Decision



Yorkshire GREEN – Decision on the project's Initial Needs Case and initial thinking on its suitability for competition

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This document sets out our key findings and decisions from the Yorkshire GREEN project's Initial Needs Case following our consultation on 4th October 2021.

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Executive summary

The Yorkshire GREEN project and what this document covers

In October 2021 we consulted on our findings on the Initial Needs Case (INC) for the proposed 'Yorkshire GREEN' (Yorkshire Green Energy Enablement) project. Yorkshire GREEN is a proposed project from National Grid Electricity Transmission Plc (NGET), which owns and operates the electricity transmission network in England and Wales. It was submitted under our Large Onshore Transmission Investment (LOTI) mechanism¹.

Yorkshire GREEN is an electricity transmission project proposing to construct a new c.7.5km 400kV double circuit overhead line teeing off from the existing Norton to Osbaldwick line, a new 400kV substation in Monk Fryston, a new 275kV substation in York North, and various upgrades to existing 275kV infrastructure. The project is triggered by the need to increase the capability² of major boundaries within NGET's network in the North of England region (B7a and B8), to manage increasing power flows from the North of England to the South. NGET estimate that the project will be delivered by 2027 and cost approximately £392m, providing an estimated 1.7GW uplift on boundary B7a and 394MW across boundary B8.

This document summarises our confirmed decisions from our INC assessment and next steps for the project.

Large Onshore Transmission Investment mechanism (LOTI) Initial Needs Case assessment

We are satisfied that there is a clear consumer benefit in the Yorkshire GREEN project progressing. Having taken into consideration the three consultation responses received, which all agreed with the project needs case, we have concluded that NGET has made a

¹ Special Condition 3.13 of the Electricity Transmission Licence

² Boundary transfer capability: To provide an overview of existing and future transmission requirements, and report the restrictions on the NETS, the concept of boundaries is used. The NETS is split by boundaries that cross critical circuit paths that carry power between the areas where power flow limitations may be encountered. Boundary transfer capability is the maximum pre-fault power that the transmission system can carry from the region on one side of a boundary to the region on the other side of the boundary while ensuring acceptable transmission system operating conditions will exist following one of a range of different faults.

clear case so far for the boundary reinforcements which make up the project. We have not identified any material changes, through consultation responses, to the evidence underpinning the needs case. As such, we see no reason to move away from our position, as set out in our October 2021 consultation. Additionally, we note the associated detriment to consumers through constraint costs³ should there be delays in meeting the proposed delivery date for the reinforcements.

Various technical options were considered within NGET's optioneering process, and the project-specific cost benefit analysis (LOTI CBA) presented an appropriate number of options for analysis. One respondent to the consultation raised a concern on a specific aspect of the technical option chosen by NGET, however, we consider suitable options were assessed robustly. In our view, the results of the LOTI CBA demonstrate that NGET's preferred option, OPN2⁴, for Yorkshire GREEN is the most economical. We note that the optimal performance of OPN2 in the LOTI CBA, in comparison to alternatives considered, can be attributed, at least in part, to its earlier delivery date. This demonstrated to us that in this case the benefits of an earlier delivery date outweigh the benefits of potentially lower cost alternatives for reinforcement of the boundaries. It is therefore essential that the Yorkshire GREEN project is progressed in a timely manner in order to realise these benefits.

NGET intends to continue to progress its preferred option for Yorkshire GREEN further and provide a Final Needs Case (FNC) submission in summer 2022. As part of the FNC process, we expect to receive a detailed technical report, as well as an updated LOTI CBA from NGET. We will use this updated LOTI CBA, as well as any further information and evidence that becomes available during our assessment process, to assess whether the case for the proposed works remains economic and efficient relative to alternative options. Based on our assessment at this INC stage, we expect our focus at the FNC stage to be on assessing whether any changes in technical scope, design, or cost estimates relative to the INC are fully understood and justified. Where NGET propose any changes to the delivery dates of the proposed options, it can be expected that our FNC assessment will be more in depth.

³ Constraints on the network would lead to the ESO making constraint payments to generators that need to be switched off. The cost of this would ultimately feed into consumer bills. ⁴ OPN2 is the NOA code of NGET's preferred option for the delivery of Yorkshire GREEN.

Assessment of suitability for late competition models

In line with our Final Determinations for the RIIO-2 period for Electricity Transmission, as Yorkshire GREEN is being considered under the LOTI mechanism, we have assessed the suitability of the project for 'late model' competition⁵. Our view is that the project, as a whole and as currently scoped, would not meet the criteria for late model competition. However, a significant majority of the project elements do meet the criteria for competition and could therefore be separated out from the other elements in a 'repackaged' project that could be considered for late model competition. This is in line with the Electricity System Operator's (ESO's) view, as published in the Network Options Assessment ("NOA") 2022.⁶

In response to the consultation, both NGET and SSEN expressed their concerns over the impact of the application of competition on project delivery and on consumers. In line with the view expressed in our October consultation, we have not made a decision yet on whether to apply one of the late competition models to the project. This is because we do not think it is appropriate to make a decision until near the time of NGET's proposed major supply chain procurement for Yorkshire GREEN, in case that procurement is materially delayed. At that time we will be able to more confidently compare the delivery timetable for Yorkshire GREEN against the timetable for introduction of the required legislation to finalise the Competitively Appointed Transmission Owner (CATO) model. This will allow us to assess at that point whether the late CATO model could support timely delivery of the Yorkshire GREEN project.

