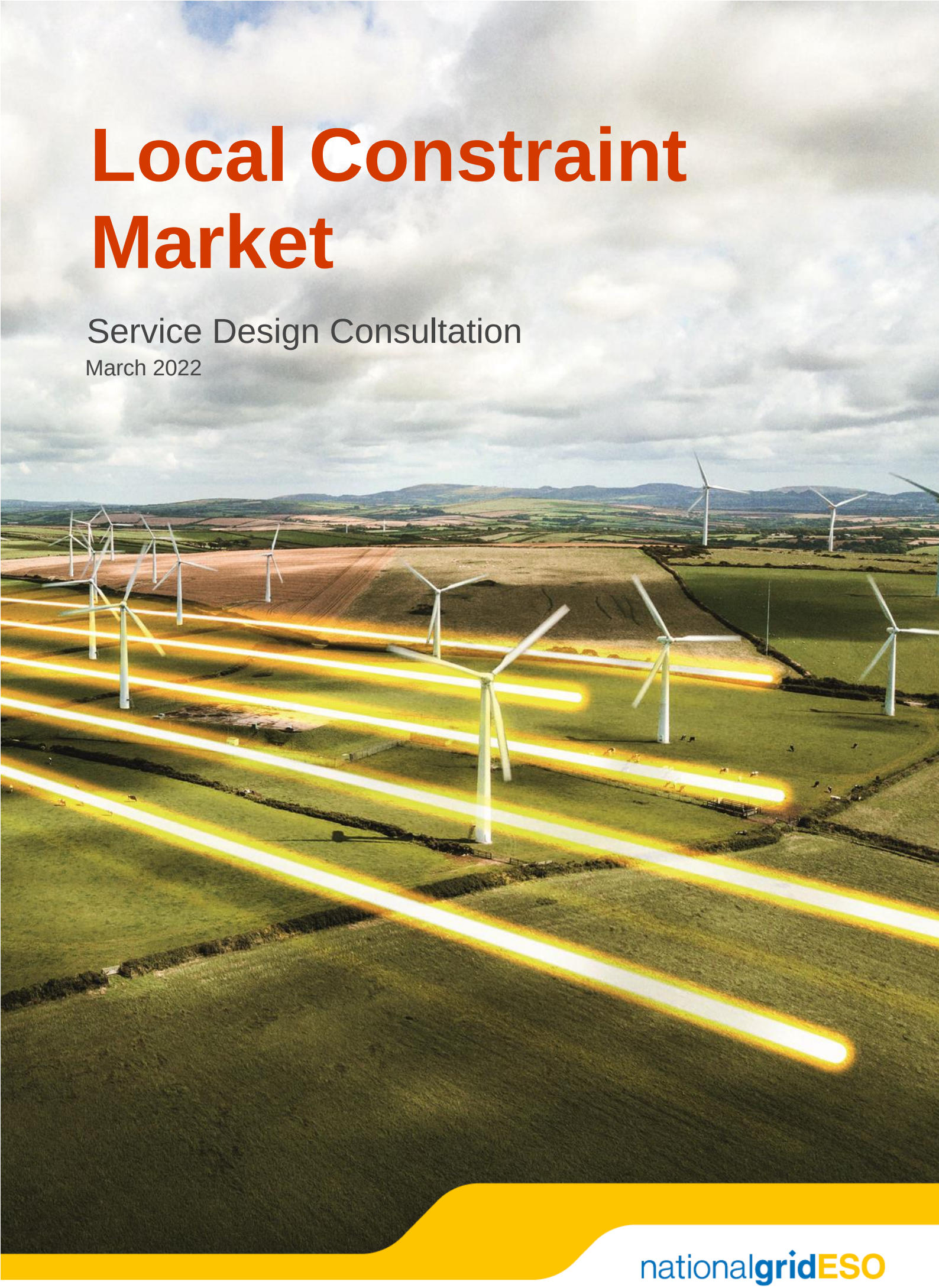
Local Constraint Market

Service Design Consultation

March 2022



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Background

This document is a consultation seeking feedback and further stakeholder input on the draft service design created by National Grid ESO for a new Local Constraint Market (LCM). The design has been co-created through bilateral conversations with multiple industry stakeholders, where we have sought to design a service that takes learning from the Optional Downward Flexibility Management (ODFM) service to allow smaller and non-traditional assets to provide transmission constraint management services.

