ofgem
Making a positive difference
for energy consumers

Consultation

Shetland transmission project: Consultation on proposed Final Needs Case and Delivery Model

Publication date:	23/04/2020	**Contact:**	James Norman, Head of New Transmission Investment
		Team:	New Transmission Investment, Systems and Networks
Response deadline:	18/06/2020	**Tel:**	020 7901 7420
		Email:	NTIMailbox@ofgem.gov.uk

This consultation opens on 23/04/2020 and we would like views from people with an interest in the Shetland transmission project. We particularly welcome responses from generators and local stakeholders on Shetland. We would also welcome responses from other stakeholders and the public.

In light of the Coronavirus (COVID-19) national emergency, we have allowed an additional 2 weeks for consultation. The consultation period is 8 weeks. We will keep this period under review and consider allowing additional time for consultation if appropriate.

This document outlines the scope, purpose and questions of the consultation and how you can get involved. Once the consultation is closed, we will consider all responses. We want to be transparent in our consultations. We will publish the non-confidential responses we receive alongside a decision on next steps on our website at **Ofgem.gov.uk/consultations**. If you want your response – in whole or in part – to be considered confidential, please tell us in your response and explain why. Please clearly mark the parts of your response that you consider to be confidential, and if possible, put the confidential material in separate appendices to your response.

Contents

Executive summary

Needs case

This consultation sets out our minded-to position to approve the 600MW High Voltage Direct Current (HVDC) subsea transmission link between mainland Scotland and the Shetland Isles, proposed by Scottish Hydro Electric Transmission[1] (SHE-T) to be delivered in quarter 1 2024. We propose to approve the link on the condition that Ofgem is satisfied, by the end of 2020, that Viking Energy Wind Farm (VEWF) is likely to go ahead.

The type of evidence that would confirm that VEWF is likely to go ahead includes:

1. Evidence of the Final Investment Decision being reached (this may be in the form of board minutes);

2. Evidence of project information on the basis of which that Final Investment Decision has been taken (this may be in the form of the board submission pack and supporting information); and

3. Evidence of the Final Investment Decision triggering a major development milestone, which indicates project commencement (this may be in the form of entry into a major supply contract or commitment of significant development spend).

We have considered a number of factors in order to assess the costs and benefits to existing and future consumers in Great Britain (GB) of SHE-T's proposal. These include security of supply requirements on Shetland, the merits of different link sizes, the level of certainty we would need that the link will be sufficiently used, the impact of potential delay and wider decarbonisation considerations. In addition to various cost benefit assessments, we have also considered further qualitative and quantitative analysis.

We are minded to conditionally approve SHE-T's proposed 600MW link because we consider it to be in the interests of existing and future GB consumers to do so. On balance, we consider that, subject to our conditions being satisfied, construction of the proposed link is likely to

[1] SHE-T is part of Scottish and Southern Electricity Networks (SSEN) which is a subsidiary of Scottish and Southern Energy (SSE).

represent an economic and efficient outcome (in terms of long-term value for money) for GB consumers.

Context

As explained further below, we are reconsulting on the need for SHE-T's proposed link following our previous March 2019 consultation.

SHE-T submitted its original Final Needs Case for the Shetland transmission project under the RIIO SWW (Strategic Wider Works) mechanism in October 2018. Following assessment of SHE-T's submission, we consulted in March 2019 on a minded-to position to approve the Final Needs Case subject to conditions being met.

In that consultation we outlined that we considered there to be a technical and economic need for the Shetland transmission project (dependent on the volume of generation which came forward), and that we were minded-to approve the Final Needs Case if we could be confident that GB consumers were appropriately protected from the risks and costs associated with building an underutilised link. We set out that we were minded-to approve the Final Needs Case subject to VEWF securing a Contract for Difference (CfD) in the 2019 auction. Our consultation also outlined a minded-to position to apply the Competition Proxy Model (CPM) to SHE-T's delivery of the Shetland Isles project, should we ultimately approve the Final Needs Case.

