# Local Constraint Market (LCM)

Product & Service Design

December 2022

**ESO**

# Contents

# 1.  Context – Tackling B6 Boundary Costs

- Ahead of longer-term considerations of Regional Development Programme (RDP) functionality across Scotland, there is a growing need for a tactical solution utilising Distributed Energy Resources (DER) to manage rising constraint costs on GB's most congested boundary. The Anglo-Scottish (B6) boundary currently has the highest constraints of any boundary across GB and these are set to increase.

- This work seeks to develop an interim solution and has learned
from the simple construct of the ODFM service (recognising its manual processes). LCM develops a light touch system to facilitate an accelerated DER market using existing third-party market software services.

- The LCM forms part of the ESO 5 Point Plan, whilst work is ongoing to develop a longer-term strategy for Regional Development Programmes (RDPs). RDP progress is anticipated to be gradual, through continued close collaboration with SPEN and SSEN prior to any implementation.

- As a discrete, accelerated, tactical solution we will not have time to implement a platform that will form part of longer-term strategic work. We therefore propose to accommodate an interim/tactical solution with LCM over approximately 3 years.

# 2.  Local Constraint Market – An Accelerated Solution

**Part of ESO 5-point plan** to manage rising constraint costs.  The service is targeted specifically at the B6 boundary with the objective of reducing constraint spend compared with balancing mechanism costs.

**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 have challenges with accessing the BM. The Optional Downward Flexibility Management (ODFM) service demonstrated how improved access to DER can provide additional flexibility. It is anticipated cheaper prices seen in ODFM could be used to manage the B6 boundary and provide competition to the BM.

**DNO coordination** - We see this Local Constraint Market work lightly coordinating with DNOs without systems integration and providing visibility, flexibility and a coordinated approach.

**Platform Procurement** - We have contracted 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. Delivering this standalone platform will provide the ESO with access to more DER with minimal additional effort.

**Delivery in Q1 2023 (calendar)** - We aim to run live trials of the LCM service in Q1 2023 – interested parties should follow the signposting found on the ESO LCM website.

# 3.  Service Design Context

To provide some additional context and aid understanding of the how we have arrived at this draft service design, we have detailed some areas that have/are impacting and influencing the LCM.

## 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 through cheaper DER, or provide competition to prices seen in 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 the BM at closer to real-time.

## 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 is not a requirement. We welcome and remain open to consultation on the configuration of the services via the published comments proforma on the LCM web page.

## Anticipated Provider Base

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.

## Provider Engagement

Having scoped a draft service design with ESO SME's from National Control, NAP, and Trading, we engaged bi-laterally with a small number of ODFM providers. Their feedback has been incorporated into the design.

## Alignment with SEIMP Process

There are existing processes in place whereby the Trading team manages and trades on the SEIMP boundary constraint. We intend to replicate these processes and principles where possible.

# 4. Service Design

## Summary

**Type of market**: Daily day ahead and within day market

**Service day:** to run from 07:00 – 06:59

**Pre-fault:** designed to address constraints at the B6 boundary and provide a more cost-effective alternative to BM actions. The LCM will operate ahead of Gate Closure and real-time and provides a mechanism to curtail generation / increase demand for periods of high B6 constraints, most notably in periods of high wind generation.

**Instruction Windows** – There will be two instruction windows. This allows for instruction to be based upon the NAP outage report that covers 07:00 – 06:59, which will require an instruction time of 21:00 (day ahead). The second instruction time at 13:00 (within day) will allow for providers who cannot meet the 21:00 instruction time and will cover the final 12 hours of the service day (19:00 – 07:00).

**Response time.** Providers will have one hour to respond and accept/decline the instruction.

For instruction window 1 providers will have up to 10 hours to prepare for dispatch post Instruct Time.

For instruction window 2 providers will have up to 6 hours to prepare for dispatch post Instruct Time.

**Flexibility Direction:** Generation turn down to zero / demand turn-up

**Assessment:** Based on the day ahead NAP outage report. LCM prices will be compared Assessed at day ahead against the BM, with B4 boundary to be assessed and instructed upon first due to the additional benefit this has on both boundary constraints.

