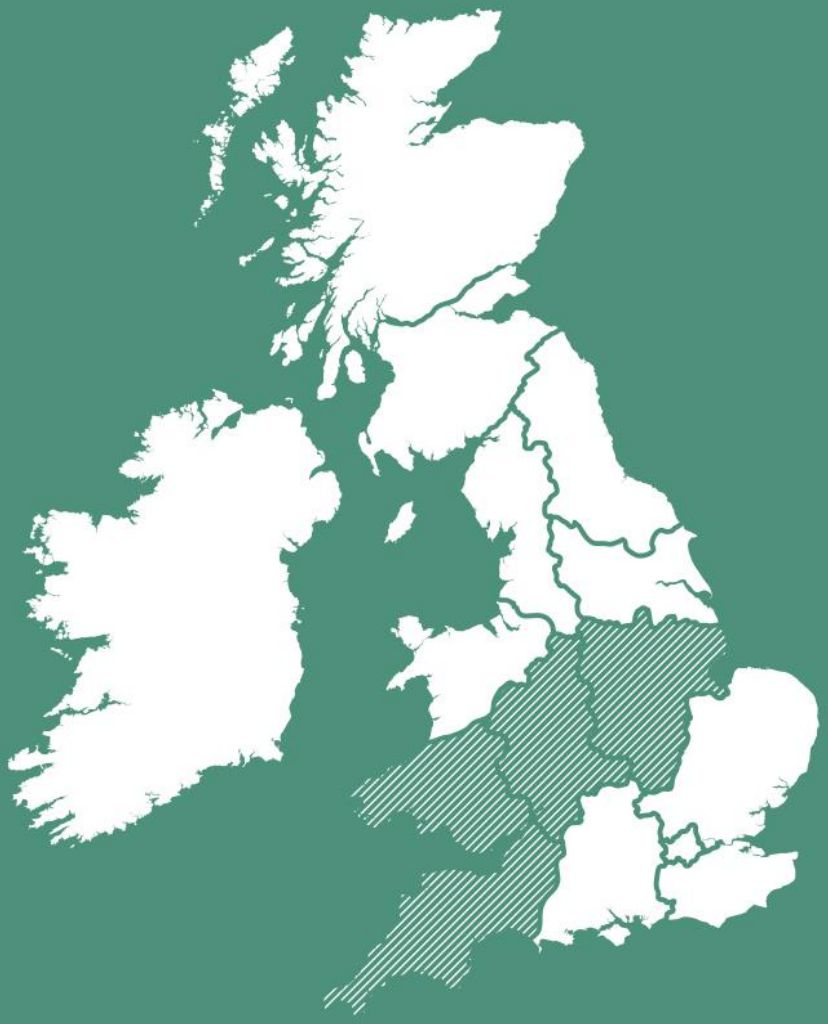
WESTERN POWER DISTRIBUTION

INNOVATION

NEXT GENERATION NETWORKS

Entire

WPD_NIA_017



NIA MAJOR PROJECT PROGRESS REPORT

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Prepared by:	Matt Watson	06/04/2017
Reviewed by:	Faithfull Chanda	21/04/2017
Approved (WPD):	Roger Hey	02/05/2017

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06/04/2017	0.1	Draft
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Contents

Glossary

Term	Definition
ASC	Agreed Supply Capacity
BAU	Business as usual
BSP	Bulk Supply Point
CDM	Construction Design Management
CMP	CUSC modification proposal
DNO	Distribution Network Operator
DSR	Demand Side Response
GB	Great Britain
GSP	Grid Supply Point
IPR	Intellectual Property Register
kV	kilo-Volt
KOMP	Kiwi Operations Management Platform
LV	Low Voltage
NIA	Network Innovation Allowance
NG	National Grid
NPV	Net Present Value
PSD	Primary System Design
SGC	Smart Grid Consultancy
SO	System Operator
STOR	Short Term Operating Reserve
TO	Transmission Operator
WPD	Western Power Distribution

1 Executive Summary

Entire is funded through Ofgem's Network Innovation Allowance (NIA). Entire was registered in June 2016 and will be complete by June 2020

Entire aims to develop and test a comprehensive DSR aggregation capability to manage generators and customer loads. Previous trials have shown that manually controlled DSR can provide a valuable tool to network management. Entire is seeking to develop our understanding of DSR both in terms of more advanced systems but also the operational framework that would allow DNOs to participate more widely in DSR schemes operates by other parties. The project will also investigate the regulatory and policies requirements to operate and manage DSR as well as the skills required to develop the commercial DSR markets.

