Public

EIR/24/0011

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27 March 2025

Dear requester

Request for Information

Thank you for your request for information which we received on 26 February.

Your request has been considered under the Environmental Information Regulations 2004 (EIR) as the information requested falls within the definition of environmental information as set out in Regulation 2(1) of the EIR. NESO has been subject to the Freedom of Information Act 2000 (FOIA) since 1 October 2024, but the exemption at Section 39 of the FOIA has the effect of routing all requests for environmental information via the EIR and not the FOIA.

Request

You asked us:

1. *Please provide all documentation supplied by SSEN to NG-ESO that was used to make their assessment in NOA 20/21 regarding the TKUP project.*
2. *Please provide minutes of all meetings conducted in the decision-making process used to decide on TKUP recommendation to proceed.*
3. *Please supply any reports produced as a result of the afore mentioned decision-making process.*
4. *Please provide a copy of any material submitted to Ofgem by NG-ESO which could be used in the decision to grant ASTI status.*

5. *Please provide details of any internal or external meetings discussing the need to subject the HND plan to a Strategic Environmental Assessment or a habitats assessment under Art.6(3) of the Habitats Directive*
6. *Why was the HND not subjected to a Strategic Environmental and Sustainability Assessment as required by The Environmental Assessment of Plans and Programmes Regulations 2004?*

Our response

We confirm that we hold information in scope of your request and have responded to your points in turn below.

1. ***Please provide all documentation supplied by SSEN to NG-ESO that was used to make their assessment in NOA 20/21 regarding the TKUP project.***

Please see attached the submissions from the Transmission Owner to ESO. These are on ESO branded templates, but the information was submitted by the TO. It was not clear to us if your request for documentation relating to "NOA 20/21" covered the report that is named NOA 20/21 or any NOAs in 2020 and 2021, so we have provided three submissions and the timeline below.

NOA number	NOA Report Name	Publication Date	Link to NOA Document	Comments
NOA 6	NOA 2020/21	26 January 2021	https://www.neso.energy/document/185886/download	The recommendation for TKUP at this time was "Do not start". Please note that "Do not start" means "do not start yet/at this point in time" and is not a recommendation to never start a project.
NOA 7	NOA 2021/22	27 January 2022	https://www.neso.energy/document/233081/download	TKUP was given a "Hold" recommendation at this point.
NOA 7 Refresh	NOA 2021/22 Refresh	July 2022	https://www.neso.energy/document/262981/download	The NOA 7 Refresh forms part of the suite of documents that make up the Pathway to 2030 Holistic Network Design. This was the point in time where a recommendation to proceed with TKUP was given.

The circuit ID numbers and circuit diagrams have been redacted as these are a potential security risk. The exception at Regulation 12(5)(a) allows us to redact or withhold information that poses a risk to public safety and national security. Circuits within the national grid are considered to be critical national infrastructure and any damage to this infrastructure could have an impact on the

security of energy supply and public safety. NESO acknowledges the public interest in transparency and accountability and providing the full submissions from the TO, but in this case the information does not substantially add to the understanding of the decision to recommend TKUP and there is a greater public interest in maintaining the security of the grid and critical infrastructure and ensuring the safety of members of the public.

2. ***Please provide minutes of all meetings conducted in the decision-making process used to decide on TKUP recommendation to proceed.***

We publish the minutes of the NOA Committee meetings on our website. The minutes of the NOA Committee on 17 June 2022 for the NOA 7 Refresh relate to TKUP. You will see a reference to TKUP on page 7 of the minutes and then a record that "The committee endorsed the list of NOA refresh options".

3. ***Please supply any reports produced as a result of the afore mentioned decision-making process.***

The NOA and HND reports are all published on our website. These are the key outputs from the NOA and HND processes. No other reports that fall within the scope of your request are held.

4. ***Please provide a copy of any material submitted to Ofgem by NG-ESO which could be used in the decision to grant ASTI status.***

We do hold material submitted to Ofgem associated with the decision about ASTI status. The aim of Ofgem's review was to check how their regulatory framework could be adjusted to support strategic onshore electricity transmission projects being expedited to deliver the Government's 2030 ambitions. ESO's involvement was to calculate the economic impact of accelerating or delaying projects.

Please see the attached document which was submitted to Ofgem. The "Draft" watermark on the document appears to have been left on the document, but this document was shared with Ofgem.

Some detail, including cost figures, has been redacted as this information is considered commercially sensitive information and we are redacting under the exception at Regulation 12 (5)(e) of the EIR which states that a public authority may refuse to disclose information to the extent that its disclosure would adversely affect the confidentiality of commercial or industrial information where such confidentiality is provided by law to protect a legitimate economic interest. The information is based on data provided to us by the TOs in confidence and only for the purpose of our licenced activities.

NESO is bound by the confidentiality obligations under the System Operator Transmission Owner Code (STC) when we receive information for the purposes of our system operator business. NESO also falls within the scope of the Utilities Act 2000 and Section 105 of that Act makes it a criminal

offence to disclose information: a) obtained under the Utilities Act 2000 and any other key energy legislation such as the Gas Act 1986 and the Electricity Act 1989, subject to specific exceptions; and b) where the information relates to the affairs of any individual or any particular business during the lifetime of the individual or so long as the business continues to be carried on.

In our opinion, the information in question which is held for the purpose of the economic assessment is subject to the restrictions at Section 105 of the Utilities Act and does not fall within any of the limited exceptions to that duty of confidentiality. Beyond this, there is also a common law duty of confidentiality based on the expectations of the Transmission Owners.

All exceptions in the EIR are subject to a public interest test.

NESO is mindful that the EIR requires us to apply a presumption in favour of disclosure when considering the public interest test. There is a public interest in NESO, as a public corporation, being accountable for its advice and recommendations. We also recognize that there is a public interest in local residents having information about changes to infrastructure which may impact on their local communities and the environment and during planning processes.

The Information Commissioner has acknowledged that there is some inherent public interest in maintaining commercial confidences and that third parties would be discouraged from confiding in public authorities if they did not have some assurances that confidences would be respected. In order to fulfil our statutory and licence obligations as the independent system operator and planner under the Energy Act 2023, we must remain independent, fair, and consumer focused. Disclosure is likely to harm the relationship between NESO and the TOs and would be likely to reduce trust in NESO more widely in the energy sector. If suppliers of information are concerned about the disclosure of the information, and feel that they cannot trust NESO, such that they are unwilling to provide information in the future, this would be likely to have a detrimental effect on NESO's ability to carry out our role, which would not be in the public interest. Additionally, we are moving to a model with a greater level of competition, where the information provided by TOs may be used by competitors, and there is a public interest in allowing fair competition within the market place.

Having weighed up these public interest arguments, our opinion is that the balance of the public interest lies in maintaining the exemption and withholding the confidential information provided by the TOs.

Please note that in reaching our decision regarding the disclosure of this document and the redactions, we have consulted with Ofgem and with SSEN.

Please see information on the Ofgem website relating to the ASTI consultations and decisions:

- Decision on accelerating onshore electricity transmission investment
- https://www.ofgem.gov.uk/consultation/consultation-accelerating-onshore-electricity-transmission-investment.

We advise that you contact Ofgem regarding the information that they used in their decision-making process.

5. ***Please provide details of any internal or external meetings discussing the need to subject the HND plan to a Strategic Environmental Assessment or a habitats assessment under Art.6(3) of the Habitats Directive***

AND

6. ***Why was the HND not subjected to a Strategic Environmental and Sustainability Assessment as required by The Environmental Assessment of Plans and Programmes Regulations 2004?***

At the time of carrying out the HND, we sought legal advice on the requirement for environmental assessments aligned with relevant legislation. The advice was that the HND did not require an SEA or HRA.

