

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.

NIA Project Annual Progress Report Document

Date of Submission

Jul 2023

Project Reference Number

NIA2_NGESO046

Project Progress

Project Title

STARTZ (Stability Requirements Calculation Toward Net-Zero)

Project Reference Number

NIA2_NGESO046

Project Start Date

March 2023

Project Duration

1 year and 6 months

Nominated Project Contact(s)

Tatiana Assis, Shurooque Baloch

Scope

Decarbonisation is bringing technical challenges that include the management of potential stability issues caused by the reduction in inertia and short circuit levels. In order to overcome potential stability problems while keeping economic and secure operation, NOA Stability Pathfinder projects have been looking to find and procure alternative sources of stability support.

One key aspect to the NOA Stability Pathfinder project or any other future stability services procurement process is the calculation of future system stability needs. Overestimation or underestimation of system needs potentially represents, respectively, unnecessary costs for consumers or system vulnerability with increased risk of blackouts.

The current methodology to calculate the system stability needs is based on several assumptions, criteria and simplifications that should be revised and improved following network evolving and energy landscape transition. Also, since a number of future generation and demand dispatches are considered, a higher level of automation in the calculation process is required.

This project will review the current methods of calculating system stability and identify areas of improvement, performing the analysis on a sufficiently granular representation of the active and passive network components in the GB system. Bases on this analysis, It will apply automation and other necessary methods (machine learning) to manage additional computational burden of using detailed network representation.

Objectives

The existing tool to compute system needs is a standalone process and is not integrated with any of the NOA tools or ETYS models. The calculations are based on empirical formulas. At the same time, the year-round analysis computes hourly generation and demand dispatches to identify the amount and the location of the services that need to be procured. These dispatches have a temporal variation which is captured through a time series analysis. The current tool is, however, not able to consider spatial uncertainty for inertia assessment, as the model is a lumped representation of the GB system. This project, therefore, seeks to achieve three main objectives:

1. Review the current methods of calculating system stability needs and identify areas of improvement.
2. Perform the analysis on a sufficiently granular representation of the active and passive network components in the GB system.

3. Implement automation and other necessary methods (machine learning) to manage additional computational burden of using detailed network representation.

Success Criteria

The project will be considered successful if the following criteria are met:

- Creation of an improved methodology and associated new tools which will interface with the detailed DlgSILENT Powerfactory model of the GB system to allow year-round calculating of system stability needs.
- Development of the ability to perform granular calculations of year-round system stability needs by implementing a set of automation and machine learning techniques.
- Validation of the new tool's output against accurate outputs from DlgSILENT Powerfactory and the measured values from ESO operation.
- Dissemination and training for learnings and tools developed in the project.

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 STARTZ (Stability Requirements Calculation Toward Net-Zero), NIA2_NGESO046 ("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).

The Report provided is for information only and viewers of the Report should not place any reliance on any of the contents of this Report including (without limitation) any data, recommendations or conclusions and should take all appropriate steps to verify this information before acting upon it and rely on their own information. None of the Publishers nor its affiliated companies make any representations nor give any warranties or undertakings in relation to the content of the Report in relation to the quality, accuracy, completeness or fitness for purpose of such content. To the fullest extent permitted by law, the Publishers shall not be liable howsoever arising (including negligence) in respect of or in relation to any reliance on information contained in the Report

Copyright © National Grid Electricity System Operator 2023

The project comprises three work packages (WPs) and seven main deliverables. WP1 consists of reviewing the current methods of calculating system stability needs and identifying areas of improvement. Due to data sharing arrangements the WP1 deliverables have been pushed back slightly until updated security agreements are in place to allow the sharing of confidential information.

However, WP1 is on track to produce the first deliverable of the project within a few weeks of the initial timelines. This report will include a review of the current methods for calculating system stability needs and identify areas of improvement, specifically looking at inertia, short circuit level and voltage. Once completed, WP2 will focus on implementing alternate methods based on the findings of WP1, which will include workshops with key stakeholders to gather scenario data and reviewing the Electricity Ten Year Statement model to then perform the analysis on a sufficiently granular representation of the active and passive network components in the GB System.

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

Due to the nature of the project, some of the data which needed to be shared with our project partner, TNEI, was classed as confidential. This has meant that we have had to upgrade some of the security levels within the contract before the data can be shared, hence pushing back some of the WP1 deliverables.

Lessons Learnt for Future Projects

As the project is at the very initial stage, there are no lessons learnt to be reported to date. As the project progresses, lessons will be captured and reported appropriately.

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 project is at very initial stage, there are no outcomes to be reported to date.

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.smartnetworks.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 following foreground IPR is expected to be generated in the course of the project:

- An improved methodology and associated new tools which will interface with the detailed DIgSILENT Powerfactory model of the GB system to allow year-round calculating of system stability needs.
- Training materials for learnings and tools developed in the project.