Guidance for Electricity Distribution Flexibility Service Providers

V1.1

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Electricity Distribution

nationalgrid

Contents

Introduction

This guide for Flexibility Service Providers (FSPs) has been created to provide a clear view of how we procure Flexibility Services at National Grid Electricity Distribution.

The guide is split into chapters, each focussing on different key areas of the procurement and operational process, but highlights and informs where processes are interrelated. The high level process is summarised below.
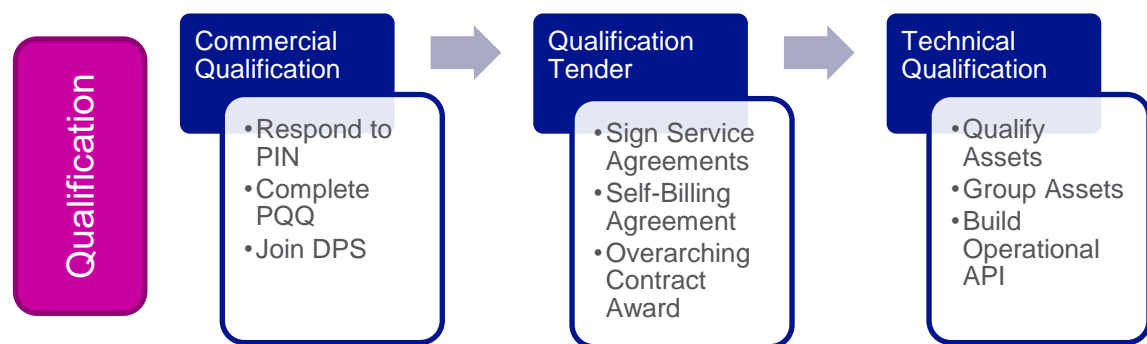

Figure 1: Overview of our qualification processes

Qualification enables the eligibility of FSPs and their Assets ready to Trade. This involves the commercial aspects; agreeing to the Flexibility Service Agreement and receiving an Overarching Contract and the technical aspects; building logical asset groupings, and the required API links to the operational portal (the Flexible Power Operational Portal).
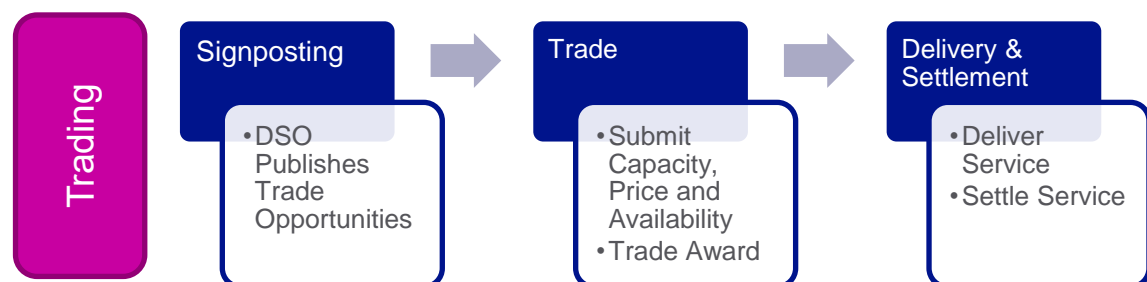

Figure 2: Overview of our trading processes

Trading is how we show our needs for products and how FSPs respond to those needs. We accept or reject those responses, utilise the service and then settle any payments.

The focus of this document is on how we procure Flexibility Services. For more details on where we procure, please see the publications detailed in the diagram below.
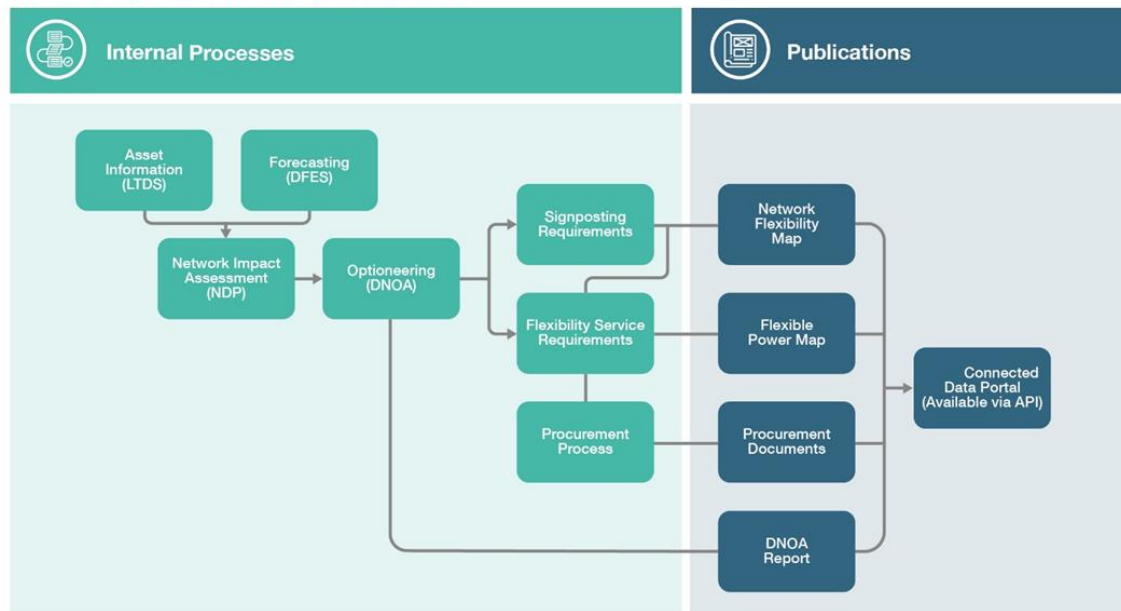
Flexibility Service Requirements

Figure 3: Network Requirement publication and signposting

A full catalogue of the data and documentation relating to flexibility we publish is available here; https://flexiblepower.wpdserv.net/downloads/1120

Most of this data is available on the Flexible Power Website: www.flexiblepower.co.uk/national-grid-electricity-distribution with raw data published on our Connected Data Portal http://connecteddata.nationalgrid.co.uk/

Our flexibility team can be contacted at: **NGED.Flexiblepower@nationalgrid.co.uk**

Changes to this document

National Grid may update this guidance from time to time. Should you have any suggestions on changes, please contact: NGED.Flexiblepower@nationalgrid.co.uk.

Commercial Qualification

The Commercial Qualification processes adopted by National Grid for the procurement of its distribution flexibility needs have been designed to ensure adherence to UK procurement regulations (as defined in the Utilities Contract Regulations). The processes are facilitated through the Market Gateway, which offers a simple and low barrier route for FSPs to qualify for an Overarching Contract.

All FSPs awarded an Overarching Contract are then eligible to complete the Technical Qualification processes and ultimately enter into Trades where they will bid to deliver flexibility services in response to the publication of our flexibility requirements.

Commercial Qualification can be completed at any time, it is always open.

The Market Gateway has been developed to support the contracting, and technical on-boarding processes FSPs are required to complete to enable their eligibility to provide distribution flexibility services to National Grid. FSPs wishing to enter the process should visit https://marketgateway.nationalgrid.co.uk/ to request and account for their organisation.

Below is a summary of the process steps within Commercial Qualification;

Periodic Indicative Notice (PIN) response

The PIN response is simply an expression of interest to provide services.

To join the DPS, interested parties must first register their interest in response to our Annual PIN (published on the UK governments My Tenders site) on our Market Gateway. This involves simple confirmation of company details and registering formal interest in the PIN. This starts registration to the DPS.

This PIN response only needs to be completed once.

Registration to the PIN does not commit either party to flexibility service provision.

Pre-Qualification Questionnaire (PQQ)

Following the PIN response the FSP must complete the PQQ on the Market Gateway.

This requires confirmation that the FSP meets the minimum requirements for participation in flexibility services. These are:

1. Commitment to build the Flexible Power API
2. Ability to provide relevant metering data over the API
3. Asset ability to respond to a dispatch signal within 15mins and hold a response for minimum of 30mins.

There are also a number of mandatory questions specified in the Utilities Contract Regulations that cover mandatory ineligibility, discretionary grounds for rejection, and confidentiality requirements. The FSP must confirm their acceptance and adherence to these.

Once the PQQ is complete, the FSP can then continue to the Qualification Tender.

Qualification Tender

In order to receive and Overarching Contract, FSPs will be invited to respond to the Qualification Tender. The Qualification Tender requires the FSP to agree to the Flexibility Service Agreement within the Market Gateway, the Service Agreement is broken down into six sections which are;

1. The Glossary to the General Terms and Conditions
2. The General Terms and Conditions
3. The Service Terms

4. Annex 1 - Flexibility Management System
5. Annex 2 – Trade Rules
6. Annex 3 – Special Requirements

Each section must be agreed.