From our assessment at the INC stage we do not consider that there is likely to be any meaningful consumer detriment in delaying our competition decision until nearer the start of the invitation to tender (ITT) stage of NGET's proposed major supply chain procurement for Yorkshire GREEN.

⁵ 'late model' competition refers to the late models of competition (i.e. run for delivery once a project is sufficiently developed) identified for consideration for LOTI projects within the RIIO-2 Period (the Competitively Appointed Transmission Owner (CATO) model, the Special Purpose Vehicle (SPV) model and the Competition Proxy Model (CPM)).

⁶ NOA Report, January 2022

1. Introduction

Context

1.1. The GB onshore electricity transmission network is currently planned, constructed, owned and operated by three transmission owners (TOs): National Grid Electricity Transmission plc (NGET) in England and Wales, Scottish Power Transmission plc (SPT) in the south of Scotland, and Scottish Hydro Electric Transmission plc (SSEN) in the north of Scotland. We regulate these TOs through the RIIO (Revenue = Incentives + Innovation + Outputs) price control framework. For offshore transmission, we appoint offshore transmission owners (OFTOs) using competitive tenders.

1.2. The incumbent onshore TOs are currently regulated under the RIIO-T2 price control, which started on 1 April 2021 and will run for 5 years. Under this price control, we developed a mechanism for assessing the need for, and efficient cost of, large and uncertain electricity transmission reinforcement projects. This mechanism is called 'Large Onshore Transmission Investment' (LOTI). Once the need for and costs of projects become more certain, the TOs bring forward construction proposals and seek funding for them. As explained in Chapter 9 of our RIIO-2 Final proposals – Core document, all projects that come forward for assessment via the LOTI reopener during the RIIO-2 period will be considered for their suitability for delivery through one of the late competition models.

Overview of the Large Onshore Transmission Investment (LOTI) reopener mechanism

1.3. The Large Onshore Transmission Investments (LOTI) re-opener mechanism is an uncertainty mechanism we have included within the RIIO-2 price control for the electricity transmission sector. It provides TOs with a route to apply for funding for large investment projects that can be shown to deliver benefits to consumers, but that were uncertain or not sufficiently developed at the time we set costs and outputs for the RIIO-2 price control period. The LOTI mechanism provides us with a robust assessment process through which we can ensure that TO proposals represent value for money for present and future consumers.

1.4. In order to qualify for the LOTI mechanism, TO proposals must meet the following criteria:

- a) are expected to cost £100m or more of capital expenditure; and
- b) are, in whole or in part, either;
 - i. load-related; or
 - ii. related to a shared-use or sole-use generator connection project.

1.5. We are satisfied that the Yorkshire GREEN project meets these criteria, is eligible as a LOTI project and we are therefore assessing it in accordance with the LOTI process, which is detailed in the LOTI Guidance⁷.

Stages of our LOTI assessment

1.6. Following the approval of eligibility, our LOTI assessment process is made up of three main stages:

- Initial Needs Case (INC) The usual focus of our assessment at this stage is to review the technical and/or economic requirement for the project, the technical options under consideration, and the TO's justification for taking forward its preferred option for further development.
- 2. Final Needs Case (FNC) Following the securing of all material planning consents for its project (unless we specify alternative timing), the TO will then need to submit a FNC. The focus of our assessment at this stage is to confirm the need for the project, by checking that there have been no material changes in technical and/or economic drivers that were established at INC.
- 3. Project Assessment If the FNC is approved, the TO will then need to apply for a Project Assessment Direction. The focus of our assessment at this stage is the assessment of the proposed costs and delivery plan that the TO has in place for the project, with a view to potentially specifying a new LOTI Output, a LOTI Delivery date, and setting the efficient cost allowances that can be recovered from consumers for delivery of the project.

⁷ Large Onshore Transmission Investments (LOTI) Re-opener Guidance | Ofgem

Initial Needs Case for the Yorkshire GREEN project

1.7. The Initial Needs Case (INC) for the Yorkshire GREEN project was submitted by National Grid Electricity Transmission plc (NGET) to us for assessment in June 2021.

1.8. We assessed the INC submission and consulted on our INC views in October 2021. Overall, we received three responses to our consultation from NGET, SSEN and a confidential respondent. All respondents presented their views on the needs case for the project, however only NGET and SSEN presented views on the consideration of delivery model. All non-confidential responses to our consultation are published on our website alongside the decision. We summarise respondent views on the consultation within Chapter 2 of this document, along with our views on these.

Related publications

Yorkshire GREEN INC consultation: <u>Yorkshire GREEN – Consultation on the project's Initial</u> <u>Needs Case and initial thinking on its suitability for competition | Ofgem</u> RIIO-2 Final Determinations - Core Document: <u>https://www.ofgem.gov.uk/publications-</u> <u>and-updates/riio-2-final-determinations-transmission-and-gas-distribution-network-</u> <u>companies-and-electricity-system-operator</u>

LOTI Reopener Guidance document: <u>https://www.ofgem.gov.uk/publications-and-updates/large-onshore-transmission-investments-loti-re-opener-guidance</u>



Our decision-making process

Your feedback

Outline how to give general feedback on the decision. Some template text is provided below:

General feedback

Please send any general feedback comments to <u>RIIOElectricityTransmission@ofgem.gov.uk</u>.

2. Yorkshire GREEN Initial Needs Case Assessment

Section summary

This chapter summarises the key design decisions NGET has made to date on the Yorkshire GREEN project. It sets out our views on these as set out in our October consultation and summarises key responses to that consultation. Finally, it sets out our key views and decisions on the Initial Needs Case (INC).

