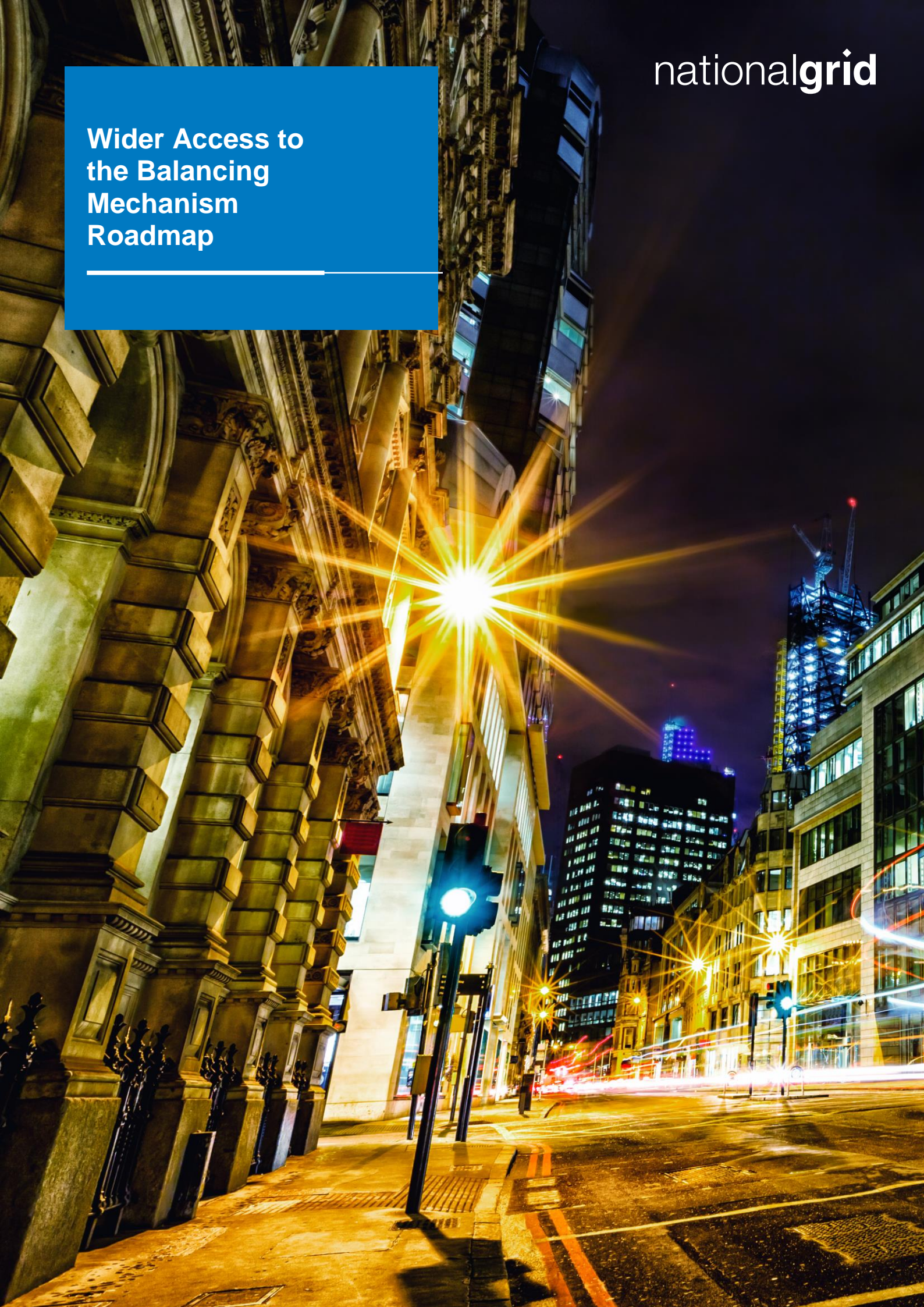


Wider Access to
the Balancing
Mechanism
Roadmap



How to use this document

This document is of interest to a broad range of stakeholders who are interested in learning how we are widening access to the GB Balancing Mechanism. This includes what we are looking to do in the short term to improve access to the Balancing Mechanism under current arrangements, and our plans to create new routes to market. The roadmap is set out as follows:

Chapter 1 – Introduction

Provides context around wider access and why we're committed to working with industry to deliver it.

Chapter 2 – Background

Gives information on how the Balancing Mechanism works and current routes to market. Sets out the rationale for creating aggregated BMUs, and their potential routes to market. For parties interested in creating these BMUs, this section answers "what can I do right now?". Finally, it explains why current arrangements need to change.

Chapter 3 - How are we facilitating wider access?

Explains how we will facilitate wider BM access through improving existing routes to market, creating new routes to market and improving systems and processes. Within each area we make a number of commitments, both short and long-term, to ensure wider access is delivered.

Chapter 4 – Our roadmap commitments to widen access to the Balancing Mechanism

Sets out each commitment in detail. Describes the issue driving each commitment, what is being done to address them, and the key milestones which demonstrate progress in this area.

Chapter 5 – Summary

Sets out next steps and how interested parties can stay involved.

We hope that you will find this document useful. We welcome all feedback and this can be provided to commercial.operation@nationalgrid.com

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Executive Summary

As the Electricity System Operator (ESO), our vision is to meet the future needs of the electricity system by making the most of all resources available on the system in a flexible and economic way.

We are establishing the ESO as a legally separate business within National Grid. It is our job to operate Great Britain's electricity network to ensure that supply and demand are balanced and power flows across the network safely and reliably. We are seeing a transformation in GB's energy mix as we move towards a decarbonised energy system. With this change, we are facing new challenges in balancing the GB electricity system while also delivering value to energy consumers. To overcome these challenges, we need to maximise the resources we have available on the system today and in the future. Our service providers are key to helping us manage these challenges, which is why we want to better help them to help us balance the GB system in the most cost effective way. After listening to these providers, we want to widen access to the Balancing Mechanism (BM), Great Britain's core flexibility market.

This roadmap sets out how we will improve the information we share, simplify our balancing services and remove barriers to participating in the Balancing Mechanism. We know that there is much more we can do to make this market more accessible for smaller providers and aggregators. We also know that increasing participation in the Balancing Mechanism will significantly help the ESO manage operability challenges, and consequently lead to more cost effective balancing actions. In this roadmap, we are seeking to remove barriers to Balancing Mechanism entry for small and aggregated units in three ways:

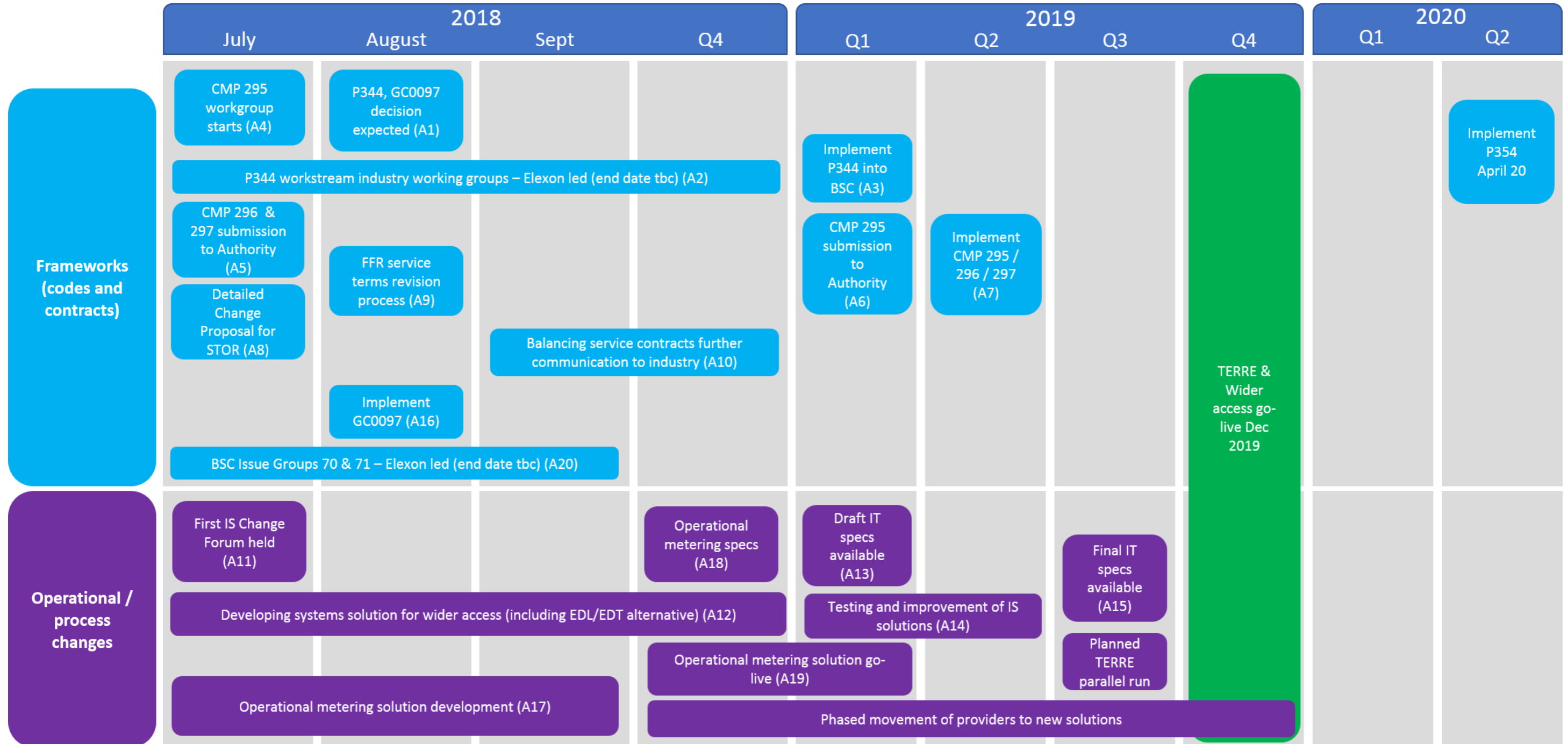
1. Improving existing routes to market to ensure their suitability for the participation of supplier aggregators in the BM.
2. Developing new routes to market through framework changes to create a new way of entering the BM for parties wishing to provide near real-time flexibility. These may be from non-traditional providers or aggregators who are not currently licenced suppliers.
3. Enhancing IT systems to improve data flows between the ESO and market participants so they are more efficient and cost-effective for smaller and aggregated units.

