



powerstar®



## Battery Energy Storage

A versatile and flexible technology -  
revolutionising your organisation's  
energy use.





# Battery Energy Storage Systems (BESS)

The increase in renewable generation, and the focus on achieving net zero carbon, are making BESS an essential technology for all commercial and industrial organisations.

Storage systems allow for greater control and flexibility of your electricity use. A Powerstar system is designed to be installed on a customer site, and can be used for a variety of functions, such as:

- Maximising consumption of on-site generated power
- Accessing grid service revenues and generating trading revenues
- Saving money by changing your site's demand profile
- Optional addition of power resilience through an Uninterruptible Power Supply (UPS)
- 'Buffering' large loads, such as Electric Vehicle (EV) charging, to overcome site restrictions on power usage
- Managing complex on-site power flows
- Site wide or microgrid monitoring and control of multiple sources of demand and generation assets

## Multiple Benefits of BESS



Generating Revenue



Maximising On-Site Generation



Avoiding Capacity Charges & Releasing Constraints



Uninterruptible Power Supply (UPS)





## Generating Revenue

BESS can be used to generate revenue through local and national Grid Service Contracts and wholesale trading - increasing the profitability of your investment.

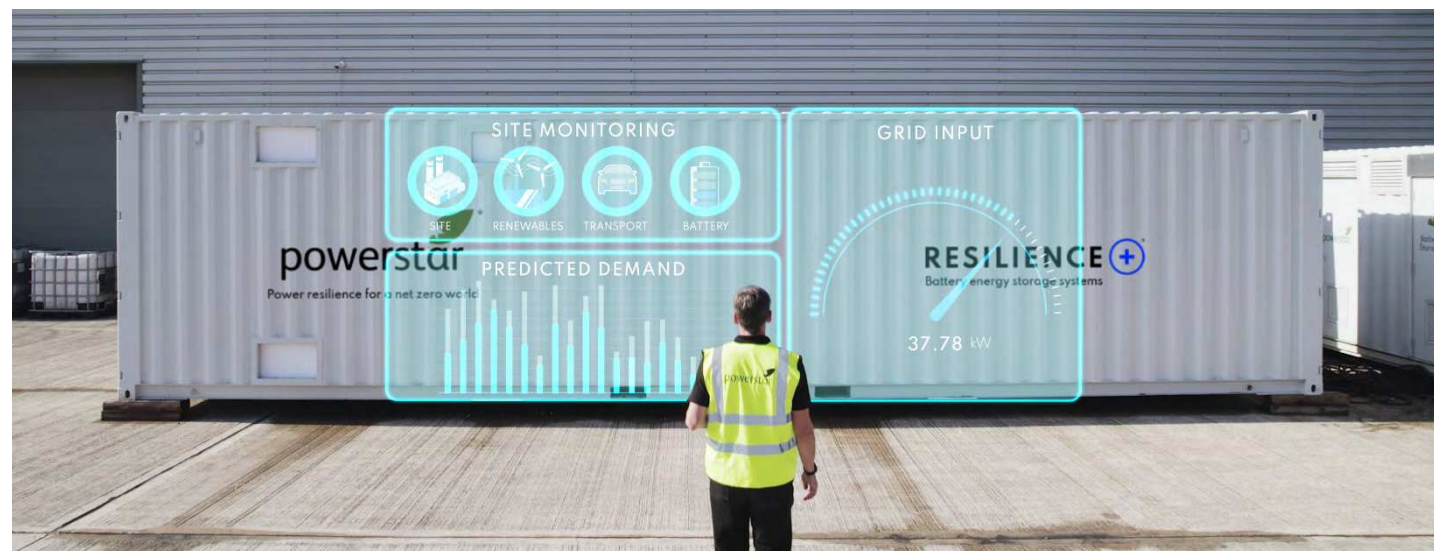
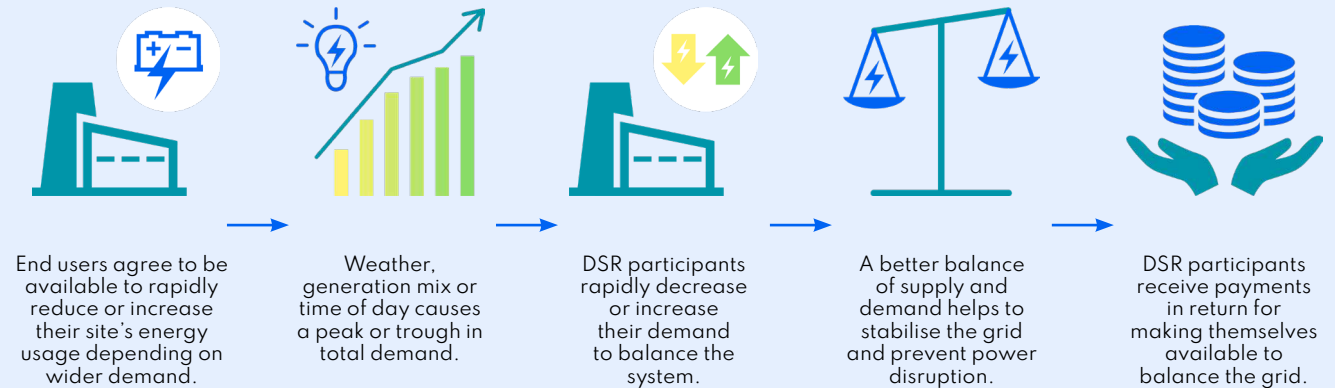
In simple terms, the energy stored in the BESS can be used to stabilise the grid or traded as energy prices change every thirty minutes. The National Grid must balance supply and demand at all times. Customers are rewarded for providing flexibility, either additional supply or demand. Although revenue streams can change in value over time, the need to balance supply and demand will always be a feature of the grid, so revenues will remain as the grid system adapts to emerging energy challenges.