The full Service Agreement can found on the [Flexible Power Website](), for review ahead of completing the agreement within the Market Gateway.

Once the Flexibility Service Agreement is accepted, the FSP must then confirm acceptance of a Self-Billing agreement. This allows us to raise invoices on the FSP's behalf. See the Billing Process section for more details.

Finally, the FSP will be directed to download a Supplier Details form. This form is used to gather the FSPs billing information, it must be completed and returned to [NGED.Flexiblepower@nationalgrid.co.uk](). The FSPs tender submission for an Overarching Contract will not be actioned by National Grid until they are in receipt of the Supplier Details Form.

Following receipt of the Supplier Details Form, National Grid will issue a formal Overarching Contract Award. Issue of the Contract Award will also trigger Portal Account set-up, providing FSPs with access to the API set-up and testing environments. See the Technical Qualification Chapter for more details.

Upon issue of the Contract Award, a 10 day standstill period will commence. During this time Users are unable to access Trades. The standstill period does not affect a User's access to Technical Qualification.

Technical Qualification

Technical Qualification ensures FSPs are ready to conduct Trades.

It includes the registration and validation of assets, the creation of logical grouping of these assets, and building out the API to our operational portal so that start stop signals can received and metering data can be shared for verification and settlement purposes.

Asset Registration & Management

The first step is for the FSP to register assets on the Market Gateway.

An Asset is the smallest entity that we consider on the Market Gateway. It is used to represent the lowest level at which the FSP can meter. This could either be an individual or combination of machines/Low Carbon Technologies (LCTs) depending on the metering location.

A few examples of asset include:

- A grid scale battery with metering at either the asset level or the Point of Connection.

- A single generator if using DER Level metering, or all generators on site if using Point of Connection metering

- Individual EV charge points or Heat Pumps with DER Level metering, or a property with its associated Low Carbon Technologies, with Point of Connection metering.

Collecting information at this level of granularity helps us to better understand, and validate where the flexibility we are procuring is coming from. It feeds into the baselines we use and into elements or reporting, such as on the carbon intensity of our service.

The information required to register an Asset includes:

- The location of the asset
- The MPAN(s)/MSIDs associated with the asset
- The technology types
- The peak capacity (in MW)

These assets are then validated by National Grid. Once validated we assign the links to CMZs as well as ensure that there are no duplicate assets. Where there is duplication, we will work with both FSPs to agree ownership. We will build out a more extensive process in due course.

It should be noted that **we will not allow multiple assets on a single site (behind a single MPAN) if any of them have point of connection metering**. In this case, they would be combined into a single asset to avoid any risk of double counting performance.

Assets can be edited on the Market Gateway subject to revalidation and the **Error! Reference source not found.**. **It should be noted that changes to Assets, may impact existing Trades where the change in the Asset has an impact on the baseline.**

More details on this process can be found on the Market Gateway.

Creating Meterable Units

Once Assets have been approved they need to be assigned into logical groups.

These logical groups, called Meterable Units, are used to group assets into a joint metering feed. Baselining is also applied at the Meterable Unit level.

The FSP will need to create a metering API for each Meterable Unit.

A number of Meterable Units can be combined into a single Trade Response to allow delivery risk to be shared across them. This is the level at which Pricing, Availability and Settlement are run. The logical grouping or Meterable Units in a Trade Response can be referred to as a Trade Dispatch Groups. More details on Trades can be found in the later chapters of this guidance.

The links between Assets, Meterable Units and Trade Responses as shown in the diagram below.
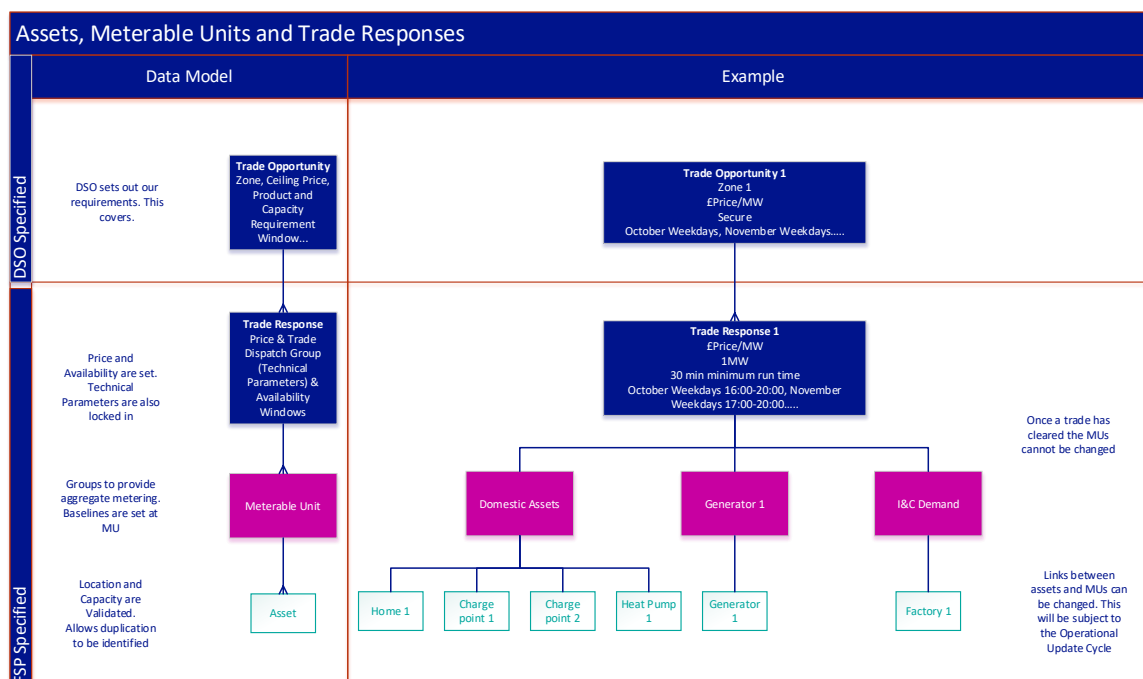
Figure 4: Links between Assets, Meterable Units and Trade Responses.

It should be noted that a direct one to one relationship between the MU and Trading Response can be, and often is, specified.

FSPs can create and edit MUs on the Market Gateway. These are then transposed to the Flexible Power Operational Portal by the DNO subject to the **Error! Reference source not found.**. **It should be noted that changing MUs can have an impact on existing Trades, if the changes impact the baseline to be used. As such care should be taken when making changes.**

Due to the interaction with Baselining and Metering requirements, there are a number of restrictions on the technologies that are able to be mixed within a single MU. These are detailed in the table below.

ASSET TYPES	IS GROUPING ALLOWED?
Industrial or Commercial Demand	No
All other categories	Yes

Operational Period and Update Cycle

As detailed in the section below, we use the Flexible Power Operational Portal as our operational tool.

This currently works on an operational week (Monday-Sunday). This means that availability declarations and technical parameters are specified on a weekly process. As an example the provider can set a maximum weekly run time. This operational week is proceeded by a cut off for changes, currently set at 00:00 on Thursday Morning.

A Longer term Trade is effectively made up of a number weekly Operational Periods.

The parameter is important as any changes to MUs only come into effect for the following Operational Period. This should be factored in when making changes to Assets and MUs.

Whilst this is specified by our current tooling we see this as a parameter of the trade, and could be updated in the future. By default it will be set at weekly.

To manage the number of changes, we currently join a number of Operational Periods together in our Operational Update Cycle. This defines when changes can be made, and when they will be implemented:

- Assets and MUs can be changed up to 23.59 on the second from last Tuesday of the month

- The DSO then has until the 23.59 on the last Tuesday of the month to approve/reject these changes

- The FSP will need to adapt their Reading API (see APIs section) to cover the new Assets.

- The changes will come into force on the first Monday of the next month.

- Subsequent changes can be made as soon as the DSO has completed the previous changes. These will fall into the next Operational Update Cycle.

Flexible Power Operational Portal Set Up and Integration

The Flexible Power Operational Portal is the operational platform through which we collect metering data, send Utilisation Instructions and calculate settlement. It is a key part of the operational side of a Trade.

Portal Access

Once the Qualification Tender is complete, and we have received your billing information, we will request a list of users for the Flexible Power Operational Portal and grant access. The users should be emailed once they have been granted access.

The user should then visit; https://flexiblepowerportal.co.uk/ to access the portal.

APIs

An Application Programming Interface (API) is a software intermediary that allows two applications to talk to each other.

The API removes the requirement for dedicated DSO hardware to be connected at an FSP site in order to collect the metering data and receive instructions from a DSOs control systems.

