# WESTERN POWER DISTRIBUTION

## EFFS

# ELECTRICITY FLEXIBILITY AND FORECASTING SYSTEM

**EFFS**
WPD_EN_NIC_003

**NIC PROJECT**
**SYSTEM DESIGN REPORTING**

**RIIO** **NIC** NETWORK INNOVATION COMPETITION
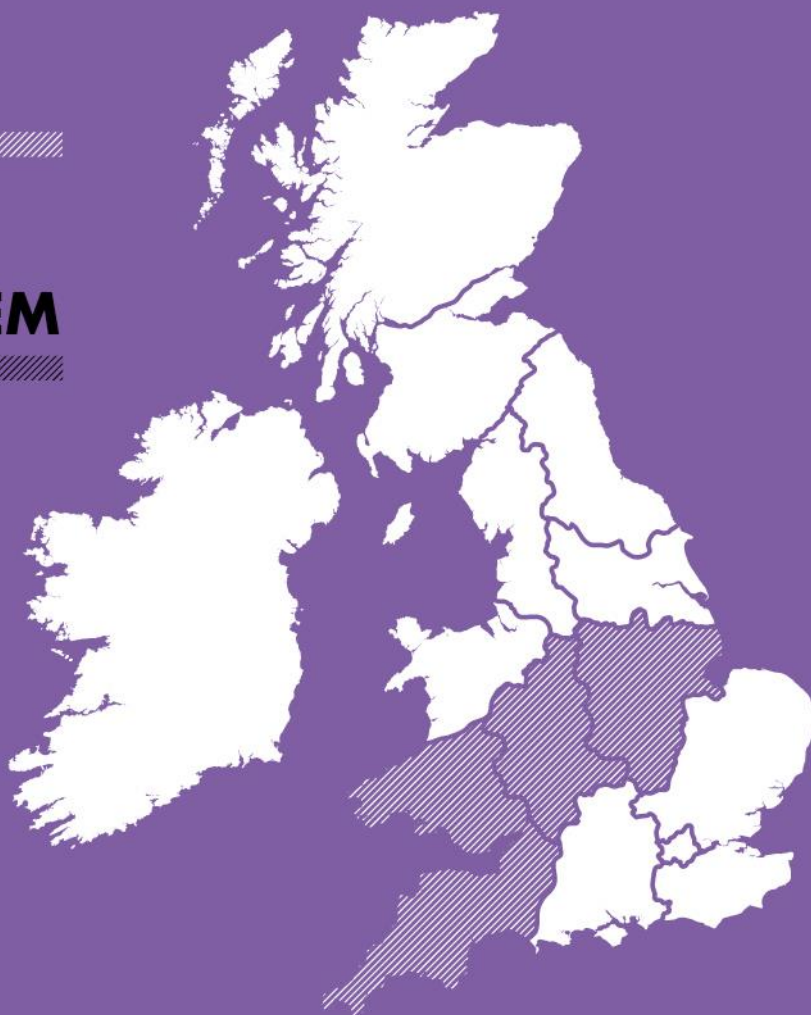
| Report Title | : | System Design: Reporting |
|---|---|---|
| Report Status | : | FINAL REDACTED |
| Project Reference: | : | WPD/EN/NIC/03 |
| Date | : | 25/10/2019 |

| Document Control | | |
|---|---|---|
| | Name | Date |
| Prepared by: | Ray Adams | 09/09/2019 |
| Reviewed by: | Jennifer Woodruff | 09/09/2019 |
| Approved by: | Ben Godfrey | 14/10/2019 |
| | Paul Hartshorne | 15/10/2019 |
| | Jonathan Berry | 16/10/2019 |
| | Sarah Hadfield | 22/10/2019 |

| Revision History | | |
|---|---|---|
| Date | Issue | Status |
| 19/07/2019 | 0.1 | DRAFT |
| 20/08/2019 | 0.2 | DRAFT |
| 26/08/2019 | 0.3 | DRAFT |
| 19/09/2019 | 0.4 | DRAFT |
| 01/10/2019 | 0.5 | DRAFT |
| 08/10/2019 | 0.6 | DRAFT |
| 09/10/2019 | 0.7 | DRAFT |
| 09/10/2019 | 0.8 | ISSUED FOR APPROVAL |
| 16/10/2019 | 1.0 | FINAL |
| 25/10/2019 | 2.0 | FINAL REDACTED |

