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Respond
Project Progress Report

Version 1.0
19 June 2016

RESPOND

VERSION HISTORY

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REVIEW

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CONTENTS

1 EXECUTIVE SUMMARY 6

1.1 The Respond project 6

1.2 Progress to date 6

1.3 Risks 8

2 PROJECT MANAGER'S REPORT 9

2.1 General 9

2.2 Technology workstream 9

2.3 Trials & analysis workstream 14

2.4 Customer engagement workstream 19

2.5 Learning and dissemination workstream 19

3 CONSISTENCY WITH FULL SUBMISSION 20

4 RISK MANAGEMENT 20

5 SUCCESSFUL DELIVERY REWARD CRITERIA (SDRC) 21

6 LEARNING OUTCOMES 22

7 BUSINESS CASE UPDATE 25

8 PROGRESS AGAINST BUDGET 25

9 BANK ACCOUNT 26

10 INTELLECTUAL PROPERTY RIGHTS 26

11 ACCURACY ASSURANCE STATEMENT 26

GLOSSARY OF TERMS

Adaptive Protection	The use of adjustable protection settings that can be changed in real time
Association of Decentralised Energy (ADE)	Leading industry advocate of an integrated approach to delivering energy services using combined heat and power and district heating. Previously known as the Combined Heat and Power Association (CHPA)
CAT	Customer acceptance testing
Circuit breaker	Device that interrupts the flow of current in an electric circuit
CEP	Customer engagement plan
Combined heat and power (CHP)	Simultaneous generation of usable heat and power (usually electricity) in a single process
Demand side response (DSR)	Actions undertaken by distribution network operators to influence customers to change their electricity use, in terms of quantity and/or time of use
Distribution network operator (DNO)	The owner and/or operator of an electricity distribution system and associated assets
Engaged customer panel (ECP)	A panel of industrial and commercial customers used to help shape the customer survey approach and survey materials.
FAT	Factory acceptance testing
Fault Level Assessment Tool (FLAT)	Intelligent software which assesses near real time fault current peaks on the network and decides to enable or disable the mitigation technologies
Fault current	Actual current which flows during a fault
Fault Current Limiting service (FCL service)	A distributed generation and/or industrial and commercial customer-provided response to reduce overall fault current on the distribution network
Fault current mitigation technology	Device that responds to the flow of fault current in an electricity network and ensures that the fault current remains within network switchgear and circuit ratings
Fault level	Prospective maximum current which will flow during a fault
FlexDGrid	Second Tier LCN Fund fault level mitigation project run by Western Power Distribution
I_S-limiter	A fault current mitigation technology
LCN Fund	Low Carbon Networks Fund
Near real time	A measure of the frequency of the calculation by the Fault Level Assessment Tool. For Respond this will be every five minutes
NMS	Network management system
PPR	Project progress report

Primary substation	A point on the network where the voltage changes from 33kV to 11kV or 6.6kV
Protection relays	Device that analyses power system voltages and currents to detect faults and sends signals to circuit breakers to open
Successful delivery reward criteria (SDRC)	Key milestones to be delivered throughout the project
Substation	A point on the network where voltage transformation occurs
Switchgear	Device for opening and closing electrical circuits (including circuit breakers)

1 EXECUTIVE SUMMARY

1.1 The Respond project

This is the third six-monthly project progress report (PPR) for the Respond project. This project was approved under the name Fault Level Active Response (FLARE). This report covers the period from December 2015 to the end of May 2016.

Respond is seeking to demonstrate that a network's fault level can be estimated in near real time, and in responding to that estimation, a series of innovative technical and commercial techniques can be initiated to reduce the fault level without the need for expensive and time-consuming asset replacement. As this approach could maximise the use of existing assets and minimise the need for capital investment, Respond has the potential to realise significant cost savings to customers and improve the connection of generation to the network. There are four key elements to Respond:

- **Fault Level Assessment Tool:** This intelligent software will be deployed alongside the network management system (NMS) and use data from it to predict the network's fault level in near real time. When it estimates the fault level increasing beyond a set threshold it will initiate one of three mitigation techniques:
- **Adaptive Protection:** This technique re-sequences the operation of circuit breakers (CBs) and is retro-fitted into existing substation equipment
- **Fault Current Limiting (FCL) service:** This will identify customers who operate equipment that contributes to fault current (eg large motors and generators) and are willing to help develop and ultimately enter into a managed commercial service backed by new technical interfaces with their equipment
- **I_S-limiters:** These devices are widely used across the world to limit fault current, but are not used on GB DNO networks due to compliance issues with GB regulations. Two devices will be installed, along with a further five installations of monitoring-only equipment.

1.2 Progress to date

The project is on track and all of the SDRC have been delivered as planned. The last six month period has been focused on finalising technical design of all of the stages of the project and completion of the construction delivery phase in line with go live in May 2016.

The key project highlights during the reporting period are outlined below in the four workstreams.

1.2.1 Technical workstream

Fault Level Assessment Tool

A number of workshops, factory acceptance testing (FAT) and site acceptance testing (SAT) have taken place with Schneider on the Fault Level Assessment Tool requirements for the Respond project. The Fault Level Assessment Tool is now integrated into the NMS, calculating close to real time fault levels and taking the appropriate action following comparisons with plant ratings.

Adaptive Protection

The Adaptive Protection installations have been completed and sites are now operational. The design and installation have proved to be more complex than planned and there are still some ongoing snagging issues that require resolution.

I_S-limiter and sensing units

The I_S-limiter and I_S sensing units have been through a number of FAT testing stages during construction and have been installed at seven substation sites by Electricity North West employees and commissioned by ABB.

1.2.2 Trials & analysis workstream

FCL service customer engagement materials developed

Feedback regarding the suitability of communications materials developed to support the customer survey during the initial phase of customer engagement associated with this project was used to refine the materials. This customer feedback was also used to guide the development of commercial templates to ensure that both commercial contracts and engagement materials are suitable to take the FCL service to market.

Engaged customer panel delivered

The refined FCL service materials were further tested with a reconvened ECP. Conclusions from the ECP have been incorporated into the final FCL service customer engagement materials ensuring that the Respond premise is described effectively and clearly for potential customers participating in the FCL service trial.

FCL service

The project team has successfully engaged with United Utilities on the FCL service and has identified one site with CHP. A number of sites will be surveyed with the aim of identifying a second suitable site with a large motor.

FCL service contract

The FCL service standard contract has been completed and presented to the ECP for final review.

Post-fault monitoring and analysis procedure

It is necessary to validate each and every fault that occurs within the Respond network to ensure that the correct action has taken place. The **Post fault analysis methodology** details the process and data requirements to confirm: fault level, operation of each of the respective fault level mitigation techniques and Fault Level Assessment Tool action.

Asset health study

An asset condition monitoring site selection and equipment rotation programme has been agreed with EA Technology and the equipment has been installed at a number of selected sites.

Fault level monitors

Outram fault level monitors have been installed at a total of seven Respond sites. These monitors have been installed for the purpose of network model validation of both the Electricity North West IPSA+ network model and the Schneider Fault Level Assessment Tool. The first set of results have been provided from three sites, with validation work ongoing by the project partners.

1.2.3 Customer workstream

Customer survey completed

After a robust, targeted campaign and the use of project partners to recruit suitable respondents, a total of 103 I&C demand and DG customers across GB participated in the customer survey.

Customer survey results analysed and report of findings drafted

Interim analysis of survey responses proved the hypothesis that the Respond method enables a market for the provision of an FCL service. Further details can be found in the **Interim Customer Survey Report** which is published on the Respond website.

1.2.4 Learning and dissemination

The Respond project team have been utilising a range of tools to disseminate and share knowledge about the project with stakeholders. These include the project's first knowledge sharing event which was held in May 2016, advertorials and industry newsletters, internal updates as well as providing regular updates on the project website and via social media.

All Electricity North West operational teams, including planning engineers were trained on Respond fault level mitigation management protocols before go live.

All successful delivery reward criteria (SDRC) due in the reporting period have been achieved, and those due in the next period are on track.

The eight SDRC due in the reporting period were successfully delivered. The most significant of these are shown in Table 1.1 below, and all are discussed in Section 5.

Table 1.1: Most significant SDRC delivered in this reporting period

SDRC (evidence)	Planned date	Completion date
Issue second project progress report in accordance with Ofgem's June and December production cycle and publish on Respond website	Dec 2015	Dec 2015
Brief and train Electricity North West operational teams, including planning engineers, on fault level mitigation management protocols	April 2016	April 2015
Publish monitoring and analysis procedures for trials on Respond website	May 2016	May 2016
Publicise commencement of live trials on Respond website	May 2016	May 2016
First knowledge sharing event	May 2016	May 2016

Project expenditure as at the end of May 2016 was £2,446,000 compared to a cost baseline of £3,487,000. The project completion costs remain on budget, less contingency expenditure.

