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.

NIA Project Registration and PEA Document

Date of Submission

Nov 2024

Project Reference Number

NIA2_NESO0092

Project Registration

Project Title

Dispatch Transparency Methodology

Project Reference Number

NIA2_NESO0092

Project Licensee(s)

National Energy System Operator

Project Start

October 2024

Project Duration

0 years and -2 months

Nominated Project Contact(s)

innovation@nationalgrideso.com

Project Budget

£1,000,000.00

Summary

The current lack of centralised clarity in dispatch reasoning makes it difficult to identify and evaluate possible process improvements to mitigate perceived skips. This project will explore the current state of dispatch transparency and define innovative new routes to increased dispatch transparency, including developing a new definition and methodology as well as a proof-of-concept tool. This will give engineers greater opportunity to mitigate potential future skips and enable NESO to understand the wider system conditions that contribute to the occurrence of perceived skips. This will be achieved by consulting with stakeholders and specialists, auditing external and internal data sources, and exploring statistical and AI methods that will prove useful in terms of increasing the range and scope of dispatch transparency tools available to NESO.

Nominated Contact Email Address(es)

box.so.innovation@nationalgrid.com

Problem Being Solved

NESO has a licence condition to operate efficiently and at the lowest possible cost to the consumer. NESO also has a goal to operate the grid carbon-free year-round by 2035. Dispatch actions which do not follow merit order could be interpreted to conflict with these goals. But perceived ‘skips’ will often have an underlying systemic reason, and many actions which appear from data analysis to be ‘skips’ are in fact decisions taken for technical reasons and hence not preventable at the time.
The task of maintaining the delicate balance between supply and demand, with its many attendant considerations, is extremely difficult. This is reflected in the complexities of the actions undertaken by engineers in the ENCC. These decisions are made using a blend of

data, software recommendations and human experience. Supplying complete reasoning for every single action taken in the challenging environment of the balancing mechanism may not be perfectly possible at this juncture in time. However, with a clear definition of what transparency means to NESO and its stakeholders, and with a thorough examination of the current methodology and the data sets that are available, the problem can be divided into parts separately solvable through dispatch decision intelligence, new data sets, and cutting-edge AI analytics. This project aims to pragmatically scope and attack the most promising aspects of the problem and so deliver operationally impactful tools while simultaneously making full dispatch transparency a tangible reality.

Method(s)

The first phase of this project will implement the recently proposed baseline skip rate definition, delivering both an evaluation of the results and the code required to implement the methodology. This provides a solid foundation on which this project will build, whilst providing independent assurance on the replicability and reliability of that skip rate definition.
The project will then engage with NESO stakeholders to identify feasible and valuable routes to improved general dispatch transparency, focussing especially on ENCC situational awareness. Available data sources will be audited, and cognitive scientists consulted to examine how control room cognitive load may be accounted for. External stakeholders will be engaged to ensure transparency will be of wider industry value.
Using internally available data sources, dispatch-driven concrete reasoning will be developed. Additional data from other services will be used to expand concrete reasoning to ancillary services, through the deployment of advanced statistical techniques such as causal inference to test hypotheses.
In parallel, cutting-edge foundation model AI will be used to explore an approach to holistic reasoning, potentially allowing us to significantly extend the number of cases where decision reasoning can be inferred.

The second phase of the project will involve developing a proof-of-concept tool that will highlight the reasons for recent skips, giving engineers greater opportunity to adjust future decisions. Phase two will also provide NESO with a reporting tool that will enable NESO to provide enriched skip-reasoning data to external stakeholders.

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.

Objective(s)

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.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

The NESO does not have a direct connection to consumers, and therefore is unable to differentiate the impact on consumers and those in vulnerable situations.

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.

Project Partners and External Funding

NESO and Smith Institute

Potential for New Learning

The project aims to determine what datasets can be used to provide insights into dispatch reasoning, and what analytic and statistical methods can be used to directly infer why decisions were taken for simpler scenarios. It also aims to determine how foundation model AI can be leveraged to provide reasoning for more complex scenarios. This learning will be disseminated in the report provided in the project.

Scale of Project

This project has the potential to influence dispatch at the ENCC level and so has a national scope.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL5 Pilot Scale

Geographical Area

The tools that will be defined by this project would take into account geographic factors which affect the entire of the GB electricity grid.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

£1000,000

Project Eligibility Assessment Part 1

There are slightly differing requirements for RIIO-1 and RIIO-2 NIA projects. This is noted in each case, with the requirement numbers listed for both where they differ (shown as RIIO-2 / RIIO-1).

Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations (Please complete sections 3.1.1 and 3.1.2 for RIIO-2 projects only)

Please answer **at least one** of the following:

How the Project has the potential to facilitate the energy system transition:

This project facilitates energy system transition by providing greater transparency around dispatch reasoning. Greater transparency should enable the dispatch of assets in merit order, strengthening market signals and providing greater clarity to green energy investors and asset owners.

