

Q2 Market Report

August 2021

Executive summary

It has been a very busy quarter across the board, with plenty of developments and insights to include in this quarter's market report. Some of these we had predicted, while others have been unexpected.

Headlines include:

- Gas supply concerns grow for the UK and further afield as lower than usual temperatures and politics 'strangle' supply
- Lower than expected renewable generation and cold temperatures created a volatile power market, leading to high system prices
- Dynamic Containment auction volume filled up quickly this quarter and **Limejump** bid in Europe's largest battery
- A flourish of insightful reports from regulators and National Grid published this quarter, including National Grid's Future Energy Scenarios, are all highlighted in this report.

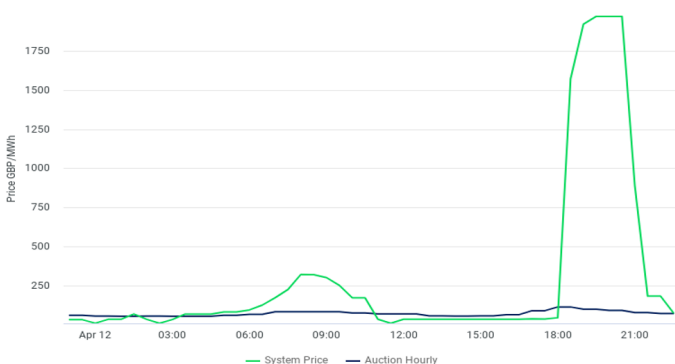
Market update

Low renewable output and cold temperatures drive up prices

Demand has now bounced back to levels consistent with pre-March 2020 (Covid lockdown 1.0), helped in part by colder than normal seasonal temperatures. The UK experienced the coldest April since 1989, while low levels of wind and overcast conditions saw renewable generation decrease by 25% compared to Q1 2021 and 9% compared to Q2 2020. Low renewable generation meant that National Grid had to rely on generation from gas, in the form of CCGTs and gas peakers to balance the system. Generation from gas increased 44% compared to Q2 2020—this has had significant knock on effects that will be discussed later in the report.

Low renewable generation and cold temperatures were the main drivers of Q2's 'volatile' power market, resulting in the high average system price of £74.85/MWh, which is almost £10/MWh higher than any quarter since Q4 2011. The most extreme example of this occurred on 12th April, where wind dropped to as low as 0.6GW, which also coincided with a trip on the IFA2 (a clean energy interconnector between France and the UK) removing a further 1GW of supply. This led to incredibly high system prices jumping from £43/MWh to over £1,500/MWh and peaking at £1,971.95/MWh for three consecutive settlement periods.

Day Ahead and System Price



There were a couple of highlights for renewable generation in Q2. The UK witnessed a new record for the lowest ever carbon intensity on the National Grid at 39gCO₂/kWh on the 5th April. This was due to very high winds combined with high solar generation, accounting for 41% and 23% of the generation mix around lunchtime respectively. There were also two new wind generation records in May, reaching 17.6GW on the 3rd and then 17.7GW on the 21st.

Carbon continues its unprecedented rise, UK ETS debuted

The price of EU Allowance (EUA) carbon credits increased by an astonishing 38% during Q2 and is up by over 60% since the start of the year. Carbon pricing usually follows macroeconomic trends, and growing confidence in the global economy due to the vaccine boost has translated even more bullishly across to the carbon price increases that we saw through H1.

Market analysts were suggesting that the fundamental price of carbon was consistently \geq €10/mt below market levels for April. The only thing that stopped this meteoric rise was the debut of the UK ETS, the UK's official carbon credit scheme following the split from Europe. This led to a sell sentiment to free up funds to invest in the UK ETAs, creating a drop of over €5/mt in one day. Interestingly, the UK ETS also had a significant drop off when the market opened, starting at £50/mt and ending at £43.99/mt. The EUA continues to be a predominant driver of the UK power market because the UKA is still too illiquid. Following this crash, there was reasonable volatility, with carbon prices rising and falling consistently until mid-June, when an increasingly tight gas market led to a surge in the forward market.

