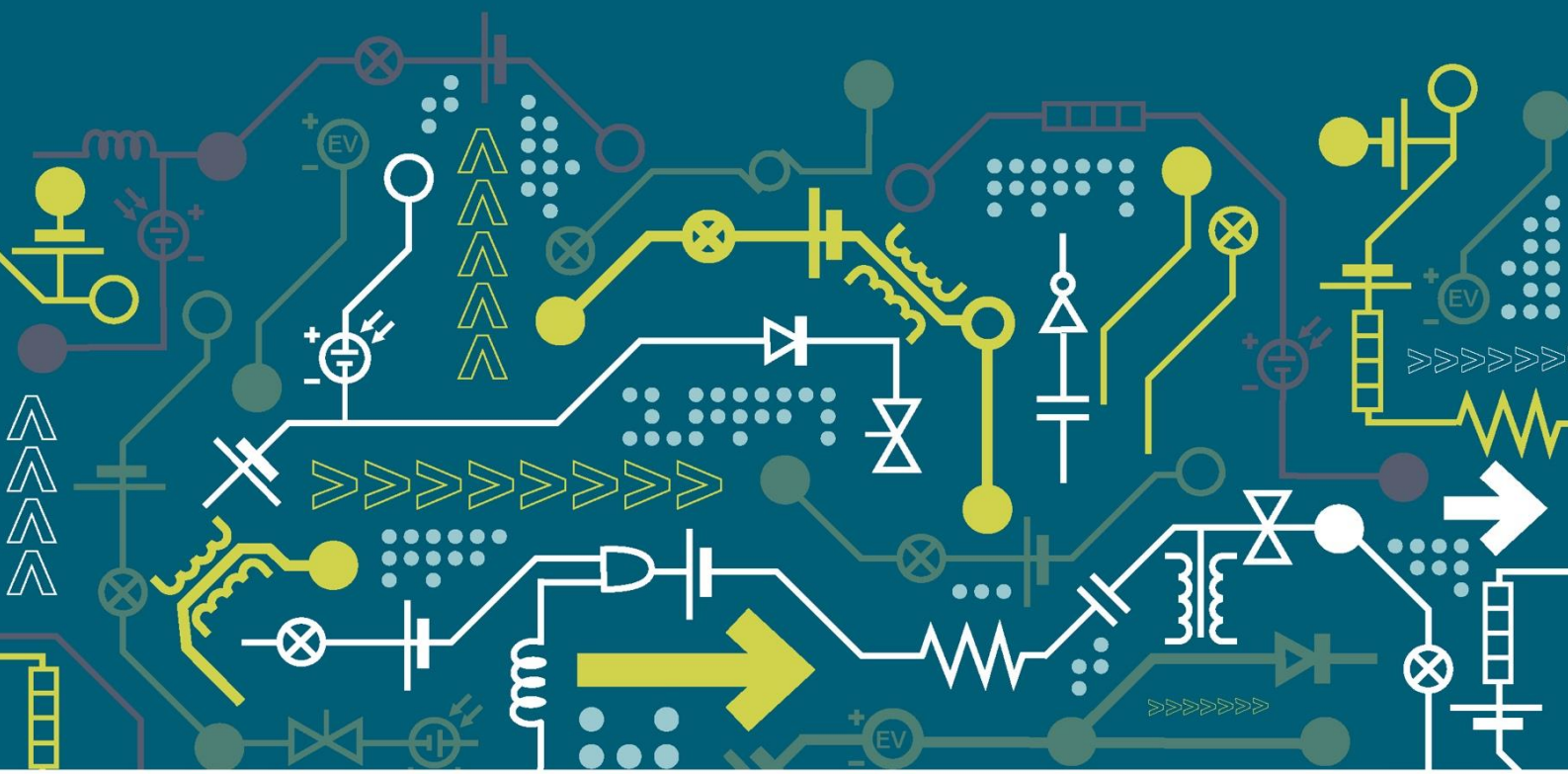
WPD INNOVATION

EFFS

NIC Progress report

Reporting Period Oct 2019 to Mar 2020



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Contents

1 Executive Summary

1.1 Introduction

The Electricity Flexibility and Forecasting System Project (EFFS or "the Project") is funded through Ofgem's Network Innovation Competition (NIC). EFFS was registered in October 2018 and will be complete by October 2021.

EFFS supports the Distribution System Operator (DSO) transition by developing and trialling a system to plan and dispatch flexibility services in operational timescales. EFFS is split into four workstreams: 1) Forecasting Evaluation and Requirements, 2) Implementation, 3) System and Trials Testing, 4) Collaboration and Learning. The Project is working collaboratively with the Scottish and Southern Electricity Networks' TRANSITION project and Scottish Power Energy Networks' FUSION project. Together with EFFS these projects are collectively known as TEF. All three TEF projects are coordinating with the Energy Network Association's Open Networks project[1]. EFFS has already shared forecasting algorithms and, as it is scheduled to start trials ahead of the other two projects, will continue to share learning as it will often be first to tackle common issues.

1.2 Overall Project Progress

This document is the Project's third six-monthly project progress report and covers progress from October 2019 to the end of March 2020. The second progress report, covering March 2019 to October 2019, covered the forecasting evaluation, system requirements specification and gateway 1 deliverables, which formally enabled progression into the project's Workstream 2. Moreover, this period saw the bulk of the design work to produce the EFFS system design documentation.

This documentation was shared with the industry in October 2019. Since then, the project has entered into its development phase, which has seen the following key developments;

- the capture of architectural requirements;
- the reconfiguration by AMT-SYBEX of their Affinity Networkflow solution to support the forecasting, optimisation and service management requirements;
- the initiation of additional development work of a PSS/E tool, to support with the power flow analysis requirements;
- the initiation of additional forecasting analysis following up on recommendations from the original forecasting work; and
- the initiation of work on interface specifications and a data model.

The key achievements in the last period of the project are summarised below.

- Delivery of the project's fifth project deliverable, the EFFS system design documentation.
- Production of the TEF stage gate report.
- TEF collaboration and coordination.
- Dissemination of the EFFS system design at WPD's Balancing Act event.

1.3 Business Case

There have been no changes to the benefits case to date. For information, the original business case benefits are included in Appendix 1.