Underpinning this roadmap is our desire for a Balancing Mechanism that is open to all technologies and providers, with no significant barriers to entry. We want the BM to be competitive and robust enough to continue to be a core ESO tool for managing the system.

Our roadmap of commitments and actions is shown in summary form on the next page. Read on to find out what we will be doing to widen BM access out to 2020, and how this will be delivered alongside the implementation of project TERRE – the new pan-European reserve market. It is important to note that regardless of future arrangements between the GB and EU, we are committed to delivering wider BM access.

Roadmap of actions and milestones relating to BM wider access July 2018 – April 2020

Figure 0.1 Roadmap of wider access actions to 2020



Key to code modifications & issue groups

- P344 (BSC) – Project TERRE implementation into GB market arrangements
- P354 (BSC) – Use of ABSVD for non-BM Balancing Services as the metered (MPAN) level
- GC0097 (Grid Code) – Grid Code processes supporting TERRE
- CMP 295 (CUSC) – Contractual Arrangements for Virtual Lead Parties (Project TERRE)
- CMP 296 (CUSC) – Aligning the CUSC to the BSC post-P344 (Project TERRE) – to exempt Virtual Lead Parties from BSUoS
- CMP 297 (CUSC) - Aligning the CUSC to the BSC post-P344 (Project TERRE) - introduce definition of Virtual Lead Party
- BSC Issue Group 70 – Settlement of Secondary BM Units using metering at the asset
- BSC Issue Group 71 – Introduction of a baselining methodology as an alternative to Physical Notifications

1 Introduction

The GB electricity system is undergoing a period of fundamental change. We are transitioning to a smart, flexible energy system, marked by a shift away from large thermal power generation to more renewable and distribution-connected generation. New sources of energy, emerging technologies and changing consumer behaviour are all contributing to this.

New market opportunities are also coming from outside GB. European legislation called the Third Energy Package created a requirement for the establishment of a set of European Network Codes (ENC), covering grid connections, markets, and system operation¹. The codes aim to provide a sustainable, secure and competitive electricity market across Europe. Implementation of the ENCs is underway and will continue for a number of years, bringing wide-ranging changes to the GB energy market.

As the Electricity System Operator (ESO) we have a key role to play in facilitating these changes while delivering value to the end consumer. To support this, we are working to evolve our balancing services markets, allowing us to manage the evolving system effectively and all technology types to compete on a level playing field.

Our recently published ESO Forward Plan² sets out our long-term vision for an ESO which thinks across networks, plays a more active part in the energy system and helps to shape frameworks for markets. There are seven principles guiding our work to accomplish this vision. The four most relevant to the development of balancing services markets are:

- Principle 1: Support market participants to make informed decisions by providing user-friendly, comprehensive and accurate information
- Principle 2: Drive overall efficiency and transparency in balancing, taking into account impacts of ESO actions across time horizons
- Principle 3: Ensure the rules and processes for procuring balancing services maximise competition where possible and are simple, fair and transparent
- Principle 4: Promote competition in the wholesale and capacity markets

The journey of delivering against these principles began with our System Needs and Product Strategy³ (SNaPS) consultation in 2017. This laid out how our requirements for products and services are changing and outlined plans to improve and develop our products

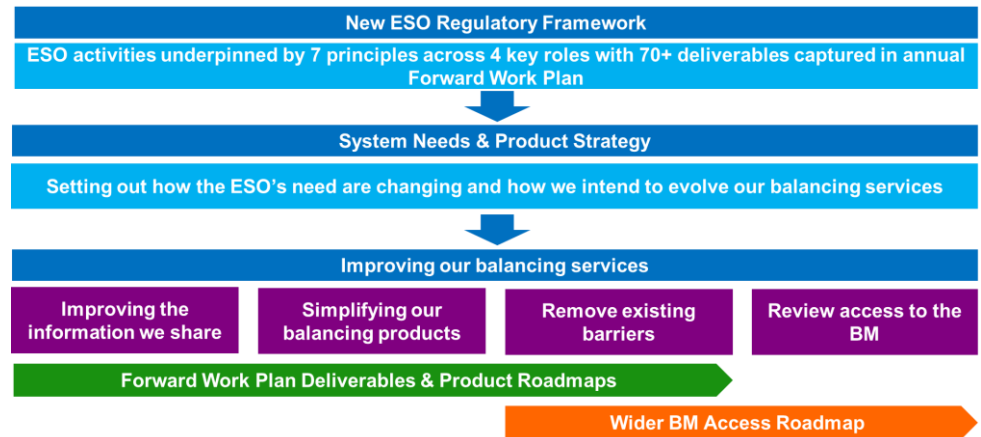
¹ Further information on the European Network Codes can be found at <https://www.nationalgrid.com/uk/electricity/codes/european-network-codes>

² Further information on our ESO forward plan can be found at <https://www.nationalgrid.com/uk/about-grid/our-role-in-the-future-of-electricity-system-operator>

³ Further information on the Future of Balancing Services can be found at <https://www.nationalgrid.com/uk/electricity/balancing-services/future-balancing-services>

and balancing markets. Since then we have been delivering a number of changes to facilitate this (Figure 1.1).

Figure 1.1:
Balancing markets change process



As part of this process we have been publishing a series of product roadmaps⁴. These have focused on improving the information we share, simplifying our balancing services and removing barriers for new entrants. They also set out the direction for the implementation of EU standardised products, which will give market participants increased access to pan-European markets.

This Wider Balancing Mechanism (BM) Access Roadmap is the next step in our journey to reform balancing services. We know from stakeholder feedback that the current BM arrangements present significant barriers to entry. This roadmap focuses on activities we are undertaking with industry to remove these barriers for all providers and technology types. We want to share these activities to both enable understanding of the current challenges and to seek industry help and feedback in making these changes happen.

We will set out the current routes into the BM, their associated challenges, and how we are working with industry between now and the end of 2019 to improve existing routes and create a new route to market. We will also outline changes to balancing services from providers who are not in the BM which ensure providers of the same service are treated equally regardless of being in the BM or not.

We believe the changes being implemented are the most significant reform of central BM arrangements since the New Electricity Trading Arrangements (NETA) in 2001. The delivery of these changes will enhance the ESO's essential system balancing tool, allowing us to address operability challenges whilst delivering benefits to the end consumer.

⁴ Further information on the product roadmaps can be found on the Future of Balancing Services webpages at <https://www.nationalgrid.com/uk/electricity/balancing-services/future-balancing-services>

2 Background

As the ESO one of our core roles is residual electricity system balancer for GB. This means ensuring electricity generation and demand are balanced on a second-by-second basis. To do this we instruct flexible generation close to real time through the Balancing Mechanism and contract ahead of time for balancing services where we have a firm requirement.

What is the Balancing Mechanism?