In October 2019, following confirmation that VEWF had not been successful in the 2019 CfD auction, we published an Update Letter on the Shetland project, which set out that we considered it would be in the interests of consumers for Ofgem to consider any revised Final Needs Case that SHE-T may wish to submit.

SHE-T submitted a revised Final Needs Case for the Shetland transmission project in January 2020 and we are now consulting on our assessment of that submission.

Delivery model

This consultation also sets out our minded-to position on the delivery model for the Shetland transmission project.

In our March 2019 consultation, we said that we were minded-to apply the CPM to the Shetland transmission project, based on our analysis of the likely consumer savings from funding the project through the CPM rather than the RIIO counterfactual.

The analysis underpinning our March 2019 minded-to position indicated that the CPM would likely deliver significant savings to consumers for the Shetland transmission project.

We have revisited and updated our analysis. In light of significant changes to the inputs into our analysis since March 2019, we are no longer minded to apply the CPM to the Shetland electricity transmission project. Further detail on this can be found in chapter 5.

Next steps

If, in line with our minded-to position, we decide to approve the Final Needs Case for the Shetland transmission project subject to conditions, we will also need to decide whether those conditions have been satisfied before giving final approval of the Final Needs Case.

Where appropriate, our decision on conditional approval of the project, and on whether any conditions have been met, will be covered in a single document that would constitute our final approval of the Final Needs Case for the Shetland transmission project.

We will confirm the delivery model that we will use to fund delivery of the Shetland transmission project, in the event that we approve the Final Needs Case for the project.

If our decisions change from our minded-to positions set out in this document, in light of responses and new information received, then we may need to re-consult.

1. Introduction

What are we consulting on?

1.1. This consultation document sets out our views and proposals on the Final Needs Case for the Shetland transmission project, a 600MW electricity connection that Scottish Hydro Electric Transmission (SHE-T) is proposing to construct between the Shetland Isles and the Scottish mainland by April 2024. SHE-T estimates the capital costs of the project as c. £630m.

Scope of this document

1.2. This document covers two broad areas:

- **Our assessment of and minded-to position on the Final Needs Case for the Shetland transmission project based on SHE-T's revised submission (January 2020).** This includes consideration of the size, technical design and costs of the proposed link, the potential generation on the Shetland Isles driving the need for the link, and our views on the cost benefit analysis for different link options.

- **Our updated assessment of and minded-to position on the delivery model for the Shetland transmission project**. We will confirm our decision on the delivery model for the project if and when we give final approval for the Final Needs Case for the project (namely, if we are satisfied that the conditions of approval have been).

1.3. The views set out in this document are for consultation and we invite stakeholders to respond using the contact details set out on the front of this document. We have provided questions for stakeholders on particular areas at the start of each chapter, but stakeholders should not feel constrained by those questions in their response.

1.4. We previously consulted on the Final Needs Case for the Shetland transmission link project in March 2019. As discussed further below, we are now reconsulting on the Final Needs Case following receipt of a revised Final Needs Case submission from SHE-T. Where appropriate we have taken account of responses to our March 2019 consultation in coming to the minded-to position, which we set out for consultation below.

1.5. In light of the Coronavirus (COVID-19) national emergency, we have allowed an additional 2 weeks for consultation. The consultation period is 8 weeks running from 23/04/2020 to 18/06/2020. We will keep this period under review and consider allowing additional time for consultation if appropriate.

1.6. This document consists of five chapters and is set out as follows;

- Chapter 1: Introduction – this covers our previous steps in our assessment of the Shetland Final Need Case, wider background and context including the existing network on Shetland and competition in onshore transmission.

- Chapter 2: Final Needs Case – Inputs and assumptions – this covers an evaluation of the generation scenarios, demand sensitivities, reinforcement options and high level views on the technical design and costs.

- Chapter 3: Final Needs Case – CBA and methodology – this covers our review of the cost benefit analysis (CBA) methodology and results submitted by SHE-T as well as further cost benefit analysis undertaken by the Electricity System Operator (ESO).

- Chapter 4: Our overall view on the Final Needs Case, including proposed conditions for approval – this sets out our minded-to position on the Shetland Final Needs Case and the proposed conditions for approval.

