



# Respond Interim Customer Survey Report

26 February 2016



# RESPOND

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## VERSION HISTORY

Version	Date	Author	Status	Comments
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## ABBREVIATIONS

Abbreviation	Term
AC	Alternating current
C <sub>2</sub> C	Capacity to Customers (Second Tier LCN Fund Electricity North West project)
CHP	Combined heat and power
DG	Distributed generation
DNO	Distribution network operator
DSR	Demand side response
ECP	Engaged customer panel
FCL service	Fault Current Limiting service
GB	Great Britain
I&C	Industrial and commercial
LCN Fund	Low Carbon Networks Fund
NMS	Network management system
PPE	Payment per event
QUOS	Quality of Service Incentives

# FOREWORD

This report is one of a series of documents, submitted as part of Electricity North West's Second Tier Low Carbon Networks (LCN) Fund project, Respond. Electricity North West received formal notification of selection for funding on 24 November 2014. The project will run for 46 months, starting in January 2015 and finishing in October 2018.

Respond seeks to demonstrate the viability and effectiveness of near real time fault level assessment and adaptive mitigation techniques to overcome fault level challenges faced by distribution network operators (DNOs).

The results of the analysis outlined in this report are derived from a customer engagement methodology submitted as part of the Respond [customer engagement plan](#).

The key findings form part of the project dissemination and specifically reference the learning from a strategic phase of market research which involved a statistically robust quantitative survey of industrial and commercial (I&C) customers.

The customer survey was designed to test whether a viable market exists for a new commercial solution to address the fault level problem and to determine the optimal price point at which customers express an interest, thereby providing a route to market.

The survey was jointly designed by Electricity North West and its market research project partner, Impact Research, and was developed with an engaged customer panel (ECP) specifically convened for this purpose. The lessons learned from this initial ECP phase of customer research are documented in the [ECP report](#) which was published in October 2015.

Impact Research conducted the customer surveys and this document summarises the interim findings from their analysis.

A final customer survey report will provide a more comprehensive evaluation of customer research spanning the entire trial period. This report will be published in May 2017.

## 1 EXECUTIVE SUMMARY

### 1.1 Background and business objectives

As Great Britain (GB) moves to a low carbon future, demand for electricity is expected to increase significantly and this will inevitably increase fault level on distribution networks. Respond will deliver an intelligent approach to managing fault current – the instantaneous surge of electrical energy which occurs under fault conditions. Respond is an innovative solution to that problem, which is faster and cheaper to apply than traditional reinforcement techniques. The method will result in significant cost savings by maximising the use of existing assets to defer or prevent the need for reinforcement, and will speed up the connection of low carbon demand and generation.

Respond will deliver a Fault Level Assessment Tool which calculates potential fault current in near real time and then utilises one of three innovative techniques, two technical and one commercial, designed to manage fault current safely.

The commercial concept is a managed Fault Current Limiting (FCL) service. Electricity North West will trial this concept by purchasing a response service from existing connected and potential new customers operating large alternating current (AC) rotating electrical equipment, such as generators and motors. The FCL service actively manages fault current in the event of a fault by remotely constraining the customer's specified generator or motor,

thereby reducing the flow of fault current onto the network. The FCL service is the only one of the three Respond techniques requiring customer validation.

## **1.2 Customer engagement objective**

A customer hypothesis of Respond is that:

*The method enables a market for the provision of an FCL service.*

To test the hypothesis, a two stage programme of customer engagement was developed:

Initially, an ECP was convened to review and test the FCL service communication materials and a customer survey instrument.

The second stage involved conducting a robust customer survey with a representative sample of industrial and commercial (I&C) demand and distributed generation (DG) customers.

## **1.3 Research approach**

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.

An ECP of eight I&C demand and DG customers was initially convened to review and test FCL service communication materials and the survey instrument.

The customer research approach adopted to test the FCL service was broadly similar to that used to test Electricity North West's commercial post-fault demand side response (DSR) concept in its Second Tier LCN Fund project, Capacity to Customers (C<sub>2</sub>C).

A total of 82 I&C demand and DG customers across GB participated in the customer survey during October 2015 to January 2016.

## **1.4 Summary of key findings**

Interim analysis of survey responses proves 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.

Based on the survey responses, the optimal duration for an FCL service contract is likely to be one year. Significant gains in take-up can be achieved among the target market by offering a payment per event (PPE) structure with financial rewards that are up to 10% above a level derived from Ofgem's Quality of Service Incentives (QUOS), which is explained further in Section 3.3.

## **1.5 Next steps**

After a robust, targeted campaign and the use of project partners to recruit suitable respondents, 82 customer interviews were completed before the survey was due to close in January 2016. This number provided a statistically robust sample on which to conduct analysis but represents a smaller sample than the campaign had aimed to achieve. However,

to increase survey numbers, the quantitative survey will continue to maximise the response rate.

The key learning from the customer survey will be used to refine the existing FCL service communication materials which were developed with the assistance of an ECP in the initial phase of this research. The refined materials will be further tested with the reconvened ECP in April 2016 and will form a suite of supplementary information available to customers interested in providing an FCL service. Electricity North West will use these materials to guide the development of its commercial templates and support future contract negotiations.

After successfully developing new commercial templates for purchasing the managed service, Electricity North West will seek to secure up to five FCL service contracts from suitable customers as part of the trial. It is anticipated that potential trial participants meeting suitability criteria will be identified from the survey.