**Volume Requirement –** as is typically the case with system constraints, the volume requirement is determined by a combination of Transmission System conditions and Generation patterns.

**Settlement:** Utilisation only payment based on 'energy' delivered.

**Cashout & ABSVD:** Service will enter into the Cashout calculations and be ABSVD'd.

## Eligibility

**Minimum Asset MW** – Whilst many ESO Ancillary Services procurements typically employ a minimum unit size of 1MW, the ESO is exploring dropping this level in order to widen participation as much as possible. Because LCM uses a new approach and will be using an established market platform it may be practical and cost effective to drop this level substantially and potentially remove any requirement to manage assets as Units altogether.

Platform rules or limits may still apply and Flexibility Providers may find it helpful to use a guideline minimum declared volume. Whilst we hope the 1 MW minimum will not be needed, LCM may still need a lower minimum limit for assets or units.

Proposed Approach –

Remove >1 MW min. entry requirement subject to smooth implementation:

Allow participation at an Asset level (as opposed to Units);

LCM platform permits many sub-MW* assets

ESO can then dispatch larger MW stacks together; LCM facilitates this autonomously

**Non-integer unit volumes** will be allowed.  E.g. 1.5MW

* ESO currently finds no justification to enforce grouping assets into MW-sized Units provided the overall volumes from all LCM asset bids add up to larger, usable volumes. When the term "Unit" is used below to describe a requirement to configure and describe assets, the term may apply to Asset or Unit, depending on where that particular requirement appears in the final implementation of the LCM platform. This will be confirmed in the LCM terms and conditions, available shortly.

**Open to any technology type** of generation turn-down to zero, or demand increase (either of which can be aggregated from more than one constituent asset).

**Connection** - Assets must be distribution connected above the B6 (Anglo-Scottish/SCOTEX) boundary.

**GSP** – units volumes are to be aggregated by GSP.  This ensures National Control visibility of constraint actions and allows consideration to import constraint and localised voltage.

**Non-BM only** - 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).  See 'BM unit exclusion - CEP Article 13' above for full justification.

**Stacking** – for the phase 1/MVP we are proposing no stacking with other services. This may be reviewed for phase 2, but the service needs to remain simple to implement for an accelerated MVP.

**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.

## Service Day / Week

**Service Day:** to run from 07:00 – 06:59 each day and align with the NAP Outage Plan (Picasso) handed over to National Control on a daily basis – usually at 17:00 day ahead.

**Service Week:** Not applicable.

## Registration by Providers

- The preferred approach is to utilise the Platform out-of-the-box onboarding and contracting process and functionality. At a high-level:

    **Provider set-up:**
    - We propose to allow Providers to enrol via the 3rd Party platform's web interface, upload asset details and apply to the Dynamic Purchasing System (DPS). The Platform Customer Success team reviews the registration, validates information (e.g., against Company House) and onboards the flexibility provider.

    **Asset market qualification:**
    - Assets are qualified against a set of eligibility criteria on the platform that have been determined by National Grid ESO. If the assets are eligible, the asset is qualified to submit availability data to the LCM Market.
    Note: this approach may differ from the usual form ABC process, and applies to the LCM service only, as we look to use the LCM platform's existing onboarding functionality.

## Submissions

**Volume Declarations** – units wishing to participate in any LCM procurement event must submit asset or unit volumes (forecast volume and expected delivered volume), availability (time), min/max runtimes, recovery period and price (for each half-hour) no later than:

> 18:00 each day (day ahead) **for window 1**

> (or revised) 10:00 each day (within day) **for window 2**

The flexibility provider will have the ability to make 'bulk' submissions (and roll them over) days, weeks, and/or months in advance. Provider will have the ability to update their submissions up until window gate/window closure highlighted above.

**Prices** - Providers will have the ability to enter different prices for different settlement periods.

**Volumes** - Providers will have the ability to enter different volumes for different settlement periods.

**A provider declaration of instruction windows** may be offered (depending on platform functionality). This will enable providers to opt-in/out of the 21:00 day ahead instruction and the 13:00 within day instruction, essentially giving them three options:

> To be instructed in the 21:00 window only

> To be instructed in the 13:00 window only

> To be instructed in both the 21:00 and 13:00 windows.

