NIA Project Registration and PEA Document

Date of Submission

Jan 2021

Project Reference Number

WPD_NIA_057

Project Registration

Project Title

Energy Planning Integrated with Councils

Project Reference Number

WPD_NIA_057

Project Licensee(s)

National Grid Electricity Distribution

Project Start

February 2021

Project Duration

1 year and 11 months

Nominated Project Contact(s)

Jennifer Woodruff

Project Budget

£540,455.00

Summary

This project involves developing a new process to share information with councils to develop energy plans in a consistent format. The energy plans are then used to modify the planning assumptions used by the electricity and gas utilities that are captured in the distribution future energy scenarios, and the impact of changed future gas and electricity profiles is then analysed for electricity and gas networks . For electricity Low Voltage networks this will be achieved using the Network Investment Forecast Tool and for High Voltage electricity networks a new tool designed by the project to automate analysis using Sincal. Proposed investments to resolve future identified network issues are then combined with proposed investments from the Local Authority in another new tool to identify synergies and create an Integrated Investment Plan.

The project will involve collaborative work between Regen, WECA, WPD and WWU to develop energy and integrated plans with EA Technology and PSC providing the analysis and tools for LV and HV networks respectively.

Problem Being Solved

As part of the process to create Distribution Future Energy Scenarios (DFES) gas and electricity utilities reflect local and regional factors as well as information from local authority development and decarbonisation plans. Local authorities are consulted and give input to the DFES process however the DFES, since it is based on national scenarios, does not wholly adopt or incorporate local authorities' longer term strategic plans. This could lead to different expectations of future energy requirements between the local authority and the utilities. There is also a potential missed opportunity to align plans across energy networks and to take a more holistic and strategic view of future investment options, which could lead to better investment outcomes both for the networks and for regional stakeholders. To close this gap a new process needs to be developed which will align planning assumptions but also provide stakeholder input into the way solutions to network constraints are selected. These solutions may involve non-network options such as flexibility services. Given the large number of different local authorities that the network operators liaise with, the new process needs to standardized but still be able to work with differing levels of available data.

Method(s)

The project will develop a process to support the creation of an integrated local energy plan in a format that can be incorporated back into a DFES analysis.

The local energy plans will then be used to modify the WPD Best View and WWU regional gas scenarios, which will then be used to determine the changes in profiles for electricity and gas usage. Power flow and gas flow analysis will determine the expected network issues resulting from those load and generation profiles and investments to overcome them will be proposed. For WPD the project will define and develop a new tool to enable the automated analysis of the HV network and use the existing Network Investment Forecast Tool (NIFT) to assess the impact on LV networks. For WWU the project will identify and develop potential enhancements to the process of incorporating local authority information in their investment plan. Similarly WWU will be enhancing the data that they use for analysis to reflect developments in the use of hydrogen and bio-methane.

The planned investments on the electricity network will be combined with those from the gas utility and the local authority in a new tool to help determine the combined benefits of one set of potential investments against another set, the effect of changing the timing of investments etc. This tool is expected to assess the long term cost to the consumer using a Net Present Value (NPV) financial model and be able to assess the trade-off between the risk of regret cost versus the opportunity to support regional strategic development goals, such as decarbonisation, supporting local jobs etc.

As well as considering cross network and non-network solutions the project will assess three different types of investment strategy:

1. **"Just in time investment"** – which is broadly the baseline approach of making individual network investments only as and when network demand becomes apparent and connections applications are made. This approach minimises risk and regret cost, but foregoes the opportunity to harness economies of scale and economies for combining investments. It may also prove to be more expensive over the longer term potentially requiring multiple network upgrades.
2. **"One Touch or Fit for the future"** investment under which investment is made as demand becomes apparent and connections are triggered but network assets are then future proofed by building in additional capacity to meet the anticipated growth in demand.
3. **"Strategic investment"** which entails taking a more holistic approach to look at the totality of energy requirements across multiple sites and customers and developing a proposal to make anticipatory investment to unlock net zero and regional economic growth opportunities. This implies taking more risk but also seizing the opportunity to combine investments, harness economies of scale and collaboration.

The process and supporting tool set will be trialled with between three selected trial areas within the West of England Combined Authority (WECA) area.

Scope

The project will build on the existing process to build a DFES and analyse its impact which is currently used to create WPD's shaping sub-transmission reports which consider the 132kV and EHV networks. It will determine how to create a local energy plan and the impact this will have at LV and HV. The analysis of the networks and the generation of solutions and investment options will consider at least one primary substation in each of the selected trial areas.

The work will be delivered in the following work packages.

WP1 – Trial energy planning area selection
Working with WECA and local authorities the project will select three suitable strategic development areas to reflect the variations between local authorities within the WECA region, a mix of urban and rural geographies, a range of energy requirements including new developments, energy efficiency, energy generation, green gas, transport and opportunities for flexibility and energy storage. During this work package the project will also define the scope and boundaries of the strategic areas and identify key energy opportunities/challenges to be considered.

