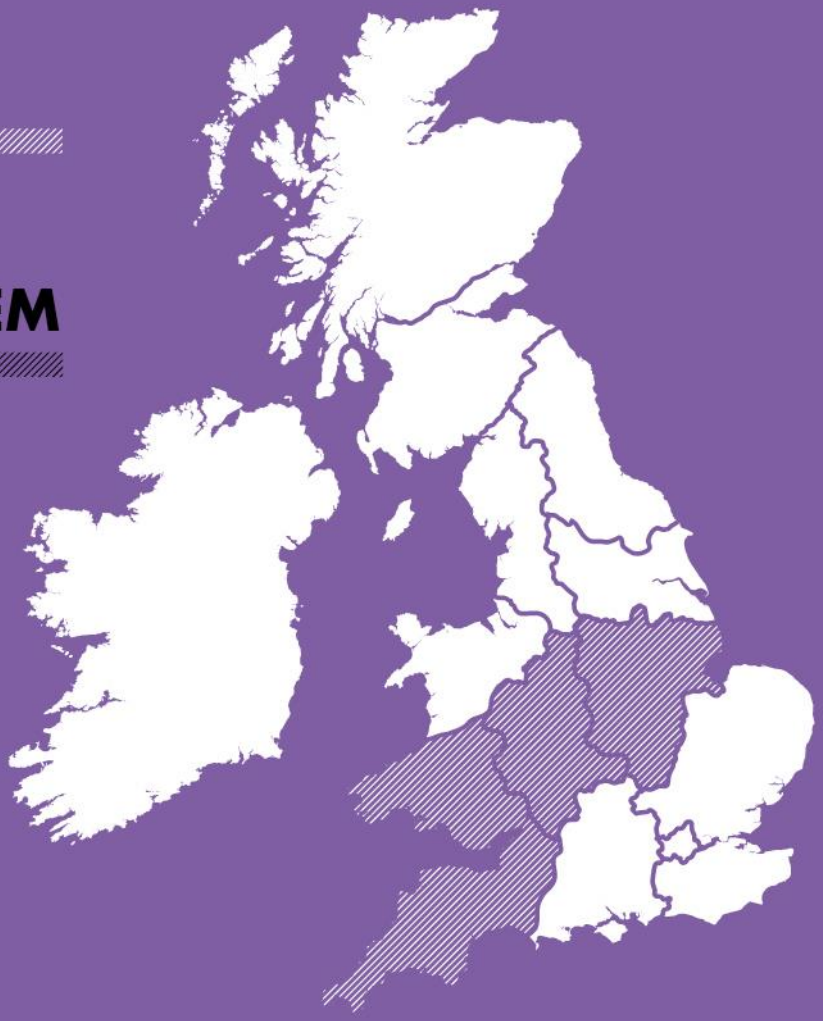
WESTERN POWER DISTRIBUTION

EFFS

ELECTRICITY FLEXIBILITY AND FORECASTING SYSTEM

EFFS
WPD_EN_NIC_003

NIC PROJECT
System Design:
Market Interface



RIIO NIC NETWORK INNOVATION COMPETITION

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Contents

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1 Purpose

The purpose of this design document is to specify how the market interface requirements defined in the EFFS project's DSO Requirements Specification will be delivered from a functional perspective. This design document forms one of eight system design documents (listed below), namely the market interface design document. The system design documents complement the System Design Summary Report, which contains an overview each functional area and the relationships between them.

- Forecasting;
- Capacity Engine;
- Service Management;
- Optimisation;
- Scheduling;
- Conflict avoidance and synergy identification;
- **Market Interface;**
- Reporting.

In accordance with the EFFS Project Direction, this document forms part fulfilment of the project's fourth deliverable to Ofgem, the 'EFFS system design specification'.

2 Executive summary

To support the trials, EFFS will interface with the following three Flexibility Platforms:

- Cornwall Local Energy Market, operated by Centrica;
- Flexible Power, developed by KiwiPower; and
- PowerShift, operated by EDF Energy.

These platforms offer access to a variety of customers required for the trial phase of EFFS. As the platforms have evolved at different times to meet different purposes, they will generate separate learnings for each platform rather than being duplicates of each other. Interfacing with multiple platforms allows for learning around the practical issues for activities such as optimisation and whether the multiple platforms act to facilitate a single open marketplace or act to subdivide the market.

Market interface instructions and associated data items were derived from the four service types defined by the ENA ON (see Appendix 3 for more details) as well as from the operational procurement and dispatch processes defined in the project. The original project assumption was that the market platforms would be interoperable and would not require bespoke interfaces. However, as an industry standard is not available, each platform has their own interface (taking advantage of any synergies between the respective platforms design where possible). This approach enables the project to execute its trials despite the lack of uniformity in the market; it is recognised however that custom interfaces would not be supported once an industry standard interface has been defined.

Once a requirement for flexibility has been identified, this will be issued to the Flexibility Platform via an agreed mechanism such as an interface. The mechanism includes a series of request / responses so that participants can bid for periods of flexibility. There are two general principles to the market interface process, namely procurement and dispatch; this was simplified to two stages from originally three which included arming. The arming data exchange has been removed following further refinement in the design phase: simplifying the process and data exchange without loss of functionality. Procurement refers to the reservation of specific flexibility service instances with a Flexibility Platform in operational timescales. The aim of the process is to have a flexibility service (or services) procured, which can subsequently be dispatched to resolve network constraint(s) or to speed up fault restoration. At this stage there is no obligation to use the service, so it may not be utilised or dispatched. Dispatch refers to the dispatching of specific flexibility services instances via a Flexibility Platform in operational timescales. The aim of this process is to dispatch a service (or services) to resolve a network constraint(s). The direct dispatch and real time control of the asset will not be carried out by EFFS; this will be the responsibility of the Flexibility Platform / service provider.

