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INSIGHTS

Battery Storage Vision in the UK

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Despite the challenges of 2020, notable regulatory steps have been taken in the United Kingdom to accelerate the growth in battery storage projects – with more expected in 2021.

Introduction

In its 16 months in government, the current administration has made some very promising remarks on its plans for energy storage in the UK.

It has been described as a high priority by BEIS and government representatives and appears to be a key limb of the government's push towards a net zero carbon economy as set out in the December 2020 White Paper.

UK regulators have also contributed to this enthusiasm. Ofgem has continued to emphasise that energy storage must play a key role in the integrated, flexible energy network the country is developing. It has also gone several steps further by clarifying the barriers faced by the energy storage market that have inhibited its competitiveness, as well as publishing a number of related updates on consultations and regulations.

Buoyed by these positive forces, reduced costs, improved technology and the economic attractiveness of revenue stacking, battery storage capacity in the UK sky-rocketed in 2020.

Operational battery storage projects in the UK surpassed the 1GW mark in April 2020 – by way of context it was less than 10% of that amount in 2016. There is currently about 16GW of further battery storage capacity in the development pipeline – with up to half of that already granted planning permission. Multiple projects across the country with capacity as large as 49MW have been completed, and many more of this size (and bigger) are under construction. In November, a project with 320MW capacity gained planning permission in the Thames Estuary.

So ministerial and regulatory enthusiasm has been matched by investment enthusiasm.

But what legal and regulatory developments actually occurred in 2020 to reduce barriers and further accelerate the progress towards the battery era?

Storage Finally Defined

Energy storage has historically been left undefined in the principle legislation which governs the regulation of the electricity network (the Electricity Act 1989) and was also not addressed in the related licensing regime. It has traditionally been grouped with generators for the purposes of legislation and regulations – but without express confirmation that this is the case. Ofgem consultations from 2017 revealed a strong interest from the energy market in having storage defined in primary legislation.

Following lengthy consultations, Ofgem confirmed that from 29 November 2020, for licence purposes, electricity storage would be treated the same as other forms of generation.

Ofgem also confirmed which technologies would be considered batteries (electrochemical batteries, gravity energy storage, air-based storage etc.) and those that would not be (transformers, inductors, thermal energy when stored energy is not re-converted to electricity). Given the rapid development of new battery technologies, Ofgem helpfully clarified that it does not consider this to be an exhaustive list.

It was also stated that, when parliamentary time allows, a definition would be inserted into primary legislation and further clarity provided as to how storage fits into the legislative framework.

Whilst not yet enshrined in primary legislation (and many storage projects, in fact, benefit from licence exemptions due to their scale), Ogem's confirmation was a notable step for energy storage as it provides classification certainty to investors. This is particularly relevant for the growing number of larger projects where licences will be required and investors will be seeking the comfort of a settled regulatory regime. As a market of the UK government's intent, in the December 2020 White Paper the first item on the government's Energy System Key Commitments page is for this regulatory step to be enshrined in statute.

Parts of the energy sector were seeking more bespoke provisions for energy storage to be set out in regulations and statute. It will be interesting to see if the parliamentary draughtsmen or the related debates expand on how electricity storage fits into the legislative framework (as alluded to by Ofgem) beyond that of the inclusion of a definition.

By way of comparison, in 2020 the United States also made very similar changes to their regulatory regime to broaden the definition of "Generating Facility" to specifically include energy storage devices whether developed as a stand-alone project or co-located (FERC Order No. 841).

Planning Restrictions Removed

Another significant obstacle to the development of large battery storage projects was removed in early December 2020. Legislation was enforced to exempt electricity storage (excluding pumped hydro) from the nationally significant infrastructure project (NSIP) regime. The NSIP regime is a separate planning regime aimed at large infrastructure projects – and requires a pre-consultation, submission and examination process with the secretary of state in order for a project to be given a Development Consent Order. This can take up to 13 months (following a consultation and pre-application period) and is a time and labour intensive process.

Before December 2020, this process under the NSIP regime was required for planning permission for battery storage projects with a capacity in excess of 50MW despite the relatively low planning impacts of such projects. It was for this reason (along with certain licensing exemptions) that many of the largest UK battery storage projects in development during the last few years have squeaked in at 49.5MW. Tellingly, in December 2019, one quarter of all battery projects in the UK were sized between 49MW and 50MW.

So this clustering and the market soundings were persuasive indicators that this NSIP capacity threshold was distorting sizing and investment decisions. The related BEIS consultation on the matter also acknowledged the low planning impact of these projects, noting that the footprint of a 50MW lithium-ion battery storage plant will likely be approximately 1 hectare, as compared to in excess of 100 hectares for a 50MW solar or wind farm.

The removal of this *de facto* cap through the disapplication of the onerous NSIP regime has, of course, opened up extended capacity potential – and, perhaps by no coincidence, there has been a recent increase in planning applications for larger battery storage projects.

