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1. Introduction

- 1.1.1 This paper responds to the East Anglia Transmission Network Reinforcement¹ Report by Hiorns Smart Energy Networks (the Hiorns Report), jointly commissioned by Essex, Suffolk and Norfolk County Councils. The Report largely reflects upon our Norwich to Tilbury – Strategic Options Backcheck and Review² (SOBR) published in June 2023.

¹ [East Anglia Transmission Network Reinforcements](#)

² [Norwich to Tilbury Strategic Options Backcheck and Review](#)

2. Summary

- 2.1.1 By the end of the decade, there could be as much as 18 GW of new, cleaner electricity – enough to power around 18 million homes – connected into the East Anglian network. Ensuring this energy can reach homes and businesses means we need to improve our onshore energy infrastructure, much of which was built to accommodate less demand.
- 2.1.2 The Norwich to Tilbury proposals would reinforce the electricity transmission network in East Anglia, adding much needed capacity to the network. These proposals are part of The Great Grid Upgrade, the largest overhaul of the grid in generations.
- 2.1.3 We welcome all feedback on our Norwich to Tilbury proposals, including on issues raised in the Hiorns Report. We note that the Report is a significant and robust independent study of our proposals. We also welcome the Report’s support of the need for improvements and recognition that an offshore solution would result in significantly higher costs and provide lower capacity than the Norwich to Tilbury onshore proposals.
- 2.1.4 However, we do not accept the Report’s conclusions around the timing of need for additional capacity being closer to 2035 than 2030. NGET is legally obliged (under our Transmission Owner License) to provide capacity at the dates formally agreed in contracts with energy generators (or customers). Contract dates are set out in the ESO Transmission Entry Capacity (TEC) register. At the time of writing, the TEC register shows a significant pipeline of energy generation schemes connecting in East Anglia after 2026 – including several that have already been granted development consent and are committing to contracts with their suppliers.
- 2.1.5 At each key stage of the development process for Norwich to Tilbury, we undertake checks – described as backchecks - to ensure the capacity required in the declared contracts is consistent with our understanding of need (see our Strategic Options Backcheck Report for details). These backchecks also review the progress energy generators are making with planning consents for their projects.
- 2.1.6 Norwich to Tilbury would deliver the capacity required for current and future electricity transmission needs. Even if planned generation connections in East Anglia reduced in the short term, a more expensive offshore solution would not provide sufficient capacity to accommodate predicted future need.

3. Detailed Response

- 3.1.1 The Hiorns Report confirms that there is a need for additional electricity transmission capacity to enable renewable and low carbon generation in the East Anglia region. The Report also agrees that the assessment of boundaries and National Electricity Transmission System Security Quality of Supply Standards (NETS SQSS) must be addressed by National Grid in accordance with its transmission licence. It also acknowledges that NGET's proposed option, including overhead lines, may ultimately be the optimum solution to meet future need.
- 3.1.2 The Hiorns Report concludes that the need is likely to occur closer to 2035, compared to NGET and Electricity System Operator (ESO) recommendations of connection by 2030. The Report, however, represents an independent view of generation timing that is not reflective of the current contracted positions of generators on the TEC register.
- 3.1.3 National Grid's transmission licence includes condition D2 – 'Obligation to provide transmission services'. Our obligations under this condition include responding to requests for the construction of additional transmission system capacity (including system extension, disconnections and/or reinforcement). We cannot make assumptions about generation connections contracts and must provide system capacity at the contracted dates as set out in the TEC register. A summary of relevant legal obligations required by National Grid's transmission licence can be found in Appendix A of the SOBR.
- 3.1.4 The need for additional capacity is established and backchecked against current declared contracts at every key stage of our project (see the SOBR for details). We also backcheck at key point of the planning process, including at submission of an application for a Development Consent Order. The SOBR shows that following the connection of Hornsea 3 in 2026, we will start to see capacities above the maximum achievable transfer from the Norwich group. All projects with connections contracted for after this date (of which there are many), would need to fall away before the proposed Norwich to Tilbury reinforcements were not required.
- 3.1.5 The Hiorns Report also references (in table 2.3) circuit ratings of 3820 MVA in relation to export capacity. These ratings are above the 5000A continuous equipment rating of 400kV substations. We are required to design and plan the transmission system using continuous ratings. This limits these circuits to 3450 MVA continuous operation (see SOBR and SOBR appendix for more detail) and reduces EC5 export capacity to 13,552 MVA compared to the Hiorns Report 14292 MVA.
- 3.1.6 The Hiorns Report also references SIEX group being limited to circuit ratings of 2779 MVA. However, all of these circuits are capable of uprating to the maximum 3465 MVA capacity. When planning the network, this uprating is taken into account before considering further reinforcement requirements of the SIEX group. This gives a SIEX transmission capacity of 6930 MW compared to the Hiorns Report 5558 MVA.
- 3.1.7 The Hiorns Report draws upon a number of ESO documents to question timing of projects but notes the analysis done within the SOBR being based upon contracted background and NETS SQSS as required by National Grid's transmission licence.
- 3.1.8 The Hiorns Report also questions the timing of projects, such as the new Sizewell C connections. However, a number of the projects highlighted in the Report - especially

offshore wind with connection dates beyond 2026 - have been granted development consent and are also committing to contracts with their suppliers. We are obliged to meet their connection dates and ensure our transmission system remains compliant with licence Condition D3 Transmission system security standard and quality of service. D3 states "Transmission owners are required to at all times plan, develop the transmission system in accordance with the NETS SQSS.