Overview of the TO's Proposal

2.1. The INC for the Yorkshire GREEN project is supported by a cost benefit analysis (LOTI CBA) carried out by the Electricity System Operator (ESO) as well as recommendations from the annual Network Options Assessment (NOA) process and report.

2.2. NGET's project proposal seeks to reinforce the B7a and B8 boundaries in the North of England to facilitate anticipated increases in North to South power transfers of anticipated renewable generation in Scotland and the North Sea. The proposed project scope consists of:

- 1. Construction of a total of c.7.5km of new 400kV double circuit teeing off of the existing Norton to Osbaldwick line.
- 2. A new 275kV substation at York North, and rationalisation of existing network around it.
- 3. A new 400kV substation at Monk Fryston, adjacent to the existing 275kV substation.
- 4. Reconductoring and uprating 36km of the existing 275kV double circuit overhead line between the new York North and Monk Fryston substations.

2.3. Appendix 1 of this document replicates the information provided in the consultation on why the project has been brought forward, how NGET arrived at its preferred option for reinforcement and the options that were considered in the LOTI CBA. The result of the LOTI CBA is also included, along with justification for NGET's proposed position.

2.4. The remainder of this chapter explains our consideration of these aspects as presented in our October consultation, the views presented by respondents and our consideration of these, including our final INC decision.

Our views on the TO proposals

Our INC conclusions on why the project has been brought forward

Consultation position

2.5. In our October consultation, we agreed that the boundary reinforcement investment is needed given that the anticipated transmission requirements are expected to exceed current boundary capabilities over the forthcoming decade, according to analysis published in ESO's System Requirements Form (SRF) 2020⁸. We note that this is largely driven by anticipated connections of renewable generation, within the context of Net Zero, in Scotland and the North Sea. Hence, we agreed with the necessary role of the Yorkshire GREEN project in facilitating those increased power flows further down south, thus avoiding the need for constraints and associated costs.

2.6. We also noted that all options considered within the LOTI CBA displayed a positive Net Present Value (NPV) for consumers, further highlighting the need for boundary reinforcement.

Consultation responses and our consideration of them

2.7. All respondents agreed with our assessment and supported the needs case for the boundary reinforcements, particularly due to the projects' interaction with facilitating Net Zero targets.

2.8. We remain satisfied that there is a valid technical requirement for the boundary reinforcements proposed by NGET. Having considered all INC consultations responses, our view that the project is needed has not changed.

⁸ https://www.nationalgrideso.com/document/171956/download

Our views on how NGET arrived at the preferred option for reinforcement

Consultation position

2.9. Our consultation highlighted that we were satisfied that NGET considered a suitable range of options to arrive at the preferred option of OPN2 for the Yorkshire GREEN project. We perceived that rational judgements were made during the shortlisting process, particularly the impacts of alternative options on routing and planning consents, and also the additional constraint cost implications of pursuing cheaper options with later EISDs⁹.

2.10. Furthermore, we were satisfied that an appropriate range of options were tested within the LOTI CBA to allow for effective analysis of feasible options.

2.11. Although we perceived that NGET generally provided a clear narrative as to how options were developed, we requested the submission of a detailed technical report to further support our engineering judgement that the current scope of proposed reinforcement was appropriate. While this does not affect our view of the INC for the project, we expect to receive the detailed technical report prior to or alongside the FNC submission.

Consultation responses and our consideration of them

2.12. One confidential respondent raised a concern on the technical option proposed by NGET. The respondent set out that it would be more cost effective to reconstruct the 275kV overhead line using modern towers, as opposed to carrying out the reinforcement with the current towers. The perceived benefit is that this would allow for sustained use of the 275kV circuit as well as creating an additional 400kV circuit for use in future generation scenarios.

2.13. No other respondent raised concerns about the range of options considered.

2.14. Firstly, we note that the technical option presented by the respondent is already similar to one of the alternative options considered by NGET during the optioneering process. It is our view that this option is economically inefficient due to the additional

⁹ EISD is used to show the earliest year at which a network reinforcement option can be feasibly delivered.

investment of £325m that would be required, which would only produce an additional 17MW / year capacity. We consider that such additional costs are not justified for a relatively small increase in boundary capacity. Additionally, in order to realise the full benefits of the alternative option, further network reinforcements would be required outside the network area considered by NGET. Such works to increase capacity level are not required within the next decade, according to the Electricity Ten Year Statement ETYS 2020¹⁰.

Our INC conclusion

2.15. We remain satisfied that NGET has considered a reasonable range of technically feasible options to reinforce the relevant boundaries. Having considered representations made through the consultation responses, we do not consider that any feasible technical solutions able to address the boundary reinforcements have been unreasonably excluded from consideration. For this reason, we agree that the optioneering process that was followed by NGET to shortlist identified options is appropriate.

Our views on the LOTI CBA results

Consultation position

2.16. Our consultation explained our view that NGET considered an appropriate range of options to be tested in the LOTI CBA. The CBA itself justified NGET's preferred option, OPN2, for the reinforcement of the relevant boundaries, as the option displayed the highest Net Present Value across each of the Future Energy Scenarios (FES) used to model future relevant supply and demand and is also the Least Worst Regret¹¹ (LWR) option.

2.17. More importantly, the LOTI CBA analysis demonstrated that although there are cheaper alternative options than the preferred option of OPN2, it is still the economically appropriate option due to its earlier EISD, which delivers significant constraint savings compared to the cheaper capital cost options.

