UPS BATTERIES & ENERGY STORAGE

BATT TO THE FUTURE: ENERGY STORAGE & SMART GRIDS

Leo Craig, Riello UPS General Manager

With the way we generate electricity going through a low carbon revolution, Riello UPS General Manager Leo Craig explains why batteries have a key part to play in powering Ireland's future.

According to EirGrid's latest 'Tomorrow's Energy Scenarios' plan, electricity use across Ireland will grow by between 8-16 TWh by 2030. That's an increase of up to 55% on today's consumption levels, partly caused by the ongoing data centre boom.

This increase in demand comes at the same time as the power generation mix is shifting to gas and renewables. Peat, oil and coal-fired plants are being phased out completely over the next decade.

Security of supply will become much more unpredictable. For instance, onshore wind capacity could reach 8.2 GW by 2030. Solar installations are on the rise too. But what happens when the wind doesn't blow or the sun doesn't shine?

That's where smart grids become a necessity. Sophisticated, decentralised power networks adapting in real-time to balance supply with demand.

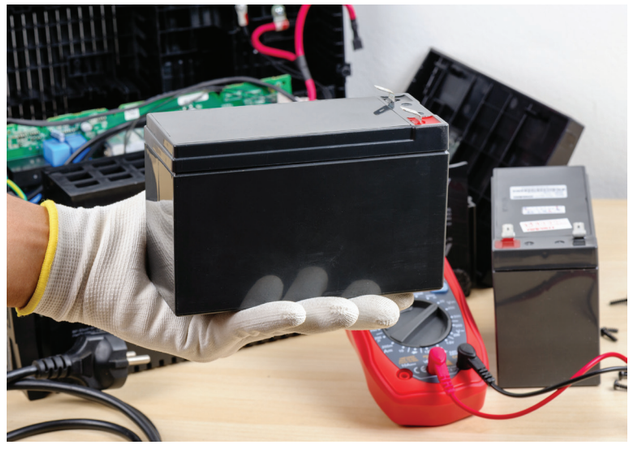
A key aspect of smart grids is Demand Side Response (DSR) – sometimes known as Demand Side Management (DSM) – where larger energy users get incentives to shift and/or reduce their electricity use to ease pressures on the wider grid.

What Role Do Batteries Have In DSM?

This is where large-scale battery storage systems, including those installed as part of uninterruptible power supplies providing emergency backup, have a pivotal role.

Lithium-ion (Li-ion) battery technology is fast-becoming a commercially-viable alternative to traditional sealed lead-acid (SLA) blocks. Li-ion batteries deliver the same power density in less than half the space and weight. They also have around 50 times the cycle life and recharge far quicker than SLA.

While it's true Li-ion batteries have a significantly higher upfront cost, SLA cells would need replacing two or three times during their 10 to 15-year lifespan. Over the course of a decade, opting for lithium-ion could cut the total cost of ownership by 10 to 40%.



Deploying these advanced, high capacity battery systems enable energy-intensive users such as data centres, hospitals and manufacturing plants to store cheaper off-peak electricity. This is then used instead of more expensive peak-demand power, cutting energy bills appreciably. Surplus electricity remaining in the battery can also be sold back into the grid.

How Can Businesses Benefit?

There are several tariff-based schemes available. These include Powersave, which requires medium and large-sized organisations to reduce demand at busy times. In return, they receive payments based on the kWh reduction in use.

Another option is Short Term Active Response (STAR), which in effect rewards businesses for having their supplies interrupted during times of stress on the main network.

Larger electricity users can also take part in Demand Side Units (DSU), either individually if they can reduce consumption by at least 10 MW or collectively via a third-party aggregator. For the latter, sites must be able to reduce demand by 4 MW.

DSUs deploy a combination of on-site generation and strategic plant and equipment shutdown. They must be able to turn down demand at one hour's notice and maintain it for at least two hours.

Powering The Future

In the UK, battery storage played a key role in mitigating the impact of the major power cut in August that left a million customers without electricity.

Two power plants went offline, which led to grid frequency dropping to unsafe levels. Automatic safety mechanisms cut off 5% of the country to protect the remaining supplies. National Grid's 1 GW of reserve power resolved the issue quickly. Nearly half of this backup (475 MW) came from battery storage.

As electricity networks shift from fossil fuels to low or zero carbon generation, its increasingly likely that this kind of energy storage will be called upon not only to save the day at times of emergency, but be a significant contributor to a more diverse day-to-day energy mix.

It should come as little surprise that EirGrid predicts Demand Side Management capacity could reach 700 MW by 2025, rising to as much as 1,000 MW by 2040, with battery storage having the potential to contribute up to 200 MW by 2025 and 500 MW by 2040.

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