These issues were discussed at two meetings of the Environmental Sub-Group (ESG) of the Central Design Group (CDG) which were attended by staff from ESO, representatives from the Transmission Owners, government departments, the Crown Estate, Ofgem, and various environmental bodies:

- 6 October 2021 (the first meeting of the ESG)
- 3 November 2021.

We do hold the full legal advice that we received, the slides that were shared with the ESG with the relevant parts of the advice, and the minutes of the two meetings which also recorded a summary of the advice. We but are not providing a copy to you as this is covered by legal professional privilege and the EIR exception at Regulation 12(5)(b). In terms of the public interest test, NESO recognises that there is a public interest in understanding the rationale for the decisions that it makes, particularly where these impact on the environment and planning related matters. There is, however, a public interest in safeguarding openness in all communications between client and lawyer to ensure access to full and frank legal advice. Information Tribunal decisions have placed considerable weight in favour of upholding legal professional privilege and on balance, therefore, we believe that the public interest lies in maintaining the exception at Regulation 12(5)(b) and not providing a full copy of the advice.

Our environmental appraisal approach through the HND and HND follow up exercise have followed principles aligned with a SEA to ensure our decision-making process was robust in considering all four network design objectives on an equal footing (cost, environment, community and deliverability/operability).

We have continued engagement with stakeholders through our Environmental Sub-Group through the HND follow up exercise and kept the position under review as the work has evolved.

Following feedback from stakeholders, and as our role and licence requirements have developed, we are in the process of undertaking a SEA and HRA for the future HND and HNDFUE marine cabling and components up to the transmission interface point. We also believe that given the increased scale of the proposed future offshore network, undertaking assessments at a more strategic stage will help to move plans forwards through later stages. It remains the case that developers would be required to undertake more detailed assessment at the detailed design stage in advance of consent.

We are also in the process of reviewing what is to be captured for assessments under the Centralised Strategic Network Plan (CSNP). Onshore and offshore works will be considered together under the CSNP (which is under development), and we will take the learning from the offshore network design in setting up the CSNP engagement. Separately, we are also going to be undertaking assessments as part of developing the Strategic Spatial Energy Plan (SSEP) for Great Britian. You can find out more about future strategic energy planning environmental assessments here: Strategic Energy Planning Environmental Assessments.

Additional Points

You have also asked about our use of the word "recommended". We use this term because we are making recommendations. If you refer to Ofgem's ASTI document Accelerated Strategic Transmission Investment Guidance And Submission Requirements Document you will see on pages 9-11 that the ESO's view on a project was listed as only one of a number of criteria that Ofgem uses to determine whether the ASTI framework is applicable to a project. Not all projects from the HND and NOA 7 were included. Ofgem makes the decision regarding ASTI and NESO (and previously ESO) has no direct decision-making role in planning matters or the release of funding. If you have not already done so, you may wish to ask Ofgem for further information about how it processes and considers recommendations from NESO (formerly ESO).

This concludes our response to your request.

Advice and assistance

The following abbreviations have been used in this response:

- NOA – Network Options Analysis
- ASTI – Accelerated Strategic Transmission Investment
- HND – Holistic Network Design
- HNDFUE – Holistic Network
- TO – Transmission Owner
- SEA – Strategic Environmental Assessment
- HRA – Habitat Regulations Assessment

For more information on ASTI, please see the Ofgem webpage: Decision on accelerating onshore electricity transmission investment | Ofgem.

NESO publishes current information about NOA and past documents: Network Options Assessment (NOA) | National Energy System Operator.

HND documents are available on the NESO website: Publications library | National Energy System Operator

Next steps

You can ask us to review our response. If you want us to carry out a review, please let us know within 40 working days and quote the reference number at the top of this letter.

If you are still dissatisfied after our internal review, you can complain to the Information Commissioner's Office (ICO). You should make complaints to the ICO within six weeks of receiving the outcome of an internal review. The easiest way to lodge a complaint is through their website: www.ico.org.uk/foicomplaints. Alternatively, they can be contacted at: Wycliffe House, Water Lane, Wilmslow, SK9 5AF.

Thank you for your interest in the work of the National Energy System Operator (NESO).

Regards,

The Information Rights Team

National Energy System Operator (NESO)

nationalgridESO

SRF Part B -
Physical Description & Diagram

Reinforcement Details

NOA ref	TKUP
TO ref	TKUP
Option Name	East Coast Onshore 400kV Phase 2 Reinforcement

nationalgridESO

Physical Description

Establish further 400kV infrastructure on the east coast following the East Coast 400kV onshore incremental (ECUP) reinforcement, Eastern HVDC link from Peterhead (E4DC/D2/D3) and from Torness (E2DC/D2/D3).

SHE Transmission

Create a new 400kV double busbar substation at Tealing, re-insulation of the existing 275kV double circuit OHLs for 400kV operation from Alyth to Tealing and from Tealing to the SHE Transmission / SPT border (towards Glenrothes / Westfield), and the rebuild of the Kintore to Tealing double circuit OHL [redacted] for 400kV operation (~100km). Remove (or find a new suitable location for) the 1000MVA 400/275kV SGTs at Alyth and dismantle the existing 275kV double circuit OHL from Kintore to Tealing [redacted]

Tealing substation: Establish a new 400kV double busbar arrangement complete with bus section, bus isolators, two bus couplers and busbar selection on all circuits with space provision to accommodate 10 bays. Install two new 1200MVA 400/275kV SGTs for connection of the new 400kV busbars to the existing 275kV busbars. The connection to the 275kV busbar (maintained for connection to Firth of Forth, Tealing SVC and the 132kV network) will be via existing 275kV OHL circuit breakers. The new 400kV OHLs from Kintore, Alyth and the SHE Transmission / SPT border (i.e. via Glenrothes / Westfield) are to be connected to the 400kV busbar via dedicated circuit breaker bays.

The new 400kV line from Kintore to Tealing is assumed to be an L8 construction with twin 425mm2 AAAC Totara conductor.

SHE Transmission Asset List:

400kV 10 Bay double busbar substation at Tealing

2x1200MVA 400/275kV SGTs at Tealing, consider relocation from Alyth

Rebuilt Kintore - Tealing 400kV double circuit OHL

Reinsulated Alyth - Tealing and Tealing - SHE Transmission/SPT border 400kV double circuit OHLs

SHE Transmission Equipment Parameters:

Line or Cable Data

From	To	Circuit Length (km)	Parameters (Per Unit on 100MVA base)			Post Fault Rating (MVA)		
			R1	X1	B1	Winter	Spr/Aut	Summer
400kV OHL 2x425mm2 Totara AAAC (90°C), L8 towers (x2)								
Kintore 400kV	Tealing 400kV	100	0.0020	0.0192	0.5884	1980	1900	1770
Alyth 400kV	Tealing 400kV	16.2	0.0003	0.0031	0.0953	1980	1900	1770
400kV OHL, 2 x 400mm2 Zebra ACSR (65° C), L8 towers								
Tealing 400kV	Glenrothes/Westfield (SPT)	38.8	0.0008	0.0073	0.2358	1590	1500	1340

Wound Components Data

From	To	Tap Range Data			Parameters (Per Unit on 100MVA Base)		Post Fault Rating (MVA)		
		Number	+%	-%	R1	X1	Winter	Spr/Aut	Summer
Tealing 400/275kV SGT1 and SGT2									
Tealing 400kV	Tealing 275kV	-	-	-	0.00025	0.012	1200	1200	1200
Tealing 275kV	Tertiary				0.00341	0.0396	90	90	90
Tertiary	Tealing 400kV				0.00286	0.0573	90	90	90

SP Transmission Works

Overhead line works

Uprate the existing circuits (2x400mm Zebra ACSR) between the SHE Transmission border and Longannet from 275kV 65° operation to 400kV 65° operation assuming new ratings based on TGN(E) 026.

