



# RESPOND

## Project Progress Report

19 June 2018



## VERSION HISTORY

Version	Date	Author	Status	Comments
V1.0	5 June 2018	Paul Marshall Project manager	Final draft	Internally reviewed

## REVIEW

Name	Role	Date
Lucy Eyquem	Innovation PMO manager	12 June 2018
Paul Turner	Innovation manager	12 June 2018

## APPROVAL

Name	Role	Signature
Steve Cox	Engineering and technical director	12 June 2018
Sarah Barrett	Finance business partner	12 June 2018

# CONTENTS

<b>1</b>	<b>EXECUTIVE SUMMARY</b>	<b>6</b>
1.1	The Respond project	6
1.2	Progress to date	6
1.3	Risks	9
<b>2</b>	<b>PROJECT MANAGER'S REPORT</b>	<b>9</b>
2.1	General	9
2.2	Technology workstream	10
2.3	Trials & analysis workstream	11
2.4	Customer engagement workstream	13
2.5	Learning & dissemination workstream	16
<b>3</b>	<b>CONSISTENCY WITH FULL SUBMISSION</b>	<b>16</b>
<b>4</b>	<b>RISK MANAGEMENT</b>	<b>16</b>
<b>5</b>	<b>SUCCESSFUL DELIVERY REWARD CRITERIA (SDRC)</b>	<b>17</b>
<b>6</b>	<b>LEARNING OUTCOMES</b>	<b>18</b>
<b>7</b>	<b>BUSINESS CASE UPDATE</b>	<b>18</b>
<b>8</b>	<b>PROGRESS AGAINST BUDGET</b>	<b>18</b>
<b>9</b>	<b>BANK ACCOUNT</b>	<b>19</b>
<b>10</b>	<b>INTELLECTUAL PROPERTY RIGHTS</b>	<b>19</b>
<b>11</b>	<b>ACCURACY ASSURANCE STATEMENT</b>	<b>19</b>

## GLOSSARY OF TERMS AND ABBREVIATIONS

Abbreviation/Term	Definition
AP	<b>Adaptive Protection</b> is the use of adjustable protection settings that can be changed in real time
ADE	<b>The Association of Decentralised Energy</b> is a 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)
CB	<b>A circuit breaker</b> is a device that interrupts the flow of current in an electric circuit
CCCM	<b>Common Connection Charging Methodology</b> is a section within DCUSA that covers charging for new connections to the distribution system
CHP	<b>Combined heat and power</b> is the simultaneous generation of usable heat and power (usually electricity) in a single process
CRMS	<b>Control Room Management System</b>
CT	A <b>current transformer</b> is a transformer designed to scale down large primary currents to smaller values for the purpose of measurement and protection
DCUSA	<b>Distribution Connection and Use of System Agreement</b> is a multi-party contract between licensed distributors, suppliers and generators
DG	<b>Distributed generation</b> is generation connected to the distribution network
DNO	A <b>distribution network operator</b> is the owner and/or operator of an electricity distribution system and associated assets
FLAT	The <b>Fault Level Assessment Tool</b> is 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
FCL service	The <b>Fault Current Limiting service</b> is a distributed generation and/or industrial and commercial customer-provided response to reduce overall fault current on the distribution network
Fault level	Prospective maximum current which will flow during a fault
FlexDGrid	A Second Tier LCN Fund fault level mitigation project run by Western Power Distribution
HAZOP	A <b>hazard and operability</b> study is a structured and systematic technique for system examination and risk management
HV	<b>High voltage</b> is the 11,000/6,600 volt network
I&C	<b>Industrial and commercial</b> customers are non-domestic customers

Abbreviation/Term	Definition
<b>IPSA+</b>	<b>Interactive Power Systems Analysis Plus</b> software is used to model and assess network power flows, voltage profiles, fault levels, stability and harmonics
<b>I<sub>s</sub>-limiter</b>	A fault current mitigation technology
<b>LCN Fund</b>	<b>Low Carbon Networks Fund</b>
<b>LCNI</b>	<b>Low Carbon Networks and Innovation</b>
<b>Near real time</b>	A measure of the frequency of the calculation by the Fault Level Assessment Tool. For Respond this will be every five minutes
<b>NMS</b>	<b>Network management system</b>
<b>NTC</b>	<b>National Terms for Connection</b> is a document containing the standard terms for connection to the electricity distribution system
<b>Primary substation</b>	A point on the network where the voltage changes from 33kV to 11kV or 6.6kV
<b>Protection relay</b>	Device that analyses power system voltages and currents to detect faults and sends signals to circuit breakers to open
<b>RTU</b>	A <b>remote terminal unit</b> is the interface between the substation equipment and the <b>NMS</b>
<b>SDRC</b>	<b>Successful delivery reward criteria</b> are key milestones to be delivered throughout the project
<b>Substation</b>	A point on the network where voltage transformation occurs
<b>Switchgear</b>	Device for opening and closing electrical circuits (including circuit breakers)
<b>TRIAD</b>	A National Grid charging system that allows large electricity users to reduce energy charges by reducing consumption during peak demand periods

# 1 EXECUTIVE SUMMARY

## 1.1 The Respond project

This is the seventh in a series of six-monthly progress reports for the Respond project and represents the final update prior to the project's closedown. This project was approved under the name Fault Level Active Response (FLARE). This report covers the period from December 2017 to the end of May 2018.

Respond is demonstrating 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.

## 1.2 Progress to date

The project is on track and all SDRC have been delivered as planned; however, we have not fully achieved the aspiration of trialling the technical and commercial elements of the Fault Current Limiting (FCL) service at a customer premise. Nevertheless, we have produced a contract template, built and tested a prototype that could be used for a customer installation and demonstrated that the service is more appropriately applied as a managed connection agreement for new connectors rather than procured from existing customers. The project has completed the two-year trials and analysis phase to collect data and evaluate the effectiveness of the installed techniques. 11 successful post-fault operations have occurred during the trials and analysis phase.