Storage Charges Reduced

Ofgem has delivered a reduction of certain charges that have distorted the competitiveness of the energy storage market. These mainly relate to erasing double-charging for importing and exporting electricity, and withdrawing final consumer charges - together forming a welcome revision which the industry has been anticipating.

It was confirmed in May 2020 that the double-charging balancing costs that has disadvantaged storage providers is now to be removed. This is the result of consultations following market submissions from 2017.

The National Grid recovers system balancing costs from generators and demand customers based on the volumes of energy imported or exported to the grid every half hour. This is levied through the Balancing Service Use of System charge (BSUoS). Battery storage projects both import energy from the grid, store it and then export energy back to the demand customer. Unlike with other generators, the current charging system can result in battery storage providers paying BSUoS on both the amount of energy they import and the amount they export.

Given that this double-charging does not apply to other generators, it is not surprising that Ofgem considered this placed storage providers at a competitive disadvantage. It was also noted that the BSUoS is intended to recover balancing costs and, given the system support role of battery storage, the balancing costs they impose on the system will likely be significantly less than other users.

Ofgem therefore confirmed that, effective from 1 April 2021, eligible storage facilities will be exempt from the BSuoS charges on their imported electricity volumes and will only be charged for their exports.

The timing of this relief is all the more important when considered in the context of the recent increase in the BSUoS costs. The combination of increased integration into the network of numerous renewables energy sources and other small generators and demand reductions due

to Covid have complicated the process for the National Grid to balance the system, requiring further actions to be taken and increased costs which are passed on to the market through the BSUoS. The average BSUoS £/MWh charge in 2020 increased by about 40% against 2019 (based on settlement final (SF) BSUoS run data) and half-hourly charges reached peaks as high as £40/MWh in January 2021. However, the introduction by Ofgem of caps and payment deferrals have helped mitigate against these increases.

Relatedly, Ofgem has also clarified that the final consumption levies (FCLs) that are payable by end consumers to fund the government's subsidy schemes should not be payable by energy storage licence-holders, provided the electricity they import is used only for the activities of energy storage. This became effective on 29 November 2020. Again, the philosophy being that storage is not a final consumer of electricity. The changes to the licensing regime (at condition E1) now require information to be provided to relevant electricity suppliers to allow for the correct application of final consumption levies. To benefit from this relief from the FCLs, a licence would be required – so the numerous energy storage projects which benefit from a licence exemption would have to consider if the relief from FCLs outweighs the obligations flowing from being a licence-holder.

Similar modifications will be made to industry codes to exclude storage facilities from the application of the residual charge element of other network charges. The intention is that storage is not subject to residual charges for demand where the intent is to export the energy back onto the system. The changes again reflect Ofgem's position that storage is temporary and so should not be treated as final demand. These reforms are expected to come into force in April 2021 and April 2022.

These various clarifications to the regulatory and charging status of electricity storage facilities and simplifying the charging regime lowers the barriers for connection, increases the economic viability and investment prospects of energy storage projects and will ultimately increase the number of electricity storage facilities in the UK.

New Services Introduced

Dynamic Containment is a new faster frequency response service that was rolled out by the National Grid on 1 October 2020 and that has attracted particular interest from the storage market.

This product requires a very swift and accurate response for which battery facilities provide a natural fit with the fast and highly precise response times that battery storage provides.

It operates as a post-fault service to redress the deviation in frequency caused, for example, by a generator or interconnector fault.

The National Grid has been presented with recent challenges in keeping the country's grid frequency steady at 50Hz. The proliferation of renewables sources now integrated into the grid contributes to more rapid and regular deviations to the system frequency.

Speedier frequency response services are therefore key to address this issue, particularly considering the further renewable integration that is anticipated. The value in Dynamic Containment is the speed of response. It can deliver a response in 0.5 seconds as opposed to 2

seconds for the existing Dynamic Firm Frequency Response.

It is tendered daily in 24 hour blocks one day in advance currently capped at an availability fee of £17/MW/h. This is a price that is significantly higher than other current response services and, due partly to a relatively low demand, the fee has not so far departed materially from this cap.

The National Grid's plan was initially to procure 500 MW daily response and for this to be increased to 1GW thereafter. The high bar to participate (due mainly to high performance and data reporting requirements to tender for the service) has initially led to a shortfall in full uptake, but, as above, bolstered the impressive availability fees for those participating.

This new service presents an attractive revenue stream for the battery market – and appears tailor made for it.

Financing Issues

The financing of battery storage projects on a standalone, limited recourse basis remains at a nascent stage in the UK. From a project financing perspective there is a larger than usual tension between debt and equity in a battery storage project: in a traditional project financing the relevant asset is limited in its application (which suits risk averse debt providers, whose return is typically limited to the interest on their loans), whereas a battery storage project would ideally be granted the flexibility to perform a variety of services (which suits shareholders whose return on their investment is, in theory, unlimited). For developers, ideally the covenant package in their loan agreements would, for example, expressly to permit the various uses the battery is intended to serve, or could serve in the future. This runs somewhat contrary to the traditional project finance model where tight controls are placed on the project company.