[1] TRANSITION and FUSION are NIC funded projects that bid in the same year as EFFS that also relate to flexibility services. The projects' approval was conditional on collaboratively identifying benefits to be delivered through shared working. The projects continue to work closely to ensure shared benefits are delivered and will need to demonstrate this to progress beyond a common stage gate assessment. Open Networks is an ENA managed industry wide project relating to DSO transition which looks to provide shared analysis, roadmaps, models etc. and promote standardisation.

1.4 Learning and Dissemination

A number of insights have been gained during the design and initial stages of building the EFFS system. These result from learning within the project, broader industry developments and pragmatic decisions made during the implementation of the solution. For more details please refer to section 6.

Within this reporting period, the EFFS projects progress and learnings have been disseminated at the following events:

- LCNI 2019 Conference – October 2019
- WPD 2019 Balancing Act Event – November 2019

1.5 Project Risks

The EFFS project risk register was formally created at project commencement. It is a live document and is updated regularly Mitigation action plans are identified when raising a risk and the appropriate steps then taken to ensure risks do not become issues wherever possible. Recently in response to the Coronavirus pandemic, a new risk register of COVID 19 related risks has been created which is reviewed daily.

Section 8.1 of this report outlines the current top risks associated with successfully delivering EFFS as captured in our risk register. Section 8.2 provides an update on the most prominent risks reported in the previous progress report.

2 Project Manager's Report

2.1 Project Background

The EFFS project was awarded funding in October 2018 under the 2017 Network Innovation Competition (NIC). It will specify and trial the additional system functionality required by a Distribution Network Operator (DNO) to help the transition to DSO as given in the following objectives:

1. Enhancing the output of the ENA Open Networks project, looking at the high-level functions a DSO must perform, provide a detailed specification of the new functions validated by stakeholders, and the inclusion of specifications for data exchange;
2. Determining the optimum technical implementation to support those new functions;
3. Creating and testing that technical implementation by implementing suitable software and integrating hardware as required; and
4. Using and testing the technical implementation, which will involve modelling the impact of flexibility services.

The first objective has been achieved by the production of the DSO requirements specification with the input from industry stakeholders. The technical specification documents that are under development will meet the second objective with the third and fourth objectives relating the build and trial phases of the project respectively.

EFFS will focus on 33kV networks and above as these are the parts of the network where the case for flexibility as an alternative to reinforcement is currently strongest. This is reflected in WPD's BaU roll out of flexibility services via Flexible Power. This is because reinforcement costs at 33kV and above are highest and the number of flexibility customers that may be able to provide relevant services is also highest due to the ability to aggregate the impact of flexibility customers connected downstream. This is in contrast to the LV network where reinforcement costs are considerably lower and currently LV connected flexibility services are sparse.

The design of the EFFS functions and processes will aim, where possible, to ensure that they could be adapted to lower voltages at a later date. E.g. when the higher levels of flexible EV charging may offer widespread services.

Ofgem have obliged EFFS to work collaboratively with two other NIC projects, TRANSITION and FUSION, which are also exploring the DSO transition. Project funding was dependent on an initial assessment of collaborative benefits and associated budget reduction to ensure that synergies were exploited, and duplication was avoided. This is explained in further detail in section 2.8.1, TEF Collaboration. Similarly, the ENA's Open Networks project is also working to determine the new skills and functions that DNOs will need to develop in order for the DSO transition to take place. EFFS is working closely with Open Networks via the TEF collaboration, contributing to and receiving information from several products across the workstreams.

The Project Partners involved in EFFS are:

1. Western Power Distribution: Project Lead/Funding DNO (licensee);
2. AMT-SYBEX: Third Party Lead Supplier; and
3. National Grid Electricity System Operator (ESO).

Furthermore, the project has the following key stakeholders:

- Energy Network Association's Open Networks project;
- Scottish and Southern Electricity Networks, as Project Lead/Funding DNO (licensee) of the TRANSITION project;
- Scottish Power Energy Networks as Project Lead/Funding DNO (licensee) of the FUSION project;
- Capita Employee Benefits data science team as Design Authority of the Forecasting Partner; this service is provided through AMT-SYBEX
- Smarter Grid Solutions (Forecasting Partner);
- Centrica as managers of the Cornwall Local Energy Market project; and
- EDF Energy.

These relationships are depicted in Figure 1 below.

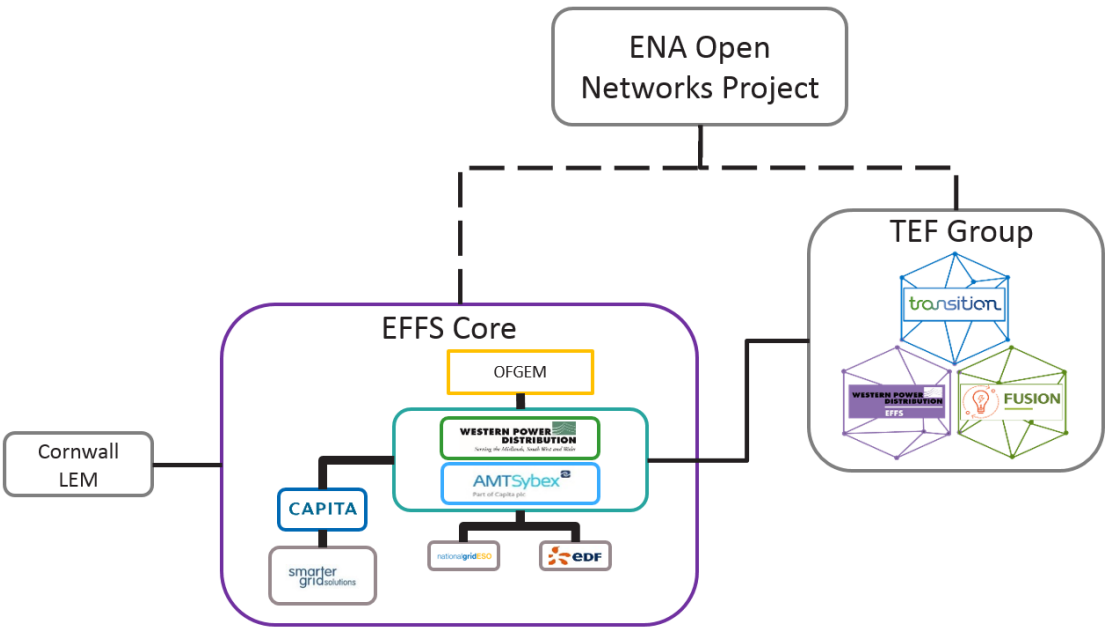

Figure 1: EFFS Key Stakeholders

The Project commenced in October 2018 and is scheduled to complete in October 2021. The Project has four workstreams as shown in Figure 2. This report details the progress of the Project over the last 6 months, October 2019 to March 2020. The reporting period is depicted on Figure 2 by the blue shaded box.

