NIA Project Annual Progress Report Document

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Network Licensees must publish the required Project Progress information on the Smarter Networks Portal by 31st July 2014 and each year thereafter. The Network Licensee(s) must publish Project Progress information for each NIA Project that has developed new learning in the preceding relevant year.

Date of Submission

Jul 2024

Project Reference Number

NIA2_NGESO065

Project Progress

Project Title

Virtual Energy System: Common Socio-technical Framework Development

Project Reference Number

NIA2_NGESO065

Project Start Date

November 2023

Project Duration

0 years and 8 months

Nominated Project Contact(s)

Jonathan Barcroft

Scope

This project will build on the high-level design, governance model and key factors delivered in previous project phases (NIA2_NGESO0014 and NIA2_NGESO0028). There remains no existing socio-technical framework for data sharing in energy, delivery of this would accelerate the journey to net zero. This project and its predecessors have progressed the development of this framework including defining its scope through the key factors and assessing potential solutions.

This project will form the design for an MVP through a technical assessment of the integration and capabilities of the National Digital Twin Programme and Trust Framework.

This project will produce a breakdown of the expected development requirements and assess their technical maturity. It will identify where solutions from other sectors or innovation would be required to support the data sharing infrastructure for a net zero energy system. This will allow future consideration of cost and time to implement an MVP.

Practical development of this MVP would follow completion of this project with the delivery model and funding approach to be confirmed.

A critical element of this design is to ensure it meets security requirements. A deliverable of this project is to perform a security architecture assessment. This will identify the constraints and precautions that need to be applied as well as identifying where there are opportunities for innovative solutions.

Objectives

- Defined functional requirements of the proposed architecture for an MVP
- Clear definition of interfaces with National Digital Twin Programme and assessment of Trust Framework requirements.
- Evaluating the security requirements and identifying potential mitigations in the proposed architecture.

Success Criteria

- Functional requirements of the proposed architecture will be clearly articulated.
- Clear definition of interfaces with National Digital Twin Programme and assessment of Trust Framework requirements.
- Security requirements will be defined, and architecture reviewed.
- Reporting on the potential Operating Model, enduring funding and business case.
- At this stage all outputs would be designs based on desktop analysis, to progress to Proof of Concept additional network partners are required as well as formal data sharing agreements.

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

National Grid Electricity System Operator ("NGESO") has endeavoured to prepare the published report ("Report") in respect of Virtual Energy System: Common Socio-technical Framework Development, NIA2_NGESO065 ("Project") in a manner which is, as far as possible, objective, using information collected and compiled by NG and its Project partners ("Publishers"). Any intellectual property rights developed in the course of the Project and used in the Report shall be owned by the Publishers (as agreed between NG and the Project partners).

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Project Aims

This project has explored the functional and non-functional requirements to deliver the data sharing infrastructure.

Work packages and delivery milestones

The project consisted of a series of work packages and to assist the mapping to previous phases, these were numbered in a sequence starting from the conclusion and outputs of the NIA2_NGESO028 project for Virtual Energy System Common Framework. These packages included:

- WP2.5 – Network model merging and partner requirements – considering how data that has been shared by neighbouring networks can be merged to reflect the connection at the boundary of models as well as how scenario information can be overlayed and linked back to network models.
- WP5.1 – Functional specification – defining design principles and considering the components that need to be developed to achieve the requirements of the data sharing infrastructure based on the High-Level Design developed in NIA2_NGESO028.
- WP5.2 – Technical alignment review with National Digital Twin Programme and Open Energy reviewing how existing learning can be leveraged to achieve the data sharing infrastructure.
- WP6.1 – Managing Security – Reviewing the security legislation, regulation and best practice that must be considered in the design, development, and operation of the Virtual Energy System.
- WP6.2 – Operating Environment – Considering the future operating environment identifying the required roles, capabilities, and options to ensure the Virtual Energy System is developed in an economic and efficient way.