**Adding / Removing Availability** - Providers can remove their availability or price themselves out of the market at any point prior to the declaration deadline (see 'Unit Declarations') should they not wish to be called upon. However, units cannot declare themselves available for any period previously declared as unavailable once the declaration deadline has passed.

Providers are encouraged to do declare unavailability as soon as possible and ideally at least 12-hours prior to the start of the new service day.

**Forecasting -** units wishing to participate in any LCM procurement event must submit unit volumes (forecast volume and expected delivered volume), availability (time), min/max runtimes, recovery period and price (for half-hour) no later than:

> 18:00 each day (day ahead) **for window 1**

> (or revised) 10:00 each day (within day) **for window 2**

If not called in window 1, providers have the option to update their submission for window 2 (within-day) 10:00 (everyday). No update after this point.

More information providing the required forecasting information will be provided in the ESO service framework terms and conditions.

**'Step-block'** submissions will be allowed whereby the provider can stagger their delivery settlement period by settlement period as per the diagram below.



If not called in window 1, option to update submission for window 2 (within-day) 10:00 (everyday). No update after this point.

**'Linear'** submissions will be allowed whereby the provider can submit the same delivery profile across all settlement periods as per the diagram on the below.
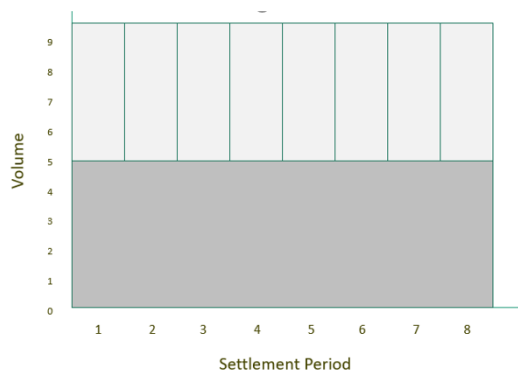


**Service Stacking** – Until further notice the LCM service is not to be provided simultaneously with any other Balancing Services or 3rd party service. Where, during any instructed period, a unit is made available and/or delivering other services then the relevant unit should be deemed unavailable in the LCM. We plan to review this subject to system requirements and platform and market performance.

**Relevant Balancing Service Statement** – our intention is to include the LCM on the Relevant Balancing Services (RBS) statement allow flexibility providers with Capacity Market contracts the ability to participate in the LCM. The earliest we expect the LCM service to be added to the RBS statement is 1st April 2023, once consulted with industry and approved by Ofgem. Those with Capacity Market contracts that receive exemptions from Cashout charges will not be able to participate in the LCM until the LCM service is approved by Ofgem for inclusion in the C16/RBS statement.

**Locationality.** Locational precision remains key to LCM operation both for ESO and Distribution. Provided assets and locations are accurately declared to the platform, in LCM we anticipate being able to relax the usual requirement on providers to define groups of Assets as Units and also remove the required minimum-per-GSP. If trials prove effective in the LCM service, we propose to remove the need for per-GSP aggregations of 1MW minimum, subject to further considerations. To ensure control room visibility of locational flows and ensure safe voltage levels are maintained, Providers will be required to map all assets accurately to physical locations in the asset registration platform, so that all their energy volumes show up (per MPAN) at their actual latitude/longitude.

**Linking of bids** will not be permitted to ensure the service remains simple for the instructing parties (ESO teams) to assess.

## Assessment

**Service Requirement** will be based on the daily Picasso plan handed over from NAP to the OSM at 17:00 daily. (See Service Day/Week).

We anticipate that we would never seek to resolve more that 75% of the B6 boundary at day ahead, due to the large variability on both the demand and DER side. The control room OSM will make the ultimate decision regarding what volumes should be instructed through the LCM.

**An assessment trigger** had been considered.  However, we believe it is suitable for the LCM service to be assessed whenever the daily Picasso report demonstrates a constraint at the B6 boundary.  The assessment will take place after the MOYLE Reference Programme comes in at 18:00.  It is only after this and any potential security trades over Moyle that the assessment can be started.