Powerstar's software and control systems will manage the charging profile of the battery to ensure the most profitable operation whilst respecting the needs of the site. By using artificial intelligence to predict your own load requirements, on-site generation, and the optimal time to be supporting the grid, it ensures you are generating the maximum revenue without impacting operations.

We will make a revenue estimate following a review of your data and sizing of your system.

### Demand Side Response

Demand Side Response (DSR) is used to describe activities that change the power demand profile of a site for financial reward. This is needed due to the intermittent nature of renewable energy sources. Organisations can engage with DSR mechanisms such as Dynamic Containment and Dynamic Moderation.





## On-Site Generation

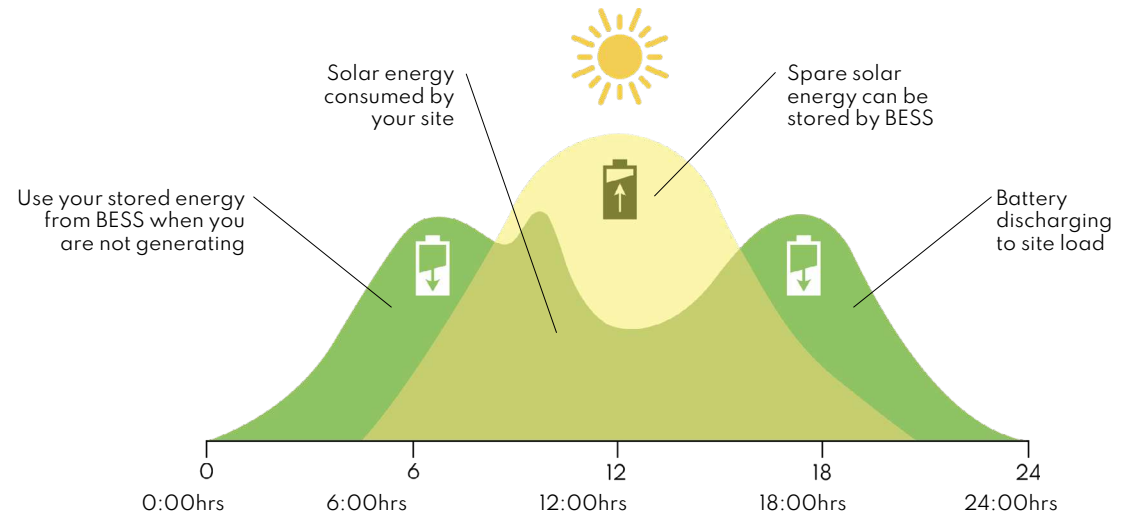
On-site energy generation is a powerful way to reduce dependence on power from the grid, dramatically reduce energy costs, work towards net-zero carbon emissions, and create power resiliency.

