Date of Submission
June 2016

NIA Project Registration and PEA Document

Notes on Completion: Please refer to the **NIA Governance Document** to assist in the completion of this form. Please use the default font (Calibri font size 10) in your submission. Please ensure all content is contained within the boundaries of the text areas. The full-completed submission should not exceed 6 pages in total.

Project Registration

Project Title		Project Reference
Entire		**WPD_NIA_017**
Funding Licensee(s)	**Project Start Date**	**Project Duration**
WPD East Midlands, WPD West Midlands, WPD South Wales, WPD South West	27th June 2016	34 Months
Nominated Project Contact(s)		**Project Budget**
Roger Hey / Matt Watson		£1,838,000

Problem(s)

With the successful completion of previous trials that have sought to determine the principals of Demand Response and interaction with customers to modify behaviour, Entire will progress the understanding of customers and their operational priorities. The 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 the skills, relationships and systems necessary for a DNO to provide a comprehensive DSR capability

Method(s)

Building on the successes and the learning achieved during the commercial trials in Project FALCON, this project aims to develop and test comprehensive DSR capability to control generators and customer loads. Based on our previous small scale interventions using a very manually controlled DSR arrangement it has been proven that DSR can potentially provide a valuable tool in the management of transient or temporary network issues, particularly where the case is uncertain for a large capital investment. We are therefore seeking to develop our understanding and capability of DSR both in terms of advanced systems that would support BaU operation, but also the operational framework that would allow DNO DSR customers to participate more in wider DSR schemes operated by other parties, including National Grid. BaU use of DSR is likely to require regulatory approval and new policies from a governance perspective as well as new systems capabilities to operate and manage. Finally, this is not an engineering based solution and therefore skills development in the commercial DSR markets will also feature as a key deliverable.

Scope

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.
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, commercially effective 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
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- Stakeholder engagement and interaction including recruitment of DSR programme participants
- 'Interaction with' external DSR programmes to optimise commercial attractiveness of DNO DSR. 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'
- Determination of data required for customer recruitment. This will include an assessment of the benefits (and any confidentiality barriers) from market availability of this data.
- Assessment of varying DSR offerings for constraint management
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Objective(s)

The trial will identify and address many of the key challenges a DNO is presented with as they develop DSR and other commercial service capabilities within what is a traditional engineering and asset management organization. In doing so WPD will create a roadmap for WPD's other regions as well as other DNOs to assist development of a commercial service capability and deliver increased value to their customers.
In order to start this transition, it is necessary to ensure that the data held regarding customers with generation or sufficient volumes of flexibility to affect the network operation, is accurate and comprehensive. It is therefore our intention to carry out a deep audit of customer assets within the trial zones and ensure that they are compliant with the current standards, while taking advantage of this interaction to engage with them to educate and where appropriate recruit for demand side management activity. By carrying out this project we will ensure that the underlying assumptions regarding our networks are correct and that we have increased visibility of dynamic users that will effect operational decisions as we migrate to local system operation.

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

Technology Readiness Level at Start	Technology Readiness Level at Completion
TRL 6	**TRL 8**

Project Partners and External Funding

The project will be managed internally with the continued support of DSR specialist expertise. These will be provided at a significantly discounted rate by Smart Grid Consultancy who have already successfully delivered projects for WPD and continue to provide essential support for ongoing commercial trials.
In the event that WPD successfully enrol in external DSR programmes that generate income, any profits after operational costs not funded under LCNI will be used to offset the overall cost of the trial.

Potential for New Learning

The proposed trial scope includes many areas of new learning that are of value to DNOs UK wide. These are not limited just within a specific aspect such as the new technology, and is expected to deliver results in the following areas:

- Furthering the work already done to determine the potential of commercial intervention alongside or as an alternative to engineering solutions
- Establishing best practice methodology and new policies relating to engaging customers in active network management.
- Attitudinal analysis and performance assessment of participants within commercial techniques.
- Financial impact assessment of commercial techniques.
- Development of new related policies, processes and systems to support commercial techniques.
- Development and documentation of new systems to enable successful learning to be replicated.

Scale of Project

Five potential constraints have been identified in the East Midlands. DSR will be recruited in the networks to help support the delivery of capacity for peak demand. In the long term up to 150MW of DSR may be required in these target areas.