The cost benefit analysis study report and the buy order of Respond/FlexDGrid/ traditional reinforcement fault level mitigation solutions was completed and published on the website in January 2018.

A submission paper that could be used as a basis for changing the National Terms of Connection within Distribution Connection and Use of System Code (DCUSA) for amending the application approach to the Fault Level Cost Apportionment Factor in the Common Connection Charging Methodology (CCCM) has been completed and published on the website in March 2018, should this be required at a future date.

The Respond project was presented at the Low Carbon Networks and Innovation (LCNI) conference on 7 December 2017 in Telford and a seventh and final newsletter was published in April 2018 to provide an update on the results of the trials and analysis phase of the project.

The equipment specification and installation report for the FCL service was published on the project website in April 2018, in addition to the report disseminating contract templates for FCL services with new and existing customers and the commercial arrangements learning.

Work has progressed on the development of safety cases for each of the fault level mitigation techniques, which are scheduled to be peer reviewed and published on the website by September 2018.

The Respond assets are now in the process of being decommissioned at the 14 trial sites as the trials and analysis period has been completed and the learning achieved.

All documentation evidencing the progress of the project and the achievement of SCRC is available on the [project website](#).

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

## 1.2.1 Technical workstream

### Fault Level Assessment Tool

The Fault Level Assessment Tool (FLAT) has been successfully integrated into the network management system for the last 24 months, calculating close to real time fault levels and taking the appropriate action following comparisons with plant ratings and enabling/disabling the techniques.

### Adaptive Protection

Since the trial period began there have been eight network faults across four sites. These occurred at: Atherton Town Centre, Blackbull, Littleborough and Irlam substations. The Adaptive Protection solution responded correctly in every case.

Two alternative installation methods were designed, installed and have successfully demonstrated that Adaptive Protection can be implemented by modifying existing installations. These modifications took place at Atherton Town Centre and Denton West primary substations.

### I<sub>S</sub>-limiter and I<sub>S</sub>-sensing units

Since the trial period began we have had two network faults at Bamber Bridge substation where the I<sub>S</sub>-limiter has responded correctly. Additionally one network fault occurred which caused the Hareholme substation I<sub>S</sub>-sensing site to operate.

## 1.2.2 Trials & analysis workstream

### Post-fault monitoring and analysis procedure

Every fault that occurs within the Respond network must be validated to ensure that the correct action has taken place. The post-fault analysis methodology details the process and data requirements to confirm the fault level, the operation of each of the respective fault level mitigation techniques and FLAT action.

Ten successful post-fault operations have occurred during the trials and analysis phase with the data being collected, monitored and analysed prior to publication on the project website. There has been one successful operation of an I<sub>S</sub>-sensing site.

### Asset health study

An asset condition monitoring site selection and equipment rotation programme was agreed with EA Technology. The equipment was installed at a number of selected sites and was rotated around them during the trial period. An interim report for partial discharge results was published on the project website in November 2017 and this will be superseded by the complete report, which is due for publication in July 2018.

### Fault level monitors

Outram fault level monitors have been installed at 11 Respond sites for the purpose of network model validation of both the Electricity North West IPSA+ network model and the Schneider FLAT. Reports detailing the predicted fault level at nine sites can be viewed on the website.

### FCL service contract

Preparation of the FCL service standard contract has been completed in conjunction with our project partner United Utilities and the contract template is available on the project website.

### Purchase of FCL service

The Respond project team have found it challenging to engage customers willing to participate in the FCL service trial due to a number of barriers that have been highlighted and



documented as a risk in previous six-monthly progress reports. Active discussions have continued to take place during this reporting period but we have been unsuccessful in securing an agreement to test the FCL service at a project partner site, or in obtaining a managed agreement with a new or existing customer.

As such, a technical solution was designed, constructed and successfully tested at an Electricity North West substation to demonstrate how FCL service integration technologies could be installed and applied at a customer's site. The technical specification and installation report was published in April 2018.

### 1.2.3 Learning and dissemination

The Respond project team have been utilising a range of tools in this reporting period to disseminate and share knowledge about the project with stakeholders. These include an advertorial, an industry newsletter, company internal magazine articles, updates on the project website and via social media.

The Respond project was presented at the Low Carbon Networks & Innovation Conference on 7 December 2017 in Telford, Shropshire. The seventh and final newsletter on the Respond project was published in April 2018 to provide an update of the results of the trials and analysis phase of the project.

The five SCRC due in the reporting period were successfully delivered and those due in the next period are on track. Two SCRC due in the next reporting period are included in the following table, having been completed ahead of the planned date. The most significant of these are shown in Figure 1.1 below, and all are discussed in Section 5.

*Figure 1.1: Most significant SCRC delivered in this reporting period*

SDRC (evidence)	Planned date	Completion date
Actively participate at LCNI conference	November 2017	December 2017
Issue sixth project progress report in accordance with Ofgem's June and December production cycle and publish on Respond website	December 2017	December 2017
Publish equipment specifications and installation reports for the FCL service	April 2018	April 2018
Publish contract templates for the FCL service with new and existing customers and commercial arrangements learning	May 2018	April 2018
Publish seventh and final newsletter	May 2018	April 2018
Publish on Respond website the cost benefit analysis study report and the buy order of Respond/ FlexDGrid/ traditional reinforcement fault level mitigation solutions	July 2018	January 2018
Submit a DCUSA change proposal for amending application approach to Fault Level Cost Apportionment Factor in Common Connection Charging Methodology	August 2018	March 2018



Project expenditure as at the end of May 2018 was £3,798,029 compared to a cost baseline of £4,667,266. The estimated project completion costs are exceeding budget, excluding contingency, due to the project design and installation being more complex and time-consuming than expected.