BESS allows excess zero-carbon energy generated on-site to be stored for later use.

Renewable energy, such as solar or wind, are green sources and preferable to the traditionally used alternatives such as fossil fuels.

- Renewable sources can be less reliable due to their intermittent nature
- BESS have the ability to store the excess generation and time-shift it for use later
- With increasing restrictions on connecting new generation, BESS systems can allow new systems to get Distribution Network Operator consent.

### Summer Scenario: BESS & Solar Generation







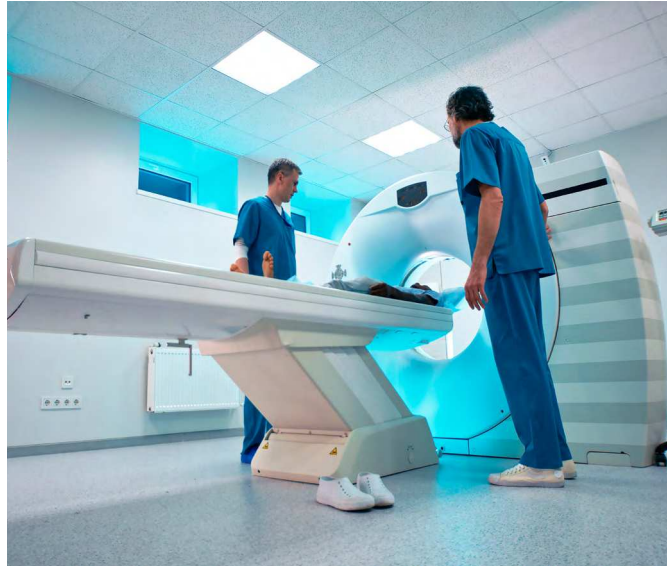
## Avoiding Capacity Charges & Releasing Constraints

BESS can be used to 'buffer' large power demands. The battery charges slowly from the grid supply and then delivers high energy discharge when needed.

Power demands on a site can often be dominated by a single large peak load, such as rapid electric vehicle chargers, MRI scanners, or a period of the day with particularly high demand.

If this demand exceeds your agreed supply capacity you could face punitive charges from your Distribution Network Operator (DNO). Alternatively, if your site consistently operates close to its agreed supply capacity, your DNO could block applications for these types of loads to be installed altogether.

A BESS will allow an organisation to 'buffer' these large power demands, avoiding capacity charges and releasing on-site power constraints to allow other systems to be installed on site.





## Our UPS Technology

An Uninterruptible Power Supply (UPS) provides fast switching battery backup power in the event that your grid power supply fails. Powerstar provide large commercial UPS backups to a range of sectors, including healthcare, manufacturing, defence, and data centres which all require continuity of power.

By protecting all the incoming power, on-site equipment won't experience variation in its power supply in the event of any kind of power disruption, be it a full power cut or a temporary loss or dip in power. A UPS is different to a back-up power supply, which is slow to respond but designed to support a site over a longer period of time. A UPS will provide a seamless transition from the mains electricity supply to the back-up by switching over faster than electrical equipment will recognise a change. This prevents sensitive equipment and machinery from being damaged or disrupted, but will not support the site for an extended period of time.

### A Traditional UPS

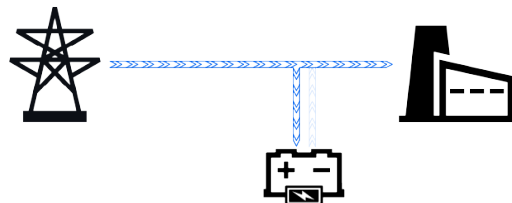


Battery in series, between the grid and the site. Grid charges the battery. Battery supplies the site.