A comprehensive customer survey report will be published in May 2017. This will include more detailed analysis of all survey responses, an explanation of the engagement methodology, the data analysis protocol and lessons learned.

The contract templates and commercial arrangements developed for new and existing customers will be documented in a separate report. This report will highlight the learning from the commercial phase of the project and will be published on the Respond website in May 2018.

## 2 THE RESPOND TRIALS

Respond will trial an intelligent Fault Level Assessment Tool which provides a platform from which new, innovative technical and commercial techniques can be adaptively controlled to manage fault current. The Fault Level Assessment Tool will enable DNOs to more quickly connect customers' low carbon demand and generation at a lower cost than traditional reinforcement, by avoiding the need to replace expensive switchgear and cables prematurely.

When the fault level approaches or rises above the fault level rating of network equipment, the Fault Level Assessment Tool will enable one of three techniques; two technical solutions and a commercial concept.

A summary of the Respond trials is provided below. A detailed explanation of the trials and testing methodology is provided in the [Respond full submission](#). A customer survey was conducted to evaluate the commercial concept. The technical solutions are not subject to any form of customer engagement.

### 2.1 Technical solutions: Adaptive Protection and $I_S$ -limiters

Adaptive Protection is the use of adjustable protection relay settings to alter how a protection scheme operates. In the event of a fault and where the fault level is exceeded at a substation, the new Fault Level Assessment Tool will instruct Electricity North West's network management system (NMS) to change the order in which circuit breakers operate, allowing them to safely interrupt the flow of fault current and isolate the fault from the network.

An  $I_S$ -limiter is a device capable of detecting and interrupting part of the fault current in less than one millisecond. This device will operate in the event of a fault, where fault level has exceeded the rating of a device and poses a risk to the network. This fast interruption prevents the fault current from reaching its peak value and damaging equipment.

To demonstrate the applicability of the Respond method, Adaptive Protection will be deployed at five high voltage (HV) primary substations (6.6kV and 11kV) and two extra high

voltage (EHV) substations (33kV), serving around 105,000 customers. The I<sub>s</sub>-limiters will be trialled on two HV substations. These technical solutions will be demonstrated on networks in town and city locations with a differing range of characteristics and load patterns that include distributed generation. Additionally, the site selection criteria considered substation type, age and protection category along with fault history and fault level to ensure that the trial results are representative of the GB population.

These technical solutions will be trialled between May 2016 and April 2018.

## 2.2 Commercial solution: FCL service

The third Respond technique being explored is a commercial agreement which offers additional value to customers who are willing and able to provide a response to Electricity North West. The customer survey will test the appetite for a managed FCL service purchased from existing connected and potential new customers operating large AC rotating electrical equipment ie generators and motors, which can contribute significantly to fault current. The survey will also establish the prices at which customers are willing to engage in these response contracts.

In a similar manner to the technical solutions described above, the Fault Level Assessment Tool and NMS will communicate with the customer's own protection system (circuit breaker) on their AC machine. This will set the customer's circuit breaker (CB) to disconnect before Electricity North West's equipment if a fault occurs at times of higher fault level. This will trip the customer's motor or generator to disconnect its contribution to fault current.

This rapid disconnection will allow Electricity North West to safely isolate the fault without damaging its network protection equipment. It will then remove the constraint on the customer's equipment, which will occur within a few minutes of it being disconnected, after which the customer is able to safely switch their machine back on.

Following the customer survey and its analysis, the project team will seek to purchase up to five FCL service agreements from I&C demand or DG customers to trial the technical and commercial elements of the FCL service. Respond will deliver new commercial templates for the purchase of these managed agreements.

## 3 CUSTOMER ENGAGEMENT METHODOLOGY

The customer hypothesis for Respond's commercial solution is that:

*The method enables a market for the provision of an FCL service.*

A range of customer engagement activities will test this hypothesis, key to which is a customer survey of I&C demand and DG customers from across GB. The aim of the survey is to determine the willingness and ability of customers to provide FCL services and the price at which those customers would consider engaging in the provision of the service. Full details of the customer engagement methodology are outlined in the Respond [customer engagement plan](#) which was submitted to Ofgem on 30 June 2015.

Customers were specifically targeted to participate in the ECP and subsequent survey on the basis of an existing or proposed new HV connection and the organisation's maximum import capacity and/or maximum export capacity. A suitable individual was then identified as a potential ECP member or survey respondent within that organisation.

An ECP of eight I&C demand and DG customers was convened in September 2015 to test, review and refine FCL service communications materials and the customer survey instrument. The ECP was influential in shaping the quantitative customer survey by ensuring that the survey instrument was easy to understand, administer and provided a framework to maximise the learning outcomes.

### 3.1 Customer survey approach

A refined version of the customer survey (Appendix B) was piloted in October 2015 with a previously unengaged group of six I&C demand and DG customers. Final enhancements to the instrument were made before the survey was launched on 30 October 2015, based on feedback from the pilot group. This document focuses specifically on the customer survey; further details of ECP engagement activities are provided in the Respond [ECP report](#).

During the survey phase of the trial, potential respondents were asked a number of screening questions to ensure that their organisation (or the organisation to which they provide an electricity service) met key criteria to provide an FCL service. These requirements included the organisation having:

- A combined heat and power (CHP) plant or other synchronous generator and/or a rotating motor or combination of connected motors
- A single machine or combination of connected rotating plant with a demand or generation capacity between 500kW and 15,000kW.