Carbon Prices



High pressure systems and politics 'strangle' gas supply

As mentioned earlier, the combination of low temperatures and low renewable generation from several high pressure systems has had a significant impact on the gas market this quarter. During the summer months, the UK should be injecting into their gas supplies in order to have sufficient levels for the following winter, but the market has had to consistently withdraw from the storage rather than inject across Q2-21. There have also been issues with the supply of gas coming into the UK and Europe, such as regular maintenance on key gas pipelines from Norway.

Gas prices began to seriously increase in mid-June. This is because there was an even more severe gas shortage situation in Asia, which meant that all Liquid Natural Gas (LNG) supplies were diverted from Europe to Asia. Gazprom has also played a significant part in this rapid increase in gas prices. They had the ability to increase gas flow into Europe, but have chosen not to. This is all occurring due to the politically charged Nord Stream 2 project, a new pipeline that would significantly increase gas pipeline capacity from Russia to Europe. There are concerns over the strategic advantage Russia could gain from controlling gas flows into Europe, delaying the commissioning of this new pipeline. The USA has been especially anti-Nord Stream 2 and have threatened sanctions on the project. This decision from Gazprom is another suggestion that they may be deliberately tightening the gas supply into Europe in order to push through the opening of Nord Stream 2. Gas supplies, so far, are far below the five year average and it is likely that there won't be stable supplies before winter.

UK NBP Winter 21



A bullish power price run benefits renewable generators

Due to unprecedented rises in both carbon and gas prices, UK power prices have also experienced a huge increase. UK Baseload Winter 21 increased by over 50% in Q2 and almost broke through the £100/MWh price. This has been exciting news for our renewable customers that have been able to lock in their new Fixed PPAs at a significantly higher rate than last year.

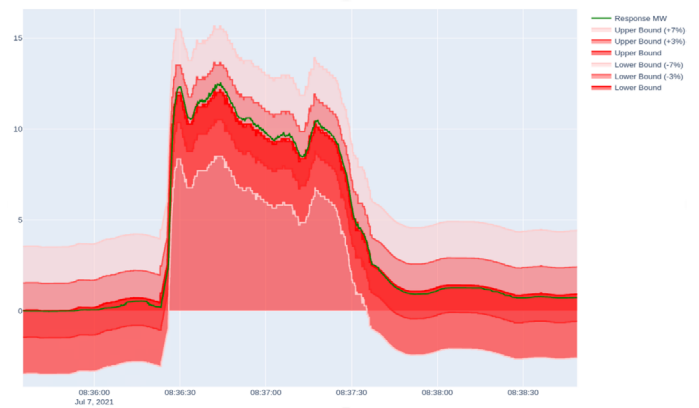
UK Baseload Winter 21



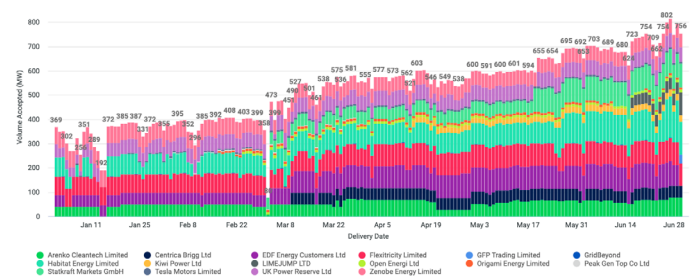
Ancillary services Dynamic Containment

In June, **Limejump** became the latest battery optimiser to begin trading in National Grid's newest market on the block, Dynamic Containment (DC). DC is a fast-acting, post-fault service that ensures frequency remains within the statutory range of +/-0.5Hz in the event of sudden demand drop or supply surge on the grid. The DC market is better suited to battery assets that can respond in sub-second speed. **Limejump** entered Minety, Europe's largest battery (100MW) into DC, and so far has assisted with balancing during outages and times of high demand, such as at half-time during the Euros final.

The next image shows how **Limejump** assets performed during a frequency event. In green is the response of the assets. In red we also plot the acceptable range of outputs. You can see that our asset operates well within the 3% National Grid upper and lower tolerance levels. Operating above or below these tolerance levels results in a financial penalty for delivery of the service, so it is paramount to partner with an optimiser with a track record of delivering frequency services.



The DC market is competitive and this quarter we have seen the auction volume fill up very quickly, with circa 275MW of batteries added into the auction.