- Chapter 5: Delivery Model – this sets out our minded-to position on the delivery model for the Shetland transmission project.

- Chapter 6: Next steps – this sets out the expected decision making timeline for the proposed Shetland transmission project.

Context

Ofgem assessment of Strategic Wider Works projects

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

1.8. The incumbent onshore TOs are currently regulated under the RIIO-T1 price control, which runs for eight years until 31 March 2021. Under this price control, we developed a mechanism for managing the assessment of large and uncertain projects called Strategic Wider Works (SWW). The incumbent TOs are funded to complete pre-construction works, and then subsequently follow up with applications for construction funding when the need and costs for the project become more certain. If Ofgem approves the need for the project it carries out a subsequent assessment of costs and any revenue allowance is then determined. Detail on the SWW arrangements can be found in Ofgem's SWW Guidance document[2] and in Special Condition 6I of SHE-T's electricity transmission licence.[3]

1.9. Our SWW assessment process is in three main stages:

- **Initial Needs Case** – The opportunity to identify, at an early stage, any concerns with how the TO has selected the option it intends to seek planning approval for.

- **Final Needs Case** – The process for taking a final decision on whether there is a confirmed need for the transmission project. This process includes a robust review of the TO's cost-benefit analysis (CBA) for the project.

[2] https://www.ofgem.gov.uk/system/files/docs/2017/11/sww_guidance_version_2.pdf
[3] Further information can be found https://www.ofgem.gov.uk/licences-industry-codes-and-standards/licences/licence-conditions

- **Project Assessment** – The assessment of the detailed cost estimates and delivery plan in order to set allowed expenditure and required deliverables for the transmission project. This stage sets cost allowances for the relevant project, which will ultimately be passed on to consumers.

1.10. As set out in our SWW Guidance document,[4] we will undertake an Initial Needs Case assessment at an early stage of the project's development, before the application for planning consent. The Final Needs Case will usually occur after a TO has submitted an application for planning or development consent to the relevant planning authorities for its proposal.

1.11. This consultation concerns our assessment of the need for SHE-T's proposed Shetland project following receipt (in January 2020) of SHE-T's revised Final Needs Case submission for the project.

1.12. The Initial Needs Case was introduced into the SWW process in 2016. The proposed Shetland transmission project has not been the subject of an Initial Needs Case because the proposed project had already been substantially developed by the time we introduced the Initial Needs Case stage into the SWW process.

Interactions with the planning regime

1.13. Ofgem does not design new transmission projects, plan how they should be built, or decide which routes they should take. This is the responsibility of the developing TO and the relevant planning authorities. For this reason, we do not look at the detailed location of individual lines, pylons or substations nor take a view on what additional visual mitigation measures might be required. Our role is to review the TO's justifications for such decisions where these affect the potential cost of the project to existing and future consumers.[5]

1.14. We also do not design or plan where generation should be sited. The design and location of generation is undertaken by generation project developers in accordance with planning requirements and in response to a variety of other signals and requirements, including; government policy (such as Contracts for Difference), environmental requirements

[4] https://www.ofgem.gov.uk/system/files/docs/2017/11/sww_guidance_version_2.pdf
[5] Further information on our role and the Strategic Wider Works process under which proposed projects such as this are assessed can be found in the SWW Guidance which provides guidance on the process set out in Special Condition 6I of SHE-T's electricity transmission licence – https://www.ofgem.gov.uk/system/files/docs/2017/11/sww_guidance_version_2.pdf

(such as emissions directives or Net Zero), wholesale market prices and network charges. Planning considerations for generation are matters for the relevant planning authorities.

Contracts for Difference (CfD)

1.15. In October 2017 the Department for Business, Energy and Industrial Strategy (BEIS) confirmed that it would be running the third CfD allocation round in 2019.

1.16. In December 2017, BEIS published a consultation on, amongst other things, differentiating Remote Island Wind (RIW) from other onshore wind projects to enable RIW to compete for a CfD in Pot 2 alongside other 'less established' technologies.[6] In July 2018 BEIS confirmed its decision to allow projects on remote islands (which includes Shetland, Orkney and the Western Isles), to compete for a CfD in Pot 2 in the third CfD allocation round. BEIS's decision to allow RIW to bid in Pot 2 was partially driven by the fact that RIW generators face significantly higher costs than other onshore wind for connecting to, and using, the transmission system, due to their distance from the mainland.