Substation Works

Glenrothes

- Establish a new 400kV substation at Glenrothes, install two new 400/275kV 240MVA transformers to feed existing 275kV substation.

Westfield

- Replace existing 275/132kV 240MVA transformers with two new 400/132kV 360MVA transformers and maintain existing running arrangment at higher voltage.

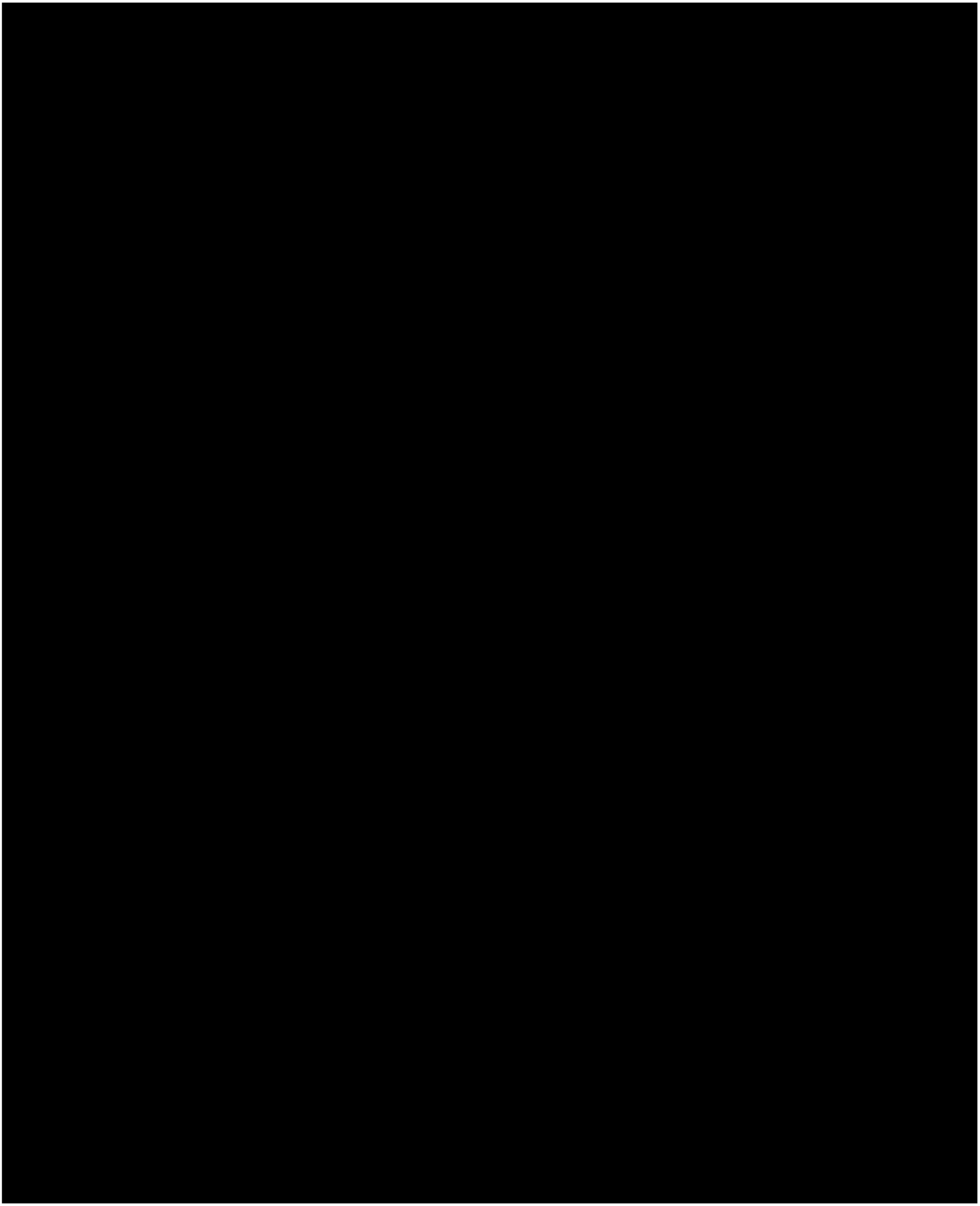
Mossmorran

- Replace existing 275/132 240MVA transformers with two new 400/132kV 240MVA transformers and maintain existing running arrangment at higher voltage.

Longannet

Assume 400kV busbar available for connection of new 400kV circuits from Westfield.

Diagram



What problem does the reinforcement solve?

Following completion of ECUP and the Eastern HVDC links this reinforcement further enhances the boundary transfer capability of B2 and B4 in line with the Part A requirements

Instructions for filling in

This form is a complement of the SRF Part B and should be attached to the field "Physical Description attachment" of the SRF of the corresponding reinforcement in the Data Room SharePoint site.
Please use a separate form for each reinforcement.
If the reinforcement has been submitted for NOA analysis in the past:

- **A form with the existing data should be filled in for you**
- **Please review and update the fields "Physical Description", "Diagram", "What problem does the reinforcement solve?".**
- **Upload the form back to the Data Room SharePoint site.**

If the reinforcement is new:

- **Fill in all the fields in the form and upload it to the Data Room SharePoint site.**
- **Please use the following naming conversion: "NOA ref_NOA6_PartB_attachment"**

Note that "NOA ref", "TO ref" and "Option Name" are provided in this form for reference only.

SRF Part B -
Physical Description & Diagram

Reinforcement Details

NOA ref	TKUP
TO ref	TKUP (SPT-RI-2073)
Option Name	East Coast Onshore 400kV Phase 2 Reinforcement

nationalgridESO

Physical Description

Establish further 400kV infrastructure on the east coast following the East Coast 400kV onshore incremental (ECUP) reinforcement, Eastern HVDC link from Peterhead (E4DC/D2/D3) and from Torness (E2DC/D2/D3).

SHE Transmission

Create a new 400kV double busbar substation at Tealing, re-insulation of the existing 275kV double circuit OHLs for 400kV operation from Alyth to Tealing and from Tealing to the SHE Transmission / SPT border (towards Glenrothes / Westfield), and the rebuild of the Kintore to Tealing double circuit OHL [redacted] for 400kV operation (~100km). Remove (or find a new suitable location for) the 1000MVA 400/275kV SGTs at Alyth and dismantle the existing 275kV double circuit OHL from Kintore to Tealing [redacted].

Tealing substation: Establish a new 400kV double busbar arrangement complete with bus section, bus isolators, two bus couplers and busbar selection on all circuits with space provision to accommodate 10 bays. Install two new 1200MVA 400/275kV SGTs for connection of the new 400kV busbars to the existing 275kV busbars. The connection to the 275kV busbar (maintained for connection to Firth of Forth, Tealing SVC and the 132kV network) will be via existing 275kV OHL circuit breakers. The new 400kV OHLs from Kintore, Alyth and the SHE Transmission / SPT border (i.e. via Glenrothes / Westfield) are to be connected to the 400kV busbar via dedicated circuit breaker bays.

The new 400kV line from Kintore to Tealing is assumed to be an L8 construction with twin 425mm2 AAAC Totara conductor.

