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NIA Project Close Down Report Document

Date of Submission

Jul 2024

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

0 years and 4 months

Nominated Project Contact(s)

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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 assess 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 reduced level of competition and ultimately higher cost 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 the ESO's consultant-partner under supervision from 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 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 in the medium of a spreadsheet which detailed the technical parameters of existing and emerging technologies, providing the ESO with a comprehensive list of providers that could, in theory, provide technical services to the ESO.

The methodology employed combined existing knowledge, academic research and interviews.

This has been shared internally, feeding into several business as usual processes and will be shared externally in the final report.

Phase 2: Understanding our customer's 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.

The initial brief was to include factors that influence investment and operational / market entry decisions, as well as locationality and environmental considerations. It was also intended to provide a 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 intended to 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.

Insights were to be brought forward from a range of mediums, including our consultants existing knowledge, industrial literature, and first-hand interviews.

A broad overview of the aforementioned influencing factors and the role of aggregators was delivered. Owing to the high-level nature delivered, insights into our customers commercial and investment decision-factors was limited.

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'.

The outcome of the mapping exercise was provided to ESO. Similarly to Phase 2, the process was broad. This limited the learnings which could be fed into business as usual processes.

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.

Drawing upon the aforementioned methodologies, several recommendations were provided to ESO. These provide the foundations for recommendations to reduce the barriers to our customers. Nonetheless, the high-tier nature of these recommendations limits the practicalities of implementation.

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.

The report has been disseminated internally to feed into business-as-usual processes. An external version of the report will be published as per the NIA funding requirements.

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

Overall, the methodology employed within this project has remained the same 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.
- ESO requested several amendment phases to enhance the deliverables and provide a better representation for our customers.
- The initial report provided was significantly larger than expected. Due to the size, many of the proposed insights were not clear. The key points were subsequently synthesized into a more accessible document.

Lessons Learnt for Future Projects

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.

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.

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.

Not meeting original objectives and lessons learnt:

As detailed within the 'Performance Compared to the Original Project Aims, Objectives and Success Criteria' section, many of the original objectives were not fully met from an ESO perspective. On reflection, there are several reasons why this may have been the case. Whilst this is not a review of our working relationship with the consultants, it is of note that the lessons learnt must consider improvements that could have been made by both parties.

First and foremost, there was room for improved communication. It is worth considering how greater clarity on the objectives would likely have resulted in a clearer role for the consultants and therefore a greater meeting of our intended objectives. On reflection, the SMART framework could have been positively employed.

Second, we acknowledge that during the process our asks was amended to bring forward new learnings which were only partially covered in the initial ask. Whilst the scope for scope creep may have been enhanced owing to the length of the project, clearer scoping at the beginning with the consultants would likely have been to the benefit of both parties.

Third, the limited insights may also stem from concerns of Intellectual Property. Though appropriate legal text was drafted and agreed upon to permit the secure sharing of information, there were times where the source of the information provided in the report was called to question e.g., stemming only from interviews conducted as part of this project and not the wealth of existing learnings held by the consultants internally. Clearer statements of where the information would be stemming from could mitigate future risks of this occurring.

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 final report and appendices were delivered in December 2023.

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.

Consultants delivered a robust assessment of service providers, achieving Work Package 1.

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 was partially met. A list of commercial factors was provided, however, the limited insights from this reduced the value add. As such, this is considered partially met; likely owing to factors detailed in the lessons' learnt section above.

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.

This work package was partially met. Pain points were provided, yet, these too were high-level summaries which do not identify concrete next steps to address them.

Work Package 4: Overlay the findings from work packages 1-3 onto the suite of ESO balancing service markets to assess their efficacy against providers' capabilities and business models.

This work package was partially met. The knock-on impact of limited insights provided in WP2&3 limited the value add from overlaying these findings onto our markets. This was reflected in the broad recommendations provided which, similarly to WP3, are not actionable.

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

Commentary:

This work package was met. A final report was provided following an extensive revision period.

Looking forward, there is an opportunity to consider building upon this NIA project through an altered lens; reframing a future project where the most value for our customers and consumers exists. An internal assessment of next steps is ongoing.

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 following Foreground IPR will be generated from the project:

- Details of all service providers, both existing and emerging, their technical capabilities and their commercial models.
- Details of 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.
- Guidance document on reforming markets to reduce barriers to entry, increasing competition and liquidity.

Planned Implementation

As a research-based NIA project, the intention was to enhance internal understanding of our customers' mindset. This has been facilitated, where possible, through the internal dissemination of the final report and appendices.

We recognize there is scope to enhance our understanding of our customers. This could be facilitated through a continuation of this innovation project, however, there is recognition of customer learnings that are also emerging through other, collaborative projects, such as the Constraints Collaboration Project (CCP). The CCP, for example, is an ESO led, non-innovation funded project intended to enable the ESO and industry to work together to find solutions for thermal constraints. In this project, and many others, collaborating with industry has provided lessons on our customer needs which may mitigate the need for the continuation of the Service Provider Capability Mapping project.

Nonetheless, understanding our evolving customer business models will continue to be a priority. If it becomes apparent there is further work needed to understand our customers, we may re-scope the Service Provider Capability Mapping project to meet this need.

Other Comments

The Project outcomes and results contain confidential information and intellectual property rights that cannot be disclosed in this Report due to their proprietary nature. Should the viewer of this Report ("Viewer") require further details this may be provided on a case by case basis following consultation of all Publishers. In the event such further information is provided each and any Publisher that owns such confidential information or intellectual property rights shall be entitled to request the Viewer enter into terms that govern the

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