Workstream	Description	H1 2018	H2 2018	H1 2019	H2 2019	H1 2020	H2 2020	H1 2021	H2 2021
1	Forecasting Evaluation, Co-ordination and Requirements	Ofgem Approval		Gateway Review 1					
2	System Design, Development, Build, System Test					Gateway Review 2			
3	Onsite Testing, Trials and Conflict Management							Gateway Review 3	
4	Collaboration and Knowledge Dissemination								Closedown Report

Figure 2: EFFS Timeline

The Project has progressed steadily over the past 6 months with a significant Project deliverable, the EFFS System Design Documentation, delivered to time and budget, as well as close collaboration with the TEF partners. Areas of focus for the purposes of this report include:

- EFFS System Design Documentation;
- TEF Collaboration;
- TEF Stage Gate Report; and
- Project Dissemination.

2.2 EFFS System Design Documentation

The EFFS system design was specified as part of the first activity in the EFFS project's Workstream 2. The system design has built on the relevant DSO requirements defined in Workstream 1 and specifies the design principles for how EFFS will be delivered from a functional perspective. While some functionality detailed in the system design is generic and transferable to other DNOs, the design phase also reflects WPD specific systems within or interacting with EFFS. Specifying the system design focused largely on identifying practical design options from the expertise of subject matter experts of existing systems within WPD, as well as drawing on AMT-SYBEX's Affinity Networkflow functionality. The system design documentation was split into the functional areas for EFFS, which are:

- Forecasting;
- Capacity engine;
- Service management;
- Optimisation;
- Scheduling;
- Conflict avoidance and synergy identification;
- Market interface; and
- Reporting.

Figure 3 below provides a functional overview of the system.

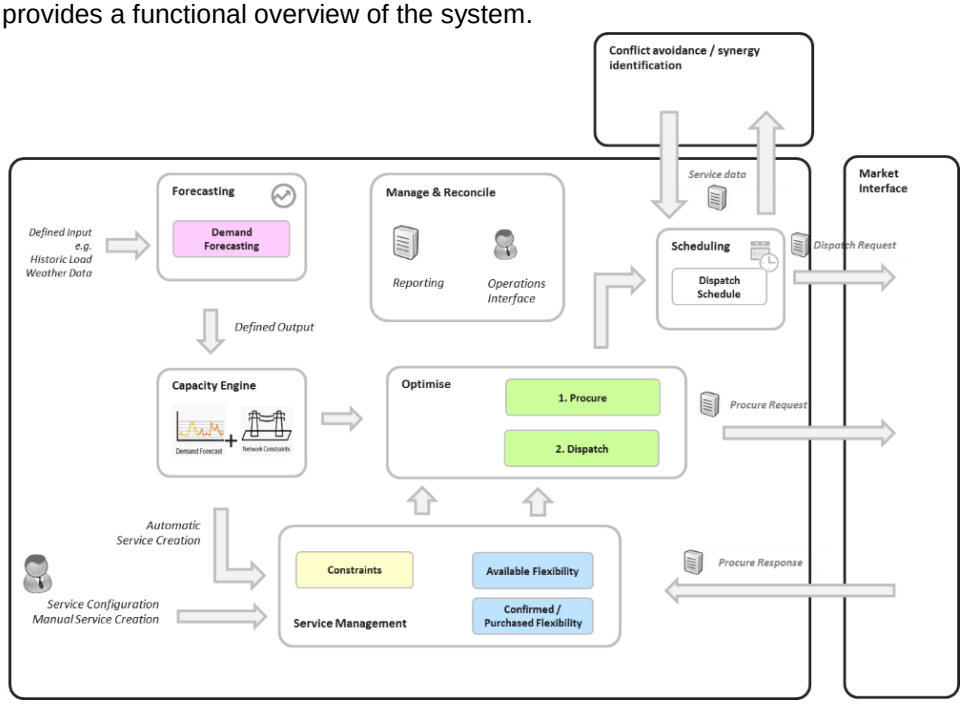

Figure 3: EFFS core functions

2.3 EFFS System Development

Since the design documents were published, work has continued to define the technical architecture for the system and to finalise design details. This has involved the appointment of a System Architect who was also able to provide an independent review of the system design to date. Their recommendations have included the simplification of some of the elements of the system where complex processes or adjustments had been previously proposed. The technical complexity of the system to be delivered has been a long standing risk for the EFFS project so these simplifications, which do not affect the overall deliverables for the project, are a sensible approach to ensure that the system can be delivered.

The simplifications include the removal of some of the adjustments made to forecasts which were included to support the potential modelling of 11kV feeders in the future. This is not essential to the demonstration of EFFS functionality. Similarly the approach to providing two key areas of functionality has been confirmed. These areas are the power flow analysis for multiple contingency scenarios required to support the capacity engine, and a new requirement for cleansing the input data to the forecasting system. The power flow analysis functionality will now be provided by a separately commissioned tool that will be provided by a company that has previous experience in providing software that interfaces with PSS/E.

While WPD has been addressing the data quality issues highlighted by the NIA project Time Series Data Quality, there are still a number of remaining issues in the area of EFFS trial. Therefore, to maximise the quality of the forecasts, some data cleansing functionality is being provided by the same tool that will provide the PSS/E analysis.

Another addition to the original plan is the inclusion of some follow-on work relating to forecasting. This follows on to recommendations from the original report by SGS to explore the use of engineering models but also extends the use of weather data to use forecast values as well as historic data.