SHE Transmission Asset List:

400kV 10 Bay double busbar substation at Tealing

2x1200MVA 400/275kV SGTs at Tealing, consider relocation from Alyth

Rebuilt Kintore - Tealing 400kV double circuit OHL

Reinsulated Alyth - Tealing and Tealing - SHE Transmission/SPT border 400kV double circuit OHLs

SHE Transmission Equipment Parameters:

Line or Cable Data

From	To	Circuit Length (km)	Parameters (Per Unit on 100MVA base)			Post Fault Rating (MVA)		
			R1	X1	B1	Winter	Spr/Aut	Summer
400kV OHL 2x425mm2 Totara AAAC (90°C), L8 towers (x2)								
Kintore 400kV	Tealing 400kV	100	0.0020	0.0192	0.5884	1980	1900	1770
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400kV OHL, 2 x 400mm2 Zebra ACSR (65° C), L8 towers								
Tealing 400kV	Glenrothes/Westfield (SPT)	38.8	0.0008	0.0073	0.2358	1590	1500	1340

Wound Components Data

From	To	Tap Range Data			Parameters (Per Unit on 100MVA Base)		Post Fault Rating (MVA)		
		Number	+%	-%	R1	X1	Winter	Spr/Aut	Summer
Tealing 400/275kV SGT1 and SGT2									
Tealing 400kV	Tealing 275kV	-	-	-	0.00025	0.012	1200	1200	1200
Tealing 275kV	Tertiary				0.00341	0.0396	90	90	90
Tertiary	Tealing 400kV				0.00286	0.0573	90	90	90

SP Transmission Works

Overhead line works

Uprate the existing circuits between the SHE Transmission border and Longannet from 275kV 65° operation to 400kV 65° operation. These circuits are:

- Tealing to Westfield 275kV circuit (YS route – from YS065 to YS001) via Glenrothes 275kV circuit [redacted]
- Westfield to Longannet 275kV circuit [redacted] via Mossmorran 275kV circuit [redacted]

All associated environmental and civil works.

Substation works:

Glenrothes

- Establish a new 400kV compound.
- Installation of two new 400/275kV 240MVA transformers, SGT3 and SGT4, and new 400kV circuit breaker and associated disconnectors.
- Install new 400kV line disconnectors to feed new SGTs.
- Modification of line entry to accommodate existing [redacted] route circuit into new SGTs (SGT3 and SGT4).
- Updates to existing protection to accommodate new voltage

Westfield

- Proposed 275kV switchgear to be replaced as part of T2. Incremental cost of including 400kV switchgear instead of like for like replacement of 275kV switchgear required for this project.
- Removal of existing 240MVA SGT1 and SGT2.
- Installation of new 400/132kV 360MVA transformers to be accommodated via existing 132kV connections, and existing 275kV connection to become 400kV
- Updates to existing protection to accommodate new voltage.

Mossmorran

- Removal of existing 240MVA 275/132kV SGT1 and SGT2, and associated 275kV switchgear [redacted]
- Installation of two new 400/132kV 240MVA transformers to be accommodated by existing 132kV switchgear.
- Installation of new 400kV switchgear as per existing 275kV arrangement [redacted]
- Updates to existing protection to accommodate new voltage

Kincardine North

- Installation of two new 400kV switchbays into new 400kV GIS substation and connection of new 400kV circuits into these. Assume new substation laid out to accommodate.

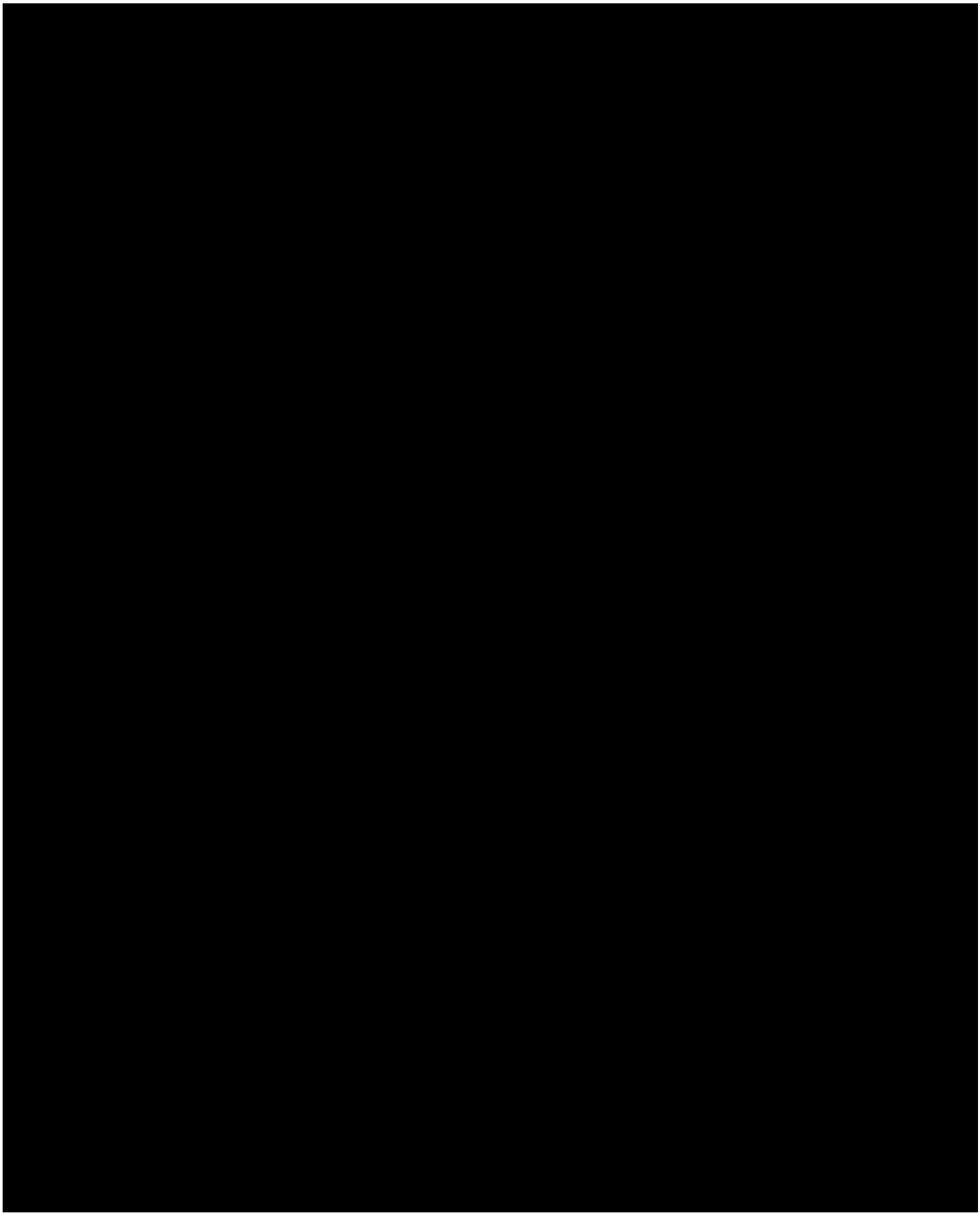
Longannet

- Following ECUP and LWUP, at Longannet site [redacted] and [redacted] will be connected at 275kV to form Kincardine – Mossmorran and Kincardine – Westfield 275kV circuits. Disconnect this and connect [redacted] to form 400kV circuit to Kincardine North.

Kincardine

- Disconnect, denergise and retain existing Westfield/Mossmorran double circuit [redacted] at Kincardine.

Diagram



What problem does the reinforcement solve?

