Energy Networks Innovation Process

Annual Project Progress Report Document

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Project Title (*This cannot be changed once registered*) Whole System Growth Scenario Modelling Phase 2	Project Reference NIA_SSEN_0043
Funding Licensee(s) Scottish Hydro Electric Power Distribution	Project Start Date January 2020
Project Duration 3 years and 6 months	Year 2022
Nominated Project Contact(s) Tim Sammon	

1. Scope

The scope of the project is to carry out whole system planning and modelling to a more granular level (11kV distribution network) to understand the impact of low carbon technologies and local authorities' strategies. The project will inform whole system methodology and will capture benefits for GB as a whole, from both a network planning and local stakeholders' perspective.

2. Objective(s)

1. Enhance a model tool to incorporate new governmental targets for economic and sustainable action plans and provide greater granularity by incorporating the 11kV network.

2. Understand the possible patterns of change associated with the Scottish Government 2045 climate change targets (Note: the UK target is 2050) in the distribution networks served by a single Grid Supply Point in an area of accelerated EV growth. Develop optimum solutions to meet whole system needs.

3. Validate and calibrate inputs for whole system planning with existing or planned requirements/expectations for the Local Authorities to avoid unnecessary extra work in producing local energy plans/strategies.

4. Develop a methodology and framework that allows the two-way transfer of knowledge and understanding between network operators and those that make investment decisions in the areas served by the network, to facilitate efficient whole system planning.

3. Success Criteria

If the project delivers the anticipated learning to GB stakeholders, then it is deemed successful.

4. Performance compared to the original project aims, objectives and success criteria

Details of how the Project is investigating/solving the issue described in the NIA Project Registration Pro-forma. Details of how the Project is performing/performed relative to its aims, objectives and success criteria.

Project background

This project is associated with the next level of detailed investigation following on from NIA_SSEN_0030 Whole-System Growth Scenario Modelling which developed an initial model tool which demonstrated network impacts and informed possible investment decisions over a two-decade time period.

This project is known publicly as the Regional Energy System Optimisation Planning (RESOP).

Project Progress

Between April 2021 and the end of March 2023 the below changes and progress has been made against the objectives.

Significant changes have taken place between April 2021 and March 2022. Baringa are no longer going to implement Energy Systems Catapult's (ESC) Energy Path Networks (EPN) tool within the SSEN IT environment as previously planned. We are now going to partner with Arup who will utilise their own cost optimisation tool on their own premises. Arup will also take the lead on stakeholder engagement to create a Local Area Energy Plan (LAEP) and a Local Heat and Energy Efficiency Strategy (LHEES) for Dundee City Council. We plan on using Advanced Infrastructure's (AI) LAEP+ tool, which is a web Geographical Information System (GIS) tool that visually displays a variety of data sets, to enable collaboration between Dundee, SSEN and SGN. Additionally, we will be utilising Derryherk's Navi tool that was developed by Scottish Power Energy Networks (SPEN) under NIA allowance. This tool will provide power flow capabilities to the LAEP+ tool and enable our planners to assess energy projects proposed by the Council. Finally, we plan to bring Oxford City Council into the project to provide additional testing for the LAEP+ tool.

Objectives

1. Enhance a model tool to incorporate new governmental targets for economic and sustainable action plans and provide greater granularity by incorporating the 11kV network.
This objective will be met by using the LAEP+ and Navi tools described above. We will be modelling more granular data sets than the objective set i.e. we will be modelling the LV network and 33kV network rather than focussing on the 11kV network alone. The LAEP+ tool will display Regen Distributed Future Energy Scenarios (DFES) for different options to decarbonise between now and 2045 for Dundee City Council. It will also display LAEP/LHEES cost optimised solutions to decarbonise between now and 2045.

2. Understand the possible patterns of change associated with the Scottish Government 2045 climate change targets (Note: the UK target is 2050) in the distribution networks served by a single Grid Supply Point in an area of accelerated EV growth. Develop optimum solutions to meet whole system needs.
Arup will create a LAEP and an LHEES to show a cost optimised solution between now and 2045. However, SSEN, SGN and Dundee City Council will also collaborate together on the LAEP+ tool to offer alternative options if the cost optimised solution is not suitable.

3. Validate and calibrate inputs for whole system planning with existing or planned requirements/expectations for the Local Authorities to avoid unnecessary extra work in producing local energy plans/strategies.
The Navi tool will be used to export network data to the LAEP+ tool for visualisation and also import new project data from LAEP+ e.g. new rapid charging locations, heat pump locations, etc. SSEN planners will be able to use the Navi tool to suggest alternative investment options e.g. less constrained areas. The Navi tool will also connect to LAEP+ via an Application Programming Interface (API) to provide up to date constraint information for Local Council Planners to make use of. This will reduce the amount of work SSEN planners will need to do.