¹⁰ The ESO's Electricity Ten Year Statement outlines the present capability and future requirements of the transmission system's boundaries: <u>https://www.nationalgrideso.com/document/181711/download</u> ¹¹ A regret value is calculated for each option in each scenario. This regret value is calculated as the difference between the outcome of a specific option relative to the best performing option under that scenario (meaning that the best performing option in each scenario has a regret of zero).

2.18. We were also satisfied that across the range of LOTI CBA sensitivities tested, specifically delay and cost changes, on balance OPN2 remains the most appropriate option.

Consultation responses and our consideration of them

2.19. No view or concerns were presented on the LOTI CBA results.

Our INC conclusion

2.20. We remain satisfied that the range of options included in the LOTI CBA allowed for appropriate analysis to be carried out. We are satisfied that NGET's decision to pursue OPN2 is supported by the results of the LOTI CBA, as well as the range of sensitivities tested. We also note that following the close of our consultation on the project, the latest Network Options Assessment (NOA 2022¹²) has been published by the ESO, for which OPN2 has received a proceed signal.

2.21. We continue to note that the performance of OPN2 against the other options included in the analysis is largely driven by its earlier EISD, which results in greater constraint cost savings for consumers. Hence, timely delivery of the project is essential for ensuring that the economic benefits, as indicated by the LOTI CBA, are fully realised.

¹² Network Options Assessment – January 2022

3. Delivery model considerations

Background

3.1. Competition in the design and delivery of energy networks is a central aspect of our RIIO-2 price controls. Competition has a key role to play in driving innovative solutions and efficient delivery that can help us meet our decarbonisation targets at the lowest cost to consumers. We set out in our Final Determinations for RIIO-2 that during the RIIO-2 period all projects that meet the criteria for competition and are brought forward under an uncertainty mechanism will be considered for potential delivery through a late competition model. As explained in Chapter 1, Yorkshire GREEN is being brought forward for assessment under the LOTI mechanism, which is an uncertainty mechanism in RIIO-2.

Whether Yorkshire GREEN meets the criteria for competition

3.2. The criteria for late model competition are as follows:

- 3.2.1. New
- 3.2.2. Separable

3.2.3. High-value: projects of £100m or greater expected capital expenditure.

Consultation position

3.3. In Appendix 2 we set out an explanation of our competition assessment from our October consultation. We summarise key elements of our consultation position below.

3.4. In our consultation we explained that we consider that some of the works that make up the proposed Yorkshire GREEN project do not meet the criteria for late competition. These works are the reconductoring of the 275kV overhead line, and some specific works at existing sites and temporary diversions. We explained that we do not consider that these aspects of the project meet the new and separable criteria.

3.5. We explained that the remaining aspects of the project, which make up approximately 73% of the project's cost, do meet the criteria for late competition¹³. Our view was therefore that there is scope to repackage the project in order to apply competition to the aspects of the project elements that do meet the criteria, whilst excluding the works that don't meet the new and separable criteria for competitive tendering purposes.

Consultation responses and our consideration of them

3.6. Only two responses addressed the delivery model.

3.7. One respondent agreed with our assessment of the Yorkshire GREEN project, as proposed, against the criteria for late competition, in particular the aspects which do not meet the new and separable criteria. The other respondent did not comment on the criteria but stated it disagreed with the proposed repackaging of the Yorkshire GREEN project citing that there is no evidence that this would reduce costs for consumers or encourage timely delivery.

Our INC conclusion

3.8. We consider that the proposed approach in our consultation, i.e. in the event that we decide to apply competition to the Yorkshire GREEN project, it would be applied to those aspects of the project that meet the late competition criteria. This aligns with our principles for 'project packaging' as set out in previous decisions on competition policy. As part of our decision on delivery model we will consider the benefits case to consumers of repackaging the Yorkshire GREEN project.

Delivery model considerations and timing of decision

Consultation position

3.9. Since we considered that the majority of the Yorkshire GREEN project meets the criteria for late model competition, our consultation also considered whether it is in the

¹³ Detail on the elements which we consider do not meet the criteria for competition is set out in paragraph 4.4 of our consultation. <u>Yorkshire GREEN – Consultation on the project's Initial Needs Case</u> and initial thinking on its suitability for competition | Ofgem

interests of consumers for any repackaged part of the project to be delivered through a late model of competition, rather than via the prevailing LOTI mechanism under the RIIO-2 arrangements. It also considered whether a decision on the delivery model was necessary at the INC stage.

3.10. Our consultation explained that, in line with the LOTI Guidance, wherever possible we intend to decide whether to apply a late competition model to a project at the INC stage of our assessment. It also explained that we may, at the INC stage, give an initial view before confirming our view at the FNC stage of our assessment.

3.11. In the case of the Yorkshire GREEN project, our consultation explained that NGET expected to submit the FNC at the end of 2023¹⁴. This comes ahead of the decision on major planning consents for Yorkshire GREEN, which is expected to take place at the start of 2024. We would usually expect to make our FNC decision soon after. Based on the delivery plan provided by NGET at the INC submission stage, we did not consider that any evidence had been provided by NGET to demonstrate that there is likely to be any consumer detriment that would result from reaching a final decision on competition during the FNC stage.

3.12. Through engagement with NGET, following the closure of the Yorkshire GREEN consultation and further refinement of the programme, NGET has indicated that it now intends to submit its FNC in mid-2022 in order to minimise the risk of delay to the 2027 EISD for the project.

Consultation responses and our consideration of them

3.13. Both respondents emphasised the importance of a decision being made on the delivery model as soon as possible, given their views on broader industry supply chain status and global manufacturing limitations.