The BM is the period between gate closure (one hour prior to real time) until the end of a settlement period (30 minute window). During this time the ESO can instruct (or dispatch) parties to increase or decrease their generation or consumption. Parties who respond to this instruction in the Balancing Mechanism do this through their BM Unit (BMU). We receive commercial and operational data (also known as dynamic parameters) from each BMU (Figure 2.1). This includes

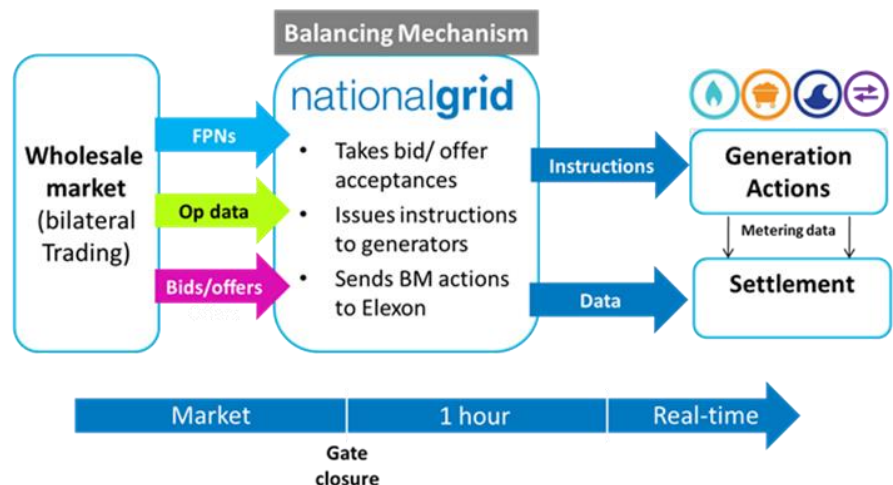
- Final Physical Notifications (FPNs) – the generation or consumption profile of the BMU for each settlement period (30 mins) of the day.
- Operational data – technical data such as ramp rates i.e. how quickly a BMU can alter its generation or consumption.
- Bids or offers – how much the BM participant is willing to pay or be paid by the ESO to increase or decrease their BMU's generation/or consumption by a given amount.

This data is used in balancing tools to inform balancing decisions with the objective of ensuring cost efficiency whilst accounting for system needs and security.

All wholesale market participants, generators and suppliers (apart from Non-physical Traders) will register as BMUs. These BMUs contain either a generating unit or a collection of consumption meters. After each settlement period (30 minute window) all energy that is produced or consumed at meters within a BMU is then used to calculate energy positions and imbalance for each BMU by Elexon⁵.

⁵ More information about Elexon can be found at <https://www.elexon.co.uk/>

Figure 2.1:
High level overview of the
processes in the BM



A core tool for the ESO

The BM is a core ESO tool for managing the GB electricity system, typically accounting for 5-15% of all contracted electricity volumes over a year. The BM is a platform used to ensure electricity supply and demand is balanced. It is also used to address a wide range of other system needs beyond balancing, such as managing voltage levels. The BM allows us to manage system extremes and volatility close to real time. These flexibility needs cannot always be predicted and continuously change. Managing them as they arise taking action in the BM is often more efficient than trying to contract specific services ahead of BM timescales.

The BM also allows us to manage constraints on the transmission system, where power can't be transmitted to the location of demand. In the BM, we can instruct parties to vary their generation or consumption, or, to mitigate or work around a constraint by changing the power flows on the network. This avoids the need for costly infrastructure investments to reinforce the network leading to a net benefit for the end consumer.

How can parties currently enter the BM?

There are currently four ways that parties can register Balancing Mechanism Units:

- Transmission connected generation BMUs
- Distribution connected generation BMUs
- Supplier Base BMUs
- Supplier Additional BMUs

An active BM participant means a party with one or more BMUs that are 'dispatchable' by the ESO. This means that they are available to change their generation/consumption when asked to by the ESO.

All operators of BMUs have a contractual relationship with the ESO. They must also follow the relevant codes which form the framework and rules for operating the GB electricity transmission network.

These are the Balancing and Settlement Code⁶ (BSC), Connection and Use of System Code⁷ (CUSC) and Grid Code⁸ (GC):

- The BSC details the rules for wholesale electricity trading and is administered by Elexon.
- The CUSC is the contractual framework for connection to, and use of, the electricity transmission system, administered by the ESO.
- The GC is the technical code for connection and development of the electricity transmission system, administered by the ESO.

These codes place obligations on parties, which facilitate an end-to-end process from market entrance to active BM participation.

Generation BMUs

All transmission connected generators are part of the BM. For generation directly connected to the electricity transmission system, BM participation is mandatory. Generation connected to the electricity distribution system is also able to participate in the BM, if they have a relevant contract with the ESO⁹ (Bilateral Connection Agreement – BCA or Bilateral Embedded Generation Agreement – BEGA) (Figure 2.2). One BMU is usually one generating unit which will have its own unique identifier (BMU ID). Commercial, operational and metering data is then provided for that BMU ID.

Figure 2.2:
The current routes in to the
Balancing Mechanism for
generation BMUs

BMU type	Generation BMUs (Central Volume Allocation)	
Category	Transmission connected	Distribution connected
SO contract	Sign BCA contract	Sign BEGA Contract
Obligations	Contract sets out CUSC & Grid Code obligations	Contract sets out CUSC & Grid Code obligations
BMU activity status	Each registered unit an Active BMU	Each registered unit an Active BMU

⁶ Further information on the Balancing Settlement Code can be found at <https://www.elexon.co.uk/bsc-and-codes/balancing-settlement-code/>

⁷ Further information on the Connection and Use of System Code can be found at <https://www.nationalgrid.com/uk/electricity/codes/connection-and-use-system-code-cusc>

⁸ Further information on the Grid Code can be found at <https://www.nationalgrid.com/uk/electricity/codes/grid-code>

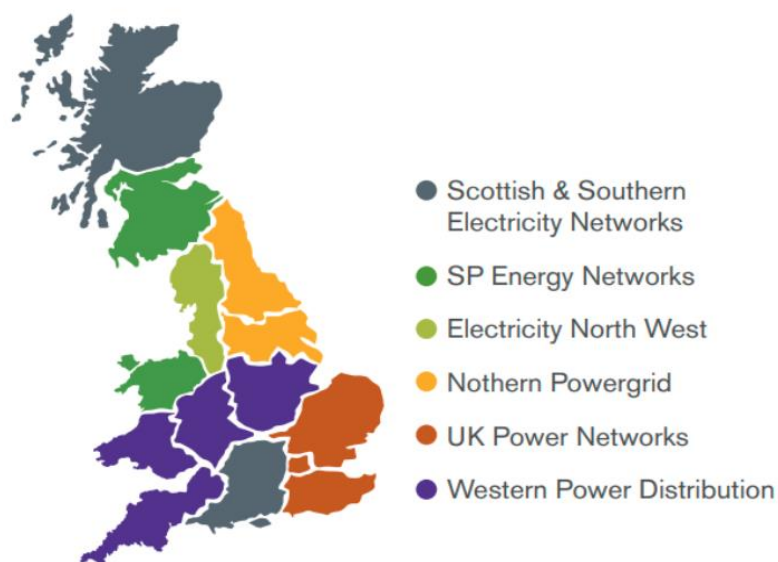
⁹ Further information on connection agreements can be found at <https://www.nationalgrid.com/uk/electricity/industrial-connections/applying-connection>

Supplier BMUs

Supplier Base BMUs

The core of a supplier's traditional business model is to supply electricity, and supplier portfolios cover a range of customers including domestic and commercial. When suppliers enter the market they register a set of 'Base' BMUs to register their meters for each geographic area to be settled against. Unlike a generator, whose location is known specifically at the Grid Supply Point (the point of connection to the transmission system), suppliers' portfolios are spread across a number of locations. This is why suppliers' Base BMUs are set up as a collection of BMUs over an area. This is called a 'GSP Group', which broadly aligns to areas covered by the distribution networks (see Figure 2.3). Base BMUs are not currently used for active participation in the Balancing Mechanism.

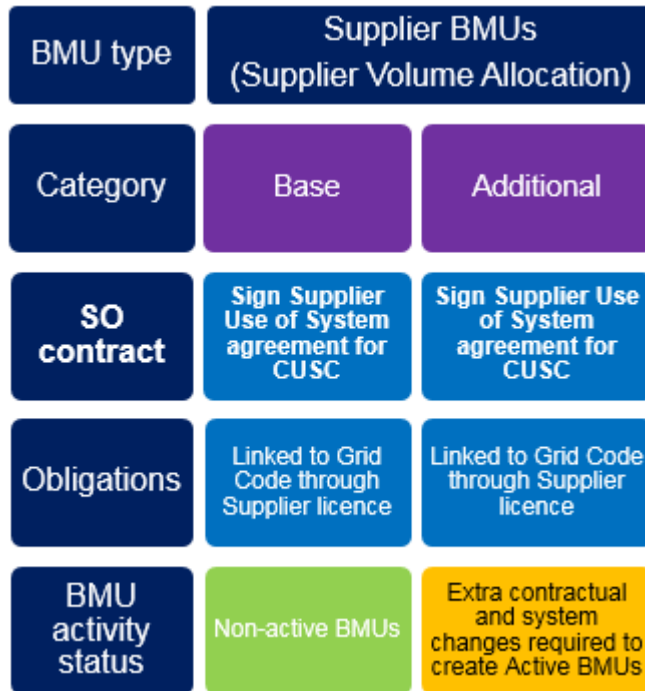
Figure 2.3: Distribution networks in GB



The supplier route for BM participation – Additional BMUs

If suppliers wish to become active BM participants, they may register "Additional" BMUs to be used in the Balancing Mechanism. These Additional BMUs, like Base BMUs, can be a collection of meters across the geographical area of a GSP Group. This route to market is called the "Supplier route", and is only available to licenced suppliers (Figure 2.4).