4. Develop a methodology and framework that allows the two-way transfer of knowledge and understanding between network operators and those that make investment decisions in the areas served by the network, to facilitate efficient whole system planning.
The RESOP project will work to establish this methodology as the project progresses.

5. Required modifications to the planned approach during the course of the project

The Network Licensee should state any changes to its planned methodology and describe why the planned approach proved to be inappropriate. Please confirm if no changes are required.

Due to delays with Covid and resource issues with RIIO-ED2 work, a significant amount of time has passed since the project was first registered in January 2020. As a result the project has been extended from 18 months to 3 years and 6 months. Throughout this time period there has been significant thinking around how DNOs will collaborate with local councils through the ENA Whole Systems Working Group. There has also been significant development in the types of tools that are now available for collaborative use. As a result, we are now in a much better position to offer local councils valuable energy services with fewer resources than previously anticipated as much of the manual work can now be automated through the new methodology we are taking.

We have moved away from installing the EPN tool in our IT infrastructure due to:

- High costs of implementation
- Additional costs to implement on SSEN infrastructure
- Unease around recommending investments to local councils that consider both electricity and gas, as SSEN planners only have expertise in electrical investments.
- Other companies having the expertise in using cost optimisation tools to deliver LAEP and LHEES.

We still see value in making use of a cost optimisation tool for going through the LAEP/LHEES stakeholder engagement process. This will be done on the Arup premises for a much lower cost vs installing a cost optimisation tool at SSEN premises. We will explore ways to streamline / automate the LAEP/LHEES process with the LAEP+ tool as part of this project. We also plan to display the LAEP/LHEES plans developed by Arup on the LAEP+ tool as a layer for Dundee City Council to visualise interactively. Previous LAEP/LHEES outputs were provided through pdf images.

We have contracted Advanced Infrastructure to provide the LAEP+ tool for both Dundee and Oxford City Council to start trialling. This is a web GIS tool that allows Local Council Planners to place new energy projects. The tool shows where network constraints are present and therefore gives Local Council Planners an indication where energy projects may result in higher costs i.e. if area is highlighted green there is no constraint, if highlighted red then there is a constraint, or a constraint will be caused by the new connection and likely cause higher connection costs. The LAEP+ tool will also show SGN, the gas network operator in Dundee, data to provide Local Council Planners additional data layers when making investment decisions. Local Council projects can then be viewed by all parties to work collaboratively in suggesting new locations or investment options.

We have contracted Derryherk who will be providing the Navi tool. Navi will provide network data to the LAEP+ tool as well as electrical property data so that constraints can be viewed in real time in red/amber/green visualisations. Navi provides additional power flow analysis, which allows SSEN planners to analyse different investment options and return those options to LAEP+ for further consideration by Local Council Planners.

6. Lessons learnt for future projects

Recommendations on how the learning from the Project could be exploited further. This may include recommendations on what form of trialling will be required to move the Method to the next TRL. The Network Licensee should also state if the Project discovered significant problems with the trialled Methods. The Network Licensee should comment on the likelihood that the Method will be deployed on a large scale in future. The Network Licensee should discuss the effectiveness of any Research, Development or Demonstration undertaken.

Capacity and Resource – Local authorities have limited resource to support whole system planning information or strategies for specific years or utilities. Any process established by the DNOs must be mindful of this and consider options to minimise 'extra work' by looking at data already being produced or in the public domain to support plans.

Data availability - Data varies in quality, availability and consistency across local authorities. Dundee City Council is progressive and has more data than most other local authorities on EVs, but the methodology produced by this project must be consistent and replicable across all regions. This means some assumptions like the adoption of EV's between 2025 and 2030 will need to be clearly defined, to ensure the methodology produced can be applied to all areas.

7. The outcomes of the project

When available, comprehensive details of the Project's outcomes are to be reported. Where quantitative data is available to describe these outcomes it should be included in the report. Wherever possible, the performance improvement attributable to the Project should be described. If the TRL of the Method has changed as a result of *the Project this should be reported. The Network Licensee should highlight any opportunities for future Projects to develop learning further.*

No outcomes are available yet.

8. Data Access & Quality Details

A description of how any network or consumption data (anonymised where necessary) gathered in the course of the Project can be requested by interested parties. This requirement may be met by including a link to the publicly available data sharing policy.

For information on how to request data gathered in the course of this project see Network Innovation Competition (NIC) and Network Innovation Allowance (NIA) Data Sharing Procedure at https://ssen-innovation.co.uk/innovation-strategy/

9. Foreground IPR

A description of any foreground IPR that have been developed by the project and how this will be owned.

This will be shared when available.