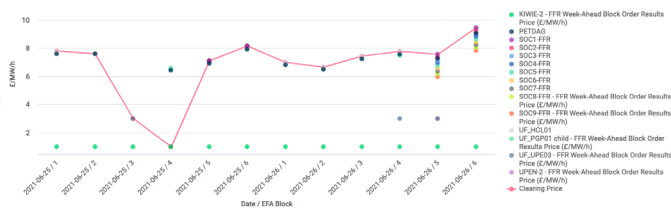
National Grid requires a volume of 1.4GW, however, this will decrease to 800MW in November. As a result, we expect the £/MWh procurement price to fall, which is why revenue stacking is key to successfully maximising returns for customers. There are a few changes being made to DC by National Grid over the coming weeks and months. Firstly, National Grid is switching its procurement strategy later this month with the following changes:

- 'Pay as bid' changes to 'pay as clear'
- Daily contracts move to EFA block contracts

Secondly, National Grid has further changes scheduled for October with the release of the High Frequency-DC. This product can be combined with the current DC-Low Frequency product simultaneously.

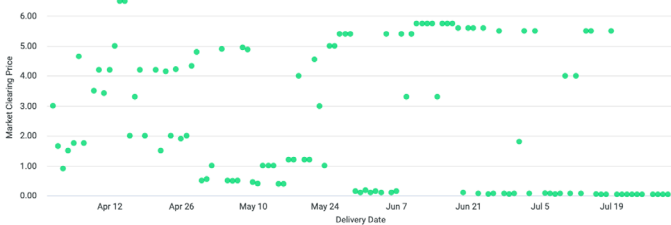
Firm Frequency Response (FFR)

Due to the premium pricing of the DC market, FFR auctions have been heavily undersupplied this quarter, not helped by National Grid also increasing their FFR volume requirements from 375MW to circa 600MW. 'Monthly FFR' commands a premium compared with 'Weekly FFR', and the monthly auction is undersupplied. This therefore resulted in the weekly auction being severely undersupplied, and for the first time ever, we have seen a few instances of no-one bidding for certain EFA blocks. This has been interesting for the 'paid as clear auction' as it means some providers, with less knowledge/ forecasting ability, struggled with price discovery, leading to instances of clearing prices as low as £1/MWh, even in an undersupplied auction. It is important to highlight that the weekly FFR auctions are scheduled to end in November and monthly FFR will end in April 2022. The market will then transition to a new suite of Dynamic Response products, with DC being the first in this new suite to go live.



STOR

At the beginning of the quarter (1st April), STOR moved to day-ahead auctions, something we highlighted in our Q1 report. STOR's availability pricing has been volatile over Q2. This has been partly due to the unique clearing of the EPEX algorithm, which enables units offering smaller volume to dictate the price more easily. As more parties have joined the STOR market, there has been pressure on the prices offered and they have tended to be lower (although there are sporadic high value days). See below where the prices are more regularly clearing at <£0.1/MWh.



Regulation update

Capacity Market application period open

The Capacity Market eight-week Prequalification period started on the 21st July and runs until 14th September. Under this product, National Grid makes availability payments for assets which are able to respond in the event of a tight system. This product is open to all technologies, including wind and solar. A different 'de-rating' factor is applied by technology to reflect the reliability of each. For onshore wind this factor is between 6-8% and for solar between 2-3%. We generally recommend this product is viable for wind and solar assets over 30MW as well as battery and gas peaking assets. If you would like to explore further, please contact info@limejump.com.

Reactive Power Services from Distributed Energy Resources (DER)

National Grid completed its four-year trial with the Distribution Network Operator, UK Power Networks, on the use of DER to provide Reactive Power Services that have historically been provided by Transmission connected generation. The successful trial included five DERs being two batteries, one solar and two wind assets between 2-60MW. National Grid is now assessing how it will productise this solution as part of the Reactive Power workstream which is due to conclude in April 2022. We will keep you updated on this product.

Longer duration Energy Storage competition

The Government launched **innovation funding** of £68m for innovative long duration battery storage (application window closed at the end of July). It is anticipated that the funding will support initiatives across six projects with completions due in 2024 and 2025. At the same time, the Government has launched a consultation into 'facilitating the deployment of long term storage' as it sees it as essential to delivering flexibility to the electricity system.