Please find details for responding to this consultation at the end of this document.

Current state

Constraint management is required where the electricity transmission system is unable to transmit power to the location of demand, due to congestion at one or more parts of the transmission network.

In order or manage transmission network constraints, we sometimes instruct a generator to reduce its electricity output. To balance the system, we also need to instruct the same amount of electricity from another generator in a different part of the transmission system.

We use several methods to manage transmission constraints. However, the largest proportion of actions are carried out pre-fault through Bid Offer Acceptances (BOAs) in the Balancing Mechanism (BM) and via trades at prices submitted by generators.

The majority of actions to reduce generation in 2020 was on wind units; £400m for constraining just over 3TWh. This is mostly from wind assets in Scotland, where we see high generation, and lower demand, hence leading to the need to export power to demand centres further south.

What challenge are we looking to resolve?

Our need to manage thermal constraints on the transmission system is already increasing and are forecast to grow beyond 2030. Through the Network Option Assessment (NOA) process we identified that today, our most constrained boundaries are congested 85% of the time, and we anticipate this cost rising over the next decade. Today, the Anglo-Scottish B6 boundary has the highest constraint cost across the GB network.

The increase in cost is mainly driven by significant growth in renewable generation in Scotland and increased offshore and interconnection capacity on the South coast, resulting in some boundaries seeing a 600% increase in peak flows.

Within our Constraint Management 5-Point Plan we aim to mitigate some of the cost of redispatch ahead of network reinforcement in 2027 with commercial opportunities from flexible resource such as distributed energy resources (DER). The 5-Point Plan is a medium-term strategy to manage our most constrained boundary, and includes our Regional Development Programmes (RDPs) and NOA Constraint Management Pathfinder (CMP). These market solutions will reduce the number of actions we need to take in the BM to manage our thermal requirements.

As part of the 5-point plan National Grid ESO are exploring the implementation of a Local Constraint Management to access new cost-effective sources of flexibility that will help our control-room manage B6 boundary constraints.

Implementing a Local Constraint Market (LCM)

The LCM seeks to learn from the simple construct of the ODFM service which facilitated access to new sources of flexibility to answer low-demand conditions experienced during the Covid-19 pandemic lockdowns. We wish to build upon this and introduce a tactical, interim downward flexibility service (initially intended to be in place for 3 – 3.5 years) to provide competition to BM costs in the absence of confirmed RDP plans to answer B6 boundary constraints.

We are exploring the delivery of the LCM through a 3rd party flexibility platform. We anticipate the earliest market delivery date could be Q4 of 2022, although this will be subject to platform procurement and development timescales.

The market is initially intended to run until circa December 2025, at which point more long-term solutions could be in place, such as the Regional Development Programmes.

Platform Overview and Requirement

We plan to facilitate the delivery of the LCM utilising a 3rd party flexibility platform to accelerate market delivery and minimise any manual processes.

We anticipate that to accelerate the delivery of the LCM an 'off-the-shelf' platform solution is required that consists of:

- An end-to-end solution (see diagram 1)
- No/minimal integration with ESO and DNO systems
- No/minimal customisation or develop of existing platform functionality

