SSEN FLEXIBILITY SERVICES

An Introductory Guide for Providers

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Scottish & Southern Electricity Networks

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INTRODUCTION

SSEN procure Flexibility Services from owners, operators or aggregators of Distributed Energy Resources (DERs), which can be generators, storage or demand assets. These services are needed in areas of the network which have capacity constraints at particular times or under certain circumstances. These areas are known as Constraint Managed Zones (CMZs).

With the rollout of low carbon technologies and the need to make the most of available network capacity, Distribution Network Operators (DNOs) like SSEN are preparing for significant growth in the use of Flexibility Services to help manage the network in a cost-effective way.

We have plans to increase the use of Flexibility Services to help avoid potential overload conditions. DER owners, operators or aggregators able to offer more than 50kW of flexible capacity may be able to provide Flexibility Services and benefit from availability and utilisation payments.

This document outlines the Flexibility Services that SSEN procures and how they are operated, as a guide for prospective providers or other stakeholders.

What is Flexibility?

Flexibility refers changing the amount of power generated or consumed when requested. For example, at times of high demand on the network a demand asset might be instructed to reduce import, or a generator might be instructed to increase export.

Flexibility is usually provided by DERs with capabilities such as demand side response, energy storage or flexible generation capacity. The change in export or import is measured from a reference known as a baseline, with different kinds of baselining methodologies used depending on the type of DER and the type of service being provided.

The following diagram summarises the types of response and some of the key terms used to describe services:

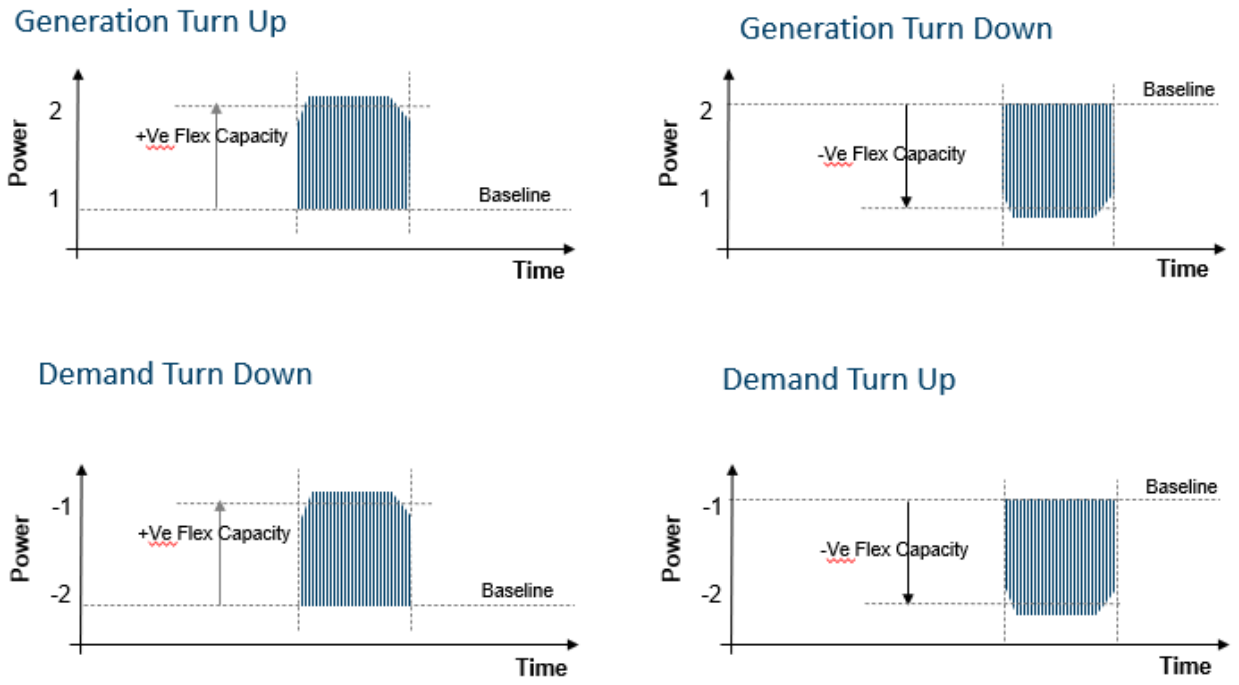

Figure 1: Types of response

Baselines

The instruction and measurement of flexibility are made against a reference baseline, which will depend on the type of service and asset. There are broadly two types of baseline method used:

- **Historical**: Using past meter readings to estimate the baseline using standard algorithms.
- **Nominated**: Using other forecasting techniques (e.g. weather based models) to estimate the future baseline, or setting a baseline value through mutual agreement.

