Bird & Bird

Energy Storage: 2020 update

Contents

Foreword

Josh Partridge, Senior Associate & CO-Head of Bird & Bird's Energy Storage Team

The energy sector has undergone major change in the last decade due to the growth of the renewables market. Energy storage technology is touted as a solution to many of the issues facing the energy market as we continue to move towards a system based on more decentralised and intermittent generation where the generation and demand profiles embedded within the electricity grid become ever more complex and unpredictable.

We are beginning to see material changes to the regulatory treatment of storage, illustrated by proposals published by BEIS on 14 July 2020 to remove storage from the NSIP regime for planning purposes. Concrete steps to clarify the regulatory framework are helpful and complement the developing energy storage market in the UK, where we are beginning to see considerable investment and deployment of the technology. Bird & Bird has recently advised on Europe's largest battery storage project, and we expect the market to continue to blossom in the coming years as the investment and regulatory landscape becomes ever more clear.

In these uncertain times the way we generate and use energy is changing: energy storage has the potential to play a key role in the way we manage the challenges this presents. This paper provides a brief update on some of the ongoing regulatory and revenue stream developments relating to energy storage in the UK market.

"Experienced renewables group with a wealth of expertise in solar work and frequently sought to advise on energy matters with complex technological aspects. Often called upon to handle commercial, regulatory and development matters for a number of energy companies"

CHAMBERS UK, 2020

Josh Partridge
Senior Associate

Introduction

Energy storage technology

The logic behind energy storage is simple: convert excess electricity into something else, then, when that electricity is required, convert it back. This paper primarily focusses on battery storage technologies which allow near real time dispatch of stored energy to the electricity grid. We have previously looked in detail at the potential benefits of battery storage technology and the challenges facing its deployment, including the need to update the regulatory framework to allow battery storage to fulfil its potential in the UK market. These resources are available on our website[1].

The majority of recent storage projects are understood to be based on lithium-ion or flow battery technologies but there are ongoing developments in other storage technologies including hydrogen, ammonia and compressed and liquid air, as well as developments in longstanding technologies such as flywheels, which may diversify the technological landscape for energy storage deployment in future.

Market highlights

There is plenty of reason to be excited by recent developments - for example:

- A 2018 Bloomberg report suggested that the global energy storage market will attract over $600 billion in investment over the next 22 years, and the cost of utility-scale lithium-ion battery storage will drop by roughly 50% by 2030[2].
- National Grid's 2019 Future Energy Scenarios demonstrates growth in the UK's energy storage capacity under all scenarios in order to support the continued growth of renewables[3].
- Research by Renewable UK shows that by the end of 2019, the total cumulative capacity of battery storage planning applications in the UK stood at 10,500MW, up from 6,900 MW the year before. In 2012 this figure was just 2MW[4]. This rapid recent growth demonstrates the appetite for deployment of energy storage in the UK.

We are also starting to see an increase in projects moving forward with investment and deployment, indicating that the business case for energy storage projects is beginning to reach the point where investors are comfortable with the future revenue stack. For example, in **February 2020** Bird & Bird advised on the development of two in front of the meter 49.9 MW battery storage facilities located in Wiltshire. The combined capacity of both facilities means it is one of the largest battery storage projects in Europe[5].

[1] https://www.twobirds.com/en/sectors/energy-and-utilities/energy-storage
[2] https://www.bloomberg.com/news/articles/2018-11-06/the-battery-boom-will-draw-1-2-trillion-in-investment-by-2040
[3] https://www.nationalgrideso.com/sites/eso/files/documents/fes-2019.pdf
[4] https://www.renewableuk.com/news/479977/New-research-shows-massive-growth-in-energy-storage-projects.html
[5] http://www.chng.com.cn/eng/n75863/n75941/c39789550/content.html

The Regulatory Framework

Change is coming

Planning - Removal of energy storage from NSIP

On **14 July 2020,** BEIS issued proposals following its recent consultation process which confirmed that Government will legislate to remove electricity storage (except pumped hydro) from the NSIP regime in England and Wales. Following implementation, electricity storage will primarily be consented under local planning law, although the Secretary of State will retain discretion to direct projects into the NSIP regime where appropriate.

Up to this point, differing planning regimes applied depending on the size of the relevant project:

- **Under 50MW:** projects under 50MW were determined through local planning laws under the Town and Country Planning Act 1990,
- **50MW or more:** projects of 50MW or more in England had to be approved by the Planning Inspectorate as they were considered Nationally Significant Infrastructure Projects (NSIPs) and fall under the Planning Act 2008. According to the Electricity Storage Network (ESN), classification as an NSIP can add up to three years to project lead times and drive up costs from the tens of thousands to hundreds of thousands of pounds[6].