3 Glossary

Term	Definition
API	Application Programming Interface
BAU	Business As Usual
CLEM	Cornwall Local Energy Market
Constraint	For EFFS purposes this refers to thermal network constraints (as opposed to voltage constraints)
DNO	Distribution Network Operator
DSO	Distribution System Operator
EFFS	Electricity Flexibility and Forecasting Systems
ENA	Energy Networks Association (specifically the Open Networks Project)
Flexibility platform	See Appendix 1**Error! Reference source not found.** for details
Flexible Power	WPD branding for flexibility services and the name used to refer to the platform to deliver the procurement of flexibility services
HH	Half Hourly electricity metering
kV	Kilovolt
kW	Kilowatt
MPAN	A Meter Point Administration Number is a 21-digit reference used in Great Britain to uniquely identify electricity supply points such as individual domestic residence.
MW	Megawatt
MVA	Mega Volt Amp
Affinity Networkflow or Networkflow	Proprietary software suite developed, licenced and maintained by AMT-SYBEX relating to the management of flexibility services for electricity networks
PowerOn	WPD's Distribution Management System provided by GE
Service Instance	A service instance is an instance of a service type for the purpose of procuring and mastering service management data. In essence a service instance the record in the system of the service, what type it is, what status it is at and what parameters it uses
Service types	Types of peak shaving flexibility services that will be supported by EFFS (namely scheduled constraint management, pre-fault constraint management,

Term	Definition
	post-fault constraint management, restoration support)
User	Users of the EFFS system are anticipated to be: • **Forecaster and flexibility co-ordinator** up until the real time management, dispatch and monitoring. Note: both these roles do not currently exist but are required, as they do not map onto an existing business function. The flexibility co-ordinator role will have a very similar skill set to that of an outage planner, whereas the forecaster role will require individuals with a mathematical / statistical background and possibly some programming experience. • **Control engineer** for real time dispatch and monitoring of the network. • **System administrator** system and interface support, maintenance of master data, data cleansing.
WPD	Western Power Distribution

4 Related documents

Ref	Document title	Version	Date issued	Prepared by	Location
1	Revised_EFFS_FSP_ Redacted_v2	2.0	06/07/2018	EFFS	Link
2	WPD_EFFS_DSO Requirements Specification_v1.0	1.0	24/05/2019	EFFS	Link
3	System Design Summary Report	2.0	25/10/2019	EFFS	Link

5 System overview

5.1 Core functions overview areas

Figure 1 below is a diagrammatic representation of the functional areas within the EFFS project. The area that is subject of this document is highlighted in red.

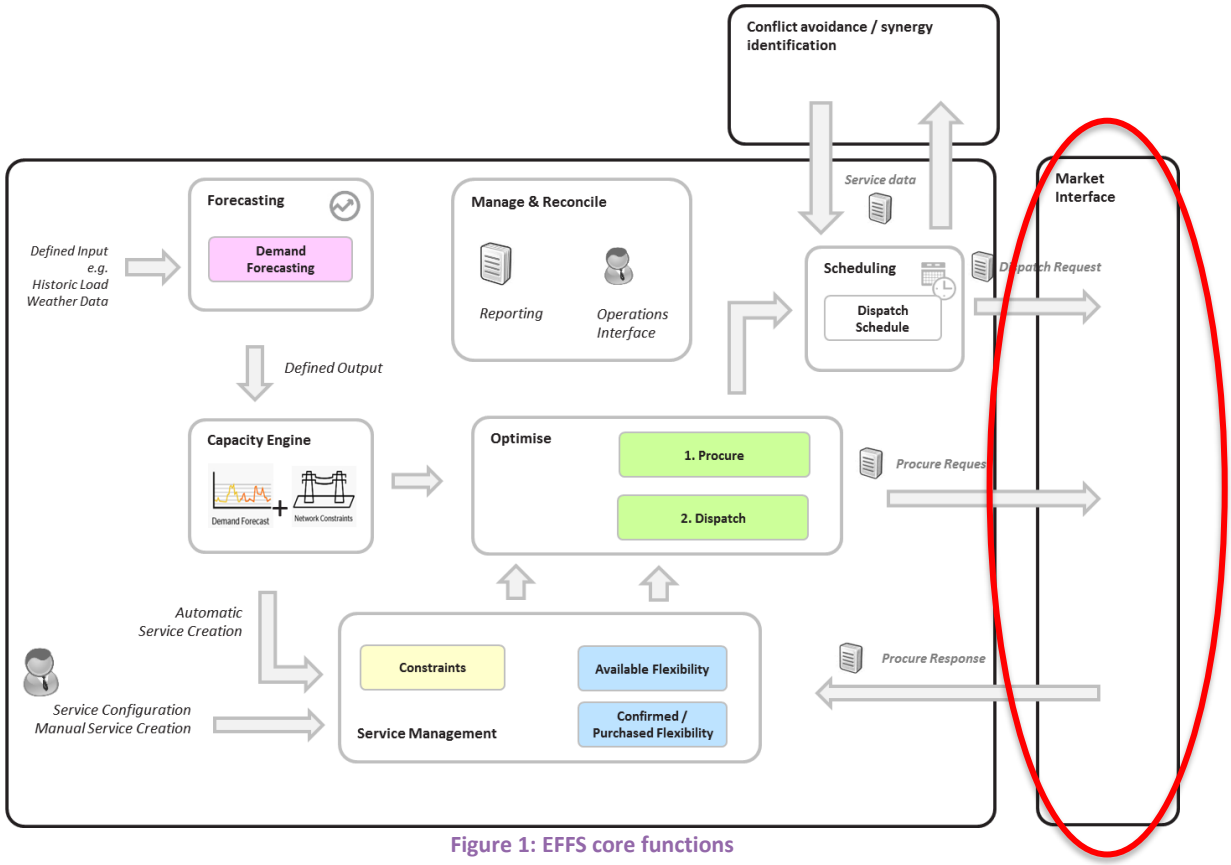

Figure 1: EFFS core functions

6 Market interface

The scope of EFFS deliberately excludes the activities that are carried out by market platforms for flexibility services. This is an area of rapid evolution in which the BEIS FleX competition has recently awarded investment funding for further development. Interfacing to market platforms, rather than replicating their functions, not only avoids duplication of effort but should make it simpler to communicate with a number of different platforms on an equal basis, which would be expected from a neutral market facilitator. Communicating with market platforms on an equal basis is best supported by industry standardisation which needs to apply to the flexibility products on offer, the business processes relating to these products, the timings of various events within the processes and communications interfaces.