Why are SSEN procuring Flexibility Services?

As more assets such as electric vehicles, heat pumps, distributed generation and storage assets connect to distribution networks, the traditional approach of building more network capacity is becoming unsustainable and risks becoming a barrier to net-zero ambitions. The use of flexibility is intended to allow more efficient use of existing network capacity, as well as helping to maintain supply during planned and unplanned outages.

DER Suitability

Different types of DER can provide different types of flexibility response depending on technology and the scenario. The following table illustrates the broad relationship, but the specific suitability of each provider and DER is evaluated during tenders as each scenario is unique.

DER Type	Examples	Generation Turn Up	Generation Turn Down	Demand Turn Up	Demand Turn Down

Steady generation (no headroom)	Combined Heat and Power plant	No (Sus/Sec) Yes (Dyn/Rest)	Yes (Sus/Sec) No (Dyn/Rest)	N/A	N/A
Standby generation	Gas peaking plant	Yes	No	N/A	N/A
Storage	Battery	Yes	No	Yes	Yes
Intermittent Generation	Wind Farm Solar Farm	No (Sus/Sec) Yes (Dyn/Rest)	Yes (Sus/Sec) No (Dyn/Rest)	N/A	N/A
Demand Side Response	Aggregated demand time shifting	N/A	N/A	Yes	Yes

Table 2: DER & Service suitability

Note that physically mobile assets are not suitable for providing flexibility services. Services must be provided via a connection to the distribution network and be within the capacity limits of existing connection agreements. In the case of aggregators that control large number of DERs, there will be a similarly large number of connections.

Service Stacking & Exclusivity

Stacking means being paid under multiple contracts for the same MW of capacity delivered.

SSEN agreements are not exclusive. Providers can deliver a service under other contracts during a Service Window, provided that this does not affect their ability to deliver services to SSEN if instructed. Note that delivery is measured against an agreed baseline methodology which will depend on the type of DER.

It is the responsibility of the provider to ensure they are ready and able to deliver the agreed capacity upon instruction.

Constraint Managed Zones (CMZ)

CMZs are geographic areas served by the distribution network which have constraints that can be managed in a cost-effective way using flexibility services instead of network reinforcement or other traditional approaches. The constrained parts of the network are identified by:

- Network planning forecasts that indicate risks of thermal, voltage or frequency limits being reached, either in normal operation or under outage conditions.
- Planned works or outage mitigation plans for parts of the network that cannot be easily reconfigured and therefore might involve or increase the risk of power outages.

The geographical boundary of the CMZ provides a guide to where DERs would need to be connected to the network.

Standard Services Overview

SSEN normally procure active power services named Sustain, Secure, Dynamic and Restore. The definitions of these services are broadly aligned with Open Networks standards.

Service	Description	Use Cases	Payments
Sustain	The provider agrees, ahead of time, to either deliver a change in export or import (or apply a limit), at specific times.	Network forecasts indicate risk of the network going beyond capacity in normal conditions.	Utilisation or Fixed Income*
Secure	The provider agrees, ahead of time, their availability to deliver a change in export or import at certain times known as service windows. Based on refined forecasts closer to the event, SSEN may or may not instruct the use of the service.	Planned works which would normally involve either a power outage or the use of mobile diesel generation. OR Network forecasts indicate risk of the network going beyond capacity in N-1 fault conditions (i.e. where resilience is compromised)	Availability and Utilisation
Dynamic	The provider agrees, ahead of time, their availability to deliver a change in export or import at certain times known as service windows. Depending on network conditions close to or during the service window, SSEN may or may not instruct the use of the service.	Planned works where there is a risk of a power outage that needs to be mitigated. OR Network forecasts indicate risk of the network going beyond capacity in N-2 fault conditions. (i.e. situations where power outages are likely).	Availability and Utilisation
Restore	SSEN instructs a provider in real-time to either remain off supply, reconnect with lower demand, or to reconnect generation to support faster restoration.	Restoration following unplanned power outages.	Utilisation

Table 2: Standard Services Overview

**Fixed Income is currently only used where a guaranteed power limit/level is required over a period of months.*

PROCUREMENT

Process Overview

Prospective providers must be pre-qualified on the Dynamic Purchasing System (DPS) in order to participate in any tender. Simply register at ssen.delta-esourcing.com and complete the pre-qualification questionnaire for North (SHEPD) or South (SEPD) network areas. Note that providers with assets in both North and South will need to complete questionnaires for both areas.