## Contents

---

DISCLAIMER

Neither WPD, nor any person acting on its behalf, makes any warranty, express or implied, with respect to the use of any information, method or process disclosed in this document or that such use may not infringe the rights of any third party or assumes any liabilities with respect to the use of, or for damage resulting in any way from the use of, any information, apparatus, method or process disclosed in the document.

© Western Power Distribution 2019

No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means electronic, mechanical, photocopying, recording or otherwise, without the written permission of the Innovation Team Manager, Western Power Distribution, Herald Way, Pegasus Business Park, Castle Donington. DE74 2TU.

Telephone +44 (0) 1332 827446. E-mail wpdinnovation@westernpower.co.uk

# 1   Purpose of this document

The purpose of this design document is to specify how the reporting 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 reporting 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; and
- **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 demonstrate the trial outcomes and learnings of EFFS, the project has defined a high-level approach to reporting. The EFFS project has adopted the principle that a limited number of pre-defined reports relating to the EFFS processes and core systems will be delivered. This is based on the known business requirements at this stage. These detailed business requirements have changed significantly since those defined in Workstream 1 (forecasting evaluation and requirements gathering),  due to the evolution of Flexibility Platforms plus an increased understanding of the use and management of flexibility within the operational business. For example, there was an original requirement to support a service delivery confirmation report from the Flexibility Platform to the DSO. However, working through the design it has been established that this is a settlements activity that is out of scope for EFFS. As this will follow existing BAU practises for each Flexibility Platform to provide the invoicing and billing of flexibility procured by the DSO.

In addition, there was a requirement for EFFS to compare what flexibility was requested to be dispatched with what has actually dispatched (both in terms of timeliness and also fulfilment of the energy requirement). Like the above, this falls into settlement processing and does not fit into the scope of the EFFS project. Based on this experience during the system design deliverable phase, an exhaustive suite of bespoke reports would not be appropriate as the reporting requirements are likely to evolve further as the trials progress. However, the key principles of reporting at this stage that we expect to expand upon are cost of flexibility services, timeliness of responses from Flexibility Platforms and forecasting accuracy.

## 3 Glossary

| Term | Definition |
|---|---|
| BAU | Business As Usual |
| DSO | Distribution System Operator |
| EFFS | Electricity Flexibility and Forecasting Systems |
| Flexibility Platform | See Appendix 1 for details |
| FMZ | Flexibility Management Zone, a generic term within the AMT-SYBEX Affinity Networkflow application to describe an area where flexibility will be managed (equivalent to CMZ) |
| FMZ ID | Unqiue ID for an FMZ |
| kV | Kilovolt |
| kW | Kilowatt |
| Affinity Networkflow or Networkflow | Proprietary software suite developed, licenced and maintained by AMT-SYBEX relating to the management of flexibility services for electricity networks |
| Service types | Types of peak shaving flexibility services that will be supported by EFFS (namely scheduled constraint management, pre-fault constraint management, post-fault constraint management, restoration support) |
| User | Users of the EFFS system are anticipated to be:<br><br>• **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.<br>• **Control engineer** for real time dispatch and monitoring of the network.<br>• **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

