

Batteries as an infrastructure asset class: A new paradigm

Investment | Battery storage is flexible, remarkable — and investable — but you need to know what you're doing and know where the market opportunities and limits lie. Renewable and clean energy financier Laurent Segalen from Megawatt-X explains some of the things he's seen as batteries have become an infrastructure asset in their own right.



Credit: Flickr/James Case

Energy storage is like a digital Swiss Army Knife for the grid.

to deal with several types of revenues (arbitrage, grid services, reserve) which are difficult to model. Even more important, capturing those new revenues relies on implementing ever-improving software that maximise the monetisation of the numerous market opportunities but can be often seen as "black boxes" by investors.

The software race is on. Against Tesla's Autobidder, you see Fluence acquiring AMS to provide an integrated hardware + software solution. Those new software are incomparably more suited to optimise battery assets than human traders. For instance in Australia, the new market design has created five-minute bidding windows: the best human trader will post 15-20 trades a day, whereas the software will be able to bid 288 times (12 bids per hour x 24h).

A tale of two countries: Germany and the UK

Germany has the most liquid and competitive power market in the EU. It is also at the centre of the European Grid. 800 distribution system operators (DSOs) are daily managing the flexibility of the system. The arbitrage cases are widely publicised but overall not sufficient to sustain a "buy low-sell high" business case. The balancing market is dominated by coal plants which remain cheaper than batteries. And for network services, a German DSO will directly invest in batteries. So there are limited short-term opportunities for infrastructure investors.

The UK presents a radically different picture, with less access to the ultra-liquid Central European Grid, much less pumped hydro capacity than in Germany and fewer interconnectors. Hence, there are many more opportunities for batteries and the strong UK investment community has started to invest in them.

As we witness the relentless growth of renewables, operators and investors are wondering how to mitigate the increased intermittency of power generation. We are seeing more and more instances of negative prices, and also an increased volatility in daily power prices, especially in the zones with high renewable penetration and thin grids.

These zones include Australia, the US West Coast, and the EU periphery (Spain, Scandinavia, UK). Going forward, the burden of dealing with intermittency will fall back, either directly or indirectly, in the hands of investors. This is not great news for infrastructure investors who allocated equity and debt into the renewable industry for its fixed income revenue profile.

Once long term capital-intensive solutions (such as interconnectors and pumped hydro) have been exhausted, it is clearly the time for batteries to become a key infrastructure component of the balancing mechanisms.

How then can batteries become a proper infrastructure play?

From an investment point of view, going long on flexibility when the market

is shorting it, is the perfect move. The technological trends are also heading in the right direction, as the cost for stationary storage is falling precipitously, in the wake of the billions of USD investments in EV batteries. Within a few years, leading experts such as Benchmark Minerals and BNEF expect another 50% fall in the costs of battery cells.

The question of bankability: From tech to revenue model

From a financial point of view, li-ion batteries are now a fully bankable technology. World-class providers like Fluence and Tesla are delivering new products with up to 20,000 cycles and above 90% round-trip efficiencies. And lithium ferro phosphate (LFP), with its lower cost and reduced fire risk, seems now the chemistry of choice for stationary storage.

Now that the technology aspect has been sorted, how can the revenue model of stationary storage become bankable? Contrary to wind and solar, batteries don't typically benefit from long-term secured revenues, such as power purchase agreements (PPAs).

Instead, investors in storage need

Namely, the UK harbours two pioneering funds, Gresham House Energy Storage Fund and Gore Street Energy Storage Fund which are 100% dedicated to batteries. Infracapital, with the support of M&G is also very ambitious in its plans for storage and e-mobility solutions provider Zenobe. We also have leading traders, such as Hartree, Goldman Sachs and soon Mercuria and Trafigura that are joining the fray. And of course the “master disruptor” Tesla is also present; Tesla obtained this year a UK electricity trading license and signed an agreement with Octopus to connect all its Powerwall into a gigantic virtual power plant (VPP), while Shell’s sonnen is doing the same.

So how do you build a revenue stack for battery storage in the UK? First, it is better to partner with a digital platform that can provide you access to the various arbitrage, balancing and flexibility markets: routes to market providers like Flexitricity, Habitat Energy, Kiwi Power and others are delivering such very innovative services.

Second, a growing list of asset optimisers with solid balance sheets like Shell’s Limejump are offering PPAs with long term price floors to battery asset owners in return for a share of the upside; this is catalysing the interest of debt lenders.

The digital Swiss Army Knife

A few years ago, a battery revenue model in the UK was a boring set of “ancillary services”, mostly frequency response in the form of long-term Enhanced Frequency Response (EFR) or shorter-term Firm Frequency Response (FFR).

As those legacy services are now close to saturation, we are entering into a more “revenue agile” phase. Namely, the UK’s electricity system operator National Grid ESO has signalled a clear intent to move to shorter term, more liquid markets for system services reflective of real time system needs. And it is the new generation of software that allows this transformation.

With a battery in the right place and at the right time, an investor can simultaneously:

- provide newer, more precise frequency services such as Dynamic Containment for National Grid ESO
- deliver Voltage Control for a local DSO overnight
- trade in the power exchanges day ahead
- switch out position to play in the grid’s Balancing Mechanism instead because just before gate closure there’s an energy shortfall due to the wind dropping off sooner than forecast.

No way back

New market infrastructure designs are now allowing a deeper penetration of batteries to cope with the growing market share of renewables. In Europe, Project TERRE, which stands for Trans European Replacement Reserve Exchange, will increase the digitisation of short term power markets.

It is therefore my opinion that infrastructure managers who don’t invest in batteries in the next two years will be marginalised as renewable energy investors by mid-decade; they simply won’t be in a position to catch up.

I am not saying it’s going to be simple for early movers; lots of things to learn, mistakes to be made, new value chains to be created. But this is not a leap of faith, it is simply common sense. ■

Author

Laurent Segalen is a franco-british banker specialised in Renewable Energy transactions. He is the founder of Megawatt-X, the London-based platform for investing in Wind and Solar assets, which he currently heads. Megawatt-X has listed more than 14GW of Wind and Solar transactions over the past 8 years. His career spans over 25 years, from Director at PWC, Fund Manager at Natixis/Mirova to Managing Director Clean Commodities at Nomura. Along with fellow financier Gerard Reid of Alexa Capital, Laurent is a co-host of the podcast Redefining Energy, launched in 2018.



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