There are a large variety of DER control arrangements, ranging from a single asset such as a standalone generator through to a complex estate with multiple assets or even part of a portfolio under management by a commercial aggregator. Therefore, FSPs are required to implement their own interface for the API to their DER control.

The Flexible Power API covers 3 key areas:

1. The collection of metering from the FSP to the DSO via the readings API. This is built of 2 sub APIs to collect either minute by minute or half hourly metering data. This needs to be built out **per MU**.

2. The sending of Utilisation Instructions from the DSO to the FSP via the Dispatch API. This needs to be built out **per Trade Dispatch Group**. Within the signal it will detail the component MU IDs.

3. The sending of an Emergency Stop from the FSP to the DSO via the Stop API. This is implemented at **MU level**.

4. In addition to the API process we also accept metering data in the form of a CVS upload. Details for this process can be found in the FAQ section of the Documentation page of the Flexible Power Portal; [Flexible Power - Frequently Asked Questions (flexiblepowerportal.co.uk)](flexiblepowerportal.co.uk)

The latest definitions of each API, including the surrounding authentication are available on the [Flexible Power Operational Portal](#).

The APIs to be implemented vary depending on the Product and Asset types being utilised. These are summarised in the table below.

	SUSTAIN	SECURE	DYNAMIC	RESTORE
Readings (used for minute by minute metering)	Not Required (unless not providing HH metering)	Required (for all but Domestic MUs, which must have the option of the "/energy" API)	Required	As per Secure or Dynamic (as applies in the zone)
Readings/energy (used for HH metering)	Required (unless using minute by minute)	Only permitted for domestic MUs	Not permitted	As per Secure or Dynamic (as applies in the zone)
Dispatch (both Start and Stop)	Optional	Required	Required	Required
Stop (for emergency stop)	Optional	Optional	Optional	Optional

It should be noted that for the Readings API, whilst we would prefer to collect data in a near real time stream, however we will accept the provision of batched data. This can be limited to the duration of events. All batched data must be received within 5 working days of operational month end.

The relevant IDs needed to implement the API are all provided within the Flexible Power Operational Portal.

Testing

Initially the FSP will be set up with just access to the Sandbox zone. This will allow them understand how the portal works and to test the APIs without any impact on the live zones.

A number of tools are provided within the portal to enable self-testing of the API. This include the ability to send simulated Dispatches and see the latest metering signals being received by the portal.

Once a Meterable Unit has been created, an associated Meterable Unit will be created on the Flexible Power Operational Portal. At this stage the MU IDs will be available for the FSP to set up their APIs. A Trade Dispatch Group will only be awarded post Tender Award.

A Meterable Unit will be considered ready for trades, once we can determine that the FSP can send data to it. We determine this as once we have seen at least 12 meter readings within the last 7 days.

Viewing Availability Acceptances

The declaration and acceptance of availability for FSPs is now carried out in the Trade. Acceptances will then be loaded into the Flexible Power Operational Portal by the DSO. Once loaded the, FSP can view these on the Flexible Power Operational Portal if desired. There may be a lag between the conclusion of the trade and the transfer onto the Flexible Power Operational Portal. The concluded Trades will be loaded into the Flexible Power Operational Portal no later than the start of the next Operational Update Cycle.

Trading

Products and Trades

Once the commercial and Technical Qualification aspects are complete (including the 10 day standstill post Contract Award), Trades can be entered into.

Our Products

To date we have procured three Active Power services: Secure, Dynamic and Restore. These align with the Open Networks Common Services definitions which were set out by Product 3 of WS1a in 2020. Going forwards we will be adding the fourth service, Sustain to our suite of services. These services are summarised in the figure below.
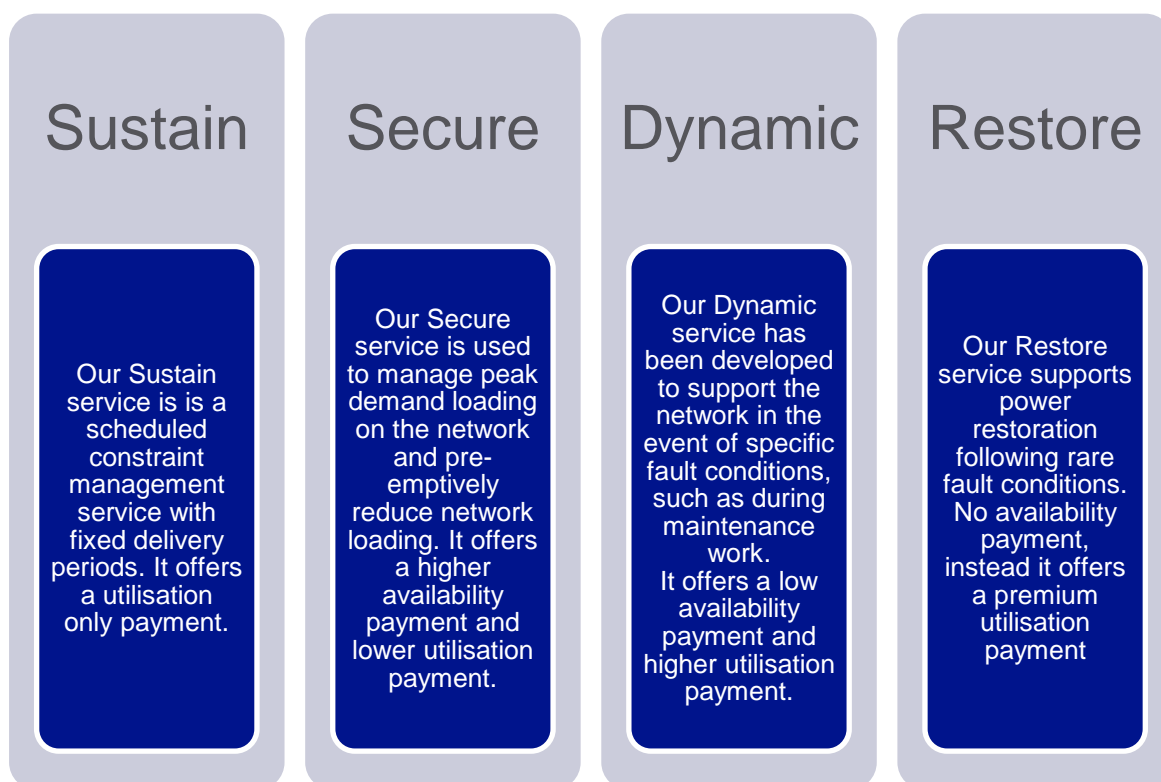
Sustain	Secure	Dynamic	Restore
Our Sustain service is is a scheduled constraint management service with fixed delivery periods. It offers a utilisation only payment.	Our Secure service is used to manage peak demand loading on the network and pre-emptively reduce network loading. It offers a higher availability payment and lower utilisation payment.	Our Dynamic service has been developed to support the network in the event of specific fault conditions, such as during maintenance work. It offers a low availability payment and higher utilisation payment.	Our Restore service supports power restoration following rare fault conditions. No availability payment, instead it offers a premium utilisation payment

Figure 5: Overview of our Flexibility Services

We currently only procure products for Active Power (in MW).

Our services have previously been focussed at managing constraints on the higher voltage levels (EHV and Primary networks). In addition to using the Sustain product for these voltage levels, we will also be using the Sustain Service to help us manage loadings on distribution transformers (HV/LV transformers).

Our suite of products is summarised in the table below.

Table 1: Product Summary

Products	Voltage of Constraint		Trading Timescale	
	EHV & EHV/HV boundary	HV & HV/LV boundary	Longer term (currently 6 months ahead)	Shorter term (currently weekly)
Sustain	✔	✔	✔	

Secure	✔		✔	Trades to launch later in 2023
Dynamic	✔		✔	Trades to launch later in 2023
Restore	✔		✔	Trades to launch later in 2023

There are many similarities between our Longer Term Secure and Sustain services. The key difference between the services is the level of targeting seen in the availability/utilisation windows. For Sustain will have common delivery windows that are common across all zones. For the Longer Term Secure, these will be zone specific windows. Where assets can be controlled in a more targeted way, we would expect them to opt in to Secure as it would require fewer hours of operation to deliver a similar revenue, however we see the value in simplified interactions possible through Sustain.

With the creation of new services we will have a number of variants of flexibility services, based on the four Open Networks core products. To simplify the number available in each zone we will continue our current approach of using either allocating a higher voltage zone Secure or Dynamic. The zone would feature both the long term and short term versions of these products. Sustain and Restore will be available in all zones. This allocation is shown in the table below.