1.3 Risks

Risks identified in the Respond project bid are regularly reviewed by the delivery team and a significant proportion of them have been mitigated and are therefore no longer active. There were two new risks identified in the last report that have also been mitigated. The first risk was a potential delay to the Fault Level Assessment Tool delivery due to a dependency on the delivery of the new Electricity North West NMS. This risk was mitigated by close working with the network management delivery team and prioritisation of the Respond sites for data cleanse and migration. The Fault Level Assessment Tool went live in May 2016.

The second risk was that there might be a low return of surveys from the participants in the customer surveys. This risk was mitigated by working closely with the project partners and as a result the minimum survey requirement was exceeded.

.Risks are monitored on a continuous basis, including the potential risks that were documented in the full submission. The revised status of each of these risks is described in Appendix A. There are no new risks.

2 PROJECT MANAGER'S REPORT

2.1 General

During this reporting period a new Ofgem project manager has been appointed. A successful handover was conducted with the previous project manager and the Electricity North West project manager.

The key project management activities undertaken during the reporting period are summarised below:

- **Management of project resources:** The Electricity North West internal resources have worked well in designing, installing and commissioning of all aspects of the Respond project. A number of these resources bring experience of the company's other second tier projects (C_2C, CLASS and Smart Street) and maintain an input to those projects that are still active.
- **Project monitoring and control:** Processes for the monitoring and control of the delivery of the Respond project are well established. These processes build on those developed during earlier LCN Fund projects to ensure that this project progresses in a controlled manner and that the outputs are of the highest quality.
- **Regular engagement with project partners:** The Electricity North West Respond project team has engaged and continues to hold regular meetings with the project partners. A project delivery "start-up meeting" was held in May 2015, the first project steering group (with all project partners) was held in September 2015, the second was held in December 2015, the third in March 2016 and the fourth in June 2016.
- **Engagement with Ofgem project team:** Monthly communication with the Ofgem project team has continued throughout the change of Electricity North West and Ofgem project managers.

2.2 Technology workstream

The key activities undertaken by the technology workstream during the reporting period are summarised below:

Adaptive Protection

The 11kV Adaptive Protection has been installed and commissioned at Atherton Town centre, Blackbull, Irlam, Littleborough and Denton West primary substation sites. Hindley Green substation has been advanced in the Electricity North West capital programme for earlier replacement of switchgear than originally planned meaning that it will fall into the Respond trial period and therefore Denton West substation was identified as a suitable replacement. Both Adaptive Protection designs have been designed to ensure they are easily translated to other DNOs as a standalone retrofit unit rather than bespoke designs.

The design and installation proved to be more complex that originally planned and there are some outstanding snagging issues that will incur contingency expenditure.

The pictures below show the wall-mounted Adaptive Protection cubicle and interposing CTs installed at Irlam primary substation. A wall-mounted cubicle was required at most sites as it was not possible to fit in to existing panels.

Figure 1: Irlam 6.6kV Adaptive Protection

Figure 2: Interposing CTs at Irlam

Figure 2a: Adaptive protection relay fitted in existing panel at Blackbull

I_S-limiters and sensing units

The two I_S-limiters have undergone three separate FATs witnessed by Electricity North West employees both in Germany and the UK during the various build stages. They have been successfully installed by Electricity North West employees and commissioned by ABB at Bamber Bridge and Broadheath substations.

The five I_S sensing units have also undergone FATs witnessed by ABB. They were installed on site by Electricity North West employees and commissioned by ABB at Athletic Street, Wigan BSP, Longridge, Hareholme and Nelson substations. The I_S-limiter sensing sites are passive in that no actual fault level mitigation is carried out. These devices are designed to sense if a fault occurs rather than switch. If a fault occurs, and the fault conditions are met, an alarm will be sent to the NMS.

The pictures below show the electrical configurations for Broadheath and Bamber Bridge and the actual Broadheath I_S-limiters and bypass equipment.

Figure 3: I_S-limiter configurations

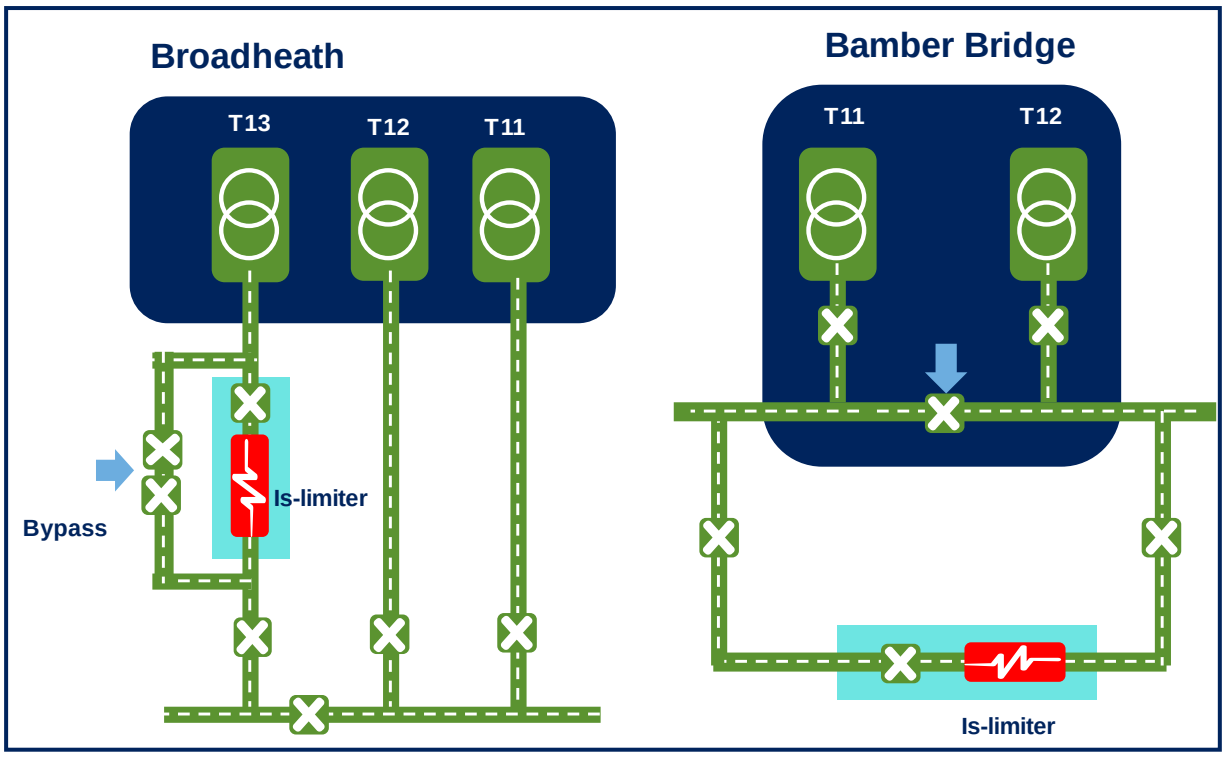


Figure 4: Broadheath I_s-limiter

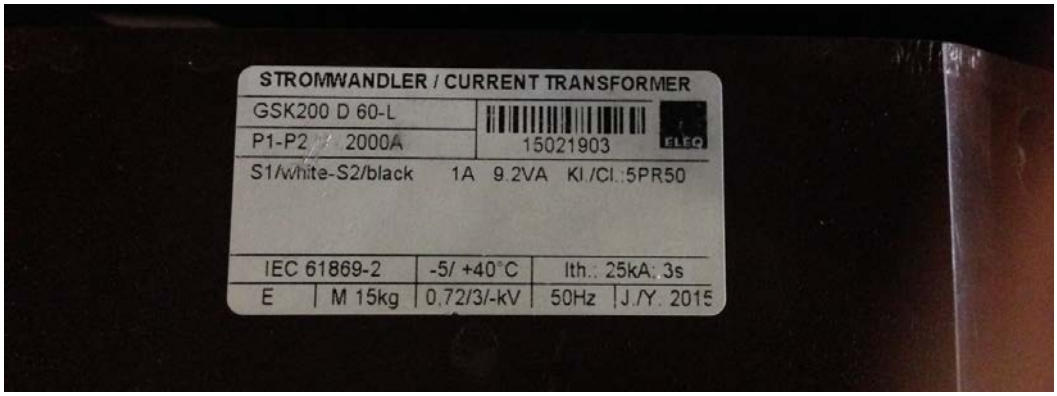
Figure 5: Broadheath I_s-limiter bypass

Figure 5a: Is Limiter container at Bamber Bridge

Figure 5b: IS sensing unit at Wigan BSP

Figure 5d: IS sensing unit CTs at Wigan on the Gidlow No1 33kV Circuit

Figure 5e: IS sensing unit CT data plate at Wigan on the Gidlow No1 33kV circuit



Fault Level Assessment Tool

The Schneider Fault Level Assessment Tool has been the subject of a number of workshops with factory acceptance testing in the factory at Nova Sad and site acceptance tests in the UK having taken place with Schneider on the specific Respond requirements. The Fault Level Assessment Tool is now active and has been successfully integrated and implemented into the network management system. The project team will work closely with the network management system replacement programme to ensure that programme has minimal impact on the Respond trials.