3.14. One respondent, NGET, also flagged that it considers deferral of a competition decision to beyond the INC stage would cause consumer detriment, namely:

¹⁴ See Chapter 4 for changes made to the FNC submission timing post-INC consultation.

3.14.1. Delay to the EISD;

- 3.14.2. Additional constraint costs caused by delay; and
- 3.14.3. Uncertainty in the supply chain resulting in a suboptimal procurement process.

3.15. NGET emphasised that a decision on the delivery model is needed 8-10 months ahead of the Invitation to Tender (ITT) stage of NGET's major supply chain procurement process to allow sufficient time for tender preparation and market engagement. NGET also flagged more generally that given the current uncertainty in the construction and transmission sector and pressing need to deliver Yorkshire GREEN by the 2027 EISD, it may need to begin the procurement process earlier to enable a more realistic construction programme. NGET has requested that a decision on the delivery model is made alongside our INC decision, or by May 2022 at the latest.

3.16. We consider that the responses accurately reflect that there remains a need to balance providing sufficient certainty to allow the Yorkshire GREEN project to continue to progress on time with the potential consumer savings that can be delivered through additional competitive pressures in its delivery.

Our INC conclusion

3.17. In general, and until the underpinning legislation for late model competition is in place, we do not think it is appropriate to make a decision on competition until near the time of a TO's proposed major supply chain procurement for a LOTI project, in case that procurement is materially delayed. This would allow us to more confidently compare the delivery timetable for a LOTI project against timetable for introduction of the required legislation to finalise the late CATO model.

3.18. Having considered the representations to our consultation, in this instance we consider that it is likely to be beneficial to provide NGET with certainty on the delivery model ahead of the ITT stage of the Yorkshire GREEN procurement process, in order to provide certainty to the market and avoid any unnecessary costs. For this reason, once we have received the FNC submission (or other relevant information, if provided earlier by NGET) in mid-2022 according to NGET's updated delivery plan, we will make our delivery model decision ahead of the ITT stage of the Yorkshire GREEN procurement process (which NGET has indicated could begin in November 2022). This will allow us to assess at that

point whether the CATO model could support timely delivery of the Yorkshire GREEN project. After considering consultation responses, we do not consider that there is likely to be any consumer detriment in delaying our competition decision until that time.

4. Next Steps

Section summary

This chapter briefly sets out the next steps in our assessment of this project under the LOTI mechanism, particularly the specific areas of focus for the FNC stage.

4.1. The next stage of our assessment will be the FNC, which we originally expected to be submitted at the beginning of 2023; however, NGET has now informed that it intends to submit the FNC in mid-2022.

4.2. We would normally expect to only receive a FNC submission once planning consent is in place, but in the case of the Yorkshire GREEN project, we are comfortable that it is in the interests of consumers to allow flexibility to the LOTI process to avoid any potential delay to delivery dates as a result of our regulatory processes. For the avoidance of doubt, although we are open in this instance to receive the FNC submission before the decision on major planning consents, we do not intend to make a final decision on the FNC for the Yorkshire GREEN project until after the planning consent decision, as that decision will be important to the overall needs case.

4.3. As part of the FNC submission we expect to receive a detailed technical report and an updated LOTI CBA from NGET, based on up-to-date information. We expect to focus our FNC assessment on ensuring that a robust delivery plan is in place to deliver the project on time, and ensuring that any material changes in technical scope, design or cost, relative to the INC are fully understood and justified. As part of the FNC stage we will also carry out a more detailed assessment of the cost assumptions of NGET's proposed option.

4.4. As set out in Chapter 3, we will make our delivery model decision ahead of the ITT stage of the Yorkshire GREEN procurement process, which NGET has indicated would begin in November 2022.

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Appendix 1 - Explanation of NGET's justification of Yorkshire GREEN needs case from consultation document

Why the project has been brought forward

1.1. In line with Net Zero targets, an expansion in the growth of renewable generation, particularly offshore wind, is expected in the North of England and Scotland over the next decade. Without reinforcement, the transmission network in the North of England region can become strained, requiring constraint action¹⁵ from the ESO to maintain secure and safe system operation. Such action from the ESO would result in costs (constraint costs) which ultimately feed into consumer bills.

1.2. These constraints costs are expected to increase over time, as renewable generation increases, further impacting consumer bills.

1.3. The ESO's Electricity Ten Year Statement¹⁶ (ETYS) has shown the need for investment across multiple northern transmission boundaries of the GB network.
Specifically relevant to Yorkshire GREEN, this analysis shows that the current capability of network boundaries B7a and B8 are unlikely to be sufficient to accommodate the future network requirements. This is illustrated in **Figures 6 & 7** below, which are copied from the ESO's System Requirements Form (SRF) 2020¹⁷, published as part of the ETYS. **Figure 5** shows the major boundaries within NGET's network in the north of England.

Figure 5: Boundaries B7a and B8 (ETYS 2020¹⁸)

¹⁵ When transmission capability is insufficient to support required electricity flow this is known as a constraint. The ESO manages these constraints by taking actions - by paying generators (or demand) in different locations to change their output (or consumption), thus changing the flow on the network. The amount the ESO pays network users to manage constraints in this way is known as the constraint cost.

¹⁶ The ETYS presents the ESO's annual view of what the transmission requirements and capability of Great Britain's NETS are over the next decade.

