cut resilience is an important factor in the design and specification of the energy storage system.

Can I schedule charging and discharge times for the inverter-charger?

Yes. This can be done direct on the inverter or by an external control. It depends on the inverter manufacturer. If this is needed, it will be considered in the equipment specification and quote.

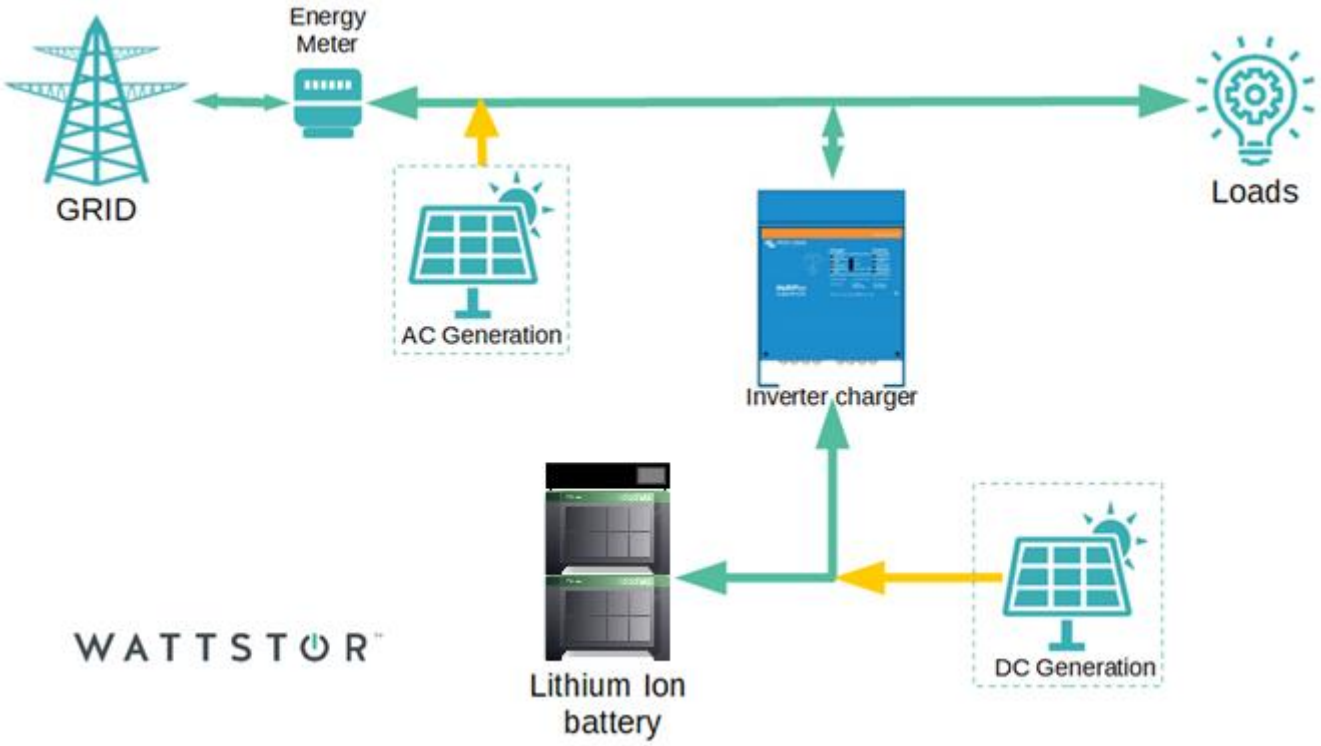
Can my PV system continue generating in the event of a power-cut?

It can do. It depends on how the generation is connected to the system but if this functionality is important to the customer, the design of the storage system can accommodate it. In such cases, it is important to get a detailed understanding of the generating system and property loads/supply layout. A completed Wattstor Survey Form will acquire the necessary information.

What information should I provide Wattstor to receive an appropriate quote?

In order to design an optimal system that meets or exceeds client expectations, filling out the Wattstor Survey Form is the best way to start. This empowers customers and surveyors alike and informs us whether there is space for the system, on site generation parameters, how the electric distribution in the property is set out, the number of loads and power rating of those loads. Crucially, it is important to determine what the battery system is to be installed for: backup, maximizing self-consumption of on-site generation or grid-services.