This report details progress of the project, focusing on the last reporting period, June 2016 to November 2016.

1.1 Business Case

There are multiple benefits provided by the broad scope of the trial. Ultimately the direct financial benefits will relate to:

- The release of unused capacity locked out from reallocation by outdated agreements, and
- Additional headroom that can be provided by DSR.
- Additional income from fixed and mobile DNO emergency generating assets

The benefits however are not merely limited to the financial impact and it should be recognised that even when not in use and not incurring costs it provides increased redundancy and improved resilience by merely being available to be called upon.

The business case that has been proposed for the use of DSR has been financially justified in this document using just one of the two GSPs required. This has been done in order that the justification has been developed on the most conservative scenario with the minimum benefit to WPD and consumers. This includes an assumption where relatively large volumes of DSR require to be utilised to reduce demand on the basis that all other embedded generation including renewables are not generating any power during peaks. This is unlikely and therefore the saving is in real terms likely to be of a far higher magnitude.

The financial benefits have been assumed on the basis of the operation of DSR taking place on a GSP that will be subject to a capital upgrade of approximately £36m that will be necessary and is targeted under the initial scenario to be completed by 2025. The DSR will assist in the management of risk between the period of 2017 and 2025 which hasn't been allocated a discrete benefit value. If however the DSR scheme was to be extended for an extra year and allow the large scale capital upgrades to be completed in 2026 there would be significant financial benefits. Using the Capital Investment Appraisal model that has been authored by PSD the benefits relating to the NPV in the first GSP would yield a minimum saving of around £800K. If a similar set of economics were to be applied for the

second GSP that has been identified, we would see these benefits under the minimum benefits scenario increase to £1.6m In spite of doubling the size of the trial, this will have a relatively moderate impact on the majority of the trials budget as the DSR capabilities are centralised with the same systems and resources being utilised regardless of multiple applications. Customer payments will be increased but these are not funded from the Network Innovation Allowance.

1.2 Project Progress

This is the first progress report. It covers progress from initial registration in June 2016 to the end of March 2017. Full details can be found in section 2.2

The project is now in the build phase having completed the design phase in February 2017. Completion of the design phase required more resource than expected due to several complications within the project. This includes very slow progress with National Grid, delays in procurement, and modifications in the target locations and additional regulatory questions in the project. This is reflected in the project budget.
As part of the design phase the project engaged with the large number of internal stakeholders, designed the requirements of the service, and developed the customer proposition and the customer journey.

The build phase has now started, and progress has been made on signing the STOR contract as has the marketing plan. The generator location app has been launched and the technical equipment has been tendered for. The website has now been launched and customer engagement will be starting imminently.

1.3 Project Delivery Structure

1.3.1 Project Review Group

The Entire Project Review Group meets on a bi-annual basis. The role of the Project Review Group is to:

- Ensure the project is aligned with organisational strategy;
- Ensure the project makes good use of assets;
- Assist with resolving strategic level issues and risks;
- Approve or reject changes to the project with a high impact on timelines and budget;
- Assess project progress and report on project to senior management and higher authorities;
- Provide advice and guidance on business issues facing the project;
- Use influence and authority to assist the project in achieving its outcomes;
- Review and approve final project deliverables; and
- Perform reviews at agreed stage boundaries.

1.3.2 Project Resource

The WPD project manager Matt Watson, is supported by Smart Grid Consultancy. SGC have provided the commercial lead, Gary Swandells and the commercial officer, Gareth Dauley.

1.4 Procurement

The following table details the current status of procurement for this project.

Provider	Services/goods	Area of project applicable to	Anticipated Delivery Dates
Kiwi Power	Control system	Whole Project	Full system to be delivered by November 2017

Table 1-1: Procurement Details

1.5 Project Risks

A proactive role in ensuring effective risk management for Entire is taken. This ensures that processes have been put in place to review whether risks still exist, whether new risks have arisen, whether the likelihood and impact of risks have changed, reporting of significant changes that will affect risk priorities and deliver assurance of the effectiveness of control.

Contained within Section 7.1 of this report are the current top risks associated with successfully delivering Entire as captured in our Risk Register. Section 7.2 provides an update on the most prominent risks identified at the project bid phase.

1.6 Project Learning and Dissemination

Project lessons learned and what worked well are captured throughout the project lifecycle. These are captured through a series of on-going reviews with stakeholders and project team members, and will be shared in lessons learned workshops at the end of the project. These are reported in Section 5 of this report.

