NIA Project Annual Progress Report Document

Notes on Completion: Please refer to the appropriate NIA Governance Document to assist in the completion of this form. The full completed submission should not exceed 6 pages in total.
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 2023

Project Reference Number

NIA2_NGESO031

Project Progress

Project Title

Service Provider Capability Mapping

Project Reference Number

NIA2_NGESO031

Project Start Date

October 2022

Project Duration

1 year and 1 month

Nominated Project Contact(s)

Thomas Pownall

Scope

The scope consists of 5-phases.

Work package 1: Generate a comprehensive list of current, emerging and future service providers across voltages and fuel types and detail their technical service provisions. Such provisions would include reactive/active power, stability services (such as inertia), speed of response and the duration of output that can be sustained, reliability, limitations etc.

Develop our understanding of the hardware required for these assets to 'flex': metering, smart control, grid forming capability etc. What is the cost of such equipment, and who provides the capability (the unit themselves, an aggregator, third party, part of asset investment, etc)?

Benefits: a comprehensive list of providers will ensure all technologies are considered when designing markets, thereby improving liquidity and reducing costs.

Work Package 2: Understand how these providers make their commercial decisions. This will include factors that influence investment and operational / market entry decisions, as well as locationality and environmental considerations. Carry out comprehensive segmentation of providers/investors based on their risk appetite and routes to market, e.g., via an aggregator, a supplier etc.

This work package will also include a deep dive into the role of aggregators and the broader stakeholder landscape including the role of policymakers and local authorities to understand their respective roles in the flexibility value chain.

Benefits: support decision-making for the commercial terms of products, to ensure they maximise participation and reduce system costs.

Work Package 3: Building on the mapping of the overall stakeholder landscape to translate these into the practical and commercial issues experienced along the provider journey. These will be the key steps within the value chain, from asset development through to the provision of services and settlement. This will include registration, auctions/trades, scheduling, dispatch, performance monitoring,

settlement etc, to identify any key 'pain points'.

Building upon this, another output from this task will be to compare and contrast this service provider journey across different markets (CM, WM, DSO etc) in order to provide a holistic understanding of the issues that service providers incur.

Benefits: an understanding of the customer journey will help identify barriers and inefficiencies within ESO markets which, by removing, could improve market efficiency and lower consumer bills.

Work Package 4: Overlay the findings from work packages 1-3 onto the suite of ESO balancing service markets to access their efficacy against providers' capabilities and business models. This is to identify the preferred market design parameters of each service provider. In doing so, understand how the ESO can become an 'enabler' by asking what customers need from the ESO, and by when, to allow them to provide the services that they want to.

Benefits: concrete recommendations for reforms to improve competition and lower consumer bills.

Work Package 5: Pulling together all the work of phases 1-4 to create a summary report.

Benefits: all the analysis in a report format will enable ESO, DSOs and policymakers to enhance their understandings of emerging technologies and improve the ESO, DSO products and wider market design, thereby reducing consumer cost.

Objectives

The key objectives for this project are to:

1. Gain understandings of all service providers, both existing and emerging, their technical capabilities and their commercial models.
2. Identify the pain points for ESO customers, both existing and emerging, across markets to provide a holistic view on the barriers to entry and how these may be avoided through future reforms.
3. Create high-level guidance for the ESO on reforming markets to reduce barriers to entry, increasing competition and liquidity.

Success Criteria

The project will be considered a success if:

- Insights generated feed into reforms of ESO services, via the following workstreams Markets Roadmap, the Distributed Flexibility Strategy and the Stability Market Design Phase II project.
- Positive feedback is obtained from customers on ESO stakeholder engagement and recognition that the ESO is proactively working to enable the participation of their assets.

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 Service Provider Capability Mapping NIA2_NGESO031 ("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 overview:

The service provider landscape is rapidly evolving. Historically dominated by large, transmission-connected thermal generators, we are seeing a proliferation of new low-carbon and decentralized technologies that can offer us new forms of flexibility and operability services. This will continue to change as we reach our net zero target in 2035.

Each of these technologies have different technical characteristics, e.g. provision of active and reactive power, speed and duration of response etc. and importantly the organizations that own, operate or aggregate these technologies have very different business models. Their levels of sophistication in trading and general understanding of energy markets are different from traditional market

participants.

Based on ESO market engagement we are aware that our markets sometimes are not optimally structured for these new assets and their owners, both in terms of technical requirements and commercial terms. On occasion, this has resulted in lower participation from new technologies, and therefore a reduced level of competition and ultimately higher costs to consumers. We need to develop more in-depth knowledge of these new providers and by bridging this knowledge gap, we will improve the way we reform and design our markets.

This NIA project set out principally to enhance the ESO's understanding of the technical capabilities and commercial decision-making (investment and operation) of existing and future flexibility providers. This greater understanding will enable ESO to reform markets in ways that unlock the potential of future flex providers, enabling them to maximise their value to the whole electricity system.

Project plan:

To achieve the intended objectives, the project was split into five phases, conducted by project -partner AFRY under collaboration with the ESO. The methodology employed included a combination of desk-top research, intensive external engagement, including 1-1s and workshops, as well as supply side modelling to project the capacity and volumes of supply side capacity between now and 2035, going into greater depth than the Future Energy Scenarios (FES) 2022 projections.

