Trial Review: Reserve from storage in the BM

6th July 2020

Background

On 30th April 2020 we published a letter to the industry, seeking parties 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 pandemic[1]. As part of this invitation we also asked providers to contact us if they had flexibility options 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.

Additionally, Arenko responded to our invitation we ran a trial with Arenko to determine whether we can access additional flexibility from storage providers, looking to access both upward and downward energy reserves.

To allow us to learn as fast as possible, we took the approach of a trial. We intended this, and further trials, to ultimately inform if a new service is required or whether access via the BM is sufficient.

The trial was communicated to the market on the 18th May 2020 and experience of the trial was obtained on the 22nd May 2020.

The key objectives of the initial trial were:

- How existing mechanisms can be used to facilitate participation of storage assets to provide upward and downward energy reserves?
- Assess the cost effectiveness of batteries against thermal plant.
- Gain experience of the operational arrangement of the trial.
- What capability should be in place to implement the operational arrangement to scale?

The trial is consistent with our 2025 ambitions to develop tools and process to enable us to operate an electricity system that can operate carbon free and having competition everywhere.

This trial is an excellent example of collaborative working between industry and National Grid ESO to meet these ambitions and we now want to share our learnings with the wider industry.

Key Questions

What did the trial set out to achieve?

In order to ensure that unplanned variations in either demand or BM unit availability can be continuously managed the ENCC holds a volume of energy, known as reserve, to manage this uncertainty, Sustained reserve is held to allow variations above and below the expected position and is known as upward and downward reserve.

Upward and Downward reserve from thermal plant can be procured ahead of time through a variety of means: BM start up instructions to bring on a BMU on in a position where it can provide reserve; bid/offer instructions to BMUs already operating to position them so reserve can be delivered; or the enactment of a SuperSEL contract to position a BMU to enable more reserve. These actions occur ahead of time, in anticipation of a

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

future need. These actions enable the control room to issue utilisation instructions in real time at marginal additional cost having already paid to secure the reserve.

The trial investigated whether the ENCC can effectively request the availability of sustained upward and downward reserve from batteries, using existing operational arrangements to achieve the same effect - enable the ENCC to position the asset and access reserve at marginal pricing in a similar way as existing operational methods. The trial needed to work with existing frameworks and no information such as pre-gate pricing or requirements which are not available to other market participants were to be communicated to Arenko.

What happened and what was learned?

The process followed was:

- ENCC would determine whether to request the availability of sustained upward and downward reserve.

  Arenko would provide the bid and offers prices, which will be changed for the duration of the operational arrangement following ENCC requesting activation.

  These prices were provided within day, and were as follows[2]:

Bid Offer Pair	Bid Price	Offer Price (Energy Reversal)
-1 (Bids)	15	30

Bid Offer Pair	Offer Price	Bid Price (Energy Reversal)
+1 (Offer)	30	15

  Following the submission of process ENCC carried out an economic assessment of meeting reserve requirements against other available actions and determined whether to activate the operational arrangement. Activation was communicated to allow sufficient time for Arenko to submit the above bid and offer prices into the BM before gate closure which is 60 minutes ahead of a half-hour settlement period.

  ENCC nominated two windows during the trial; Settlement Periods 21-26 (10:00-13:00) and Settlement Periods 27-32 (13:00-16:00).

  Arenko were required to submit bid and offer prices before 09:00 (ahead of gate closure) for the first window and by 12:00 for the second window. Arenko had sufficient time to submit the bids and offer prices for the first window but a last-minute communication from the ENCC meant insufficient time to submit prices ahead of the second window, therefore a revised window was agreed for Settlement Periods 28-32 (13:30-16:00).

- Activation of operational arrangement for upward and downward reserve.

  The operational arrangement was activated through a set of bid and offer instructions which would result in a payment. The net impact of the set of these instructions would result in no delivery of energy. The effective payment can be calculated as:

  Payment: [Offer Price – Bid Price], £/MWh * MW Capacity * Nominated Window Duration, Hours

  Under this arrangement there was a total payment (rounded to nearest pound) of £3342.

- Utilisation of the reserve.

  Following activation of the operational arrangement, the ENCC then activated the reserve service economically and efficiently. This was instructed though either a bid or offer.

  Throughout this period, the battery was instructed in 11 settlement periods and provided 53.5MWh of negative reserve instructions (bids) and 29.9MWh of positive reserve instructions (offers). This provided a net cashflow of £96.

[2] Data published externally on BM Reports - https://www.bmreports.com/bmrs/?q=balancing/searchbyBMUnit

- Repositioning.

  To create overall value across the nominated window and ensure continued access to upward and/or downward reserve, repositioning bids and offers may be required to provide the optimal state of energy. Enacting a repositioning action requires assessment of current system needs against future value.

  There were no repositioning actions taken during the trial.

  We have collated the learnings which are described below with a focus on the trial itself and required development work to implement the arrangement to scale.

Area	Trial Feedback	Rolling out to scale
Assessment	Due to manual nature of the process used in the trial this initially resulted in insufficient time for Arenko to submit prices. Therefore, a revised window was agreed.	Automatic data feeds / systems would be required to efficiently implement the process.
Assessment	More experience required to fully test the process and deliver a robust assessment.	Additional tools to ensure robustness in the process.
Nomination	Provided via a phone call.	Automated nomination of arrangement for multiple parties. Would benefit from trial with more participants.
Activation	Manual process to activate arrangement with a set of bids and offers. Additional workload for the ENCC.	Automation is required.
Activation	The order of actions in manual process to activate the operational arrangement change based on the data submissions by Arenko. This increases the risk of user error.	Would require automation with a set of instructions sent instantaneously. Would benefit from further trial.
Utilisation	No different to existing practise.	
Repositioning	Complex economic assessment is required to determine when to take a repositioning action.	Requires further operational experience. Adaptation of current modelling and tools is required. Would benefit from further trial.

Conclusions

The trial demonstrated that the ENCC can effectively request the availability of sustained upward and downward reserve through a new operational arrangement. We also found it to be a cost-effective option and thus think further trials to develop this will provide value for consumers.

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

1. More experience of the operational arrangement is required to understand how this can be fully and efficiently integrated into ENCC processes noting the current process is very manual and may not be suitable to scale without development in capability. However, the learning from this trail will Inform any additional tools required.

2. The potential value of the operational arrangement was not fully understood as repositioning was not tested. This would benefit from a second trial.

The proposed next steps are:

- Design a second trial over a longer period to allow us to fully test the arrangement and the additional areas highlighted.
- 22nd July 2020 - 28th July 2020: Run a second trial with Arenko.
- Incorporate learnings and design a third trial which will be extended to include additional market participants.
- September 2020; Run extended third trial and we welcome conversations with other providers to extend participation. More detail will be provided ahead of this trial.

National Grid ESO want to thank Arenko for their proposal and working with us on the initial trial, and all other parties who worked with us to access additional flexibility at pace this summer. We believe that short burst trials are a positive way to learn at pace and support providers looking to enter the market, and provide solid foundations for operating carbon free by 2025. If other provides have any ideas for future trials to access additional flexibility, then National Grid ESO look forward to receiving these and discussing these further.

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