The screening questions also ensured that the respondent was best placed within their organisation to sufficiently answer the survey questions.

After the screening exercise, suitable participants were provided with an electronic link to the quantitative customer survey, which they were able to complete at their convenience. The survey was expected to take approximately 20 minutes and respondents were able to complete it in its entirety, or return to it on multiple occasions to complete it in stages. Participants received an incentive for completing the survey, which was either a £25 voucher or an equivalent charitable donation. This incentive was enhanced to £50 and a prize draw was introduced in the latter stages of the survey to maximise participation.

In addition to testing the Respond hypothesis, it is anticipated that the survey will identify customers who may be interested in providing an FCL service during the trial phase of the project.

### 3.2 Customer survey population

The customer survey population was comprised of a cross-section of I&C demand and DG customers, who were recruited from multiple data sources as defined in the customer engagement plan. These included:

- **Electricity North West customer data** – Electricity North West provided Impact Research with a list of customers meeting the selection criteria, derived from its distributed generation, new connection and meter point administration number (MPAN) databases.
- **ENER-G and the Association for Decentralised Energy** – These project partners worked in collaboration with the Respond team to introduce the project to their respective members/customers and encourage participation in the survey.

All survey participants held relevant technical and/or commercial roles within their organisation and had responsibility for managing, maintaining or financing the electrical equipment in scope. All were employed by organisations that had been successfully screened as meeting the criteria to provide an FCL service.

Respondents were recruited from organisations across a diverse range of industries to help identify which sectors are receptive to the concept and which have no appetite for the FCL service. The survey was also designed to identify any variations in customers' needs and expectations across the industrial and commercial base.

After a robust targeted campaign and the use of project partners to recruit suitable respondents, 82 customer interviews were completed before the survey was due to close in



January 2016. This number provided a statistically robust sample on which to conduct analysis but represents a smaller sample than the campaign had aimed to achieve. The challenges of engaging a sufficiently large survey population among industrial and commercial customers are reflective of Electricity North West's experience in the C<sub>2</sub>C project, despite learning from C<sub>2</sub>C being incorporated into the Respond engagement methodology. The approach to recruiting customers and the issues arising from this activity will be documented separately in the full customer survey report published in May 2017.

The 82 completed surveys form the basis of the interim analysis included in Section 4. However, to increase survey numbers, the quantitative survey will continue to maximise the survey response. The final results and key learning will be documented in the full report in May 2017.

### **3.3 Customer survey content**

The customer survey (Appendix A) was designed to assess the appetite of existing and potential new I&C demand and DG customers to take up FCL service agreements, and identify the price at which they would be willing to engage.

Respondents were initially asked about their organisation and the industry sector in which they operate. They were asked to provide details of their largest single AC rotating machine or the largest combination of rotating plant connected to a common circuit breaker. Questions were then introduced to establish the likely implications of the equipment being constrained (disconnected) for up to ten minutes.

The FCL service concept was then introduced using a range of supplementary information embedded within the survey. This was provided via a:

- Video
- Concept board outlining the background, problem, solution, method and benefits
- Analogy
- Frequently asked questions (FAQs) document.

These materials are provided in Appendices C to E and were developed to explain the concept sufficiently to assist respondents in answering subsequent questions concerning its appeal, their organisation's likelihood to take up this type of contract and to determine the key drivers and barriers. Respondents were also asked to score a number of statements to provide an indication of their overall perception of the FCL service concept.

A series of questions was then introduced to establish the optimum price point, payment method and contract length. This element of the survey was presented using a 'stated preference exercise' in which respondents were asked to select their preferred option from a pair of possible FCL service contract scenarios.

Each customer responded sequentially to 12 pairs of FCL service contracts containing a range of variables. This technique allows complex decision-making to be analysed as respondents trade off the importance of the presented variables, including:

- The level of financial reward
- The method of calculating the payment ie per event (constraint of equipment) versus a guaranteed annual payment regardless of the number of events
- Contract length in years
- The maximum number of events that would be acceptable to the organisation per year.

All contracts scenarios were based on the constraint of equipment for a fixed duration of ten minutes. This duration is the maximum period of constraint that would realistically be required by Electricity North West, irrespective of the customer's potential down time.

The number of events per year was arbitrarily capped at eight, as this is the maximum number of faults that would be expected out of a primary substation in a 12-month period, when fault level on the network is high.

On completion of the survey, advanced analytical techniques were employed to derive and model customers' likelihood to take up specific combinations of FCL service contracts. This sophisticated approach of combining direct and derived questioning established:

- The market viability for the FCL service
- The variation in appetite for this type of agreement by customer segment
- An understanding of which contract components are the fundamental drivers influencing receptiveness to an FCL service contract
- The optimum price point at which customers expressed an interest.

To evaluate the relative appeal of different contract options, a base case scenario was applied, against which all variants could be benchmarked. This is shown in Figure 3.1 below:

Figure 3.1: Base case scenario

<b>Base case scenario</b>
One year contract
Maximum of one of event per year
Rate paid by contract – 100%
Pre-paid (fixed per contract retainer, paid in advance)/Payment per event (PPE) payment methods

The base price point was established using a calculation based on Ofgem's QUOS scheme figures. This scheme places a value on supply interruption performance of DNOs, measured in customer minutes lost and customer interruptions. A pricing matrix was developed which equated a £ value on a ten-minute constraint per MW of demand or generation capacity. This method of calculating the base price point was similar to the formula used in C<sub>2</sub>C, which also used a stated preference exercise to deliver contract templates and pricing mechanisms.