How the Project has potential to benefit consumer in vulnerable situations:

N/A

Requirement 2 / 2b

Has the potential to deliver net benefits to consumers

Project must have the potential to deliver a Solution that delivers a net benefit to consumers of the Gas Transporter and/or Electricity Transmission or Electricity Distribution licensee, as the context requires. This could include delivering a Solution at a lower cost than the most efficient Method currently in use on the GB Gas Transportation System, the Gas Transporter's and/or Electricity Transmission or Electricity Distribution licensee's network, or wider benefits, such as social or environmental.

Please provide an estimate of the saving if the Problem is solved (RIIO-1 projects only)

N/A

Please provide a calculation of the expected benefits the Solution

The key expected cost benefit is the balancing cost savings through identification/implementation of more economically beneficial options to obtain balancing services. This will not only improve the situational awareness for ENCC but also demonstrate the NESO are meeting requirements for economic dispatch.

Please provide an estimate of how replicable the Method is across GB

This project applies to ENCC and so does not need to be replicable across other sites.

Please provide an outline of the costs of rolling out the Method across GB.

N/A

Requirement 3 / 1

Involve Research, Development or Demonstration

A RIIO-1 NIA Project must have the potential to have a Direct Impact on a Network Licensee's network or the operations of the System Operator and involve the Research, Development, or Demonstration of at least one of the following (please tick which applies):

☐ A specific piece of new (i.e. unproven in GB, or where a method has been trialled outside GB the Network Licensee must justify repeating it as part of a project) equipment (including control and communications system software).

☐ A specific novel arrangement or application of existing licensee equipment (including control and/or communications systems and/or software)

☐ A specific novel operational practice directly related to the operation of the Network Licensees system

☐ A specific novel commercial arrangement

- ☐ A specific piece of new equipment (including monitoring, control and communications systems and software)
- ☑ A specific piece of new technology (including analysis and modelling systems or software), in relation to which the Method is unproven
- ☑ A new methodology (including the identification of specific new procedures or techniques used to identify, select, process, and analyse information)
- ☐ A specific novel arrangement or application of existing gas transportation, electricity transmission or electricity distribution equipment, technology or methodology
- ☐ A specific novel operational practice directly related to the operation of the GB Gas Transportation System, electricity transmission or electricity distribution
- ☐ A specific novel commercial arrangement

Specific Requirements 4 / 2a

Please explain how the learning that will be generated could be used by the relevant Network Licensees

N/A

Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIIO-1 only)

N/a

Is the default IPR position being applied?

- ☑ Yes

Project Eligibility Assessment Part 2

Not lead to unnecessary duplication

A Project must not lead to unnecessary duplication of any other Project, including but not limited to IFI, LCNF, NIA, NIC or SIF projects already registered, being carried out or completed.

Please demonstrate below that no unnecessary duplication will occur as a result of the Project.

A previous project focusing on skip rates will form the starting point for this work, ensuring that we are aware of what has already been accomplished in this space. There are no other projects that utilise the data sets that we will be requesting, so we are confident that no replication will occur.

If applicable, justify why you are undertaking a Project similar to those being carried out by any other Network Licensees.

N/A

Additional Governance And Document Upload

Please identify why the project is innovative and has not been tried before

The data sets and techniques proposed to increase the scope of dispatch transparency available have not been used for this purpose before. A purpose of the project is to ascertain what is possible in this space and it does, consequently, carry some risk.

Relevant Foreground IPR

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

- Report defining dispatch transparency scope
- Presentation of new methodology for dispatch transparency
- Specification for a new dispatch transparency too

Data Access Details

Data for this project and all other projects funded under the Network Innovation Allowance (NIA), Network Innovation Competition (NIC) or the new Strategic Innovation Fund (SIF) can be found or requested in a number of ways:
A request for information via the Smarter Networks Portal at https://smarter.energynetworks.org, to contact select a project and click 'Contact Lead Network'. National Energy System Operator already publishes much of the data arising from our innovation projects here so you may wish to check this website before making an application.
Via our Innovation website at Innovation | National Energy System Operator (neso.energy)
Via our managed mailbox innovation@nationalenergyso.com
Details on the terms on which such data will be made available by National Energy System Operator can be found in our publicly available "Data sharing policy relating to NIC/NIA projects" at 80797503.1 (neso.energy)

Please identify why the Network Licensees will not fund the project as apart of it's business and usual activities

This project contains an element of speculation and requires deviating from the previous dispatch transparency provisions made under the banner of business as usual.

Please identify why the project can only be undertaken with the support of the NIA, including reference to the specific risks(e.g. commercial, technical, operational or regulatory) associated with the project

This project carries technical risks.
Technical risks include that the data sets under consideration are not available, have quality issues or do not yield fruitful results under analysis. It is also possible that the statistical and AI methods under consideration do not provide meaningful results or are inconsistent with the data available.
Previous work on skip rate analysis has highlighted the complexity of the challenge and the need for innovation to further explore methodologies and data around decisions made within ENCC.

This project has been approved by a senior member of staff

☑ Yes