Following completion of ECUP and the Eastern HVDC links this reinforcement further enhances the boundary transfer capability of B2 and B4 in line with the Part A requirements

Instructions for filling in

This form is a complement of the SRF Part B and should be attached to the field "Physical Description attachment" of the SRF of the corresponding reinforcement in the Data Room SharePoint site.
Please use a separate form for each reinforcement.
If the reinforcement has been submitted for NOA analysis in the past:

- **A form with the existing data should be filled in for you**
- **Please review and update the fields "Physical Description", "Diagram", "What problem does the reinforcement solve?".**
- **Upload the form back to the Data Room SharePoint site.**

If the reinforcement is new:

- **Fill in all the fields in the form and upload it to the Data Room SharePoint site.**
- **Please use the following naming conversion: "NOA ref_NOA6_PartB_attachment"**

Note that "NOA ref", "TO ref" and "Option Name" are provided in this form for reference only.

SRF Part B -
Physical Description & Diagram

Reinforcement Details

NOA ref	TKUP
TO ref	TKUP (SPT-RI-2073)
Option Name	East Coast Onshore 400kV Phase 2 Reinforcement

nationalgridESO

Physical Description

Establish further 400kV infrastructure on the east coast following the East Coast 400kV onshore incremental (ECUP) reinforcement, Eastern HVDC link from Peterhead (E4DC/D2/D3) and from Torness (E2DC/D2/D3).

SHE Transmission

Create a new 400kV double busbar substation at Tealing, re-insulation of the existing 275kV double circuit OHLs for 400kV operation from Alyth to Tealing and from Tealing to the SHE Transmission / SPT border (towards Glenrothes / Westfield). Rebuild of the Kintore to Tealing double circuit OHL [redacted] for 400kV operation (~100km). Construct an additional 400kv circuit between Rothienorman and Kintore. Remove (or find a new suitable location for) the 1000MVA 400/275kV SGTs at Alyth and dismantle the existing 275kV double circuit OHL from Kintore to Tealing [redacted].

Tealing substation: Establish a new 400kV double busbar arrangement complete with bus section, bus isolators, two bus couplers and busbar selection on all circuits with space provision to accommodate 10 bays. Install two new 1200MVA 400/275kV SGTs for connection of the new 400kV busbars to the existing 275kV busbars. The connection to the 275kV busbar (maintained for connection to Firth of Forth, Tealing SVC and the 132kV network) will be via existing 275kV OHL circuit breakers. The new 400kV OHLs from Kintore, Alyth and the SHE Transmission / SPT border (i.e. via Glenrothes / Westfield) are to be connected to the 400kV busbar via dedicated circuit breaker bays.

The new 400kV line from Kintore to Tealing is assumed to be an L8 construction with twin 425mm2 AAAC Totara conductor.

The new 400kV line from Rothienorman to Kintore is assumed to be an L8 construction with twin 425mm2 AAAC Totara conductor.

SHE Transmission Asset List:

400kV 10 Bay double busbar substation at Tealing

2x1200MVA 400/275kV SGTs at Tealing, consider relocation from Alyth

Rebuilt Kintore - Tealing 400kV double circuit OHL

New Rothienorman – Kintore 400kV double circuit tower route (strung with single circuit)

Reinsulated Alyth - Tealing and Tealing - SHE Transmission/SPT border 400kV double circuit OHLs

SP Transmission Works

Overhead line works

Uprate the existing circuits between the SHE Transmission border and Longannet from 275kV 65° operation to 400kV 65° operation. These circuits are:

- Tealing to Westfield 275kV circuit [redacted] via Glenrothes 275kV circuit [redacted]
- Westfield to Longannet 275kV circuit [redacted] via Mossmorran 275kV circuit [redacted]

All associated environmental and civil works.

Substation works:

Glenrothes

- Establish a new 400kV compound.
- Installation of two new 400/275kV 240MVA transformers, SGT3 and SGT4, and new 400kV circuit breaker and associated disconnectors.
- Install new 400kV line disconnectors to feed new SGTs.
- Modification of line entry to accommodate existing [redacted] route circuit into new SGTs (SGT3 and SGT4).
- Updates to existing protection to accommodate new voltage

Westfield

- Proposed 275kV switchgear to be replaced as part of T2. Incremental cost of including 400kV switchgear instead of like for like replacement of 275kV switchgear required for this project.
- Removal of existing 240MVA SGT1 and SGT2.
- Installation of new 400/132kV 360MVA transformers to be accommodated via existing 132kV connections, and existing 275kV connection to become 400kV
- Updates to existing protection to accommodate new voltage.

Mossmorran

- Removal of existing 240MVA 275/132kV SGT1 and SGT2, and associated 275kV switchgear [redacted]
- Installation of two new 400/132kV 240MVA transformers to be accommodated by existing 132kV switchgear.
- Installation of new 400kV switchgear as per existing 275kV arrangement [redacted]
- Updates to existing protection to accommodate new voltage

Kincardine North

- Installation of two new 400kV switchbays into new 400kV GIS substation and connection of new 400kV circuits into these. Assume new substation laid out to accommodate.