Figure 1 below is a diagrammatic representation of the functional areas within the EFFS project. The core of this functionality will be supported by the Reporting module in AMT-SYBEX's Affinity Networkflow[1] product.
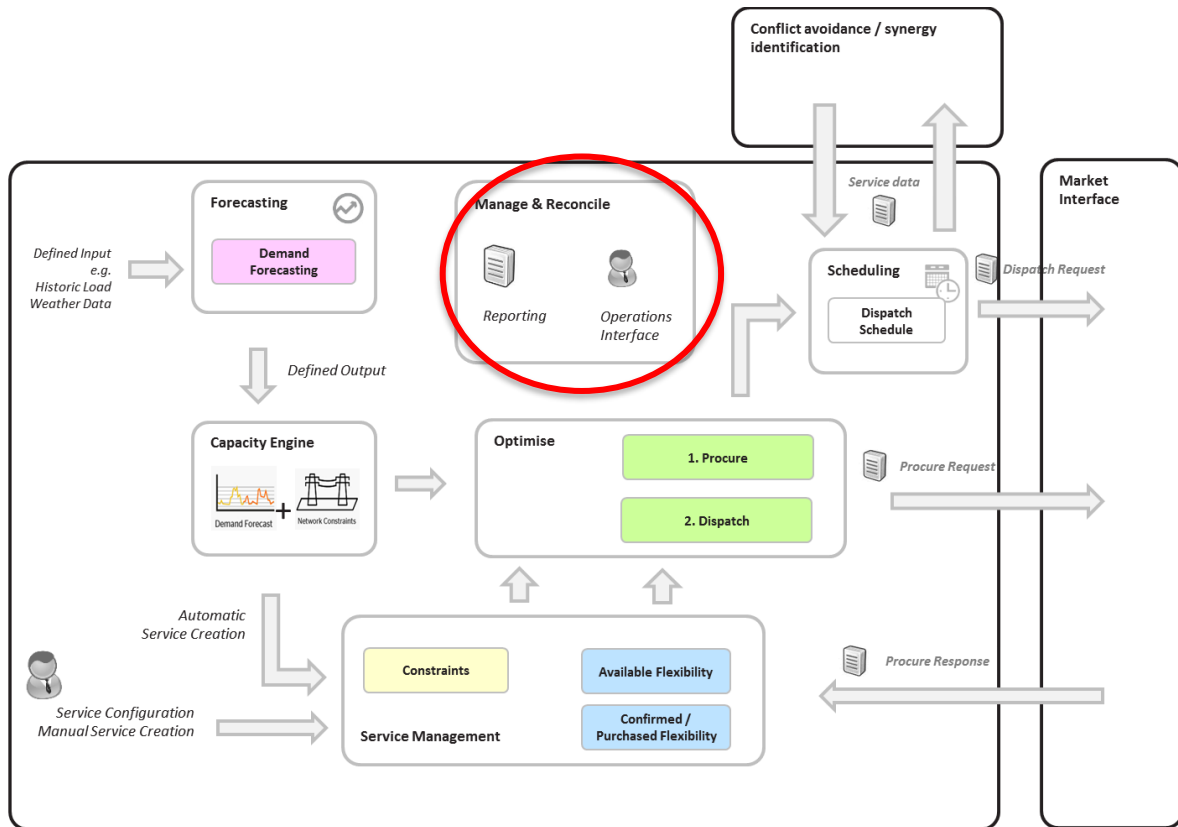


**Figure 1: EFFS core functions**

---

[1] https://www.amt-sybex.com/networkflow/

# 6   Reporting

Networkflow will support a limited selection of pre-defined reports that can be delivered by the system. These will support exporting the relevant data in ▇▇▇ format so that it can be integrated with other data outside Networkflow and can support any particular presentation format the user chooses to create. Networkflow will not present the results of the various reports to the user via a user interface. Ad-hoc reports could also be created by a system administrator directly from the underlying databases.

The business activities supported by the standard predefined reports will be:

1. Monitoring forward looking commitments against budget – by providing summaries reflecting planned procurement and dispatching to allow a comparison between the volumes of service and service costs committed in an area over a period of time in the future, against budget. (For the avoidance of doubt, it is not planned to interface to WPD financial reporting systems to present data relating to sanctions for flexibility service payments, levels of spend against these sanctions, details of invoices etc. as this would duplicate existing systems);
2. Tracking indicative historic prices and volumes;
3. To support an assessment of fairness (i.e. that no particular provider type, technology or market is being treated preferentially), this is expected to be of marked interest to Ofgem;
4. To track market development, providing information to determine trends in the number of flexibility service providers, average prices paid etc. to inform policy development and budgeting; and
5. To support Regulatory Reporting Packs for Ofgem, which are expected to aggregate costs according to the type of constraint being mitigated (N-1, N-2). This is not a current field across EFFS, but it is assumed it will be possible to relate the services to these categories as a mapping activity outside EFFS.