Success criteria

The project has delivered the functional specification for the proposed architecture of the data sharing infrastructure, this defines the architectural principles, considering among others security and data requirements.
Through workshops with the National Digital Twin Programme an assessment of technical alignment was completed. This has confirmed the interfaces and identified opportunities for future collaboration to maximise interoperability and benefits for consumers and industry.
A review of the requirements for managing security was completed including an assessment of applicable standards, regulations, and legislation.
The project delivered a review of the potential options for the enduring operation of the Data Sharing Infrastructure of VirtualES considering the roles required and the potential mechanisms for the economic sustainability of these.

The project has been considering the use case of operational outage planning and reviewing the data sharing of topology and scenario information to support this. This use case explores data sharing between three types of organisations (ESO, DNO and TO) and maps to existing well-defined business processes. This selection of use case allows the project to focus on the exploring the data sharing requirements with reduced development challenges from novel optimisation or modelling approaches.
The project has continued to validate requirements and proposals widely across industry, academia, and government. This has included regular discussions with government departments, Ofgem and energy networks.

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

The deliverables of the initial project work packages were delivered on time and to quality.

The project agreed a change request which extended the end date to June 2024 and added a further series of work packages. These work packages are intended to answer the specific requirements for developing a Pilot implementation, considered the first step of developing the MVP. These packages included:

- WP2.6 – Requirements catalogue – consolidates the technical and use case user journeys into a prioritised set of defined requirements including risks and assumptions to be tested in pilot.
- WP2.7 – Pilot hosting environment – having defined the functional specification this package has reviewed the requirements for proving the Data Sharing Infrastructure while ensuring that it can be used by a wide range of organisations.
- WP5.3 – IES vs CIM – The technical alignment with NDTP identified that there were a range of potential ontologies that could be used to achieve the use case, and this required evaluation to ensure the solution could both meet the requirements of pilot use case but also to support the future requirements of the Virtual Energy System.
- WP5.4 – NDTP Roadmap – having confirmed alignment with the NDTP programme this work package further examines the sequence and delivery responsibilities to increase the existing NDTP capability to meet the requirements of Pilot.
- WP5.5 – DPN Security – To address requirements for secure and assured data sharing further evaluation was required of the specific sensitivities that the DSI must be able to accommodate and mitigate, this included evaluating existing standards for security labelling and access control.
- WP6.3 – Security Governance – This addresses specific stakeholder requirements to include a governance and design assurance approach to security with the relevant authorities and technical experts.

Lessons Learnt for Future Projects

The project has delivered the required preparation and design to enable ESO and partners to commence a pilot implementation in future phases. Learning from this project can also support other networks and industry participants with understanding and developing their data sharing requirements.

The pilot will be the beginning of the VirtualES build process; during this phase, the technology will be deployed in a test or virtual lab environment and trialled in pilot mode to enable early testing of the solution, and to gain feedback from users for future development. The same operational planning use case that has been defined and explored during the previous programme phases will be used to drive the development and testing of the pilot.

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

To date the project has delivered all deliverables as planned, these will be reviewed through a triage process and made available where possible, there may be constraints to sharing some of the outputs due to Security and Commercial sensitivities. This will be considered on closure of the project and where possible redacted issues will be shared.

Data Access

Details on how network or consumption data arising in the course of NIA funded projects can be requested by interested parties, and the terms on which such data will be made available by National Grid can be found in our publicly available “Data sharing policy related to NIC/NIA projects” and www.nationalgrideso.com/innovation.

National Grid Electricity System Operator already publishes much of the data arising from our NIC/NIA projects at www.smarternetworks.org. You may wish to check this website before making an application under this policy, in case the data which you are seeking has already been published.

Foreground IPR

The project will primarily develop reports and documentary artefacts that will be published in the course of the project subject to

security and commercial sensitivities.

Expected outputs include detailed user journey, detailed architecture, functional requirements for demonstrator use case, outline security and CNI assessment.

Expected reports include connecting models report, Data Standardisation Mechanism integration report Operational environment report and a report of the Trust Framework integration.