The payment options presented to individual respondents were based on the size of equipment they had specified earlier in the survey, on the basis of contribution to fault current. Receptiveness to the base price point was tested in this part of the survey by applying pre-determined price adjustments above and below the base within the 12 randomised scenarios. Figure 3.2 summarises how the £ value per MW was derived.

Figure 3.2: Factors involved in calculating financial rewards

Technical factor	Figures
Number of Electricity North West customers	2.4M
Electricity North West winter max demand	4.2GW
Max demand per customer	1.75kW
One customer interruption	£12.34
One customer hour lost	£17.81

## 4 INTERIM RESULTS

This report provides the interim analysis of 82 customer surveys completed between October 2015 and January 2016. The quantitative and qualitative evidence obtained from the collected data proves the hypothesis that the Respond method provides an opportunity for DNOs to utilise commercially managed agreements to provide a solution to the fault level problem. Overall take-up of the FCL service among the total market is relatively low; however, appetite is significantly higher among specific customer industry sectors, namely:

- Non-manufacturing
- Organisations able to constrain their motor/generator for up to ten minutes without significant impact on operation and/or losses in productivity.

Further key findings are summarised below.

### 4.1 Key customer segments

To preserve the statistical robustness of the data, the majority of analysis was conducted at:

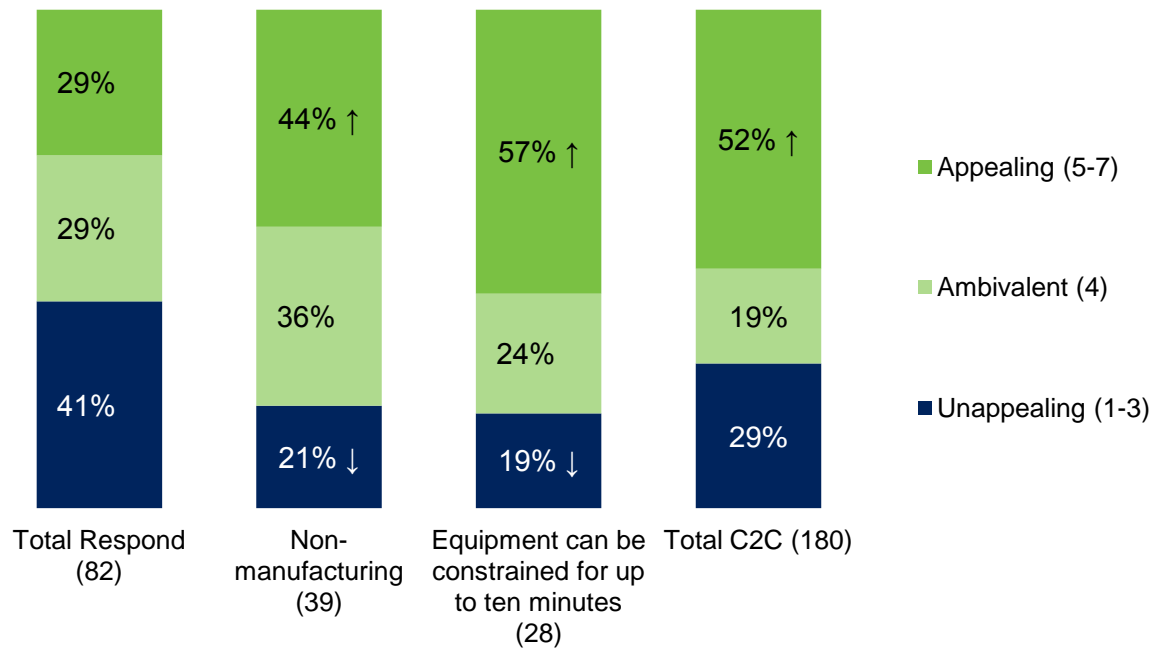
- Customer level (n=82)
- Manufacturing and processing (n=43) versus 'non-manufacturing' (n=39)
- Customers with equipment able to withstand a ten-minute constraint (disconnection) without any significant impact on the operation and/or losses in productivity for their organisation (21) versus those where a constraint would have a significant impact (57).

Organisations in the 'non-manufacturing' customer group operated in a range of different sectors including information and communication centres, mining and quarrying, utilities, waste management, health, agriculture and education.

Data was also analysed for customers who confirmed that having their motor or generator remotely constrained for up to ten minutes would have no significant operational impact or loss in productivity (n=21) compared with those who could not (n=57). The remainder did not know (n=2) or had a mixture of sites, some of which could withstand a ten-minute constraint and some which could not (n=2).

Prior to information concerning financial rewards being shared, 29% of customers overall found the FCL service concept appealing, based on ratings of five, six and seven on a 1-7 rating scale. This is significantly lower than the 52% of customers who found the C<sub>2</sub>C concept appealing in previous research (see Figure 4.1 below). Appetite for the FCL service was higher among non-manufacturing customers (44%) and organisations that could have their generator or motor constrained for up to ten minutes without an operational or productivity impact (57%).