Uniform interfaces to flexibility platforms have yet to be defined at an industry level. Therefore, in the requirements specification phase, EFFS defined a default set of instructions between EFFS and flexibility platforms based on the assumption that any flexibility platform integrating to EFFS will use this standard. i.e. there will be no requirement to develop customised interfaces for EFFS to interface with platforms. The instructions and associated data items were derived from the service types defined by the ENA ON (see Appendix 2 for more details) and the operational procurement and dispatch processes defined in this document. However, in practice the flexibility platforms EFFS is interacting with are not yet interoperable in terms of service types and signals supported, therefore separate interfaces have been specified per platform (taking advantage of any synergies between the respective platforms design where possible). The approach enables the EFFS trial however it is recognised that custom interfaces would not be supported once an industry standard interface was defined.

It is possible that interfaces to flexibility platforms will also be used to disseminate other data than the exchanges specified in this document. This may include information to help service providers understand how their customers are associated with our network, e.g. which primary, Bulk Supply Point (BSP) or Grid Supply Point (GSP) would be impacted by their services and any planned time-ranges where these default relationships would be altered.

The EFFS project includes interfaces to multiple market platforms which are:

- Cornwall Local Energy Market (CLEM) – operated by Centrica;
- Flexible Power – initially developed with innovation funding under project ENTIRE, and now deployed for BAU by WPD
- PowerShift – operated by EDF Energy

These platforms offer access to a variety of customers required for the trial phase of EFFS. These platforms have evolved at different times to meet very different purposes and therefore will generate separate new learning for each platform rather than being duplicates of each other. Interfacing with multiple platforms also allows for learning around the practical issues for activities such as optimisation and whether the multiple platforms act to facilitate a single open market place or act to subdivide the market.

6.1 Scope

In scope	Out of scope
• Mechanism to issue requirements of flexibility to the market i.e. procurement requirements, reservation/utilisation and dispatch requests and for the market to respond; and • Interfaces with the following platforms/participant portals are to be supported: ○ PowerShift EDF Energy; ○ Flexible Power; and ○ CLEM.	• Industry settlements (i.e. settlement agent role); • Direct interfaces from EFFS to controlled customers assets, either for sending dispatch instructions or for asset monitoring to support response checking or baselining; and • Settlement and billing processes as this will be taken care of by existing WPD BAU or CLEM processes.

Table 2: Scope for market interface

6.2 Description

Once a requirement for flexibility has been identified, it will be issued to a Flexibility Platform via an agreed mechanism. The mechanism includes a series of request / responses to enable participants to bid for periods of flexibility.

Procurement
In this process we are referring to procurement or reservation of specific flexibility service instances in operational timescales to be carried out via a flexibility platform. The aim of the process is to have a service (or services) procured that can then be subsequently dispatched to resolve network constraint(s) or to speed up fault restoration. At this stage there is no obligation to use the service, so it may not be utilised or dispatched.

Longer term framework agreements / creating new contracts and pre-qualification of flexibility service providers to participate in markets are not included (they will be covered in planning timescales and by the relevant flexibility platforms respectively). The process defined here happens in shorter timescales and assumes these steps have already taken place. Likewise, the creation of new service types is not within the scope of EFFS.

Dispatch
In this process we are referring to dispatch of specific flexibility services instances in operational timescales to be carried out via a flexibility platform. The aim of the process is to dispatch a service (or services) to resolve a network constraint(s).

The direct dispatch and real time control of the asset will not be carried out by EFFS, this will be the responsibility of the flexibility platform / service provider (EFFS is agnostic as to who the end provider is, how the dispatch is carried out and the technology involved).

Please note that this specification only deals with the interface and does not define the business logic that triggers the interactions, this is defined in the 'WPD EFFS_System_Design_Service_Management Specification'.

6.3 Solution

6.3.1 Pre-requisites

- Service Instance is created with flexibility requirements; and
- Flexibility Platform operable for the trials.

6.3.2 Input

- Procurement request for flexibility from Service Management;
- Procurement request (bid) response/s;
- Procurement request (bid) acceptances; and
- Dispatch instruction to instruct the delivery of flexibility.

6.3.3 Output

- Procurement request interface message; and
- Procurement request (bid) acceptances interface message.

The original project assumption was that the market platforms would be interoperable and would not require bespoke interfaces. However, as the industry standard is not yet available, each participant has their own interface. Therefore, the sections that follow will detail each interface individually. While there is not complete commonality across all the platforms, the EDF PowerShift and Flexible Power platforms have many key features in common which should support a degree of optimisation across both platforms concurrently.

6.4 EDF PowerShift

For the purpose of the EFFS trials [redacted] will be used to support this process. Below are the proposed data exchanges required in Figure 2.

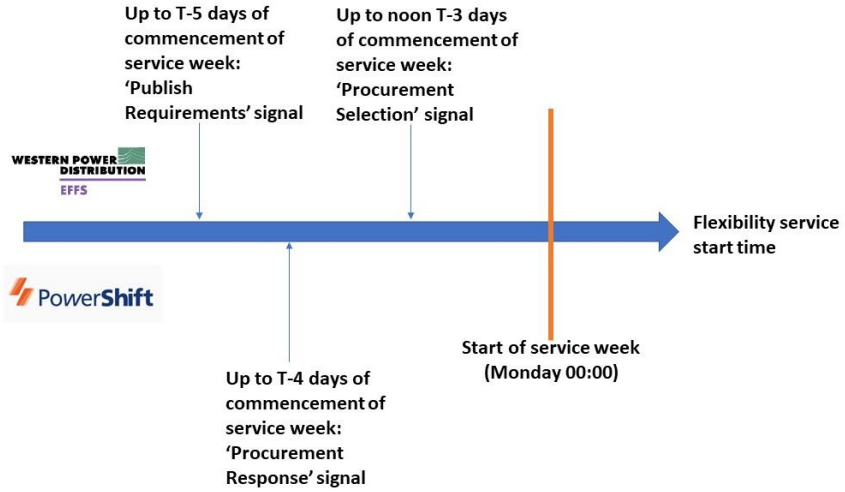

Figure 2: PowerShift timelines

The number of days in Figure 2 is given in calendar days rather than working days, so service requirements are published on the Wednesday, responses received on the Thursday and selections confirmed on the Friday before the next service week.