Last resort disconnection

Ofgem approved modification GC0147 in May, formalising the ability of the System Operator to instruct the disconnection of embedded generation after all other commercial options have been explored. This was a clarification within the rules and is expected to be used infrequently. There will be no compensation should this situation arise.

Network charges

On 30th June, Ofgem issued its network charging consultation (the Access and Forward-Looking Charges Review 'AFLCR'). This consultation was delayed for a year as Ofgem grappled with the impact network charges would have on delivering the net zero target by 2050. The changes cover three areas, all of which are relevant for distributed connected assets. We are flagging these for awareness as they are still under consultation;

- 1. Distribution connection charge**—Ofgem proposes to move closer to a 'Shallow connection' (i.e., connection cost with limited reinforcement costs) compared to the existing arrangement where reinforcement costs are paid as part of connection. This change is to better align with the treatment of Transmission-connected generation assets and to support the rollout of distributed connected assets like electric vehicles.
- 2. Access rights to Distributed network**—The proposal recommends introducing a choice on the level of 'firmness' and a possible time profiled connection. This would provide greater clarity for Distribution connected assets.
- 3. Transmission connected charge (TNUoS)**—For Distribution connected assets greater than 1MW. Currently, Small Distributed Generation (SDG) receives an Embedded Export Tariff payment if located in the South and no charge in the North. Ofgem has proposed a TNUoS charge for Distribution connected assets greater than 1MW but are considering delaying this change until it completes additional work. The other changes are likely to come into force from April 2023.

At this stage, all changes are provisional so we will keep you up to date as to when they are finalised.

Future Energy Scenarios (FES)

National Grid published its **FES** in July, setting out four possible scenarios for electricity requirements out to 2050. Three of these scenarios reach the target of net zero emissions by 2050. In the net zero scenarios, wind and solar capacity play a significant role in future generation, with the expected capacity increasing from 36GW today to between 87-113GW by 2030 and between 313-374GW by 2050. Under the 'Leading the Way' scenario, there is a requirement for 12GW of battery storage by 2030 and 28GW by 2050, while currently there is only circa 1GW connected to the grid. This highlights the massive opportunity within the battery market right now. While we are seeing strong returns for batteries in the new frequency product, Dynamic Containment, this has nearly reached its capacity and does not provide the long-term investment signal for batteries. Instead, this will need to come from appropriate wholesale market price signals and the ability to 'stack' revenue streams. Check out our **blog** for a summary of National Grid's FES report.

Smart Systems and Flexibility Plan 2021 (SSFP2)

Ofgem and the Government recently published the much-anticipated **SSFP2** setting out the roadmap to meet the legislated net zero 2050 target. They have assessed the requirements by looking at them across five areas; Facilitating flexibility from consumers, Removing barriers to flexibility on the grid, Reforming markets to reward flexibility, Digitalising the system and Delivering this plan.

This paper goes a long way to setting out a comprehensive plan for industry. Of particular note, there are some improvements for batteries as they seek a level playing field for co-located batteries and renewable generation. This will include a review of the use of batteries in Contract for Difference contracts awarded to large renewable generation. There is a requirement for the DNOs and National Grid to agree on a standardised approach to procuring flexibility across all voltage levels by April 2023. We see this as integral to opening up Distribution connected flexibility. There is also going to be a review of how to factor carbon emission considerations into the Capacity Market via a consultation which has just been launched. The carbon review will also include a review of the UK carbon scheme exemption threshold of 20MW which will likely be removed from 2026.

At the same time as the SSFP, the Government provided its first industry specific **Energy Digitalisation strategy**, setting out the framework to deliver on the net zero targets.

Limejump continues to engage with the regulators on these key topics.

Conclusion

Q1 and Q2 have already offered a vast amount of exciting insight and events. The next two quarters will certainly be interesting, as there still appears to be a certain level of instability thanks to the global pandemic, unpredictable weather and various political factors. Whatever the future of the energy sector looks like, we look forward to analysing it in the next report.

If you have any questions or comments about our report, please get in touch with us at info@limejump.com