### 1.3 Risks

Risks identified in the Respond project bid are regularly reviewed by the delivery team. A significant proportion of them have been mitigated during the delivery and trials & analysis phase and are therefore no longer active and closed. No new risks have been identified in this reporting period.

The principal risk was the ability to secure a customer willing to participate in the FCL service trial. This risk and the challenges encountered were outlined in the previous progress reports and Ofgem was specifically advised on 12 February 2018 that it had not been possible to secure an FCL service trial at a customer premise. 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.

## 2 PROJECT MANAGER'S REPORT

### 2.1 General

During this reporting period we have been monitoring and analysing the fault level mitigation techniques and we have had 11 successful operations of the Respond techniques.

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

- **Trials and analysis monitoring:** Investigation and detailed post analysis of the ten fault level mitigation activations
- **Customer and commercial learning:** publication of contract templates and commercial learning gained from activities to secure the trial of an FCL service agreement
- **Cost benefit analysis:** Production of a final cost benefit analysis and buy order of the Respond fault level mitigation techniques.

An interim cost benefit analysis and buy order of the Respond techniques report (published in June 2017) has since been superseded by the final report. This SDRC was completed ahead of schedule, in January 2018. Adaptive Protection and I<sub>S</sub>-limiters have been installed as part of the Respond trial and the costs of the installation are summarised in the report. The operating and maintenance costs for Adaptive Protection and I<sub>S</sub>-limiters are based upon the experience in the trial period; whereas, in the absence of any other data, the cost for procurement of an FCL service are those used in the project submission document. The capital cost of installing fault current limiters for the FlexDGrid project together with the ongoing operational costs were obtained from WPD and these are also summarised in the report.

Work has been ongoing with Hazard and Operability Studies (HAZOP) on the development of the safety cases for the fault level mitigation techniques which is due to be peer-reviewed in June 2018. This approach is a structured and systematic examination of a complex planned or existing process or operation in order to identify and evaluate problems that may represent risks to colleagues or equipment. The approach to the safety case has been discussed with the Health and Safety Executive to ensure compliance with the relevant legislation. We have also engaged with UK Power Networks to ensure a consistent approach to safety cases in view of its requirement to build a similar case for its Powerful-CB project, which will develop and trial two new fault limiting circuit breakers.

Two alternative installation methods have been designed and installed to demonstrate that Adaptive Protection can be implemented by:

- Utilising an existing digital relay with a new setting group and using a single transformer CT input for fault measurement
- Installing a new digital relay to replace an existing electro-mechanical relay and using a transformer CT input for fault measurement.

We have trialled each of these methods by modifying the existing installations at Atherton Town Centre and Denton West primary substations.

*Figure 2.1: Simplified installations at Denton West*



*Figure 2.2: Interposing CTs removed for the simplified installation at Denton West*



## 2.2 Technology workstream

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

### Adaptive Protection

The five Adaptive Protection schemes are designed to operate for multi-phase faults which may occur on the network they protect. To date there have been eight successful operations, three at Atherton Town centre substation, one at Blackbull substation, one at Irlam substation and three at Littleborough substation; all of the data has been analysed and the details published on the Respond website.

## I<sub>S</sub>-limiters and I<sub>S</sub>-sensing units

The two I<sub>S</sub>-limiters have been designed and installed to operate for a multi-phase fault on the networks they are protecting and we have had two successful operations at Bamber Bridge substation.

The five I<sub>S</sub>-sensing units are also designed to detect multi-phase faults on the networks they monitor and are passive in that no actual fault level mitigation is carried out. They are designed to sense rather than switch but if a fault occurs, and the fault conditions are met, an alarm will be sent to the NMS. To date one fault has occurred on the I<sub>S</sub>-sensing networks at Hareholme substation where the I<sub>S</sub>-sensing unit operated correctly and alarmed in our network management system.

## Fault Level Assessment Tool

The project team worked closely with the network management system replacement programme team to ensure that their programme had minimal impact on the Respond trials.

### 2.3 Trials & analysis workstream

#### Respond faults

Since going live, there have been ten HV faults where the magnitude of the fault current has been sufficiently high to initiate operation of a fault level mitigation technique within the trial area. The table in Figure 2.1 below lists all faults to date in the trial area which have caused operation of the respective fault level mitigation technique along with a web link, where available, to the post-fault reports produced by our project partner WSP.

Figure 2.3: Faults to date

Respond fault ref	Substation name	Date	FLM technique	Web link
001	Atherton Town Centre	29/07/2016	Adaptive protection	<a href="#">What we have learned - trials</a>
002	Atherton Town Centre	28/08/2016	Adaptive protection	<a href="#">What we have learned - trials</a>
003	Atherton Town Centre	16/09/2016	Adaptive protection	<a href="#">What we have learned - trials</a>
004	Blackbull	03/04/2017	Adaptive protection	<a href="#">What we have learned - trials</a>
005	Littleborough	08/05/2017	Adaptive protection	<a href="#">What we have learned - trials</a>
006	Bamber Bridge	22/05/2017	I <sub>S</sub> -limiter	<a href="#">What we have learned - trials</a>
007	Littleborough	20/06/2017	Adaptive protection	<a href="#">What we have learned - trials</a>
008	Irlam	17/08/2017	Adaptive protection	<a href="#">What we have learned - trials</a>
009	Bamber Bridge	18/08/2017	I <sub>S</sub> -limiter	<a href="#">What we have learned - trials</a>
010	Hareholme	01/01/2018	I <sub>S</sub> sensing	No report as only sensing
011	Littleborough	18/02/2018	Adaptive protection	<a href="#">What we have learned - trials</a>

Post-fault analysis of the eight Adaptive Protection operations above has shown clearly that the techniques have been successful for each event.

Post-fault analysis of the two  $I_S$ -limiter events at Bamber Bridge substation has shown that the  $I_S$ -limiter operated as designed and limited the prospective fault current. However, the disturbance recorders integral to the protection relays at Bamber Bridge substation did not capture the fault current prior to the operation of the  $I_S$ -limiter due to its extremely fast operating time. Without any captured analogue waveforms it has not been possible to analyse the magnitude and duration of the initial fault current.