6.4.1 Procurement/Dispatch

6.4.1.1 Publish requirements

The 'Publish Requirements' interface will be a [redacted]. This will contain the EFFS flexibility procurement requirements.

This interface (and all others within this document) is described in an indicative, logical fashion rather than physically as this information is proprietary. The detailed physical interfaces will be agreed during the build phase of EFFS.

Please see the format below:

Data item	Type	Unit	Cardinality	Valid set value	Notes
Transaction type	VARCHAR(50)	N/A	1	'Publish Requirements'	
Transaction ID	NUMBER(10)	Numeric	1		Unique ID for the transaction. Should be included in any related responses generated by the generating system.
Transaction Datetime	TIMESTAMP	TIMESTAMP	1		Date and Time when the request was created in the following format 'YYYY-MM-DD HH24:MI:SS.FF'
Network location	VARCHAR(50)	N/A	1		The network Location will be the BSP or Primary Substation WPD Site ID and will match the published list of names given to the flexibility platforms'

Data item	Type	Unit	Cardinality	Valid set value	Notes
Service type	VARCHAR(20)	N/A	1	'Pre-fault constraint management'	
HH Datetime	TIMESTAMP	TIMESTAMP	1-*		This will be defined by a DATE + TIME of the end of the HH period. These are the periods that flexibility services are required for.
Power requirements	NUMBER(10,3)	MW	1-*		

Table 2: EDF PowerShift Publish Requirements data items

6.4.1.2 Procurement response

PowerShift will compare the 'Publish Requirements' signal with the flexibility services available on the PowerShift platform and will populate a 'Procurement Response' [redacted]. Please see the format below:

Data item	Type	Unit	Cardinality	Valid set value	Notes
Transaction type	VARCHAR(50)	N/A	1	'Procurement Response'	
Transaction ID	NUMBER(10)	Numeric	1		Unique ID for the transaction. Should be included in any related responses generated by the generating system.
Transaction Datetime	TIMESTAMP	TIMESTAMP	1		Date and Time when the request was created in the following

Data item	Type	Unit	Cardinality	Valid set value	Notes
					format 'YYYY-MM-DD HH24:MI:SS.FF'
Network location	VARCHAR(50)	N/A	1		The network Location will be the BSP or Primary Substation WPD Site ID and will match the published list of names given to the flexibility platforms'
Service type	VARCHAR(20)	N/A	1	'Pre-fault constraint management'	
HH Datetime	TIMESTAMP	Timestamp	1-*		This will be defined by a DATE + TIME of the end of the HH period. These are the periods that flexibility services are being offered for.
Power available	NUMBER(10,3)	MW	1-*		
Asset ID(s)	VARCHAR(50)	N/A	1-*		This value will be the unique Asset ID for the flexibility asset and can only be supported by non-aggregator customers.
MPAN(s)	NUMBER(13)	Numeric	1-*		MPAN's can only be supported by non-aggregator

Data item	Type	Unit	Cardinality	Valid set value	Notes
					customers and depending on the flexibility will provide wither an import or export MPAN.
Actual market procurement payment	NUMBER(4)	(£/kW)	0-*		

Table 3: EDF PowerShift Procurement Response data items

6.4.1.3 Procurement Selection

EFFS will optimise the bids contained in the 'Procurement Response' [redacted] file (as well as those received from other flexibility platforms if the timescales align). The output will be a 'Procurement Selection' [redacted] file that contains details of which bids are to be progressed and which are not. This will be treated as a dispatch signal due to the certainty of what services will be required. This will be sent to PowerShift via [redacted].

No handshake or acknowledgement is required, any issues progressing the selected services within PowerShift will be handled as an offline exception management process. Therefore, EFFS will assume this instruction is always successful. Please see the format below:

Data item	Type	Unit	Cardinality	Valid set value	Notes
Transaction type	VARCHAR(50)	N/A	1	'Procurement Selection'	
Transaction ID	NUMBER(10)	Numeric	1		Unique ID for the transaction. Should be included in any related responses generated by the generating system.
Transaction Datetime	TIMESTAMP	TIMESTAMP	1		Date and Time when the request was created in the following format 'YYYY-MM-DD HH24:MI:SS.FF'

Data item	Type	Unit	Cardinality	Valid set value	Notes
Network location	VARCHAR(50)	N/A	1		The network Location will be the BSP or Primary Substation WPD Site ID and will match the published list of names given to the flexibility platforms'
Service type	VARCHAR(20)	N/A	1	'Pre-fault constraint management'	
HH Datetime	TIMESTAMP	TIMESTAMP	1-*		This will be defined by a DATE + TIME of the end of the HH period. These are the periods that flexibility services are required to be available for
Power required	NUMBER(10,3)	MW	1-*		
Asset ID(s)	VARCHAR(50)	N/A	1-*		This value will be the unique Asset ID for the flexibility asset and can only be supported by non-aggregator customers.
MPAN(s)	NUMBER(13)	Numeric	1-*		MPAN's can only be supported by non-aggregator customers and depending on the flexibility will provide wither an import or export MPAN.

Data item	Type	Unit	Cardinality	Valid set value	Notes
Status	VARCHAR(20)	N/A	1-*	'Accept' 'Reject'	

Table 4: EDF PowerShift Procurement Selection data items

6.4.2 [redacted] Naming Conventions

Each [redacted] message will have a naming convention in the following format:
[redacted]

An example of the above would be as follows:

Publish requirements = [redacted].