2 Project Manager's Report

2.1 Project Background

DNOs have been running limited scope trials in order to assess the potential of DSR as an enhancement to existing network operations. These have to date not addressed the issue of customer participation in multiple DSR schemes and the need for a service provider that can aggregate and optimise capacity to meet the requirements of multiple schemes (SO, TO, DNO & Supplier) and maximise value to asset owners. If this is not addressed it is unlikely that DNOs will be in a position to recruit participants for the exclusive purpose of constraint management due to higher, or more frequent, income stream from non-DNO sources. Further, this is likely to have the negative effect of promoting an unnecessary competitive market between TO, SO, DNO and suppliers.
Prior DSR trials have so far been limited in their scope with only small sample groups being engaged to offer quite limited functionality specifically for distribution constraint management. As the name 'Entire' suggests, we will now extend the previously limited scope to fully develop and test the skills, relationships and systems necessary for a DNO to provide a comprehensive DSR capability. We will be doing this in areas within the WPD network that are may be due a significant capital upgrade but where the certainty of immediate need is absent. The project will also demonstrate how DSR can be used to defer capital investment which can sometimes take up to 10 years.

In order to achieve this, the **'Entire'** project scope includes;

- Recruit team / place contracts with partners
- Develop connection policies / DSR contracts / technology and systems to facilitate services
- Regulatory rules and financial reward structure for developing and operating multifunctional DSR programme
- Comprehensive knowledge of all legacy embedded generation and its impact on network and updating of asset records
- Stakeholder engagement and interaction including recruitment of DSR programme participants
- Standardisation of all participating generation to latest G59-3 code in support of HSE directive
- 'Interaction with' and 'enrolment in' external DSR programmes to optimise commercial Establishing direct relationships with the largest demand customers to understand their usage, flexibility and possible changes. This will be combined with advice around ASC (Approved Supply Capacity) and DSR to reduce their costs and introduce new revenue opportunities.
- Identifying the skills gaps and organisational structure issues that are required to be addressed to operate a commercial DSR programme and ongoing migration to DSO
- Measuring direct impact of LV connected DSR on 33kV & 132kV infrastructure and establishing financial 'use case'
- Use of WPD owned generation assets to test the new DSR technology and processes before contracting with customers' assets
- Assess results and report

The 4 year project is split into 5 phases: Design, Build, Test, Trial and Report.
The largest section is the trial section which will run over 3 years, helping build confidence on DSR running.

- Design
  - Project design and governance
  - Supplier engagement
  - Network Analysis
- Build
  - Regulatory approvals to enable operational phase to include services to 3rd parties.
  - Remote asset interface, central dispatch
  - Metering and data collection
  - Back Office Systems (performance / financial)
  - Customer contact and communication
  - Policy development
  - Field engineer 'App' development
  - Staff Training
  - Upgrades to WPD stand-by assets for DSR
- Test
- Trial
  - Customer payments for DNO constraint actions (*£390K)*
  - Trial administration
  - Knowledge Management
  - Enhanced customer data records
- Report
  - Stakeholder interviews
  - Closedown reports
  - Public dissemination

This was to follow this original project delivery plan;

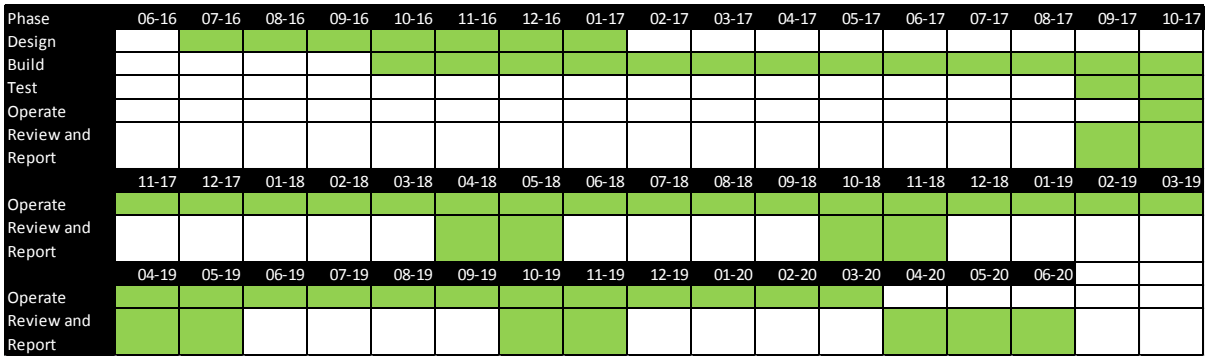

Table 2-1: Gantt chart

2.2 Project Progress

The initial reporting period has covered the initial design of the project as well as the start of the build phase. These are detailed below.

