

## NIA Project Registration and PEA Document

### Date of Submission

May 2019

### Project Reference Number

NIA\_UKPN0050

## Project Registration

### Project Title

Urban Energy Club

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NIA\_UKPN0050

### Project Licensee(s)

UK Power Networks

### Project Start

May 2019

### Project Duration

2 years and 10 months

### Nominated Project Contact(s)

Romina Arefin

### Project Budget

£195,238.00

## Summary

As part of UK Power Networks' role in understanding the transition to the future smart flexible energy system we have identified potential categories of exclusion from the transition consisting of financial exclusion, fuel poverty, lack of engagement in the energy market and lack of flexibility in energy use. DNOs need to explore inclusive approaches that will ensure everyone is able to access the benefits of a flexible system if they wish to do so.

In urban areas, multiple occupancy properties such as blocks of flats are a common living arrangement. Many local authorities plan to further develop affordable housing: this will also contribute to an increase in this type of living arrangement. Often blocks of flats are a type of social housing and are common in areas where financially underprivileged customers live in higher concentrations.

Living in these premises can often limit customers' energy options and the uptake of low carbon technologies (LCTs) such as rooftop solar panels and batteries due to the nature of shared properties and limited space on individual sites. This can be a barrier for certain customers who would be unable to actively participate in the energy market, own distributed energy resources and offer flexibility services.

Shared ownership and virtual allocation of the assets can open energy saving opportunities, choices and new revenue streams for customers who would otherwise not be able to participate in the flexibility market.

### Nominated Contact Email Address(es)

innovation@ukpowernetworks.co.uk

## Problem Being Solved

As part of UK Power Networks' role in understanding the transition to the future smart flexible energy system we have identified potential categories of exclusion from the transition consisting of financial exclusion, fuel poverty, lack of engagement in the energy market and lack of flexibility in energy use. DNOs need to explore inclusive approaches that will ensure everyone is able to access the benefits of a flexible system if they wish to do so.

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## Method(s)

Other projects such as Domestic Energy and Storage Control (DESC), energywise, SAVE (SSEN) and ACE (NPG) have explored both the network impacts associated with small/domestic distributed energy resources, energy efficiency and Demand Side Response (DSR) and the opportunities for better network management through domestic load flexibility. Currently there are other projects funded by BEIS investigating domestic flexibility and NIA projects exploring how electric vehicles can provide flexibility at low voltage (Vehicle 2 Grid solutions and Shift). Unlike these projects, Urban Energy Club focuses on social innovation that will help unlock the flexibility potential of specific customer groups that might be otherwise excluded from the flexibility market offerings, such as those living in blocks of flats that have limited opportunities to install individually owned solar photo-voltaic generation and batteries. Urban Energy Club is doing this by exploring a new commercial model that will enable virtual allocation of shared assets and opt-in preferences for customers. This project covers UK Power Networks' involvement in an existing wider project (CommUNITY) funded by EDF Energy, that will install an energy storage in a block of flats and will develop a platform to provide more options to customers on how they use their energy (photo-voltaic generation and storage, peer to peer) and how they can stack revenue and savings from the use of their virtually allocated assets.

Urban Energy Club will cover the design, development and testing of the network-related aspects of the wider project. Specifically it will look at how customers can choose to use their virtual allocation of the shared asset to provide flexibility to the local electricity network and design a financial incentive offering flexibility suitable for the urban consumer group living in blocks of flats.

### October 2020 Update:

The lockdown period brought a halt to the project CommUNITY and paused any onsite work required for seven months between March and September 2020. On-site work was started in again in September. As this project deals with vulnerable customer and in light of the government guidelines, UK Power Networks supported this decision to pause the on-site work. As such the project required extension in order to fulfil an appropriate trial period.

With the above in mind, the project has been extended until November 2021 to fulfil the agreed project objectives.

### November 2021 Update:

We are extending the project by three months to allow for the conclusion of research and analysis carried out by University College London. There are no impacts on costs.

## Scope

Urban Energy Club will test how virtual allocation of a shared asset can support a more inclusive approach of procuring network flexibility from domestic customers. Trial participants will be recruited amongst residents living in a block of flats, with a 2x 6KW/13KWh scale battery energy storage system integrated with a photovoltaic generation system. Both recruitment and the commercial model development are out of scope of Urban Energy Club. Participants will be already engaged through the existing project CommUNITY, they will be able to select preferences on how to use their energy and will have options to trade or share their virtual allocated shares of communal asset with each other (e.g. options will include feed-in, self-consumption and peer to peer trading).

This project will specifically help DNOs explore how a commercial model with virtual allocation of assets can deliver benefits to network customers and can open opportunities into the flexibility market for customers living in flats with limited space.

The network trial will be carried out by simulating peak times designed on historical metering data, by adding the flexibility revenue stream option in the wider model and by comparing customers' acceptance of this option with other preferences.

## Objective(s)

The main objectives of this project are:

- To test whether customers living in blocks of flats can access financial benefits through flexibility;
- To explore how DNOs can be more inclusive by way of flexibility based on virtual allocation of shared assets;
- To create better value around low carbon and other future technology for groups that are part of some of the potential exclusion categories from a future flexible energy system (fuel poverty, lack of engagement in the energy market);
- To facilitate non-prosumers and fuel poor households' ability to benefit from future energy technologies and from flexibility opportunities.

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

n/a

## Success Criteria

The project will be considered successful if it will provide insights into:

- the level of acceptance of the network flexibility option compared with other options
- the extent of demand side load reduction that can be achieved by trial participants at simulated peak times through the virtual allocation of shared assets
- how a commercial model with virtual allocation of assets can promote wider participation in network flexibility by consumer groups that have limited opportunities to install individually owned solar photo-voltaic generation and batteries.