1.17. In November 2018, BEIS set out further information[7] on the third CfD allocation round, including the draft budget that would be allocated to the round. In January 2019, BEIS published the draft allocation framework for the 2019 round.[8] This repeated that RIW would be included in the third allocation round.

1.18. In September 2019, the results of the third CFD allocation round were published;[9] this confirmed that none of the prospective generators on the Shetland Isles were successful in the 2019 auction.

1.19. In March 2020, BEIS published a consultation[10] on proposed amendments that could be implemented to future CfD allocation rounds. Amongst other things, this consultation

[6] www.gov.uk/government/consultations/contracts-for-difference-cfd-proposed-amendments-to-the-scheme
[7] https://www.gov.uk/government/publications/contracts-for-difference-cfd-draft-budget-notice-for-the-third-allocation-round
[8] https://www.gov.uk/government/publications/contracts-for-difference-allocation-framework-for-the-third-allocation-round-2019
[9] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/643560/CFD_allocation_round_2_outcome_FINAL.pdf
[10] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/869

considers whether the structure by which different technologies currently compete against each other within groups ('pots'[11]) should be altered and sets out the Government's plans to hold the fourth CfD allocation round in 2021 for both established and less-established technologies. Remote island wind continues to be proposed to be included in Pot 2, for less established technologies.

1.20. The proposed inclusion of RIW in the fourth CfD allocation round is relevant to our assessment of the Shetland transmission project because we anticipate that some prospective generators on the Shetland Isles may view the fourth CfD round as an opportunity to secure a route to market for their projects.

Previous steps in Ofgem assessment of the Shetland Final Needs Case

March 2019 Consultation on Final Needs Case submission from SHE-T

1.21. SHE-T submitted its Final Needs Case for the Shetland transmission project under the RIIO SWW mechanism in October 2018. This requested approval of future funding for a 600MW High Voltage Direct Current (HVDC) subsea transmission link between mainland Scotland and the Shetland Isles to be delivered in quarter 1 2024. SHE-T proposed that approval of the transmission link should be made conditional on the success of Viking Energy Wind Farm (VEWF) in the 2019 CfD auction, i.e. it proposed that Ofgem approve the Final Needs Case for the Shetland transmission project if VEWF was successful in the 2019 CfD auction.

1.22. Following assessment of SHE-T's submission, we consulted[12] in March 2019 on a minded-to position to approve the Final Needs Case subject to conditions. In that consultation we outlined that we considered there to be a technical and economic need for the Shetland transmission project, and that we were minded-to approve the Final Needs Case if we could be confident that GB consumers were appropriately protected from the risks and costs associated with building an underutilised link. We set out that we were minded-to approve the Final Needs Case subject to VEWF (457MW) securing a CfD in the 2019 auction. Our

778/cfd-ar4-proposed-amendments-consultation.pdf

[11] CfDs are allocated in a competitive auction process, in which different technologies compete against each other within groups or 'pots'. BEIS has set out plans to hold the fourth CfD allocation round, in 2021, and for this to include auctions for both established technologies (Pot 1) and less-established technologies (Pot 2).

[12] https://www.ofgem.gov.uk/publications-and-updates/shetland-transmission-project-consultation-final-needs-case-and-delivery-model

consultation also outlined a minded-to position to apply the Competition Proxy Model (CPM) to SHE-T's delivery of the Shetland Isles project, should we ultimately approve the Final Needs Case.

1.23. Our March 2019 consultation received 80 responses, 79 of which addressed the Final Needs Case (the other response only addressed the project delivery model). These came from a mixture of stakeholders, including local generators, Shetland residents, local bodies, politicians and renewable energy associations. Most respondents agreed with the need to reinforce the network on the Shetland Isles to allow generation projects to progress. A number of respondents[13] including SHE-T and VEWF were supportive of our proposed position, however, a quarter of respondents expressed opposition to the proposed transmission reinforcement (and/or to proposed wind generation projects on the Shetland Isles). We set out key aspects of responses in chapters 2 and 3 of this consultation. Appendix 1 provides a summary of responses to our March 2019 consultation.