Figure 2.2 shows an example of the disturbance records of a fault at Atherton Town Centre substation on the York Street 11kV circuit on 29 September 2016 at 18.25.

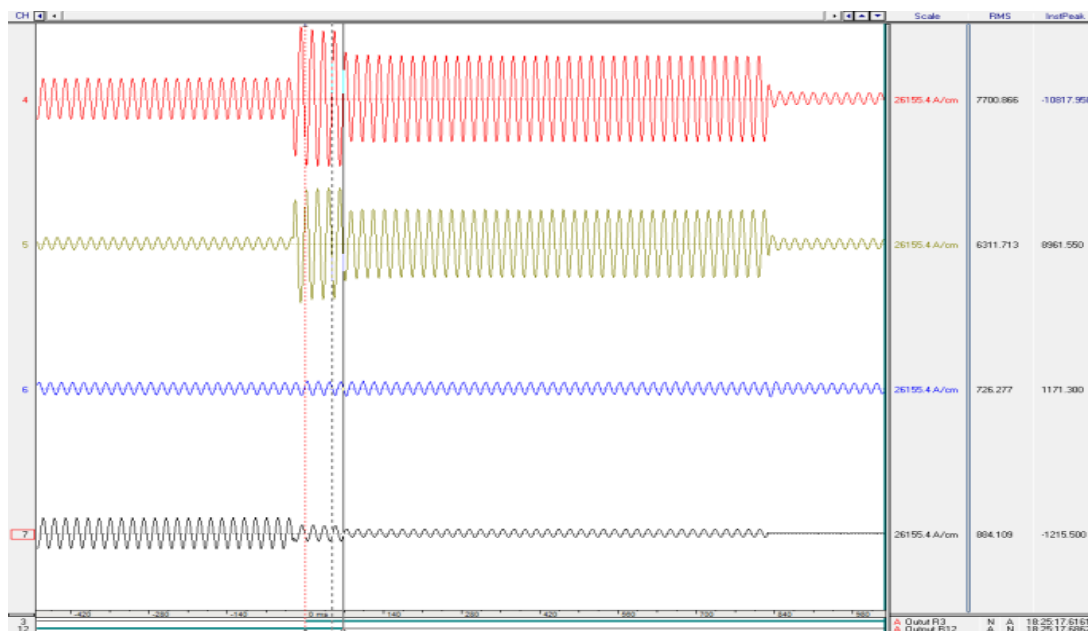
Prior to the phase to phase to earth fault, which the Adaptive Protection responded to, there was a red phase to earth fault present. The magnitude of the earth fault current was 1712.7 Amps with a corresponding red phase fault current of 2306.6 Amps (inclusive of load current).

The phase to phase to earth fault with 7652.5 Amps and 6262.7 Amps in the red and yellow phases respectively and a 918.7 Amp residual fault current, occurred 22.5 ms prior to being detected by the Adaptive Protection relay. The 11 kV bus-section circuit breaker tripped 70.9 ms after the trip signal from the Adaptive Protection relay was sent. The total duration of the phase to phase to earth fault which the Adaptive Protection responded to, up to the tripping of the 11 kV bus section circuit breaker, was 93.4 ms.

After the 11 kV bus section circuit breaker tripped, the phase to phase to earth fault current reduced to 4979.4 Amps and 3923.2 Amps in the red and yellow phases respectively and the residual fault current reduced to 463.4 Amps. These fault currents continued for a further 758.9 ms, until the feeder protection operated ie the fault was eventually cleared 829.8 ms after the Adaptive Protection detected the initial phase to phase to earth fault.

The residual current is seen to reduce from 918.7 Amps to 463.4 Amps (a reduction of approximately 50%). This reduction in residual current reflects the dominant effect of the earthing resistors at Atherton Town Centre substation and the expected doubling of the earth resistance as the bus section is opened and the earthing resistors on each bus section are no longer in parallel.

Figure 2.2: Instantaneous Adaptive Protection relay recordings ( $I_A$ =red,  $I_B$ =yellow,  $I_C$ =blue and  $I_N$  (residual)=black)



Overall, the analysis has confirmed that the Adaptive Protection operated as expected and reduced the fault current to be interrupted by the feeder circuit breaker.

Reports for the faults have been completed and published on the website as per SDRC 9.3.3. For full details of each fault follow the link in the table above.

### **Asset health study**

The asset condition monitoring is now complete, using the site selection and equipment rotation programme previously agreed with EA Technology during the trial period. As part of this work an interim partial discharge report has been completed and the final report due in July 2018.

## **2.4 Customer engagement workstream**

### **FCL service contract**

One of the key outputs of the project was to develop appropriate commercial arrangements and contract templates for FCL service provision. A model commercial contract, based on a variation to the National Terms of Connection (NTC) was published on the project website in May 2016. This could be applied to both existing load/generation customers and new connection customers. This template is transferable to other GB DNOs.

United Utilities played an active role in the evaluation of the contract template prior to publication and identified certain conditions that could be open to challenge, if procuring the service from an existing customer.

The regulatory and legal necessity for specific clauses to protect the network operator, its network and the customers served, prevents significant material changes to the document. However, as highlighted by United Utilities and as documented in the customer report (published May 2017) existing customers electing to provide a voluntary fault level response to a DNO for commercial gain, are expected to challenge specific terms and clauses. The document explains how such complications could be negated by offering the FCL service as a constrained connection agreement, as opposed to a standard offer for new customers (and existing customers adding new demand and generation). Application of the method as a new form of constrained connection agreement could negate significant capital investment by creating a wider choice of quicker and lower cost connection options for customers who are able to accept a flexible arrangement.

