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## NIA Project Registration and PEA Document

### Date of Submission

Nov 2019

### Project Reference Number

NIA\_WPD\_047

## Project Registration

### Project Title

Future Flex

### Project Reference Number

NIA\_WPD\_047

### Project Licensee(s)

National Grid Electricity Distribution

### Project Start

November 2019

### Project Duration

2 years and 2 months

### Nominated Project Contact(s)

Matt Watson

### Project Budget

£828,425.00

## Summary

Future Flex is a participant-led trial of second generation DSO services, deploying step-change innovations for procurement, testing and delivery suitable for domestic scale assets. The project will focus on active power demand reduction services. The benefits will be increased market liquidity and competition – and resulting lower costs of flex service provision.

## Problem Being Solved

First generation DSO services are already being provided by large distribution-connected assets – as evidenced by Flexible Power, Piclo, Power Potential, and more. Western Power Distribution (WPD) alone procured 28 MW of flexibility in 2018 with volumes expected to increase as the service develops. Distribution System Operator (DSO) services are being standardised across DSOs under the Open Networks project, initially focused on constraint management, and are becoming Business as Usual (BaU) across GB.

Whilst there are some smaller providers emerging, these services tend to be provided by relatively large (>200kW) assets, for instance batteries and generators. Flexibility providers to date have tended to be commercial actors for whom energy is core business (or a fundamental cost component of business), rather than individual householders.

But second generation DSO services will need to facilitate widespread participation from homes too. The market is fast developing new domestic flexibility solutions – spanning vehicle-to-grid (V2G), smart and hybrid heating, stationary batteries and more. The units of flexibility offered at domestic scale are individually small, often at the level of single kilowatts. This drives different requirements when participating in local flexibility markets. If DSOs are to be a neutral market facilitator, they must ensure a level playing field for these new domestic solutions.

Facilitating domestic participation means identifying – and addressing – unconscious biases in DSO service design. Example issues have been raised in National Grid Electricity System Operator's (ESO) live Residential Response project, which seeks to address some specific barriers to domestic flexibility providing Firm Frequency Response (FFR); this is not yet public domain but early findings have been shared with WPD. Barriers are also outlined in Everoze's Swarm Governance report under the Core4Grid project. In addition, Everoze's experience of acting as Independent Technical Expert (ITE) for frequency response testing is uncovering practical empirical lessons. Issues include:

- Dynamic allocation of Demand Side Response (DSR) assets within domestic portfolios.
- Bid windows to accommodate rapidly changing asset availability.

- Automation in testing and delivery to accommodate very large numbers of assets.
- Metering and baselining.
- Commercial incentive design and risk allocation.
- Possible standardisation of requirements between DSO and other services.

## Method(s)

Future Flex is a participant-led trial of second generation DSO services, deploying step-change innovations for procurement, testing and delivery suitable for domestic scale assets. The project will focus on active power demand reduction services. The benefits will be increased market liquidity and competition – and resulting lower costs of flex service provision.

## Scope

The Project is scoped in phases, as logged below.

### 1. Participant engagement

- This data-gathering phase is the bedrock of the whole project, using workshops to secure meaningful, deliberated participant input, with follow-on semi-structured interviews, social media engagement and peer-review.
- At the heart of this phase is two intensive workshops, informed by best practice in workshop design – with upfront participant priming on key topics, and careful curation of agenda, invitee list and seating plan to ensure meaningful feedback. The workshop methodology is substantially more intensive and bespoke than is typically deployed in the energy sector; for instance, drawing upon 'priming' theory from social sciences to set the interpretative frame – using an upfront written briefing and individual verbal calls prior to workshop delivery.

Following the participant engagement we have three areas of work to progress:

### 2A. DSO-ready homes

- This workstream will identify and deploy interventions in the customer journey to futureproof homes for DSO services.
- The objective is to deliver a set of costed interventions to make homes DSO-ready through adopting a customer-centric approach.

### 2B. Sustain-H Trial (with aggregated data sets)

- Implement a trial with different data options with energy suppliers and/or asset aggregators using the Sustain service as a test case.
- The objective is to demonstrate the provision of an inclusive DSO service, which is accessible to a broad range of domestic solutions, and is flexible on data provision.