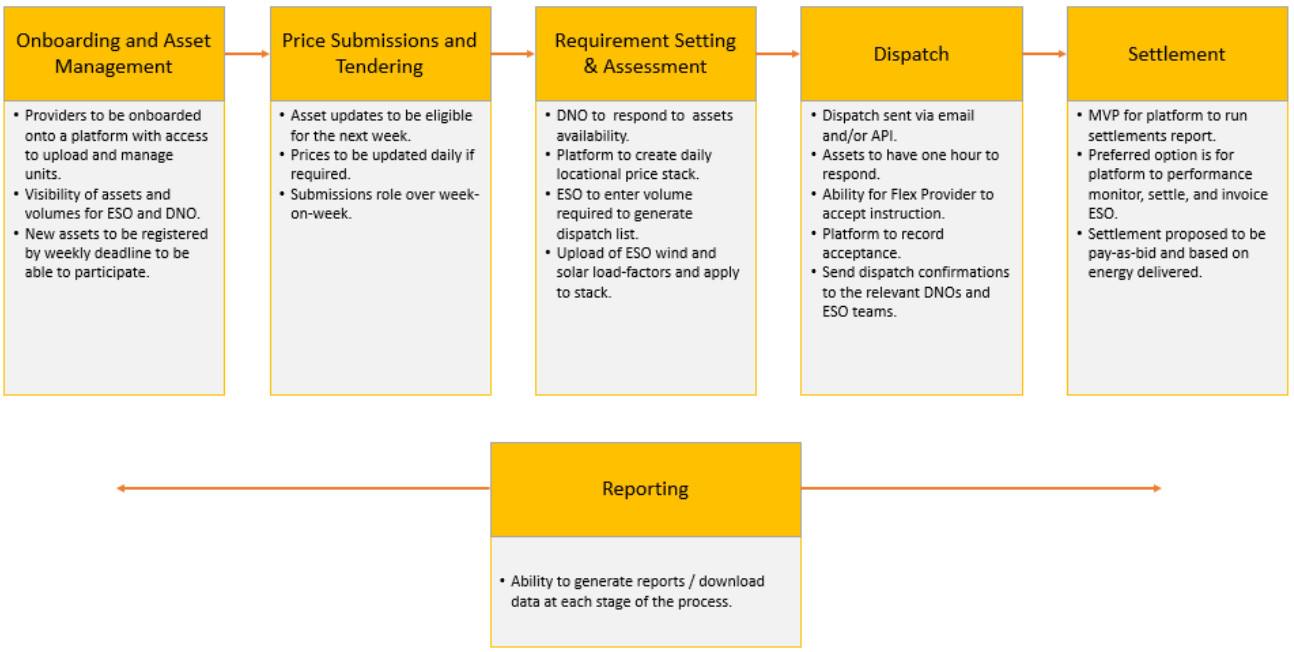

Diagram 1 – Possible High-level Platform Requirements.

Service Design

Service Design Influences

Below highlights some of the areas of influence that have guided our current thinking and contributed to the existing draft design.

A System Product

The LCM will be used only for managing constraints. It is therefore considered to be a 'System' product under the Clean Energy Package (CEP). As a 'non-balancing' product, we understand that a formal consultation

under CEP Article 18 followed by Ofgem approval is not a requirement. We are however seeking industry views and contribution to ensure we have considered all viewpoints across a range of stakeholders.

Relieving v Resolving the B6 boundary

It should be noted that the LCM is not attempting to 'resolve' the B6 boundary constraint, only to relieve it via more cost-effective DER and/or provide commercial competition to the BM. Regardless of any actions taken through the LCM, it is not anticipated that the LCM will ultimately resolve a constraint, this will ultimately still be achieved in the BM at closer to real-time.

Not a system requirement

The LCM should not be considered as a system requirement as existing tools are in place to manage the constraint safely and securely through the Balancing Mechanism.

Cost reduction objective

The objective of the LCM is to reduce the annual B6 boundary cost through increased competition from new assets who currently experience barriers to entry to the BM. The Optional Downward Flexibility Management (ODFM) service demonstrated how improved access to DER can provide additional flexibility. It is anticipated that providers of ODFM may be able to contribute more economic solutions to help manage the B6 boundary.

DNO coordination

We hope to facilitate light-touch DNO coordination by providing visibility and communication of asset availability and dispatch without systems integration.

Platform Procurement

We are seeking to run the service through a 3rd party platform provider who can offer an off-the-shelf solution, deliver at pace, and therefore minimise disruption and additional processes to the ESO and DNOs. Delivering this standalone platform will provide the ESO with access to more DER with minimal additional effort. We are not seeking a customised development and must therefore accept that an off-the-shelf solution may impact our service design.

Platforms may be also explored as part of RDP dispatch solutions and the two projects will therefore take learning from each other.