### **FCL service tested in the marketplace**

The project aim was to seek up to five FCL service contracts with I&C or distributed generation (DG) customers during the trial period. It was originally proposed that two of these managed agreements would be provided by project partner United Utilities.

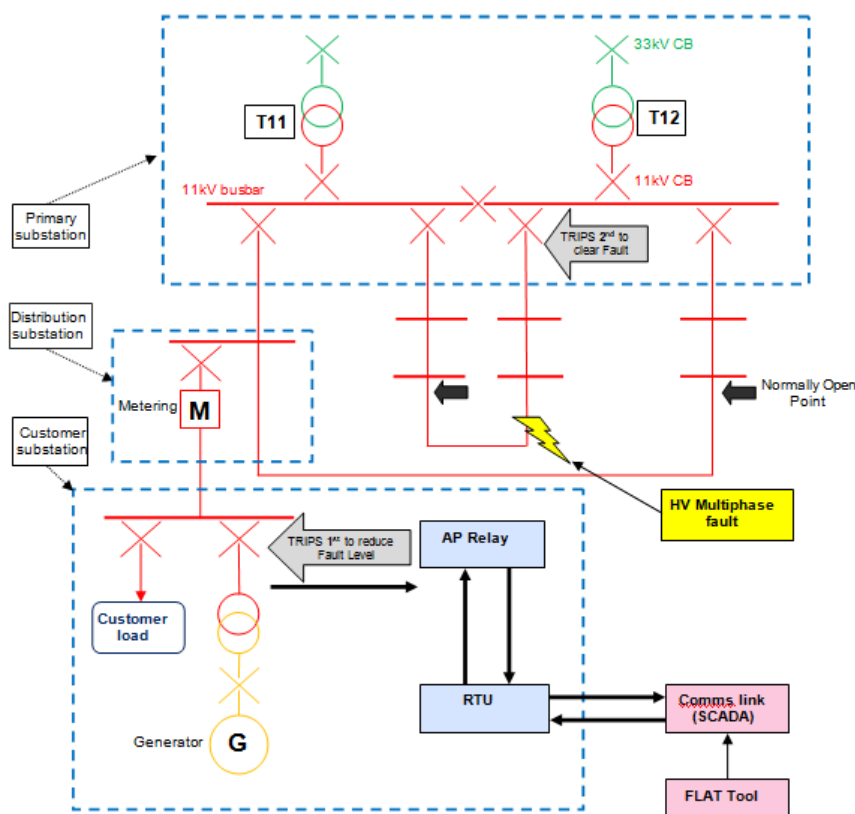
Due to the perceived commercial risk, contract negotiations to commence trials with United Utilities, took considerably longer than was originally envisaged. This delay restricted the time available to develop the design and technical arrangements required to actively test the interface technologies at two proposed sites and consequently, it was not possible to proceed to the installation stage.

Despite a robust customer engagement strategy the Respond project team have found it extremely challenging to identify customers willing to participate in the FCL service trial due to a number of barriers that have been highlighted and documented as a risk in previous six-monthly progress reports. These issues are more thoroughly reported in the customer report (published in May 2017) and the contract commercial learning report which was published in April 2018. Active discussions took place with 13 organisations who initially indicated a willingness to participate in the Respond trials. But only one progressed into the final stage of technical and commercial discussions and these were unsuccessful due to concerns over commercial issues during the TRIAD period.

In the absence of a customer trial of the FCL service, a technical solution was designed and a prototype built to demonstrate that the new FCL service modules can communicate correctly with the SCADA system (telecontrol, CRMS, NMS and the FLAT tool), to locally monitor on-site CB status.

The equipment specifications and installation report for the FCL service has been completed and was published on the Respond website in April 2018. While the project team recognised that it may be feasible to use the existing protection relay in a customer’s installation by utilising an additional settings group, this would not be the case in all circumstances. Therefore a generic design was developed, incorporating new protection and tripping relays which could then be tailored to suit any particular installation. Figure 2.3 shows a typical schematic layout of a design that could be utilised to trip a customer’s HV circuit breaker to provide an FCL service.

Figure 2.4: Generic Adaptive Protection scheme for a customer substation



Figures 2.5 to 2.7 illustrate the remote terminal unit (RTU) and Adaptive Protection panel installed and tested at an Electricity North West substation site to demonstrate how the FCL service installation could be applied at a customer’s site.



Figure 2.5: External view of the RTU and AP panel used to communicate and control with the FCL service installation



Figure 2.6: Internal view of the RTU



Figure 2.7: Internal view of the FCL service protection (AP panel)





## 2.5 Learning & dissemination workstream

The project team attends relevant industry events to present developments in the project.

Respond was presented at the LCNI conference held on 7 December 2018 in Telford, which was well attended and the feedback was positive. A seventh and final newsletter was published in April 2018 to provide an update on the results of the trials & analysis phase of the project. This was issued to approximately 700 industry stakeholders, details of whom are held in an internal database, developed as a result of interest/engagement in previous LCN Funded projects.

**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>

## 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; however, the principal risk (as outlined in previous six-monthly progress reports) of not meeting the aspiration to secure up to five managed agreements with customers willing to participate in the FCL service trial has materialised. Ofgem was specifically advised of this situation on 12 February 2018.

## 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 considered to be at a low level.

The following risk was realised:

- There is a risk that the project team is unable to secure an FCL service participant to take part in the trial, to conduct trials at one demand and one generation 'project partner owned' site. However, the delivery team will continue to collaborate with ADE, Ener-G and other internal and external stakeholders to publicise the project and attract existing Electricity North West customers along with new customers connecting to the electricity network, to attain up to five suitable participants.

Risks will be monitored on a continuous basis, including the potential risks that were documented in the full submission. The project risks are described in detail in Appendix A.

## 5 SUCCESSFUL DELIVERY REWARD CRITERIA (SDRC)

The five SDRC due in the reporting period were successfully delivered and those due in the next period are on track. Two SDRC due in the next reporting period are included in the following table, having been completed ahead of the planned date. These are shown in Figure 5.1 below.