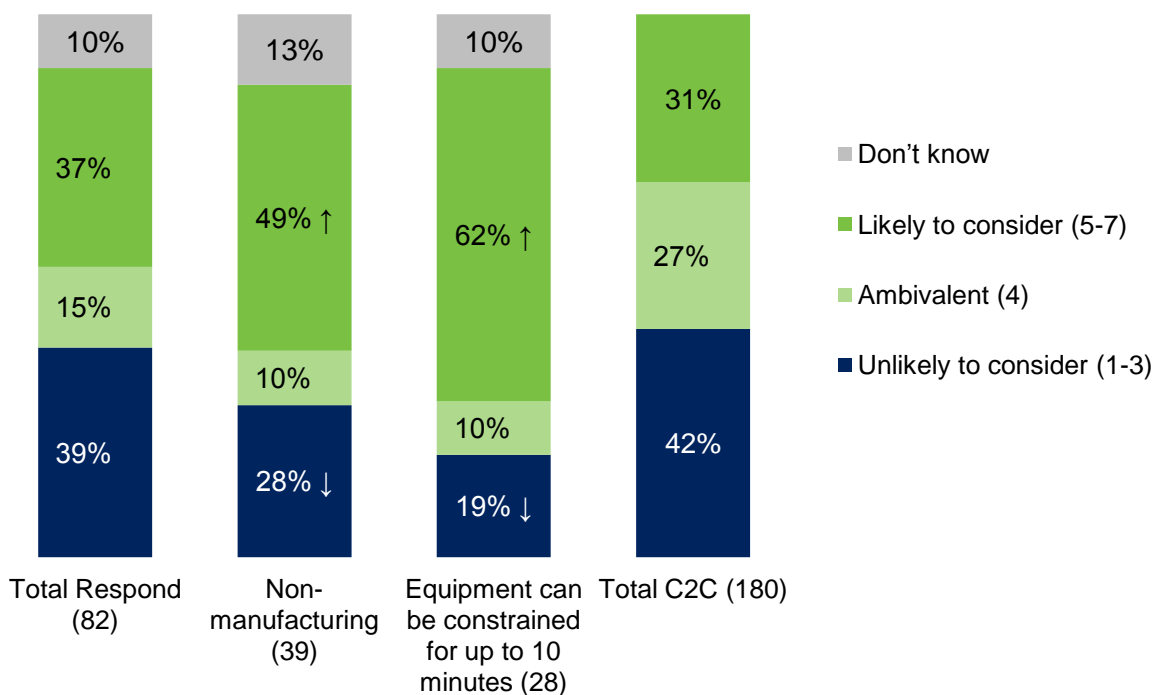
Figure 4.1: Appeal of the FCL service (based on a 1-7 rating scale)



Before financial reward information was provided, 37% of all respondents indicated that they would recommend that their organisation consider an FCL service agreement. At a total level, this is marginally higher than that observed for C<sub>2</sub>C (31%) and represents a significantly improved conversion rate from an expression of appeal (29%) to an expression of interest in take-up of the service. This indicates that customers may initially be ambivalent about the appeal of the FCL service but are inclined to consider the concept further, to understand the specific impact and benefits for their individual organisations.

Indicative take-up levels following the sharing of information about financial rewards are discussed in Section 4.3.

Figure 4.2: Consideration of the FCL service (based on a 1-7 rating scale)



Recommendation of the FCL service was significantly higher among the non-manufacturing sector (49%) and organisations that can withstand having their equipment constrained for up to ten minutes (62%). These findings imply that a market for the FCL service exists in specific I&C sectors.

#### 4.2 Key drivers and barriers to take-up of the FCL service

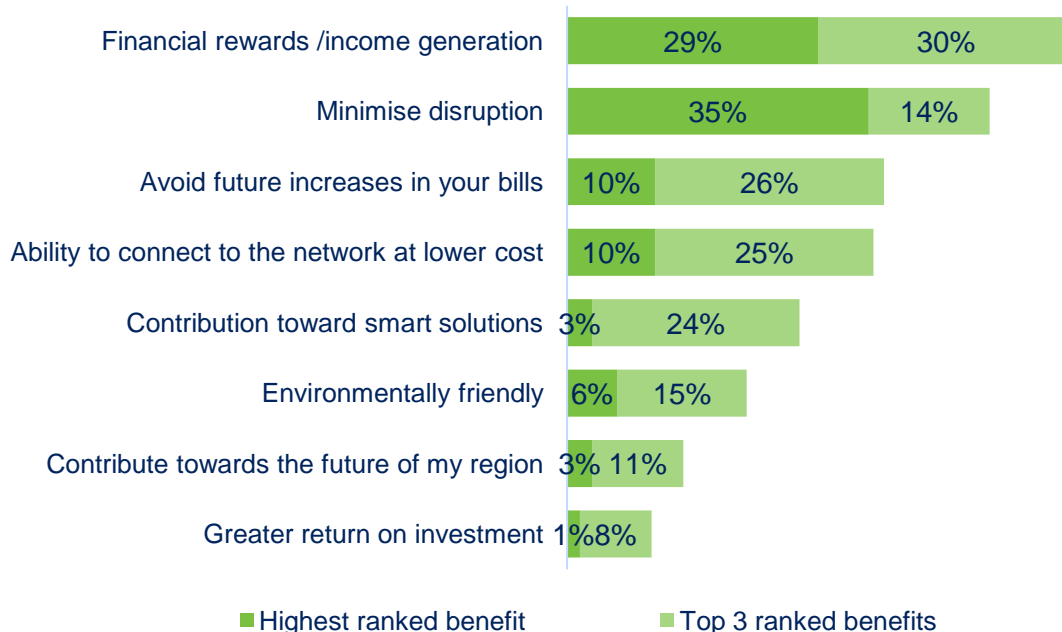
Before introducing any indicative financial benefits (as outlined in Section 3.2), customers were asked to rank the perceived top five benefits to their organisation from providing an FCL service.