WP2 – Development of a local energy plan for each area. Including process design, trial design & support tool specification.
During this work package the project will examine the existing planning processes for the local authority, electricity and gas networks. This will involve bringing together DFES data and planning data and energy requirements from local authority and WECA decarbonisation action plans, net zero analysis and existing transport, new development, energy efficiency and heat strategies.

Using inputs from WECA and LA's the project will develop the process to create a Local Energy Plan in a format that can then be compared with, and incorporated into, network DFES forecasts. The process definition will including the data exchanges, timings, roles, methods of engagement, data gathering, forecasting assumptions etc. The Ofgem published Local Area Energy Plan methodology developed by CSE and the Energy System Catapult will be used as a basis.

This process will then be carried for the three trial areas, working with WECA and Local Authority teams, to create Local Energy Plans.

Alongside the development of a Local Energy Plan this element of the project will identify and define the requirements for new and enhanced support tools required for both local energy data exchange, network planning and investment appraisal. The way in which the different investment strategies will be modelled will be decided as will the range of sensitivity analysis required. These decisions will feed into the specifications for the various support tools including :

- New HV analysis tools – see WP4E
- Use of the NIFT toolset for the LV network
- Development of a Plan development support tool – See WP3
- Enhancements to existing gas network analysis tools – see WP4G

WP3 – Plan development support tool – detailed design, development, testing & documentation
This will develop a tool to compare planned investments from the local authority, electricity and gas networks to create an Integrated Investment Plan. The tool will support selecting between options using criteria that reflect the value more holistically, different investment strategies and will identify potential synergies that could be exploited by amending the planned investments. The project will first assess the potential to develop the Cost Benefit Analysis tool developed as part of the Open Networks project to provide the required functionality to avoid duplication of effort if possible.

WP4E – Electricity HV analysis tool detailed design, development & delivery
This work package will automate the process for analysing HV networks and will include the process by which the local energy plans are used to reflect the changes to future load / generation profiles.

WP4G – Gas network analysis tool development
This work package will develop new data assumptions to assist with modelling future gas supplies, storage and demands in general to assist with the creation of the local energy plan. The data areas in scope are:

- the optimum pressure/velocity values for 100% and blended hydrogen
- the capacity impacts of moving to hydrogen due to its lower calorific value
- other capacity impacts of moving to hydrogen due to e.g. different compressibility factors
- bio-methane and within grid compression

The outputs of this work package will be used as a set of analysis assumptions.

WP5G – Gas network Analysis for trial areas
This will use the support tool developed in WP4G to assist with the analysis of the impact of the Local Energy Plans on the gas network. Network investment options will be developed.

WP5E – Electricity network analysis for trial areas
This will use the tool developed in WP4E together with the NIFT to analyse electricity networks associated with at least one primary substation within each trial area and provision of investment options.

WP5 – Network analysis for trial areas
This covers the network analysis for the electricity and gas network in the three trial areas. On the electricity side HV and LV network analysis will be conducted for at least one selected primary substations within each of the trial areas. The analysis will identify the network issues that are encountered in different timeframes and the investments required to ensure the network complies with standards. This will include non-network solutions where possible.

WP6 - Integrated plan development with stakeholders
The Plan development support tool that was created in WP3 will then be used with the data from the network analysis trial areas to create an Integrated Investment Plans for each area.

WP7 - Evaluation & Learning report
The various elements of the project will be evaluated, such as the degree of added value from the Integrated Investment Plan compared to the original separate plans, the sensitivity of the analysis to particular factors, whether the results suggest any shortcuts that could be made in future iterations etc.

WP8 – Dissemination & Closedown
The results of the project will be shared via webinars and reports.

Running alongside the EPIC project, and taking input from the EPIC work package 2, Regen have been commissioned by WECA to complete an Infrastructure Requirements Plan for the South West Bristol strategic area. This high level infrastructure plan will feed into the Infrastructure Master Planning that WECA is currently undertaking for the SW Bristol area. Owing to the timing of the Infrastructure Master Plan (which will be completed by May 2021) this parallel workstream will provide a relatively high level view of the infrastructure requirements of the strategic area which will not involve detailed network planning. Input and benchmark guidance from WPD and WWU network planning teams will however be provided.

This work package is not part of the EPIC NIA budget and will be funded by separate arrangement between WECA and Regen. The EPIC project partners are however happy to support the work to ensure that the EPIC outputs from work package 2 can feed into the SW Bristol study.

Objective(s)

The objective of the project are to;

- Develop a standardized process that can be used with different local authorities to create a local energy plan.
- To create energy plans for the three trial areas
- To determine how to reflect the local energy plans in the DFES used for network planning purposes
- To disaggregate the DFES data to support LV and HV planning
- To develop a tool to support automated analysis of HV networks and suggest network remedies
- To analyse the HV and LV networks associated with at least one primary substation in the trial areas and provide a view of the network and non-network solutions under different investment strategies
- To develop a tool to allow the investment plans for electricity networks, gas networks and the local authorities to be compared to identify potential synergies
- To use the tool to create an Integrated Investment Plan in the trial areas.
- To refine the processes to reflect the learning gained during the project.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The project will be judged successful if the following criteria are met.

