Energy storage for peak shaving ireland

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Energy storage is a critical enabler of our renewable energy transition, and its importance is starting to be recognised by stakeholders across the energy sector.

There are currently over 700 MW of primarily short duration batteries operational on the island of Ireland. These batteries contain frequency events by injecting power into the grid in milli-second timeframes. This has enabled EirGrid and SONI to reduce their reliance on fossil fuel spinning reserves allowing more space on the system for wind and solar generation.

The short-duration battery market is saturated at present so attention is turning to longer-duration batteries and other storage technologies that can provide additional benefits and capture other potential revenue streams such as energy arbitrage, peak shaving, capacity adequacy, congestion management etc. These longer-duration technologies will allow us to shift large amounts of renewable energy to help balance the system, reduce renewable dispatch down and provide an alternative to fossil fuels during times of low renewable output.

The battery storage deployed today is enough to meet Ireland"s short-term reserve requirements, but we are going to need a lot more energy storage from a variety of technologies with different capabilities by 2030.

In our "Game Changer" report, ESI carried out a piece of work with energy consultants Baringa to try and estimate how much energy storage might be needed by 2030 and what benefits it can bring to the power system and consumers.

The results show that an additional 2 GW of long duration energy storage technologies can reduce power sector emissions by up to 50% in 2030. This is particularly important because at this stage these residual emissions are the hardest to abate so energy storage plays a critical role in soaking up renewable oversupply and displacing fossil fuels at times of low renewable generation.

The study also showed that medium duration storage (i.e. two-six hours duration) can play an important role in providing quick to deploy peaking capacity solutions to alleviate short-term periods of congestion and system stress. These can help mitigate against volatile wholesale prices particularly during winter periods.

Longer durations of 24 hours plus are particularly important for solving generation constraints and for absorbing renewable energy that would otherwise be dispatched down. These storage technologies can reduce dispatch down due to renewable oversupply by approximately 55% in 2030.

Finally, Baringa estimated that each of the storage scenarios would deliver a net economic benefit for consumers when taking account of the locational value of energy storage. This ranged from EUR30 million up to EUR85 million per annum in the longer duration storage scenario.

Baringa"s assumption of an additional 2 GW of energy storage by 2030 should be seen as the minimum we will need. More will very likely be required, particularly as we aim towards net-zero. Putting in place the right market frameworks will be essential to ensuring investment in the quantities and types of energy storage that will deliver best value to the system and to consumers.

Delivering the volumes of energy storage we will need for 2030 and beyond will require coordinated policy action and specific market incentives to drive investment.

There are several existing market policies and systems which were designed around conventional generation and need to be updated to accommodate energy storage. For instance, the TSOs" market systems are undergoing needed upgrades so they can more effectively utilise operational storage assets in the energy market.