Energy Networks Innovation Process

Annual Project Progress Report Document

The voice of the networks

Date of Submission: 27/06/2024

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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
ExtenDER	NIA_SSEN_0067 ExtenDER
Funding Licensee(s)	**Project Start Date**
Southern Electric Power Distribution	August 2023
Project Duration	**Year**
2 years 5 months	2024

Nominated Project Contact(s)
Tim Sammon, Innovation Programme Delivery Manager at SSEN

1. Scope

This is a feasibility study to better understand the risks associated with market-based connection services. The purpose of this study is to engage with stakeholders to document the risks and propose strategies to mitigate or remove the risk. If mitigation strategies are approved by SSEN, National Grid Transmission and National Grid ESO, a second live trial Phase may be pursued. The project is also attempting to understand market liquidity, which will also be used to determine whether a second Phase should be initiated.

This project will focus on the Greater London Authority (GLA) area, where there are known constraints caused by Transmission related reinforcements. The project is focussed on market-based connections only and therefore will not consider DNO flexibility methods i.e. ANM or CMZ. However, it may suggest DNO flexibility methods where market-based connections are not suitable. This is a Phase 1 feasibility assessment of market-based connection tools, which may potentially lead to a much larger second Phase involving live trials of such a connection approach.

Pre-registration assessment estimates potential benefits of the ExtenDER approach could deliver up to £1.2bn of economic benefit to connecting parties over seven years, or £174m per year if its feasibility can be demonstrated. If feasibility is demonstrated, a refreshed estimation of potential benefits and the costs associated with accessing them will be reported.

2. Objective(s)

The project has the following objectives:

Phase 1

- Confirm the potential viability of a market for market-based connections. Report examples of capable sellers and buyers.
- Report the risks of market based connections to TOs, DNOs, buyers and sellers and discuss mitigation options.
- Propose a skeleton market-based connection agreement acceptable to TOs, DNOs, buyers, and sellers.

Phase 2 (Future Project)

- Understand the value of market-based connections to both buyers and sellers of energy capacity (i.e., is there enough support and buy-in for such a service).
- Compare value of market-based connections to costs of achieving the same connections using ANM and/or CMZ.
- Create a replicable market design.
- Create a market-based connection tool that can communicate with a Power Systems Analysis tool to automatically provide go/no-go decision on trades.
- Understand the interaction between existing connection agreements and the impact on other customers.
- Create a clear process from start to finish for market-based connections to operate.
- Understand what risk of market failure and its impact on the market-based element of the connection agreement is acceptable to users.

- Create a Framework for market-based connection operation including monitoring and legal implementation.

3. Success Criteria

The project will be deemed successful if:

Phase 1

- The solution is shown to have no detrimental impacts on the electrical network for which a mitigation has not been identified and tested, with sufficient confidence to proceed to a second trial Phase.

Phase 2

- Market Based Connections are considered as viable and useful for demand customers (i.e., the business proposition works)
- Market participation for those providing flexibility find the process accessible, and valuable.
- Market design produced is replicable.
- Market solution tool can communicate with Power Systems Analysis tool to automatically provide go/no-go decision on trades.
- The interaction between existing connection agreements and the impact on other customers is acceptable.
- A clear path for entry into and exit from a Market based connection is defined.
- The risk of market failure and its subsequent impact on the Market based element of the connection agreement is a risk that is acceptable to customers.

Framework created for Market Based Connection operation including monitoring and legal implementation alongside Access SCR.

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.

Performance against the Phase 1 objectives are shown below.

Phase 1

- Confirm the potential viability of a market for market-based connections. Report examples of capable sellers and buyers.
    - High level analysis was done by SSEN to get an indication of the number of customers that were waiting in the connections queue, which was broken down by size of connection and customer type (domestic, commercial, etc.). The numbers were high enough to confirm that a market-based connection approach might be suitable to connect some customers earlier than anticipated.
- Report the risks of market based connections to Transmission Network Operators TNOs, DNOs, buyers and sellers and discuss mitigation options.
    - Extensive stakeholder engagement took place to understand the risks of a market-based connection. A report can be supplied on these risks, but at high level they include:
        - Network Resilience – If market sellers don't turn down on a constrained network there is a chance of circuits tripping and customers losing supply.
        - Commercial Regulation – Distribution Use of System (DUoS) charging will be impacted as new market based connections do not fit in with the current processes and systems that DNOs use. This could result in high capacity charges or frequent fines for breaching capacity.
        - Market liquidity – Low market liquidity reduces the chance of successful peer to peer (P2P) trades occurring. This may reduce the likelihood of potential buyers engaging in this service due to unpredictable energy availability.
- Propose a skeleton market-based connection agreement acceptable to TOs, DNOs, buyers, and sellers.
    - The heads of terms have been agreed for testing, which is also available upon request.

Phase 2

- As of March 31st 2024, Phase 2 has been accepted to go ahead. Progress against Phase 2 will be updated in the next progress / closure report.

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 Phase 1 has successfully demonstrated that the project will have no detrimental impact on the electrical network, the project will move to Phase 2 as detailed in the PEA, which means more time and cost to achieve the Phase 2 objectives.
Initially, 4 months was planned for Phase 1. Now that Phase 2 is proceeding, the new time scale is estimated to be 2 years and 5 months. Phase 1 costs were £185,884. Updated costs to include Phase 2 are estimated to be £1.59m.

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.

Market based connections will require significant effort from the DNO, as it is a new concept that has not previously been implemented. We need to make sure we understand the risks and mitigation options at our disposal. Allowing these connections to occur with limited control ability and at high volume could have significant detrimental impacts that could affect network reliability. Therefore a lot of upfront effort is needed to mitigate risks and design safe working practices.
DNOs will require some additional powerflow analyses to be carried out prior to approving a new market based connection, compared to that required for standard connections.

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

N/A

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 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/.

9. Foreground IPR

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

The majority of the foreground IPR will be made publicly available. It is likely that this IPR will include the methodology on how market based connections will operate allowing other DNOs and market actors to engage in such a service.