In the next reporting period, the technology workstream will undertake the following activities:

- Publish the equipment specifications and installation reports for the Adaptive Protection
- Publish the equipment specifications and installation reports for the I_S limiters
- Publish the NMS interface and configuration specifications and commissioning reports.

2.3 Trials & analysis workstream

FCL service customer engagement materials developed

Feedback regarding the suitability of communications materials supporting the customer survey was used to refine the materials, which were originally developed with the assistance of an ECP in the initial phase of this research. This customer feedback was also used to guide the development of commercial templates to ensure that both commercial contracts and engagement materials are suitable to take the FCL service to market.

Engaged customer panel undertaken

The refined FCL service engagement materials were further tested with a reconvened ECP and will form a suite of supplementary information available to customers interested in providing an FCL service. The panel comprised eight I&C demand or generation customers employed in relevant job roles at organisations potentially eligible to provide an FCL service. All eight panellists had participated in the previous Respond ECPs.

A 90-minute focus group reintroduced the Respond concept and obtained feedback on a range of FCL service communication materials. Conclusions from the ECP have been incorporated into the final FCL service customer engagement materials ensuring that the Respond premise is described effectively and clearly for potential customers participating in the FCL service trial.

Fault level monitoring

Outram fault level monitors (FLM) have been installed at seven sites and will be rotated around all Respond locations. The fault level monitors have been installed to validate the Electricity North West IPSA+ master network to identify any difference between the simulated and monitored results. Both the FLM and IPSA+ results will be used to validate the Respond electrical network model and simulated fault levels.

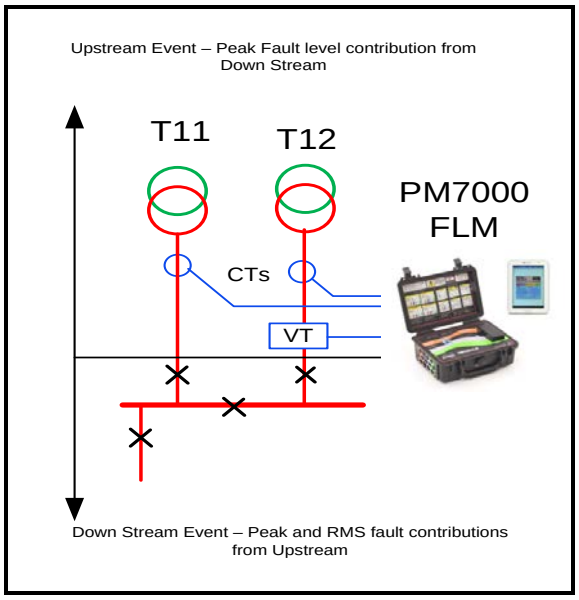
The Outram Power Master 7000 fault level monitor (FLM) is designed by Outram Research to obtain fault level estimation for three phase and single phase systems on radial or interconnected networks. The fault level prediction results are derived from natural disturbances occurring on the network during normal operation and can measure events with voltage changes as small as 0.15%. The principal parameters available from the process are

- Peak upstream fault level at ½ cycle (10 ms at 50 Hz)
    - The upstream FL measured for a downstream event (below monitoring location)
- RMS upstream fault level at, typically 90 ms (selectable)
    - The upstream FL measured for a downstream event (below monitoring location)
- Peak downstream (motor) contribution at ½ cycle (10 ms)

- The downstream fault level measured for an upstream event (above the monitoring location)

Figure 6 below shows the typical installation arrangement in the case of Broadheath

Figure 6: Typical Outram FLM connection



FLM results and comparisons with IPSA+

The first report from Outram Research, showing the results for Broadheath, Wigan, Irlam and Denton West, has been completed. The fault level monitoring and network model validation report is still being progressed, however, the initial results for three of these four sites are shown below. An FLM was installed at Broadheath, however, due to a connection issue the monitor was reinstalled for a further period of data collection.

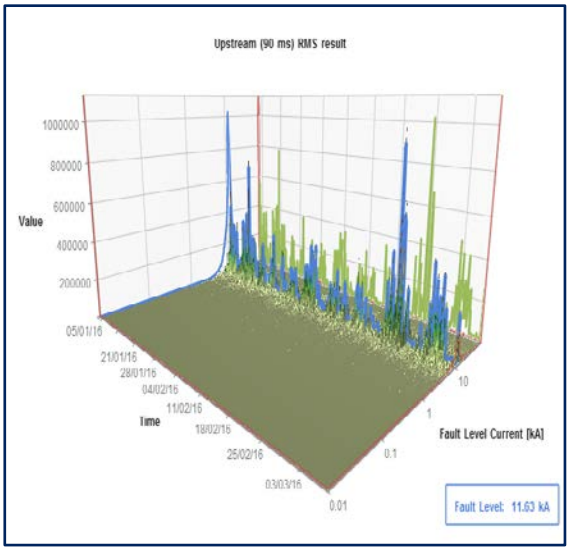
The table below shows a strong agreement between Irlam and Denton West, however, the results for Wigan are less so. The purpose of the fault level validation work is to identify these differences and the potential cause.

Substation	Outram FLM				IPSA+		Difference %	
	10ms Peak Upstream (kA)	10ms Peak Downstream (kA)	90ms RMS upstream (kA)	Combined 10ms Peak (kA)	10ms Peak (kA)	90ms RMS upstream (kA)	10ms peak (%)	90ms RMS (%)
Wigan BSP	16.83	1.6	7.51	18.43	29.9	8.28	62.24	10.25
Irlam primary	29.4	4.27	11.63	33.67	34.64	11.94	2.88	2.67
Denton West	34.84	3.47	14.08	38.31	39.51	13.65	3.13	-3.05

The graphs below show the Outram FLM results for Irlam primary substation during the period 03/01 to 07/03. The results are provided as distribution plots in both 3D and 2D The results show the predicted fault level for both downstream events (asymmetrical peak and symmetrical RMS) and upstream events (asymmetrical peak).

- Peak upstream fault level at 10ms
- RMS upstream fault level at 90 ms
- Peak downstream fault level at 10ms

Figure 7: Irlam RMS U/stream contribution 3D (left) and Irlam RMS U/stream contribution 2D (right)



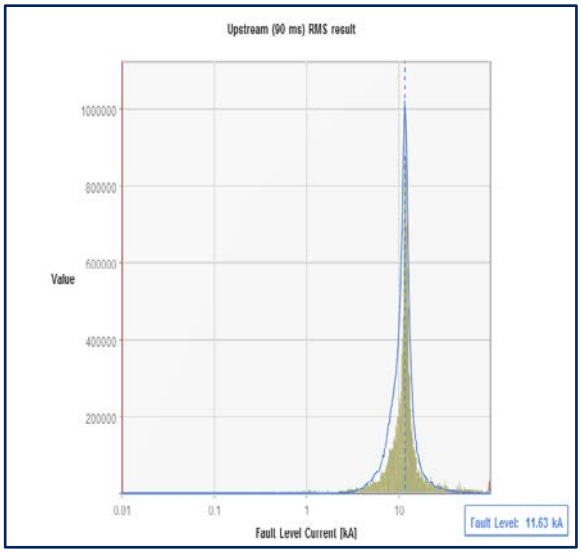
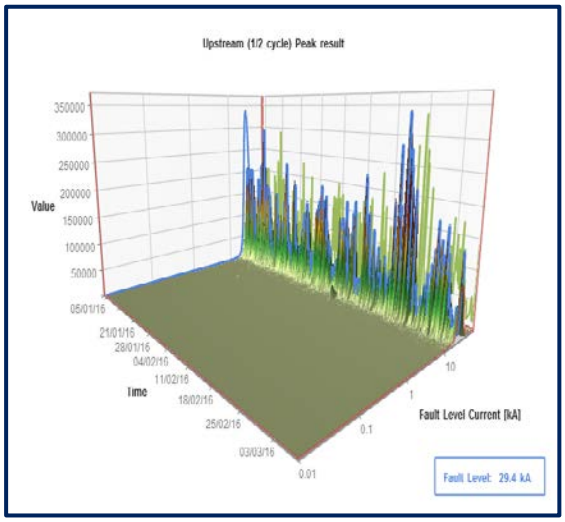


Figure 8: Irlam Asym U/stream contribution 3D (left) and Irlam Asym U/stream contribution 2D (right)