¹⁷ <u>https://www.nationalgrideso.com/document/171956/download</u>

¹⁸ Electricity Ten Year Statement 2020 - <u>https://www.nationalgrideso.com/research-publications/etys-2020</u>



Figure 6: Boundary capability and transfer requirements for Boundary B7a



Figure 7: Boundary capability and Transfer requirements for boundary B8



1.4. In three of the FES 2020 scenarios, System Transformation, Consumer Transformation and Leading the Way, the required boundary transfers are well above the current boundary capability by the mid-2020s, and in the fourth scenario, Steady Progression, by the late 2020s.

1.5. To relieve these constraints on the affected boundaries, and reduce consequential constraint costs, NGET put forward potential solutions to be compared within the ESO's NOA process. The NOA assesses investment options through a CBA and makes recommendations on options to progress further, to pause, or to stop. In the case of those proposed investments that qualify for the LOTI mechanism, these projects are subject to a further comparative LOTI CBA by the ESO that is used to support the LOTI submission made to us. The LOTI CBA considers options in a greater level of detail, including in terms of route location, delivery timing, and local and wider supply and demand forecasts and trends.

1.6. NGET put the Yorkshire GREEN project proposal forward as an option in the NOA to reinforce the transmission network in the North England region, specifically the restricted capability boundaries B7a and B8, in order to reduce the need for constraint actions and subsequent costs to the system.

1.7. The Eastern HVDC project, a separate LOTI project currently under consideration by Ofgem¹⁹, has close interactions with Yorkshire GREEN. The full boundary benefits of Eastern HVDC will be realised when Yorkshire GREEN is delivered. The most updated constraint cost analysis from the ESO indicates that, if Eastern HVDC is delivered in 2027, the cost of a single year delay to Yorkshire GREEN ranges from £119m to £392m across the FES.

1.8. Another factor influencing the technical option selected for the Yorkshire GREEN project, though not essential to the underlying needs case, is the potential connections of the three future offshore wind and interconnector projects listed below, which currently have 2027 contracted connection dates. However, it is important to note that the FES assume later expected connection dates for these projects based on the extent of progress on each project to date. Those later connection dates have therefore been used in the options analysis carried out in the NOA and LOTI CBA referred to later in this chapter (although a sensitivity analysis has been run using the 2027 connection dates, as referred to in Table 3). The three future offshore wind and interconnector projects are:

- i. Hornsea P4 1.5GW offshore wind;
- ii. Continental Link 1.8GW Interconnector between England and Norway; and
- iii. the Superconnection 1GW Interconnector from Iceland to England.

How NGET arrived at the preferred option for reinforcement

1.9. In line with the LOTI guidance, we have assessed the INC to determine whether NGET has evaluated an appropriate range of options to meet the technical requirement of the project. The next few paragraphs describe this process in which the option proposed by NGET, coded in NOA as OPN2, was determined as the preferred option for the Yorkshire GREEN project.

1.10. Figure 8 below outlines the stages of NGET's development for OPN2.

¹⁹ Eastern HVDC - Consultation on the project's Initial Needs Case and initial thinking on its suitability for competition

Figure 8: Stages of development leading to preferred option



1.11. The initial preferred option for NGET to reinforce the B7a and B8 boundaries was the 'OENO' Central Yorkshire Reinforcement, involving the construction of a new c.28km 400kV double circuit overhead line and 400kV substations in central Yorkshire. This option received a NOA Proceed Signal in NOA 2016/17, a 'hold' in 2017/18 NOA and a NOA Proceed Signal again in the 2018/19 NOA.

1.12. Following the NOA Proceed Signal for the OENO option in the NOA 2018/19, alternative technical solutions were investigated to relieve the same boundary constraints. The outcome of this process stage was the identification of a longlist of 379 strategic options. Filtering of these options carried out by NGET based on costs, distinct benefits, compliance with the Security and Quality of Supply Standards²⁰ (SQSS) criteria and route length²¹, reduced the number of strategic options to 105

1.13. The original assessment resulted in the identification of earlier version OPN2 instead of OENO as the preferred solution at the end of 2019. This earlier version of OPN2 cost

²⁰ <u>https://www.nationalgrideso.com/industry-information/codes/security-and-quality-supply-standards</u>

²¹ NGET considered that minimisation of route lengths would reduce the environmental and social receptors impacted by the project. Longer route options presented increased consenting related delay risks, cost increases as a result of visual mitigation or risk of Development Consent Order (DCO) refusals.

approximately £160m at the time. Subsequently, this option was submitted in the 2019/20 NOA, receiving a proceed signal while OENO received a stop signal.

1.14. Following the proceed signal for OPN2 in the 2019/20 NOA, the potential need to facilitate additional customer connections previously not accounted for arose, and consequently, the scope of the OPN2 project increased, at an increased cost (now £392m).

1.15. The additional elements to accommodate the customer connections were deemed necessary to achieve a required rating of 1500MVA for the proposed transmission line between Osbaldwick and Monk Fryston and associated infrastructure, where previously the rating required was 1100 MVA. The elements added to the scope include:

- i. Construction of additional substation infrastructure (400kV substation at Monk Fryston and 275kV substation at York North)
- ii. Additional 275 kV underground cables
- iii. Additional Power Control System infrastructure
- iv. Additional 1.5km overhead line (OHL) route length
- v. Additional OHL reconductoring
- vi. Additional cable sealing ends
- vii. Additional Super Grid Transformers

1.16. Following the identification of an increased scope and costs for OPN2, the earlier 105 options mentioned were further explored. The result of the process was several shortlisted options now cheaper than increased cost of OPN2 (options shown below 'OENO' in **Table**1). However, these cheaper options had later delivery dates and longer route lengths, and therefore OPN2 remained a better overall option in cost benefit terms regardless of its increased cost.