Figure 2.4:
The current routes in to the
Balancing Mechanism for
Supplier BMUs



Aggregated BMUs

Why aggregate BMUs?

We have heard from stakeholders that aggregation is important to potential new BM participants. Aggregation is where a collection of distributed generation or supply assets are used collectively as a BMU across a GSP Group. Some providers find it more efficient to aggregate multiple smaller units into a larger BMU to release efficiencies of size.

Aggregation for Supplier Additional BMUs for BM participation

The key difference between supplier and generation BMUs is that supplier BMUs are by nature able to be aggregated. This is because suppliers are able to register multiple meters within each BMU. This is different to current arrangements for generation BMUs, which are inherently one meter and one unit per BMU.

Transmission connected BMUs

It is not currently possible to aggregate volume between transmission connected units for BM participation. This is because transmission connected units are already set up individually to participate in the BM as part of their contractual arrangements.

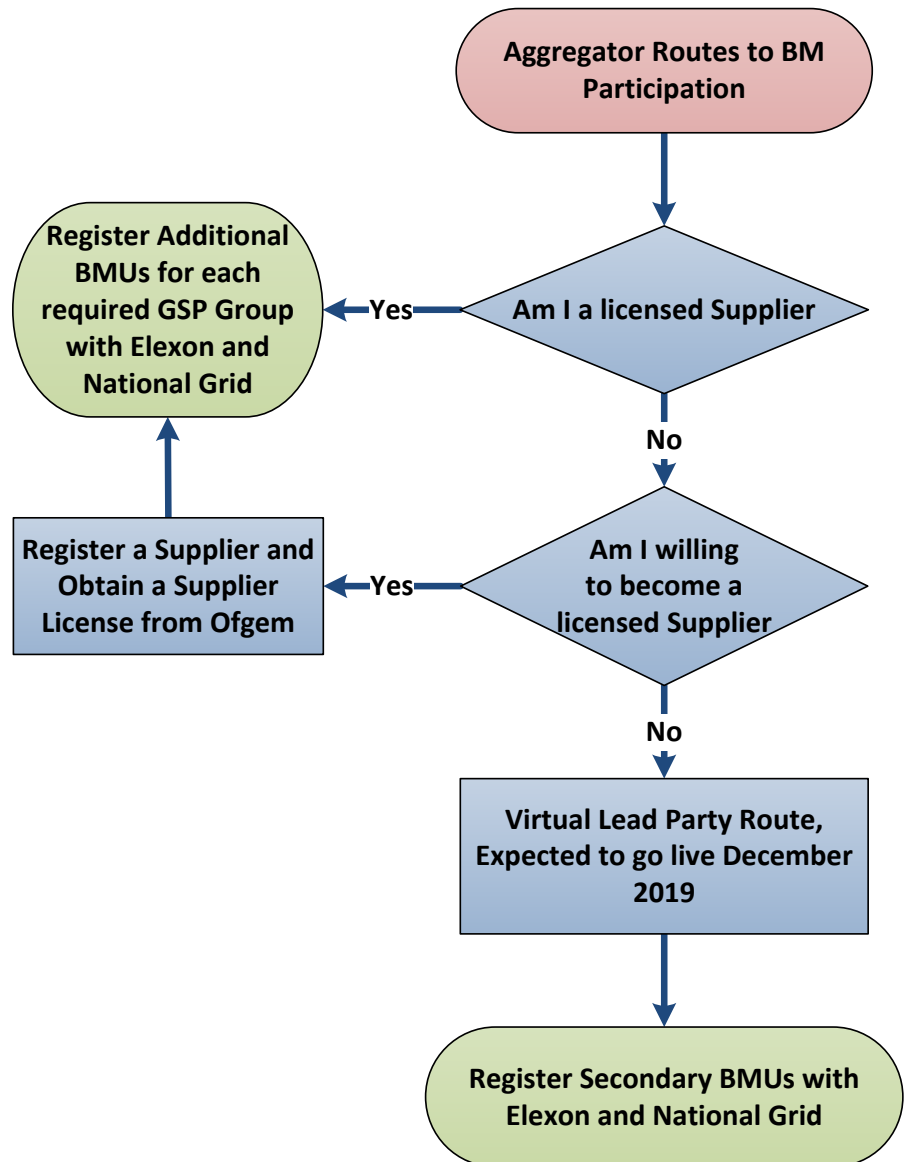
How can aggregators participate in the BM?

We recognise that BM participation routes may not be straightforward for aggregators, who may or may not already be a licenced supplier.

For parties who aren't licenced suppliers, we are working to create a new route to market, which you can learn more about in chapters 3 and 4.

The flowchart in Figure 2.5 depicts potential routes to market for aggregators..

Figure 2.5: Aggregator routes to BM participation



Main drivers for BM reform

In this section, we set out the three main drivers for why, in our view, access to the BM needs to be reformed. These are:

- 1. Consumer benefits of increased participation**
- 2. Maintaining operability**
- 3. Removing barriers to entry – equal treatment and access**

1. Consumer benefits of increased participation

We want to facilitate competitive balancing markets that drive down costs for consumers and help us manage the system in the most effective way. The BM is the ultimate flexibility market in GB and we are working to allow the widest possible participation to encourage competition and deliver benefit to consumers.

Several studies have investigated the economic benefits of increasing participation in the BM. While these studies vary widely in the consumer benefits they report (£110-500m per annum by 2020¹⁰), they all nonetheless point to significant benefits resulting from increased liquidity and competition in the BM.

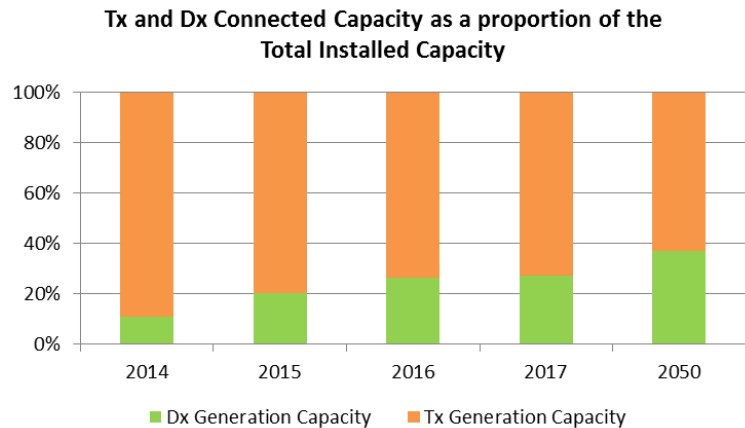
2. Maintaining operability

The BM has remained relatively unchanged since its creation as part of NETA in 2001. However, the make up of the GB energy market is changing significantly, leading to new and increasing system operability challenges.

Between 2014 and 2017, distribution connected capacity more than doubled and could reach 67GW or just under 40% of total installed capacity by 2050 (Figure 2.6). Only a small volume of this distribution connected capacity is currently accessible through the BM. This means an increasing proportion of system flexibility cannot be accessed via the BM. Enabling better access presents a significant opportunity for the ESO, service providers and end consumers.

¹⁰ Figures relating to the benefits of wider access are taken from “Understanding the Balancing Challenge”, Imperial College and NERA, August 2012
“An analysis of electricity system flexibility for GB”, Carbon Trust and Imperial College, November 2016
“An assessment of economic value of demand side participation in the BM and evaluation of options to improve access”, Charles Rivers Associates, April 2017

Figure 2.6:
Historic and projected distributed capacity in GB as a proportion of total installed capacity
Source: Future Energy Scenarios 2018
<http://fes.nationalgrid.com/media/1363/fes-interactive-version-final.pdf>



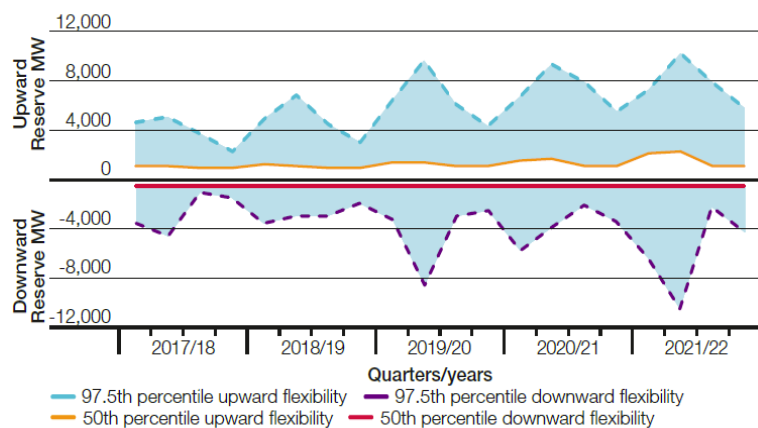
Additionally, a number of providers in the BM are needed to provide frequency response capability. When units are providing frequency response, they cannot also be counted on as spare capacity to match any upward or downward fluctuations in demand. This is leading to a decrease in the number of providers in the BM able to provide the flexibility needed to match generation with demand.