The DPS is open for registrations at any time, but pre-qualification questionnaires must be submitted at least 5 working days ahead of the tender open date to be considered.

Figure 2: High level procurement process

Pricing

SSEN may use ceiling prices for a tender to ensure we contract where there is there is a financial benefit over alternative provisions such as reinforcement or the use of diesel generators. Where ceiling prices are used, they are set per tender to reflect the available budget.

The prices of each contract are published on our website as a guide for future bidders, and the following table gives indicative ceiling prices based on the most recent tender.

Should ceiling prices change between tenders for the same zone, existing providers are invited to re-bid if they wish.

Service	Availability Fee (£/MW/hr)	Utilisation Fee (£/MWh)
Sustain	N/A	TBD
Secure	£150	£200
Dynamic	£25	£350
Restore	N/A	£400

Table 3: SSEN Indicative Ceiling Prices (Last updated Sept 2022)

OPERATION

Process Overview

Each of the four services has slightly different operating processes and timelines. The diagram below summarises SSEN's forecasting & operational activities and how these correspond with the stages of agreeing availability and instructing utilisation for each service type.

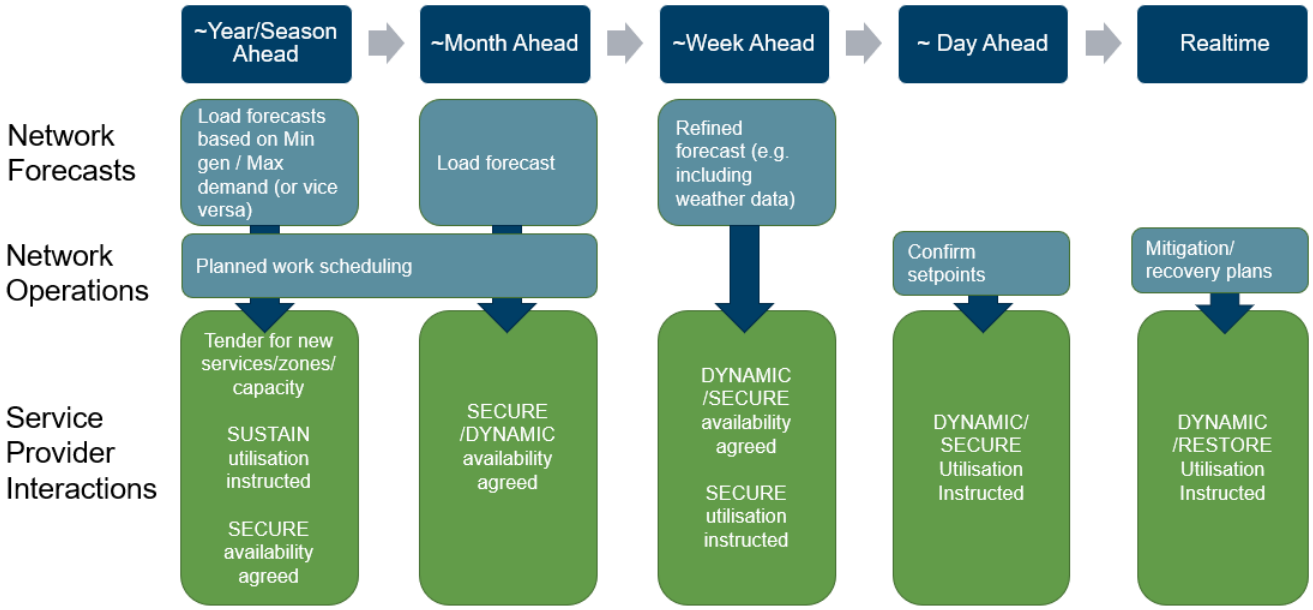

Figure 3: High level planning and interaction timeline

How do we choose which provider to use?

Where there is a choice of contracted providers or DERs in a zone, SSEN review the following criteria before requesting availability or issuing a utilisation Instruction.

- Cost.
- Technical suitability.
- CO2 Emissions.
- Reliability (based on prior service use).
- Any declared periods of unavailability or reduced capacity.

Dispatch

Dispatch is the term used to describe the process of instructing a provider to change their DER export or import. This process can be manual, with instructions given by email and phone call, or automated via the Flexible Power API.

