

Trial Phase 2 Review: Reserve from storage in the BM

14th August 2020

Background

On 30th April 2020 we published a letter to the industry, inviting market participants to engage in a temporary service (Optional Downward Flexibility Management) to help the Electricity National Control Centre (ENCC) manage the unprecedented levels of low demand that we are experiencing during the Covid-19 pandemic¹. As part of this invitation we also asked providers to contact us if they had flexibility options which we could potentially utilise.

This led to the successful implementation of more SuperSEL arrangements, a single bilateral contract with EDF and the implementation of ODFM agreed with over 4GW of distributed energy providers who previously had no direct access to market widening competitive access in response to the challenges.

In response to our invitation for flexibility options Arenko proposed a battery storage solution. We ran a trial with them to determine whether we can access additional flexibility from storage providers, looking to access both upward and downward energy reserve.

The following activities have been completed:

- First phase of trial on 22nd May 2020
- Review of first phase of trial, published on 6th July 2020².
- Design of a second trial over a longer period to allow the full testing of the proposal.
- Second phase of trial between 22nd July 2020 and 28th July 2020.

The following areas were highlighted for exploration during the second trial.

- Gain more experience to understand how the proposal can be fully and efficiently integrated into ENCC.
- Fully test the proposal across various operational and market conditions.

This document provides a review of the second phase of the trial and draws out the main design questions for an extended trial which will be run in September with an extended number of providers.

Key Questions

What did the trial set out to achieve?

As part of the phase two design we identified the following themes.

Process

We tested the component parts of our operational process to ensure that we know how to best use storage for its full range of flexibility via the BM, rather than having separate additional balancing services.

¹ <https://data.nationalgrideso.com/plans-reports-analysis/covid-19-preparedness-materials>

² https://data.nationalgrideso.com/plans-reports-analysis/covid-19-preparedness-materials/r/trial_review_-_reserve_from_storage_in_the_bm

To meet the objective to integrate the proposal into ENCC processes, we focussed and made improvements in the following areas: planning, commitment and utilisation.

The planning process, included regular assessment at four hours ahead of real time, aligning with the final System Operating Plan³ process. This allowed for the assessment of storage assets against alternative planned actions taken to meet our reserve requirements such as conventional generation.

To facilitate the commitment decision to enact the service, we designed and agreed a protocol, which incorporated additional automation over and above the first trial to reduce the manual workarounds. This facilitated more efficient delivery and enabled the proposal to be tested across weekends and overnights. We also aligned commitment decisions across the day in four hour blocks to align with operational need and ensure regular economic assessment was carried out.

In facilitating the utilisation of the service, we provided additional guidance to our balancing engineers to provide a clear way to instruct BM Storage. If real time operational conditions warranted extension to the original commitment decision, then this would be enacted by the balancing engineer.

Full test of the proposal

During the trial, it was important to understand how to access the full flexibility of storage to meet various operational needs. These operational needs are broken down into three areas:

- Provision of upward and downward reserve over a sustained period. This included repositioning the battery to ensure sustained provision.
- Delivery of fast-acting bids and offers to arrest changes in frequency i.e. frequency control
- Ensuring real time second-by-second balancing of energy resources against demand i.e. energy balancing.

During the trial, we wanted to gain broader experience of how to utilise BM Storage to meet these various operational needs and fully understand the interactions.

Rolling out at scale

As part of Phase 2, it was useful to understand the impact on the ENCC in terms of additional workload. To facilitate the extended trial in September, the insights received can be used to inform the scale of the extended trial. As stated above, as part of the process, we implemented additional automation to facilitate Phase 2. However, there may be additional or different automation required for several participants.

What did we learn?

Planning

The planning element was completed as required, although there were additional questions which were highlighted:

- How to robustly incorporate the uncertainty between four hours ahead and real time into ENCC planning decisions?
- How to more effectively assess the interactions between the various elements of flexibility provided, such as provision of sustained upward and downward reserve and frequency control.

Commitment

Out of 160 hours, a commitment decision was made for 106 hours, for which instructions were issued.

The predominant value was for the provision of sustained upward and downward reserve, followed by provision of frequency control.

Utilisation

In terms of utilisation, a lot of experience was gained in meeting the various demand changes throughout the day with ongoing consideration of future energy available. This resulted in instances where the output went

³ <https://data.nationalgrideso.com/system/system-operating-plan-sop>

from an instructed output of -41MW to +41MW and vice-versa, effectively a full 82MW of flexibility being delivered.

There were four instances (out of 212) where the commitment instruction was made too late, due to the requirements of real time operations. Additional consideration is required to ensure this does not happen when rolled out at scale.

The BM storage unit demonstrated good reliability during the trial. It was fully automated and delivered on 100% of all instructions, as per the protocol.

Additionally, we have considered the market impacts. For the duration of the trial Arenko determined the prices they would submit which were an offer price of £30/MWh and a bid price of £15/MWh. These price submissions were based on the information which is available to all market participants.

In terms of imbalance price calculation, we have noted that instructed volumes were fed into the calculation of the imbalance price i.e. system buy price and system sell price including actions for utilisation which were less than ten minutes. Actions of less than ten minutes do not feed through into the calculation of imbalance pricing and so this requires further consideration in future trials.

Conclusions

Following the trial, the ENCC demonstrated that it can effectively request the availability of sustained upward and downward reserve. We also found it to be a cost-effective option, and therefore further trials to develop this will provide value for consumers.

We had some great learnings which highlighted the following key areas where more work is required.

The main design questions for the extended trial are the following:

- How to facilitate more participants efficiently and effectively?
- How do we economically and efficiently assess the various operational needs and their interactions i.e. continuous reserve provision versus frequency control.
- Consider the design of the trial to reduce the impacts on imbalance price calculation.
- What would an enduring service or product look like?

The proposed next steps are:

- Approach BM storage providers to participate in the extended trial in September. We welcome conversations with other providers to extend participation, please indicate your interest to commercial.operation@nationalgrideso.com.
- Implement the extended trial to meet the design questions which have been raised.
- Run extended trial for a three-week period from the 4th September 2020 – 24th September 2020.
- Undertake a review of the extended trial and publish the results in October 2020
- Determine any next steps in November 2020

National Grid ESO want to thank Arenko for their proposal and working with us on the initial trials, along with all other parties who worked with us to access additional flexibility at pace this summer. If other providers have any ideas for future trials to access additional flexibility, then National Grid ESO look forward to receiving these and discussing further.

We welcome feedback from the industry and this can be sent to box.BalancingProgramme@nationalgrid.com.