- The process to create investment plans jointly between electricity and gas utilities and the local authority will have been developed.
- The process will include flexibility and other non-network solutions as options to alleviate network constraints.
- The process will have been applied to develop joint plans for at least three trial areas.
- The process will have been refined to reflect learning from the real-world use.
- The process will have been assessed in relation to the LAEP method document and/or subsequent guidance from Ofgem regarding Local Authority Energy Planning
- A plan development support tool will have been developed to assist with the appraisal of investment options and to provide the evaluations necessary to improve plans e.g. by changing investment combinations, scale, timing etc.
- An HV network analysis automation tool will have been developed so that real network issues can be identified for the energy scenarios and variants.
- The support tools will have been refined to reflect learning from the real-world use.
- The impact of different investment strategies i)"just in time" at point of need investment, ii) "One touch" future proof investment and iii) anticipatory or strategic investment will have been assessed.
- The benefits from the jointly created plans compared to the individually created plans will have been assessed.
- The learning from the project will have been collated into a report and disseminated.

Project Partners and External Funding

The project partners for this project are

1. Regen - to support the development of new processes with local authority and to develop the tool to support the creation of the Integrated Investment plan

2. Wales & West Utilities (WWU) to support process development and providing network investment options for the gas network
3. West of England Combined Authority (WECA)) – to assist with process development, trial area selection etc.
4. PSC to develop the HV network analysis automation tool
5. EA Technology to adapt the NIFT and use it to assess WPD's LV networks
6. The local authorities for the trial areas (yet to be selected)

Potential for New Learning

This project will develop a new process for creating a local energy plan as well as new tools for HV analysis and to support the development of an Integrated Investment plan.

The processes to disaggregate the DFES are also new.

Scale of Project

The project will focus on three trial areas in the WECA area which allows an understanding of the variations between local authorities without introducing unnecessary duplication.

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

South West of England – a selection of areas that are part of the West of England Combined Authority

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

The project budget is £540,455 with costs split approx. £467,022 to WPD and £79,733 to WWU.

Taking contributions of £54,046 (WPD £46,072 + WWU £7,973) into account reduced the required funding to £486,410 (WPD £414,650 + WWU £71,760).

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)

Improved planning is estimated to provide a saving of £925k for all WPD areas over the rest of ED1 assuming that load related expenditure is reduced by half of one percent. However the project benefits are likely to be wider when considered against the background of decarbonizing heat.

Please provide a calculation of the expected benefits the Solution

The improved project plans are expected to reduce load related reinforcement. WPD's load related reinforcement expenditure for ED2 is approximately £600m1. Of this the budget for General Reinforcement and LCT related reinforcement for 2021/22 and 2022/23 is approx. £160m in 2012/13 prices which is the equivalent of £185m in 2020 prices. Therefore assuming that improved planning reduces costs by only one half of one percent this equates to £925k saving for the remainder of ED1.

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

The method is designed to be replicable as local authorities are very different to each other. The process and tools developed could be adopted by any gas or electricity distribution network company.

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

The cost of rolling out the engagement process will depend on the number of local authorities each DNO needs to work with and the time required to carry out the process which is not yet known. Additional staff costs would be expected to be in the region of £63k per annum per distribution area per utility.

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 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

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 process and support tools developed as part of this project are intended to be standardized so that they appropriate for use with any local authority. Similarly the process and support tools can be used by any electricity or gas DNO.

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

This project contributes to the priority area of our innovation strategy of Net zero and Decarbonisation as creating local energy plans and Integrated Investment plans will show the path to net zero. By improving local stakeholder engagement and producing a more localized view of LCT uptake and investments this will also benefit local community groups to understand what is planned in their area. Improving the information and support we provide to community energy groups is another priority area within the innovation strategy.

☑ 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.

While this builds on the work undertaken under the Net Zero South Wales project, it is developing a new process and supporting toolset for creating a stakeholder led energy plan and therefore does not duplicate previous work. The project includes an assessment of the suitability of the CBA tool produced by the Open Networks project to eliminate potential duplication of effort.

We are aware of the work that Scottish and Southern Electricity Networks are carrying out within their RESOP project (SSEN_NIA_0043), however the projects differ in a number of key areas such as the voltages of the networks included in the assessment and the level of detail at which investment options will be specified. Similarly there are differences in the scope for drivers of energy change reflecting differences in policy between Scotland and England. While the RESOP project includes an element of 11kV network assessment this is not automated and therefore the requirement for the tool within EPIC remains. RESOP will develop an evaluation framework that is likely to have some similar functions to the Business Plan Support Tool being developed within EPIC. As that framework is planned to be developed later in the RESOP project and the requirements of the EPIC tool are only known at a very high level it is planned to have regular update meetings to ensure learning transfer during the project.

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 developing a new process to contribute towards increased requirements for stakeholder engagement to be a core part of the planning process. This is a relatively new shift in emphasis.

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 is a significant change requiring new software and ultimately new personnel to support it and is therefore not business as usual.

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

As yet the quality of the information held by local authorities is not known nor is the degree of divergence between their processes and requirements. There is a risk that a standardized process may not be cost effective to develop or operate.

This project has been approved by a senior member of staff

☑ Yes