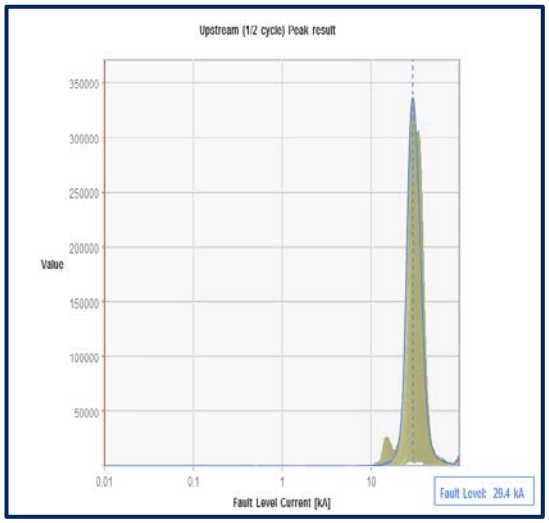
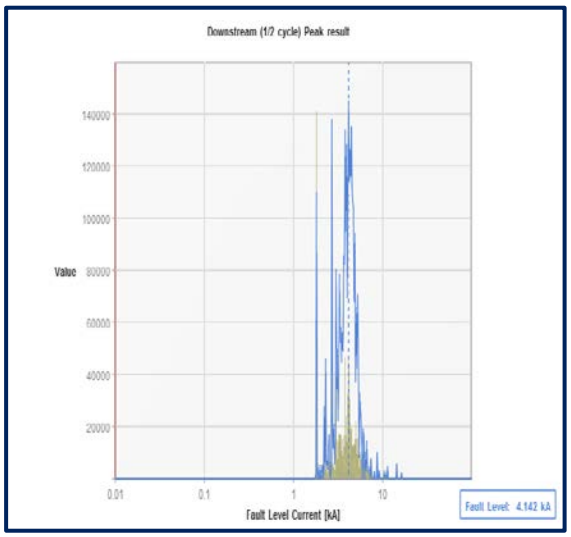


Figure 9: Irlam Asym D/stream contribution 3D



FCL service

The project team has successfully engaged with project partner, United Utilities, on the FCL service and has identified one site with CHP; the next stage is to survey a number of sites with the aim of identifying a second site with a large motor. The motor's suitability will then be assessed to establish the technical and operational protocols at the site. It is expected that additional participants, identified from the customer survey, will become involved in the FCL service trial and enter into a managed agreement to test enabling technologies for approximately 12 months.

Asset health study

The asset condition monitoring site selection and equipment rotation programme has been agreed with EA Technology with asset condition monitoring equipment being installed as follows:

- The dissolved gas analysis equipment has been installed permanently at Broadheath and Wigan substations
- The EATL Ultratev partial discharge and acoustic monitoring equipment has been installed permanently at Broadheath substation, which is one of the I_S-limiter sites.
- The other three Ultratev units are travelling units and will be deployed across all the Respond sites during the trial period; the first installations are at Littleborough, Denton West and Offerton substation sites
- Similarly one of the Kelvatek profilers has been permanently installed at Broadheath substation as it is an I_S-limiter site
- The other three Kelvatek profilers are travelling units and will be deployed across all the Respond sites during the trial period; the first installations are at Littleborough, Denton West and Offerton substations.

The pictures below show an installation of each health monitoring technique.

Figure 10: EATL Ultratev installation at Broadheath

Figure 118: Kelvatek profiler measurement at Denton West

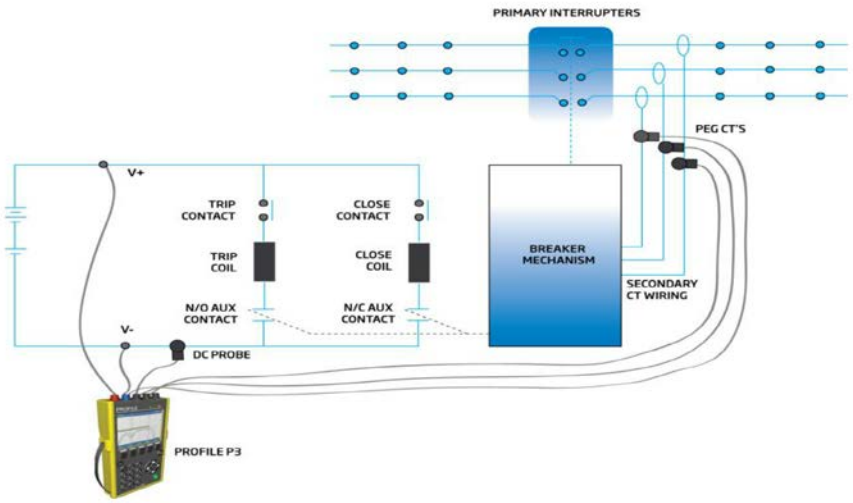


Figure 12: Kelvatek TOTUS dissolved gas analysis installation

In the next reporting period, the trials and analysis workstream will undertake the following activities:

- Publish on the Respond website a summary of each fault event three months after each event
- Publish a report on validation of the Fault Level Assessment Tool
- Ensure the Fault Level Assessment Tool is still functional during the Electricity North West NMS changeover
- Engage with survey customers who indicated that they may be willing to trial the FCL service.

2.4 Customer engagement workstream

The key activities undertaken by the customer engagement workstream during the reporting period are summarised below:

Customer survey completed

The survey was administered by Electricity North West's market research project partner, Impact Research, and sought to establish the appetite among new and existing customers to engage in FCL service contracts. The survey was also designed to ascertain the optimal price point at which customers are willing to engage, in order to establish a route to market.

After a robust, targeted campaign and the use of project partners to recruit suitable respondents, a total of 103 I&C demand and DG customers across GB participated in the customer survey.

Customer survey results analysed and report of findings drafted

Interim analysis of survey responses proved the hypothesis that the Respond method enables a market for the provision of an FCL service.

Overall, indicative take-up of the FCL service among the total market is relatively low. However, appetite is significantly higher among non-manufacturing customers and organisations able to constrain their motor or generator for up to ten minutes without this having any significant impact on their operation and/or it resulting in any loss of productivity. These customers represent the target market.

Further details can be found in the **Interim Customer Survey Report** which is published on the Respond website.

There are no customer workstream activities due to be undertaken in the next reporting period. The next activity to be completed will be publication of the full customer survey report and information for customer evaluation of FCL service provision on the Respond website by May 2017.

2.5 Learning and dissemination workstream

The third Respond industry newsletter was circulated in May 2016 to approximately 700 industry stakeholders, details of whom are held in an internal database, developed as a result of interest/engagement in previous LCN Fund projects

The first knowledge sharing event was held in Manchester in May 2016 and was well attended by industry stakeholders.

The second Respond advertorial was published in Engineering and Technology magazine in April 2016.

All Electricity North West operational, control room and design teams have been briefed and trained on the Respond fault level mitigation management project and operational protocols.

Social media forums exploited: To ensure that the key messages from Respond are disseminated as widely as possible, the project team is using a range of social media outlets to communicate Respond-related information, specifically:

 http://www.facebook.com/ElectricityNorthWest

 https://twitter.com/ElectricityNW

 http://www.linkedin.com/company/Electricity-North-West

 http://www.youtube.com/ElectricityNorthWest

In the next reporting period, the learning and dissemination workstream will undertake the following activities:

- Publish third advertorial
- Publish fourth industry newsletter
- Hold second webinar
- Submit fourth six-monthly report to Ofgem.

3 CONSISTENCY WITH FULL SUBMISSION

At the end of this reporting period, it can be confirmed that the Respond project is being undertaken in accordance with the full submission.

4 RISK MANAGEMENT

The project risks identified in the project bid document have been migrated into the Respond delivery risk register, reviewed and updated.

Risks identified in the project bid are regularly reviewed by the delivery team and a significant proportion of them have been mitigated and are therefore no longer active or are a low level risk:

- There was a delay against plan in obtaining the signature of a number of partner contracts. All contracts have now been signed and are working well.
- There was a risk that project partners were not able to mobilise their resources in time because of other commitments leading to a delay in achieving potential milestones which could have project, reputational and financial repercussions. The project partners have achieved all milestones and deliverables for ‘go live’.
- There was a risk that the Fault Level Assessment Tool delivery would be affected by the major project of replacing Electricity North West’s NMS. To mitigate the risk the Respond team and the network management delivery team have been working closely and co-ordinating delivery plans. Through this co-ordination the team has been able to identify the Respond network and associated attributes which were prioritised within the data cleanse and network build programme in the NMS in order to meet the Respond delivery timescales.
- There was a risk that the new Fault Level Assessment Tool would not perform as expected during testing and commissioning, leading to delayed start of live trials. The Fault Level Assessment Tool passed the FAT and SAT testing and went live in May 2016.