1.17. OPN2 itself was then developed into several variants for further consideration (the other 'OPN' options in **Table 1**). OPN2 still remained NGET's preferred option after review against its variants mainly due to delivery time and route lengths. NGET's indicative delivery programme for Yorkshire GREEN is set out in Appendix 1.

LOTI CBA process

1.18. The LOTI CBA for Yorkshire GREEN compares the likely benefits (in terms of reductions in future constraint costs) across the ESO's FES 2020 scenarios versus the costs (in terms of estimated capital costs) of the shortlisted investment options.

1.19. The options tested in the CBA, as highlighted in **Table 1**, are:

- i. Yorkshire GREEN (OPN2)
- ii. Options tested in NOA 2020/21 (OENO and the 'OPN' variants)
- iii. Options that were less costly than Yorkshire GREEN which all involved more OHL along differing routes (Options below 'OENO' in Table 1)

Table 1: Options considered for the LOTI CBA

NOA code/option	Start Point	End Point	Costs (2020/21 prices £m; capex only)	EISD	Estimated boundary uplift B7A (MW) ²	Estimated boundary uplift B7A in combination with E2DC (MW) ²
OPN1	Norton - Osbaldwick circuits	Poppleton (And Monk Fryston)	644.4	2028	1835	2017
OPN2 (Yorkshire GREEN)	Norton - Osbaldwick circuits	York North substation	392.00	2027	1676	2000
OPN4	Norton - Osbaldwick circuits	York North substation	513.51	2026	1676	2000
OPN5	Norton - Osbaldwick circuits	York North substation	414.19	2027	1676	2000
OENO	Osbaldwick	Eggborough	556.32	2029	1823	2005
4ZR-OSB / THO-4VJ- DRA/EGG- OAC	Thornton – Osbaldwick circuits	Drax – Eggborough circuits	280.00	2029	1823 (as OENO)	2005
4ZR-OSB / THO-4YS- MON/EGG- OAC	Thornton – Osbaldwick circuits	Monk Fryston – Eggborough circuits	292.20	2029	1835 (as OPN1)	2017
OSB-4VJ- DRA/EGG- OAC	Osbaldwick	Drax – Eggborough circuits	312.67	2029	1823 (as OENO)	2005
OSB-4YS- MON/EGG- OAC	Osbaldwick	Monk Fryston – Eggborough circuits	316.15	2029	1835 (as OPN1)	2017
4ZR-OSB / THO-MON- OAC	Osbaldwick – Thornton circuits	Monk Fryston	319.26	2029	1835 (as OPN1)	2017
THO-4VJ- DRA/EGG- OAC	Thornton	Drax – Eggborough circuits	334.75	2029	1823 (as OENO)	2005

LOTI CBA results

1.20. All the options tested in the LOTI CBA displayed high Net Present Values (NPVs), i.e. all the options deliver benefits for consumers (in terms of estimated avoided constraint costs) significantly higher than their estimated capital costs. With the NPV ranging between

£350.51m to £2.02bn across the FES scenarios, OPN2 produces the highest NPV in each scenario, and is consequently the Least Worst Regret²² (LWR) option.

1.21. **Table 2** below shows the LOTI CBA results for all options.

Regret (£m)	СТ	LW	SP	ST	Worst Regret	Rank
OENO	304.69	326.74	268.32	249.44	326.74	12
OPN1	270.22	316.18	247.72	279.97	316.18	11
OPN2	0.00	0.00	0.00	0.00	0.00	1
OPN4	119.92	119.92	119.92	119.92	119.92	5
OPN5	19.65	19.65	19.65	19.65	19.65	2
BCR1: 4ZR-OSB/THO-4VJ-DRA/EGG-OAC	78.95	101.01	42.58	23.70	101.01	3
BCR2: 4ZR-OSB/THO-4YS-MON/EGG-OAC	82.58	105.38	52.49	32.80	105.38	4
BCR3: OSB-4VJ-DRA/EGG-OAC	105.97	128.03	69.61	50.72	128.03	8
BCR4: OSB-4YS-MON/EGG-OAC	102.30	125.10	72.21	52.52	125.10	6
BCR5: 4ZR-OSB/THO-MON-OAC	104.85	127.66	74.76	55.07	127.66	7
BCR6: THO-4VJ-DRA/EGG-OAC	124.15	146.20	87.78	68.90	146.20	9
BCR7: THO-4YS-MON/EGG-OAC	134.81	157.62	104.72	85.04	157.62	10

Table 2: Main LOTI CBA results

1.22. In addition to the LOTI CBA referred to above, various sensitivity analyses were carried out by the ESO. The summary of the results are highlighted in **Table 3** below and the full results can be found in **Appendix 2**.

Table	3:	LOTI	CBA	sensitivity	analysis	summary
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Sensitivity	Result
Delay to options: Each option was tested with delays of 1, 2 and 3 years to the EISD and the impact of delay to OPN2 only was also tested.	When OPN2 is delayed by one year, the LWR option is OPN5. However, as OPN5 is a variation on OPN2, it could not be delivered on its EISD if OPN2 would be delayed (as it would be subject to the same delay as OPN2). The next two options are BCR 1 and 2 (ranked 3 and 4)
	which would have marginally lower regrets than OPN2 if OPN2 was delayed by a year.