2.2.1 Planning Phase

Progress within this reporting period

The following actions were undertaken:

- Development of detailed project plan
- Internal stakeholder engagement. This includes PSD, Control, Local Network Services teams, Contact Centre Purchasing, PowerOn support, IR and Corporate comms.
- Detailed understanding of WPD DSR short and long term requirements with PSD. This involved a detailed assessment of profiles in the target area as well as new generation connections
- Specifying and tendering for Outstations, Control Functions and the Back office systems.
- Detailed investigations on current markets, programme requirements and values. This includes the various current and proposed changes to the services such as CMP 264 and 265.
- Investigations into commercial and contracting options from both the WPD and customer perspective to develop a balanced proposition
- Development of WPD contracting principles and customer requirements. This specifies the detail of what the project will aim to recruit, what they must be capable of doing as well as how they will be remunerated
- Initial contract discussions with National Grid. This took significantly longer than expected. Further discussions are ongoing to work towards signing the contract.
- Development of Flexible Power Branding.
- Development of customer engagement requirements, processes and basic materials. This includes developing the customer journey and understanding the requirements at each point.
- Development of Customer relationship management spreadsheet to manage customer journey.
- Development of process for participants identified with incorrect connection agreements.
- Development and targeting of ASC reclaim process. This involved extensive data analysis of energy usage in the target area.
- Investigations into use of WPD generation within services, both regulated and non-regulated assets. This included site audits and connection applications.
- Investigation into regulatory and legal implications of project. A legal review was conducted by Osbourne Clark around the legal and regulatory implications of the project.
- Development of generation identifying App. This aims to help with the identification of previously unknown generation.

Several non-planned additional actions were required:

- Investigations into planned changes to wider markets. This included the review on embedded benefits and the NG product simplification.
- Adaption of WPD requirements to new zones. This involved the shifting of the PSD requirement from a single constraint in Coventry to 5 zones in the area.
- Responding to Ofgem and market participant concerns about the project. These arose in Mid-January. Conversations alleviated any further escalation.

2.2.2 Build Phase

Progress within this reporting period

The project is part way through the build phase; the following actions have been completed:

- Detailed assessment of National Grid STOR contracts. This includes a detailed assessment of the liabilities.
- Development of marketing and engagement plan. This details the engagement strategy for customer recruitment
- Application for Flexible Power trademark
- Creation of the WPD flexible power mailbox and phone number

The following actions are underway:

- We have just launched the website and the first customer engagements
- Development of tendered systems to fulfil WPD spec. Kiwi Power will provide a cloud based solution (KOMP) alongside their Fruit device to control assets. The back office is integrated into KOMP. A client app will also be provided for declaring availability.
- Finalising of CDM implications of Fruit installs.
- Design of operations requirements and interactions with control
- Roll out of generator app
- Identification of WPD site for technology testing. No suitable sites so far. Awaiting final investigation.
- Roll out of ASC investigation letters
- Developing process for call taking
- Development of internal financial flows within WPD

Next steps

- Continue customer recruitment, following marketing plan. This is a key objective for the next 12 months.
- Development of customer contracts. This involves merging the functional requirements developed into a contract. This also includes investigating the risks and liabilities that must be passed thorough to customers.
- Delivery of tendered system. Delivery of the basic system is expected by the end of Q2. The full system should be delivered by the end of Q3.

3 Progress against Budget

Spend Area	Budget (£k)	Budget (£k) Minus SGC contribution	Expected Spend to Date (£k)	Actual Spend to Date (£k)	Variance to expected (£k)	Variance to expected %
Design	85	85	85	139.128	54.128	63%[1]
Build	950	800	5.05	5.05	0	0
Test	50	40	0	0	0	0
Trial	800	580	0	0	0	0
Report	80	60	0	0	0	0
TOTAL	**1965**	**1565**	**90.05**	**144.178**	**54.128**	**60%**

Table 3-1: Budget

Comments around variance

1. The Design Phase took significant additional resourcing than expected. This is due to the additional work described in section 2.

4 Progress towards Success Criteria

NETWORK: Identify, audit and update all generation connected to the 11kV network within the trial zone(s). This should enable the return of any unused export capacity to network planners. Identify all connected generation above 150kW and identify where these may affect dynamic network operation. We will also interact with other WPD initiatives to advise where increased telemetry may be required to monitor active locations in the network and update future forecasting models.