**Satisfying a 'target benefit' score** will determine if LCM units are to be instructed.  Any LCM action will be considered as a hedge against the BM prices at the point of assessment. Given the relative uncertainty of instructing volume at day ahead (or significantly ahead of time for the 13:00 within day instruction), satisfying a 'target benefit' score of circa 2% below expected BM prices is suggested. This process is currently in practice by the Trading team when trading on SEIMP.

**Generation turn-down to zero –**  generation providers are not expected to turn-down to zero. Providers are to submit their forecast and a 'down-to' figure per SP.  'Down-to' figure is the level they anticipate reducing their volume to.  Could be zero.

**Addressing the B4 boundary**  - additional thermal constraints above B6 such as 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 be resolved with priority, as they will effectively contribute to relieving both boundary constraints.

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

> Assess actions from units above the B4 boundary and hedge against the BM using the 'target benefit' score before instruction of the appropriate units.

> Assess actions from units above the greater B6 boundary area, and hedge 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 an hourly basis (as opposed to Settlement Period). This aligns with current Trading Team process for managing constraints (e.g. SEIMP – traded on the interconnectors) and therefore a consistent approach is proposed.

**Assessment against the BM** - Our operational teams will assess Balancing Mechanism prices against unit prices submitted onto the LCM platform for the required time periods. We also anticipate that the platform will ensure the optimal units will be offered in the LCM order stack.

## Dispatch

**Instruction Method.** Dispatch is to be issued directly from the service platform. As a minimum this will be an email instruction, however, via engagements we understand a number of platforms have API integrations and this may therefore remain a possibility/option open to the provider.

**Instruction Acceptance.** The service provider will be expected to respond to the instruction within an hour of receipt. Again, depending on the platform solution that's implemented, this could be direct to the platform, or alternatively via email return.

**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 07:00 – 06:59 (24 hour) period.

> **Instruction window 2** – 13:00 within day instruction for activation between the following 19:00 – 06:59 (12 hour) period.

**Instructing Party.**

> **Instruction window 1** (21:00 – day ahead) to be assessed and dispatched via the control room OSM.

> **Instruction window 2** (13:00 – within day) to be assessed and dispatched by the Trading Team.

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

| | | Instruction Window 1 | Instruction Window 2 |
|---|---|---|---|
| **Day Ahead** | 17:00 | | Outage Plan Rec'd |
| | 21:00 | Instruction Delivered | |
| | 22:00 | Acceptance Received | |
| | | | |
| **Service Day** | 07:00 | Service Delivery Starts | |
| | | | |
| | 13:00 | | Instruction Delivered |
| | 14:00 | | Acceptance Received |
| | 19:00 | | Service Delivery Starts |
| | | | |
| | 07:00 | | |

**Justification:**

> The first instruction window at 21:00 is to accommodate the NAP outage plan (Picasso) to the OSM. The outage plan is handed over daily at 17:00 and, it is recommended that any instruction should be reflective of a more informed network view as this plan is put into action.

> The daily outage plan is in place and duly analysed by Control Room before 7pm. The daily peak demand is moving into the overnight low, hence this has informed our half-day 'service day' to cover the 19:00 – 06:59 period, and aligning the full day ahead service period with this at 07:00 – 06:59.

> 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. For these providers the 21:00 (out of office hours) proves problematic and would result in no service provision. Additionally the second instruction window allows the Control Room to refine overnight constraint management, with a start time of 19:00 which does not infringe the real-time timescales (4 hours).

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** will not 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**

**Locational Planning / Voltage Control –** we are exploring if we need to consider regional planning and the potential for instructing too much volume in one location/GSP. There could be concern that taking too much volume off in one location could impact voltage. Scottish ODFM volumes are circa 850MW although we would expect this to increase as the market develops. Analysis on the location/clusters of this volume may be required.

Because the services the ESO offers on this platform are very locational by nature, from time-to-time certain providers at certain locations may not be able to participate in some procurement events (or exceptional circumstances, cancelled during the window), subject to locational system conditions, including but not limited to, distribution system operability requirements, distribution network faults and distribution requests to accommodate localised balancing management.

## 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 allows a wide range of assets to participate and provides flexibility to their service provision. We recommend no limit to the delivery duration. One provider has told us that they are capable of sustaining their output indefinitely.