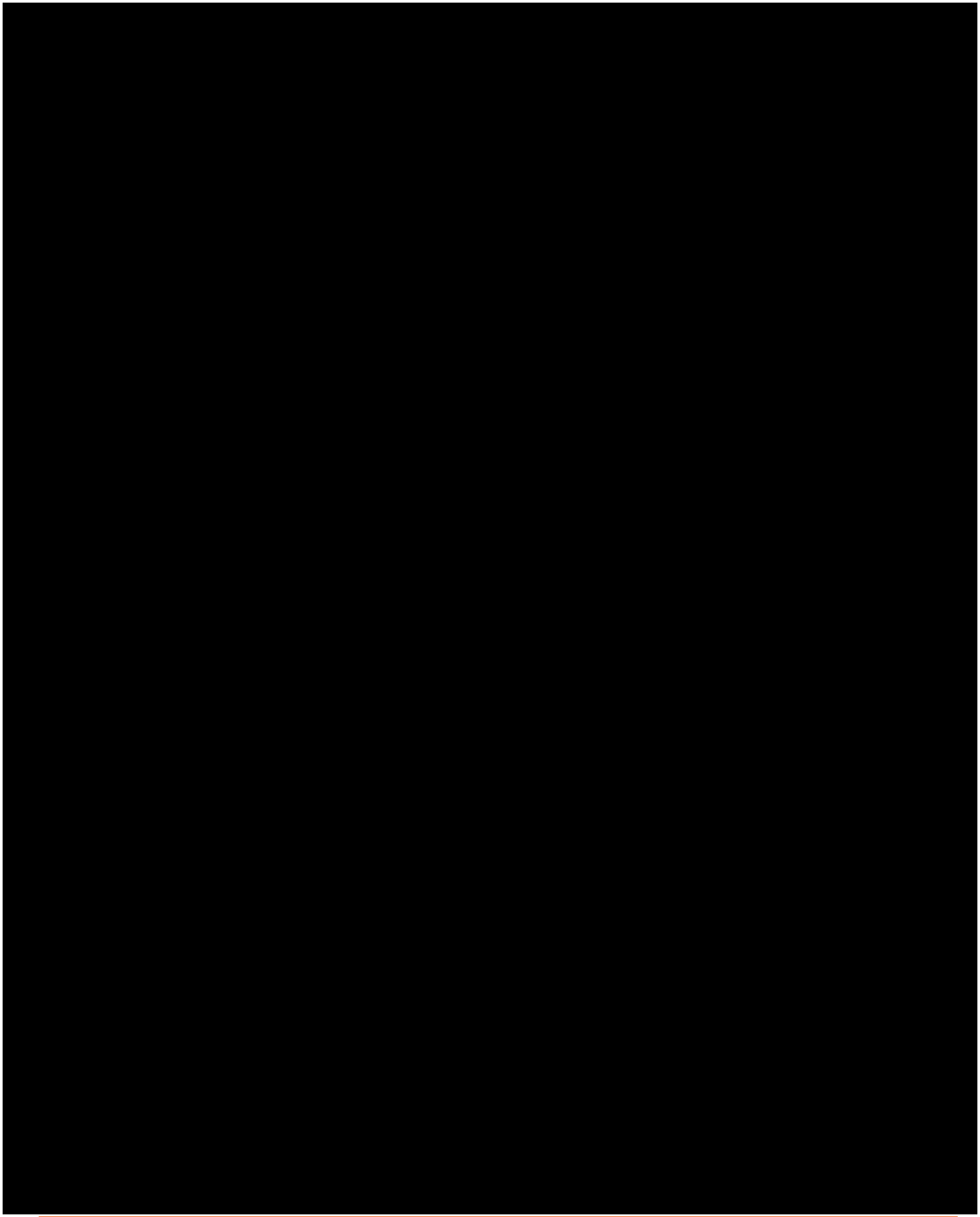
Longannet

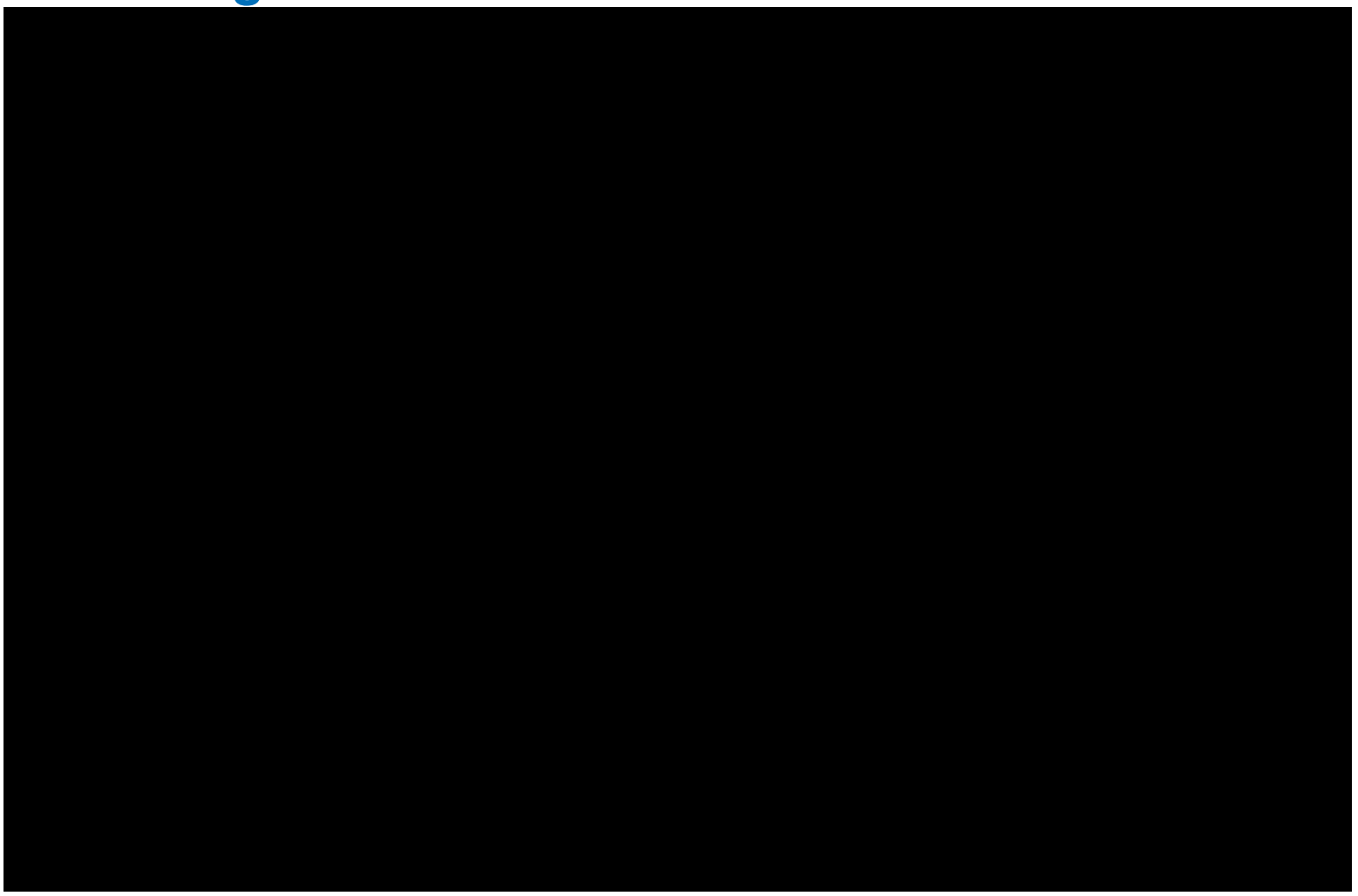
- Following ECUP and LWUP, at Longannet site [redacted] will be connected at 275kV to form Kincardine – Mossmorran and Kincardine – Westfield 275kV circuits. Disconnect this and connect [redacted] to form 400kV circuit to Kincardine North.

Kincardine

- Disconnect, denergise and retain existing Westfield/Mossmorran double circuit [redacted] at Kincardine.

Diagram





What problem does the reinforcement solve?

Following completion of ECUP and the Eastern HVDC links this reinforcement further enhances the boundary transfer capability of B2 and B4 in line with the Part A requirements

Instructions for filling in

This form is a complement of the SRF Part B and should be attached to the field "Physical Description attachment" of the SRF of the corresponding reinforcement in the Data Room SharePoint site.
Please use a separate form for each reinforcement.
If the reinforcement has been submitted for NOA analysis in the past:

- **A form with the existing data should be filled in for you**
- **Please review and update the fields "Physical Description", "Diagram", "What problem does the reinforcement solve?".**
- **Upload the form back to the Data Room SharePoint site.**

If the reinforcement is new:

- **Fill in all the fields in the form and upload it to the Data Room SharePoint site.**
- **Please use the following naming conversion: "NOA ref_NOA6_PartB_attachment"**

Note that "NOA ref", "TO ref" and "Option Name" are provided in this form for reference only.

Data submission

Ofgem ASTI Data Request

Executive summary

Context

Ofgem have been consulting on what actions should be taken to aid in accelerating 26 options, listed in Table 1. These options were identified as "Required for 2030" in the ESO's HND and NOA7 Refresh publication and have been included in Ofgem's Accelerating Strategic Transmission Investment (ASTI) scheme. Actions to aid in acceleration could cause consumer detriment, by removing things such as competition and changing the regulatory approval process. Ofgem have asked the ESO to provide economic data that provides evidence of the economic benefits to accelerating these projects, so that they can assess that against the potential consumer detriment. This paper explains the ESO's analysis to support this process in response to Ofgem's two main questions shown below.

