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NIA Project Close Down Report Document

Date of Submission

Jul 2023

Project Reference Number

NIA2_NGES042

Project Progress

Project Title

Revamp Interconnector Ramping Arrangements (RIRA)

Project Reference Number

NIA2_NGES042

Project Start Date

February 2023

Project Duration

0 years and 3 months

Nominated Project Contact(s)

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Scope

The ESO seeks a CBA review of solutions which can fulfil the requirements of Ofgem's decision letter and the obligations in Article 137 (3) (below). To do this, the ESO would like to understand which solution delivers the most resilience to the network through security of supply and offers the most benefit to consumers by a reduction in balancing costs related to actions taken to ensure frequency issues do not arise.

"Article 137 (3). All connecting TSOs of an HVDC interconnector shall have the right to determine in the LFC block operational agreement common restrictions for the active power output of that HVDC interconnector to limit its influence on the fulfilment of the FRCE target parameter of the connected LFC blocks by agreeing on ramping periods and/or maximum ramping rates for this HVDC interconnector. Those common restrictions shall not apply for imbalance netting, frequency coupling as well as cross-border activation of FRR and RR over HVDC interconnectors. All TSOs of the GB synchronous area shall coordinate these measures within the synchronous area."

The CBA needs to ensure that the results consider how the solution/s impact the following from a compliance perspective in relation to SOGL Article 119 and 137 and operational challenges in the ENCC as a result of increased interconnection. Including the cost impacts on consumers as a result of balancing actions taken close to real time.

It is expected that any modelling completed is done so based on the interconnectors that we have currently connected to the system and those which are due to connect up to 2025 (ESO net zero target) and 2050 GB net zero target so as to be forward looking.

Objectives

1. Complete a CBA and present a detailed report to outline the cost and benefits of solutions to satisfy drivers for change. This will provide the ESO with the recommendations to take to industry.
2. Complete modelling of shortlisted options, including all relevant assumptions and criteria used for shortlisting the options, and produce a recommendation based on these outputs.
3. Deliver a final report that presents a summary of the key findings and a recommendation to take forward.

Success Criteria

Ofgem have asked the ESO to incorporate HVDC interconnector ramping requirements into the Grid Code. The solution must meet the requirements set out in Article 137 (3). The ESO seeks a review of options to present a recommended solution/s which mitigates current challenges, whilst being resilient to the future. Whilst it supports the ESO in operating a secure and stable system, keeping the cost to consumers minimal.

For the solution to be viable, it should meet the following success criteria:

- enable transparency of interconnector ramping arrangements
- enable continued security of supply and decrease costs for the end GB consumer
- not be discriminatory to currently connected interconnectors and future interconnectors
- it may be market based
- benefit the end GB consumer and contribute to the social welfare in connected countries whilst benefiting the connected TSOs

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 Revamp Interconnector Ramping Arrangements (RIRA), NIA2_NGESO42 (“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).

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Project Overview

National Grid Electricity System Operator (ESO) often encounters scenarios where cross-border markets react to the same price signals simultaneously, leading to rapid changes in interconnector (IC) flow and frequency deviations (potential swing to 12GW and a maximum ramp rate of 500MW/min when these interconnector ramp rates are combined). Multiple control room actions must be taken by the ESO to accommodate these large changes and managing them with a fixed ramp rate of 100MW/min is financially intensive.

With IC capacity due to double by 2030, the ESO will need additional operational tools to ensure security of supply. This project will develop a cost benefit analysis (CBA) review of possible solutions to help solve this issue.

Project Plan and Activities

The project was set into phases. This was to understand how the ESO could find a solution for the costs incurred as a result of fast simultaneous ramping. The aim to lower balancing costs and benefit end consumers by reducing balancing actions taken close to real time which are more costly.

There were 4 phases to deliver the work.

Phase 1 – A Review of data and options.

This was to build on the initial review and options presented and to support understanding of the data and agree how it will be used in the assessment. Our initial view was developed and documented on how we will quantify the costs and benefits of the options to assess.

Deliverables: A slide pack summarising long list of options and key features, and draft methodology was created and shared to support this first phase and the next phase of the project with discussion with the ESO project team.