- **Max Delivery** - No limit on max duration from ESO. It will be up to provider to set max trading duration for their unit/asset.

- **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. The recovery period allows the ESO / platform algorithm to understand what 'rest period' each unit requires after a period of delivery and should therefore not be considered again for redispatch. Restart times will not be paid for.

- **Minimum acceptance time** - We propose to capture the minimum acceptance duration and apply this through the platform algorithm. We wish to standardise this approach and therefore acceptance periods are proposed to be in settlement period blocks.

- **Multiple periods of acceptance** - Provider will have the opportunity to declare individual settlement periods for which they are available/unavailable. Given the declared availability and the minimum recovery time, providers can be called upon multiple times within a service day.

## Settlement

The preferred position is for the platform and platform provider to deal with the settlement alleviating ESO settlements of this process, including the capture of bank details etc at the onboarding stage.

**Availability Payments** will not be facilitated in the LCM service.

**Utilisation Payments**. Utilisation payments will be based on delivered energy.

Utilisation will be paid on £/MW/h.

Pay as bid.

Ramping - utilisation payments will not include the energy delivered in ramping up to/down from the instructed MW level due to the granularity of the metering data being requested. Where minute by minute metering data is employed, then ramp rates are more viable – this is not currently anticipated.

**Performance monitoring** of individual units will determine liability for payment. Instructed units will be expected to submit the required metering data within one week of instruction. Required settlement data to include:

> half hourly metered data for each settlement period for the service day;

> other half hourly metered data may also be required for other periods other than the instruction periods.

**Under-delivery**. We assess the volume the provider has delivered and use that information to determine future eligibility, in order to maintain a reasonable level of consistent actual delivery. This will be clarified once volume data on service performance has been reviewed.

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

**Over-delivery** of contracted MW for LCM will not receive utilisation payment. Therefore, any utilisation payments will be limited to the instructed delivery volume only.

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

**Forecasting -** See 'Forecasting' in 'Submission section (page 6).

**Validation of Forecasting –** NG ESO may require the provider to submit metering data that allows for validation of forecasting accuracy.

**Baselining** - Given that provider is providing a forecast, we do not foresee a baseline being required however this will be clarified in contract terms.

**Onboarding** – For Settlements purposes, MPAN data from the platform will be added to additional systems.

**Allocating Energy** – Following instructions, providers will be required to allocate delivered energy to each MPAN instructed through the 3rd Party Platform.

**Settlement** – the final settlement calculation is TBD. NG ESO will work with the platform provider to agree this prior to inclusion in the final contract T&Cs.

## Cashout & ABSVD

**Cashout.** Post instruction metering data will be sent to Elexon through Settlements. This will ensure inclusion in any cash-out calculations.

The LCM service will not integrate with any existing ESO Settlements systems.

**ABSVD -** Through provider engagements we have established that it is imperative for providers to be made whole for their energy.

## Market Monitoring

Prices and availability in LCM and BM will be constantly assessed against Balancing Principles and reported if any unusual activities are noticed.

## 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.

**Visibility an Coordination.** 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 a specified asset not to be instructed if they present a network issue.

It is recommended that all visibility and control is to take place at least weekly, or more granularly should the DNO chose.

**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 –** For day one delivery, Market Information will be provided on the LCM market platform.  We anticipate pointing to this from a page on the data portal.  Day 2 we envisage data to be sent and published from the platform directly to the data portal.

**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)).

# 5.   Contract Structure

We are currently working with our LCM platform provider to support the required service and platform contract components and structure.

**Framework agreement.** We will trial a contract structure and process to be supported by the platform provider.  The likely structure will be around a standard platform framework agreement.

**A service carve-out** forming part of the framework agreement will accommodate the ESO specific details of the product to be procured.

# 6. Consultation Responses

NGESO invites responses to the Local Constraint Market service design consultation by **18:00 Monday 9th January 2023**.  Please use this response proforma to answer the consultation questions.

https://www.nationalgrideso.com/documents/273336-lcm-trials-design-consultation-launch-response-proforma

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

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

For any questions on this consultation process, please contact david.phillips1@nationalgrideso.com