2.4 TEF Collaboration

In 2017, three projects were submitted funding requests from the NIC that supported the transition from DNO to DSO. Collectively known as TEF, these were:

- Our submission, Electricity Flexibility and Forecasting Systems (EFFS);
- TRANSITION, submitted by Scottish and Southern Electricity Networks and Electricity North West; and
- FUSION, submitted by Scottish Power Energy Networks.

The three projects look at different aspects of the DSO transition with differing aims and areas of focus. Ofgem included additional conditions in the Project Directions to reduce the risk of unnecessary duplication, improve delivery efficiency and ensure the projects deliver complementary learning. The principles of engagement for the TEF projects are defined in section 5 of NIC 2017 Compliance Document (see related documents for link).

Collaboration and coordination activities between the TEF projects have again progressed well over this reporting period. Key activities have included:

- Use of EFFS generated forecasting learning by TRANSITION;
- Collective engagement with ENA Open Networks project;
- Evaluation of joint procurement options between TRANSITION and FUSION; and

- Production of the TEF Stage Gate Report, which was submitted to Ofgem on 26 February 2020.

2.5 TEF Stage Gate Report

The TEF Stage Gate Report demonstrates that the commitments made in the TEF Compliance Document have been, and are still being, fulfilled and that the need for each project is at least as great as that defined during the original bid phases. The report format covers each of the topics originally presented in the T.E.F. Compliance Document, shown in Figure 4 below.

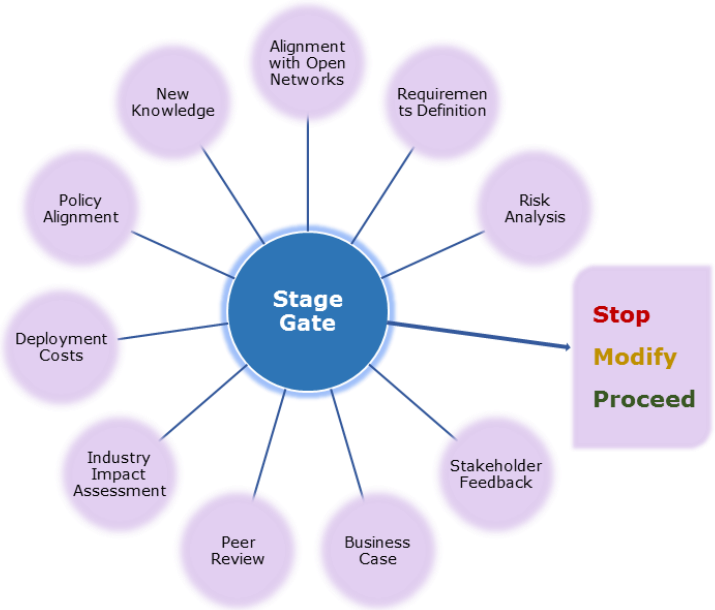

Figure 4: Collaboration Topics identified in the TEF Compliance Document

2.6 Project Dissemination

Key dissemination activities within the reporting period are as follows:

- System design deliverables published to WPD EFFS project webpage
- EFFS project flyers created to support events
- EFFS presented as part of TRANSITION and FUSION presentations at Low Carbon Networks Innovation event in Glasgow 30-31 October 2019
- EFFS presented at WPD Balancing Act event in 26 November 2019
- ENA Open Networks Workstream 5 has also been kept up to date with progress of project deliverables.

3 Business Case

At the time of writing, there have been no changes to the anticipated benefits to be gained by the Project. For information, the original business case benefits have been included in this document as Appendix 1.

4 Progress against Budget

Spend Area	Budget (£k)	Expected Spend to Date (£k)	Actual Spend to Date (£k)	Variance to expected (£k)	Variance to expected %
Labour	397.4	216.0	172.6	43.4	20%
Equipment	58.0	16.9	0.7	16.2	96%
Contractors	2029.7	862.5	718.3	144.2	17%
IT	630.1	543.4	500.0	43.4	8%
IPR Costs	0.0	0.0	0.0	0.0	0%
Travel & Expenses	39.7	21.6	19.2	2.4	11%
Payments to users & Contingency	82.0	52.2	0.0	52.2	100%
Decommissioning	0.0	0.0	0.0	0.0	0%
Other	101.8	0.0	0.0	0.0	0%
TOTAL	3,338.8	1,712.7	1,410.7	301.9	18%

4.1 Comments around variance

1 Labour - this underspend reflects the assumption that during the mobilisation and specification phases greater WPD resource time would be available for use on the project with lower requirements during the build phase. A flatter resource profile is now expected.

2 Payments to users & contingency – this underspend relates to contingency values being allocated on a pro-rata basis. No payments to users are scheduled until the trial phase in 2020.

3 Equipment - this underspend reflects the uncertainty around the exact month of purchase of the system server. The budget cost has been smeared over three months and this cost has not yet been incurred.

5 Deliverables

Progress against the Project's deliverables has been as expected with the fifth project deliverable delivered at the start of this reporting period to time and budget. Significant progress is being made towards the next project deliverable which is the Implementation and System Delivery. A full list of EFFS deliverables is given in section 5.1.

5.1 EFFS Project Deliverables

Below are the Project's deliverables in line with the Project Direction (see Project Direction ref: WPD EMID / EFFS / 28 September 2018' for further details). Note: the Project's deadlines were revised part way through the TEF signoff process which continued for a further three months. As it was not possible to revise the deadlines to reflect this additional time, the deadlines being worked to are stated separately in the 'Deadline' column as agreed with Ofgem.