Table 2: Products available in each type of higher voltage zone

Products	Secure EHV/HV Zone	Dynamic EHV/HV Zone	HV/LV zone
Sustain	Yes	Yes	Yes
Secure (longer term)	Yes	No	No
Secure (shorter term)	Yes (Trades to be launched later in 2023)	No	No
Dynamic (longer term)	No	Yes	No
Dynamic (shorter term)	No	Yes (Trades to be launched later in 2023)	No
Restore	Yes	Yes	No

All LV zones will only operate the Sustain service.

By default the commercial structure of our products are as below.

Table 3: Commercial structure for each product

Products	Availability Payment	Utilisation Payment	Subject to JUC
Sustain	No	Yes	No
Secure	Yes	Yes	No
Dynamic	Yes	Yes	Yes
Restore	No	Yes	No

What is a Trade?

Trades are the vehicle for the award of service windows. They form the detailed requirements for availability (and for some products utilisation). Once awarded, as well as service windows, a Trade

will specify the parameters for delivery; the expected volume of response, the assets being utilised and the associated price.

Trades are administered through the Market Gateway. Our Trades currently operate across two timeframes, short term (weekly) and long term (bi-annually).

A Trade has 3 sets of data:

- The Trade Opportunity, setting out the DSO's requirements

- The Trade Response, setting out the FSPs availability to deliver response to the requirements

- The Trade Award, the acceptance or rejection of the FSPs availability by the DSO and the specification of awarded parameters.

Trade Opportunity

A trade opportunity sets out the DSO's needs. This includes the following key data points:

Attribute	Description
Trade Opportunity Reference	The Unique ID for the Trade Opportunity
Trade Signposting Opening Date	When the trade is published
Trade Opening Date	When the trade opens
Trade Closing Date	When the trade closes
Trade Acceptance Date	When the trade will clear and results will be published
Operational Period	The timeframe in which operational changes can be made (see later section for more detail). By default this will be weekly.
Start Date	When the MW requirement of the trade starts
End Date	When the MW requirement of the trade ends
Ceiling Prices	The maximum price we are willing to pay
Pricing Mechanic	How pricing set. Will it use Pay As Clear or Fixed Pricing?
Location	The geographic bounds of the CMZ
Product Type	The product being purchased (Sustain, Secure, Dynamic, Restore)
Service Direction	The direction of the response required. Demand Turn Down (DTD)/Generation Turn Up (GTU) or Demand Turn Up (DTU)/Generation Turn Down (DTD).
Maximum MWh Requirement	The maximum volume to be procured in the Trade.
A number of Capacity Requirement Windows (See detail below)	The requirements for capacity over time. These will include a time series of maximum and minimum requirements. These will be grouped into windows.
Acceptable Baseline Options	Which baseline options are available for the Trade.

DSO requirements for flexibility are generally for a time series of data over time.

To allow FSPs to the respond we will group the requirements into Capacity Requirement Windows. Each Window is comprised of a daily profile of Delivery Periods accompanied by the dates and days the window applies to. The repetition of these windows will change depending on the specific needs of the trade, including for example the product and the timescales being procured in.

See below a few examples:

1. For our Sustain product, the requirements are consistent over the duration of the trade. As such the requirement would be for the one season long Capacity Requirement Window made up of 2 Delivery Periods (08:00-12:00 & 16:00-20:00). The Delivery Periods would be repeated for each weekday of the entirety of the Sustain Season. The Delivery Period is set at 4 hrs as the requirement is consistent across it and responses must cover the entirety of the requirement.

Table 4: Example Sustain Delivery Periods Requirement within Capacity Requirement Window 1

Delivery Period Start Time >=	06:00	16:00
Delivery Period End Time <	10:00	20:00
Minimum Requirement	0.5	0.5
Target Requirement	1	1
Maximum Requirement	1.5	1.5

Table 5: Example Capacity Requirement Windows repetition for a Summer Sustain trade

	MON, TUE, WED, THU & FRI
April, May, June, July, August & September	Window 1

2. For our Secure product, the requirements currently vary by weekday and month. As such we might have a separate window for each weekday in a month. In addition the Delivery Periods have been shortened to half hours to give more flexibility in response. This is highlighted in the diagram below.

Table 6: Example longer term Secure Delivery Periods Requirement within Capacity Requirement Window 1

Delivery Period Start Time >=	07:00	07:30	08:00	08:30	09:00	09:30	16:00	16:30	17:00	17:30	18:00	18:30	19:00
Delivery period End Time <	07:30	08:00	08:30	09:00	09:30	16:00	16:30	17:00	17:30	18:00	18:30	19:00	19:30
Minimum Requirement	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Target Requirement	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum Requirement	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5

Table 7: Example Windows repetition for a longer term Secure trade

	MON	TUE	WED	THU	FRI	SAT	SUN
April	Window 1	Window 2	Window 3	Window 4	Window 5	Window 6	Window 7
May	Window 8	Window 9	Window 10	Window 11	Window 12	Window 13	Window 14

June	Window 15	Window 16	Window 17	Window 18	Window 19	Window 20	Window 21
July	Window 22	Window 23	Window 24	Window 25	Window 26	Window 27	Window 28
August	Window 28	Window 29	Window 30	Window 31	Window 32	Window 33	Window 34
September	Window 36	Window 37	Window 38	Window 39	Window 40	Window 41	Window 42

Some Windows may have repeating requirements, however specifying them individually allows for more tailored responses as set out in the next section.

These are examples only. The specific windows and requirements will be defined in the Trade Opportunity.

Trade Response

The trade response is the FSPs response to the Trade Opportunity. It includes the following key data points:

Attribute	Description
Trade Response ID	The Unique ID for the Trade Response
Trade Opportunity ID	The ID of the associated Trade Opportunity
MU IDs	The Meterable Units Associated with the trade
Price	The price offered by the FSP
Capacity (MW)	The capacity being offered by the FSP. It should be noted this will be capped at the "Maximum Requirement"
Availability Declarations Windows (see the detail below)	This is the FSPs response to the windows or requirements in the Trade opportunity

The FSP has the ability to provide an Availability Declaration Windows in response to the DSO's Capacity Requirement Windows. This availability is copied across the window repetitions. The FSP can declare availability for any combination of the availability windows offered.

See the following example responses:

1. For the Sustain example the provider may only be available for the evening Delivery Period. This is the copied for the entire Capacity Requirement Window, which covers the whole season.

   Table 8: Example Sustain Availability Declaration Window 1

Delivery period Start Time >=	06:00	16:00
Delivery period End Time <	10:00	20:00
Available?	No	Yes

2. For the Secure example, in window 1 the provider may only be available for the early evening on Mondays in April, but all day on the Tuesdays.

Table 9: Example longer term Secure Availability Declaration Window 1

Delivery period Start Time >=	07:00	07:30	08:00	08:30	09:00	09:30	16:00	16:30	17:00	17:30	18:00	18:30	19:00
Delivery period End Time <	07:30	08:00	08:30	09:00	09:30	16:00	16:30	17:00	17:30	18:00	18:30	19:00	19:30
Available?	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No

Table 10: Example longer term Secure Availability Declaration Window 2

Delivery period Start Time >=	07:00	07:30	08:00	08:30	09:00	09:30	16:00	16:30	17:00	17:30	18:00	18:30	19:00
Delivery period End Time <	07:30	08:00	08:30	09:00	09:30	16:00	16:30	17:00	17:30	18:00	18:30	19:00	19:30
Available?	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Trade Award

Following the collation of all Trade Responses by the DSO, and the selection of the services (see later section), the Trade Award is the confirmation of the window of availability accepted by the DSO. It includes the following key data points:

The Trade Award is formed of:

Attribute	Description
Trade Award ID	The Unique ID for the Trade Award
Trade Response ID	The ID of the linked Trade Response
Price	The trade clearing price.
Availability Acceptance window (see example below)	The portion of the availability window accepted by the DSO in response to the FSPs Availability Declaration Window.

The DSO has the right to accept any combination of the Delivery Periods offered in an Availability Declaration Window within the Trade Response.

See the example acceptances below:

1. For the Sustain example the DSO might accept the window made available.

    Table 11: Example Sustain Availability Acceptance Window 1

Delivery period Start Time >=	06:00	16:00
Delivery period End Time <	10:00	20:00

Available?	No	Yes
Accepted?	N/A	Yes

2. For the Secure example, the DSO may only accept the availability in the afternoons.

Table 12: Example longer term Secure Availability Acceptance Window 1

DELIVERY PERIOD START TIME >=	07:00	07:30	08:00	08:30	09:00	09:30	16:00	16:30	17:00	17:30	18:00	18:30	19:00
Delivery period End Time <	07:30	08:00	08:30	09:00	09:30	16:00	16:30	17:00	17:30	18:00	18:30	19:00	19:30
Available?	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No
Accepted?	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A

Table 13: Example longer term Secure Availability Declarations for Window 2

Delivery period Start Time >=	07:00	07:30	08:00	08:30	09:00	09:30	16:00	16:30	17:00	17:30	18:00	18:30	19:00
Delivery period End Time <	07:30	08:00	08:30	09:00	09:30	16:00	16:30	17:00	17:30	18:00	18:30	19:00	19:30
Available?	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Accepted?	No	No	No	No	No	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Managing Trades

A trade is used to lock in key requirements from FSPs and the DSO and clearly set out delivery expectations.