This two-tier system was felt to set an artificial ceiling on the capacity of energy storage projects in the UK, as projects sought to avoid the additional planning burden which applies to projects over 50MW. As an illustration of this, BEIS data shows there is a significant clustering of projects between 49 and 50MW[7].

In **January 2019,** BEIS began consultations on the 50MW threshold applicable to energy storage for planning purposes. The consultation noted that BEIS had found that the 50MW cap was not a hindrance to developments and that other factors such as network connection costs, upfront capital costs and available revenue streams were bigger hurdles. At that stage, BEIS proposed to retain the 50MW threshold for standalone energy storage projects but create a new capacity threshold for co-located storage.

In **October 2019,** BEIS issued a follow up consultation which explained that respondents to the January 2019 consultation had provided strong evidence that projects were being limited by the 50MW cap (often being installed at a capacity of 49.9MW) or were being split into several sites. Therefore, the proposal in the October 2019 consultation was to carve out electricity storage (other than pumped hydro) entirely from the NSIP regime. The recent proposals put forward by BEIS on 14 July 2020 confirm this position which once implemented is intended to apply to new storage facilities whether as part of a co-located or composite project, an extension to an existing generation station, or a standalone installation.

Further to this, BEIS intends to issue guidance to local authorities on the treatment of storage to address concerns that the treatment of energy storage is somewhat uncertain under local planning law. The Energy Institute's 2019 Battery Storage Planning report notes that in England, energy storage installations have been applied for under several use classes under local planning law including: class B1 (light industrial), class B2 (general industrial), or class B8 (industrial storage and distribution centres). Further, some planners have chosen to classify storage as sui generis, meaning it does not fit into any of the official classes - which can delay planning applications. Clear guidance for local planning authorities should facilitate consistency in the planning process.

This is a firm step towards a clearer regulatory regime for storage and may help open up the market to larger capacity installation. However, this is one of many ongoing processes to update the regulatory framework as part of the Smart Systems and Flexibility Plan, some of which we touch upon below.

Licensing - modified generation licence for energy storage

As we have previously explored in detail, the regulatory regime applicable to energy storage technologies is not entirely clear, and this creates potential barriers to investment and deployment. Under the Electricity Act 1989 energy storage is not explicitly defined but is treated as generation and storage operators would, on the face of it, require a generation licence unless entitled to a rely on an exemption. In practice, many of the energy storage projects that have been deployed so far in the UK have a capacity of less than 50MW and are able to rely on an exemption under the Electricity (Class Exemptions from the Requirement for a Licence) Order 2001. In **November 2016** Ofgem issued a consultation entitled, 'A smart, flexible energy system: call for evidence' and subsequently in **July 2017** Ofgem and the UK Government released their initial response. This established the 'Smart Systems and Flexibility Plan', which set out Ofgem and the Government's proposals to address commercial and regulatory barriers to the further deployment of energy storage. In particular, it identified the need for a regulatory definition of energy storage, and proposed a modified form of generation licence for energy storage.

Following this, in **September 2017,** Ofgem launched a consultation on the insertion of two new definitions within their licensing framework: "electricity storage" and "electricity storage facility". In June 2019, Ofgem published a document summarising responses and consulting on the proposed next steps. This included the proposed amended form of generation licence for energy storage facilities and outlined the scope of reporting requirements to be placed on those holding such a licence. The consultation closed in July 2019 and we await the outcome. There have been calls from industry for finalisation of this process to provide certainty on the future regulatory treatment of storage, believing it is necessary to incentivise investment in energy storage in the UK.

Industry codes - demonstrates the need for a legislative definition

There are a number of industry codes which a storage project may have to comply with depending on its size, location and operation. One of the barriers previously identified to the deployment of energy storage in the UK related to the treatment of energy storage under such industry codes and the potential for 'double charging' of certain grid charges (both when an energy storage facility offtakes from, and dispatches to, the grid). Ofgem believe this double charging puts energy storage at a relative disadvantage to other generation and addressing this issue has been one of the key aims of creating a legislative definition and licencing regime. Work is ongoing through both Ofgem and industry to implement various updates to grid codes to address this. For example, following consultation, Ofgem has approved changes to the Connection and Use of System Code (CUSC) that would result in the removal of Balancing Service Use of System (BSUoS) charges for energy taken from the grid by storage assets. Ofgem have also indicated that the new generation license for electricity storage facilities (see above, under Licencing) will set out which industry codes are to be adhered to by a storage operator and that it may not be necessary for some licensees under the proposed storage generation licence to sign up certain of these codes[8]. This clarity should assist developers and investors in assessing the viability of potential projects.

One impressed client says: "We chose Bird & Bird to do our legal work due to their knowledge of the renewable energy sector," adding: "They're very helpful, knowledgeable and responsive."