Figure 4.3 shows that financial reward was the most influential driver of indicative take-up when the top three responses given by customers are aggregated. At this aggregated level the provision of financial rewards was identified as the primary benefit for 29% of all customers and 41% of those in non-manufacturing industries.

Based on the highest ranked response from the top three benefit options, 35% of all customers perceived that the most important driver to taking up an FCL service agreement would be minimised disruption to the electricity network. Minimised disruption was ranked highest by 47% of customers from manufacturing organisations.

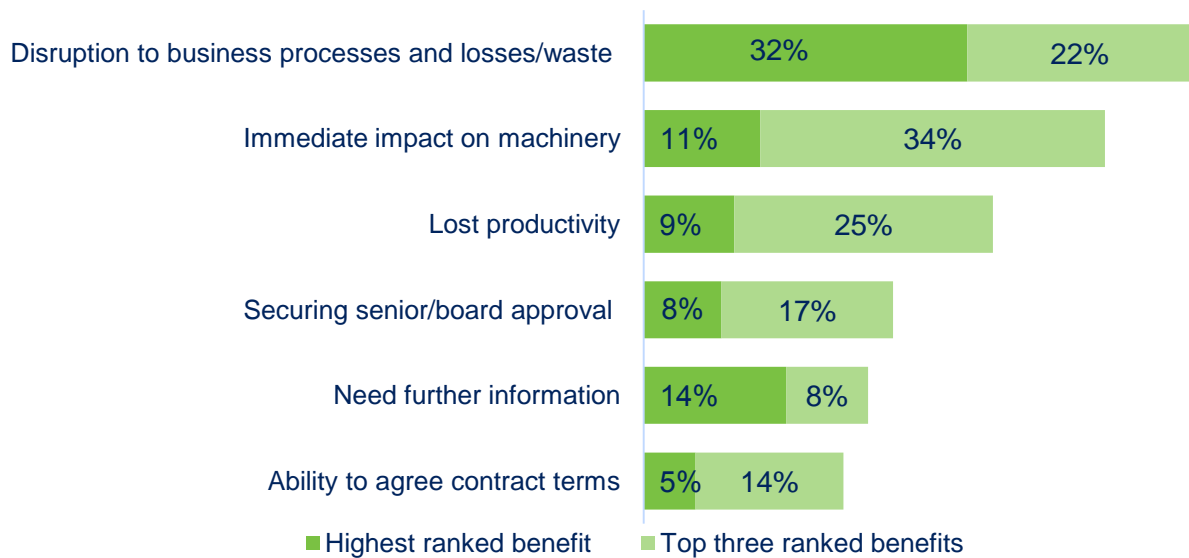
Other perceived benefits were principally commercially focused: the avoidance of future increases in bills (driven by the premature reinforcement of DNO assets) and the ability to connect load or generation to the network at a lower cost.

Figure 4.3: Factors involved in the decision to take up an FCL service agreement (total market)



As indicated in Figure 4.4 the main perceived barrier to providing an FCL service was concern over disruption to business processes and losses/waste arising from the constraint of a generator or motor (32% of all customers and 43% in the manufacturing industry). Other perceived concerns related to the immediate impact on specific equipment when it is switched off and restarted. Other perceived barriers were around lost productivity in the workforce. 14% of respondents stated that the main barrier was their requirement for more information about Respond, suggesting project communication materials may require further enhancement or tailoring to meet customers' needs.

Figure 4.4: Top barriers to take-up of an FCL service agreement (total market)