- There was a risk that the six-month lead time for delivery of the I_S-limiters may have led to a delay in the installation of this technology. Both I_S-limiters were designed, installed and commissioned ahead of schedule.
- There was a risk that appropriately skilled resource might not be available to perform the retrofit installation of technologies leading to a delay in the installation programme. Both Electricity North West employees and contractors worked effectively and efficiently together to achieve all commissioning deadlines even when encountering a number of challenges during installation. This was helped by a number of these resources bringing experience from working on previous second tier projects.
- There was a risk that the data protection strategy would be complicated by accessing customer survey participants from outside the company's geographical licence area leading to legal and reputational issues. This was mitigated by close working with project partners to ensure adherence of strict compliance with data protection regulations and market research protocol, to ensure that the minimum required number of completed surveys was exceeded.
- There was a risk that customers with relevant demand or generation equipment would not engage in the customer survey leading to a lack of robust data for Hypothesis 5. Impact Research has had experience of this issue in a Second Tier project delivery environment and the survey contact list was designed to identify key decision makers within organisations.
- There was a risk that there would be a low level of return of surveys from the participants in the customer surveys. The Respond team worked with project partners, Impact Research, Ener-G and the Association of Decentralised Energy (ADE) to ensure the minimum number of surveys was completed. Indeed, the minimum requirement of 75 surveys was exceeded to achieve a total return of 103 completed surveys.

Risks will be monitored on a continuous basis, including the potential risks that were documented in the full submission.

Project risks are described in detail in Appendix A.

5 SUCCESSFUL DELIVERY REWARD CRITERIA (SDRC)

Eight SDRC were successfully delivered in this reporting period. These are shown in Table 5.1 below.

Table 5.1: Respond project SDRC delivered in the reporting period

SDRC (evidence)	Planned date	Completion date
Issue second project progress report in accordance with Ofgem's June and December production cycle and publish on Respond website	Dec 2015	Dec 2015
Brief and train Electricity North West operational teams, including planning engineers, on fault level mitigation management protocols	April 2016	April 2016
Publish second advertorial	April 2016	April 2016
Publish monitoring and analysis procedures for trials on Respond website	May 2016	May 2016
Publicise commencement of live trials on Respond website	May 2016	May 2016

SDRC (evidence)	Planned date	Completion date
Publish third newsletter	May 2016	May 2016
First knowledge sharing event	May 2016	May 2016

The SDRC due in the next reporting period are shown below.

Table 5.2: Respond SDRC due in the next reporting period

SDRC (Evidence)	Planned date	Status
Publicise Respond within Electricity North West in monthly team brief pack and/ or Volt (intranet) and/ or Newswire (quarterly employee magazine)	June 2016	On schedule
Publish third advertorial	July 2016	On schedule
Publish equipment specifications and installation reports for the Adaptive Protection	Sept 2016	On schedule
Publish equipment specifications and installation reports for the I_S-limiter	Sept 2016	On schedule
Publish NMS interface and configuration specifications and commissioning reports	Sept 2016	On schedule
Hold second webinar	Sept 2016	On schedule
Publish report on validation of the Fault Level Assessment Tool	Nov 2016	On schedule
Publish fourth newsletter	Nov 2016	On schedule
Actively participate at the second of four annual LCNI conferences	Nov 2016	On schedule
Issue fourth project progress report in accordance with Ofgem's June and December production cycle and publish on Respond website	Nov 2016	On schedule

The current status of the evidence for all Respond SDRC is shown in Appendix B. Progress against the SDRC and the project plan will continue to be monitored, and if the current forecast for SDRC delivery changes, future project progress reports will be updated accordingly.

6 LEARNING OUTCOMES

A number of lessons were learnt and learning outcomes achieved during the reporting period. The key learning outcomes are summarised below:

Lesson 1: Standardised containers

- **Background:** Standard solution of two containers for Broadheath and one for Bamber Bridge (One container at each site has I_S-limiter and series CB and the second container at Broadheath contains bybass CB).

- **Lesson Learned:** A standard solution for both sites created a simpler/ quicker/ cost effective design and allowed easier delivery on site.

Lesson 2: Installation of the Adaptive Protection

- **Background**: The marshalling box was well constructed; however, it was very heavy and difficult to handle when mounting on the top of the protection panels (even though a two-metre panel lifter was used). The weight of the IPCT marshalling box and the difficult to determine strength of the protection panel resulted in the use of supports to spread the load across multiple panels.
- **Lesson learned:** The marshalling kiosks should have the CTs mounted as low as possible to increase lateral stability and the use of load spreading techniques to be considered when mounting heavy objects on top of legacy protection and control panels to spread loads and hence assure their structural stability

Lesson 3: Unforeseen civil engineering

- **Background:** The I_S-limiter containers for Broadheath and Bamber Bridge provided a quicker and cost effective design and allowed easier delivery on site. However, there were a number of unforeseen civil engineering problems once excavation started which were costly and caused a delay, such as the removal of reinforced concrete and removal of abandoned cables.
- **Lessons learned:** To minimise the risk of delay on future projects, trial holes across the proposed site should be undertaken to ascertain the civil engineering required to identify any issues early to avoid any undue delays.

Lesson 4: Conducting a customer survey with I&C customers

- **Background:** As the customer survey completion period progressed it became apparent that a strategy was needed to encourage a greater conversion between the pool of customers recruited for the survey and those that actually went on to take part. Some customers who were recruited over the phone, were emailed the survey and subsequently had to be sent up to three reminders before completion which was very time-consuming. In addition, the volume of customers that had started the survey and only partially completed it was relatively high, which was thought to be a consequence of them attempting to complete the survey at work during a busy time of year. Anecdotal feedback was received that the survey was important but not urgent for participants who were very busy in the run up to Christmas.
- **Lessons learned:** A one-off additional incentive was introduced to encourage earlier completion of the survey, and in particular, before respondents went on their Christmas annual leave. The incentive took the form of a retail voucher or charity donation at double the previous incentive value and/or entry into a prize draw to win a 16GB iPad Mini. Prize draws had proven to be an effective incentive with I&C customers in a previous project Capacity to Customers. The difference with this project was that surveys had to be completed within a specific time frame in order for participants to qualify for the increased reward. Reluctant participants or those who had only partially completed the survey were contacted personally with the offer of this additional one-off incentive, which was combined with the recruiter explaining the importance of customer participation in the research. This approach was sufficient to boost the response rate to the required level.

Lesson 5: Scripting a customer survey

- **Background:** Although the online survey was tested before it was issued to the ECP, the panellists reported some issues in finding the email invitation (sometimes located in their 'spam' folder) and accessing the link to the first pilot survey. Some customers were unable to access the link at all due to internal IT restrictions and others were only able to complete the survey up to a certain point (often at a question placed up front regarding video compatibility).

- **Lessons learned**: The survey was re-scripted in HTML-5 (as opposed to FLASH). Two versions of the survey link were created, one with the pilot link embedded and one without (in the case of the latter version, the Respond video was sent via a separate YouTube link). At the point of recruitment, respondents were asked which survey link would be most appropriate for them. For those who had been recruited before the pilot survey, two versions of the link were emailed, with some explanatory text around which to select. In total, 58 participants completed the survey using a link without the video embedded, indicating it was a worthwhile and cost effective exercise to provide the alternative option, which had the effect of significantly enhancing accessibility.

Lesson 6: Survey recruitment

- **Background:** Various newsletters and emails from project partners to their members and/or customers were circulated over the summer period of 2015 in order to recruit and pre-register respondents to take part in the survey. The response to this was very low, with only a relatively small number of respondents (16) recruited in this way. The majority of customers were recruited by telephone by Impact Research.
- **Lessons learned**: Using a range of recruitment methods proved effective in achieving sufficient numbers of survey participants. The following methods were utilised to facilitate a sample size that allowed for natural attrition (post recruitment) and a statistically robust sample of relevant customers completing the survey:

    - Delivering face to face presentations to prospective respondents (ADE's members)
    - Newsletter distributed to prospective respondents (members/customers of ADE and ENER-G)
    - Letter distributed to prospective respondents identified within Electricity North West's operating region (COMA customers)
    - Telephoning prospective respondents and engaging them in conversation about the survey and the rewards available. This was found to be the most effective method of encouraging survey participation.

Lesson 7: Reconvening an ECP to evaluate a contract template

- **Background**: Reconvening a previously educated ECP to support the development of a commercial template was considered the most efficient and cost effective means of evaluating customer engagement materials to take the FCL service to market. The ECP were presented with a suite of draft communication materials, developed from those previously used to support the customer survey, which had been further refined following respondents' feedback on the effectiveness of materials in conveying an extremely complicated concept to differing types of customers. The panel was also shown a presentation, which will form the basis of a tailored pitch, used to introduce the FCL service to potential trial participants. This platform will enable the commercial manager to explain the incentives available to individual customers, based on their equipment's contribution to fault current and represents the first customer engagement phase in the trial of the FCL service, which is expected to lead to more detailed commercial negotiations.
- **Lesson learned**. The panel concluded that the written materials were effective in conveying the objectives of the trial and how participating customers' equipment might be impacted. The Q&A document was thought to be particularly effective, and while the panel agreed it was lengthy in nature, felt all its content was relevant and it would be inappropriate to compress the materials, given the complexities of the subject. The panel suggested that the literature was sent to prospective trial participants before the personal delivery of a bespoke presentation, to provide sufficient opportunity for relevant people within the organisation to comment and compile a list of questions and concerns. The panel concluded that the presentation effectively explained the concept in a manner that was accessible to customers from a range of technical and commercial backgrounds. The proposed method of delivery by a commercial manager and a senior technical engineer was considered appropriate and provides a suitable

framework by which to engage customers more thoroughly. The approach opens communications channels for more detailed technical discussions and contract negotiations with those organisations who agree to take part in the trial.