Residential – Parallel



Main characteristics

- Maximises self consumption from on site generation.
- Can be installed in 1 and 3 phase systems.
- Cannot provide power during a power-cut.
- Small systems possible.

Extra components included

- Energy meter

RANGE

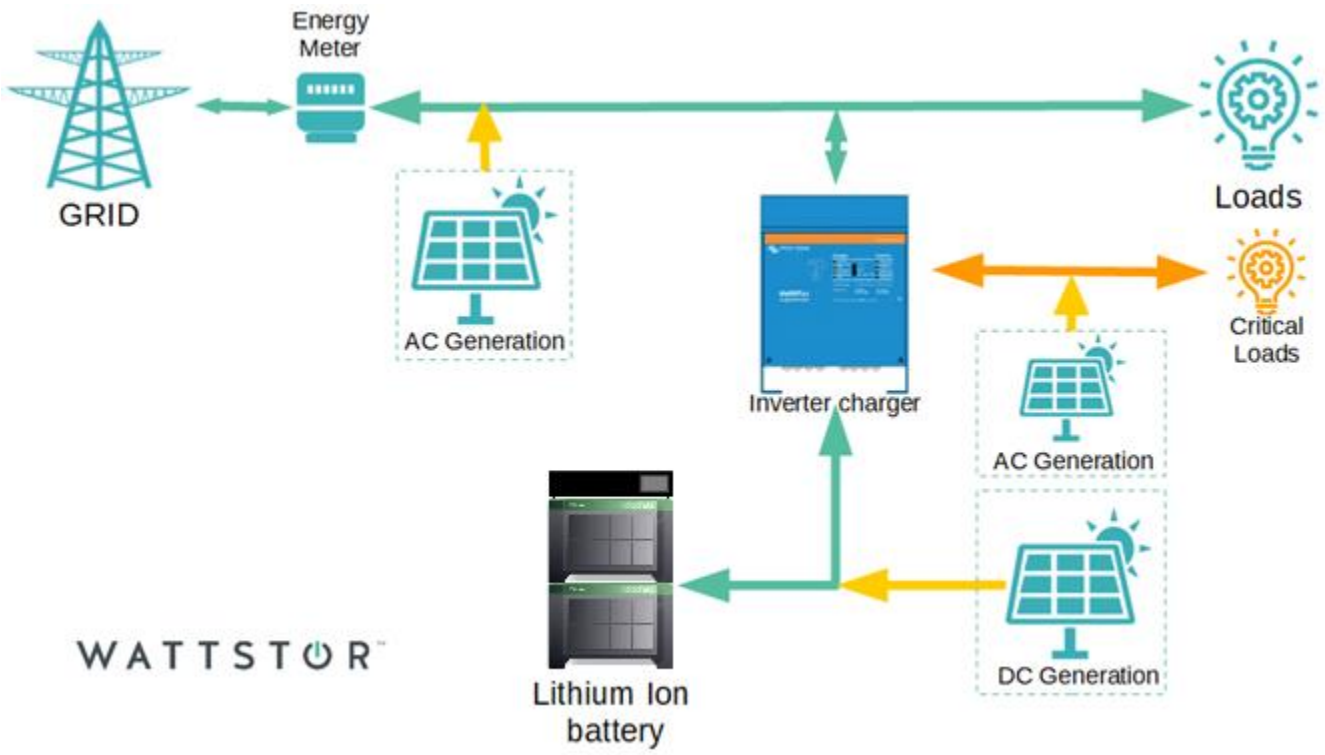
1-P 3-15 kW
3-P 3-45 kW

2.5 – 60 kWh

Inverter size Power output	Battery capacity	System cost	£/kWh
3 kVA	5kWh	£3,100	£620
5 kVA	10kWh	£5,200	£520
10 kVA	26kWh	£14,700	£565
15 kVA	60kWh	£29,600	£493

These are budget supply prices excluding VAT.

Residential – Part Backup



Main characteristics

- Maximises self consumption from on site generation.
- Provides power to critical loads in case of a power-cut.
- System should be installed close to main distribution board if possible.
- Can be installed in 1 and 3 phase systems.