Progress - Initial investigations of target areas have been started. Initial analysis of ASCs has been conducted and review letters will be sent out shortly. Target area has been identified as an area of focus for analogue reviews and improvements.

SYSTEMS: Identify, develop and demonstrate new policies, processes and systems that are required in order for WPD to operate standalone DSR services. (Monitor, control, meter and settle)

Progress - Technical systems required have been scoped and tendered for the project. Customer journeys sign up processes have been designed. These will be tested and refined over the duration of the project.

OPERATIONAL: Identify new skills and roles that currently don't exist within the DNO organisational structure and either train existing staff to address gap or create appropriate job specifications for future recruitment.

Progress - Final roles to be designed following learning gathered from operation of the trial.

COMMERCIAL: Develop an economic business model for combined internal and external DSR service provision that demonstrates enhanced value to customers. This will integrate savings with additional opportunities that could generate new incremental revenues from third party DSR schemes and cost avoidance. Broadening the scope of what a DNO can do with DSR we would expect to achieve improved efficiencies for overall GB system operation.

Progress - Initial commercial propositions have been developed. WPD service has been designed to be cost effective for the WPD requirement as well as commercial effective against the Flexible STOR programme. This will be tested in the trial phase

MARKET: Agree a new set of conditions that allow and incentivise DNOs to operate DSR services that not only address internal constraint issues but incentivise the efficient use of these new capabilities to support overall GB System operation requirements. This will enable the use of customer assets and WPD's own stand by generation to participate in external DSR schemes, including SO balancing services.

Progress - Revenue stacking proposal has be developed to coordinate with a flexible STOR contract and TRIAD avoidance. The effectiveness of the proposal shall be tested and reviewed through the trial phase of the project.

KNOWLEDGE: Document and share all key learning that is achieved in order that the results should be replicable across all UK Distribution Networks.

Progress - Learning is being documented. This will be shared with the wider industry later in the project.

5 Learning Outcomes

The initial project work has focussed on the design of the project. More learning is expected as we start to interact with customers.

New learning this reporting period:

Commercial Products:

- Latest market valuations of both flexible STOR and TRIAD markets
- Potential changes to the above markets such as CMP 264 and 265 as well as National grid's product simplification work
- Complexity of STOR contracting

WPD technical requirements:

- Simplicity of interactions and rules wanted by the control centre
- Complexity of PSD requirements, changing with customer requirements
- Levels of unused ASCs

Technical implementation:

- Limitations of internal systems for DSR control
- Availability and cost effectiveness of third party systems
- Costs of WPD generator upgrades for technology testing.

6 Intellectual Property Rights

A complete list of all background IPR from all project partners has been compiled. The IP register is reviewed on a quarterly basis.

The key background IPR is:

IPR	Comment	Background/Foreground	Owner	%
KOMP V2	Being licenced from Kiwi Power for project	Enabling' Relevant Background	Kiwi Power	100%
Fruit	Being licenced from Kiwi Power for project	Enabling' Relevant Background	Kiwi Power	100%
Client App	Being licenced from Kiwi Power for project	Enabling' Relevant Background	Kiwi Power	100%

Table 6-1: Key intellectual property

This IPR is being licenced from Kiwi Power as part of the technology tender.

The relevant foreground IPR identified in this reporting period is:

- WPD technical document library for new services
- WPD Commercial document library for new services
- Flexible Power Branding and logos
- WPD customer proposition
- WPD customer Journey
- WPD CRM spreadsheet
- WPD generator App
- WPD market investigations
- ASC reports

7 Risk Management

Our risk management objectives are to:

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

These objectives will be achieved by:

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

7.1 Current Risks

The Entire risk register is a live document and is updated regularly. There are currently 21 live project related risks. Mitigation action plans are identified when raising a risk and the appropriate steps then taken to ensure risks do not become issues wherever possible. In Table 7-1**Error! Reference source not found.**, we give details of our top five current risks by category. For each of these risks, a mitigation action plan has been identified and the progress of these are tracked and reported.

