# Energy Networks Innovation Process

Annual Project Progress Report Document

The voice of the networks

Date of Submission: 03/07/2024

# Annual Project Progress Report Document

*Notes on Completion: Please refer to the NIA Governance Document to assist in the completion of this form. Please use the default font (Calibri font size 10) in your submission. Please ensure all content is contained within the boundaries of the text areas.*

| Project Title *(This cannot be changed once registered)* | Project Reference |
|---|---|
| Demand Diversification Service for LMAs | NIA_SSEN_0072 |
| **Funding Licensee(s)** | **Project Start Date** |
| Scottish and Southern Electricity Networks Distribution | February 2024 |
| **Project Duration** | **Year** |
| 8 months | 2023/24 |
| **Nominated Project Contact(s)** | |
| Tim Sammon, Innovation Programme Delivery Manager at SSEN | |

# 1. Scope

**Technical**

Work with range of relevant stakeholders, which could include suppliers, aggregators, DCC and others, to understand the data and technical requirements to support the proposed DDS.

- What network data will participants require?
- Does data need to be real-time?
- What happens to the consumers scheduled load if connectivity is lost?
- Will a Data Governance Policy need to be developed?

To answer these questions, we will support limited technical trials (20-30 consumer with the correct, schedulable smart meter in their home) with suppliers. Established within areas of the network with suitable monitoring, the outcome of the trials will be recommendations for full commercial trials and the issues that will have to be remediated to enable further trials or Business as Usual (BAU) services.

To date, two Flexibility Mechanisms have been discussed as the basis of potential commercial services with FSPs. These drive the scope of the initial simulation exercises in the project:

- Allocated Capacity – where each FSP is given a Maximum Demand Limit (MDL) based on units consumed and number of consumers in each area. They commit to manage their local portfolio of demand below the MDL for a fixed period in return for a Service Payment. The benefits of this mechanism are that the risk to the network is minimal and that it is clear what each FSP is responsible for.
- Dynamic Congestion Response – FSPs respond to real time network limitation levels, rescheduling smart loads to avoid these periods (and high flex-prices) and making use of other times with low loading and low wholesale prices. The benefit of this

mechanism is that network utilisation may be higher, potentially deferring the need for reinforcing until later. However, there is a shared responsibility for keeping aggregate demand within network capacity.

Desktop exercises and a simulation workshop will be used to understand if either of these mechanisms are suitable as the basis of future DDSs. The expected outcomes are an understanding of participant actions when providing the service and unintended consequences from the aggregation of all participant actions.

**Evaluation & Dissemination**

The outcomes of the technical and commercial workstreams will be evaluated with a particular focus on the implications for the future design of priced contract mechanisms and how these will compare with the cost to reinforce constrained parts of the network. The outcome of both workstreams will also influence a route map for the next phase.

There will be significant re-use of the Energy Networks Association (ENA) Flexibility Service Agreements (FSAs), and one of the project outcomes will be new Service Type templates suitable for the DDSs, ensuring alignment with the ENA Open Network Project principles.

# 2. Objective(s)

- To establish if LMAs can be removed with the introduction of DDS; enabling consumers within current LMAs to fully participate in the electricity market and transition to LCTs at their discretion.
- To establish if potential DDS providers are interested in signing up to such services and under what provisions.
- To establish if there are any unintended consequences.
- Through a small-scale pilot, to better understand the suitability of the current SMETS2 infrastructure to provide the granularity required for a more dynamic scheduling of loads to support the new DDS.
- Through desktop exercises and a simulation with stakeholders, to gather feedback, tease out unintended consequences, and gauge interest from providers.
- To establish a Minimum Viable Product in terms of service, market participants and consumer participants – understand level of demand participation to achieve the desired outcomes.
- To identify the next steps required, including follow-up innovation projects, to bring DDS closer to a BAU deployment.

# 3. Success Criteria

- Confirm any new DDS is technically feasible through the current SMETS2 infrastructure.
- Engaged with stakeholders and gathered feedback that confirms that there is enough interest to establish workable market mechanisms.
- Enough suppliers contribute to the trials and simulation exercise to understand the DDSs and therefore are willing to provide services when the need is BAU rather than an innovation trial.
- Recommendations for what to do next.

# 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.*

The original aim of the project was to consider the validity of two of the assumed barriers to the adoption of demand diversification using market-based mechanisms. These were:

1. What technical constraints, if any, exist with current technologies that might prevent an end-to-end process for deploying DDSs. Constraints could include the capabilities of smart metering technology, connectivity issues with the smart meter network, or the availability of real-time monitoring of the low voltage network.
2. The appetite of FSPs to adopt new DDS commercial models.

<u>Technical constraints</u> were descoped from this phase of the project. There were several reasons behind this decision:

- It became clear that other parties (Smart DCC, Vodafone and relevant suppliers) were already investigating options for addressing consumers that are not connected to the Smart Meter Network. Therefore, there was no need for this project to replicate their work.
- The time it took to review and approve the PEA doc meant that there was little time to prepare for trials over the critical demand peaks during winter 2023/24.
- The requirements for selecting trial participants proved too challenging in the time available. That is for consumers who:
    - Were in large enough clusters to see the impact of their loads being scheduled;
    - Were in areas of the network with LV monitoring;
    - Had a schedulable load; and
    - For those with storage heaters, had the new five terminal SMETS2 smart meters.