### 2C. Pro Low Carbon

- Conduct analysis of carbon intensity of DSO services, with an emphasis on domestic flex.
- The objective is explore the impact of flexibility services to feed into wider policy/regulatory setting.

## Objective(s)

The objective of the project is to understand current process limitations with regards to domestic flexibility providers with the aim to demonstrate and test solutions to those limitations.

## Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

## Success Criteria

- Two intensive workshops, adopting workshop best practice methodology.
- A clear list of participant-led recommendations for second generation DSO services, segmented into step-change innovations and BaU tweaks, and clearly prioritised via impact/effort chart.
- Implementation of highest priority recommendations, via empirical trial, targeting at least two providers and 100 homes.
- Finalised designs following trial.

## Project Partners and External Funding

As project lead, Everoze is a technical and commercial energy consultancy with expertise in low carbon energy flexibility.

Smart Grid Consultancy (SGC), who is assigned to provide specialist input, has worked with WPD on multiple DSR projects.

National Grid ESO will act as Advisor.

## Potential for New Learning

The key learning for each phase is:

- Phase 1: What stakeholders want from second generation DSO services?
- Phase 2: How stakeholder requests can be implemented in practice – what specifically need to change.
- Phase 3: Which step-change innovations work in practice, and which do not.

## Scale of Project

The question of scale applies to Phase 1 & 3.

Phase 1 – Participant engagement: We propose two workshops (of 15-20 participants each), five interviews, two peer-reviewers, five LinkedIn posts.

Justification: Consulting broadly in this way is essential to be genuinely participant-led – and to ensure that a diversity of industry perspectives are captured.

Phase 2 – Sustain-H Trial: We target trialling with at least two industry participants (e.g. energy suppliers, aggregators), spanning >100 homes. We are open to increasing this if there is sufficient industry interest.

Justification: Trialling with at least two participants is essential to capture meaningful empirical lessons in the field – and reach robust 'learning-by-doing' conclusions on what works.

## Technology Readiness at Start

TRL3 Proof of Concept

## Technology Readiness at End

TRL7 Inactive Commissioning

## Geographical Area

The geographic area will be determined during Phase 2, rather than upfront. This is a purposeful decision, guided by two considerations:

- The project is focused on DSO procurement processes, rather than solving a specific network issue: As such we are agnostic to geographic area – unless participant feedback suggests otherwise. This leads to our second consideration.
- We seek to be participant led: Whilst our research to date flags up themes which are likely to emerge, we are eager to confirm the geographic area following meaningful participant feedback. For instance, if the participant workshops identify particular challenges in dispatching flexibility in rural areas, then we want to retain freedom to focus our trial on such an area.

## Revenue Allowed for the RII Settlement

N/A

## Indicative Total NIA Project Expenditure

£691,583.00

## Project Eligibility Assessment Part 1

There are slightly differing requirements for RIIO-1 and RIIO-2 NIA projects. This is noted in each case, with the requirement numbers listed for both where they differ (shown as RIIO-2 / RIIO-1).

### Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations (Please complete sections 3.1.1 and 3.1.2 for RIIO-2 projects only)

Please answer **at least one** of the following:

#### How the Project has the potential to facilitate the energy system transition:

n/a

#### How the Project has potential to benefit consumer in vulnerable situations:

n/a

### Requirement 2 / 2b

Has the potential to deliver net benefits to consumers

Project must have the potential to deliver a Solution that delivers a net benefit to consumers of the Gas Transporter and/or Electricity Transmission or Electricity Distribution licensee, as the context requires. This could include delivering a Solution at a lower cost than the most efficient Method currently in use on the GB Gas Transportation System, the Gas Transporter's and/or Electricity Transmission or Electricity Distribution licensee's network, or wider benefits, such as social or environmental.