6.5 Flexible Power

For the purpose of the trials [redacted] will be used to support this process. Below are the proposed data exchanges required in Figure 3.

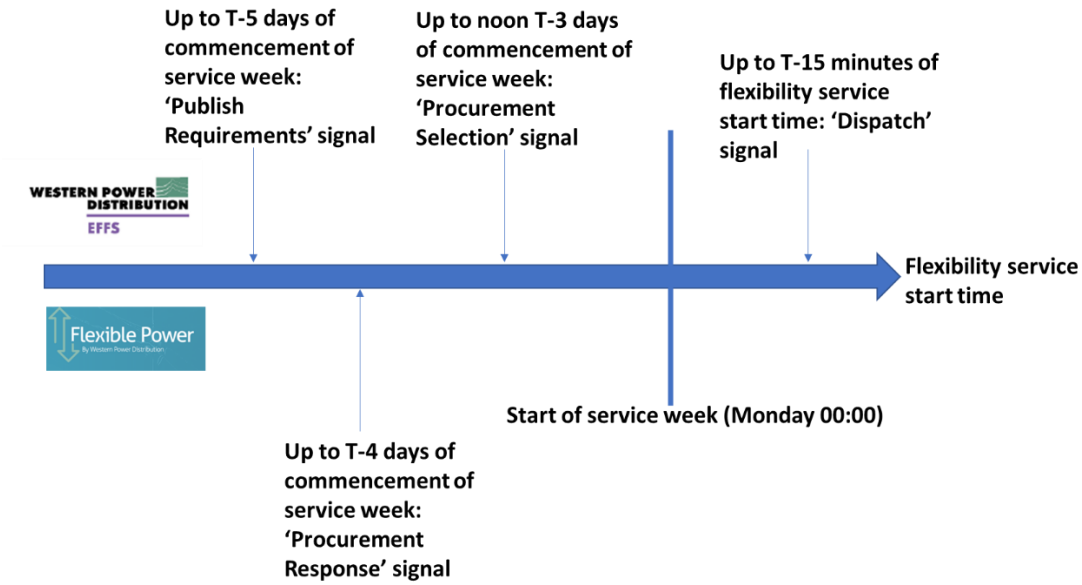

Figure 3: Flexible Power timelines

The number of days in Figure 3 is given is calendar days rather than working days so Service requirements are published on the Wednesday, responses received on the Thursday and selections confirmed on the Friday before the next service week.

6.5.1 Procurement

6.5.1.1 Publish requirements

The 'Publish Requirements' interface will be [redacted]. This will contain the EFFS flexibility procurement requirements.

Please see the format below:

Data item	Type	Unit	Cardinality	Valid set value	Notes
Transaction type	VARCHAR(50)	N/A	1	'Publish Requirements'	
Transaction ID	NUMBER(10)	Numeric	1		Unique ID for the transaction. Should be included in any related responses generated by the generating system.
Transaction Datetime	TIMESTAMP	TIMESTAMP	1		Date and Time when the request was created in the following format 'YYYY-MM-DD HH24:MI:SS.FF'
Network location	VARCHAR(50)	N/A	1		The network Location will be the BSP or Primary Substation WPD Site ID and will match the published list of names given to the flexibility platforms'
Service type	VARCHAR(20)	N/A	1	'Pre-fault constraint management' 'Post-fault constraint management' 'Restoration support'	
HH Datetime	TIMESTAMP	TIMESTAMP	1-*		This will be defined by a DATE + TIME of the end of the

Data item	Type	Unit	Cardinality	Valid set value	Notes
					HH period. These are the periods that flexibility services are required for.
Power requirements	NUMBER(10,3)	MW	1-*		

Table 5: Flexible Power Publish Requirements data items

6.5.1.2 Procurement response

Flexible Power will compare the 'Publish Requirements' signal with the flexibility services available on the Flexible Power platform and will populate a [redacted]. Please see the format below:

Data item	Type	Unit	Cardinality	Valid set value	Notes
Transaction type	VARCHAR(50)	N/A	1	'Procurement Response'	
Transaction ID	NUMBER(10)	Numeric	1		Unique ID for the transaction. Should be included in any related responses generated by the generating system.
Transaction Datetime	TIMESTAMP	TIMESTAMP	1		Date and Time when the request was created in the following format 'YYYY-MM-DD HH24:MI:SS.FF'
Network location	VARCHAR(50)	N/A	1		The network Location will be the BSP or Primary Substation WPD Site ID and will match the published list of

Data item	Type	Unit	Cardinality	Valid set value	Notes
					names given to the flexibility platforms'
Service type	VARCHAR(20)	N/A	1	'Pre-fault constraint management' 'Post-fault constraint management' 'Restoration support'	
HH Datetime	TIMESTAMP	TIMESTAMP	1-*		This will be defined by a DATE + TIME of the end of the HH period. These are the periods that flexibility services are being offered for.
Power available	NUMBER(10,3)	MW	1-*		
Asset ID(s)	VARCHAR(50)	N/A	1-*		This value will be the unique Asset ID for the flexibility asset and can only be supported by non-aggregator customers.
MPAN(s)	NUMBER(13)	Numeric	1-*		MPAN's can only be supported by non-aggregator customers and depending on the flexibility will provide wither an import or export MPAN.

Data item	Type	Unit	Cardinality	Valid set value	Notes
Actual market procurement payment	NUMBER(4)	£/kW	0-*		

Table 6: Flexible Power Procurement Response data items

6.5.1.3 Procurement Selection

EFFS will optimise the bids contained in the 'Procurement Response' [redacted] (as well as those received from other flexibility platforms if the timescales align). The output will be a 'Procurement Selection' [redacted] that contains details of which bids are to be progressed and which are not.