Networkflow will not support a reporting interface to allow users to create and customise reports. This is because, aside from the categories of reporting identified above, no business requirement for such a facility has been identified.

While the Reporting module in Networkflow is called "Reporting and Reconciliation", the project does not expect to be carrying out a reconciliation function. Financial settlements for flexibility services will be handled via the associated Flexibility Platforms with the process to authorise and handle payments being outside the scope of EFFS. However, the procurement and dispatching summaries may provide a useful cross-check to the existing processes.

## 6.1   Scope

| In scope | Out of scope |
|---|---|
| • A set of reports relating to historic and planned flexibility services, exportable in ▇▇▇ format. | • Financial settlements;<br>• An interface to produce custom queries not included in the set of standard reports; and<br>• A user interface to allow users to monitor key aspects of the system. |

Table 2: Scope for reporting

## 6.2   Description

The Reporting module will allow the production of reports to assess the performance and management of flexibility services between the DSO and the Flexibility Platforms. The reports will look

at measuring the performance of the Flexibility Platforms in terms of timeliness and costs. These reports will be displayed depending on its suitability in graph format or in data tables with drill-downs for users to view more detailed information.

Networkflow will provide standard reporting for the requirements defined below. Some reporting for the trials may involve multiple systems (at this stage assumed to be those specified within the other seven system design documents) and manual intervention for reporting on ad-hoc activities such as the total costs for running the trials or financial reconciliation. Therefore, not all reporting will be productised for the trial.

## 6.3 Solution

## 6.4 Pre-requisites

- Databases with data held for the relevant reporting.

## 6.5 Input

- Service data in the service register including:
    - Service statuses;
    - Costs per MWh;
    - Volume of MWhs procured/dispatched;
    - Service start and end datetimes; and
    - Flexibility Management Zone (FMZ) IDs.

## 6.6 Output

The solution will output the following reports with the ability to export the data to ███ format:

1. Indicative spends to date;
2. Average costs of flexibility;
3. Average Flexibility Platform response times; and
4. Forecasting accuracy.

## 6.7 Reports

### 6.7.1 Indicative spend to date for flexibility procurement

The solution will provide the users the ability to report indicative spends to date based on a configurable time period for flexibility procured. This is to give the Network Strategy Team an early view of the expected spend for a configurable period of time such as the last week or month for flexibility dispatched or where money has been committed for reserved services not yet dispatched.

The report will run on a configured batch and will source the data from the service register database. The ███ file output will be stored on a WPD network drive location accessible to the Network Strategy Team. The report will contain the following data items:

**Tab 1 – Summary**
- FMZ ID – The ID used for the FMZ;
- Subtotal of the cost of all reserved and not dispatched services;
- Subtotal of the volume of reserved and not dispatched services;

_____

- Subtotal of the cost of all utilised (dispatched) Services;
- Subtotal of the volume of all utilised (dispatched) Services;
- Total of the above cost figures per FMZ ID;
- Total of the above volume figures per FMZ ID;
- Start datetime of Query; and
- End datetime of Query.

**Tab 2 – Raw Data**

- FMZ ID;
- Service ID;
- Service type;
- Flexibility Platform;
- Start datetime of service;
- End datetime of service;
- Volume of MWhs reserved;
- Volume of MWhs utilised;
- Price of MWhs reserved; and
- Price of MWhs utilised.

The ▮▮▮ will be generated with a file naming convention ▮▮. Note: Networkflow will have details of the prices agreed for flexibility services that were procured and dispatched, however the final payments to Flexibility Platforms/providers will differ to reflect penalty and reward mechanisms within the contract for under/over delivery. The financial values extracted from Networkflow are not expected to align perfectly with the costs reported in WPD's financial systems and therefore the values can only be considered indicative.