Figure 5.1: Respond project SDRC delivered in the reporting period

SDRC (evidence)	Planned date	Completion date
Actively participate at LCNI conference	November 2017	December 2017
Issue sixth project progress report in accordance with Ofgem's June and December production cycle and publish on Respond website	December 2017	December 2017
Publish equipment specifications and installation reports for the FCL service	April 2018	April 2018
Publish contract templates for FCL service with new and existing customers and commercial arrangements learning	May 2018	May 2018
Publish seventh and final newsletter	May 2018	April 2018
Publish on Respond website the cost benefit analysis study report and the buy order of Respond/ FlexDGrid/ traditional reinforcement fault level mitigation solutions	July 2018	January 2018
Submit a DCUSA change proposal for amending application approach to Fault Level Cost Apportionment Factor in Common Connection Charging Methodology	August 2018	March 2018

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

Figure 5.2: Respond SDRC due in the next reporting period

SDRC (Evidence)	Planned date	Status
Publish updated fault level management, planning, design, protection settings and operation and maintenance policies	June 2018	On track
Issue seventh project progress reports in accordance with Ofgem's June and December production cycle and publish on Respond website	June 2018	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	July 2018	Complete
Publish on Respond website the carbon impact assessment report	July 2018	On track
Publish asset health study on Respond website	July 2018	On track

SDRC (Evidence)	Planned date	Status
Submit a DCUSA change proposal for amending application approach to Fault Level Cost Apportionment Factor in Common Connection Charging Methodology	July 2018	Complete
Publish peer-reviewed safety cases on the Respond project website	Sept 2018	On track
Third knowledge sharing event	Sept 2018	On track
Publicise Respond within Electricity North West in monthly team brief pack	Oct 2018	On track
Publish fifth and final advertorial	Oct 2018	On track
Fourth webinar	Oct 2018	On track
Issue Respond project closedown report to Ofgem and publish on Respond website	Oct 2018	On track
Publish Electricity North West's approach to managing fault level reinforcement on Respond website	Oct 2018	On track
Actively participate at annual LCNI conference	Nov 2018	On track

The current status of the evidence for all Respond SDRC is shown in Appendix B. Progress against the SCRC and the project plan will continue to be monitored.

## 6 LEARNING OUTCOMES

A project website has been established as a repository for sharing project learning to interested stakeholders. No key learning outcomes have been identified in this reporting period.

## 7 BUSINESS CASE UPDATE

The project team is not aware of any developments that have taken place since the issue of the Respond 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 Figure 8.1 below. The report includes expenditure up to and including 31 May 2018.

Actual spend to date is reported as being below the planned expenditure to date (excluding contingencies) yet for the total project an overspend (excluding contingencies) is anticipated.

The overspend is due to a variety of issues which arose during the detailed design and site installation phase of the project within each of the technologies that were unforeseen and unbudgeted. This has resulted in an increase in forecast costs across labour, equipment and contractors as shown for the total project.

Project spend to date is £3,968,511 compared to planned expenditure of £4,761,458.

Forecast expenditure at completion is £4,760,322 against a plan of £5,024,000 including contingencies.

Figure 8.1: Summary of project expenditure

£'000s Excluding Partner Funding Ofgem Cost Category	Spend to date			Total Project		
	Actual	Plan	Variance	Forecast	Plan	Variance
Labour	1,342	1,212	(130)	1,472	1,305	(167)
Equipment	989	1,058	69	1,098	1,058	(41)
Contractors	870	1,097	227	1,193	1,140	(53)
IT	548	573	25	573	573	(0)
IPR Costs	0	0	0	0	0	0
Travel & Expenses	0	0	0	0	0	0
Payments to Users	7	61	54	7	61	54
Contingency	0	484	484	0	484	484
Decommissioning	0	34	34	54	54	0
Other	212	243	31	363	349	(13)
<b>Total</b>	<b>3,969</b>	<b>4,761</b>	<b>793</b>	<b>4,760</b>	<b>5,024</b>	<b>264</b>

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

Note: Respond is budgeted at £5.544 million including £0.52m 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 2018.

## 10 INTELLECTUAL PROPERTY RIGHTS

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

## 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 issue of the document has been approved by the engineering and technical director.

## 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	Status
Mobilisation	<b>Closed on 31 May 2016 as project mobilisation delivered and project live.</b> 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. ( <i>Other</i> )	2	4	<ul style="list-style-type: none"> <li>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.</li> <li>A project initiation document will be issued to the project partners to ensure that all parties are ready.</li> </ul> <p><i>Contingency: Electricity North West will seek new partners should existing partners fail to mobilise.</i></p>	1	1	Closed
Technology	<b>Closed on 31 May 2016 as project delivered and project live.</b> 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. ( <i>Installation</i> )	3	5	<ul style="list-style-type: none"> <li>Robust T&amp;Cs for the Fault Level Assessment Tool provision will be agreed to ensure partner focus on achieving the Respond project timescales.</li> <li>Resources and mobilisation plan will be defined to achieve the project milestones and will be developed in conjunction with the selected software partner.</li> </ul> <p><i>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.</i></p>	1	1	Closed
Technology	<b>Closed on 31 May 2016 as project FLAT tool commissioned and project live.</b> 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. ( <i>Installation</i> )	3	4	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul> <p><i>Contingency: n/a</i></p>	1	1	Closed
Technology	<b>Closed on 31 May 2016 as project delivered and project live.</b> There is a risk that the six month lead time for delivery of I <sub>S</sub> -limiters may lead to a delay in the installation of this technology. ( <i>Procurement</i> )	4	3	<ul style="list-style-type: none"> <li>Project plan specifies that a purchase order will be raised to procure I<sub>S</sub>-limiters at the beginning of March 2015. ABB will expedite the order.</li> </ul> <p><i>Contingency: Flexibility is built into the installation programme so that installation of this technology can occur in spring 2016.</i></p>	1	1	Closed