No handshake or acknowledgement is required, any issues progressing the selected services within Flexible Power will be handled as an offline exception management process. Therefore, EFFS will assume this instruction is always successful. Please see the format below:

Data item	Type	Unit	Cardinality	Valid set value	Notes
Transaction type	VARCHAR(50)	N/A	1	'Procurement Selection'	
Transaction ID	NUMBER(10)	Numeric	1		Unique ID for the transaction. Should be included in any related responses generated by the generating system.
Transaction Datetime	TIMESTAMP	TIMESTAMP	1		Date and Time when the request was created in the following format 'YYYY-MM-DD HH24:MI:SS.FF'
Network location	VARCHAR(50)	N/A	1		The network Location will be the BSP or Primary Substation WPD Site ID and will match the published list of names given to the flexibility platforms'
Service type	VARCHAR(20)	N/A	1	'Pre-fault constraint	

Data item	Type	Unit	Cardinality	Valid set value	Notes
				management' 'Post-fault constraint management' 'Restoration support'	
HH Datetime	TIMESTAMP	TIMESTAMP	1-*		This will be defined by a DATE + TIME of the end of the HH period. These are the periods that flexibility services are required to be available for
Power required	NUMBER(10,3)	MW	1-*		
Asset ID(s)	VARCHAR(50)	N/A	1-*		This value will be the unique Asset ID for the flexibility asset and can only be supported by non-aggregator customers.
MPAN(s)	NUMBER(13)	Numeric	1-*		MPAN's can only be supported by non-aggregator customers and depending on the flexibility will provide wither an import or export MPAN.
Status	VARCHAR(20)	N/A	1-*	'Accept' 'Reject'	

Table 6: Flexible Power Procurement Response data items

6.5.2 Dispatch

6.5.2.1 Procurement Dispatch

The message to dispatch services will be triggered via a dispatch message from EFFS in [redacted]. Please see the format below:

Data item	Type	Unit	Cardinality	Valid set value	Notes
Transaction type	VARCHAR(50)	N/A	1	'Procurement Dispatch'	
Transaction ID	NUMBER(10)	Numeric	1		Unique ID for the transaction. Should be included in any related responses generated by the generating system.
Transaction Datetime	TIMESTAMP	TIMESTAMP	1		Date and Time when the request was created in the following format 'YYYY-MM-DD HH24:MI:SS.FF'
Network location	VARCHAR(50)	N/A	1		The network Location will be the BSP or Primary Substation WPD Site ID and will match the published list of names given to the flexibility platforms'
Service type	VARCHAR(20)	N/A	1	'Pre-fault constraint management'	
HH Datetime	TIMESTAMP	TIMESTAMP	1-*		This will be defined by a DATE + TIME of the end of the HH period. These are the periods that flexibility services are required to be available for
Power required	NUMBER(10,3)	MW	1-*		
Asset ID(s)	VARCHAR(50)	N/A	1-*		This value will be the unique Asset ID for the flexibility

Data item	Type	Unit	Cardinality	Valid set value	Notes
					asset and can only be supported by non-aggregator customers.
MPAN(s)	NUMBER(13)	Numeric	1-*		MPAN's can only be supported by non-aggregator customers and depending on the flexibility will provide wither an import or export MPAN.
Status	VARCHAR(20)	N/A	1-*	'Accept' 'Reject'	

Table 7: Flexible Power Procurement Dispatch data items

6.5.3 [redacted] Naming Conventions

Each [redacted] message will have a naming convention in the following format:
[redacted]
An example of the above would be as follows:

Publish requirements = [redacted].

6.6 CLEM

For the purpose of the trials EFFS will use the [redacted] but adapted to meet the requirements of the project. Below is the high-level overview of the timelines in Figure 4 and the supporting text below.

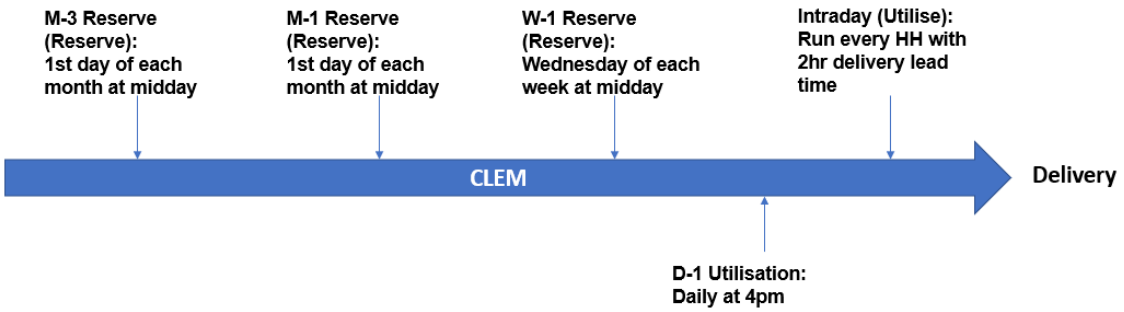

Figure 4: CLEM timelines

M-3, M-1 & W-1 are reserve auctions that the EFFS project can win reserve flexibility services in; these represent the procurement steps in the EFFS project. **D-1** is where the utilisation portion of reserved services are procured, and successful participants will dispatch at the agreed time. Intraday trading will auction and dispatch in the same day.

Due to the nature of the CLEM the EFFS interface and process will not align to the PowerShift and Flexible Power Platform timelines and logic. Therefore, this platform will be treated as a separate process.

6.6.1 Procurement

The interface will support a few messages. The below sequence diagram in Figure 5 shows the interactions the interface will support. How these messages will work is detailed in sections 6.6.2 and 6.6.3.

Figure 5: CLEM interface sequence

Unlike the above interfaces with PowerShift or Flexible Power where a procurement request is sent, the flexibility platform returns available bids, it's optimised by EFFS and then a procurement selection message is returned to advise the platform of which bids have been successful. The CLEM model determines that the flexibility procurement request is auctioned, and CLEM will procure the flexibility for EFFS based on available flexibility.