October 2019 Update Letter

1.24. In October 2019, following confirmation that VEWF had not been successful in the 2019 CfD auction, we published an Update Letter on the Shetland project.[14] We set out that in these circumstances where the conditions for approval of the Final Needs Case on which we had consulted had not been met, we considered it would be in the interests of consumers for Ofgem to consider any revised Final Needs Case that SHE-T may wish to submit.

1.25. We also set out that we considered it important that the analysis underpinning any revised submission from SHE-T should be appropriately updated and that this should include consideration of views of stakeholders, including where relevant responses to our March 2019 consultation.

1.26. We set out that if we received a revised submission from SHE-T, we would consult on our views on that submission ahead of reaching a decision. That is the purpose of this consultation.

[13] In addition, our proposed position was supported by Scottish Government, Shetland Islands Council, National Grid, Highlands and Islands Enterprise and Scottish Renewables.
[14] https://www.ofgem.gov.uk/publications-and-updates/update-shetland-isles-transmission-project-and-potential-next-steps

Existing electricity network on the Shetland Isles

Electricity Supply

1.27. The Shetland Isles are currently served by a 33kV distribution network independent of the main GB electricity system. Scottish Hydro Electric Power Distribution (SHEPD) is the local distribution network owner responsible for security of supply on the Shetland Isles.

1.28. SHEPD also owns and operates 66.95MW of diesel and gas generation at Lerwick Power Station (LPS). In addition, generation is produced by the independently owned 18MW Sullum-Voe Terminal (SVT) and by 12.42MW of embedded generation comprised of wind and some small scale tidal. This embedded generation is managed by SHEPD's Active Network Management (ANM) scheme alongside using SVT to provide system support.

1.29. As set out in our March 2019 consultation, in its current operational regime LPS would come into breach of the Industrial Emissions Directive (IED) from the 1st January 2030. The emissions targets proposed by the IED were originally expected to come into force from 2020.

1.30. As such, in April 2014, we directed SHEPD to run a competitive process to identify the most efficient solution for Shetland's energy future (the 'Shetland New Energy Solution' – SNES).[15] In May 2017 a joint bid by National Grid Shetland Link Ltd (NGSLL) and Aggreko won the competitive process with a mix of a distribution link and on-island backup generation solution.[16] The indicative capital costs associated with the distribution link were identified within the bid as £278.6m, with a further £24.6m associated with Aggreko's backup generating station.[17]

1.31. In 2017, two external developments made it necessary to reconsider our assessment of the best energy solution for Shetland. These were:

1.31.1. A document which sits under the IED was published in late July 2017 and stated that new, tougher emissions targets will only apply to engines on

[15] https://www.ofgem.gov.uk/ofgem-publications/87381/ofgemdeterminationofshepdsubmissionundercrc18a.pdf
[16] The estimated cost of the NGSLL-Aggreko solution was £581.7m (in Net Present Value terms). This figure includes financing costs and operations and maintenance costs in addition to capital costs. As referenced in our November 2017 Shetland Energy Solution decision (see footnote 17), this figure was estimated as an NPV figure in the base year of 2021
[17] Table 4.1: https://www.ofgem.gov.uk/system/files/docs/2017/07/shetland_new_energy_solution_-_consultation_document.pdf

'small isolated systems' and 'micro isolated systems' from 2030 (as opposed to 2020). The Scottish Environment Protection Agency (SEPA) confirmed that this later deadline applies to existing engines at LPS.

1.31.2. In October 2017, the Government announced that, subject to receiving State Aid approval, wind farms on remote islands such as the Shetland Isles would be eligible to compete for a CfD in the next auction for less established technologies, planned for 2019 (as set out in paragraph 1.17).