As such once a Trade Opportunity Closes, the Trade Responses are locked and assessed. The Trade Award is used to confirm the Availability Acceptance Windows, the Meterable Units covered and the technical parameters (as specified in the Trade Response).

These cannot be edited post trade. In due course we will develop processes to facilitate secondary trading.

It should however be noted that whilst the Meterable Units tied to a trade are fixed, it is still possible to edit the Assets linked to the Meterable subject to the **Error! Reference source not found.**.

This would allow FSPs to manage which assets are being used. The same response, with the same availability window is expected, but the baseline values will alter to align with the latest Assets.

For example a Supplier may want to remove Assets that are no longer their customers, and add others in their place.

Long Term Trade timelines

Longer Term products (Sustain, Secure, Dynamic & Restore) will Trade in much the same way, however they will happen over a longer timeframe. We currently plan to operate at 6 months ahead, but expect this may change and extend out over time. The timings are highlighted in the figure below.
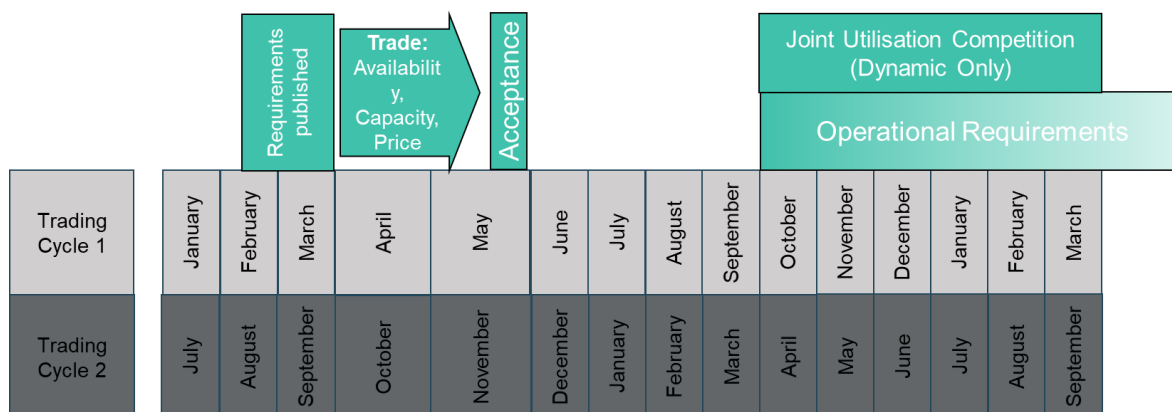

Figure 6: Long Term Operational process

Availability Declarations: Following publishing requirements in February and August, FSPs will be able to submit their availability declarations in from April/May or October/November in their Trade Response. This includes providing details such as the available capacity they can provide, the price and key operational parameters such as maximum and minimum run times.

Acceptance: We will accept or reject Trades by the end of May/October.

Joint Utilisation Competition: The Joint Utilisation Competition provides FSPs with a trade accepted for a longer term product an opportunity to submit a reduced utilisation price for an accepted availability declaration in order to make it more competitive in comparison to prices in the short term market. This is detailed in a later section of this guide.

Operation: The Trade is then operational In October or April.

Full details of requirements will be specified in the Trade Opportunity itself.

Week Ahead Trade timelines

Our previous procurements (prior to utilising Trades) were based on a week ahead timeline. We are working to deploy week ahead Trades in due course.

Joint Utilisation Competition

We will only be operating the Joint Utilisation Competition for our Dynamic products as the structure of the product requires us to make utilisation decisions nearer to real-time.

When utilisation decisions are made for our Dynamic products, all availability of flexibility services will be considered consistently based on our Service Selection principles regardless of the timeframe the offer of availability was made in.

Where longer terms products are trading months ahead, we will look to acquire a specified volume (potential defined as a range) as defined in the trade. As per our clearing process, Availability prices will be set and Utilisation pricing will be capped. At this stage the Availability payments are committed.

This Utilisation, associated with this availability will then be entered into a competition with the shorter term Dynamic product at the week-ahead stage.

This competition will be for the total required volume. As such the shorter term Dynamic participants will be competing for:

- the short term market requirements,

- any unfulfilled volume in the long term allocation, &

- any instances where their combined availability and utilisation is more economically effective that the utilisation of longer term participants.

Long term participants will automatically be entered into the competition at their capped rate, but have the option to update their pricing.

Market conditions may have changed since the point that an FSP has made a declaration of availability for a long term service such that the originally bid utilisation price is no longer competitive. This JUC allows the FSP to submit a reduced utilisation price such that utilisation of their assets can remain competitive.

The decision to resubmit a reduced utilisation price is at the discretion of the FSP and there is no obligation to submit an updated price. Where an FSP chooses to submit a reduced utilisation price for an already accepted availability period, the availability price will not be amended and will remain at the originally cleared price.

Baselining

Baselines are used to establish a counterfactual to assess delivery and then payment from.

We have evolved our baselining methodologies to align as well as possible with our network planning assumptions. This ties in with the core value of flexibility services being the deferral of network reinforcement.

As such we have moved away from historic baselines to more static baselines based on the technology types and metering level of the Assets in the Meterable Unit. The combinations we current consider are detailed below.

ASSET SCALE	ASSET TYPE	ENERGY SOURCE	DEMAND TYPE	METERING LOCTATION	**BASELINE TYPE**
Industrial or Commercial	Generation & Storage	NOT Stored Energy	N/A	Any	**Zero**
Industrial or Commercial	Generation & Storage	Stored Energy	N/A	Any	**Asset Capacity**
Industrial or Commercial	Demand	N/A	Any	Any	**Self-Nominated, based on historic demand**
Domestic	Demand	N/A	All	All	**Base on Planning Profile**
Domestic	Generation & Storage	Stored Energy	N/A	Any	**Base on Planning Profile**
Domestic	Generation & Storage	NOT Stored Energy	N/A	DER Level	**Zero**

Domestic	Generation & Storage	NOT Stored Energy	N/A	Point of Connection	**Base on Planning Profile**

It should be noted that for each Asset category there will be multiple baseline options depending on the associated Products and requirements.

The baseline in a Trade will be calculated from the combination of the baseline values in the Assets in the associated MUs. As detailed in the Creating Meterable Units section, there are some baselines that can and cannot be grouped.

The baselines based on Planning Profiles will update as our planning assumptions update. The latest versions can be found on the Flexible Power Website and will be reviewed annually. The latest view on our planning assumptions can be found in our Customer Behaviour Assumptions Report.

Service Selection

Where competitive markets have developed, resulting in over supply, we will need to select the priority order on which flexibility assets are accepted and dispatched. This section highlights our principles and methodologies for doing so.

Service Selection Principles

In March 2020 the ENA Open Networks Project published a set of dispatch decision criteria guiding principles [1], which guide how DSOs decide which services to dispatch.

PRINCIPLE	DESCRIPTION	NATIONAL GRID ELECTRICITY DISTRIBUTION IMPLEMENTATION
Security	The needs of the system will be met using flexibility in such a way that security of supply is maintained.	This principle can be subdivided into two key criteria that need to be met, Technical Integrity and Customer Security. • Technical Integrity considers Network Integrity, the ability of a network to operate within technical limits and System Frequency Integrity, the ability of the System to operate within acceptable frequency limits[1]. • Customer Security is the ability of a network to meet customer demand and generation. There are minimum standards for these National Grid Electricity Distribution must meet but opportunities to go beyond these standards are also considered where these are economic.
Cost	Flexibility will be operated to meet system need at the minimum level of cost.	The use of Flexibility Services should be cost effective and expenditure proportional to the benefits it brings to the network.
Operability	DSOs will seek to dispatch services that offer compatible levels of operability.	Operability is a measure of how well an offer of a Flexibility Service meets actual or potential System needs. National Grid Electricity Distribution will seek to

[1] Although System Frequency is not managed by National Grid Electricity Distribution, it can be affected by the operation of National Grid Electricity Distribution's network and customers.

		develop an objective and transparent method for assessing the operability of offers of Flexibility Services.
Competition	DSOs will provide transparency of their dispatch decisions and activities.	Flexibility should be procured using simple, fair and transparent rules and processes. Services should be developed such that service providers can participate easily in different markets.
Fairness	DSOs will operate a fair dispatch methodology and provide equal opportunities to participate.	Flexibility Services shall be assessed and selected impartially purely on their technical and commercial merits. Where multiple technically sufficient Flexibility Services are available at a comparable cost, we will share the dispatch of services across these providers.