Extra components included

- Switchgear panel
- Energy meter

RANGE

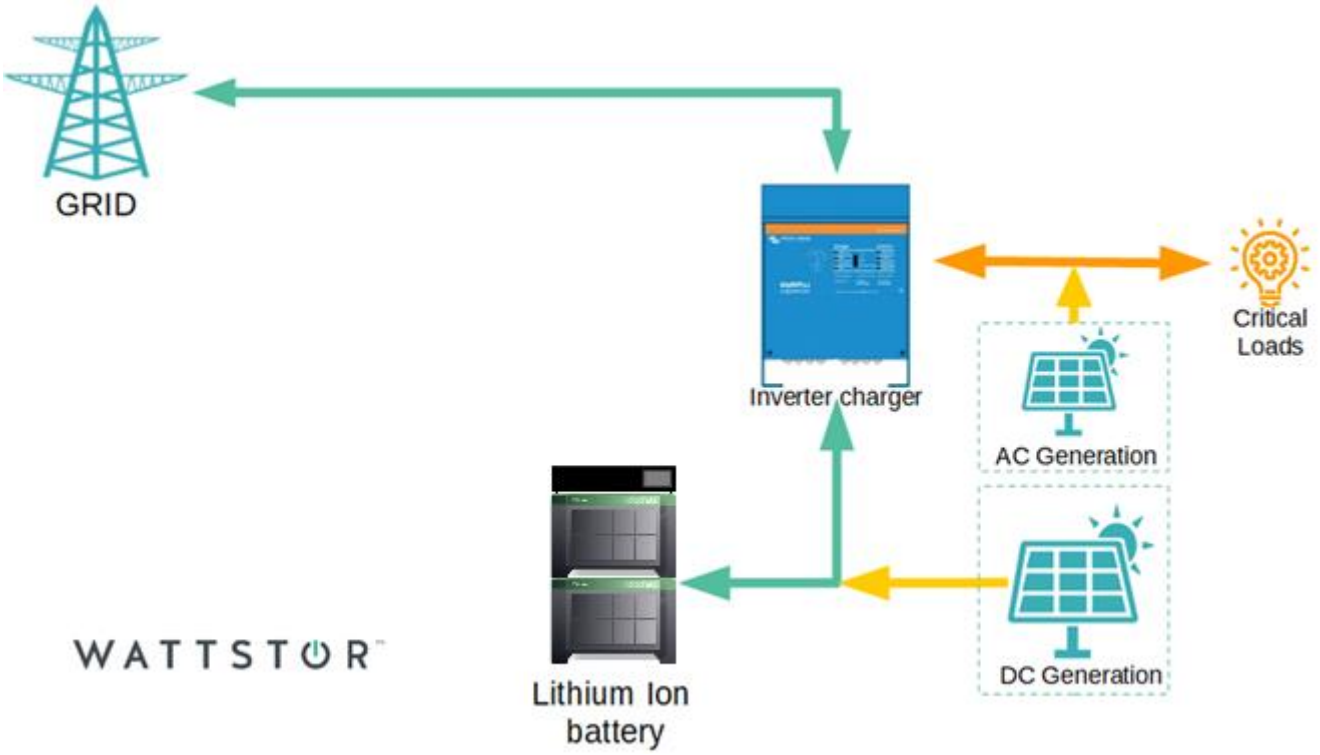
1-P 3-15 kW
3-P 3-45 kW

2.5 – 60 kWh

Inverter size Power output	Battery capacity	System cost	£/kWh
3 kVA	5kWh	£3,100	£620
5 kVA	10kWh	£5,200	£520
10 kVA	26kWh	£14,700	£565
15 kVA	60kWh	£29,600	£493

These are budget supply prices excluding VAT.

Residential – Full Backup



Main characteristics

- Maximises self consumption from on site generation.
- Provides power to the whole property in case of a power-cut.
- No requirement for an additional energy meter.
- Can be installed in 1 and 3 phase systems.
- Larger/oversized systems generally required.