Project Phase /Workstream	Description ( <i>Delivery Risk Category</i> )	Probability Score	Impact Score	Mitigating Action/ <i>Contingency</i> Action	Revised Probability	Revised Impact Score	Status
Technology	<b>Closed on 31 May 2016 as project delivered and project live.</b> 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. ( <i>Installation</i> )	3	3	<ul style="list-style-type: none"> <li>The installation programme will be considered alongside known operational and maintenance activity peaks to allow for extra resource to be secured and deployed.</li> <li>Electricity North West has scoped Respond with the input from a generator manufacturer and a customer with motors.</li> <li>Protection requirements for generators are explored in ENER-G's test cell. The Project cost includes for external contractor retrofit of the Adaptive Protection for electrical machines.</li> </ul> <p><i>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.</i></p>	1	1	Closed
Technology	<b>Closed on 31 May 2016 as project delivered and project live.</b> 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. ( <i>Installation</i> )	3	4	<ul style="list-style-type: none"> <li>Guidance on the specific skills requirements has been sought and Respond's installation programme will be designed in consideration of known operational and maintenance activity peaks.</li> </ul> <p><i>Contingency: Contractors may be brought in to cover BAU activities to allow internal resource to cover installation requirements of this project.</i></p>	1	1	Closed
Technology	<b>Closed on 30 April 2018 as project trials period finished.</b> There is a risk that Respond technologies do not perform as anticipated leading to trial circuits exceeding their fault level limits. ( <i>Other</i> )	3	5	<ul style="list-style-type: none"> <li>Forerunner projects explored techniques with academic and technical colleagues.</li> <li>Fault level mitigation techniques will be installed at substations with no fault level constraints. Standard protection capability will not be exceeded.</li> </ul> <p><i>Contingency: n/a</i></p>	2	5	Closed
Customer	<b>Closed on 31 May 2016 as no issues accessing customers.</b> 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. ( <i>Recruitment</i> )	3	5	<ul style="list-style-type: none"> <li>The CHPA/ ENER-G has members/ customers across the UK and will promote involvement in the survey.</li> <li>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.</li> <li>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.</li> </ul> <p><i>Contingency: n/a</i></p>	1	1	Closed



Project Phase /Workstream	Description (Delivery Risk Category)	Probability Score	Impact Score	Mitigating Action/ Contingency Action	Revised Probability	Revised Impact Score	Status
Customer	Closed on 31 May 2016 as project delivered and project live 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	<ul style="list-style-type: none"> <li>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.</li> <li>Incentive payments are being offered for participation.</li> </ul>	3	4	Closed
				Contingency: More customers are being approached and incentivised to participate.			
Trials & Analysis	Closed on 30 April 2018 as project trials period finished. 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	<ul style="list-style-type: none"> <li>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. No risk as all techniques have operated.</li> </ul>	1	1	Closed
				Contingency: None as all techniques have operated during the trial phase			
Trials & Analysis	There is a risk that a FCL service participant decides they no longer wish to participate in the trial. (Recruitment)	2	3	<ul style="list-style-type: none"> <li>The Respond team will work with the customer to understand why customer perception has changed and to capture learning from the trial.</li> </ul>	5	5	Open
				Contingency: Design and construct a technical prototype solution, which can be installed and tested at an ENW substation site to demonstrate how the FCL service installation could be applied at a customer's site.			
Technology	Closed on 31 May 2016 as project delivered and project live .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	<ul style="list-style-type: none"> <li>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</li> <li>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</li> </ul>	1	1	Closed
Customer	Closed on 31 May 2016 as project delivered and project live There is a risk that the customer survey participants will not complete the minimum number of surveys required for the project (Recruitment)	2	2	<ul style="list-style-type: none"> <li>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</li> <li>Contingency: Increase the financial incentive to existing participants and recruit more new participants</li> </ul>	1	1	Closed



## 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
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
Hold first knowledge sharing event by May 2016	May-16	Delivered

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 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	Delivered
Publish equipment specifications and installation reports for the Adaptive Protection and the I <sub>s</sub> -limiter by September 2016	Sep-16	Delivered
Publish NMS interface and configuration specifications and commissioning reports by September 2016	Sep-16	Delivered
Second webinar held by September 2016	Sep-16	Delivered
Publish report on validation of the Fault Level Assessment Tool by November 2016	Nov-16	Delivered
Publish fourth newsletter by November 2016	Nov-16	Delivered
Actively participate at 2016 annual LCNI conference	Nov-16	Delivered
Issue fourth project progress report in accordance with Ofgem's June and December production cycle and publish on Respond website	Dec-16	Delivered
Publish customer survey report and information for customer evaluation of FCL service provision on Respond website by May 2017	May-17	Delivered
Publish fifth newsletter by May 2017	May-17	Delivered
Hold second knowledge sharing event by May 2017	May-17	Delivered
Issue fifth project progress report in accordance with Ofgem's June and December production cycle and publish on Respond website	Jun-17	Delivered
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	Delivered
Publish fourth advertorial by July 2017	Jul-17	Delivered
Hold third webinar by September 2017	Sep-17	Delivered
Publish sixth newsletter by November 2017	Nov-17	Delivered
Actively participate at 2017 annual LCNI conference	Nov-17	Delivered
Issue sixth project progress report in accordance with Ofgem's June and December production cycle and publish on Respond website	Dec-17	Delivered

SDRC (evidence)	Due date	Status
Publish equipment specifications and installation reports for the FCL service by April 2018	Apr-18	Delivered
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	Delivered
Purchase a Fault Current Limiting service from at least one Electricity North West demand customer and one Electricity North West generation customer	May-18	Delivered
Publish contract templates for FCL service with new and existing customers and commercial arrangements learning by May 2018	May-18	Delivered
Publish seventh and final newsletter by May 2018	May-18	Delivered
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	Delivered
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	Delivered
Publish peer-reviewed safety cases on the Respond project website by September 2018	Sep-18	On track
Hold third knowledge sharing event by September 2018	Sep-18	On track
Hold fourth webinar	Oct -18	On track
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
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	Oct-18	On track

