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

May 2025

Project Reference Number

NIA2_NESO092

Project Progress

Project Title

Dispatch Transparency Methodology

Project Reference Number

NIA2_NESO092

Project Start Date

November 2024

Project Duration

1 year and 1 month

Nominated Project Contact(s)

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Scope

Greater transparency on dispatch reasoning will allow NESO to identify areas for operational efficiency gains: instances where conditions have led to a skip, but if engineers are made aware of the skip, future actions are adjusted so that future skips could be mitigated or avoided. This will support balancing engineers to make decisions with greater foresight, reduce balancing costs by optimising adherence to merit order, and give stakeholders valuable insights into the reasoning behind the actions of the balancing mechanism. Working together in this way, NESO and asset owners will be able to steadily decrease the number of skips over time, reducing costs to consumers.

Objectives

At the conclusion of Phase 1, the project will provide a clear and pragmatic methodology for an implementation specification for a dispatch transparency situational awareness tool. This will include a pathway to:

- develop a real-time tool for ENCC that highlights reasons for recent skips based on prevailing system conditions, giving engineers greater opportunity to mitigate a skip or to adjust future methodology where appropriate;
- develop a reporting tool that enables NESO to analyse past skips and understand the wider system conditions that contributed to their occurrence; and
- provide enriched skip-reasoning data to external stakeholders after the fact, using the same information and reporting tool.

The specification will be ready for implementing as proof of concept in Phase 2, which we will fully scope towards the end of Phase 1.

Success Criteria

Each stage of Phase 1 will be deemed to be successful if:

WP0: Skip rates are calculated for 16x 5-minute defined test cases, using an independent implementation. Significant methodological ambiguities encountered en-route are highlighted. The code for this implementation is delivered ready for inspection by NESO.
WP1: Dispatch transparency is defined according to data sources used, with clear limits on when transparency cannot be achieved as informed by input from NESO and cognitive load considerations.
WP2&3: A report detailing the potential for both concrete and AI-discovered dispatch reasoning provides NESO with routes to reasoning categorisations.
WP4: A workplan for the implementation of proof of concept of tool is specified and is sufficient for a team to implement the tool, given access to data and other systems described.
Phase 2 will be deemed to be successful if a proof-of-concept tool is delivered that can be productionised into live NESO systems, which gives ENCC the situational awareness to reduce skips.

Performance Compared to the Original Project Aims, Objectives and Success Criteria

For each work package, the progress is as follows:

For WP1, the objectives were achieved, as Dispatch transparency was defined in consultation with three key internal stakeholder groups, and this definition was used to describe the key user stories, with attendant data sources, intended usage and specific requirements.

For WP2, approaches considered under concrete dispatch reasoning included analysing the outcomes of optimisation tools already in use in the control room and applying causal inference logic to available data flows. The benefits and limitations of each method were considered and presented to NESO for decision making.

For WP3, AI-discovered dispatch reasoning considered and evaluated the potential of approaches including generative AI, machine learning and foundation modelling. The benefits and limitations of each method were considered and included in the final report.

For WP4, the best candidate approaches were decided in consultation with NESO, and a workplan for the implementation of proof of concept of tool using these approaches has been specified and will be used by the team to initiate phase 2 of development for the tool.

Phase 2 has not kicked-off yet but will be deemed to be successful if a proof-of-concept tool is delivered that can be productionised into live NESO systems, which gives ENCC the situational awareness to adapt patterns of dispatch in the future.

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

Phase 1 was extended by one month due to the additional time required to process the large volume of data but with no change to project scope or cost.

Phase 2 will develop a proof-of-concept tool and is expected to run for 6 months starting in June. This tool will focus on providing analysis on a post-hoc basis (either at shift end for OEMs or over some extended period of time for NESO analysts) rather than on a close to real-time basis, a decision taken after hearing the views of control room stakeholders and noting carefully how they operate and evaluate their performance.

Lessons Learnt for Future Projects

While Generative AI models such as LLMs may be of interest for ingesting and analysing text-based data such as ENCC reports, and trips and outages, they were deemed unsuitable at this stage for this purpose as they have not yet reached maturity using time series datasets. Machine learning approaches are more advanced, well understood and show more promise when attempting to predict dispatch patterns.

As part of the data review undertaken as part of this project, additional data sources were identified as helpful to this analysis and changes to data collection for NESO may occur as a result.

For the purposes of this project, a decision is defined as the issuance of a BOA.

The approach taken here will be to build models which can accurately predict the number and volume of BOAs issued, and when these models are accurate enough, use well-understood statistical methods to examine which factors present in the data are having the largest effect on the model predictions. This is an indirect method of examining decision making but given the number of BOAs issued over the course of a shift, more direct methods are impractical, time intensive and expensive.

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

Two promising machine learning models have been identified in Gradient -Boosted Trees and foundation modelling. WP4 has defined a specification for a proof-of-concept tool using these approaches and this will be implemented in Phase 2.

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 NESO can be found in our publicly available "Data sharing policy related to NIA projects (and formerly NIC)" and Innovation | National Energy System Operator.

National Energy System Operator already publishes much of the data arising from our 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

At the end of Phase 1, the foreground IPR consists of the code used to evaluate the approached considered. At the end of Phase 2, the foreground IPR will consist of the code used to generate the predictive models and analyse their results, as well as a simple UI.