1.32. We therefore asked SHEPD to investigate the options available to ensure security of supply on Shetland between the start of 2021 and 2025. SHEPD confirmed that with targeted investment, security of supply could be provided until 2025 through a combination of LPS and additional supporting measures and that this could be done at an annual cost significantly below that of the NGSLL-Aggreko solution.

1.33. In November 2017, we rejected the outcome of the SNES competition (the NGSLL-Aggreko bid).[18]

1.34. It remains our understanding that 2025 is the year by which a new solution must be in place to secure demand on the Shetland Isles or additional investment (beyond that referred to in paragraph 1.32) is likely to be needed to extend the life of LPS. We consider the indicative costs of securing demand beyond 2025 in chapter 4.

1.35. In SHEPD's view, if the Shetland transmission project which has been proposed by SHE-T is constructed, it would, when combined with investment in local backup generation (identified as capital costs of £24.6m in the 2017 NGSLL bid[19]) provide long-term security of supply for the Shetland Isles beyond 2025. This would avoid the need for major investment in a distribution link (identified as c. £280m of capital costs in the 2017 SNES competition[20]) or other replacement solution to ensure long-term security of supply on the Shetland Isles once LPS closes, while also complying with the IED.

[18] https://www.ofgem.gov.uk/system/files/docs/2017/11/shetland_new_energy_solution_decision_-_final_0.pdf

[19] This cost excludes financing, operation and maintenance costs, and profit.
[20] As in footnote 19.

1.36. In 2018 SHEPD submitted a proposal to Ofgem for SHEPD to contribute, on behalf of demand consumers, towards the cost of transmission links to remote Scottish islands (including the Shetland transmission link which has been proposed by SHE-T, if that were built) where the links deliver quantifiable benefits, including avoided costs to SHEPD consumers. SHEPD proposed that the level of contribution for Shetland would reflect the benefits to demand consumers of using the transmission link to secure demand on the Shetland Isles in the long-term, as set out above. A contribution from SHEPD would have the effect of reducing charges for transmission-connected generation that would otherwise fund the link, as the contribution would reduce the Transmission Network Use of System charges (TNUoS) charges.[21]

1.37. In May 2019, we consulted on our views on SHEPD's proposal, and in December 2019 we published our decision.[22] Our decision confirmed that if we approve a Final Needs Case for the proposed Shetland transmission project, we will approve SHEPD's contribution proposal for Shetland, subject to it being appropriately implemented. We set out that any such proposals would need to be considered and consulted on through the formal industry code modification governance process. The code modification proposal is currently under consideration through Connection and Use of System Code (CUSC) modification working groups administered by the ESO.

New Connections

1.38. Due to constraints on the existing electricity network, SHEPD is currently not able to allow any new generation connections on the island's distribution network.

1.39. In addition to the network constraints, potential generation projects that would connect into the transmission system have historically not been able to develop into financially viable projects. This may be due to significant TNUoS charges that would normally apply on the Shetland Isles. These charges reflect the costs associated with connecting these generation projects to the transmission system, on mainland Scotland. The changes to the

[21] The contribution would also reduce charges for GB consumers, and may also reduce charges for other generators within the same generation zone depending on the specific TNUoS charging arrangements which apply when the link is operational (those TNUoS charging arrangements being independent of the contribution proposals).

[22] https://www.ofgem.gov.uk/system/files/docs/2019/12/20191217_shepd_contribution_decision_accessible.pdf

CfD regime referenced in paragraphs 1.15 - 1.20 have been introduced, in part, as a result of this.

1.40. There are a number of ongoing modification proposals to the CUSC. The CUSC is the framework for connection to, and use of, the National Electricity Transmission System (NETS).[23] These proposals may have an impact on TNUoS charges in the future, for both generators on the Shetland Isles and across GB. The modification proposals include the proposal to implement any contribution from SHEPD consumers as set out in paragraph 1.37.

1.41. In addition to the ongoing CUSC modifications, and as outlined in paragraph 2.11.2 of our March 2019 consultation, we are continuing to review whether distribution connected generation should face the same transmission forward-looking charging arrangements as transmission connected generation. This would mean that it is possible that distribution connected generators may pay some form of transmission charge in the future if they connect in high cost areas.