7 BUSINESS CASE UPDATE

The project team are not aware of any developments that have taken place since the issue of the Respond (FLARE) project direction that affects the business case for the project.

8 PROGRESS AGAINST BUDGET

The project budget as defined in the project direction is shown in Appendix C.

Actual spend to date compared to project budget is summarised in Table 8.1 below. The report includes expenditure up to and including 31 May 2016.

It will be noted that the project is currently performing on budget. The detailed design and installation work required for the I_S-limiter and Adaptive Protection was more complex than originally expected resulting in an enduring risk that installation cost will exceed budget. Therefore the final cost sheet at this stage does not reflect the final installation cost.

Project expenditure as at the end of May 2016 was £2,446,000 compared to a cost baseline of £3,487,000.

It is currently forecast that the project will be delivered near the budgeted value less contingencies.

Table 8.1: Summary of project expenditure

£'000s Excluding Partner Funding Ofgem Cost Category	Spend to date			Total Project			% Var
	Actual	Budget	Variance	Forecast	Budget	Variance	Budget
Summary							
Labour	626	799	173	1,324	1,305	(19)	-1%
Equipment	845	987	142	1,136	1,058	(78)	-7%
Contractors	398	709	311	1,065	1,140	75	7%
IT	506	573	67	573	573	(0)	0%
IPR Costs	0	0	0	0	0	0	0%
Travel & Expenses	0	0	0	0	0	0	0%
Payments to Users	7	27	20	61	61	0	1%
Contingency	0	288	288	0	484	484	100%
Decommissioning	0	0	0	54	54	0	0%
Other	63	103	40	349	349	(0)	0%
Total Costs	**2,446**	**3,487**	**1,040**	**4,562**	**5,024**	**463**	**9%**

Detailed expenditure is shown at Appendix D at project activity level.

Note: Respond is budgeted at £5,544 million including £519,460 of partner contributions. For reporting these partner contributions have been removed from both the relevant budget and actual financial statements, resulting in the restated project budget of £5.024 million.

9 BANK ACCOUNT

The Respond project bank statement is shown in Appendix E. The statement contains all receipts and payments associated with the project up to the end of May 2016.

10 INTELLECTUAL PROPERTY RIGHTS

Electricity North West is following the default IPR arrangements. No IPR have been generated or registered during the reporting period.

The IPR implications of forthcoming project deliverables are currently being considered, and will be reported in the next project progress report.

11 ACCURACY ASSURANCE STATEMENT

This document has been reviewed by a number of key business stakeholders. The project team and select members of the Respond project steering group, including the lead member of the bid development team, have reviewed the report to ensure its accuracy.

The financial information has been produced by the Respond project manager and the project's finance representative who review all financial postings to the project each month in order to ensure postings are correctly allocated to the appropriate project activity. The financial information has also been peer reviewed by the Electricity North West head of business performance.

The issue of the document has been approved by the innovation delivery manager.

APPENDIX A: STATUS OF RISKS FROM THE FULL SUBMISSION

Project Phase /Workstream	Description *(Delivery Risk Category)*	Probability Score	Impact Score	Mitigating Action/ *Contingency* Action	Revised Probability	Revised Impact Score
Mobilisation	There is a risk that project partners are not able to mobilise their resources in time because of other commitments leading to a delay in achieving potential milestones which could have a project, reputational, and financial repercussion. ***(Other)***	2	4	• Suitable partnership agreements that ensure collaborative working, value for customers' money and achievement of learning objectives in a timely manner have been identified for all partners. • A project initiation document will be issued to the project partners to ensure that all parties are ready. *Contingency: Electricity North West will seek new partners should existing partners fail to mobilise.*	1	1
Technology	There is a risk that installation of the new Fault Level Assessment Tool or configuration of the network management system will overrun leading to delayed start of live trials. ***(Installation)***	3	5	• Robust T&Cs for the Fault Level Assessment Tool provision will be agreed to ensure partner focus on achieving the FLARE project timescales. • Resources and mobilisation plan will be defined to achieve the project milestones and will be developed in conjunction with the selected software partner. *Contingency: Regular progress meetings/reports to track progress against the plan. Electricity North West will commit additional operational resource should any delays occur to the installation, testing and commissioning programme.*	1	1
Technology	There is a risk that the new Fault Level Assessment Tool will not perform as expected during testing and commissioning, leading to delayed start of live trials. ***(Installation)***	3	4	• Guidance on the use of a fault level monitor to validate the Tool's calculations has been sought from WPD using their learning from FlexDGrid. • Validation of the Fault Level Assessment Tool will occur prior to live trials and periodically, and at different points on the trial networks during the live trial period. *Contingency: n/a*	1	1
Technology	There is a risk that the six month lead time for delivery of I_S-limiters may lead to a delay in the installation of this technology. ***(Procurement)***	4	3	• Project plan specifies that a purchase order will be raised to procure I_S-limiters at the beginning of March 2015. ABB will expedite the order. *Contingency: Flexibility is built into the installation programme so that installation of this technology can occur in spring 2016.*	1	1
Technology	There is a risk that retrofit of Adaptive Protection (for distribution system and electrical machines) may be more complex than anticipated leading to a delay in the installation programme. ***(Installation)***	3	3	• The installation programme will be considered alongside known operational and maintenance activity peaks to allow for extra resource to be secured and deployed. • Electricity North West has scoped Respond with the input from a generator manufacturer and a customer with motors. • Protection requirements for generators are explored in ENER-G's test cell. The	1	1

Project Phase /Workstream	Description *(Delivery Risk Category)*	Probability Score	Impact Score	Mitigating Action/ *Contingency* Action	Revised Probability	Revised Impact Score
				Project cost includes for external contractor retrofit of the Adaptive Protection for electrical machines. *Contingency: Alternative substations may be selected to ensure Respond trials are not delayed. Learning from every installation/ attempted installation will be published through knowledge dissemination activities.*		
Technology	There is a risk that appropriately skilled resource may not be available to perform the retrofit installation of technologies leading to a delay in the installation programme. ***(Installation)***	3	4	• Guidance on the specific skills requirements has been sought and FLARE's installation programme will be designed in consideration of known operational and maintenance activity peaks. *Contingency: Contractors may be brought in to cover business as usual activities to allow internal resource to cover installation requirements of this project.*	1	1
Technology	There is a risk that Respond technologies do not perform as anticipated leading to trial circuits exceeding their fault level limits. ***(Other)***	3	5	• Forerunner projects explored techniques with academic and technical colleagues. • Fault level mitigation techniques will be installed at substations with no fault level constraints. Standard protection capability will not be exceeded. *Contingency: n/a*	2	5
Customer	There is a risk that the data protection strategy will be complicated by accessing customer survey participants from outside the company's area leading to legal and reputational issues. ***(Recruitment)***	3	5	• The CHPA/ ENER-G has members/ customers across the UK and will promote involvement in the survey. • Impact Research will work with the CHPA/ ENER-G to design and undertake the customer survey work and ensure complete compliance with data privacy requirements. • Impact Research and Electricity North West will undertake a pilot communication trial, with a range of stakeholders to ensure that they are able to effectively communicate and engage with the project's stakeholders. *Contingency: n/a*	1	1
Customer	There is a risk that customers with relevant demand or generation equipment do not engage in the customer survey leading to a lack of robust data for Hypothesis 5. ***(Recruitment)***	3	4	• Impact Research has experience of this issue in a Second Tier project delivery environment. The survey contact list will be designed to identify key decision makers within organisations. • Incentive payments are being offered for participation. *Contingency: More customers will be approached and incentivised to participate.*	1	1

Trials & Analysis	There is a risk that the selected networks do not experience a fault during the period of the trials leading to the techniques and devices being untested. ***(Other)***	3	5	• Up-to-date fault statistics will be used in the site selection phase to ensure that networks with higher than average faults are selected for Respond demonstration. *Contingency: In the absence of any faults, PB Power will test, via simulation, operation of the Fault Current Assessment Tool and three mitigation techniques.*	1	2
Trials & Analysis	There is a risk that a FCL service participant decides they no longer wish to participate in the trial. ***(Recruitment)***	2	3	• The Respond team will work with the customer to understand why customer perception has changed and to capture learning from the trial. *Contingency: n/a*	2	2
Technology	There is a risk that the Respond project is delayed due to the replacements of Electricity North West's network management system taking priority. ***(Installation)***	2	4	• The project team will work closely with the network management team to ensure goals are aligned and the Respond network and attributes are prioritised for data cleanse, network build and attribute population • *Contingency: Build the Respond network and attributes on an islanded server with an ICCP link to the NMS system for live data and topology changes*	1	1
Customer	There is a risk that the customer survey participants will not complete the minimum number of surveys required for the project ***(Recruitment)***	2	2	• The Respond team will work with project partners, Impact Research, Ener-G and the Association of Decentralised Energy (ADE) to ensure the surveys are completed and aim to identify more participants. 251 who have shown an interest to participate have been identified • *Contingency: Increase the financial incentive to existing participants and recruit more new participants*	1	1

As the project progresses, the project team will gain a better view of the likelihood of these risks and will also identify more evidence-based ones.