‘Reserve’ is a service that ensures we have sufficient spare capacity to call on in the event of a system imbalance. It can be either upward (increase in generation or decrease in demand) or downward (decrease in generation or increase in demand). We procure a certain amount of reserve through tendered products, such as Short Term Operating Reserve (STOR), for needs that are relatively certain ahead of time such as correcting forecast errors. We also have variable needs that only become clear closer to real time and so reserves are typically accessed through the BM.

Figure 2.7 shows how our variable reserve requirements are projected to increase over the next 5 years and could potentially double by 2022.

A decreasing proportion of accessible flexibility in the BM, and increasing variable reserve requirements mean that, from an operability perspective, the current BM arrangements are not sustainable.

Figure 2.7
Projected variable reserve requirements out to 2022
Source: System Needs and Product Strategy
<https://www.nationalgrid.com/sites/default/files/documents/8589940795-System%20Needs%20and%20Product%20Strategy%20-%20Final.pdf>



3. Removing barriers to entry – equal treatment and access

We have been working with industry to create competitive balancing services markets that allow new and existing providers to participate. This has successfully led to much greater participation in these markets and increased competition. This has prompted providers to explore other markets and we are now working with them to remove barriers to GB's core flexibility market, the BM. Allowing all technologies and provider types access to the BM will also help to simplify the current situation of BM and non-BM providers of balancing services.

A further driver for wider access to the BM is addressing the link between equal treatment and equal access. In recent years, several market framework changes have meant that there are less revenue opportunities for smaller distribution connected generators. Wider access becomes increasingly important as these revenue opportunities change.

One such change in this space is BSC modification P354 and associated change to the Applicable Balancing Services Volume Data methodology. These recently approved framework changes will be implemented in April 2020. The result of these changes will mean that non-BM providers only receive payments for delivering a balancing service (such as STOR, Fast Reserve or Demand Turn-Up) rather than the balancing service plus imbalance spill. Whilst we believe that these framework changes are important in ensuring providers are treated more equally, we believe equal treatment and equal access go hand in hand. The BM is a market which allows the value of flexibility to be realised in short-term timescales. Widening access to the BM for all market participants will allow all provider types to compete for these revenue streams.

Delivering change in the Balancing Mechanism

The benefits of wider access for the ESO and the market are clear, but we recognise it isn't straightforward for new entrants. We know there are still barriers to entry after stakeholder feedback through our System Needs and Product Strategy (SNaPS) and code modification consultations, as well as feedback at events like Power Responsive. Many of these barriers are a result of the structural arrangements that facilitate BM participation through contracts and codes, originally created for individually controllable and often large units.

Barriers to entry for small embedded and distributed flexibility mean that current arrangements are not sustainable. We want to remove these barriers to entry and ensure there is equal access to the BM. The next chapter of this roadmap will lay out some of the barriers we are seeking to remove, the challenges we are facing in doing this and some of the ways we are working to overcome them.

3 How are we facilitating wider BM access?

This chapter covers how we are planning to facilitate wider access through:

- **Improving existing routes to market** by removing some of the barriers faced by suppliers wishing to create aggregated Additional BMUs.
- **Creating new routes to market** alongside changes being made to implement European reserve products - allowing a wider range of providers to enter the BM.
- **Improving systems and processes** including the dispatch experience for small and aggregated units.

These significant changes are being facilitated by the ESO to allow greater participation of distribution connected flexibility in the BM. We believe this will deliver the most value for the end consumer. However, it presents significant challenges in terms of changing codes, contracts and operational processes and systems.

The three change areas are set out in more detail below. Across these we have identified nine commitments. Each of these and their associated deliverables are addressed fully in Chapter 4.

1. Improving existing routes to market

What can I do as a market participant now?

As outlined in Chapter 2, stakeholders have set out plans to create aggregated BMUs to realise efficiencies when seeking to participate in the BMU with smaller scale portfolio. We are beginning to see some parties considering active participation in the BM through creating aggregated Additional BMUs. This route is called the 'supplier route' because for Balancing Mechanism market participants to do this, they need to be licenced and registered as a supplier.

Whilst this route technically exists it has only been used previously for locationally specific cases and has not been taken up in earnest. We know that improvements can be made around this route to market to make it more straightforward for new entrants.

Short term improvements relating to existing routes to market

We know that an improved supplier route will create a more attractive market opportunity, while also providing more services to the ESO to when balance the system. We are prioritising a number of our commitments ahead of December 2019, these are shown in table 3.1 below:

Table 3.1:
Commitments accelerated for
the Supplier route

Roadmap commitments (full list on page 21)	When will it be done by?	Roadmap page
3. Aggregated BMU participation in balancing services	In progress	30
5. Simpler data submission process - currently required at GSP level	Aug 2018	32
7. Clearer and simpler metering requirements	Late 2018	35

Long term improvements relating to existing routes to market

Our other commitments in this area require a substantial level of change and are on track to be delivered by December 2019, these are:

Table 3.2:
Commitments by Dec 2019
for the new route to market
relevant to Supplier route

Roadmap commitments (full list on page 21)	When will it be done by?	Roadmap page
4. Improved and clearer communications systems requirements	Dec 2019	31
6. Improved ESO ability to optimise and dispatch aggregated BMUs	Dec 2019	33
8. Support industry work on providing and delivering against PNs (Elexon led)	Dec 2019	36
9. Support industry work on more accurate settlement for behind the meter (Elexon led)	Dec 2019	37

For those interested in the Supplier route, improvements will take place throughout 2018. While these changes take place, we still encourage suppliers to explore how today's current arrangements may allow for participation in the BM. You can find out more information or guidance on the process from your ESO balancing services account manager. If you are not currently a balancing services provider please contact commercial.operation@nationalgrid.com.

2. Creating new routes to market

With new European legislation, we have the opportunity to create new and better routes to the Balancing Mechanism for some providers. The European Electricity Balancing Guideline (EBGL) means the ESO will be developing a European Balancing auction platform, alongside the other European Transmission System Operators. This platform will create a way for standardised balancing products to be exchanged across borders, and it needs to be open to all type of balancing service providers. This includes embedded generation, aggregators and Demand Side Response.

The Trans-European Replacement Reserve Exchange (TERRE)

One area where the ESO has been working to improve greater GB flexibility participation in Europe is through a new balancing platform being introduced called the **Trans-European Replacement Reserve Exchange**, also known as **Project TERRE**. This platform will allow providers over 1 MW (individual or aggregated) in capacity to participate in a pan-European reserve market. This is being introduced through the code governance process through Grid Code modification GC0097¹¹ and BSC modification P344¹². If approved by Ofgem, these changes will be implemented in summer 2018 and February 2019 respectively ahead of TERRE go-live planned for December 2019– widening access to the European market for those providing over 1MW in capacity.

New routes for aggregators and providers of embedded flexibility

For aggregators and providers of embedded flexibility, these modifications will also open up the existing GB Balancing Mechanism independently from suppliers. These changes will allow these providers to compete against more traditional sources of flexibility by reducing existing regulatory and technological barriers.

UK's exit from the EU and Project TERRE

As the UK plans to exit the EU, we understand this could cause uncertainty with providers around the implementation of Project TERRE. The European Commission published a Notice to Stakeholders in April 2018 on this topic. It is important to note that the ESO is committed to the implementation of wider GB access to the Balancing Mechanism regardless of future arrangements with Europe. Although Project TERRE and wider access to GB's Balancing Mechanism are connected, the ESO's ability and desire to widen access in GB is not dependant on wider European changes.

¹¹ Further information on GC0097 can be found at <https://www.nationalgrid.com/uk/electricity/codes/grid-code/modifications/gc0097-grid-code-processes-supporting-terre>

¹² Further information on P344 can be found at <https://www.elexon.co.uk/mod-proposal/p344/>

What are we doing in the roadmap to create these new routes to market?

In our roadmap, we have identified a number of challenges and commitments to resolving these to create new routes to markets.

These can be found in more detail in Chapter 4. Below is a summary of which roadmap actions we'll take and by when to create these new routes.