Phase 2 –Shortlist of options

A list of criteria was developed to shortlist options (e.g., operability, speed / cost of implementation, impact on interconnector revenue, impact on control room events). Understanding the impact of the options on balancing costs. The options were then scored against the evaluation criteria using a combination of expert judgement and the results from the initial data analysis to shortlist c.3 options to take through to the next phase the recommended shortlist was shared and presented to NGESO and the workgroup. The workgroup

comprises mainly of currently connected operational interconnectors, some preoperational interconnectors and other interested parties.

Deliverables: Updated slide pack, including list of criteria and their definition, scores for each option, and recommended shortlist.

Phase 3 -Detailed analysis of shortlisted options

Key inputs for scenarios were agreed, including the price scenarios and interconnector connections to use in the modelling of interconnector revenues. The results were then generated showing the outcomes under each option and scenario in terms of the average ramping of interconnectors, how often they are ramping at the chosen ramp rate caps and the knock-on impacts in terms of number of control room events. The wider advantages were assessed (qualitatively), disadvantages and risks of each option were documented as part of the assessment. Where risks were identified suggestions were provided for options to mitigate those risks. The phasing and implementation of options was also considered. The quantitative analysis was then combined with wider considerations of the advantages and disadvantages of each option to determine a preferred option based on monetised and non-monetised costs and benefits

Deliverables: Slide pack describing approach, assumptions, and results was shared with the ESO and the workgroup.

Phase 4: Report drafting

A final report was produced and shared with the ESO.

Deliverables: Final PowerPoint report

Industry was engaged throughout the project, through three industry meetings to allow outputs from the work to be shared and to respond to industry questions and queries in the process regarding the CBA.

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

The project was extended by six weeks to allow for further collaboration with industry stakeholders and to include an additional requirement that the interconnectors wanted to include in the CBA workstream. This meant that there was an increase in project costs of £98k This change request was approved and allowed Baringa to complete additional modelling which industry stakeholders believed was a credible solution to assess in the CBA.

Lessons Learnt for Future Projects

- This was a short project and was driven by deadlines to deliver. There were some challenges in setting up the contract and governance which, on reflection, there should have been more time allocated for.
- There was an additional request from industry to consider another avenue in the modelling which resulted in a change request being submitted. In order to allow for this in the future, there could have been more time allocated in phase 2 to ensure all considerations could be captured and included.

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

The project has developed a CBA to quantify a solution which it will present to industry for including interconnector ramping into the codes. The CBA will support driving further conversations in the industry working groups and the workgroup report which will be sent to Ofgem for review. This will allow for the solution to be included in the Grid Code and allow more control for the control room engineers to manage fast interconnector ramping.

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.smarternetworks.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 will be generated in the course of the project:

- Long list of options and key features
- Shortlist of solutions, the selection criteria and definitions, and scores for each option.
- Slide pack describing approach, assumptions, and results from detailed analysis of shortlisted options
- Final report with key findings and recommendations

Planned Implementation

The next steps are for the ESO to review the outputs of the CBA and draw up the recommendation to share with industry for further review. The next industry working group is scheduled for the 5th of June 2023. By the end of June 2023, it is anticipated that there will be a working group consultation to assess the position of the group.

During May and June 2023, the outputs will also be shared to the connected TSO and discussions will be held regarding implementation and the approach to implementation, along with any impacts.

There will be a consultation with industry in the Autumn 2023. Following this, the summary of discussion will form a report to Ofgem in order for them to form a decision on the recommendation(s) proposed and agree or disagree with the proposed solution to improve interconnector ramping and include it in the Grid Code. When the ESO receives this confirmation, the ESO will need to update the GB Grid Code and any specific bilateral operational agreements if applicable. Implementation will depend on the solution itself and the suggestion raised in the proposal, if the solution is simple to implement, this could be as quick as 10 working days following Ofgem decisions.

Other Comments

The Project outcomes and results contain confidential information and intellectual property rights that cannot be disclosed in this Report due to their proprietary nature. Should the viewer of this Report ("Viewer") require further details this may be provided on a case by case basis following consultation of all Publishers. In the event such further information is provided each and any Publisher that owns such confidential information or intellectual property rights shall be entitled to request the Viewer enter into terms that govern the sharing of such confidential information and/ or intellectual property rights including where appropriate formal licence terms or confidentiality provisions. Dependent upon the nature of such request the Publishers may be entitled to request a fee from the Viewer in respect of such confidential information or intellectual property rights.

Standards Documents

Following the decision from Ofgem, the Grid Code will be updated to reflect the arrangements for Interconnector ramping.