Details of the Risk	Risk Rating	Mitigation Action Plan	Progress
Shift in PSD use case	Major	Constant liaison with PSD	Ongoing
SRD is delayed due to replacement	Major	Accelerate contract signing and first tender entry	Final approval needed for unusual liabilities,

programme			contract can then be signed
Website development halted as WPD hosting contract is being moved	Major	Liaison with Main business website team	Ongoing
NG not giving FP a aggregator contract	Major	Acceptance of base aggregator terms	Final approval needed for unusual liabilities, contract can then be signed
Cyber security risks from new systems	Major	Involvement of IR in tendering processes. extensive penetration testing	IR to arrange penetration testing with Kiwi Power

Table 7-1: Top five current risks (by rating)

Table 7-2 provides a snapshot of the risk register, detailed graphically, to provide an on-going understanding of the projects' risks.

Likelihood = Probability x Proximity						
	Certain/Imminent (21-25)	0	0	0	0	0
	More likely to occur than not/Likely to be near future (16-20)	0	0	0	0	0
	50/50 chance of occuring/ Mid to short term (11-15)	0	0	0	1	0
	Less likely to occur/Mid to long term (6-10)	0	1	4	6	2
	Very unlikely to occur/Far in the future (1-5)	0	0	5	2	0
		1. Insignificant changes, re-planning may be required	2. Small Delay, small increased cost but absorbable	3. Delay, increased cost in excess of tolerance	4. Substantial Delay, key deliverables not met, significant increase in time/cost	5. Inability to deliver, business case/objective not viable
		Impact				
	Minor	Moderate	Major	Severe		
Legend	6	6	9	0	**No of instances**	
Total	21				No of live risks	

Table 7-2: Graphical view of Risk Register

Table 7-3 provides an overview of the risks by category, minor, moderate, major and severe. This information is used to understand the complete risk level of the project.

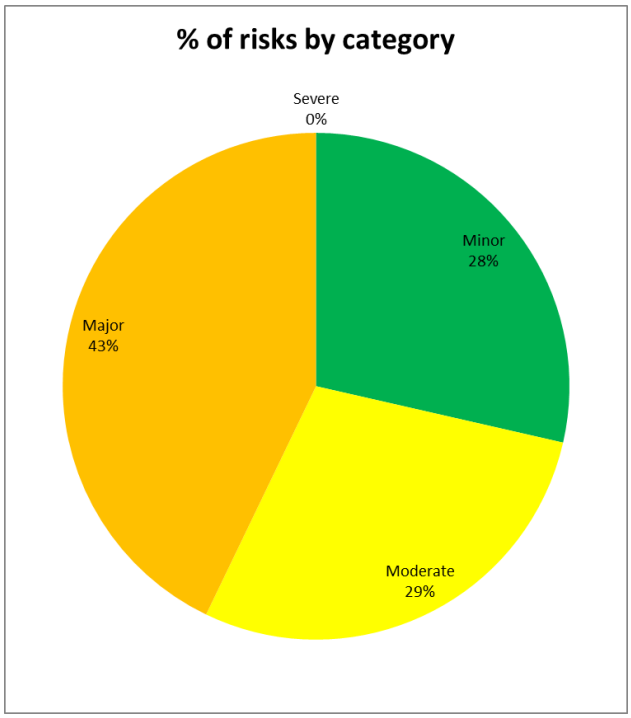

Table 7-3: Percentage of Risk by category

7.2 Update for risks previously identified

Descriptions of the most significant risks, identified in the previous six monthly progress report are provided in Table 7-4 with updates on their current risk status.

Details of the Risk	Previous Risk Rating	Current Risk Rating	Mitigation Action Plan	Progress
Shift in PSD use case	Major	Major	Constant liaison with PSD	Ongoing
Lack of flexibility in connection procedures for docking station	Major	closed	Engagement with policy team	Closed
High costs of upgrading WPD assets	Major	closed	Early applications for upgrade	Closed
Insufficient volumes of DSR in target area	Major	Major	Identification of potential customers	Ongoing
Cyber security risks from new systems	Major	Major	Involvement of IR in tendering processes. extensive penetration testing	Ongoing

Table 7-4: Risks identified in the previous progress report

8 Consistency with Project Registration Document

The target area for entire has been altered following further assessment by PSD. The details of the change can be found in CRF001.
This has altered the target area. Instead of 2 GSPs the target is now 5 sub areas made up of 1 GSP and 4 groups of BSPs. The project budget and timescales have not been affected as the same systems and resources can accommodate the additional complexity.

The registration documentation can be found here:
www.westernpowerinnovation.co.uk/Document-library/2016/Registration-Forms/Entire-Project-Registeration-Form.aspx

9 Accuracy Assurance Statement

This report has been prepared by the Entire Project Manager (Matt Watson), reviewed and approved by the Future Networks Manager (Roger Hey).

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