Table 3.3:
Commitments for the new route to market

Roadmap commitments	When will it be done by?	Roadmap page
1. Increasing participation routes	Feb 2019	26
2. Clearer accession requirements	April 2019	28
3. Aggregated BMU participation in balancing services	In progress	30
4. Improved and clearer communications systems requirements	Dec 2019	31
5. Simpler data submission process - currently required at GSP level	Aug 2018	32
6. Improved ESO ability to optimise and dispatch aggregated BMUs	Dec 2019	33
7. Clearer and simpler metering requirements	Early 2019	35
8. Support industry work on providing and delivering against PNs (Elexon led)	Dec 2019	36
9. Support industry work on accurate settlement for behind the meter (Elexon led)	Dec 2019	37

3. Improving systems and processes

Opening up markets is not just about ensuring frameworks are in place through codes and contracts. It is about making sure that systems and processes are fit for purpose. Therefore, we are addressing a number of challenges which will improve the dispatch experience for small and aggregated BMUs. These are as follows:

Table 3.4:
Commitments relating to
improving systems and
processes

Roadmap commitments (full list on page 21)	When will it be done by?	Roadmap page
4. Improved and clearer communications systems requirements	Dec 2019	31
6. Improved ESO ability to optimise and dispatch aggregated BMUs	Dec 2019	33
7. Clearer and simpler metering requirements	Early 2019	35

4 Our roadmap commitments to widen access to the Balancing Mechanism

After working with current and prospective providers, we've agreed to nine commitments in our roadmap out until April 2020 that we believe will improve existing markets, create new routes to market, and improve our IT communications. This section will talk through the commitments shown in Table 4.1 below in more detail, explaining what the initial issue is, what we're doing to resolve it, and key dates.

Overview of our nine roadmap commitments

Table 4.1:
Overview of nine roadmap commitments

Roadmap commitments	Description	When will this be done by?	Roadmap page
1. Increasing participation routes	Allow parties to participate in the BM without becoming a supplier and being responsible for overall energy balance of the sites where their units are located	Feb 2019	26
2. Clearer accession requirements	Ensure clear and proportionate arrangements to tie parties into relevant GB codes and BM obligations.	April 2019	28
3. Aggregated BMU participation in balancing services	Better clarity around how providers move from non-BM to BM ancillary service contracts.	In progress	30
4. Improved and clearer communications systems requirements	Use better technology to reduce cost and time it takes to install communication system between the ESO and BM providers.	Dec 2019	31
5. Simpler data submission process - currently required at GSP level	Allow BM participants to submit data at an aggregated BMU level rather than locationally specific.	Aug 2018	32
6. Improved ESO ability to optimise and dispatch aggregated BMUs	ESO systems in place to better dispatch aggregated BMUs.	Dec 2019	33
7. Clearer and simpler metering requirements	Use different technology to reduce the costs to providers for submitting operational metering data to the ESO control room.	Late 2018	35

Roadmap commitments	Description	When will this be done by?	Roadmap page
8. Support industry work on providing and delivering against PNs (Elexon led)	Provide a mechanism for aggregated BMUs to submit accurate predicted generation profiles (PNs).	Dec 2019	36
9. Support industry work on accurate settlement for behind the meter (Elexon led)	Provide a way to accurately determine how much energy an aggregated BMU has delivered at their connection point to the distribution system.	Dec 2019	37

Overleaf, figure 4.2 shows where each commitment sits as part of the end to end Balancing Mechanism process.

Commitments to enable wider BM access

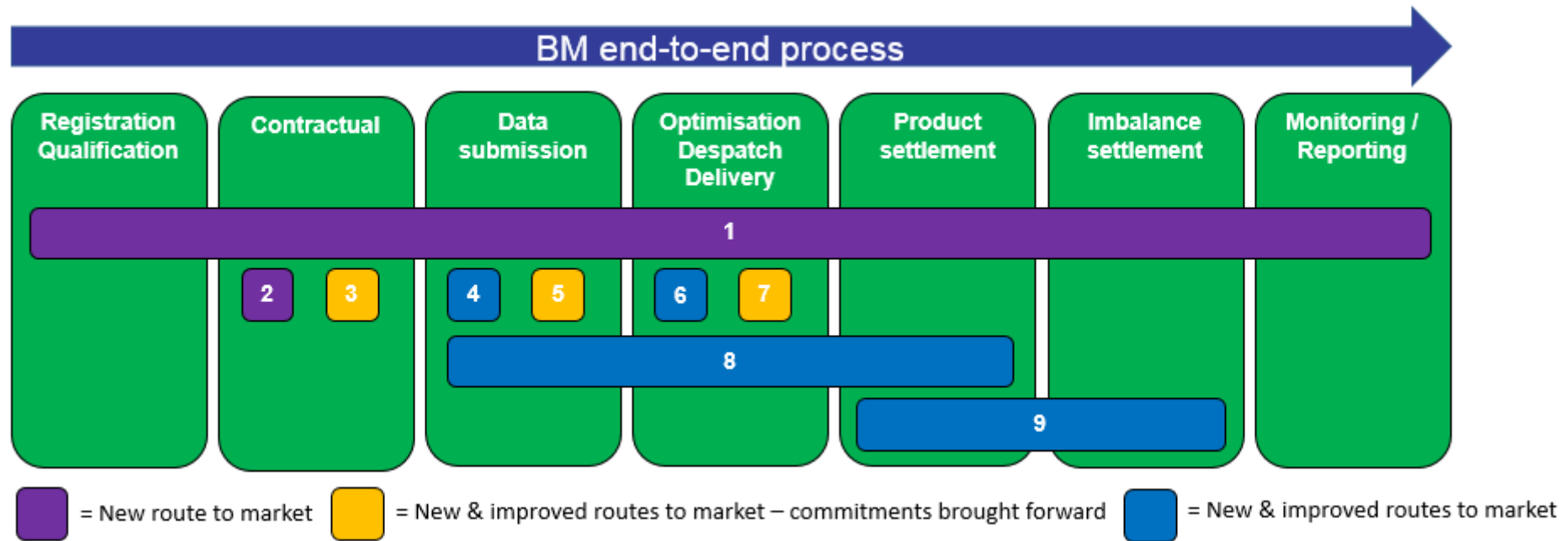


Figure 4.2 Main challenges in facilitating wider access relating to the BM end to end process

1. Increased participation routes
2. Clearer accession requirements
3. Aggregated BMU Participation in Balancing Services
4. Improved and clearer communications systems requirements
5. Simpler data submission - currently required at GSP level
6. Improved ESO ability to optimise and dispatch aggregated BMUs
7. Clearer and simpler metering requirements
8. Support industry work on providing and delivering against PNs
9. Support industry work on more accurate settlement for behind the meter

What are our commitments?

1. Increasing participation routes

Allow parties to participate in the BM without becoming a supplier and being responsible for overall energy balance of the sites where their units are located

The issue

The supplier route is currently the only way for parties to create active BMUs for meters registered within supplier portfolios (Supplier Volume Allocation). Through this route suppliers register Additional BMUs for active BM participation, and are responsible for overall energy balance of the sites where their units are situated. This is referred to as being a Balance Responsible Party. This means they are responsible for ensuring each unit within the BMU is balanced, and will pay imbalance charges if not. This arrangement may not work for independent aggregators, who may not want to take on full imbalance responsibility for the unit.

What is being done?

BSC modification P344¹³ creates a new route to market, where providers do not need to be a licenced supplier to create aggregated BMUs. It creates a new type of BSC participant, a 'Virtual Lead Party' (VLP). VLPs can create a "Secondary BMU" (minimum size 1MW). Whilst Secondary BMUs can be individual units they can, similarly to Additional BMUs be aggregated across a GSP Group level (please see chapter 2 for more information on GSP Groups).

These new Secondary BMUs created under P344 can be used in the BM and to provide the new TERRE service. Implementing a new type of BMU is complex and Elexon have recently started five industry working groups to look at additional implementation activities for P344.

Under this model Virtual Lead Parties do not become full Balance Responsible Parties. Secondary BMUs are intended only for the delivery of balancing services. The responsibility for ensuring units within a Secondary BMU are balanced will continue to sit with the registered supplier of each site at which a unit is located.

How these arrangements work contractually is set out in Figure 4.3.

¹³ <https://www.elexon.co.uk/mod-proposal/p344/>

Figure 4.3
Contractual arrangements for
Virtual Lead Party BMUs



The key milestones relating to delivering against this commitment are shown in table 4.4 below.

Table 4.4: Key milestones relating to increasing participation routes

Key Milestones		
Activity	Expected Date	Activity ref. in roadmap
Expected P344 decision	August 2018	A1
P344 workstream industry working groups	Started July 2018	A2
P344 implemented (subject to approval)	February 2019	A3

2. Clearer accession requirements

Ensure clear and proportionate arrangements to tie parties into relevant GB codes and BM obligations.

The issue

Parties wishing to become BM participants are required to have a contract with the ESO. These contracts set out the relationship between the provider and the ESO relating to required systems and processes for active BM participation. They also tie parties into relevant obligations in the CUSC and Grid Code which govern the cross-industry arrangements relating to BM participation.