Extra components included

- Switchgear panel

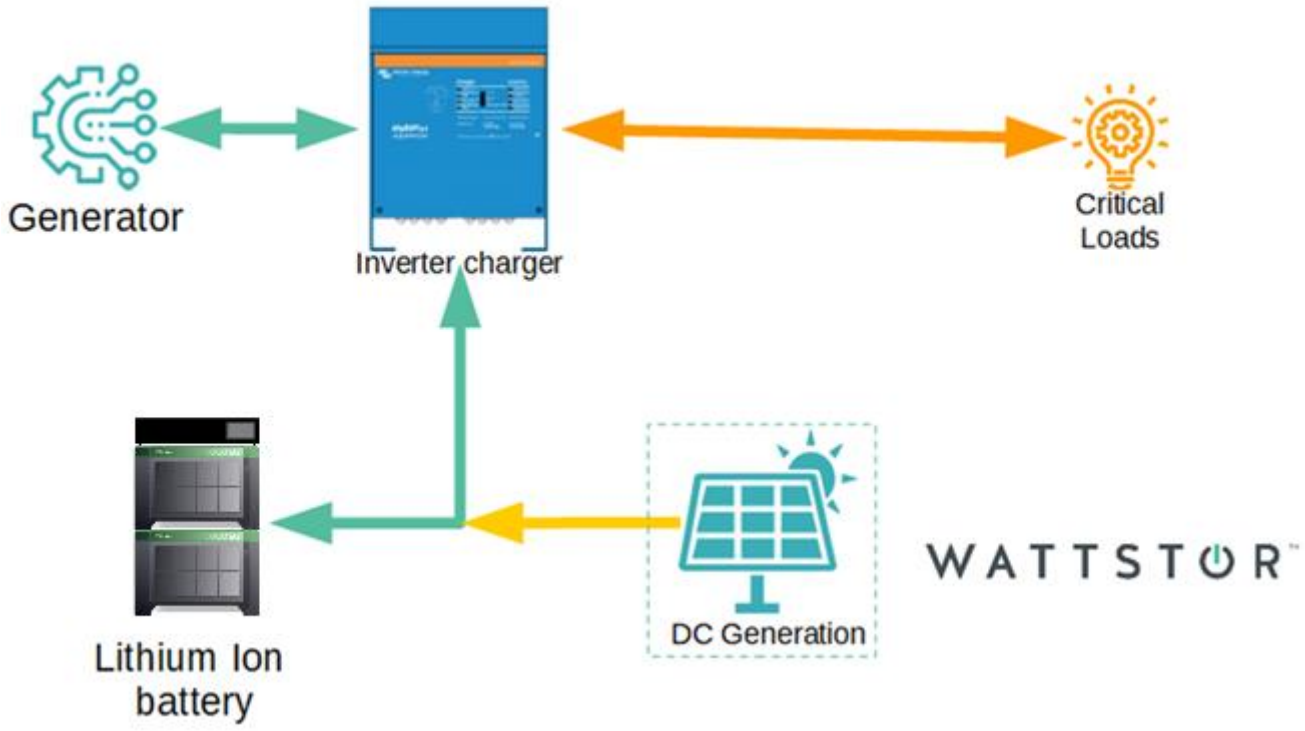
RANGE

1-P 3-15 kW
3-P 3-45 kW

2.5 – 60 kWh

Inverter size Power output	Battery capacity	System cost	£/kWh
3 kVA	5kWh	£3,100	£620
5 kVA	10kWh	£5,200	£520
10 kVA	26kWh	£14,700	£565
15 kVA	60kWh	£29,600	£493

These are budget supply prices excluding VAT.



Main characteristics

- Can be installed in 1 and 3 phase systems.
- Maintains power when there is no renewables generation.
- A generator system can be connected to the inverter to provide emergency power.
- Reduces run-times for generator reliant systems significantly and allows scheduled 'quiet' periods without loss of power.

RANGE

1-P 3-15 kW
3-P 3-45 kW

2.5 – 80 kWh

Inverter size Power output	Battery capacity	System cost	£/kWh
3 kVA	5kWh	£3,100	£620
5 kVA	10kWh	£5,200	£520
10 kVA	26kWh	£14,700	£565
15 kVA	60kWh	£29,600	£493

These are budget supply prices excluding VAT.

SME - Parallel

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Main characteristics

- Maximises self consumption from on site generation.
- Can be installed in 1 and 3 phase systems.
- High tariff avoidance.
- Provision of extra power to peak loads.
- Can provide power to critical loads in case of a power-cut (priced on application).

RANGE

1-P 3-15 kW
3-P 10-200 kW

10 – 500+ kWh

Inverter size Power output	Battery capacity	System cost	£/kWh
15 kVA	26 kWh	£15,350	£590
24 kVA	51 kWh	£26,050	£510
66 kVA	91 kWh	£62,000	£681
200 kVA	185 kWh	£146,000	£789

These are budget supply prices excluding VAT.

Please note: these are systems to be installed within the client's premises. Please submit an enquiry for pricing of external stand-alone containerised solutions.

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