

NIA Project Annual Progress Report Document

Date of Submission

Jul 2022

Project Reference Number

NIA_NGGT0184

Project Progress

Project Title

Gas and electricity transmission infrastructure outlook

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NIA_NGGT0184

Funding Licensee(s)

National Grid - Gas Transmission (GB wide)

Project Start Date

February 2022

Project Duration

0 years and 11 months

Nominated Project Contact(s)

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Scope

The project will be split into 5 Phases

1) Phase 1: Kick-off and align on assumptions, data sources and requirements (Duration – 1 month)

- Create an efficient launch of project: Agree on project scope, data, modelling approach
- Determine key data sets and their quality
- Determine the activities and methods by which to achieve the outcomes of the future project phases

· Tasks 1.1. Agree on functional requirements

Prepare, conduct a project kick-off with Guidehouse and the NG parties. Formalise project set up: Project scope, planning & schedule.

✓ Agree table of contents and storyline for the purpose of Ph.5

✓ Agree scenarios, sensitivities and modelling approach. All stakeholders agree to freeze the scenarios to ensure alignment on next steps.

✓ Envisaged stakeholder selection for the purpose of Ph.4

✓ Timing and organisation of progress meetings

✓ Schedule key meetings with project team (no surprises, and clarity on delivery)

· Task 1.2. Review and engage with other relevant work

To ensure relevance of our work and to maximize the project value we review and benchmark past and ongoing work done on the whole system approach and integrated modelling of electricity and gas infrastructure. For relevant ongoing work we assess if collaboration is possible to create synergies.

- Task 1.3. Identify and collect relevant data

Hold data gathering exercises with key ET, GT, ESO and GSO teams to acquire and agree upon the most relevant data sets. Define and gather relevant input data: investment costs, fuel price projections, emission factors, national H2 plans and climate targets

- Task 1.4. Log and agree on assumptions and setup data management

2) Phase 2: Develop insights into future integrated energy network (Duration – 4 months)

- Provide an evidence-based vision on how a pathway towards a “Net Zero Energy Transmission Network” could look like

- Develop insights into the future interaction between gas and electricity transmission, storage and conversion infrastructure to meet future demand in the various sectors

- Highlight the benefits of the whole system approach to maximize consumer benefits, i.e. of an integrated planning and operation of gas and electricity infrastructure

- Task 2.1. Develop NUTS1 datasets for selected scenarios and setup LCP model:

Review the datasets acquired in Ph.1 and develop NUTS1 dataset for each selected scenario. Setup the LCP model. Enhance and build upon the existing NG data, from Guidehouse and external sources.

- Task 2.2. Review developed datasets and LCP model setup with NG teams:

Engage with GSO/ESO, GT/ET future and regulation teams to get feedback on the developed datasets and proposed LCP model configuration. Update datasets and LCP model configuration based on feedback. Hold initial stakeholder engagement activity to align on models assumptions/inputs

- Task 2.3. Modelling pathways towards a “Net Zero Energy Network”:

Apply the LCP model for integrated capacity expansion and dispatch optimisation for gas and electricity transmission, storage and conversion infrastructure to match future energy supply and demand for each considered scenario. Major model outputs: installed transmission capacity btw. model regions regions, installed storage and conversion capacity in each model region; insights into operation of the future integrated energy network.

- Task 2.4 Perform sensitivity analyses:

Vary costs of infrastructure types and assess the option of offshore P2G to gain further insights into the configuration of the future integrated energy network.

- Task 2.5. Analyse results and develop vision for the “Net Zero Energy Network”, phase 2 report: Formulate an evidence-based vision on how an integrated UK energy network could develop until 2050 based on the quantitative outcomes of the previous tasks. The delivered Ph. 2 report specifies the major characteristics of the future integrated energy network, highlights the interaction between infrastructure and the resulting benefits but also clearly detail any limitations of the study and propose areas for further work. Validation of model and results by Imperial College.