²² LWR is a decision making tool that makes recommendations based on which options/strategy produce the least 'regret' across all of the scenarios analysed. We are aware of some limitations of the LWR analysis in practice. LWR results are determined by the balance between the least and most onerous case for development, which could lead to spurious investment recommendations if scenarios are not 'credible'. To minimise this risk, NOA results are reviewed by the NOA committee who use latest market intelligence to test the plausibility of the results, and additional sensitivity analysis is undertaken to look at how robust recommendations are to a change in a scenario.

Interaction with Eastern Link 1 (E2DC): What if E2DC is late? What does this mean for OPN2? Modelling to show the impact of delay of E2DC by 1 and 2 years.	If E2DC was delayed by one year but OPN2 energises in 2027, due to this loss of transmission capacity from B6 into B7a, the regret would be £220m (in <i>Leading the Way</i>). This increases to £430m if E2DC is delayed by 2 years. Analysis suggests that, when compared to a scenario with OPN2 delivered on time but E2DC delivering a year later, it would theoretically be marginally better to delay both projects by one year.
Capex tested with variance of +/- 10%	Varying capex changes by +/- 10% for all the options simultaneously does not alter the least worst regret rankings for the options against the FES scenarios, with OPN2 remaining the optimal option.
Capex is added to the top four options (OPN2, OPN5, BCR1 and BCR2) in £25m increments, to test the sensitivity of the results to additional costs.	Either OPN2 (or the OPN5 variant) remain the optimal option versus the lower cost alternatives even after OPN2's costs increased by ± 100 m. Conversely, similar increases to the lower cost options would make them even less preferable than OPN2.
Constraint costs tested with variance of +/- 10%	Varying constraint costs by +/- 10% for all the options simultaneously does not alter the least worst regret rankings for the options against the FES scenarios, with OPN2 remaining the optimal option.
Local generation tested with assumption that customer connections connect in 2027 rather than FES dates.	BCR2 is the LWR option for this sensitivity. OPN2 being delivered in 2027 also ranks marginally worse than OPN2 with one- or two-year delay.The ESO considers that this sensitivity is not as robust as the others considered within the CBA, as the underlying energy scenarios for this sensitivity are not self-consistent.

Appendix 2 - Explanation of competition assessment from consultation document

Relevant consideration of models

1.23. The late competition models that are available for consideration for the Yorkshire GREEN project are:

- 1. Competitively Appointed Transmission Owner (CATO) Model
- 2. Special Purpose Vehicle (SPV) Model
- 3. Competition Proxy Model (CPM)

1.24. Below we set out details of each of these models, and our initial views on how applicable each might be to any repackaged Yorkshire GREEN project.

CATO model

1.25. Under the CATO model a competitive tender would be run for the financing, construction, and operation of the proposed assets that make up any repackaged Yorkshire GREEN project, with a transmission licence provided to the winning bidder setting out the outputs, obligations and incentives associated with delivering the project. The CATO model requires legislative changes to allow for new parties to be able to be awarded a transmission licence following a competition.

1.26. The high-level delivery plan for Yorkshire GREEN presented by NGET in its submission indicates an expectation that construction will need to commence in early 2025 to meet the required delivery dates. The government has set out its intention to introduce the required legislation²³ but it is currently uncertain when that will be in place and whether this would support timely delivery of any repackaged part of the Yorkshire GREEN project by a CATO.

²³ Page 77, <u>Energy White Paper (publishing.service.gov.uk)</u> (Powering our Net Zero Future, December 2020)

1.27. As set out earlier, analysis from the ESO's LOTI CBA included within the INC submission indicates that a one-year delay to Yorkshire GREEN would cost between £119m-£392m across the FES. For this reason, we consider that any material delay resulting from the application of the CATO model on Yorkshire GREEN would not be in the interests of consumers. At this stage, we do not consider that it is appropriate to rule out the use of the CATO model for any repackaged part of the Yorkshire GREEN project.

SPV model

1.28. Under the SPV model, the incumbent network licensee would run a tender to appoint an SPV to finance, deliver and operate a new, separable and high value project on the licensee's behalf through a contract in effect for a specified revenue period. The allowed revenue for delivering the project would be set over the period of its construction and a long-term operational period (currently expected to be 25 years). The SPV model was originally developed for consideration for projects where the CATO model had been discounted due to a clear expectation that underpinning legislation would not be in place in time to allow the delivery of specific projects. The model was considered in detail during the RIIO-1 period, but we recognise that there would be significant work needed to finalise that model for the Yorkshire GREEN project.

1.29. Given that we are not ruling out the CATO model at this point, and given the indication from Government that it intends to bring forward the legislation required for the CATO model, we do not consider that it is proportionate to progress the work required to allow the SPV model to be applied to the Yorkshire GREEN project in a manner that delivers benefits to consumers without impacting on the delivery dates of the project.

СРМ

1.30. The CPM involves setting a largely project-specific set of regulatory arrangements to cover the construction period and a 25-year operational period for an asset (in contrast with setting arrangements for a portfolio of assets under a price control settlement). It is intended to replicate the efficient project finance structure that tends to be used in competitive tender bids for the delivery and operation of infrastructure projects.

1.31. Importantly, the project would remain delivered by NGET under CPM. This means that there is not the requirement to allow for the running of a full tender for delivery of the project in the same way as the CATO or SPV models, and the CPM assessment stages follow the same process as the LOTI mechanism. This means that there is sufficient time to

decide whether to apply CPM to the Yorkshire GREEN project at the FNC stage, without risking delay to delivery. We consider that it is beneficial for consumers and NGET to make this decision at the FNC stage as we will have a better understanding of the likely financing costs (for CPM and for the counterfactual under future RIIO price controls) at that point in time.