Therefore, all optimisation is completed internally, and no response message is received back for EFFS to select bids, as this is carried out by the existing CLEM portal. This requires an interface message to retrieve the auction results to update the EFFS system such as with the amount of flexibility procured that is reserved.

In addition, CLEM do not have a dispatch or arming signal as such, flexibility will only be dispatched at the agreed time after a utilisation auction which takes place the day before for previously reserved auctions or intraday for short notice procurement requests.

6.6.2 Procurement request (reservation/utilisation bid)

The 'Procurement Request' interface will be generated from EFFS, sent to CLEM [redacted]. This will contain the data to support an auction in CLEM for a reserve or utilisation auction and the below is the format of the message:

EFFS Data item	Type	Unit	Cardinality	Valid set value	Notes
Transaction type	VARCHAR(50)	N/A	1	'Procurement Request'	
Transaction ID	NUMBER(10)	Numeric	1		Unique ID for the transaction. Should be included in any related responses generated by the generating system.
Transaction Datetime	TIMESTAMP	TIMESTAMP	1		Date and Time when the request was created in the following format 'YYYY-MM-DD HH24:MI:SS.FF'
Network location	VARCHAR(50)	N/A	1		The network Location will be the BSP or Primary Substation WPD Site ID and will match the published list of names given to the flexibility platforms. This will be mapped to the gridNodeMrid
Service type	VARCHAR(20)	N/A	1	'Pre-fault constraint management' 'Post-fault constraint management' 'Restoration support'	These definitions are service naming convention used by Open Networks. These map to the WPD's existing product set: • **Secure** = Pre-fault Constraint Management • **Dynamic** = Post-fault Constraint Management

EFFS Data item	Type	Unit	Cardinality	Valid set value	Notes
					• **Restore** = Restoration Support
Selection Type	VARCHAR(12)	N/A	1	'Reserve' 'Utilisation'	This field defines what type of auction is required.
Service Date	Date	Date	1		
Start time	TIMESTAMP	TIMESTAMP	1		This will be defined by a (DATE +) TIME of start of the first HH period. These are the periods that flexibility services are required for.
Finish time	TIMESTAMP	TIMESTAMP	1		This will be defined by a (DATE +) TIME of the end of the last HH period.
Flexibility Service Direction	Text	N/A	1	'Up' 'Down'	Up means generator turn up or load turn down, Down means generator turn down or load turn up.
Power requirements	NUMBER(10,3)	MW	1		Maps to Reserve Quantity or Utilisation Quantity depending on the selection type
Timeblock	Boolean	N/A	1	0 - Off 1 – On	Default to 0 - Off.
Contract number	NUMBER(12)	Numeric	0-1		Only relevant to Utilisation bids – identifier to locate contract that needs updating with utilisation bid information. Should be provided by

EFFS Data item	Type	Unit	Cardinality	Valid set value	Notes
					previous query on reservation auction results.
Maximum Reservation Price	NUMBER(4)	£/MW	1	Default Value to be Define by EFFS	Maps to Price in CLEM
Maximum Utilisation Price	NUMBER(4)	£/MW	1	Default Value to be Define by EFFS	Maps to Energy Price. Reservation auction allows single value, variable by HH for utilisation
Minimum Acceptance Volume	NUMBER(10,3)	MW	1	Default Value to be Define by EFFS	Minimum volume at which the offer can be accepted for each period – This is an optional field within CLEM
Half Hourly Utilisation Volume	NUMBER(8,3)	MW	1-48		For specifying utilisation auction details for contracts only. Allows for refining volume on d-1 basis compared to month in advance, say.
Half Hourly Utilisation Max price	NUMBER(8,3)	£/MW	1-48		For specifying utilisation auction details for contracts only. Allows for refining volume on d-1 basis compared to month in advance.

Table 8: CLEM procurement request data items

6.6.3 Auction query

CLEM will auction for flexibility to fulfil the requirements received on 'Procurement Request (Reservation/Utilisation Bid)' request. Unlike other market interfaces, there is no direct response to the flexibility request after it has been auctioned. Therefore, no procurement selection process is taking place and in order to determine the flexibility requirement, the solution will send an 'Auction Query' response to obtain the auction results. This will contain the details requested in the 'Procurement Request' that was then auctioned, such as price per MW, amount of flexibility etc. This will be used to determine the results of procurement and utilisation requests and will be sent to EFFS via [redacted].

The CLEM will respond using the standard 'Offer' interface message:

Data item	Data type	Unit	Description
Time Interval	TIMESTAMP	N/A	Start and end time of the period of the flexibility offer
Reserve Quantity	NUMBER	kW/ MW	Defines the reserve quantity that is offered by the resource for the interval in question
Utilisation Quantity	NUMBER	kW/MW	Defines the utilisation quantity that is offered by the resource for the interval in question
Price	NUMBER	£/kW/hr £/MW/hr	The availability price required to make the resource available
Energy Price	NUMBER	£/kWh £/MWh	The utilisation price for each MWh of energy delivered
Reserve Object ID	String	UUID	Unique ID of the grid location where the energy would be delivered (corresponding to ID of a grid node at site, primary sub, BSP, GSP levels)
Reserve Object Level	String	N/A	Detail of the grid level where the energy would be delivered. Primary Substation, BSP, GSP
Direction	String	Up/Down	Direction of the energy flow on the system. Up = Generation increase or Demand decrease
Response Time	NUMBER	Minutes	Duration in minutes between receiving a dispatch instruction and activating response
Minimum Acceptance Volume	NUMBER	kW/MW	Minimum volume at which the offer can be accepted for each period

Data item	Data type	Unit	Description
Minimum Duration	NUMBER	Numeric	Minimum number of periods a flexibility dispatch event has to be active for the resource
Maximum Duration	NUMBER	Numeric	Maximum number of periods a flexibility dispatch event can be active for the resource
Recovery Time	NUMBER	Numeric	Minimum number of periods a resource needs to stay down after the end of the dispatch event
Maximum Energy	NUMBER	MW	Maximum energy for which the order can be cleared over any interval of the given duration
Ramp Rates	NUMBER	kW/min	The ramp rates for the resource

Table 9: CLEM offer data items

The process on what to do when the reservation auction has not provided all the required reservation (as insufficient suitably priced bids were available) is still to be confirmed with CLEM.