BSC modification P344 will create Virtual Lead Parties (VLPs) as a new type of market participant under the BSC. However, there is currently no provision in the CUSC for VLPs as they are a new type of participant, so they would not have the correct framework obligations to allow participation in the BM.

What is being done?

CUSC modification CMP 295 seeks to create a contract under the CUSC for VLPs. This contract would tie them into the relevant parts of the CUSC and the Grid Code relevant to BM participation. Modification CMP 295 entered workgroup development phase on 12 July 2018.

Parties wishing to create aggregated BMUs should be obligated to fulfil similar technical requirements for similar types of units whether they are a supplier or independent aggregator. This is because similar types of units would be expected to have a similar effect on the system. In the future, a follow up modification may be required to facilitate supplier route BM participation within the CUSC to replicate any suitable arrangements developed under CMP 295. In the interim to these changes, arrangements for supplier aggregated Additional BMUs over and above current CUSC supplier provisions will be addressed bilaterally.

CMP 296¹⁴ and 297¹⁵ are facilitative modifications. CMP 297 proposes to define the concept of Virtual Lead Party within the CUSC. CMP 296 proposes to Virtual Lead Parties from Balancing Services Use of System¹⁶ (BSUoS). This facilitates a level playing field by ensuring BSUoS liabilities which will already sit within the portfolio of the supplier who is balance responsible for the unit is not double charged. These modifications are currently awaiting an Ofgem decision and subject to approval should be implemented in April 2019.

¹⁴ Further information on CMP296 can be found at <https://www.nationalgrid.com/uk/electricity/codes/connection-and-use-system-code/modifications/aligning-cusc-bsc-post-p344>

¹⁵ Further information on CMP297 can be found at <https://www.nationalgrid.com/uk/electricity/codes/connection-and-use-system-code/modifications/aligning-cusc-and-bsc-post-terre>

¹⁶ Further information on BSUoS can be found at <https://www.nationalgrid.com/uk/electricity/codes/connection-and-use-system-code?overview>

The key milestones relating to delivering against this commitment are shown in table 4.5 below.

Table 4.5: Key milestones relating to clearer accession requirements

Key Milestones		
Activity	Expected Date	Activity ref. in roadmap
CMP295 workgroup commences	Commenced July 2018	A4
CMP296/297 submission to Authority	Submitted to Ofgem July 2018	A5
CMP295 submission to Authority	January 2019 tbc	A6
CMP 295/296/297 implementation (subject to approval)	April 2019	A7

3. Aggregated BMU Participation in Balancing Services

Provide clarity around aggregated BMUs participation in balancing services

The issue

Wider access to the BM should allow most balancing services (otherwise termed ancillary services such as STOR, Fast Reserve, Frequency Response etc.) to be delivered through the mechanism of BMUs in the longer term. However, current system and contract structures need to be developed for aggregated units to participate in a world of aggregated BMUs. Due to the scale of the changes that are required across multiple services, we anticipate this will be a phased approach and will aim to introduce an interim approach in order to ensure providers can stack as many revenue streams where possible.

What is being done?

To ensure the market is aligned with future wider access goals, we are reviewing balancing services Standard Contract Terms (SCTs), with the view to amend them. Currently, we are reviewing how the SCTs and framework agreements could better facilitate the introduction of aggregated BMUs. We have sought feedback from industry on this through the recent Outline Change Proposals (OCP) process for the tendered STOR¹⁷ and FFR¹⁸ markets.

Our next step in this process is to consider the responses and then to update the market on how we intend to deliver a smooth transition from the non-BM to BM market. Our ultimate goal is to move non-BM contracts into BM contracts but system and process changes will be required. These changes will need to ensure the correct data flows are in place for our operational and settlement systems.

In the interim to finalised proposals on non-BM to BM contract transition, we are looking at interim ways to achieve our goals under relevant service OCP processes. Please look to these in the first instance for updates in this area.

The key milestones relating to delivering against this commitment are shown in table 4.6 below.

Table 4.6: Key milestones relating to enabling ancillary service contract transition

Key Milestones		
Activity	Expected Date	Activity ref. in roadmap
Change proposal processes for STOR and FFR	Undertaken June/July 2018	A8
Fast Reserve service terms revision process	August 2018 tbc	A9
Further communication to industry on next steps	Q3 2018	A10

¹⁷ Further information on STOR service terms can be found at <https://www.nationalgrid.com/sites/default/files/documents/STOR%20OCP-09%202018.pdf>

¹⁸ Further information on FFR service terms can be found at <https://www.nationalgrid.com/sites/default/files/documents/FFR%20OCP%2018%20-%20EXT%20-14.06.2018..pdf>

4. Improved and clearer communications system requirements

Utilise new technologies reducing cost and time to install for providing communications links between the ESO and BM providers.

The issue

The Grid Code requires BM participants to ensure appropriate electronic communications facilities are in place. This allows required BM data to be provided to the ESO control room, while also allowing the ESO control room to dispatch BM participants. Currently the direct communications lines between the provider and the ESO control room are called Electronic Dispatch Logging (EDL) and Electronic Dispatch Transfer (EDT). Feedback from market participants tells us that installing these physical communications lines to multiple smaller units would be prohibitively costly and time consuming.

What is being done?

There have been significant technological advances in recent years which provides an opportunity to see if we can do things more efficiently in this space. We are exploring alternatives to EDL/EDT for the implementation of the wider access enduring solution by the end of 2019. More information will be available to industry in the coming months and shared with stakeholders through a quarterly IS Change Forum. These events are anticipated to continue through the life of the project.

In the interim to new IT arrangements being in place, parties entering via the supplier route will be required to meet existing requirements with regards to the installation of EDL/EDT.

The key milestones relating to delivering against this commitment are shown in table 4.7 below.

Table 4.7: Key milestones relating to improved and clearer communication systems requirements

Key Milestones		
Activity	Expected Date	Activity ref. in roadmap
First IS Change Forum – sharing plans with Industry	Held 4 July 2018	A11
Developing systems solutions for wider access (including EDL/DT alternative)	July – December 2018	A12
Draft IT user specs available to Industry	Q1 2019	A13
Testing and improvement of IS solutions	Q1-2 2019	A14
Final IT user specs available to Industry	Q3 2019	A15

5. Simpler data submission process- currently required at GSP level

Allow BM participants to submit data at an aggregated BMU level rather than locationally specific.

The issue

A Grid Supply Point or GSP is the point of entry to the transmission system. The Grid Code requires BM Participants to submit relevant data to the ESO such as Bid/Offer data, Physical Notifications etc. at a GSP level. The requirement for submitting data at a specific location does not work for aggregated BMUs which by nature are locationally spread.

What is being done?

Grid Code modification GC0097 introduces changes enabling the submission of aggregated BM participant data to the ESO across a whole BMU, which should reduce cost and complexity for providers. For parties with aggregated Additional or Secondary BMUs, data can be sent on a whole BMU basis. This is over a maximum geographical area of GSP Group. More information on the rationale for GSP Group aggregation can be found in the next section on page 31.

Parties wishing to create aggregated BMUs prior to the implementation of GC0097 will be required to submit data at an individual GSP level.

The key milestones relating to delivering against this commitment are shown in table 4.8 below.

Table 4.8: Key milestones relating to simpler data submission process – currently required at GSP level

Key Milestones		
Activity	Expected Date	Activity ref. in roadmap
GC0097 approval	August 2018	A1
GC0097 implementation (subject to approval)	August 2018 tbc	A16

6. Improved ESO ability to optimise and dispatch aggregated BMUs

ESO systems in place to more easily optimise and dispatch aggregated BMUs.

The issue

BMUs are predominantly dispatched in a price merit order, considering the technical parameters and system conditions. There are three main factors which affect the control room's ability to dispatch BMUs in operational timescales (Figure 4.9).

Figure 49:
Factors affecting BMU ease of dispatch



When dispatching BMUs, the ESO control room do not discriminate based on size. However, in certain operational scenarios large volumes of energy are required within short timescales to meet system needs. In these situations, it is not physically possible for a control engineer to issue many small instructions using current systems and processes.

The ESO control room take the location of BMUs into consideration when scheduling and dispatching BMUs. This could be for local system reasons or an energy balancing action when there are network constraints. Dispatching an aggregated BMU and causing a constraint to worsen would require further action and associated costs to alleviate it. This would not deliver the best value for end consumers. The location of existing traditional BMUs is known to the control room, which means the impact of taking any specific action is also known. However, aggregated BMUs may result in energy being delivered at different GSP locations within their GSP group area.

The maximum size of aggregated BMUs was debated widely through discussions on BSC modification P344 and Grid Code modification GC0097. For the ESO control room, the more locational a unit is, the easier it is to understand the impact on the system. For stakeholders, the ability to aggregate up to as large a level as possible to release efficiencies in batching volumes of MW was important. A compromise was agreed that aggregated BMUs could be aggregated to a GSP Group level to align with other types of supply BMUs (see chapter 2). However, the ESO control room still requires information on location for these BMUs to reduce the likelihood of inefficient dispatch.