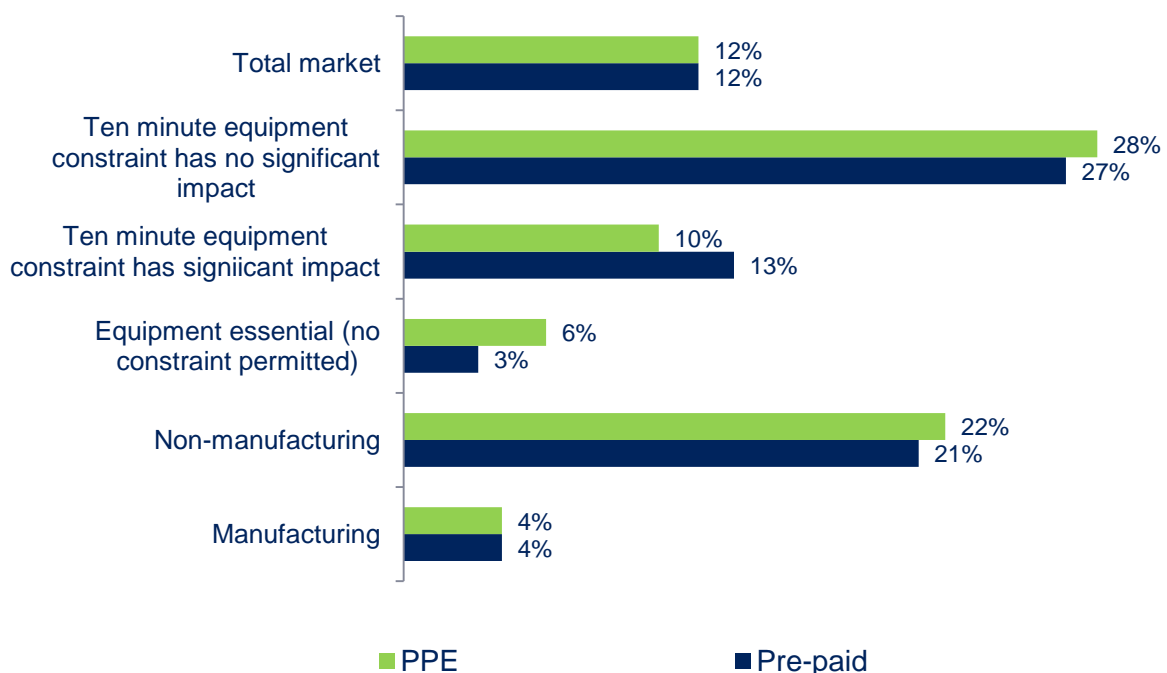


### 4.3 Stated preference analysis

More detailed analysis of responses was conducted after indicative pricing structures had been introduced in the stated preference exercise, as described in Section 3.3. This reinforced the conclusion that a market appears to exist for the provision of an FCL service in certain industry sectors.

Take-up of the base case scenario among all GB customers considering PPE contracts was 12%, which was the same as the take-up rate for a guaranteed annual pre-paid contract payment. However, Figure 4.5 shows a significantly higher take-up of the FCL service among organisations that are able to cope with having their equipment constrained for up to ten minutes and those from non-manufacturing sectors.

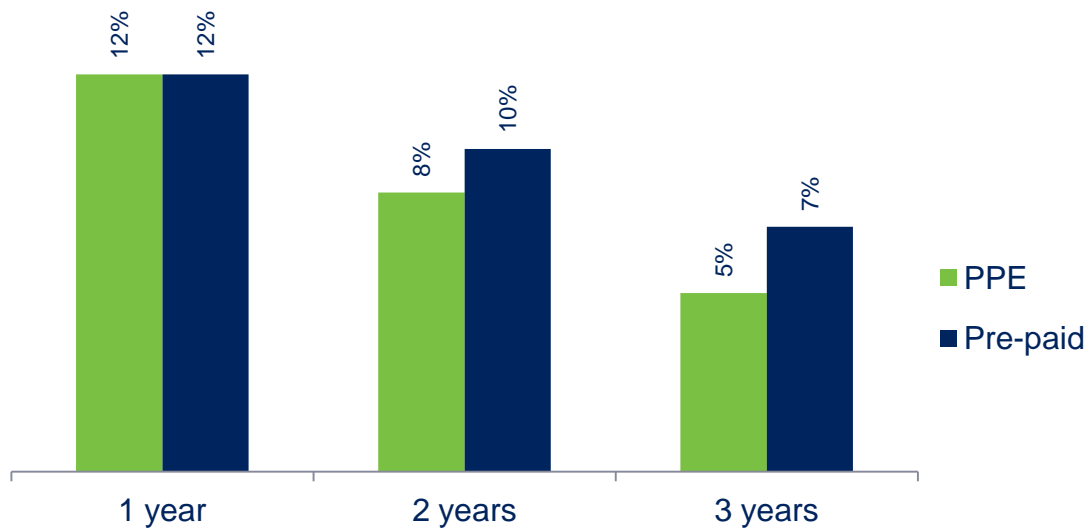
Figure 4.5: Take-up of FCL service – base scenario (stated preference exercise)



Differences in the level of take-up of FCL service agreements resulting from variations in the contract elements were then indexed against the base case scenario to identify the optimal payment.

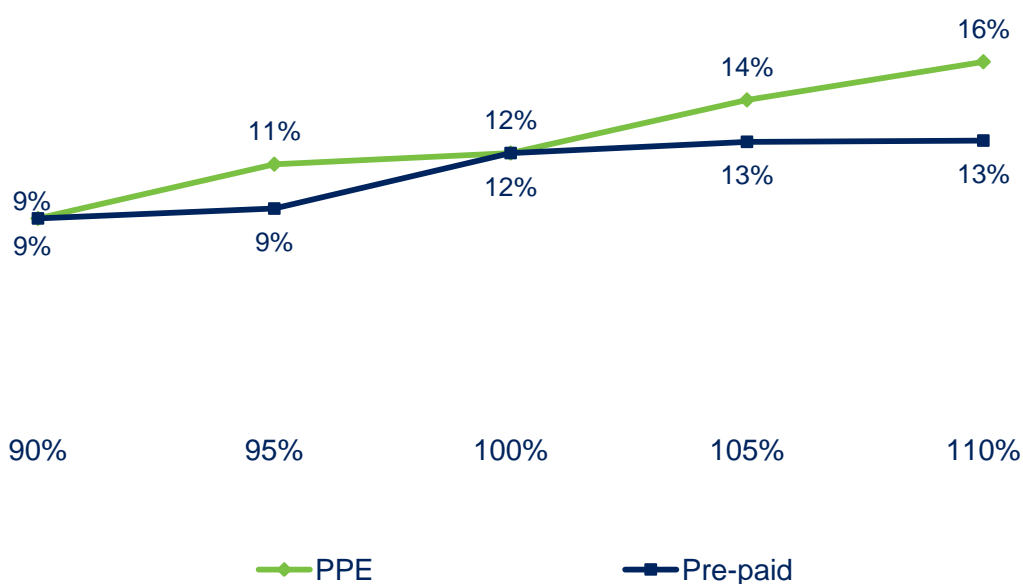
Length of contract had a significant effect on potential take-up of the FCL service, with a one year contract being the most popular (see Figure 4.6 below).