- 3.1.9 If a generator changes a contract, for example to modify timing, or ultimately removes its requirement for a connection, this would be identified by our backchecks at each project stage. The backchecked Needs Case at each stage would clearly indicate the timing requirement for the project, recognising that the Norwich to Tilbury Needs Case is multifaceted across a number of boundaries in East Anglia, the south-east and Kent.
- 3.1.10 Based upon the current contracted background, we are not able to delay the programme for Norwich to Tilbury if we are to meet our legal obligations. This is reflected in the Hiorns Report (see table 13.2 sensitivity study (a) Contracted Generation), which confirms the need for reinforcement set out by National Grid. Also noting in table 13.2 boundary EC5N needs reinforcement under all the Hiorns Report scenarios. However, changes in needs case is managed by National Grid by the back check and review of the need at each stage of the project and modification to our approach accordingly to any revised need.
- 3.1.11 The Hiorns Report also suggests that the two interconnectors from Europe planned to connect into the East Anglian network could instead be connected elsewhere on the transmission system, however it is not clear from the Report how this might be achieved. Connection locations are agreed as part of our contracts with energy generators. Under licence condition D2, we are obliged to construct additional transmission capacity on the basis of these contracts. Any changes to contracts would be a matter for the ESO.
- 3.1.12 The Hiorns Report notes that when National Grid undertook the evaluation of the Offshore 1 option, in the conclusions section, we stated that making the connections offshore would add £500m to National Grid costs. This statement was added in a paragraph 15.4.8 of the SOBR to the overall options conclusion section and not included in our full appraisal of Offshore 1. It is correct to say that costs for the offshore connections of the generators will be different from bringing their connections to onshore points.
- 3.1.13 However, this would be additional cost that National Grid would see to make those connections and is therefore accurate, albeit left as a note in paragraph 15.4.8 and not included full cost appraisal tables for Offshore 1. National Grid does not have visibility of the offshore transmission costs of each project so cannot evaluate if that £500m would ultimately save connection costs. The paragraph however is factually correct and indicates that the offshore connection will have cost associated with it.
- 3.1.14 The Hiorns Report argues that if the generation background changed significantly less offshore connections would be necessary in the short term. This was also reflected in National Grid SOBR which included costs for 4GW and 6GW offshore solutions. However, both the SOBR and Hiorns Report 4GW note that offshore solutions are always more costly than our existing proposal, with the added consequence of requiring more offshore solutions to accommodate future generation applications. Whereas the more economical AC onshore option can support both the contracted background or a reduced background and maintain the ability to accommodate future applications with no further work.

- 3.1.15 Reforms to the management of generation projects - the Queue Management process - have been introduced by Ofgem and are being implemented by the ESO. This process seeks to ensure the contracted background reflects generator progress. While there are no guarantees that significant changes to the contracted capacity requirements will occur, we will continue to identify any changes to need through our TEC register backchecking process.

4. Conclusions

- 4.1.1 The Hiorns Report represents a significant and robust independent study of National Grid's proposals and has drawn conclusions based on the assumptions and views of the independent analyst. In respect of need and cost of alternatives, there is broad alignment that reinforcement is required, and the existing proposal may be the best solution to meet future need in East Anglia. National Grid however can't reach the same conclusion as the Report regarding uncertainty associated with the contracted generation background. Noting the legal obligations National Grid is required to meet, we draw the following conclusions:
- a) We agree with the Hiorns Report that there is a need for transmission investment in East Anglia as set out in table 13.2 (a) Contracted Generation of the Hiorns Report.
 - b) Against our current Needs Case, Contractual and Legal obligations National Grid cannot delay its project programme for delivery in 2030.
 - c) Moving any existing signed contracted generation in this area, including interconnectors, is a matter for the Customer and ESO, therefore National Grid is obliged to make provision for contracted connections where they progress to their contract.
 - d) A paragraph referring to £500m of offshore connection cost for an integrated offshore connection was included and is accurate. However, there would potentially be some offset costs depending upon the current third-party costs of connecting offshore generation to the proposed onshore connection location, when compared to this £500m capital costs for accommodating an offshore connection.
 - e) The £500m offshore connection cost was not used in our comparison of appraisal cost tables for offshore 1 and therefore was a noted cost, rather than a direct comparison to onshore option costs and therefore did not influence the comparison.
 - f) The Hiorns Report confirms and aligns with the National Grid SOBR that offshore costs are significantly higher than onshore and provide lower capacity. We note that a phased approach to offshore (as suggested in the Report) - initially installing lower capacity and increasing capacity later - would create a higher initial cost and even higher long-term costs, as capacity is added. The Norwich to Tilbury proposal would deliver all the capacity at lower cost, whilst also providing current and future capacity needs.
 - g) The Queue Management Process will take time to resolve and will always be reflected in National Grid's backcheck and review process undertaken at key stages of the project and planning process. At these stages, National Grid considers its project and programme against the Needs Case and makes any necessary adjustments to proposals and timings, if required.

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