Ref.	Project Deliverable	Deadline	Evidence	NIC funding request (100%)	Status
1	Mobilisation Exit Report	Project Direction 17/12/18 WPD plan 18/03/19	A mobilisation exit report will be produced, including evidence of: • Forecasting partner tender accepted • Collaboration agreements signed • Detailed plan with breakdown by project work stream and milestones • Project staff mobilised • Workplaces set up • Governance structure in place • Project Mandate/Charter Agreed • Project Initiation Document signed off • Co-ordination plan developed with any other successful DSO related NIC bid to minimise overlap.	10%	Complete
2	Output from the forecasting	Project Direction 08/04/19 WPD plan 05/07/19	Publication of report showing forecasting options evaluated and selected options. Presentations at conferences and workshops to disseminate output.	6%	Complete
3	Development of requirements specification for DSO functionality	Project Direction 15/04/19 WPD plan 12/07/19	Production of requirements specification document outlining for DSO functionality, common protocols and approach to supporting these functionalities. Electricity Networks Association (ENA) and stakeholder collaboration strategy document (delivered a fixed period of time following publishing of ENA workshop output). Letters of support from key stakeholders (e.g. ENA Working Group) outlining agreement with specification document.	9%	Complete

Ref.	Project Deliverable	Deadline	Evidence	NIC funding request (100%)	Status
4	Development of EFFS Design Specification document	Project Direction 15/07/19 WPD plan 16/10/19	Production of set of Design models and documents outlining specific EFFS functionality and approach to delivering this functionality. Report detailing review of functional specification document at key stages.	15%	Complete
5	Implementation and System Delivery	Project Direction 20/07/20 WPD plan 19/10/20	Build and delivery of the completed EFFS system, including technical design package release, deployment and configuration and system handover.	3%	In progress
6	Completion of on-site system testing	Project Direction 02/11/20 WPD plan 01/02/21	Test report demonstrating completion of on-site testing to required standards; includes integration, user acceptance, operational and performance testing. Supply of additional supporting documentation evidencing this claim, to include test plans, scripts, exit reports and screenshots. Report detailing completed user training.	22%	On track
7	Trials design and preparation	Project Direction 30/11/20 WPD plan 01/03/21	Strategy document outlining trials approach and methodology, detailing approach to plant, system operations, supplier / aggregator and tandem operations trials. Co-operation plan showing how duplication with other DSO NIC projects has been avoided and, if possible, how testing between projects will be carried out.	31%	On track
8	Trials – execution and knowledge capture	Project Direction 01/06/21 WPD plan 31/08/21	Completion report demonstrating outcomes of trial phases alongside test scripts, exit reports etc. Letter of support from external stakeholders and partners confirming completion of project trial phase and acceptance of results.	2%	On track
9	Gateway reviews	Project Direction 26/03/19 20/05/20 07/06/21 WPD plan 25/06/19 19/08/20 06/09/21	Delivery of gateway report at the end of Workstream 1, Workstream 2 and Workstream 3, detailing progress against the project benefits and costs.	2%	Gateway review 1 – complete On track
Common Project Deliverable					
N/A	Comply with knowledge transfer requirements of the NIC Governance Document.	End of Project	1. Annual Project Progress Reports that comply with the requirements of the Governance Document. 2. Completed Close Down Report which complies with the requirements of the Governance Document. 3. Evidence of attendance and participation in the Annual Conference as described in the Governance Document.	N/A	In progress

6 Learning Outcomes

The following learning outcomes have been recorded in the Project's Learning Log in the last six months

6.1 Flexibility market platform interoperability

Uniform interfaces to flexibility platforms have yet to be defined at an industry level. Without an agreed standard, EFFS defined its own default set of instructions for communicating with flexibility platforms with the assumption that any flexibility platform integrating to EFFS would 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 and the operational procurement, arming and dispatch processes defined by EFFS. 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 and service types have been specified per platform (taking advantage of any synergies between the respective platforms design where possible). This will also impact the ability for EFFS to optimise across multiple platforms, but where this is possible this will be implemented.

6.2 Simplification of the trial solution

The requirements for forecasting and operating flexibility services defined in 'WPD_EFFS_DSO requirements specification' were tailored for an enterprise level business as usual solution and included some complex elements. However, during the work for the detailed design and system build it became apparent that this complexity would reduce the deliverability of the EFFS systems within the project timescales. Therefore, a number of design rationalisations have been made and tactical solutions implemented in order to deliver the project outcomes in a more pragmatic fashion. For example, originally a requirement was initially defined to integrate Networkflow with the network management system in order to provide control room staff with visibility of and the ability to trigger flexibility. Whilst this is still a valid business-as-usual requirement and will be captured in the project learnings as such, it is too complex and costly whilst delivering limited benefit for the trials and has therefore been de-scoped.

6.3 Forecasting granularity

Based on the learnings from the SGS forecasting evaluation report and the WPD experience of power flow analysis in PSS/E, it has been determined that forecasts at lower voltage levels are most appropriate to feed into the analysis carried out within the capacity engine. These inputs are then aggregated to higher voltage levels within the PSS/E package. Therefore, GSP and BSP forecasts are not required but rather forecasts are only required for Primary substation, 33kV connected customers and 132kV connected customers. Moreover, having forecasts at this level of granularity is especially beneficial because there is no need to alter the forecasts when the network configuration is non-standard, but rather the amended power flow can be calculated in PSS/E easily.

6.4 Network hierarchy

Due to lack of common industry naming conventions for assets and network locations defining data exchanges within the EFFS systems has been a challenge requiring a great deal of data manipulation and mapping. This has been exacerbated by the data being dispersed within WPD across multiple systems. As we move into the trial phase of the project we anticipate this issue becoming more pronounced as different organisations need to be able to identify and communicate about assets, where they are on the network and how they relate to constraints and flexibility. The work of the ENA in developing the System Wide Resource Register is a step in the right direction, but we think a common industry data model, naming conventions and references (combined with increased openness of data) will reduce this issue and greatly support the growth of flexibility markets in the future. We understand that the use of CIM for data exchanges is being investigated within Open Networks under WS1B Product 4 and that a scoping report is due this month.

6.5 Conflict avoidance with ESO

Due to fundamental process and timing differences in how the DSO and ESO use flexibility services (plus the level of aggregation the ESO operate at), exchanging meaningful information to inform conflict avoidance is challenging. However, having worked through the key process milestones for flexibility services with National Grid ESO, a number of points in the process are available where the exchange of information to identify potential conflicts and to enhance network modelling and forecasting. For example, the ESO can share information with a DSO regarding which service providers have declared availability. A DSO can then use this to inform their service selection to avoid possible conflicts.

7 Intellectual Property Rights

A complete list of all background IPR from all project partners has been compiled. The IP register is reviewed on a quarterly basis. No additional foreground IP has been identified and registered in this reporting period.