6.7 Changes since DSO requirements document baselined

6.7.1 Arming

Within the EFFS trial we have opted to drop the 'Arming' signal exchange as outlined in the previous phase for two main reasons. First is that it is deemed to be unnecessary within the timescale of the purchase procedure as being tested within EFFS. In the majority of cases the procurements from the marketplaces will take place just a week ahead of the required delivery from the participants and they will be making their submissions to the marketplace within such close proximity to real time that it is not deemed to improve the reliability of the service being procured. It will in fact add unnecessary exchanges of data that potentially elevate the barrier to entry by any participants without offering any real benefit. The greater concern however is that by calling this an 'Arming' signal it is most likely to undermine the clarity of the understanding that has been developed in relation to the BAU services that are already operational within the WPD Flexible Power 'Secure', which provide a scheduled 'pre-fault flexibility' service.

6.7.2 Platform interoperability

Uniform interfaces to flexibility platforms have yet to be defined at an industry level. Therefore, within EFFS the decision was made in the previous phase to define a default set of instructions between EFFS and flexibility platforms that it was assumed that any flexibility platform integrating to EFFS will use this standard. i.e. there will be no requirement to develop customised interfaces for EFFS to interface with platforms. The instructions and associated data items were derived from the service types defined by the ENA ON (see Appendix 2 for more details) and the operational procurement, arming and dispatch processes defined in this document. However, in practice the flexibility platforms EFFS is interacting with are not yet interoperable in terms of service types and

signals supported, therefore separate interfaces have been specified per platform (taking advantage of any synergies between the respective platforms design where possible).

7 Contact

If you have any questions relating to this document, please use the following points of contact:

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Appendix 1: Definition of Flexibility Platform

'Flexibility Platform' is a term used throughout this document and is deliberately generic due to the current lack of cross-industry consensus on what this role entails and the differences between the existing platforms. Whilst it is not the purpose of EFFS to specify how these platforms will operate, the project makes various assumptions about what functions they will perform throughout the document. For ease of reference these are collated in the table below. Please note that this list is not an exhaustive; it is an overview of assumed flexibility platform capabilities and their relationship to EFFS.

Function	Carried out by flexibility platform?	Required by EFFS?
Interface for registering flexible resources	Yes	Yes
Allows buyers and sellers to match their requirements	Yes	Yes
Communication with flexibility resources	Yes	Yes
Dispatch of flexibility resources	Yes	Yes
Commercial optimisation	Yes	No, as EFFS will use multiple platforms therefore needs a cross platform view
Conflict avoidance with other parties	Yes	No, as EFFS will use multiple platforms therefore needs a cross platform view
Synergy identification with other parties	Yes	No, as EFFS will use multiple platforms therefore needs a cross platform view
Settlements (payment of flexibility providers)	Yes	Yes
Measurement of flexibility providers performance	Yes	Yes

Table 10: Flexibility platform function

Appendix 2 – Service Definitions

Below are the definitions of the initial services types to be supported in accordance with the ENA ON workstream 1 product 2, 'DSO Service Requirements: Definitions':

"***Scheduled Constraint Management*** *- The DSO procures, ahead of time, a pre-agreed change in input or output over a defined time period to prevent a network going beyond its firm capacity (thereby ensuring all load remains secure following the next fault). For example, a reduction in demand is procured over an evening peak period to mitigate risk of overload that might result should a fault occur on one of two in-feeds to a group*[1]*.*

Pre-fault Constraint Management *– The DSO procures, ahead of time, the ability to access a pre-agreed change in Service Provider output based on network conditions close to real-time. Utilisation is then delivered by different mechanisms, depending on whether the DSO wishes to manage network risk manually, or automatically: a. Utilisation may be instructed manually, ahead of real-time, to prevent a network going beyond its firm capacity. This will generally be a manual call based on circuit loading forecasts. For example, a Service Provider is contracted to be available to the DNO over winter evening peaks. The DNO then calls the Service Provider on days forecast to have the worst predicted loadings; or b. Utilisation may be initiated through an automated DSO system. For example, a Service Provider is contracted to be available to the DSO over winter evening peaks. The DSO system then triggers the service when the loading reaches the firm capacity.*

Post-fault Constraint Management *– The DSO procures, ahead of time, the ability of a Service Provider to deliver an agreed change in output following a network fault. Utilisation is then instructed when the fault occurs on the network (but only if loading is beyond the post-fault rating of the remaining assets). This will generally be instructed through an automated system and will utilise the short-term ratings of the assets, such that a sustainable post-fault flow can be achieved. For example, a Service Provider is contracted to be available to the DSO over winter evening peaks. The DSO system instructs the Service Provider to deliver the contracted change in output when the fault occurs.*

Restoration Support *– Following a loss of supply, the DSO instructs a provider to either remain off supply, or to reconnect with lower demand, to support increased and faster load restoration under depleted network conditions. For example, a Service Provider may be restored at minimal load to allow for other (perhaps less flexible) customers to be restored."*

Table 11 summarises these service characteristics:

[1]This service is characterised by operating on a scheduled manner and is therefore simpler to manage and does not require sophisticated forecasting to support decision-making.

Service Characteristics	Scheduled Constraint Management	Pre-fault Constraint Management	Post-fault Constraint Management	Restoration Support
When to act	Pre-fault	Pre-fault	Post-fault	Post-fault
Triggering action	Time	DSO forecast; or Asset Loading	Network fault	Network fault
Certainty of utilisation	Very certain	Uncertain	Uncertain	Very uncertain
Efficiency of utilisation	Low	Medium	High	Low
Risk to network assets	Low	Medium	High	Low
Frequency of use	High	Medium	Low	Low

Table 11: Service characteristics

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