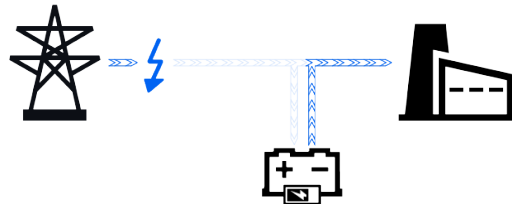


Interruption to the grid has no effect on the site as battery continues to supply the site.

### The Powerstar UPS



Battery in parallel, on-site. Grid supplies the site. Battery intelligently charged / discharged to perform multiple functions.



Interruption to the grid detected and supply switched from grid to battery in <10ms.

## What is Special About Powerstar UPS?

UPS systems come in many shapes and sizes. We design and manufacture a very specific kind of UPS which has significant benefits over others:

#### Low Loss

A Powerstar system consumes about 90% less electricity than traditional UPS, saving carbon emissions and cost.

#### Site-Wide

A single system that protects a whole location, rather than individual pieces of equipment, keeping all activity running.

#### Multi-Functional

Powerstar UPS are installed Behind-the-Meter, allowing it to be used for other functions while it is in standby, such as generating revenue via National Grid Service Contracts. Other functions include allowing greater control of energy use and assisting you in achieving net-zero.

#### Ultra fast switching

Powerstar UPS monitors the grid with software and switches over to the battery within 10ms of a power disruption being detected. This is what enables it to perform other functions when not needed for UPS.

## Case Studies

### Parkinson-Spencer Refractories

#### Challenge

Parkinson-Spencer are a leading manufacturer of refractories and glass industry solutions, based in Halifax. Their site had been suffering from increasingly frequent blackouts due to disruption to their grid supply - resulting in a significant loss of profits.

#### Solution

Powerstar and GridBeyond worked together to support Parkinson-Spencer's objectives. Powerstar installed a 250kW Battery Energy Storage System, alongside a 500kVA MAX Voltage Optimisation system. The BESS provides site-wide Uninterruptible Power Supply, keeping the manufacturing process going in the event of a blackout. As well as further improving the sustainability of the site's energy infrastructure, the project also delivered a guaranteed 5% reduction in energy costs through Voltage Optimisation.

**"The solution provided by Powerstar was a no brainer for our business."**

*Simon Parkinson, Managing Director of PSR*



### NHS: Rotherham General Hospital

#### Challenge

Powerstar were engaged to supplement the hospital's power resilience strategy with an efficient, intelligent Battery Energy Storage System (BESS) with Uninterruptible Power Supply (UPS) functionality. As UPS systems are used to ensure critical care systems remain online in the case of a power disruption, it is vital that any proposed installations are tested to the most rigorous standards and will operate exactly as intended.

#### Solution

Powerstar provided the hospital with a BESS that also incorporated the rapid switching speed and reliability of a UPS. The BESS offers savings through greater energy efficiency of around **£225,000** annually, as well as eliminating around **190 tonnes of CO2e**. Additionally, the BESS can be used to engage with Grid Services and Demand Side Response to generate additional revenue and further reduce electricity costs, as well as being used to store renewable electricity generated on-site.



Discover more case studies at:  
[www.powerstar.com/case-studies](http://www.powerstar.com/case-studies)





## Why Powerstar?

Powerstar are the UK's leading designer and manufacturer of behind-the-meter commercial and industrial BESS with UPS functionality. From design and testing, through to commissioning, installation and aftercare, Powerstar supports you to ensure your chosen energy solution delivers exactly what you need from it.

- ✦ We offer **24/7 monitoring of our BESS, 365 days a year**, as well as National Service Team Response
- ✦ All our technologies are designed and manufactured in the UK
- ✦ Our BESS offer enhanced safety through hydrogen purging
- ✦ Get in touch via the details below to request the latest technical specifications of our BESS units

## Our Customers

Powerstar have worked with a variety of businesses to revolutionise their energy use by installing BESS, including the following key sectors:



Healthcare



Manufacturing



Defence



Public Sector



Data Centres



Distribution &  
Logistics

## Our Credentials



## Get in Touch

To find out how Powerstar can help you achieve your energy management goals, contact us using the details below:

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