8 Risk Management

Our risk management objectives are to:

- Ensure that risk management is clearly and consistently integrated into the project management activities and evidenced through the project documentation;
- Comply with WPD's risk management processes and any governance requirements as specified by Ofgem; and
- Anticipate and respond to changing project requirements.

These objectives will be achieved by:

- ✓ Defining the roles, responsibilities and reporting lines within the Project Delivery Team for risk management;
- ✓ Including risk management issues when writing reports and considering decisions;
- ✓ Maintaining a risk register;
- ✓ Communicating risks and ensuring suitable training and supervision is provided;
- ✓ Preparing mitigation action plans;
- ✓ Preparing contingency action plans; and
- ✓ Monitoring and updating of risks and the risk controls.

8.1 Current Risks

The EFFS risk register is a live document and is updated regularly. An additional risk log has been created specifically to track and manage risks relating to the Corona virus pandemic.

There are currently 19 live project-related risks that are not Covid 19 related. Mitigation action plans are identified when raising a risk and the appropriate steps then taken to ensure risks do not become issues wherever possible. In Table 8-1**Error! Reference source not found.**, we give details of our top five current risks by category. For each of these risks, a mitigation action plan has been identified and the progress of these are tracked and reported.

There are 13 Covid 19 related risks. Table

The most significant risk to the project is that EFFS is working to faster timescales than TRANSITION, FUSION and the Open Networks project. This results in EFFS having to take the lead in defining DSO functionality while still achieving engagement from stakeholders that had not expected to consider these issues until later in the year. Some stakeholders have accepted that this is a shift in timescales rather than additional workload. The workshops have been generally well received and have identified future collaborative opportunities. Therefore, the mitigation of this risk lies chiefly with demonstrating useful outputs to the stakeholders to ensure continued participation, and to ensure that the outputs from EFFS are sufficiently accepted by stakeholders such that the risk of Open Networks reaching significantly different conclusions is minimal.

Title	Description	Risk Rating	Mitigation
WPD Staff availability	There is a risk that there may be a lack of availability of WPD project teams (business and IT) to support the project.	Major	'-Solution Architect brought on to project to provide central design authority, ensure system integrity and to resolve system design gaps. - PSS/E development work being outsourced; scope document issued to potential suppliers

Title	Description	Risk Rating	Mitigation
Flex customer scale	There may not be sufficiently customers signed up via flexible power that are willing to provide sufficiently low capacity short duration events to cover to demonstrate the full range of EFFS functionality.	Major	Ensure alignment with BAU requirements so that BAU payments can be used for Flexible power services, Use of smaller capacity via CLEM provides an alternative. Smaller requirements also around Hayle. options to achieve this - modified network model, modified forecasts, ability to edit requirements before passing to Flexible Power.
Complexity	There is a risk that the requirements specified by the project are too complex to be delivered within the time and budget of the project.	Major	Simplifications put forward - removal of visibility of flexibility and dispatch of resources from PowerOn, Third party provision of PSSE tool including data cleansing
Interfacing	There is a risk that the Networkflow software solution may not be able to interface to other third party systems.	Major	Interface to Forecasting tool does not appear to be onerous. Interfaces for data provision are by file exchange where possible. Interface to PSSe is biggest area of risk - managed by use of PSSE experts in coding python harness.
Design finalisation process	Due to the alternative approach to the WS2 system design deliverable (as a consequence of R016), namely all functional areas being progressed in parallel through informal meetings rather than in a logical order based on process), there is a risk of inconsistencies, gaps, duplication etc within the end to end design. This may impact on the quality of the deliverables and lead to rework.	Moderate	E2E design phase / review included in project plan. Many design gaps now closed

Table 8-1: Top five current risks (by rating)

Title	Description	Risk Rating	Mitigation
NG staff sickness	National Grid ESO is not able to support the delivery of the project due to staff issues caused by sickness or change of work priorities	Major	We know NG may not be able to substitute alternative staff for key members. In the event of staff illness preventing progress the best approach would be to restructure the trial to initially exclude conflict avoidance and only introduce that functionality at the end of the project to

Title	Description	Risk Rating	Mitigation
			allow the maximum time for NG staff to become available.
SAT, SIT sites access	SAT and SIT testing of software packages developed by AMT-Sybex may be delayed / impacted by restrictions on site access	Major	Either provide sufficient instructions for essential installation and set up to be carried out by WPD staff or allow very limited access under strict conditions for installation by third party. Maximise the use of remote access for testing.
EDF staff sickness	EDF Energy is not able to support the delivery of the project due to staff issues caused by sickness or change of work priorities	Major	Confirm EDF has a COVID risk management strategy - ensure documents are comprehensive and up to date if required to be used by a new staff member.
Server sourcing	Difficulties in sourcing a Server for EFFS due to supply chain issues.	Major	Be flexible in choice of supplier, it may be that other suppliers have the ability to provide an item sooner than the standard supplier. Consider re-use of existing assets, asset hire etc.
Reduced efficiency	Key WPD staff working remotely / no ability to travel would mean that the project, or part of, could not be delivered effectively	Moderate	Use of video conferencing and webinars. Ensure that all the potential features of remote working software are known and understood.

Table 8-2: Top five Covid 19 risks (by rating)

Table 8- provides a snapshot of the risk register, detailed graphically, to provide an on-going understanding of the projects' risks.

Likelihood = Probability x Proximity						
	Certain/Imminent (21-25)	0	0	0	0	0
	More likely to occur than not/Likely to be near future	1	2	1	0	0
	50/50 chance of occuring/ Mid to short term (11-15)	0	0	0	0	0
	Less likely to occur/Mid to long term (6-10)	0	1	3	3	2
	Very unlikely to occur/Far in the future (1-5)	0	1	3	1	3
		1. Insignificant changes, re-planning may be required	2. Small Delay, small increased cost but absorbable	3. Delay, increased cost in excess of tolerance	4. Substantial Delay, key deliverables not met, significant increase in time/cost	5. Inability to deliver, business case/objective not viable
		Impact				

	Minor	Moderate	Major	Severe		
Legend	5	8	8	0	No of instances	
Total	21				No of live risks	

Table 8-3: Graphical view of Risk Register

Chart 8- provides an overview of the risks by category, minor, moderate, major and severe. This information is used to understand the complete risk level of the project.