3) Phase 3: External Engagement (Duration – 2 months)

- Conduct bilateral meetings: across phase 2 - to avoid any surprises during the stakeholder engagement event - Guidehouse to conduct bilateral meetings with key stakeholders to align and achieve buy-in through the following process:

1. Prioritise National Grid's 84 stakeholders from Project Union ahead of workshop(s)
2. Together with National Grid characterize into 'allies, enemies and swing voters' who have a whole system mindset
3. Identify critical stakeholders, evaluate their value drivers and pain points and identify strategies to 'swing' them towards an overarching consensus

- Facilitate stakeholder engagement event

1. Present findings from Phase 2
2. Facilitate workshop with key stakeholders and incorporate their feedback into the final report
3. Leverage appropriate tools and techniques to ensure stakeholder alignment during Phase 3 such as carousel and 'way forward'

- Collate stakeholder insights and determine action plan following completion of workshop(s) including any gaps in stakeholder engagement to inform future work

- Product Phase 3 report: Inclusive of stakeholder insights, gaps in feedback, and key areas to consider development of the future state network base on stakeholder input.

4) Phase 4: Data and Engagement Insight Review and Gap Analysis (Duration – 2 months)

- Review stakeholder insights and feedback and understand impact on proposed network structure
- Update proposed transmission network and model (if needed) following review of stakeholder feedback. Undertake gap analysis to identify knowledge gaps that would still need to be addressed
- Product report having consolidated findings, clearly providing recommendations for further analysis from 1) future policy shaping angle and 2) innovation project pipeline for use cases across the following sectors:
 - Power
 - Heat
 - Transport
 - Industry

5) Phase 5: Standards & Reporting (Duration – 1 month)

- Complete final technical report write-up
- Provide a final summary report
- Populate an ENA closure report document (if required)

Help National Grid identify if any standards need to be updated based on results presented in the report.

Objectives

The key objectives for this activity are as follows:

- To provide an internal and external vision of the future net zero energy transmission system that will deliver net zero energy to industry, transport, heat and power
- To consider the main interactions between the future decarbonised electricity and gas transmission systems
- To determine what are the main areas of system interaction that need further consideration and potential policy and market / regulatory framework development

To better inform gas and electricity modelling for future scenarios, providing information such as likely production locations and end users, including an understanding of the balancing requirement and how this could best be managed with separately regulated businesses to enable and ensure the UK energy systems reliability and robustness

Success Criteria

The following key criteria need to be met for the project to be considered successful:

- Study objectives met to time and cost
- Clear understanding of the data sets utilised and why
- Stakeholder engagement and alignment
- Robust narrative that provides guidance for future interactions

Performance Compared to the Original Project Aims, Objectives and Success Criteria

The project kicked off in late January and has successfully completed Phase 1 activities to align assumptions, data sources and requirements. This has enabled progression to Phases 2 & 3, which are run concurrently. At the time of writing, this project is still early in its delivery and remains on course to achieve the project success criteria. The completion of Phase 1 means the success criteria of having a clear understand of the data sets utilised has been achieved, this has been captured in the end of Phase 1 report.

Required Modifications to the Planned Approach During the Course of the Project

No changes have been required to the planned approach.

Lessons Learnt for Future Projects

The project is in early delivery and lessons for future projects are yet to be identified.

Note: The following sections are only required for those projects which have been completed since 1st April 2013, or since the previous Project Progress information was reported.

The Outcomes of the Project

The project is in early delivery and project outcomes have not been produced.

The project has conducted a review of similar energy infrastructure projects from across the global; this includes, The Netherlands, Sweden, France and Ireland. The data inputs for the future modelling have been sourced and agreed between the prime stakeholders, ready for modelling activity in early Q1 FY23.

Data Access

Data for this project, and all other projects funded under the Network Innovation Allowance (NIA) funding scheme, can be found or requested in a number of ways:

- A request for information (RFI) via the Smarter Networks Portal at <https://smarter.energynetworks.org>. National Grid Gas Transmission regularly publishes much of the data arising from our innovation projects on the ENA portal, before submitting a RFI check this website.
- Via our managed mailbox box.GT.Innovation@nationalgrid.com. Further data can be shared upon request through the innovation mailbox. Each request will be assessed by the GT Innovation Team for its merits and viability.

Foreground IPR

The results of the project will create knowledge in the transmission approach to whole systems that can be utilised as appropriate by UK networks to determine future strategies and approaches. It may also benefit interconnecting networks and systems.

To date, no foreground IPR has been developed by the project.