Anticipated Provider Base

We anticipate the LCM service being of interest to Optional Downward Flexibility Management (ODFM) providers north of the B6 boundary. Therefore, as an accelerated solution, our starting point for the design of the LCM has focused on the ODFM service implemented in 2020 and 2021, as:

- ODFM providers have previously told us that they value the simplicity of ODFM service.
- The 2021 ODFM service design attempted to address provider feedback from the 2020 service.

Delivery in Q4 2022 (calendar)

The target delivery date for the LCM is Q4 2022. Our critical path is the delivery of the platform solution and navigation through procurement regulations and timeframes in order to remain compliant.

Service Design Summary

- **Type of market:** continuous daily day-ahead and within-day market. Daily pay-as-bid price stack hedged against Balancing Mechanism (BM) prices.
- **Pre-fault:** designed to address constraints at the B6 boundary and provide a more cost-effective alternative to BM actions. LCM is proposed to operate at day-ahead of the Balancing Mechanism to curtail generation / increase demand for periods of high B6 constraints, most notably in periods of high wind generation.
- **Service day:** to run from 05:00 – 05:00. This allows for instruction to be based upon the daily outage report that communicates to our National Control teams at circa 18:00 each day and covers the subsequent 05:00 – 05:00 period.

- **Instruction Windows:** There will be two instruction windows each day. The first instruction window will take place at 21:00 (day ahead). The second instruction time at 13:00 (within day) seeks to accommodate providers who cannot operationally meet the 21:00 instruction time.
- **Response time:** Providers will have one hour to respond and accept/decline the instruction.
  - For instruction window 1, providers will have a minimum of 8 hours from instruction (at 21:00) to activation (between 05:00 – 05:00).*
  - For instruction window 2, providers will have a minimum of 4 hours from instruction (at 13:00) to activation (between 17:00 – 05:00).*

  see diagram on page 9
- **Flexibility Direction:** Generation turn down to zero / demand turn-up.
- **Assessment:** Assessed at day ahead against the BM, with the B4 boundary to be assessed and instructed upon first (see page 5 - 'Addressing the B4 boundary') due to the additional benefit this has on both boundary constraints.
- **Settlement:** Utilisation only payment likely to paid based on 'energy' delivered as opposed to 'capacity'.
- **Cashout & ABSVD:** Service will seek to enter into the Cashout calculations with Elexon and ABSVD.

Service Design

Eligibility

- **Open to any technology type** with a minimum of 1MW capacity of generation turn-down to zero, or demand increase (either of which can be aggregated from more than one constituent asset). Demand assets must sustain consistent increased demand.
- **Connection** - Assets must be connected above the B6 boundary.
- **Aggregated units** must be of the same technology type (wind, solar, demand). Discussed later in the design, but this allows for a technology specific load-factor to be applied to wind and solar units. This will enable the inclusion of smaller providers with challenges to forecasting.
- **GSP aggregation** - As per units aggregated by technology type, units are also to be aggregated by GSP. Again, this allows for the provision of the load-factor in the absence of forecasted outputs and allows for DNO's to consider where unit instructions might affect their networks.
- **Only Non-BM participation** - We propose that the service will only be open to non-BM assets and therefore must not be separately registered as BM Units or otherwise active in the Balancing Mechanism (able to take BOAs). The aim of the service is to enable access to new sources of flexibility.
- **Stacking** - Units must not be participating in or contracted to any other balancing/flexibility or related services during periods when the service is offered.
- **Non-ANM** - Units must not have a condition in their DNO connection agreement whereby they are signed up to an Active Network Management (ANM) scheme / Flexibility Connection.
- **Half Hourly Metering** – providers must be able to provide half-hourly metering data for performance monitoring and settlement.

Service Day / Week

- **Service Day:** anticipated to run from 05:00 – 05:00 each day and align with the daily outage plan handed over to ESO National Control at circa 18:00 day ahead.
- **Service Week:** TBD - but likely required to work with timings acceptable to the DNO.