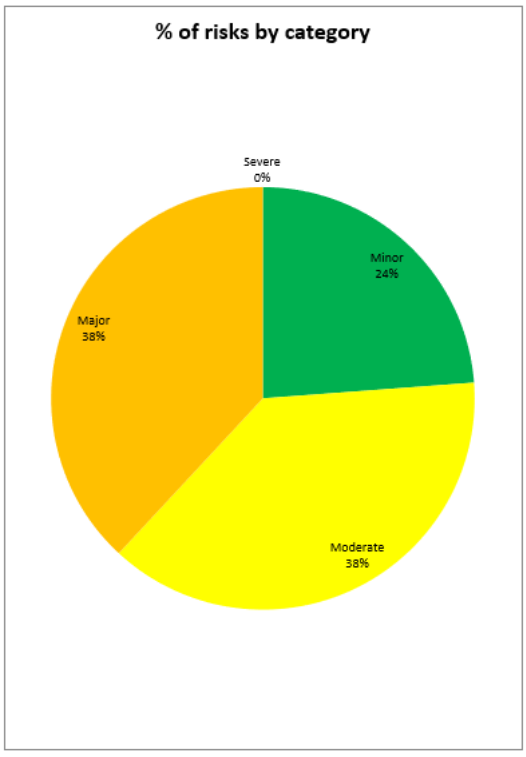

Chart 8-4: Percentage of Risk by category

8.2 Update for risks previously identified

An update on the most significant risks from the previous six-monthly report is given below.

Details of the Risk	Previous Risk Rating	Current Risk Rating	Mitigation Action Plan	Progress
Lack of availability of WPD project teams (business and IT) to support the project.	Major	Major	Escalated to Review Group. Alternative approach to WS2 development phase that is less resource intensive for WPD staff. PSS/E tool development being outsourced and Solution Architect engaged from WPD perspective.	In progress
National Grid ESO participation in the EFFS project (to support technical requirements and trials).	Major	Moderate	Risk escalated to National Grid ESO. Communicate project requirements and organise design finalisation workshops as part of technical design phase.	Closed
Cornwall LEM cannot support the EFFS interfacing requirements.	Major	Major	Continue to work and communicate requirements with CLEM. Promote simple options that can be implemented.	
There is a risk that the requirements specified by the project are too complex to be delivered within the time and budget of the project.	Major	Major	Understand build requirements early during system design phase with SMEs. Escalate early to the Project Review Group for decision on scope.	
Market platforms that EFFS interacts with are not interoperable (e.g. timelines, data items, API, service definitions)	Major	Moderate	Continue to encourage EDF platform development to reflect Flexible Power platform features. Risk/expectations of EFFS project to be managed actively.	

Table 8-5: Risks identified in the previous progress report

9 Consistency with Project Direction

The scale, cost and timeframe of the project has remained consistent with the registration document, a copy of which can be found here:

https://www.westernpower.co.uk/projects/effs

10 Accuracy Assurance Statement

This report has been prepared by the WPD EFFS Delivery Manager (Elliot Warburton of AMT-SYBEX), reviewed by the WPD EFFS Project Manager (Jennifer Woodruff) and approved by the Innovation Team Manager (Jonathan Berry).

All efforts have been made to ensure that the information contained within this report is accurate. WPD confirms that this report has been produced, reviewed and approved following our quality assurance process for external documents and reports.

Glossary

Term	Definition
Background IPR	Intellectual Property Rights owned by or licensed to a Project Participant at the start of a Project.
Distribution Network Operator (DNO)	Any Electricity Distributor in whose Electricity Distribution Licence the requirements of Section B of the standard conditions of that licence have effect (whether in whole or in part).
DSO	Distribution System Operator
EFFS	Electricity Flexibility and Forecasting System
ENA	Energy Networks Association
ESO	Electricity System Operator
Foreground IPR	All Intellectual Property Rights created by or on behalf of any of the Project Participants, their sub-Licensees, agents and sub-contractors as part of, or pursuant to, the Project, including all that subsisting in the outputs of the Project.
Full Submission Pro-forma	A pro-forma which Network Licensees must complete and submit to Ofgem in order to apply for funding under the NIC.
Funding Licensee	The Network Licensee named in the Full Submission as the Funding Licensee, which receives the Approved Amount and is responsible for ensuring the Project complies with this Governance Document and the terms of the Project Direction.
GB	Great Britain
Intellectual Property Rights (IPR)	All industrial and intellectual property rights including patents, utility models, rights in inventions, registered designs, rights in design, trademarks, copyrights and neighbouring rights, database rights, moral rights, trade secrets and rights in confidential information and know-how (all whether registered or unregistered and including any renewals and extensions thereof) and all rights or forms of protection having equivalent or similar effect to any of these which may subsist anywhere in the world and the right to apply for registrations of any of the foregoing.
NIC	Network Innovation Competition
ON	Open Networks project
Project	The Development or Demonstration being proposed or undertaken.
Project Bank Account	A separate bank account opened and used solely for the purpose of all financial transactions associated with a NIC Project.
Project Direction	A direction issued by the Authority pursuant to the NIC Governance Document setting out the terms to be followed in relation to the Eligible NIC Project as a condition of its being funded pursuant to NIC Funding Mechanism.
Project Participant	A party who is involved in a Project. A participant will be one of the following: Network Licensee, Project Partner, External Funder, Project Supplier or Project Supporter.
Project Partners	Any Network Licensee or any other Non-Network Licensee that makes a contractual commitment to contribute equity to the Project (e.g. in the form of funding, personnel, equipment etc.) the return on which is related to the success of the Network Licensee's Project.
Project Supplier	A party that makes a contractual commitment to supply a product or service to the Project according to standard commercial terms that are not related to the success of the Project.

Term	Definition
Relevant Background IPR	Any Background IPR that is required in order to undertake the Project.
Relevant Foreground IPR	Any Foreground IPR that is required in order to undertake the Project.
SGAM	Smart Grid Architecture Model
TEF	TRANSITION, EFFS and FUSION projects
WPD	Western Power Distribution

Appendix 1 – Project Benefits

This text is taken from the EFFS bid document.