#### Please provide an estimate of the saving if the Problem is solved (RIIO-1 projects only)

If the problem was solved, in the long run we would expect to see increased liquidity within DNO DSR markets and a corresponding reduction in pricing. The value of DNO DSR could reach up to £12.1m/year by the end of ED1 (£3.38m/year within WPD). This is based on the deferral of half the total EHV and 132kV reinforcement by three years. If increased liquidity drove a 10% saving in this value, the savings would be £340k/year across WPD or £1.21m/year across the UK. The 10% saving is deemed reasonable given National Grid ESO prior experience with frequency response.

#### Please provide a calculation of the expected benefits the Solution

Base cost: 12.1m/year  
Method cost:  $12.1 \times 0.9 = £10.9\text{m/year}$   
Financial benefits: £1.21m/year

It should be noted that a number of initiatives are currently underway to improve liquidity in DNO flexibility markets. The value attributed to each, and the total value created is unknown at this stage.

#### Please provide an estimate of how replicable the Method is across GB

The method is not site-specific, and hence is replicable across GB, including to other Network Licensees. As the method largely process rather than asset-based, the costs of roll-out are low once the benefits are proven, entailing a one-off upfront cost of updating procurement processes.

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

The roll out cost will depend on the solution taken forward.

### Requirement 3 / 1

Involve Research, Development or Demonstration

A RIIO-1 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 trialed outside GB the Network Licensee must justify repeating it as part of a project) equipment (including control and communications system 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

RIIO-2 Projects

- A specific piece of new equipment (including monitoring, control and communications systems and software)
- A specific piece of new technology (including analysis and modelling systems or software), in relation to which the Method is unproven
- A new methodology (including the identification of specific new procedures or techniques used to identify, select, process, and analyse information)
- A specific novel arrangement or application of existing gas transportation, electricity transmission or electricity distribution equipment, technology or methodology
- A specific novel operational practice directly related to the operation of the GB Gas Transportation System, electricity transmission or electricity distribution
- A specific novel commercial arrangement

## Specific Requirements 4 / 2a

### Please explain how the learning that will be generated could be used by the relevant Network Licensees

The innovations deployed are expected to apply across all licence areas: The project is inherently focused on procurement specifications and process, and hence is not DNO specific. We aspire that successful innovations will be rolled out to other license areas.

### Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIIO-1 only)

n/a

- Has the Potential to Develop Learning That Can be Applied by all Relevant Network Licensees

### Is the default IPR position being applied?

- Yes

## Project Eligibility Assessment Part 2

### Not lead to unnecessary duplication

A Project must not lead to unnecessary duplication of any other Project, including but not limited to IFI, LCNF, NIA, NIC or SIF projects already registered, being carried out or completed.

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

The project is designed by industry participants and implemented by a DSO, rather than designed by a DSO and implemented by participants. We are hopeful that this fundamentally novel approach will deliver novel outcomes – injecting the fresh insight required to deliver second generation DSO services.

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

n/a

## Additional Governance And Document Upload

### Please identify why the project is innovative and has not been tried before

The project is innovative in both its area of focus and its delivery method. Building on the delivery of flexibility services into BaU, this trial will look to investigate ways of improving access for domestic providers through a stakeholder led process. It is anticipated that suggested improvements will range in both their complexity, risk and value to customers. The project will ensure it only takes forward genuinely innovative improvements and ensure that low risk improvements are allocated to the BaU flexibility team for any further development required.

## Relevant Foreground IPR

n/a

## Data Access Details

n/a

## Please identify why the Network Licensees will not fund the project as apart of it's business and usual activities

This project holds both technical and commercial risks with any potential returns expected to beyond ED1. As such the project could not be carried out as part of BaU activities. This goes beyond simple feedback, as conducted by BaU activities, and looks at fundamental process changes that can increase liquidity.

## Please identify why the project can only be undertaken with the support of the NIA, including reference to the specific risks(e.g. commercial, technical, operational or regulatory) associated with the project

This project is looking for innovative techniques to widen access to DSO flexibility services. NIA support is essential to support this process. The output of phase 1 is deliberately uncertain to enable the latest industry thinking to be captured. Phase 2 and 3 will be specifically designed to take for the elements that cannot be taken forward without NIA support due to the associated risk. These are expected to be commercial, technical and operational.

## This project has been approved by a senior member of staff

Yes