## APPENDIX C: PROJECT DIRECTION BUDGET

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


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	
<b>Labour</b>	<b>1,342</b>	<b>1,212</b>	<b>(130)</b>	<b>1,472</b>	<b>1,305</b>	<b>(167)</b>	
Project Management - Labour	790	773	(18)	905	866	(39)	
Install/Commissioning - Labour	527	396	(130)	525	396	(128)	Multiple design & installation issues.
General Labour - Labour	25	43	18	43	43	(0)	
<b>Equipment</b>	<b>989</b>	<b>1,058</b>	<b>69</b>	<b>1,098</b>	<b>1,058</b>	<b>(41)</b>	
Materials - Equipment	3	4	1	4	4	(0)	
General Equipment - Equipment	7	22	15	7	22	15	
Monitoring Equipment - Equipment	152	163	11	163	163	0	
IS Limiter - Equipment	723	685	(39)	765	685	(80)	Part of equipment cost budgetted as contractor
Adaptive Protection - Equipment	104	184	80	159	184	25	Savings identified in settings design & application
<b>Contractors</b>	<b>870</b>	<b>1,097</b>	<b>227</b>	<b>1,193</b>	<b>1,140</b>	<b>(53)</b>	
Project Management - Contractor	7	20	13	14	20	6	Savings identified in Project Management
Install/Commissioning - Contractor	600	554	(46)	614	554	(60)	£131k £76k budget allocation & £45k installation cost:
Research - Contractor	62	255	193	300	295	(6)	
Customer Survey - Contractor	41	58	17	53	59	6	
Customer Engagement - Contractor	150	166	16	169	169	(0)	
Dissemination - Contractor	10	43	34	43	43	(0)	
<b>IT</b>	<b>548</b>	<b>573</b>	<b>25</b>	<b>573</b>	<b>573</b>	<b>(0)</b>	
IT Hardware - IT	0	0	0	0	0	0	
IT Software - IT	548	564	16	564	564	(0)	
IT Licences - IT	0	9	9	9	9	0	
<b>IPR Costs</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	
IPR Costs	0	0	0	0	0	0	
<b>Travel &amp; Expenses</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	
Travel & Expenses	0	0	0	0	0	0	
<b>Payments to Users</b>	<b>7</b>	<b>61</b>	<b>54</b>	<b>7</b>	<b>61</b>	<b>54</b>	
Payments to Users	0	36	36	0	36	36	
Fault Current Limiting Service	0	0	0	0	0	0	
Customer Payments	7	26	19	7	26	19	
<b>Contingency</b>	<b>0</b>	<b>484</b>	<b>484</b>	<b>0</b>	<b>484</b>	<b>484</b>	
Contingency	0	484	484	0	484	484	
<b>Decommissioning</b>	<b>0</b>	<b>34</b>	<b>34</b>	<b>54</b>	<b>54</b>	<b>0</b>	
Decommissioning	0	34	34	54	54	0	
<b>Other</b>	<b>212</b>	<b>243</b>	<b>31</b>	<b>363</b>	<b>349</b>	<b>(13)</b>	
Rent - Other	36	49	13	61	60	(1)	
Telecoms - Other	0	0	(0)	0	0	(0)	
Dissemination - Other	177	194	17	301	289	(12)	
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	
<b>Total</b>	<b>3,968.511</b>	<b>4,761.458</b>	<b>793</b>	<b>4,760.322</b>	<b>5,024</b>	<b>264</b>	

## 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 2018 month end reporting period.

 <b>Lloyds Bank</b>		Yesterday's Statement			N398611	
Statements and Balances						
308012-11782760						
ENWL NO.14 LCNF (FLARE_RESPOND) (GBP)						
Date	Type	Narrative	Value Date	Payments	Receipts	Balance
01DEC17		Opening Ledger Balance				1,307,011.00 Cr
08DEC17	DR	TO A/C TFR 02749020 300002		42,791.71		1,264,219.29 Cr
11DEC17	CR	INTEREST (GROSS)			520.05	1,264,739.34 Cr
15DEC17	CR	FROM A/C TFR 02749020 300002			657.93	1,265,397.27 Cr
09JAN18	CR	INTEREST (GROSS)			452.40	1,265,849.67 Cr
09FEB18	CR	INTEREST (GROSS)			483.80	1,266,333.47 Cr
09MAR18	CR	INTEREST (GROSS)			437.15	1,266,770.62 Cr
09APR18	CR	INTEREST (GROSS)			484.15	1,267,254.77 Cr
09MAY18	CR	INTEREST (GROSS)			468.71	1,267,723.48 Cr
11JUN18	CR	INTEREST (GROSS)			512.11	1,268,235.59 Cr
11JUN18	DR	TO A/C TFR 02749020 300002		28,906.74		1,239,328.85 Cr
11JUN18	DR	TO A/C TFR 02749020 300002		54,029.26		1,185,299.59 Cr
11JUN18	DR	TO A/C TFR 02749020 300002		32,701.24		1,152,598.35 Cr
11JUN18	DR	TO A/C TFR 02749020 300002		71,558.19		1,081,040.16 Cr
11JUN18	DR	TO A/C TFR 02749020 300002		54,783.97		1,026,256.19 Cr
11JUN18	DR	TO A/C TFR 02749020 300002		54,875.22		971,380.97 Cr
11JUN18		Value of Credits (8)			4,016.30	
11JUN18		Value of Debits (7)		339,646.33		
11JUN18		Closing Ledger Balance				971,380.97 Cr
11JUN18		Closing Cleared Balance				971,380.97 Cr
*** End of Report ***						