Ultimately, this will inform DNOs' future vulnerability strategies on the role DNOs can play in the future in tackling potential categories of exclusion from some of the benefits associated with a future smart flexible energy system.

## Project Partners and External Funding

Repowering London, EDF Energy and a consultancy/academic partner (to be determined through a mini-tender) will be our partners for the NIA project.

Organisations involved in the wider CommUnity project (externally funded) are:

- EDF Energy R&D – Project lead
- UCL Energy Institute – Social and behavioural impacts
- Repowering London – Project design and participant engagement

## Potential for New Learning

- Improve the understanding of potential localised aggregator markets in urban areas;
- Understand the value proposition for customers, DNOs and local aggregators for community-scale battery energy storage systems;
- Improve engagement and understanding of customer behaviours while tackling potential customers at risk of exclusion (this will inform future vulnerability strategies for DNOs and the role DNOs should play in ensuring that the future smart flexible energy system is inclusive)

## Scale of Project

The project is at a single site to minimise costs and was chosen for its ability to integrate the multi-partner energy trading scenario with minimum funding as part of an ongoing project. The small scale of this trial will help understand customer acceptance with minimum costs. This site targets the specific customer group at risk of exclusion due to limited space for individual asset ownership and financial barriers.

## Technology Readiness at Start

TRL5 Pilot Scale

## Technology Readiness at End

TRL8 Active Commissioning

## Geographical Area

This project is at one single site in South London.

## Revenue Allowed for the RIIO Settlement

No expenditure to carry out the work included in this project was part of the RIIO-ED1 settlement.

**Indicative Total NIA Project Expenditure**

£195,238 is the total expenditure expected to be incurred.

## Project Eligibility Assessment Part 1

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

The expected savings by 2030 are estimated at £545,000. This is based on figures of deferral of Low Voltage reinforcement at specific sites with high concentrations of blocks of flats and with a deferral need of minimum five years and with a 10% peak reduction and a 25% uptake.

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

There are no network benefits at project scale as the project site does not have a need for reinforcement.

The customers that participate in the trial will benefit through a financial payment for the participation and are expected to reduce energy bills and unlock potential new revenue streams.

This project is a trial with a simulated network constraint that will therefore deliver a theoretical network benefit at project level, however the implementation of the solution will deliver net financial benefits to customers if adopted in the market.

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

This method should be replicable across all licensees' areas that include blocks of flats in their dwelling stock and that are offering flexibility options to their domestic customers in urban areas.

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

Costs of rolling out are minimal as the learning of this project can be easily integrated into current flexibility and customer vulnerability strategies.

### Requirement 3 / 1

Involve Research, Development or Demonstration

A RII-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 trialled 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

#### RIO-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

At project completion the learning will be available for all DNOs to use and facilitate flexibility schemes in urban areas with shared ownership of storage assets. It will inform how DNOs can facilitate more inclusive approaches in procuring flexibility from consumers in the future.

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

Other projects such as Domestic Energy and Storage Control (DESC), and Energywise, SAVE (SSEN) and ACE (NPG) have explored both the network impacts associated with small/domestic distributed energy resources, energy efficiency and Demand Side Response (DSR) and the opportunities for better network management through domestic load flexibility. Currently there are other projects funded by BEIS investigating domestic flexibility and NIA projects exploring how electric vehicles can provide flexibility at low voltage (Vehicle 2 Grid solutions and Shift). Although these solutions have the potential to be an optimal source for load management, it is unlikely to be a suitable option that will be adopted in the short/medium term in areas of social/affordable housing with :

- limited parking space
- limited ownership of vehicles
- limited ownership of individually owned energy storage systems and distributed generation (photovoltaic panels) due to costs and space constraints.

energywise explored how fuel poor households can benefit from domestic DSR through energy shifting advice, time of use tariffs and behavioural/consumption change. While it looked at energy saving devices and smart meters, it didn't involve any low carbon technologies such as solar PV and battery storage. Urban Energy Club instead is proposing a method that allows customers to access communal assets and opt-in into certain preferred arrangement with no need for an active day to day change in behaviour. This is expected to make it easier for consumers to participate and responds to flexibility requirements.

Ultimately, building on all the learning generated by previous and existing projects, this project will explore how a new market arrangement for flexibility the virtual allocation model can remove the barriers associated with individual ownership of flexible asset and unlock the flexibility potential of specific customer groups that might be otherwise excluded from the flexibility market offerings.

**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**

While other projects have already tested flexibility from co-located solar PV and energy storage (as illustrated in section 2d), Urban Energy Club focuses on a new commercial model that will enable virtual allocation of shared asset and opt-in preferences for customers. By doing so, it explores social innovation that will help unlock the flexibility potential of specific customer groups that might be otherwise excluded from the flexibility market offerings, such as those living in block of flats that have limited opportunities to install individually owned solar PV and batteries.

**Relevant Foreground IPR**

This Section is not to be completed until we receive IPR guidelines from Ofgem

**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**

The customer engagement necessary for the project success creates a high risk for an investment as a business as usual activity. This project will be sourcing flexibility services from customers in a framework never tested before.

**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 can only be undertaken as an innovation pilot given the commercial risks of an uncertain and unproven method. The purpose of this project is to test the new arrangement and the range of potential benefits derived from it.

The speculative nature of this project creates uncertainty around the commercial return and business case and adoption by the stakeholders following the project.

The project will shed more light in understanding value proposition for this specific customer segment and has a high level of commercial risk associated with the novelty of the arrangement. The details on the benefits are captured in section 2b of this document.

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

☒ Yes