We are working to develop standard rules and procedures to assess the operability of offered Flexibility and match this against our system requirements. The first stage of this process is to set out our underlying service selection principles, these will guide both our current service selection process and the more detailed service selection rules we will develop. These principles incorporate the Open Networks principles and provide further information about how these are implemented in practice. These are common across our selection of services to make available, as well as utilise.

To ensure security of supply is delivered for the most cost effective outcome, we will consider these items in the following order:

PRIORITY	NAME	MEANING	IMPLEMENTED OPEN NETWORKS PRINCIPLE
1	Technical Integrity	The National Grid Electricity Distribution requirements of Network Integrity, System Frequency Integrity (SD2 [2]/ TP1B [3]) shall be met. Where these are dependent on Flexibly Services, these services must meet these requirements.	Security
2	Customer Security	National Grid Electricity Distribution requirements for demand and generator security (SD2 [2]) shall be met. Where these are dependent on Flexibility Services, these services must meet these requirements. Opportunities for enhancements to demand and generator security may be used where economic.	Security
3	Value	Flexibility should be procured and operated to carry out the roles of a DSO, in a cost effective manner.	Operability & Cost
4	Market Resilience	Where multiple technically sufficient Flexibility Services are available at a comparable cost, we will share the dispatch of services across these providers.	Competition & Fairness

As our operational experience in dispatching flexibility increases, we will use this information to further develop our systems and processes used to implement these principles. These will be regularly communicated with FSPs to ensure they can maximise their value to the system.

Price Clearing

As detailed above the specific processes for selecting services and hence clearing prices will evolve over time.

We will use a Pay as Clear (PaC) mechanic where we are using competitive pricing. This means that all providers are paid at the rate of the marginal Asset, rather than the price they bid. This is designed to encourage bids at the marginal cost of the Asset, rather than the clearing price of the Zone. This mechanic is being used in most new Flexibility Service across Europe.

The decision between PaC and Fixed pricing will be determined in the trade. Our default parameters are:

PRODUCT	PRICING MECHANIC
Sustain	Pay As Clear
Secure	Pay As Clear
Dynamic	Pay As Clear
Restore	Fixed Price

Our initial implementation of Pay as Clear will build on manual processes looking to best align with the service principles. The clearing price will be set by the most expensive provider selected.

Restore Services are used in response to rare, high impact, network events. The nature of these events often restricts the Flexibility Services that could be use due to locational requirements. In order to ensure timely usage of these services they will remain fixed price. This will be communicated in the Trade Opportunity.

Operational Process

Once Trades have been cleared, our dispatch processes then focus around the Flexible Power Operational Portal (https://flexiblepowerportal.co.uk) and its associated dispatch API. This is a simple API used to send Start/Stop messages and receive metering data (see the earlier Flexible Power Operational Portal Set Up and Integration section of this guidance for more details).

When we instruct FSPs to deliver flexibility depends on the service being used. These will always be within periods of accepted availability.

- For Sustain, once awarded, the service will be utilised. FSPs can opt to schedule their asset operations from the acceptance. A Utilisation Instruction is sent via the API 15 minutes ahead of the requirement. Integration to, and acceptance of this signal is optional as detailed in the APIs section of this guidance.

- For Secure, the default is that once accepted, the service will be utilised. FSPs can opt to schedule their asset operations and a Utilisation Instruction is sent via the API 15 minutes ahead of the requirement.

- For Dynamic, Utilisation is triggered by network conditions, after the acceptance of availability. A Utilisation instruction is sent via the API 15 minutes ahead of the requirement.

- For Restore, Utilisation is triggered in response to network conditions. FSPs are expected to provide response as soon as possible, and in all cases no later than 15 minutes, following receipt of the Utilisation Instruction sent via the API.

As covered earlier the principles for selecting services to dispatch align with our broader service selection principles.

Settlement Guidance

Payment Mechanics

Each Product is subject to specific payment mechanics. These are designed to encourage full delivery, whilst balancing the level of penalties to ensure the service provision remains attractive.

Payments are made up of a combination of an Availability payment and/or a Utilisation payment, each product has a mechanism for clawing back under delivery.

The Utilisation payments are assessed on a per metering period (generally 1 minute) basis.

There is a Grace Factor, in which delivery is assumed at 100%. If the output is below this value then a proportion of the payment is removed for every percent of under-delivery. This proportion is determined by the Penalisation Multiplier.

A summary of the values used is highlighted in the table below with example of the Penalisation Multiplier and the Grace Factors in the figure below.

Table 14: Key values for the Secure, Sustain and Dynamic Payment Mechanic

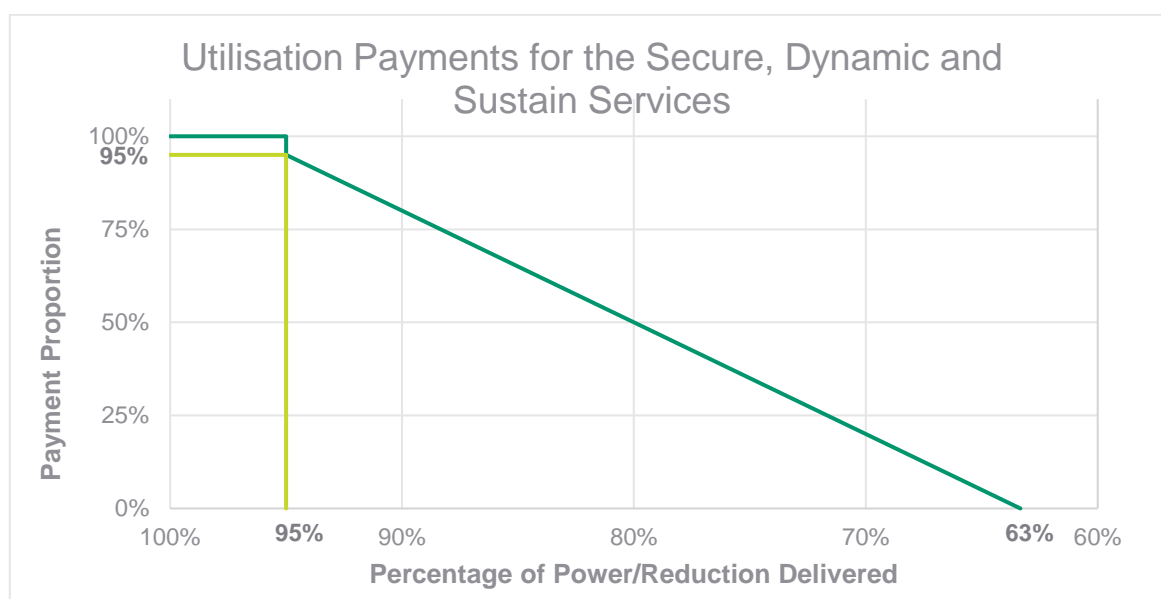| ATTRIBUTE	SUSTAIN, SECURE AND DYNAMIC
Grace Factor	5%
Penalisation Multiplier	3

Figure 7: Example of the payment proportion for the Secure, Dynamic and Sustain Product.

Our Restore Product has a slightly different approach with remuneration for over delivery, there is no Grace Factor and instead a fixed Delivery Target Threshold is set. In addition, payment for over delivery up to a threshold will be made.

A summary of the values used is highlighted in the table below with example of the Penalisation Multiplier and the thresholds in the figure below.