Geographical Area

We have identified 5 locations in the WPD East Midlands area. This covers the M1/M40 corridor and extends from Coventry to Milton Keynes. For more details please check https://www.westernpower.co.uk/Innovation/Projects/Current-Projects/Project-ENTIRE.aspx

Revenue Allowed for in the RIIO Settlement

None

Indicative Total NIA Project Expenditure

- Planning - £85K
  Project design and governance; Supplier engagement ; Network Analysis
- Build - £786K
  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

- Testing - £50K
- Operate - £842K
  Customer payments for DNO constraint actions (*£390K)*; Trial administration; Knowledge Management; Enhanced customer data records
- Report - £75K
  Stakeholder interviews ;Closedown reports; Public dissemination

Total Project Cost	£1,838,000
Partner Funding	- £ 365,000
WPD Contribution (10%)	- £ 113,500
Participant Payments	- £ 338,000
NIA Funding	**£ 1021,500**

Project Eligibility Assessment

Specific Requirements 1

1a. A NIA Project must have the potential to have a Direct Impact on a Network Licensee's network or the operations of the System Operator and involve the Research, Development, or Demonstration of at least one of the following (please tick which applies):

A specific piece of new (i.e. unproven in GB, or where a Method has been trialled outside GB the Network Licensee must justify repeating it as part of a Project) equipment (including control and communications systems and software)	☐
A specific novel arrangement or application of existing licensee equipment (including control and/or communications systems and/or software)	☐
A specific novel operational practice directly related to the operation of the Network Licensees System	☒
A specific novel commercial arrangement	☒

Specific Requirements 2

2a. Has the Potential to Develop Learning That Can be Applied by all Relevant Network Licensees ☒

Please answer one of the following:

i) Please explain how the learning that will be generated could be used by relevant Network Licenses.

WPD will develop a clear roadmap that addresses the major issues associated with the development of commercial DSR services. These challenges are very similar across all licensees as the systems and skills necessary do not exist within the core competencies of DNOs. By developing these through LCNI funding it is likely that the result will be an accelerated growth in DR services and reduced overall costs to the consumer by avoiding unnecessary duplication of learning development including external consultant fees.

ii) Please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the Project.

The commercial techniques aspects of the Tier 2 LCNF Project FALCON were successful and achieved very valuable learning regarding DR. The majority of this learning was positive, creating a clear signal that it should be pursued further but there are still many gaps between trial and BaU despite being the most advanced trial of its type. There is also a broad interest from other DNOs in determining the potential of DR and implementing within their organisations. By undertaking this project WPD can continue to lead the DNO

community in development of commercial methods of managing network conditions.

Is the default IPR position being applied?

Yes ☒

No ☐

If no, please answer i, ii, iii before continuing:

i) Demonstrate how the learning from the Project can be successfully disseminated to Network Licensees and other interested parties

ii) Describe any potential constraints or costs caused or resulting from, the imposed IPR arrangements

iii) Justify why the proposed IPR arrangements provide value for money for customers

2b. Has the Potential to Deliver Net Financial Benefits to Customers ☒

Please provide an estimate of the saving if the Problem is solved.

By making DSR commercially viable for both the DNO and participants, Entire may allow for the utilization of DSR for the management of network constraints and the extension of non-network solutions.
DSR has multiple use cases and can help defer reinforcement, manage constraints during network build out as well as offering optionality for the DNO.
These benefits are only possible if DNOs can offer products that are commercially attractive to participants and that are based on revenue stacking.

Please provide a calculation of the expected financial benefits of a Development or Demonstration Project (not required for Research Projects). (Base Cost – Method Cost, against agreed baseline).

An example of the possible value to customers is shown for one of the constraints investigated in the project.

In CMZ 1, the provision of a new Super-Grid transformer is being deferred. Based on previous similar installations the base cost for such and installation is approximately £12 million.

Taking a simple example of deferring the associated costs by one year reduces the total NPV to £11.41 million.
Running DSR for a year for this scheme was estimated to cost approximately £0.21 million.
As such:

Saving =Base cost-method costs
= 12 – (11.41 +0.21) = £0.38 million.

The cost of each year of deferral will depend on the loading of the network and the associated profile.
However DSR can provide significant savings for the deferral of high cost reinforcement.

Please provide an estimate of how replicable the Method is across GB in terms of the number of sites, the sort of site the Method could be applied to, or the percentage of the Network Licensees system where it could be rolled-out.

Over the course of LCNF and now LCNI, all DNOs have expressed a great deal of interest in Demand Side Response and most have carried out their own limited scope trials. The project seeks to accelerate the transition to BaU for all DNOs and address many of the issues that arise from the lack of overlap with their existing core competencies.

Please provide an outline of the costs of rolling out the Method across GB.

DR services are highly scalable once the central systems and skills have been developed. Much of the attraction of DSR over engineering solutions is that it offers excellent economies of scale.

2c. Does Not Lead to Unnecessary Duplication ☒

Please demonstrate below that no unnecessary duplication will occur as a result of the Project.

While there is limited activity by most DNOs in relation to DSR this is largely in the development and proving of use cases for a variety of different purposes. None of these have attempted to detail the challenges associated with creation of an enterprise scale service capability and provision of this to third parties. By doing so under LCNI we would serve to avoid future duplication of effort and by using experienced industry experts avoid errors already identified from privately funded initiatives out with the regulated business sector.

If applicable, justify why you are undertaking a Project similar to those being carried out by any other Network Licensees.

N/A