Table 1: Full list of 26 ASTI options

Code	EISD (based on current processes)	Optimal delivery date	"Accelerate to 2030" group?
AENC	2030	2030	No
ATNC	2030	2030	No
BBNC	2030	2030	No
BLN4	2031	**2030**	Yes
BPNC	2031	**2030**	Yes
BTNO	2028	2028	No
CGNC	2031	**2030**	Yes
DWNO	2028	2028	No
E2DC	2027	2027	No
E4D3	2029	2029	No
E4L5	2031	**2030**	Yes
EDEU	2027	2028	No
EDN2	2032	**2030**	Yes
GWNC	2031	**2030**	Yes
HWUP	2027	2027	No
LRN4	2033	**2030**	Yes
OPN2	2027	2027	No
PSDC	2030	2030	No
PSNC	2037	**2030**	Yes
PTC1	2027	2028	No
PTNO	2028	2029	No
SCD1	2030	2030	No
SLU4	2030	2030	No
TGDC	2031	**2030**	Yes
TKRE	2028	2028	No
TKUP	2032	2030	Yes

Author: [redacted] - ESO
Date: Sep-22

Questions

The economic data that Ofgem have requested consists of two main questions:

1. What are the economic benefits of accelerating the 10 ASTI options to 2030, ahead of their current EISDs?
2. What are the economic benefits and costs of accelerating or delaying the 26 ASTI projects from their current optimal years?

Conclusion

What are the economic benefits of accelerating the 10 ASTI options to 2030, ahead of their current EISDs?

Without accelerating the ten ASTI options to 2030, the offshore network and its associated offshore wind generation will not be able to connect to the onshore system. Ensuring compliance with the design standards of the transmission system is the fundamental reason for the acceleration of these ten options. This was outlined in detail in the Holistic Network Design (HND) Pathway to 2030 report. The consequence of non-compliance cannot be quantified economically and has the potential to significantly outweigh any savings from constraint costs, this also excludes any impact on the reputation of the ESO. Therefore, the ESO insists that the benefits outlined in this document are noted as theoretical and cannot reflect the full benefit of ensuring a compliant transmission system.

With this in mind, the economic analysis has still highlighted a significant consumer benefit of reduced constraint costs by the delivering transmission network early. The economic benefit of accelerating the options as a group from 2033 to 2030 is £1.9bn. This number is larger than the original value submitted to Ofgem for their consultation as it accounts for the benefit across multiple years. The original value was a single year of 2030.

[redacted]

What are the economic benefits and costs of accelerating or delaying the 26 ASTI projects from their current optimal years?

Broadly speaking, there is a larger regret to delay reinforcements than the benefit to accelerate them. This is due to the interconnected nature of the system. Adding one without others does not allow its full benefit to be realised, whilst taking one away makes the whole system weaker. In addition to this, the continued growth of renewable generation throughout the 2030s adds more pressures to the network. The delay costs of the 26 ASTI options can be found in their relevant section of the report below.

The economic benefits of accelerating the 26 ASTI options by one year ahead of their optimal year requires further discussion and analysis. No data is provided in this submission.

ESO's view

Based on this analysis, the ESO is strongly in favour of accelerating the ten "Required for 2030" ASTI projects and that measures are put in place to reduce the risk of delays to delivery schedules. The ESO wants to emphasise that we expect larger benefits than those that can be quantified by pure economic analysis. Government targets for offshore wind in 2030 cannot be met without these projects and there will be an increase in electricity carbon intensity due to constrained wind. This is not accounted for in our analysis but are important factors to consider.

The report

Further context and assumptions

To understand the data below, it is important to note two points. The first is the difference between the acceleration benefits submitted here and the acceleration benefit provided and published in the consultation letter. The second is the difference in values between the acceleration benefits and the delay costs.

All economical values in this document are in 2021/22 price base and in present value discounted from 2021 (to align with NOA7).

Differences to numbers provided for the consultation letter

The total acceleration benefit provided to Ofgem for their consultation letter was a single year value in 2030 that assumed all ten ASTI projects had been accelerated to 2030. The number did not account for the benefits that the offshore network provides.

There are three main differences with the numbers provided in this submission:

1. Some of the projects will be accelerated several years. For example, [redacted]. We have provided the individual yearly benefit and the total benefit across the 2030-2033 acceleration period.
2. [redacted]
3. We have provided a value for the yearly benefit of using a coordinated design against a radial design[1]. This value assumes the ASTI projects have been accelerated in both the coordinated design and in the radial design. The acceleration of the ASTI projects alone dramatically reduces constraint costs, which is why the bulk of constraint cost benefits come from the ASTI project acceleration instead of the coordinated design. Without the ASTI projects acceleration, neither the coordinated or radial designs would be compliant due to the quantity of wind required to connect to the system.

Differences between acceleration benefits and delay costs

The second important context for this information is the difference between the acceleration benefits and the delay costs. Both the acceleration and delay analyses assume an electrically compliant system with all generation allowed to connect. There is a difference because in the acceleration benefit analysis, we have assumed that none of the other ASTI projects have been accelerated. In the delay costs, we have assumed that the nine ASTI projects other than PSNC have been accelerated. Some reinforcements do not see their benefit realised without related reinforcements being built. For example, some reinforcements remove bottlenecks of flows in the network thereby allowing other reinforcements to add value. Without the necessary removal of certain bottlenecks, beneficial reinforcements do not have their value highlighted. For the same reason, removing a reinforcement can reduce the efficacy of related reinforcements and so there is a larger economic cost for removing that reinforcement. An example of this is shown in Table 2 below.

Table 2: Highlighting acceleration and delay study differences

Accelerate/delay	Option considered	Options in background	Delay cost/acceleration benefit
Accelerate	BLN4	No “accelerate to 2030” ASTI options	[redacted] benefit
Delay	BLN4	All ASTI projects except for PSNC	[redacted] cost

[1] A radial design is one where everything connects directly to the onshore network

Analysis

What is the benefit to accelerating projects to 2030?

Acceleration to 2030

Without accelerating the "Required for 2030" ASTI options, the offshore network and its associated offshore wind generation will not be able to connect to the onshore system. Ensuring compliance with the design standards of the transmission system is the fundamental reason for the acceleration of these options. The consequence of non-compliance cannot be quantified economically. Government targets for offshore wind cannot be met without the offshore network or the essential onshore reinforcements.

The HND is a holistic design, and the Network Options Assessment (NOA) is a combined analysis. Investigating options in isolation (like the requirement of this analysis) can provide misleading benefits to the system as a whole. The ESO has assessed the benefits of accelerating the individual projects as individual projects compared to accelerating them as a group. Furthermore, some of the projects are impossible to commission (as the option build on previous reinforcement option) or do not provide any benefit to the transmission system unless they are commissioned with other reinforcement recommendations from the HND.

Table 3 below provides the key summary of accelerating them as a group, and Table 4 provides the benefits of accelerating them individually.

Table 3 shows the total benefit of accelerating the ASTI options and the benefit of a coordinated offshore network. This benefit is calculated by first accelerating the ASTI options, which reduces the constraint costs dramatically, and then comparing the coordinated and radial designs. The benefit of accelerating the ASTI options is greater than the benefit of the coordinated design as the constraints have already been reduced when assessing the coordinated design. In reality, these are interlinked but this is an attempt to quantify the individual benefits.

Table 3: Summary of accelerating ASTI options as a group (2021/22 price base, discounted from 2021)

	Single year benefit, £m			
Category	**2030/2031**	**2031/2032**	**2032/2033**	**Total 2030-2033, £m**
Total benefit of accelerating ASTI options and coordinated offshore network design	£1,228	£918	£700	£2,846
Benefit of accelerating ASTI options as a group	£931	£618	£359	£1,907
Additional benefit of coordinated offshore network design against optimised radial design	£297	£300	£341	£938

Table 4 below shows the individual benefits of each reinforcement. The value of "-" is to highlight that this reinforcement does not need acceleration in that year as it is has an EISD of that year or earlier. It is important to note that this is looking at the individual benefits of each reinforcement. Certain reinforcements are interrelated and so need to be delivered in parallel to see their benefit realised. For example, E4L5 provides significant benefits to multiple boundaries, but cannot connect to the system without the additional substations that will be built as part of the GWNC option. Figure 1 shows that the GWNC option provides connection points for E4L5, TGDC and LRN4, but this benefit cannot be quantified by assessing GWNC in isolation.