Table 15: Values for the Restore payment mechanic

ATTRIBUTE	RESTORE SERVICES
Delivery Target Threshold	100%

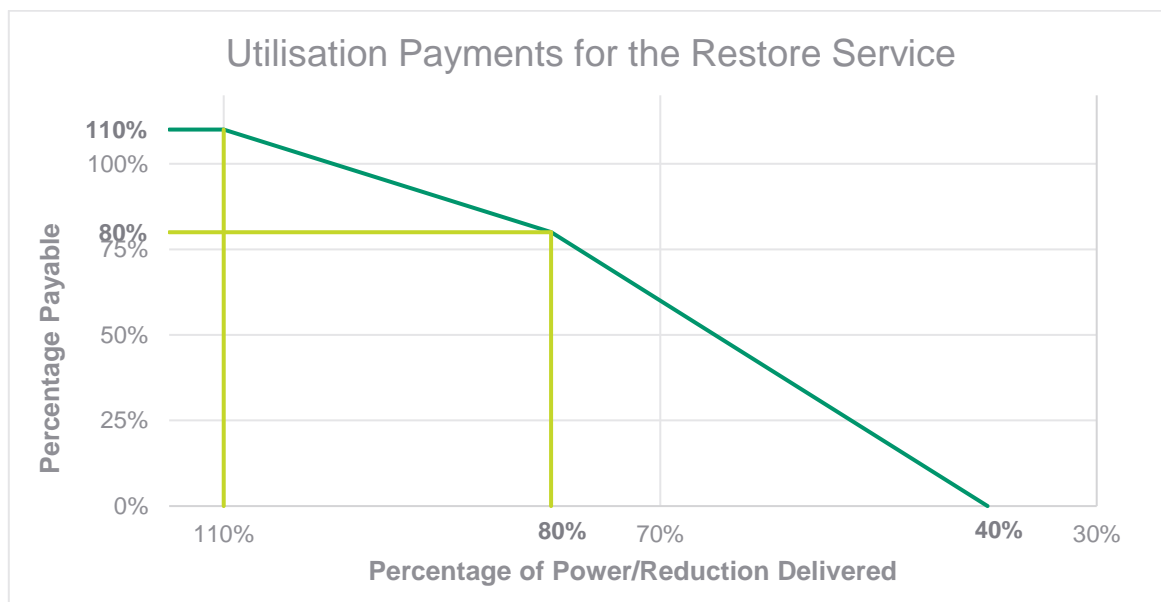|	
Payable over-delivery	10%
Penalisation Multiplier	1 for delivery between 80% and 100%, and 2 for delivery under 80%

Figure 8: Example of the Payment Proportion for the Restore Product.

Availability Payments are based on delivery across the month. This looks at the delivery percentage across the different events and calculates a Monthly Delivery Proportion using capped averages (the maximum delivery in any event is 100%). These are only used for our **Secure and Dynamic** products.

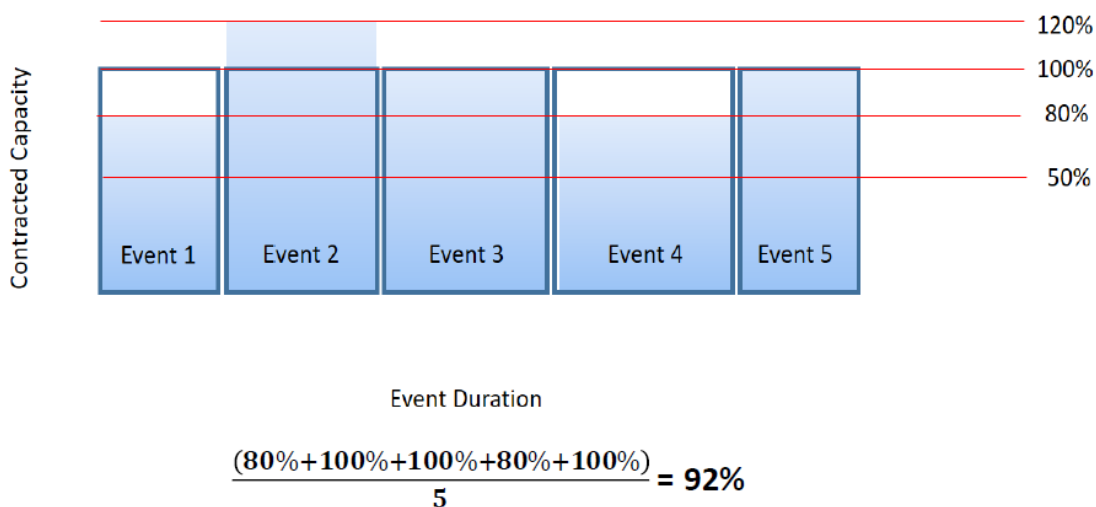$$\frac{(80\% + 100\% + 100\% + 80\% + 100\%)}{5} = 92\%$$

Figure 9: Monthly Delivery Proportion example

The calculation of performance and payments is carried out in the Flexible Power Operational Portal.

The detailed mathematical calculations used for the calculation of performance and payments is available to view here.

Billing Process

As detailed in the Flexible Power Operational Portal Set Up and Integration section of this guidance, the Flexible Power Operational Portal is used to collect metering data. This is used to monitor and pay for delivery.

After the end of each event a performance report and earning statement is created on the Flexible Power Operational Portal. This allows FSPs to review their results per event. Examples can be found on the Flexible Power Website.

At the end of the month the performance reports are compiled along with the availability payments and reconciliations for any shortfall of delivery into an invoice.

A provisional invoice will be produced on the 1st of every month. The FSP then has 14 days to raise any queries.

If no query is raised within the 14 day window the portal will generate a final 'Self-Billing' invoice which can be downloaded for financial records. This is processed by the DSO for payment. The payment terms for the invoice is 60 days.

If a query is raised, then the invoice is placed on hold until any concerns have been resolved. We endeavour to complete this within a 14 day window so as to avoid deviating from the standard payment timeline. If however this can't be achieved we will defer the payment to the following months billing cycle.
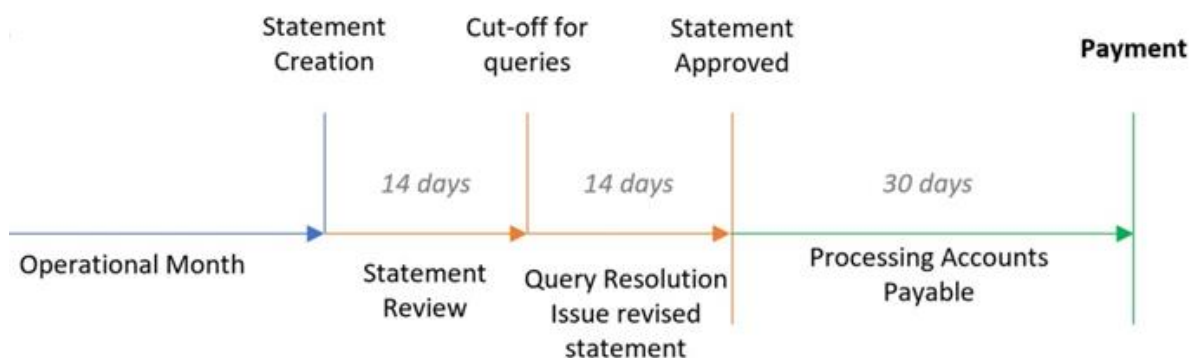

Figure 10: Invoicing & payment timeline

The service and payment cycles are based on a calendar month and therefore we operate a total of 12 billing cycles within a year.

Glossary

TERM	DEFINITION
Application Programme Interface (API)	The means through which National Grid instructs the delivery of services awarded through a Trade Award. The FSP must build an API for each MU it wishes to Trade with prior to entering a Trade Response.
Asset	The smallest entity that we consider on the Market Gateway. It is used to represent the lowest level at which the FSP can meter. This could either be an individual or combination of machines/Low Carbon Technologies depending on the metering location. This is equivalent to a DER in the Service Terms.
Availability Acceptance Window	The response of the DSO to the Availability Acceptance Window specifying when their availability has been accepted.
Availability Declaration Window	The response of an FSP the Capacity Requirement Window specifying when they are available to provide services.
Availability Payments	A payment made in return for being available to provide services.
Capacity Requirement Window	A defined period of time, where the DSO specifies its requirement for services. There may be multiple Capacity Requirement Windows in a Trade
Ceiling Price	The maximum price the DSO is willing to pay.
Commercial Qualification	Required ahead of eligibility to Technical Qualification being made available to FSPs. Encompasses the PIN, PQQ and Overarching Tender.
Contract Award	the letter issued by the Company to the Flexibility Provider to confirm the successful award of an Overarching Contract;
Contract Documents	All documentation completed via the Market Gateway to enable an Overarching Contract Award. Includes, but is not limited to; all sections of the Flexibility Services Standard Agreement, the PQQ, the self-billing agreement and the Contract Award.
Delivery Period	The increment of time within and Capacity Requirement Window.
Delivery Target Threshold	Delivery of the awarded capacity for a DG of equal to or greater than the Delivery Target Threshold (DTT), is awarded the Utilisation payment "at rate" (i.e. the payment % will equate to the delivery %).
DER Level Metering	Metering that covers just the individual DER. This does not include any underlying site load.
Dispatch Group (DG)	The higher level component, made up of one or more MUs and is used for Trade Responses, dispatch and settlement.
DSO	Distribution System Operator. The party procuring services, in the case, National Grid Electricity Distribution.
Dynamic Purchasing System (DPS)	Our record of all FSPs that have been awarded an Overarching Contract.
Flexibility Service Agreement	The documentation issued by National Grid containing the Terms and Conditions and other associated documentation that FSPs must agree to in order to be awarded an Overarching Contract.
Flexibility Service Provider (FSP)	The entity that will contract with National Grid to provide flexibility services. The FSP could be the owner, operator or appointed third party, responsible for the operation of assets capable of providing flexibility services. All settlement and communication regarding flexibility contract to National Grid, will be direct with the FSP.