CHAMBERS UK, 2019

[6] https://www.regen.co.uk/wp-content/uploads/Proposals-regarding-the-planning-system-for-electricity-storage-ESN-response.pdf
[7] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/839384/proposals-regarding-planning-system-electricity-storage-follow-up-consultation-govt-response.pdf
[8] https://www.ofgem.gov.uk/system/files/docs/2019/06/storage_licensing_-_statcon_covering_letter_final_for_website.pdf

Income streams

Understanding the revenues of a storage project over its lifecycle is vital to encourage investment and has been one of the key uncertainties up to this point. In most cases the revenue streams a storage project generates must be 'stacked' and, in the absence of long-term revenue streams, will need to be managed, adapted and developed through the lifecycle of a storage project. This creates significant uncertainty to initial investment.

Capacity Usage and Dispatch Agreements between generators and offtakers are becoming an increasingly common way to offset the above uncertainty. Under these agreements the generator gives exclusive rights to the offtaker to use the capacity of the project and issue instructions to the generator as to when it should charge and discharge. The offtaker is responsible for managing/stacking the various revenue streams for the project, and is incentivised to optimise these through revenue sharing mechanisms. Depending on the specific circumstances of the project (in particular how it is being financed and appetite for merchant risk) some of these agreements offer fixed capacity payments, that operate in a similar way to a floor price.

We have previously reported on key revenue streams available to storage projects[9] and there have been a number of developments in relation to these:

- The Capacity Market was initially a major opportunity for storage assets, offering long term revenues. However there have since been significant de-rating factors applied to short duration storage which has reduced the revenues for battery storage.
- TRIADS and peak avoidance – the ability for consumers to utilise energy storage to avoid peak pricing is a potentially lucrative revenue for behind the meter projects but returns are expected to reduce as peak charging falls.
- Frequency response is a key market for energy storage as one of the few technologies capable of reacting at the close-to real time speed required. Firm Frequency Response (FFR) and Enhanced Frequency Response (EFR) are two key markets that have been crucial in the early development of the UK's energy storage market. However, the demand for these markets has led to prices, secured through auction, falling in recent years. Further to this National Grid has been developing a suite of new frequency response markets to procure flexibility (see below).

These changes to key revenue streams demonstrate the need for storage to be adaptable and react to new opportunities as they present themselves. The energy storage investment environment is very different now to in 2017 and will continue to evolve. This does not necessarily provide investment certainty and balancing capital expenditure against a complex and somewhat uncertain revenue profile over the lifecycle of an asset remains a challenge. The key appears to be creating a revenue stack that provides the certainty needed for initial investment with the flexibility to adapt to changing revenue streams over the asset's lifecycle. This is complicated by technical and warranty constraints relating to the asset itself, the circumstances of the grid at which the asset is located, and the need to balance multiple contractual commitments for different revenue streams that may evolve over time.

New possibilities are emerging for energy storage to generate revenues and while by no means an exhaustive list, we highlight below a select few.

Dynamic Containment

Dynamic Containment is the first of National Gird's new suite of frequency response products to be launched and aims to provide a rapid response to significant frequency imbalances (e.g. post-fault). Others to follow include Dynamic Regulation (to manage ongoing small deviations in frequency) and Dynamic Moderation (to provide a rapid response to sudden frequency imbalances in intermittent generation). While these services are open to technologies that can meet the relevant technical requirements, energy storage is expected to be a major provider.

DNO/DSO Flexibility Services

As DNOs transition to Distribution System Operators (DSOs) possibilities open up for storage to provide flexibility services directly to the distribution network. As the generation mix has changed, with increasing amounts of generation directly connected to the distribution networks, flexibility products have become more complex. Storage can help manage demand and generation profiles on distribution networks by providing additional flexibility.

[9] https://www.twobirds.com/-/media/pdfs/news/structuring-your-energy-storage-project--july-2017.pdf?la=en&hash=833CE2FBB8271A-F9AA6ACC8DC7C959559D9A1CE6

The past year has seen a number of DNOs procure flexibility services, including through energy storage. This has been touted as a key part of the move towards a decentralised, decarbonised, and digitised smart grid and offers a valuable alternative to infrastructure upgrades or building new generation. These types of flexibility services add to the potential revenue streams available to storage operators.

Balancing Mechanism & Virtual Lead Parties

In December 2019 National Grid Electricity System Operator and ELEXON opened the balancing mechanism (BM), to a wider range of flexibility providers. Through the BM, providers can offer to increase or decrease their generation or demand to help balance the system and it was previously only open to participants with a supply licence. National Grid is working on ways to bring in more providers and has created the virtual lead party (VLP) as a new type of entity that can participate in the BM.