Information on the provider's integration capability is collected during pre-qualification, and if a contract is awarded the provider and SSEN will agree together if Flexible Power integration is appropriate.

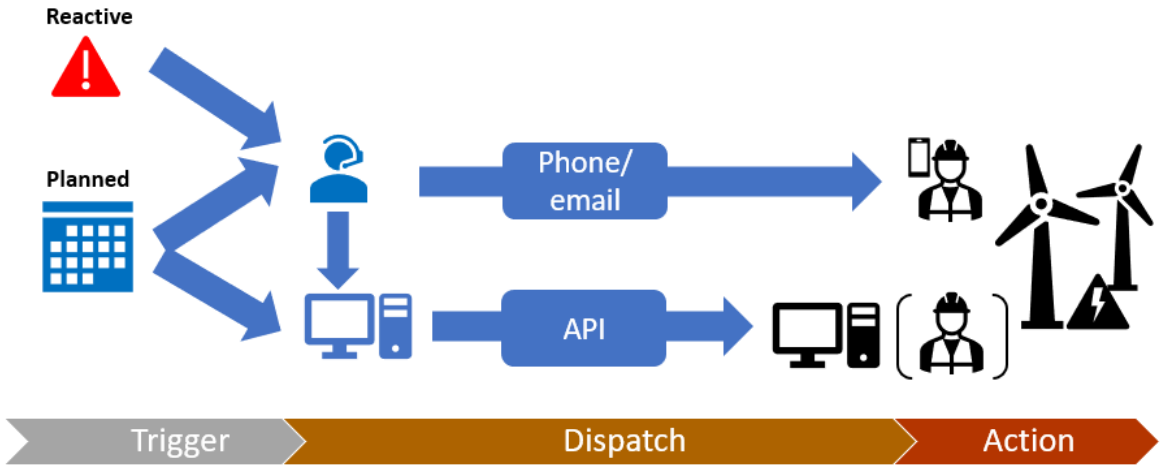

Figure 4: Dispatch methods

Performance Reporting and Invoicing

Providers must submit performance reports to SSEN at the end of each service month. We review performance against network monitoring data and instruction logs, and if approved a Purchase Order is issued for the service which the Provider can invoice against.

Providers integrated with Flexible Power can submit meter readings in near real-time which are used to generate performance reports and invoices automatically.

FLEXIBLE POWER

Flexible Power is a new joint-DNO system developed to provide a standardised and scalable process for operating Flexibility Services. Integration is via a web API used for dispatch and metering. Providers need to create an API endpoint to receive dispatch signals and connect to the participant API to continuously submit meter readings. Please see the flexible power portal for details of the API.

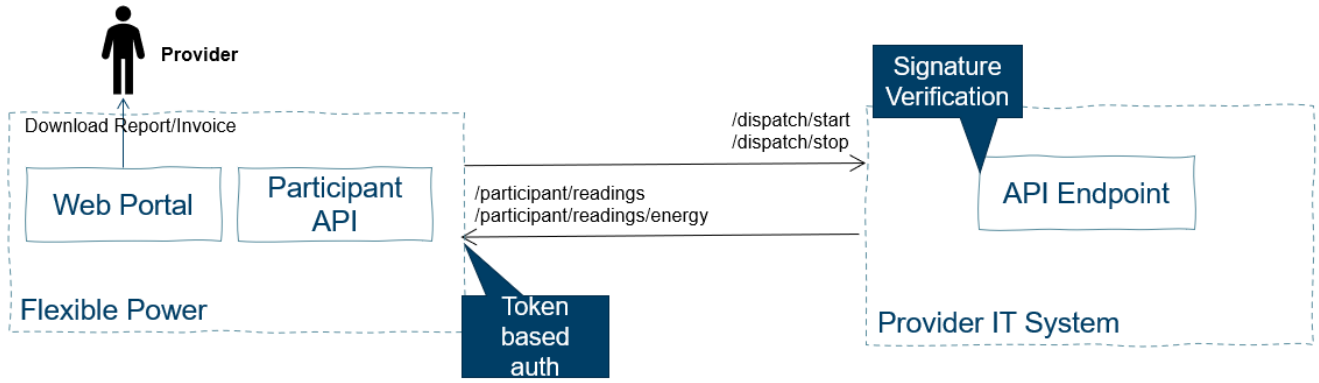

Figure 5: Flexible Power integration

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