Flexibility Services	means, and more particularly described in the Service Terms, the services to be provided by the Flexibility Provider to the Company under and in accordance with this Contract which give the Company the ability to manage the load at a specific point of the Network at certain points in time;
Flexible Power Operational Portal	The operational portal National Grid employs to facilitate all API communication and to calculate settlement and performance.
Grace Factor	A margin of error allowed in respect of under-delivery of the Awarded Capacity of a Trade. Delivery of equal to or greater than the required level of awarded capacity less the applicable Grace Factor is awarded the full Utilisation payment. A deduction from the full payment will be made for delivery of less than the required level of awarded capacity less the applicable Grace Factor.
Market Gateway	The online tool that National Grid has developed to facilitate its procurement of electricity distribution flexibility services.
Meterable Unit (MU)	Made up of one or more flexibility assets behind a single metering feed. Baselining is applied at the Meterable Unit level.
Metering data	The data FSPs are required to provide via API to the Flexible Power Operational Portal to enable calculation of settlement and performance. This must be provided either as minute by minute data, or half hourly data.
Monthly Delivery Proportion	The Availability payments for DG are subject to a monthly reconciliation based on the DGs individual Utilisation performance over the month.
Operational Period	The increment of time within the Operational Period.
Operational Update Cycle	The Cycle in which changes to Assets and MUs are made.
Overarching Contract	An enduring contract awarded to all FSPs who successfully complete the PIN, PQQ and accept all sections of the Flexibility Standard Agreement. The Overarching Contract does not include any delivery commitments, it merely provides eligibility to Trade.
Pay As Clear	A clearing mechanic where all successful bidder are paid the clearing price rather than the price they bid.
Penalisation Multiplier	The Trade Award sets out the expected delivery of a DG. For every % point under that level, a fixed proportion as set out in Chapter 4, called the Penalisation Multiplier of the full payment is deducted.
Periodic Indicative Notice (PIN)	The method through which National Grid publishes it procurement intentions on the government tendering platform. FSPs must respond to the Pin via the Marked Gateway to ensure our procurement activity complies will all relevant procurement law.
Point of Connection Metering	Metering at the Point of Connection. This inherently incorporates any DER and any embedded site demand.
Pre-qualification Questionnaire (PQQ)	A part of the commercial pre-qualification process, all FSPs are required to complete the PQQ to allow the award of an Overarching Contract.
Product	National Grids Sustain, Secure, Dynamic and Restore Flexibility Products as described in Chapter 3.
Qualification Tender	The one-off tender through which an Overarching Contract is awarded.
Supplier Details Form	The document issued by National Grid in order to collect billing information from FSPs

Technical Qualification	Required ahead of eligibility to Trade being made available to FSPs who have been awarded an Overarching Contract. Encompasses the registration of Assets, the allocation of assets to MUs and DGs and the API build
Tender	Each Trade is effectively, a Tender. Tender outcomes are notified through the Trade Award.
Trade	FSPs who are successfully awarded an Overarching Tender, will be eligible to Trade. A Trade encompasses; Trade Opportunities, Trade Response and Trade Award
Trade Award	The accepted technical (capacity, service windows) and commercial (price) parameters National Grid accept from the FSPs Trade Response. A Trade award is the binding agreement which the FSP is required to deliver against.
Trade Dispatch Group (DG)	The higher level component, made up of one or more MUs and is used for Trade Responses, dispatch and settlement.
Trade Opportunities	National Grids flexibility requirements. Published on the Market Gateway, with functionality available for FSPs to provide a Trade Response.
Trade Response	The technical (assets, volume & time) and commercial (price) parameters an FSP can offer against a Trade Opportunity.
Utilities Contract Regulations (UCR)	The procurement regulations with which National Grids procurement processes must comply.

References

[1] Energy Networks Association, "Open Networks Project - ON WS1A P3 Dispatch & Settlement Processes," Energy Networks Association, 2020.

[2] National Grid, "POLICY DOCUMENT: SD2/8 - Relating to 132kV Network Design," 20 May 2020. [Online]. Available: https://www.nationalgrid.co.uk/downloads-view-reciteme/606347.

[3] National Grid, "STANDARD TECHNIQUE: TP1B - STANDARD TECHNIQUE: TP1B," August 2022. [Online]. Available: https://www.nationalgrid.co.uk/downloads-view-reciteme/607557.

Appendix 1 – Baseline Methodology Guidance

Introduction

What is a baseline

A baseline is the established level of DER base load from which a delta is measured to determine the level of service delivered.

Baselines are fundamental to the delivery of flexibility services, they;

- set the level of delivery expectation
- set the level for delivery verification,
- allow delivery quantification enable settlement of services.

We recognises that a fair, justifiable and transparent approach to its adopted baseline methodologies is necessary to ensure the success of its flexibility programme.

Purpose of this document

As set-out in further in the Baselining section of this guidance there are four type of baseline currently available;

1. Zero,
2. Asset capacity,
3. Self-nominated based on historic demand, and,
4. Based on planning profiles.

This document provides the latest methodology for their calculation.

The FSP must register its assets through the Market Gateway and receive confirmation of their validity before their applicable baseline option(s) is confirmed.

We reserve the right to update the baseline options and the methodology for the calculations.

Zero baselines

As the name suggest, for a Zero baseline, we assume an output of 0MW.

Asset Capacity baselines

For an Asset Capacity baseline we set the baseline to capacity of the asset/DER provided as part of the registration process.

Self-Nominated Baselines Based On Historic Demand

How the baseline is calculated

The self-nominated baseline is calculated by the provider using the following parameters in respect of their historic demand data.

Calculation Frequency	Monthly – for submission by the second last Tuesday of each month
Calculation applicability	From the First Monday of each month
Calculation type	Single value average
Metering data requirements	Minute by minute, or if allowable half hourly.
Data Window	3pm-8pm weekdays
Data History	The previous 4 weeks
Data exclusions	The FSP may remove data that relates to prior utilisation events

Baselines Based On Planning Profiles

How the baseline is calculated

Table of variables

Variable Name	Description	Symbol	Units	Source
Metering Location	The metering location of the individual asset, forming the Meterable Unit for operational and baseline calculation purposes. Point of Connection (PoC) or DER Level Metering (DLM).	M_L	-	*FSP Provided*
Baseline Season	The season for which the baseline is calculated and operationally applied. Summer or Winter as defined below.	T_{season}	-	*FSP Provided*
Number of Assets	The number of assets in the Meterable Unit (MU).	N	-	*FSP Provided*
Baseline Power	The assigned value of power for the respective baseline. The baseline power is a function of Metering Location and Baseline Season.	B_P	kW	*DSO Calculated*
Meterable Unit Baseline Power	The baseline power, calculated and operationally applied, to a Meterable Unit (MU).	B_{MU}	kW	*DSO Calculated*

We calculate the assigned Baseline Power Values for DER Level Metered and POC Metered DER types using profile data from the Customer Behaviour Assumptions Report which is published annually as part of the their annual Distribution Future Energy Scenarios (DFES) Study.

The assigned Baseline Power Values are updated periodically to include the latest profile data from each DFES publication. We will publish the assigned Baseline Power Values here;

and will update them annually for the operational period Apr-Mar.

Table 2 provides values that are valid until March 2023.

Metering Location M_L	Season T_{season}	Baseline (kW) $B_P(M_L, T_{season})$
Point of Connection, *PoC*	Winter	2.223
Point of Connection, *PoC*	Summer	1.502
DER Level Metering, D*LM*	Winter	1.441
DER Level Metering, *DLM*	Summer	0.932

Table 2 - Assigned Baseline Power Values

The application of these figures will apply to services delivered within the following inclusive calendar weeks;

➢ Summer; week 13 (Apr) – week 38 (Sep)
➢ Winter; week 39 (Oct) – week 12 (Mar)

Calculating the baseline

To calculate the baseline for each MU, the following calculation is applied;

$$B_{MU} = \sum_{i=1}^{N} B_P(M_L, T_{season})_i$$

Equation 1 - Meterable Unit Baseline Equation

Example

In this example we'll calculate the summer baseline power for a MU consisting of two Point of Connection metered assets and one DER Level Metered asset.

$$B_{MU} = \sum_{i=1}^{3} B_P(M_L, T_{season})_i = B_P(PoC, Summer)_1 + B_P(PoC, Summer)_2 + B_P(ALM, Summer)_3$$

$$B_{MU} = \sum_{i=1}^{3} B_P(M_L, T_{season})_i = 1.502 + 1.502 + 0.932$$

$$B_{MU} = 3.936 \, kW$$

Equation 2 – Example Meterable Unit Baseline Calculation