Benefit 1 – Deferral or avoidance of conventional reinforcement

Work undertaken by UK Power Networks as part of the Smarter Network Storage project established that 10.8% of the 4,800 primary substation groups across Great Britain (GB) could benefit from flexible solutions, notably DSR and storage, enabling on average 3MW of traditional reinforcement to be deferred for up to 10 years.

It is therefore reasonable to argue that over 10 years £51.1m (10% of the expected general reinforcement cost within WPD at 2017/18 costs) of conventional reinforcement could be substituted with a smart flexibility services capability as the EFFS method will provide if rolled out across the WPD licensed areas. The analysis undertaken provided shows that savings of £33.8m in the 10 years to 2030 would be generated and £71.6m by 2050. By rolling this method out across the whole of the GB network would deliver savings of £114.4m by 2030 and £242.6m by 2050.

Benefit 2 – Additional flexibility in fault restoration

In areas where the EFFS system and method have been rolled out and delivering benefit as above, an additional benefit available to the network will be the option to make use of available local flexible capacity following a network fault. Ordinarily when a fault occurs at a local substation, network engineers will look to restore network capacity by reconfiguring the network through switching operations. Here, suitable flexible capacity would be utilised in addition to these switching routines in order to restore customers as quickly as possible. Using available flexibility in this way, by using generation and DSR to restore networks that would otherwise not be restored until repairs were complete, would improve restoration times. This may be especially pertinent in extreme cases where the number of concurrent faults exceeds the design assumptions. It is hoped that the high-volume testing of the EFFS system, a bench exercise including many simulated flexibility service providers, can give insights into the impact of differing levels of flexibility on restoration times to inform the potential review of p2/6 to consider the impact of flexibility services.

Benefit 3 – Reduced balancing costs via co-ordination with SO

The EFFS system and method will share all trigger and arming notifications with National Grid, the National Transmission System Operator (SO) and potentially to any other party purchasing flexibility services that might be affected by DNO operations. The benefit of this will be to ensure that any conflict between the TSO and the DSO are managed. This will ensure that the TSO does not attempt to call on ancillary services that would create or worsen a constraint for DNOs. Resolving conflicts should minimise the overall costs for the system.

In addition, it will also ensure that services are not called that might have a major impact upon the flexible capacity requirement of the DSO. For example, the TSO looking to manage national system frequency within a zone which is significantly capacity constrained could be very costly and may either result in a greater call on flexibility reserve or an ineffective management of system frequency. At present it is difficult to know the exact potential for conflict between DSO and other flexibility service users and this work will clarify the position and therefore the estimate of benefits. Anecdotal conversations have suggested that in the Netherlands requests to use the same asset, were relatively frequent and that where the same asset was being sought by multiple parties, it was about a 50/50 split between the two parties wanting the asset to operate in the same way and wanting to operate the asset in different directions.

Benefit 4 – Increased / faster renewables connections.

The use of flexibility services via the EFFS method and system to facilitate customer connections could greatly increase both the speed and cost of providing the necessary connection. Where a connection requires additional substation capacity, conventionally a substation upgrade would be required. For example, a new or upgraded transformer. Using flexibility services might avoid this work for a period of time

Appendix 2 - Overview of the Open Networks Future Worlds

The summary below is taken from the ENA ON Future Worlds consultation document.

"In 2018, the Open Networks Project showcased five potential industry structures, known as Future Worlds. Extensive work was carried out with stakeholders to define these five Future Worlds and they were modelled using the Smart Grid Architecture Model (SGAM) to further define the information flows necessary for each world to operate. These detailed definitions and the SGAM models were presented as part of the Future Worlds consultation in 2018.

Below is a high-level summary of each of the 5 future worlds:

World A: DSO Coordinates

In this world, the DSO takes on a central role for all active Customers and DER. It procures and activates distribution network connected flexibility resources for distribution network constraint management and for providing services to the ESO for regional and national requirements. The DSO also schedules flows to and from the electricity transmission system based on a pre-defined power exchange schedule agreed with the ESO. From a transmission perspective, the DSO behaves in a similar manner to other transmission connected parties and the services it can provide from DER connected within its networks are evaluated on a regional transmission and national level by the ESO in a non-discriminatory manner along with other transmission connected service providers.

World B: Coordinated DSO-ESO Procurement and Dispatch

In this World, flexibility resources can provide services to multiple SOs and are able to stack revenues from these differing SOs. It is recognised that, on occasion, the needs of different SOs will conflict and it will be the joint responsibility of these SOs to coordinate service procurement and dispatch activities. This will be done in a transparent manner which creates the most efficient outcome for the end consumer.

World C: Price Driven Flexibility

World B considered a World based on enhanced contracted flexibility arrangements. In World C, changes are made to price flexibility arrangements such that active parties vary their demand or generation in response to either or both energy price and network signals, such as time and location. World C has been developed cognisant of Ofgem's reform of electricity network access and forward-looking charges programme and considers potential changes to future charging and access arrangements. Given the relatively early stage of this programme and the nature of the SGAM modelling it has not been possible to define a detailed option. World C does consider high level principles for changes to charging and access arrangements that are consistent with the work of Charging Futures including:

- Ensuring greater alignment of arrangements between transmission and distribution
- More effective influencing of user operations through network charging arrangements

- More appropriately influencing user investments through access and user commitment arrangements
- Consideration of connection rights and arrangements

World D: ESO Coordinate(s)

In this World, the ESO takes a more central role than in previous Worlds in many of the Customer facing activities of an SO. This potentially includes connection and charging arrangements as well as flexibility services (Figure 2.4). The DSO role would become more focused on identifying short term and long-term service opportunities from third-party providers which would be passed as service requests to the ESO for procurement.

World E: Flexibility Coordinator(s)

In World A, a new party, the Flexibility Coordinator, acts as an independent, neutral market facilitator for all flexibility markets. This party could either be a national entity or one of a number of standardised regional monopoly entities. The Flexibility Coordinator(s) is responsible for collecting service requirements from both DSOs and the ESO, optimising the requirements and identifying the most efficient solution. This is achieved through the use of a common platform(s) which aids transparent decision making. The Flexibility Coordinator(s) also needs to work closely with SOs through design and operation processes to ensure a coordinated system is efficiently developed and security of supply is maintained.

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