Phase 1: Defining the technical requirements

The objective of this phase was to generate a comprehensive list of current, emerging and future service providers across voltages and fuel types and detail their technical service provisions. Such provisions would include reactive/active power, stability services (such as inertia), speed of response and the duration of output that can be sustained, reliability, limitations etc.

The phase delivered insights into the technical parameters of existing and emerging technologies, providing the ESO with a a comprehensive list of providers that will ensure we do not miss out considering any technologies when designing markets, thereby improving liquidity and reducing costs.

Phase 2: Understanding their commercial and investment decision-factors

Building upon the technological insights provided in Phase 1, the ESO was keen to enhance our knowledge of their commercial and investment decisions.

This will include factors that influence investment and operational / market entry decisions, as well as locationality and environmental considerations. We will also provide comprehensive segmentation of providers/investors based on their risk appetite and routes to market, e.g., via an aggregator, a supplier etc.

Finally, this phase will also provide a deep dive into the role of aggregators and the broader stakeholder landscape including the role of policymakers and local authorities to understand their respective roles in the flexibility value chain.

This information has helped us to identify decisions for the commercial terms of our products, to ensure they maximise participation and reduce system costs. Work is currently underway to refine the analysis and outputs.

Phase 3: Mapping out a provider journey

Building on the mapping of the overall stakeholder landscape to translate these into the practical and commercial issues experienced along the provider journey. These will be the key steps within the value chain, from asset development through to the provision of services and settlement. This will include registration, auctions/trades, scheduling, dispatch, performance monitoring, settlement etc, to identify any key 'pain points'.

An understanding of the customer journey has helped us to identify barriers and inefficiencies within ESO markets. By removing these we will improve market efficiency and lower consumer bills. Work is currently underway to refine the analysis and outputs.

Phase 4: Bringing this back to the ESO

The goal of this phase was to overlay the findings from phases 1-3 onto the suite of ESO balancing service markets to access their efficacy against our providers' capabilities and business models. This is to identify the preferred market design parameters of each service provider. In doing so, understand how the ESO can become the 'enabler' by asking what do our customers need from the ESO, and by when, to allow them to provide the services that they want to.

In doing so, the ESO has been provided with the foundation for recommendations for market reforms to reduce the barriers our customers are experiencing. Work is currently underway to refine the analysis and outputs.

Phase 5: Bringing the findings together

The final phase of this report is to pull together all the work of phases 1-4 to create a summary report which can be disseminated internally and externally. Work is ongoing to refine the analysis and outputs.

All the analysis in a report format will enable the ESO, DSOs and policymakers to enhance their understandings of emerging technologies and improve the ESO, DSO products and wider market design, thereby reducing consumer cost.

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

Overall, the methodology employed within this project has remained unchanged however certain elements of the program have led to slightly longer lead times than originally envisaged.

- The modelling undertaking in Phase 1.2 was delayed owing to resource availability.
- A number of amendment phases were added to enhance the deliverables and provide a better representation for our customers.

As a result As a result of these delays the project has been extended by a further six months.

Lessons Learnt for Future Projects

1. **Breadth of topic – longer timescales – lots of interest**
   The project received considerable interest from our customers and stakeholders which led to greater timescales required to see progress in various work packages. In hindsight, more time could have been applied to this.
2. **Detailing technological requirements**
   An in-depth literature review was conducted within Phase 1 to better understand the technical characteristics of existing and future service providers. The results of this exercise provide an in-depth understanding of these characteristics and we therefore recommend the use of this research method for future similar studies. This allowed progression onto the next stages to include more depth owing to understanding the technologies technical abilities.
3. **Technology sheets – useful visual**
   Building on from the technical requirements above, the data and context has been usefully summarized into a 'technology sheet' section which details the technical alongside commercial considerations / wider landscape notes for the technology in question. This has allowed the ESO to disseminate information pertaining to a certain technology across the ESO and to external stakeholders with ease and communicates the key messages well. This should be recommended as a viable means to convey information in a succinct manner for future projects.

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

As the research is ongoing, these are the interim outcomes of the project:

This NIA project has received considerable internal and external interest owing to the importance of understanding our customers. Internally, a slide pack detailing the technological capacities has proved to be an insightful resource for many teams as many projects covering a breadth of technologies are occurring in parallel to this NIA report. For example, an ongoing NIA project exploring the role of Hydrogen for Constraint Management was able to draw upon the insight provided by this project.

Externally the project team have liaised with The Department for Energy Security and Net Zero (DESNZ) who have also shown an interest in the role of these technologies. At the time of writing, presentations have been delivered and resources provided from this project to help inform policymakers. All relevant information will continue to be shared as the project progresses.

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/SIF projects on the Smarter Networks Portal (www.smarternetworks.org) and National Grid ESO Data Portal (data.nationalgrideso.com). You may wish to check these websites before making an application under this policy, in case the data which you are seeking has already been published.

Foreground IPR

The final report will be published on the Smarter Networks portal with some additional information when available:

- A spreadsheet detailing technical requirements
- Presentation slides from dissemination event(s)