Providers Registration

The preferred approach is for the platform and platform provider to manage the onboarding and registration of assets onto the platform. This should alleviate National Grid ESO's Market Services team of any responsibilities related to the onboarding of providers. This also assumes that the platform will be responsible for the settlement of any service instruction.

This is of course dependent on the functionality of the platform we partner with. Therefore, the fallback position will be:

1. to incorporate our existing 'Form A, B, C process' into the platform (with likely platform customisation required).
2. or the 'Form A, B, C process' remains offline, therefore likely to require additional resourcing from National Grid ESO Market Services.

Submissions

- **New units** are to be submitted ahead of the 'service-week' deadline. This deadline will be 2-3 days ahead of any new service-week. This allows for potential coordination with the two Scottish DNO's.
- **Existing units** wishing to update unit volumes, availability, and min/max runtimes, must do so prior to the 'service-week' deadline.
- **Prices** to be submitted weekly with the opportunity to update daily (if required). Deadline is TBD but will need to align with instruction timings and likely to be at least 2-3 hours before the instruction window.

  Depending on the platform functionality, providers may have the ability to enter different prices for different settlement periods. Alternatively, one price will be submitted for a complete service day.

  We will seek to offer providers who don't wish to manage their submissions with such granularity the options of rolling over submissions and prices week-on-week.
- **Instruction window choice** may be offered (depending on platform functionality). This will enable providers to opt-in/out of the 21:00 day ahead instruction or the 13:00 within day instruction, essentially giving them three options:
  1. To be instructed in the 21:00 window only
  2. To be instructed in the 13:00 window only
  3. To be instructed in either the 21:00 or 13:00 windows.
- **Adding / Removing Availability** within the service week. Providers can remove their availability or price themselves out of the market at any point within the service-week should they not wish to be called upon. However, units cannot declare themselves available for any period previously declared as unavailable within the current service-week.

  Providers are encouraged to declare unavailability as soon as possible and at least 12-hours prior to the start of the new service day.
- **Multiple weekly submissions** can be made at any time ahead of the appropriate service-week deadline. Future submissions can also be updated at any time ahead of the appropriate service-week deadline. It may also be possible to for submissions to auto-rollover week-on-week.
- **Forecasted outputs** will not be required. Providers will not be expected to submit their forecasted output, only their registered service capacity. National Grid ESO will apply wind and solar load-factors by DNO region to determine the estimated output of each unit.
- **Service Stacking** – the LCM service is not to be provided simultaneously with any other Balancing Services or 3rd party service. Where, during any instructed period, a unit is made

available and/or delivering other services then the relevant unit should be deemed unavailable in the LCM.

- **Locationality.** Unit aggregation to be permitted at a GSP level. This will aid:
  - the application of wind and solar load-factors
  - DNO management of locational network conditions
  - visibility of units above B4 / above B6.
- **Linking of bids** will not be permitted to ensure the service remains simple for National Grid ESO operational teams to assess against the BM.

Assessment

- **Service Requirement** will be based on the daily outage plan handed over to National Control at 18:00 daily.

  We anticipate solving no more than 75% of the B6 boundary constraint at day ahead, due to the large variability of the demand ahead of time. The National Grid ESO control room and operational teams will determine appropriate volumes to be instructed through the LCM given expected variability of demand.
- **Satisfying a 'target benefit' score** will determine if LCM units are to be instructed. Any LCM action will be considered against the BM prices at the point of assessment, and given the relative uncertainty of instructing volume at day ahead (or significantly ahead of time for the 13:00 within day instruction), will need to satisfying a target cost benefit saving. This process is currently in practice by National Grid ESO when trading on the Southeast Import (SEIMP).
- **Load-factor applied to Registered Capacity:** Forecasts will not be expected from providers. Therefore, National Grid ESO will apply wind and solar load-factors by DNO region to determine the estimated output of each unit.
- **Generation turn-down to zero –** providers will be expected to turn down to zero from their registered service volume.
- **Addressing the B4 boundary**. The B4 boundary must be considered before addressing the B6 boundary in isolation. When both boundaries (B6 and B4) are constrained, actions north of B4 will contribute to relieving both B4 and B6 constraints. Therefore, it is prudent to consider units that can resolve both boundaries first.