APPENDIX B: SUMMARY OF PROJECT SDRC

SDRC (evidence)	Due date	Status
Publicise Respond within Electricity North West in monthly team brief pack and/ or Volt (intranet) and/ or Newswire (quarterly employee magazine) by January 2015	Jan-15	Delivered
Publish first newsletter by May 2015	May-15	Delivered
Send customer engagement plan and data privacy statement to Ofgem by June 2015	Jun-15	Delivered
Issue first project progress report in accordance with Ofgem's June and December production cycle and publish on Respond website	Jun-15	Delivered
Deliver live Respond website and social media forums by July 2015	Jul-15	Delivered
Publish first advertorial by July 2015	Jul-15	Delivered
Deliver engaged customer panel workshop by September 2015	Sep-15	Delivered
Second publicise Respond within Electricity North West in monthly team brief pack and/ or Volt (intranet) and/ or Newswire (quarterly employee magazine) by September 2015	Sep-15	Delivered
First webinar held by September 2015	Sep-15	Delivered
Deliver lessons learned from testing customer survey materials incorporated into survey and all survey materials published on the Respond website by October 2015	Oct-15	Delivered
Publish second newsletter by November 2015	Nov-15	Delivered
Actively participate at 2015 annual LCNI conference	Nov-15	Delivered
Issue second project progress report in accordance with Ofgem's June and December production cycle and publish on Respond website	Dec-15	Delivered
Brief and train Electricity North West operational teams, including planning engineers, on fault level mitigation management protocols by April 2016	Apr-16	Delivered
Publish second advertorial by April 2016	Apr-16	Delivered
Publish monitoring and analysis procedures for trials on Respond website by May 2016	May-16	Delivered
Publicise commencement of live trials on Respond website by May 2016	May-16	Delivered
Publish third newsletter by May 2016	May-16	Delivered

SDRC (evidence)	Due date	Status
Hold first knowledge sharing event by May 2016	May-16	Delivered
Third publicise Respond within Electricity North West in monthly team brief pack and/ or Volt (intranet) and/ or Newswire (quarterly employee magazine) by June 2016	Jun-16	Delivered
Issue third project progress report in accordance with Ofgem's June and December production cycle and publish on Respond website	Jun-16	Delivered
Publish third advertorial by July 2016	Jul-16	On track
Publish equipment specifications and installation reports for the Adaptive Protection and the I_S-limiter by September 2016	Sep-16	On track
Publish NMS interface and configuration specifications and commissioning reports by September 2016	Sep-16	On track
Second webinar held by September 2016	Sep-16	On track
Publish report on validation of the Fault Level Assessment Tool by November 2016	Nov-16	On track
Publish fourth newsletter by November 2016	Nov-16	On track
Actively participate at 2016 annual LCNI conference	Nov-16	On track
Issue fourth project progress report in accordance with Ofgem's June and December production cycle and publish on Respond website	Dec-16	On track
Publish customer survey report and information for customer evaluation of FCL service provision on Respond website by May 2017	May-17	On track
Publish fifth newsletter by May 2017	May-17	On track
Hold second knowledge sharing event by May 2017	May-17	On track
Issue fifth project progress report in accordance with Ofgem's June and December production cycle and publish on Respond website	Jun-17	On track
Fourth publicise Respond within Electricity North West in monthly team brief pack and/ or Volt (intranet) and/ or Newswire (quarterly employee magazine) by July 2017	Jul-17	On track
Publish fourth advertorial by July 2017	Jul-17	On track
Hold third webinar by September 2017	Sep-17	On track
Publish sixth newsletter by November 2017	Nov-17	On track
Actively participate at 2017 annual LCNI conference	Nov-17	On track

SDRC (evidence)	Due date	Status
Issue sixth project progress report in accordance with Ofgem's June and December production cycle and publish on Respond website	Dec-17	On track
Publish equipment specifications and installation reports for the FCL service by April 2018	Apr-18	On track
Publish on Respond website a summary of each fault event three months after each event, with the expectation that a minimum of 18 faults will be reported on	May-18	On track
Purchase a Fault Current Limiting service from at least one Electricity North West demand customer and one Electricity North West generation customer	May-18	On track
Publish contract templates for FCL service with new and existing customers and commercial arrangements learning by May 2018	May-18	On track
Publish seventh and final newsletter by May 2018	May-18	On track
Publish updated fault level management, planning, design, protection settings and operation and maintenance policies by June 2018	Jun-18	On track
Issue seventh project progress report in accordance with Ofgem's June and December production cycle and publish on Respond website	Jun-18	On track
Publish on Respond website the cost benefit analysis study report and the buy order of Respond/ FlexDGrid/ traditional reinforcement fault level mitigation solutions by July 2018	Jul-18	On track
Publish on Respond website the carbon impact assessment report by July 2018	Jul-18	On track
Publish asset health study on Respond website by July 2018	Jul-18	On track
Submit a DCUSA change proposal for amending application approach to Fault Level Cost Apportionment Factor in Common Connection Charging Methodology by August 2018	Aug-18	On track
Publish peer reviewed safety cases on the Respond project website by September 2018	Sep-18	On track
Hold third knowledge sharing event September 2018	Sep-18	On track
Hold fourth webinar	Oct -18	On track
Fifth publicise Respond within Electricity North West in monthly team brief pack and/ or Volt (intranet) and/ or Newswire (quarterly employee magazine	Oct-18	On track
Publish fifth advertorial by October 2018	Oct-18	On track
Issue Respond project closedown report to Ofgem and publish on Respond website by October 2018	Oct-18	On track

SDRC (evidence)	Due date	Status
Publish Electricity North West's approach to managing fault level reinforcement on Respond website by October 2018	Oct-18	On track
Actively participate at 2018 annual LCNI conference	Nov-18	On track
Issue eighth project progress report in accordance with Ofgem's June and December production cycle and publish on Respond website	Dec-18	On track

APPENDIX C: PROJECT DIRECTION BUDGET

£000's Excluding Partner Funding Ofgem Cost Category	
Labour	**1,305**
Project Management - Labour	866
Install/Commissioning - Labour	396
General Labour - Labour	43
Equipment	**1,058**
Materials - Equipment	4
General Equipment - Equipment	22
Monitoring Equipment - Equipment	163
IS Limiter - Equipment	685
Adaptive Protection - Equipment	184
Contractors	**1,140**
Project Management - Contractor	20
Install/Commissioning - Contractor	554
Research - Contractor	295
Customer Survey - Contractor	59
Customer Engagement - Contractor	169
Dissemination - Contractor	43
IT	**573**
IT Hardware - IT	0
IT Software - IT	564
IT Licences - IT	9
IPR Costs	**0**
IPR Costs	0
Travel & Expenses	**0**
Travel & Expenses	0
Payments to Users	**61**
Payments to Users	36
Fault Current Limiting Service	0
Customer Payments	26
Contingency	**484**
Contingency	484
Decommissioning	**54**
Decommissioning	54
Other	**349**
Rent - Other	60
Telecoms - Other	0
Dissemination - Other	289
Customer Survey - Other	0
Conference Reg. Fees - Other	0
Other	0
Total	**5,024**