Table 4: Summary of benefits to accelerating individual options (2021/22 price base, discounted from 2021)

		Single year benefit, £m		
Option	**EISD**	**2030**	**2031**	**2032**
BLN4	2031	[redacted]	[redacted]	[redacted]
BPNC	2031	No benefit without E4L5		
TKUP	2032	[redacted]		
CGNC	2031	[redacted]	[redacted]	[redacted]
E4L5	2031	Not possible without GWNC		
EDN2	2032	[redacted]		
GWNC	2031	No economic benefit in isolation		
LRN4	2033	Not possible without GWNC		
TGDC	2031	Not possible without GWNC		
PSNC	2037	See section "Benefit of acceleration of PSNC" on page 7		

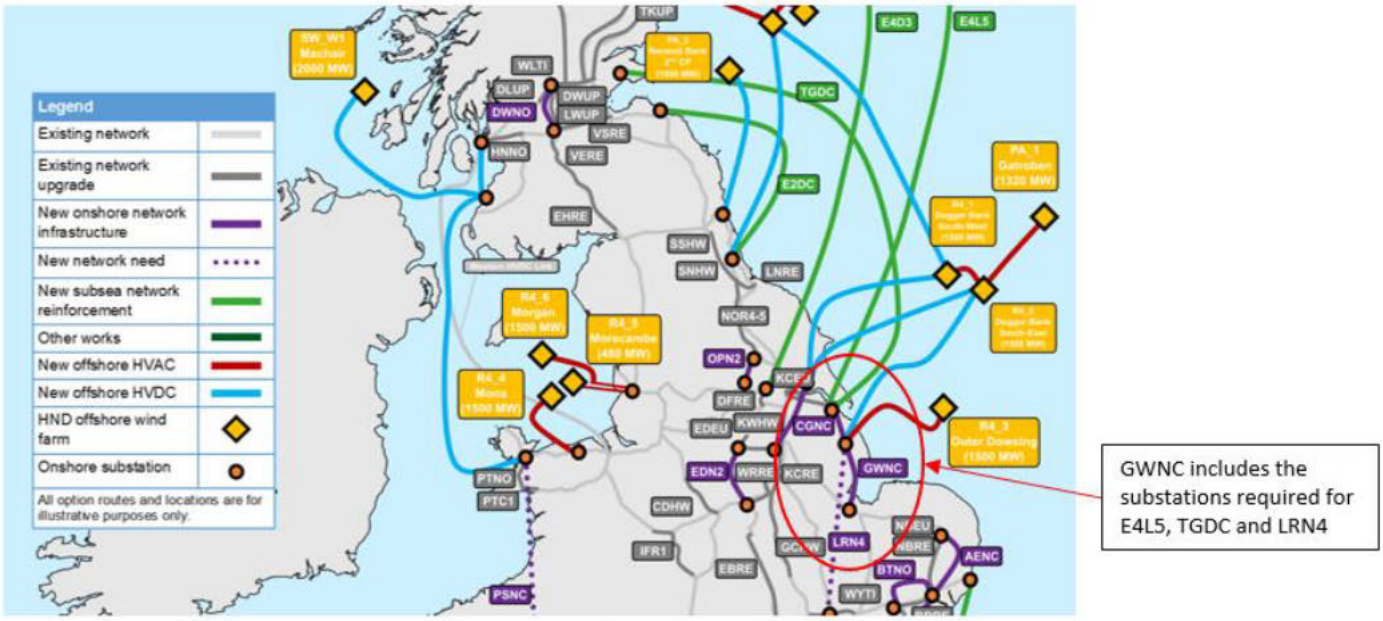


Figure 1: Visualisation of GWNC's importance for other reinforcements

Note: [redacted]

Based on this analysis, the ESO is strongly in favour of accelerating the "Required for 2030" ASTI projects. The ESO wants to emphasise that we expect larger benefits than those that can be quantified by pure economic analysis. Government targets for offshore wind in 2030 cannot be met without these projects and there will be an increase in electricity carbon intensity due to constrained wind. This is not accounted for in our analysis but are important factors to consider.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

What is the cost of delaying each of the 26 ASTI options?

Table 7 below details the delay costs of the 26 ASTI options. All data is taken from the Leading the Way scenario. Note, the data in these tables come from various datasets and use different generation backgrounds. Before any of these values are used, the ESO would like to discuss them in more detail.

Table 7: Individual delay costs of each option (2021/22 price base, discounted from 2021)

Option	Optimal year	Delay cost, £m's	Source of value
AENC	2030	[redacted]	New data
ATNC	2030		New data
BBNC	2030		New data
BLN4	2030		New data
BPNC	2030		New data
BTNO	2028		NOA7 data
CGNC	2030		New data
DWNO	2028		NOA7 data
E2DC	2027		NOA7 data
E4D3	2029		NOA7 data
E4L5	2030		New data
EDEU	2028		NOA7 data
EDN2	2030		New data
GWNC	2030		New data
HWUP	2027		FNC analysis
LRN4	2030		New data
OPN2	2027		FNC analysis
PSDC	2030		New data
PSNC	2030		New data
PTC1	2028		NOA7 data
PTNO	2029		NOA7 data
SCD1	2030		New data
SLU4	2030		New data
TGDC	2030		New data
TKRE	2028		NOA7 data
TKUP	2030		New data

AENC/ATNC/SCD1 and DWNO require further discussion.

As can be seen, cost of delays are broadly higher than the acceleration benefits seen in Table 4 earlier. This is due to the interconnected nature of the system and that the demands on it are growing at a significant rate. Accelerating a reinforcement may not allow the reinforcement's benefit to be fully realised, and delaying a reinforcement can reduce the effect of the reinforcements related to it. This provides greater weight to viewing the reinforcements as a program of works rather than individual reinforcements. An example of this was shown in Table 2 earlier in the section "Further context and assumptions" on page 3.

[2] Higher than FNC submission as this analysis uses a more recent FES with a higher generation background
[3] Higher than FNC submission as this analysis uses a more recent FES with a higher generation background

What is the benefit of accelerating each of the 26 ASTI options by another year?

This analysis has not been completed and it requires further discussion.

Conclusion

Based on the analysis in this report, the ESO strongly recommend that these reinforcements are accelerated. We also recommend actions are taken to ensure there are no delays to delivery schedules. The ESO recommend that they are treated as a program of works, rather than individual reinforcements. As has been mentioned before in this report, the reason for accelerating when required is not the economic data that has been provided here. The reinforcements are critical for ensuring compliance with the SQSS.

The consequence of non compliance cannot be quantified economically and has the potential to significantly outweigh any savings from constraint costs, this also excludes any impact on the reputation of the ESO. Therefore the ESO insists that the benefits outlined in this document are noted as theoretical and cannot reflect the full benefit of ensuring a compliant transmission system.

PSNC was recommended by the HND however it is important to note that the option is in the very early stages of its development and the TO needs to carry out further optioneering to investigate all possible design options, noting that its delivery is required by 2030. Furthermore, PSNC or a similar option is critical to ensuring the compliance of the transmission network and facilitating the compliant connection of offshore wind by 2030.

Further discussion needs to be had regarding the economic data on the acceleration of all the 26 ASTI options.