  The service assessment will therefore effectively be a two-step process:

  1. Assess actions from units above the B4 boundary against the BM using the 'target benefit' score before instruction of the appropriate units.
  2. Assess actions from units below the B4 boundary and above the B6 boundary against the BM using the 'target benefit' score before instructing the appropriate units.
- **Assessment Granularity.** It is proposed that the service will be assessed (and dispatched) on a half-hourly (Settlement Period) basis.

Dispatch

- **Instruction Method.** Dispatch is to be issued directly from the service platform. As a minimum this will be an email instruction as per ODFM, however, via engagements we understand a number of platforms have API integrations and this may therefore remain a possibility open to the provider.
- **Instruction Acceptance.** The service provider will be expected to respond to the instruction within an hour of receipt. Depending on the platform solution that's implemented, this could be direct to the platform, or alternatively via email return to the platform.

- **Instruction Windows**. We are proposing to implement two instruction windows, one at day ahead, and the other within day.
    - **Instruction window 1** – 21:00 day ahead instruction for activation between the following 05:00 – 04:59 (24 hour) period.
    - **Instruction window 2** – 13:00 within day instruction for activation between the following 17:00 – 04:59 (12 hour) period.

  Note that the two instruction windows overlap for the second 12-hour period.

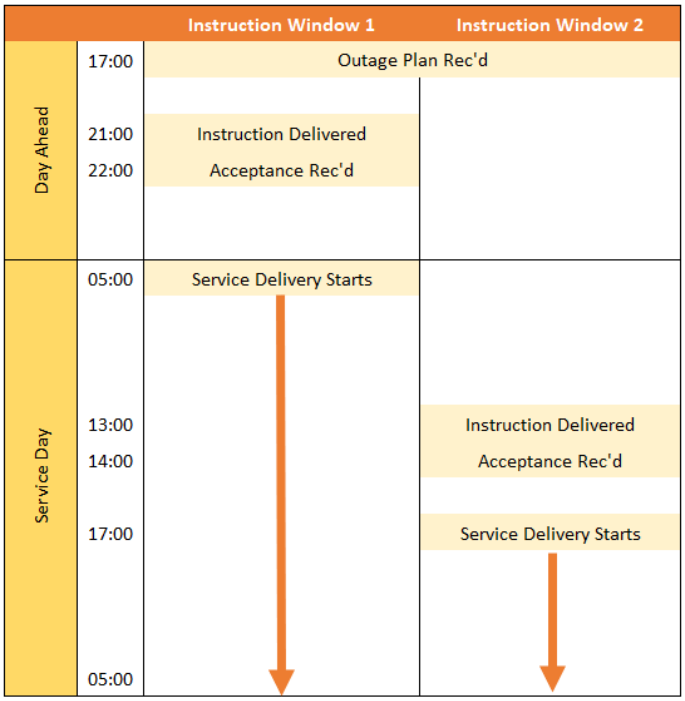

Diagram 2 – Instruction Window Timings

  Justification:

    - The first instruction window at 21:00 is to accommodate the outage plan to the control room. The outage plan is handed over daily at 17:00.
    - The daily outage plan covers the subsequent 05:00 – 05:00 period, hence this has informed our 'service day'.
    - The second instruction at 13:00 (within day) is to accommodate providers who have limited control room functions and who may need to schedule engineers to visit a site.
    - We hope to provide providers with the option to be instructed at 21:00 for the full 24-hour window, or 13:00 for the 12-hour window, or both/either.
- **Instruction ramping** is unlikely to exceed 300MW per settlement period to avoid unexpected and unmanageable frequency excursions. For example;
    - SP1 = Block 1 of 300MW
    - SP2 = Block 1 of 300MW + Block 2 of 300MW
- **Closed Instructions**

Delivery

- **Delivery Duration.** Providers must be able to sustain a response for a minimum of 30 minutes and are encouraged to offer additional utilisation >30 minutes where appropriate. This should allow a

wide range of assets to participate and provides flexibility. We recommend no limit to the delivery duration.