What is being done?

Grid Code modification GC0097 changes require all aggregated BMUs (for either suppliers with Additional BMUs or Virtual Lead Parties) to submit an Aggregator Impact Matrix at 11:00hrs at the Day Ahead stage, indicating the GSPs where energy will be delivered. This will allow the ESO to understand the risks and impacts of dispatching each aggregated BMU.

Market Participants using the wider access route will be assessed in economic merit order for dispatch consistently with other Market Participants in the Balancing Mechanism. For parties entering the BM via the supplier route in advance of the full wider access solution implementation, aggregated units with sub-units behind a live TSO/DSO constraint may not be dispatched.

The key milestones relating to delivering against this commitment are shown in table 4.10 below.

Table 4.10: Key milestones relating to improved ESO ability to optimise and dispatch aggregated BMUs

Key Milestones		
Activity	Expected Date	Activity ref. in roadmap
First IS Change Forum – sharing plans with Industry (will continue throughout project)	First held 4 th July 2018 (quarterly)	A11
Developing systems solutions for wider access (including EDL/DT alternative)	July – December 2018	A12
Testing and improvement of IS solutions	Q1-2 2019	A14
Wider access go-live	December 2019	N/A

7. Clearer and simpler metering requirements

Utilise new technologies to reduce cost for providers to submit operational metering to the ESO control room.

The issue

BM participants are required to send operational metering to the ESO. This ensures that the delivery of an accepted instruction to a BMU can be monitored by the ESO in real time.

Whilst operational metering systems are currently in place for transmission connected generation, these arrangements are not easily transferrable to aggregated units, and would be costly to replicate. The ESO currently receives operational metering from non-BM market participants such as STOR providers, however this does not meet the same standards as BMUs and does not feed directly into BM systems.

What is being done?

We are currently exploring alternative routes through which operational metering for aggregated BMUs can be submitted, that is suitable for all types of aggregated BMUs and harnessing new developments in technology.

There may be opportunities for providers to test new solutions being developed prior to Q4 2018. The suitability for this will be discussed on a case by case basis with interested providers. Please contact your Account Manager if you wish to know more.

The key milestones relating to delivering against this commitment are shown in table 4.11 below.

Table 4.11: Key milestones relating to clearer and simpler metering requirements

Key Milestones		
Activity	Expected Date	Activity ref. in roadmap
Operational metering solution development	Summer 2018	A17
Operational metering solution specs available	November 2018	A18
Operational metering solution go-live	Q4 2018 – Q1 2019	A19

8. Support industry work on providing and delivering against Physical Notifications (PNs) (baseline)

Provide a mechanism for aggregated BMUs to submit accurate predicted generation profiles (PNs).

The issue

The Grid Code sets out data requirements from BM participants, which enable the ESO control room to make scheduling and dispatch decisions. One of these is the declaration of Physical Notifications (PNs). PNs are the planned profile of a BMUs generation / consumption during a given settlement period. Once PNs have been declared, BM participants are expected to deliver against their PN unless instructed otherwise by the control room. These PNs are also sent to Elexon to form a Final Physical Notification (FPN), which is used as a baseline for settling Bid Offer Acceptances. This requirement will remain for all parties with active and dispatchable BMUs including supplier Additional BMUs and Virtual Lead Party Secondary BMUs.

Providing and delivering in line with PNs poses a challenge for some providers. In some cases, BMU PNs would be a collation of PNs from their composite sites, which may have both generation and consumption. This means the PNs are more likely to fluctuate and be inaccurate. Inaccurate PNs are problematic for the ESO as it is difficult to understand what a BMU will do in any given period. They could also lead to non-delivery of service charges for the BMU responsible party.

What is being done?

BSC Issue Group 71¹⁹ has been raised by Elexon to explore if alternative baselining methodologies could be used instead of the current process for determining PNs. This work is led by Elexon as Code Administrator for the BSC and the ESO commit to participate in these cross-industry discussions.

BSC Issue Groups are not formal change processes, and formal modifications would need to be raised if industry felt there was sufficient need to address the issues. Until any changes result from this, parties are still expected to meet current obligations.

The key milestones relating to delivering against this commitment are shown in table 4.12 below.

Table 4.12: Key milestones relating to improved ESO ability to optimise and dispatch aggregated BMUs

Key Milestones		
Activity	Expected Date	Activity ref. in roadmap
BSC Issue group 71 (Elexon led)	First meeting held 11 th July 2018 Continuing summer 2018	A20

¹⁹ Further information on BSC Issue Group 71 can be found at <https://www.elexon.co.uk/smg-issue/issue-71/>

9. Support industry work on more accurate settlement for behind the meter assets

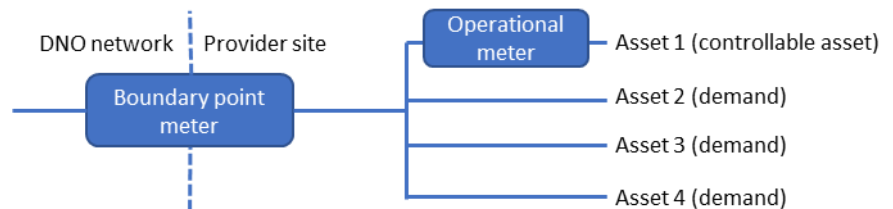
Provide a way to accurately determine how much energy an aggregated BMU has delivered at their connection point to the distribution system.

The issue

The settlement boundary meter is at the point where a distributed provider connects to the DNO network. There may be several sub-assets, each with their own operational meter behind such a boundary meter (Figure 4.12). If a party's Final Physical Notifications do not match the energy volumes metered at this point they will be charged for non-delivery of balancing services.

Stakeholder feedback indicates an increasing number of providers are looking to aggregate smaller units, co-sited with other units behind a settlement meter and would like to use these within a BMU.

Figure 4.12: Example of assets behind the boundary point meter



Under current proposals for wider access, only units where BMU delivery can be measured at a settlement meter level can be accurately settled financially.

What is being done?

BSC Issue Group 70²⁰ was raised by Flexitricity to explore how settlement can obtain appropriate metering data and allow sub-sites 'behind the meter' to provide balancing services through the BM. This work is led by Elexon as Code Administrator for the BSC and the ESO commit to participate in these cross-industry discussions.

BSC Issue Groups are not formal change processes, and formal modifications would need to be raised if industry felt there was sufficient need to address the issues. Until any changes result from this, parties are still expected to meet current obligations

Table 4.13: Key milestones relating to more accurate settlement for behind the meter assets

Key Milestones		
Activity	Expected Date	Activity ref. in roadmap
BSC Issue group 70 (Elexon led)	First meeting held 11 th July 2018 Continuing summer 2018	A19

²⁰ Further information on Issue Group 70 can be found at <https://www.elexon.co.uk/smg-issue/issue-70/>

5 Summary

Underpinning this roadmap is our desire for a Balancing Mechanism that is open to all technologies and providers, and with no significant barriers to entry. We want the BM to be competitive and robust enough to continue to be a core ESO tool for managing the system. We believe that equal treatment of providers within and outside the BM should come hand in hand with equal access to the BM. We are coordinating our work to achieve this and ensure that these changes are delivered in a holistic fashion.

This document has outlined how we are working to remove barriers to entry for parties currently outside the BM to transition to active BM participation. This work is being carried out through creating a new route to market alongside implementing European legislation, and in the interim bringing forward as many of the changes as possible to ensure smooth market entry for suppliers wishing to create aggregated Additional BMUs. We are also proposing IT developments to help BM access run more smoothly for smaller and aggregated providers.

The changes being implemented are the most significant reform of central BM arrangements since NETA in 2001 and the challenges are complex and varied. It is a key part of our commitment to creating an open and level playing field for all providers and technology types, supporting delivery against Principles 1, 2, 3 and 4 of the ESO Forward Plan.

How to stay involved

We appreciate that this is a complex topic covering a wide variety of framework, process and system changes delivered over a range of timescales. To keep stakeholders updated on the progress we are making to facilitate wider access we will be engaging with parties and disseminating information through a variety of means. We will be giving updates when there is new information to share at events such as Power Responsive and the Operational Forum. We acknowledge that not all parties are able to attend these events and will be working with trade associations to ensure their members receive the information they need, whilst also maintaining up to date information on our website.

We also encourage parties to get involved in the debates around the relevant code modifications, and change forums:

- BSC Issue Groups 70 and 71
- CMP295 workgroup
- P344 workstream industry working groups
- IS Change Forums

We look forward to working with industry over the next few months in the delivery of this roadmap. We hope we can address these challenges together to deliver a strong robust Balancing Mechanism, which meets operability needs whilst delivering efficient markets and value for end consumers.