VLPs can create secondary balancing mechanism units based on individual assets or aggregated assets using the same grid supply point. VLPs can then bid into both the BM and the European balancing market (see more below). The minimum requirement is 1MW and VLPs can take part in the BM without having a supply licence.

This move to open up the BM highlights National Grid ESO's focus on boosting real-time flexibility in the system and improving equality of access. Wider access to the BM presents a huge opportunity for a range of flexibility providers, including battery storage.

Project TERRE

Project TERRE (Trans European Replacement Reserve Exchange) is a project developed for the exchange of balancing energy and is being implemented by a group of European electricity Transmission System Operators (TSOs), in response to the European Electricity Balancing Guidelines. Project Terre will put in place a reserve market to enable cross border trading of balancing, frequency, and reserve services and potentially allows flexibility providers (including storage) connected in a particular TSO region to offer services across the European market.

TSOs currently participating in Project TERRE include National Grid, and TSOs from France, Spain, Portugal, Switzerland, Italy, Czech Republic, and Poland with more expected to follow. However in Great Britain, implementation of the project has been delayed until the end of October 2020 at the earliest due to COVID-19, and the UK's continued participation in Project Terre may also be dependent on the terms of the UK's withdrawal from the European Union.

Inertia markets

One particular challenge that the energy system faces as traditional fossil fuelled generation declines is a reduction in system inertia as fuel powered turbines are increasingly replaced by renewable generation. Battery storage has the potential to provide synthetic inertia by reacting quickly to changes in frequency, and certain storage technologies such as flywheels may have the ability to provide inertia support by regulating rotation speed in relation to grid frequency.

National Grid has recently launched a new initiative to procure inertia as a standalone service and in January awarded contracts worth £328million over a six year period to 5 providers[10]. Storage technologies did not win any of these contracts but National Grid has stated that it will look to explore the delivery of inertia by new and innovative technologies – and this may provide a potential long-term revenue stream for storage assets.

> *"It is an exceptional and perfectly structured organisation, the lawyers have a broad knowledge of smart energy-related laws and upcoming policies."*
>
> CHAMBERS UK, 2020

[10] https://www.nationalgrideso.com/media/national-grid-eso-outline-new-approach-stability-services-significant-step-forwards-towards

Our Energy & Utilities Group

Bird & Bird LLP is an international law firm. We combine exceptional legal expertise with deep industry knowledge and refreshingly creative thinking. We have over 1,350 lawyers in 29 offices across Europe, the Middle East and Asia, as well as close ties with firms in other parts of the world.

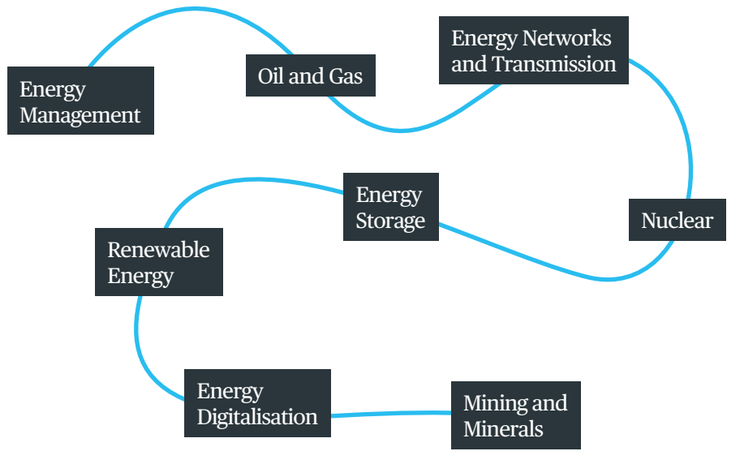
Our Energy and Utilities team of over 100 lawyers spread across our network advise on energy and utilities matters across all of our practice areas. As an international team, our sector approach is not broken down by offices but into sub-groups that focus around particular aspects of the Energy and Utilities sector.

Our practice is driven by a genuine understanding of key business imperatives and is particular strong in:

- Energy regulation
- Corporate Finance
- Major projects
- Emissions trading
- Environmental
- Dispute resolution
- Intellectual Property
- Commercial Contracts
- Telecommunications
- Technology procurement and management

The combinations of our strengths in the traditional energy sector and the technology specialism for we are better known, means that we are ideally placed to support those companies involved in new methods of energy generation and management.

Our deep understanding of this new generation mix; network issues associated with generation; and which issues arising from new technology developments, business methodologies and operational parameters allows us to help businesses protect and enhance their value.



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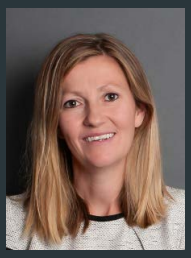

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