While this export will help understand the indicative spend to date, the level of detail in this export also supports other expected occasional reporting on market development and fairness of allocation between market platforms.

## 6.7.2 Measure average costs of flexibility

Networkflow will provide a user with the ability to report average running costs of flexibility purchasing for a configurable time period. This will give the Network Strategy Team a view of the running costs per Flexibility Platform and service type across the respective Flexibility Platforms. Given the nature of the reporting and analytic methods that could be applied, it has been agreed to submit the raw data as a ▮▮▮ for the Network Strategy Team to apply an appropriate analysis technique to determine the running costs, and to model the data.

Therefore, the report will run on a configured batch and will source the data from the service register database. This will be stored on a network drive location for the Network Strategy Team to pick up. The report will be output as a ▮▮▮ file and will contain the following data items:

- Service ID;
- Flexibility Platform;
- Service type;
- Service delivery start time;
- Service delivery end time;
- Flexibility procured (MW +/-);
- Price per MWh utilisation;

- Price per MWh reservation; and
- FMZ ID

The ▮▮▮▮ will be output with a file naming convention prefix ▮▮▮▮.

### 6.7.3    Measure Flexibility Platform response times

The solution will produce a report for the response times of interactions between the DSO and the Flexibility Platform in the procuring and dispatch of energy and/or power. The solution will hold timestamps of when a message is sent out and received from a Flexibility Platform. This may not be relevant for service types and Flexibility Platforms that do not support automated interfaces.

The report will compare the response timings in the system configuration against sent and received timestamps and display the data items in Table 2 in a reporting format.

| Name | Data Type | Notes |
|---|---|---|
| Flexibility Provider | String | |
| Process Type | String | Valid Values:<br>• Procurement<br>• Dispatch |
| Response Status | String | Valid Values:<br>• 'Responded on Time'<br>• 'Responded Late'<br>• 'Failed to Respond'<br>• 'Failed to Deliver'<br>Defined by the logic in section 6.7.3.1 |

*Table 2: Date types for measuring Flexibility Platform response times*

A user can then view details of each record of the corresponding process and response status.

### 6.7.3.1    Response status logic

The solution will use the following logic to determine the Delivery Status field above:

- **if** Configured Response Time **<=** Actual Response Time:
  - **return** 'Responded on Time'
- **else if** Configured Response Time **>=** Actual Response Time:
  - **return** 'Responded Late'
- **else**:
  - **return** 'Failed to Respond'

### 6.7.4    Forecasting accuracy

The calculation for forecasting accuracy is explained in 'WPD EFFS_System Design_Forecasting'; it has been included as a section in this document for completeness.

## 6.8   Changes since DSO requirements document baselined

There was an original requirement to support a service delivery confirmation report from the Flexibility Platform to the DSO. However, working through the design it has been established that this is a settlements activity that is out of scope for EFFS. As this will follow existing BAU practises for each Flexibility Platform to provide the invoicing and billing of flexibility procured by the DSO.

In addition, there was originally a requirement for EFFS to compare what flexibility was requested to be dispatched with what has actually dispatched (both in terms of timeliness and also fulfilment of the energy requirement). Similar to the above, this fell into settlement processing and does not fit the scope of the EFFS project.

There was also a change in requirement to manually maintain a budget value for flexibility services to inform users of fiscal decisions for flexibility. Upon further refinement of the requirement it was established that having an indicative spend to date of flexibility before subsequent settlement and billing processes concluded was more viable. This gives the Network Strategy Team early visibility of spend to date which was seen as more valuable than the original requirement. This is because users dispatching flexibility are not concerned with the fiscal implications but more network reliability.

# 7   Contact

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

**Future Networks Team:**

      Western Power Distribution,
      Pegasus Business Park,
      Herald Way,
      Castle Donington,
      Derbyshire
      DE74 2TU

Email: jwoodruff@westernpower.co.uk

# 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 3: Flexibility Platform functions

This page has been left intentionally blank.