Alongside this issue is that of control. Usage is directly related to the life-cycle costs of a battery storage system, and manufacturing warranties will often require that the project is operated within certain operational parameters. Lenders will need to work through these issues on a case by case basis, and the anticipated revenue profile of the project will be the key determinant in resolving the risk allocation on this and other points in the loan documentation.

From an EPC and O&M perspective, the fact that battery storage is a relatively nascent technology gives rise to two broad bankability considerations.

Firstly, contractors are not yet used to (or have not been willing to accept) risk positions which are a typical feature of project-financed construction contracts elsewhere in the renewable energy sector. The issue is particularly acute in relation to the more well-known battery suppliers in the market. Forceful developers have made significant progress in the course of the last 12 months and are able to effect a degree of risk transfer comparable to more settled technologies, such as solar PV. In particular, we have seen that EPC contractors are prepared to accept direct agreements, security assignments and other lender requirements in order to secure financing. Some EPC contractors have also assisted with alternative forms of financing, which they view as a 'value add' to gain market share.

The second consideration is technology risk. Battery storage projects are unique in that a single component comprises almost the entirety of the works (typically the battery constitutes 80 – 90% by value). The success of the project is therefore almost entirely dependent upon the reliability of this single piece of equipment. A key mitigant for technology risk is selection of a reputable supplier with a track record of delivering substantive battery storage projects. Although battery storage is a new technology, there are a significant number of reference battery projects across the world (primarily in OECD countries) which are in successful operation.

The supplier should provide robust equipment warranties, particularly with respect to degradation. Degradation will accelerate where a battery is used in excess of recommended limits. For this reason, it is helpful (although generally more expensive) if the supplier is engaged for the long term operation and maintenance of the system. The supplier's interests are broadly aligned with the lenders on this point: both are concerned to sustain optimum performance for the medium to long term, rather than pursuing a more aggressive operating strategy for short term gains. In fact, most suppliers will make this engagement a condition of the various product warranties provided with the battery. This approach follows the example of the early years of wind power.

Finally, the contractual framework should include a comprehensive testing and guarantee regime, covering testing in advance of construction completion and operational-phase guarantees. These guarantees comprise energy retention and availability requirements. Energy retention warranties can be provided as part of the EPC contract, although we know of one major manufacturer who now provides these as part of the long term service contractual arrangements (presumably to discourage termination of the service contract).

2021 and Beyond

Further regulatory and legislative developments are scheduled and expected in the coming months.

The government's December 2020 White Paper confirms that, along with defining electricity storage when parliamentary time allows, the government will, jointly with Ofgem, publish a new Smart Systems Plan in spring 2021 which will include a new framework for monitoring flexibility across electricity markets.

The related Ten Point Plan published by the government in November, did not contain material information relating to energy storage, but did however announce that £100 million will be made available to address energy storage and flexibility innovation challenges. This will focus on non-proven, long-duration utility-scale technologies and highlighted an enthusiasm for localised solutions between the Distribution Network Operators and the market participants. The government states that flexibility innovation challenges will be launched in spring 2021.

Simultaneously with the White Paper, the government published a Call for Evidence 'Enabling a High Renewable, Net Zero Electricity System'. The aim of which is for the government's large scale renewable support policies and allocations of future CfD rounds to be informed in order to meet objectives including the growth in renewable deployment to meet net zero targets and to support and adapt innovative technologies.

This a further step following the consultation published in March 2020 in which the government considered changes to the CfD scheme to facilitate the co-location of storage with CfD projects – concluding in November that changes are not currently needed but noted that it wishes to seek further views on how renewables can be best integrated and to identify the barriers to co-location of storage with CfD generators.

We can also look forward to the implementation of revisions to the network charges as described above and the expansion of the grid's frequency response services. Dynamic Containment is the first of three ancillary services, with the other two (Dynamic Moderation and Dynamic Regulation) expected to be rolled out this year and to manage smaller pre-fault frequency deviations.

To put the regulatory progression into perspective, the government noted in its White Paper that it has implemented two-thirds of the policies set out in the Smart Systems and Flexibility Plan of 2017 to remove barriers to energy storage, and that it expects to deliver these fully by 2022.

2020 heralded some notable regulatory developments in the UK battery storage market and several long expected commitments delivered by Ofgem. These developments are significant, particularly given the challenging circumstances of 2020.

Further progress is still needed to reduce the barriers for battery storage in the UK and to promote the effective competition in the generation market to encourage development and investment. However, it is clear that this sits within the government's agenda and we look forward to monitoring the development of further legal and regulatory adaptations to encourage the growth of the battery storage market in the UK and its contribution to meeting the government's net zero targets.