- **Ramping.** Units must ramp to full delivery by the start of the instructed delivery window and maintain delivery up until the end of the delivery window.
- **Recovery Period**. No restriction on recovery period. Providers invited to submit whatever recovery period their assets can meet.

Settlement

As per onboarding and registration, the preferred position is for the platform and platform provider to facilitate settlement, including the capture of bank details etc at the onboarding stage. In this scenario National Grid ESO will pay all utilisation fees through the platform on a monthly basis. However, other options can be explored.

- **Availability Payments** will not be facilitated in the LCM service.
- **Utilisation Payments**. Our expectation is to settle utilisation payments through the LCM based on 'energy' delivered as opposed to 'capacity'.

  Utilisation will be paid on £/MW/h and on a 'pay-as-bid' basis.

  Utilisation payments are to include the energy delivered in ramping up to/down from the instructed MW level.
- **Performance monitoring** of individual units will determine liability for payment. Instructed units will be expected to submit the required settlement data required as soon as possible after utilisation, and no later than 5 business days. Required settlement data to include half hourly metered data for each instructed service period (together with the 12 consecutive settlement periods falling immediately before and after such period), derived from relevant metering.

  Metering data is expected to be captured (uploaded) by providers through the platform in a standardised format. This will allow the service to be ABSVD'd.
- **Non-delivery**. Where the output from providers is found to be less than 90% of the expected output, this will be considered to be non-delivery and therefore no utilisation payment will be made.
- **Over-delivery** of contracted MW for LCM will not be penalised through performance monitoring for their availability payment. In addition, providers will not receive utilisation payments for any volume above the contracted capacity. Therefore, any utilisation payments will be limited to the capped delivery volume only.

  Where a unit is frequently over-delivering, the tendered capacity should be amended accordingly by the service provider.

Cashout & ABSVD

- **Cashout.** Post instruction metering data will be sent to Elexon for inclusion in Cashout calculations.
- **ABSVD** will apply to all participating units. Metering data is to be uploaded to the platform by the provider after delivery.

ESO/DSO Coordination

We are engaging with SSEN and SPEN to understand how we can coordinate with them, provide visibility of what is available and ensure activation of the LCM does not cause issues on their networks.

- Our recommended approach is to mirror the process implemented through ODFM, with potential DNO access to the market platform that will provide:

- DNO visibility of available assets.
- DNO access to review units and update GSPs.
- DNO control of available assets i.e. ability to request for assets not to be instructed if they present a network issue.

It is recommended that all visibility and control is to take place at the weekend ahead stage i.e. after the service-week deadline for submitting unit availability, but before the first instruction window of the week.

- **Reporting of instructed units** will be sent to the relevant DNO's ahead of any activation. This will typically be forwarded immediately after the 1-hour acceptance cut-off, and potentially sent directly from the platform (if in scope).

Market Reporting

- **Market Information Reports -** On a weekly/monthly (TBC) basis Market Information Reports will be uploaded to the ESO data portal. Market Information Reports will consist of daily settlement period availability and acceptance information including price, volume, and unit.

- **Reporting Re-dispatched Volumes –** in order to comply with Article 13 of the Clean Energy Package**,** re-dispatched volumes / generation types from the LCM will be fed into the annual report for the National Regulators Authority (NRA) (13(5)).

Contract Structure

- **Framework agreement.** We anticipate that the contract structure will be influenced by the platform provider. The likely structure will be a standard platform framework agreement that all parties (platform provider, ESO, and service provider) sign-up to.

- **A service carve-out** will then be part of the framework agreement that will allow the ESO to stipulate the specific details of the product to be procured.

Consultation Responses

NGESO invites responses to this consultation by **18:00 Friday 8th April 2022**. Please use the accompanying response proforma to answer the consultation questions. You can download our proforma from the following address:

- https://www.nationalgrideso.com/document/246701/download

Please note, all responses should be submitted in a Word document format to:

- **Email:** box.futureofbalancingservices@nationalgrideso.com
- **Subject Line:** LCM Service Design Consultation.

For any questions, please contact adrian.sellar@nationalgrideso.com.