With the benefit of hindsight this always going to be a tough set of requirements to fully meet.

- The release of SSEN's NERDA portal, with its open-source access to real-time network data gave another option for those suppliers that were interested in trialling the scheduling of consumer loads to avoid times of congestion on the network.

Significant progress towards validating the appetite of FSPs to adopt new DDS commercial models was made by early March 2024 after several internal desktop exercises that culminated in an external Simulation Workshop held at the ENA offices in London.

The following stakeholders were in attendance:

- Department for Energy Security and Net Zero, Ovo Energy, Consumer Scotland, Octopus Energy, Equiwatt, EDF Energy, National Grid Electricity Distribution, ElectraLink, Energy UK, and LCP Delta.

The following stakeholders were invited but could not attend:

- Ofgem, Energy Networks Association, Association of Distributed Energy, Centrica Energy, E.on Energy, Electron, National Grid Electricity System Operator, Piclo, Quarriers, Smart DCC, Nodes Market, Elexon, EV Energy, Electric Miles, Fermata Energy, Ohme EV, Regen, and Connected Response.

All attendees agreed that the workshop had been successful in presenting the pros and cons of the proposed DDS models and all FSPs expressed an interest in participating in the commercial trial being planned for the next phase of the project.

<u>Objectives performance to date</u>

| Objective | Performance |
|---|---|
| To establish if LMAs can be removed with the introduction of DDS; enabling consumers within current LMAs to fully participate in the electricity market and transition to LCTs at their discretion. | The desktop exercise and simulations have shown that it is theoretically possible to reduce peak demand using the proposed DDS. This is a critical precursor to removing LMAs in constrained areas of the network. |
| To establish if potential DDS providers are interested in signing up to such services and under what provisions. | Three suppliers and two aggregators attended the simulation workshop and expressed interest in taking part in the commercial trials. |
| To establish if there are any unintended consequences. | Simulations of the DCR DDS model indicated that there is a significant risk of FSPs herding towards the least congested time of day (with the maximum DDS price incentive), potentially creating new congestion. As each FSP has no sight of what other FSPs are planning, a phenomenon known as hunting is likely to occur, as each FSP adjusts to find the next least congested time – the aggregate effect would be an overcorrection in one direction, followed by an overcorrection in the other direction. |
| Through a small-scale pilot, to better understand the suitability of the current SMETS2 infrastructure to provide the granularity required for a more dynamic scheduling of loads to support the new DDS. | Descoped. |
| Through desktop exercises and a simulation with stakeholders, to gather feedback, tease out unintended consequences, and gauge interest from providers. | Complete. A report of the Simulation Workshop event is due to be completed in early April 2024. |
| To establish a Minimum Viable Product (MVP) in terms of service, market participants and consumer participants – understand level of demand participation to achieve the desired outcomes. | Descoped. Unable to estimate MVP without trial data. |
| To identify the next steps required, including follow-up innovation projects, to bring DDS closer to a BAU deployment. | In progress. The Simulation Workshop has shown FSPs are interested and have provided valuable input to the design of commercial DDS propositions. The herding/hunting issue with the DCR model will need to be designed out of the commercial trials |

| | |
|---|---|
| | with the inclusion of some form of damping mechanism that removes the absolute real-time nature of the original model. |

Success Criteria performance to date

| Success Criteria | Performance |
|---|---|
| Confirm any new DDS is technically feasible through the current SMETS2 infrastructure. | Descoped. |
| Engaged with stakeholders and gathered feedback that confirms that there is enough interest to establish workable market mechanisms. | Complete. The feedback from the Simulation Workshop was that all participants thought that the DDS models were worth progressing to full commercial trials. |
| Enough suppliers contribute to the trials and simulation exercise to understand the DDSs and therefore are willing to provide services when the need is BAU rather than an innovation trial. | Complete. See comment above. |
| Recommendations for what to do next. | In progress. The Simulation Workshop report will summarise the proposed next steps and this will feed in to the scope of the next phase of the project, the commercial trials. |

# 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.*

As stated above, the technical trials were descoped from the project after it became apparent that part of the scope was being addressed by others in the industry and the rest of the scope could not be completed during the essential winter demand peaks in 2024-25.

# 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.*

- The descoping of the technical trials may have been avoided if the project had consulted more widely with colleagues that had greater experience in planning and running trials with consumers. The effort required to recruit consumers to meet very explicit requirements was not recognised during project planning.
- As stated, the DCR model could lead to potential network instability if the herding and hunting behaviours are not addressed in the design of the commercial DDS models. This is likely to be an issue with any flexibility service that reacts instantaneously to real-time network status data.
- The Simulation Workshop and the preceding desktop exercises proved to be highly effective at identifying all the inputs required to model (and ultimately run) DDS as a BAU exercise.

# 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.*

The Simulation Workshop has confirmed that, in principle, there is interest from potential FSPs to provide diversification services to DNOs. Future projects are required to develop and test the mechanisms for introducing and managing these services, including the appetite for a DNO offer price based on deferred reinforcement costs and the risk of the service failing to deliver due to changing market conditions.

# 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/.

# Foreground IPR

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

N/A