Note: Value restated to £5,024,000

APPENDIX D: DETAILED PROJECT EXPENDITURE

£'000s Excluding Partner Funding Ofgem Cost Category	Spend to date			Total Project			Comments
	Actual	Plan	Variance	Forecast	Plan	Variance	
Labour	**626**	**799**	**173**	**1,324**	**1,305**	**(19)**	
Project Management - Labour	295	365	70	866	866	0	
Install/Commissioning - Labour	313	391	78	414	396	(18)	
General Labour - Labour	18	43	24	44	43	(2)	
Equipment	**845**	**987**	**142**	**1,136**	**1,058**	**(78)**	
Materials - Equipment	3	1	(2)	4	4	(0)	
General Equipment - Equipment	7	9	2	22	22	(0)	
Monitoring Equipment - Equipment	152	163	11	163	163	0	
IS Limiter - Equipment	615	665	50	761	685	(76)	Part of equipment cost budgetted as contractor
Adaptive Protection - Equipment	69	150	81	185	184	(1)	
Contractors	**398**	**709**	**311**	**1,065**	**1,140**	**75**	
Project Management - Contractor	2	20	18	20	20	0	
Install/Commissioning - Contractor	284	495	211	479	554	75	Part of equipment cost budgetted as contractor
Research - Contractor	0	13	13	295	295	0	
Customer Survey - Contractor	28	47	19	59	59	0	
Customer Engagement - Contractor	84	123	39	169	169	(0)	
Dissemination - Contractor	0	10	10	43	43	0	
IT	**506**	**573**	**67**	**573**	**573**	**(0)**	
IT Hardware - IT	0	0	0	0	0	0	
IT Software - IT	506	564	58	564	564	(0)	
IT Licences - IT	0	9	9	9	9	0	
IPR Costs	**0**	**0**	**0**	**0**	**0**	**0**	
IPR Costs	0	0	0	0	0	0	
Travel & Expenses	**0**	**0**	**0**	**0**	**0**	**0**	
Travel & Expenses	0	0	0	0	0	0	
Payments to Users	**7**	**27**	**20**	**61**	**61**	**0**	
Payments to Users	0	2	2	36	36	0	
Fault Current Limiting Service	0	0	0	0	0	0	
Customer Payments	7	26	19	25	26	0	
Contingency	**0**	**288**	**288**	**0**	**484**	**484**	
Contingency	0	288	288	0	484	484	
Decommissioning	**0**	**0**	**0**	**54**	**54**	**0**	
Decommissioning	0	0	0	54	54	0	
Other	**63**	**103**	**40**	**349**	**349**	**(0)**	
Rent - Other	21	17	(3)	60	60	0	
Telecoms - Other	0	0	(0)	0	0	(0)	
Dissemination - Other	43	86	43	289	289	(0)	
Customer Survey - Other	0	0	(0)	0	0	(0)	
Conference Reg. Fees - Other	0	0	0	0	0	0	
Other	0	0	0	0	0	0	
Total	**2,446**	**3,487**	**1,040**	**4,562**	**5,024**	**463**	

APPENDIX E: PROJECT BANK ACCOUNT

The bank statement below details all transactions relevant to the project. This includes all receipts and payments associated with the project since the previous report up to the May 2016 month end reporting period.

Lloyds Bank
Statements and Balances

P&S - ALL ACCOUNTS v2 391353

308012-11782760
ELECTRICITY NWL NO.14 LCNF (FLARE) (GBP)

Date	Type	Narrative	Value Date	Payments	Receipts	Balance
01DEC15		Opening Ledger Balance				3,214,274.74 Cr
15DEC15	BGC	UK PN OPERATIONS BGC LCNF			5,916.23	3,220,190.97 Cr
15DEC15	BGC	UK PN OPERATIONS BGC LCNF			28,759.39	3,248,950.36 Cr
15DEC15	BGC	UK PN OPERATIONS BGC LCNF			44,845.19	3,293,795.55 Cr
24DEC15	BGC	NORTHERN ELECTRIC BGC LCNF			19,955.62	3,313,751.17 Cr
24DEC15	BGC	NORTHERN ELECTRIC BGC LCNF			28,646.82	3,342,397.99 Cr
24DEC15	CR	FROM A/C TFR 02749020 300002			80,917.39	3,423,315.38 Cr
24DEC15	F/FLOW	F/FLOW SOUTHERN EL TFR			19,537.31	3,442,852.69 Cr
24DEC15	F/FLOW	F/FLOW SCOTTISH HY TFR			9,487.73	3,452,340.42 Cr
24DEC15	F/FLOW	F/FLOW WESTERN POW TFR RE: ENWL NO.14 FLA RE			79,924.28	3,532,264.70 Cr
29DEC15	F/FLOW	F/FLOW SP MANWEB P TFR SCOTTISHPOWER			18,796.27	3,551,060.97 Cr
29DEC15	F/FLOW	F/FLOW SP DISTRIBU TFR SCOTTISHPOWER			25,117.00	3,576,177.97 Cr
22JAN16	BGC	UK PN OPERATIONS BGC LCNF			5,916.23	3,582,094.20 Cr
22JAN16	BGC	UK PN OPERATIONS BGC LCNF			28,759.39	3,610,853.59 Cr
22JAN16	BGC	UK PN OPERATIONS BGC LCNF			44,845.19	3,655,698.78 Cr
25JAN16	F/FLOW	F/FLOW WESTERN POW TFR RE: ENWL NO.14 FLA RE			79,924.28	3,735,623.06 Cr
28JAN16	BGC	R B S-SP MANWEB BGC			18,796.27	3,754,419.33 Cr
28JAN16	BGC	NORTHERN ELECTRIC BGC LCNF			19,955.62	3,774,374.95 Cr
28JAN16	BGC	R B S-SP DISTRIBUT BGC			25,117.00	3,799,491.95 Cr
28JAN16	BGC	NORTHERN ELECTRIC BGC LCNF			28,646.82	3,828,138.77 Cr
28JAN16	CR	FROM A/C TFR 02749020 300002			80,917.39	3,909,056.16 Cr
29JAN16	F/FLOW	F/FLOW SOUTHERN EL TFR			19,537.31	3,928,593.47 Cr
29JAN16	F/FLOW	F/FLOW SCOTTISH HY TFR			9,487.73	3,938,081.20 Cr
16FEB16	BGC	UK PN OPERATIONS BGC LCNF			5,916.23	3,943,997.43 Cr
16FEB16	BGC	UK PN OPERATIONS BGC LCNF			28,759.39	3,972,756.82 Cr
16FEB16	BGC	UK PN OPERATIONS BGC LCNF			44,845.19	4,017,602.01 Cr
17FEB16	DR	TO A/C TFR 02749020 300002		44,585.46		3,973,016.55 Cr
17FEB16	DR	TO A/C TFR 02749020 300002		334,515.18		3,638,501.37 Cr
17FEB16	DR	TO A/C TFR 02749020 300002		100,522.72		3,537,978.65 Cr
17FEB16	DR	TO A/C TFR 02749020 300002		12,541.71		3,525,436.94 Cr
17FEB16	DR	TO A/C TFR 02749020 300002		319,930.08		3,205,506.86 Cr
24FEB16	F/FLOW	F/FLOW WESTERN POW TFR RE: ENWL NO.14 FLA RE			79,924.28	3,285,431.14 Cr
26FEB16	BGC	NORTHERN ELECTRIC BGC LCNF			19,955.62	3,305,386.76 Cr
26FEB16	BGC	NORTHERN ELECTRIC BGC LCNF			28,646.82	3,334,033.58 Cr
26FEB16	CR	FROM A/C TFR 02749020 300002			80,917.39	3,414,950.97 Cr
26FEB16	F/FLOW	F/FLOW SCOTTISH HY TFR			9,487.73	3,424,438.70 Cr
26FEB16	F/FLOW	F/FLOW SOUTHERN EL TFR			19,537.31	3,443,976.01 Cr
29FEB16	F/FLOW	F/FLOW SP DISTRIBU TFR SCOTTISHPOWER			18,796.27	3,462,772.28 Cr
29FEB16	F/FLOW	F/FLOW SP DISTRIBU TFR SCOTTISHPOWER			25,117.00	3,487,889.28 Cr
15MAR16	BGC	UK PN OPERATIONS BGC LCNF			5,916.23	3,493,805.51 Cr
15MAR16	BGC	UK PN OPERATIONS BGC LCNF			28,759.39	3,522,564.90 Cr
15MAR16	BGC	UK PN OPERATIONS BGC LCNF			44,845.19	3,567,410.09 Cr
24MAR16	BGC	NORTHERN ELECTRIC BGC			19,955.62	3,587,365.71 Cr

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Lloyds Bank
Statements and Balances

P&S - ALL ACCOUNTS v2 391353

308012-11782760
ELECTRICITY NWL NO.14 LCNF (FLARE) (GBP)

Date	Type	Narrative	Value Date	Payments	Receipts	Balance
		LCNF				
24MAR16	BGC	NORTHERN ELECTRIC BGC			28,646.82	3,616,012.53 Cr
		LCNF				
24MAR16	F/FLOW	F/FLOW WESTERN POW TFR			79,924.28	3,695,936.81 Cr
		RE: ENWL NO.14 FLA				
		RE				
29MAR16	BGC	R B S-SP MANWEB BGC			18,796.27	3,714,733.08 Cr
29MAR16	BGC	R B S-SP DISTRIBUT BGC			25,117.00	3,739,850.08 Cr
29MAR16	CR	FROM A/C TFR			80,917.39	3,820,767.47 Cr
		02749020 300002				
29MAR16	F/FLOW	F/FLOW SOUTHERN EL TFR			19,537.31	3,840,304.78 Cr
29MAR16	F/FLOW	F/FLOW SCOTTISH HY TFR			9,487.73	3,849,792.51 Cr
31MAY16		Value of Credits (44)			1,447,612.92	
31MAY16		Value of Debits (5)		812,095.15		
31MAY16		Closing Ledger Balance				3,849,792.51 Cr
31MAY16		Closing Cleared Balance				3,849,792.51 Cr