Figure 4.6: Take-up of FCL service by length of contract



Customers were more receptive to the financial rewards available on PPE contracts compared to pre-paid contracts (see Figure 4.7). On pre-paid contracts, there were diminishing returns when rewards were increased to 105% or 110% from the base rate. However, there is a more linear relationship for PPE contracts, with stronger take-up for higher levels of financial reward per event, driven predominantly by the non-manufacturing sector.

Figure 4.7: Take-up of FCL service by the level of financial reward (relative to the base scenario)



There was only a weak correlation between the maximum number of events (constraints of equipment) per annum and the likely take-up of the FCL service. This finding implies the full range of one to eight events per year could be offered to customers when taking the FCL service to market.

The analysis demonstrates receptiveness to contracts with a higher maximum number of events per year in PPE scenarios, driven by organisations from manufacturing industries and those operating only motors.

The analysis undertaken indicates that take-up, when considered across the whole market sector, would be 18% if all variants of the FCL service contracts evaluated in the stated preference exercise were available. This is marginally lower than the 22% take-up observed in C<sub>2</sub>C.

In reality, offering all the FCL service contract variants to the market may not be administratively or commercially advantageous. Therefore the more comprehensive customer survey report, due to be published in May 2017, will inform the optimal route to market.

#### **4.4 Further engagement**

In the final analysis, just over half of all respondents indicated that they would be interested in finding out more about participating in the FCL service trial. A greater level of interest was recorded among those from non-manufacturing sectors (64%) and those that could have their AC machine constrained without a detrimental impact on their operations and/or losses in productivity for the organisation (71%).

The survey provided respondents with the opportunity of asking what further questions they would have, if discussing an FCL service with Electricity North West. A recurring theme was the constraint of equipment:

*“Regarding the notification of disconnection, can we specify no-switch off times?”*

This question was raised by the ECP and had therefore been addressed in the FAQs document which supported the survey. The document explained that enabling technology will be permanently connected to a machine’s circuit breaker and could constrain it (switch it off) at any time. This ambiguity implies that the communications materials supplementing the survey had either not been read or fully understood by the respondent, or were insufficient to address their concerns.

Feedback documented in the [ECP report](#) suggests that the information requirements of individual customers are likely to be influenced by the nature of their organisation and their specific processes. This was equally apparent in the survey results, with customers asking questions related to individual requirements and the practicalities of the process, such as:

*“Who will install the disconnection equipment, who will be responsible for maintaining it and who will remove it at the end of the contract?”*

*“I would want to know precisely what would need to be switched off. There would need to be a detailed discussion because our plant is too complicated to do this without it being seriously reviewed in detail”*



The method behind the calculation of financial rewards was also queried:

*“Financial rewards for loss and how many times would it happen”*

*“How have you calculated the payments when the ‘cost’ and therefore the return for each potential participant will vary enormously?”*

Finally, customers also sought clarification on the need for contingency planning:

*“Should I start to look forward and install island generation systems to ensure continuity of supply to the factory’s customers?”*

*“When we have power outages I have concerns about getting back up and running”.*

*“It takes a large generator time to ramp down, how do you switch it off for ten minutes, without causing damage?”*

The detailed information provided in the various materials supporting the survey instrument (video, analogy, concept board and FAQs) addressed many of the above queries. The project team will consider if this extensive suite of information, supplied to satisfy the needs of a range of potential participants from a variety of I&C sectors, was potentially overwhelming. Customer feedback indicates that engagement materials may need to be revisited to enhance, emphasise or simplify specific information. Amendments may be required to highlight and address the most common concerns.

Additional revisions to the Respond communication materials will be influenced by feedback from the ECP in April 2016. This will pave the way for taking the FCL service to market and more detailed individual discussions with customers about their bespoke needs.

## **5 CONCLUSIONS AND NEXT STEPS**

Results indicate that a market exists for the FCL service; however appetite for the service is within specific I&C customer sectors, primarily, non-manufacturing industries and organisations that are able to cope with having their equipment instantaneously constrained, for short durations without notice.

Analysis indicates that the optimal initial FCL service contract is likely to be short term (one year). This reflects the findings in C<sub>2</sub>C with the initial period contract being short. Significant gains in take-up can also be achieved among the target market by offering increased PPE financial rewards (+10%) and a range in the maximum number of events per year.

Customers are sensitive and averse to the perceived risks to their organisation of entering into an FCL service agreement and there are lessons to be learned from the feedback obtained. Respond engagement materials may therefore be revised further before the FCL service is taken to market.

In line with the vision of the LCN Fund, all outputs and learning acquired from Respond customer engagement activities will be made available to other DNOs.

A subsequent report will be published in May 2017 which will provide comprehensive feedback on all customer engagement activity.

## **6 APPENDICES**

**6.1 Appendix A: [Customer survey](#)**

**6.2 Appendix B: [Customer survey pilot](#)**

**6.3 Appendix C: [Video](#)**

**6.4 Appendix D: [Analogy and concept board](#)**

**6.5 Appendix E: [Project FAQs](#)**