1.42. Further to this, as set out in our Winter Work Paper published in December 2019 and our Open Letter on shortlisted policy options, published in March 2020,[24] we are also carrying out a focused review of the merits of change to the reference node, which is a specific part of the methodology that is used to set TNUoS charges.

Competition in onshore transmission

1.43. As part of our decision on the RIIO-T1 price control, we set out that projects brought to us under the SWW regime could be subject to competition. Following our decision on the RIIO-T1 price control, we undertook the Integrated Transmission Planning and Regulation (ITPR) project, which reviewed the arrangements for planning and delivering the onshore, offshore and cross-border electricity transmission networks in GB. Through this project we decided, among other decisions, to increase the role of competition where it can bring value to consumers.

[23] National Grid, (Electricity System Operator) is the Administrator for the CUSC and maintains the Code. All changes are subject to industry consultation and approval by either Ofgem or the CUSC Modifications Panel.
[24] Both publications are available here; https://www.ofgem.gov.uk/electricity/transmission-networks/charging/reform-network-access-and-forward-looking-charges

1.44. Following the ITPR project, we set up the Extending Competition in Transmission (ECIT) project in early 2015 to introduce additional competition in the delivery of new, separable and high value onshore electricity transmission investment. We have published a series of ECIT policy consultation and decision documents, which are available on our website.[25]

1.45. In June 2017, we published an update on our plans to introduce competition to onshore electricity transmission, stating that we were deferring further development of the Competitively Appointed Transmission Owner (CATO) regime until the timing of enabling legislation was more certain. We reiterated that we continued to consider that there are significant benefits to consumers in introducing competition into the delivery of new, separable and high value onshore electricity transmission projects.

1.46. Our August 2017 consultation on the Hinkley–Seabank (HSB) project outlined two potential delivery models (the Special Purpose Vehicle (SPV) model and the Competition Proxy Model (CPM)) which we considered could deliver a significant proportion of the benefits of a CATO tender, for new, separable and high value projects.

Background on the CPM

1.47. The CPM is a regulatory model that seeks to replicate the benefits of competition in the delivery of electricity transmission projects. The CPM works by benchmarking the allowed financing costs of electricity transmission projects at the level expected from an equivalent project subject to a competitive tender. A key source of benchmarks is our Offshore Transmission Owner (OFTO) regime, through which we have been awarding licences following competition since 2009.

1.48. Under the CPM, we would set a largely project-specific set of regulatory arrangements to cover the construction period and a 25-year operational period. This 25-year operational period is designed to reflect the length at which debt is likely to be available at favourable rates in the bank and bond markets. The financing costs element of the revenue would not be subject to further review; there would be no adjustment for changes to prevailing market rates for cost of debt or equity once these have been set.

[25] https://www.ofgem.gov.uk/publications-and-updates/integrated-transmission-planning-and-regulation-itpr-project-draft-conclusions

1.49. In July 2018, following consultation, we decided that the CPM would be the regulatory model applied to the HSB electricity transmission project. This was because our analysis indicated that the CPM would be likely to deliver a significant level of saving to consumers in the delivery of the projects compared to the SWW regulatory model under our RIIO price control. This analysis focused on comparing the indicative financing costs allowed under the CPM to what was, at the time, our best estimate of future RIIO allowed rates of return.

1.50. In September 2018, we published a set of documents providing our view of the development and application of the CPM and the SPV model exclusively for future projects beyond HSB. These included: a consultation on the commercial and regulatory framework for the SPV model; an update of how we expected the CPM, developed in the context of HSB, would be applied to future electricity transmission projects that meet the criteria for competition; and an Impact Assessment (IA) setting out our analysis of the general benefits and costs to consumers of applying the SPV model and the CPM to projects that meet the criteria for competition.

1.51. In March 2019, as part of our consultation on the needs case for the proposed Shetland Isles project, we consulted on a minded-to position of applying the CPM to that project, if we ultimately approved the need for the project.

1.52. In October 2019, we published our minded-to position to revert back to using SWW under RIIO as the regulatory model that will be applied to the HSB electricity transmission project. We set out that our updated analysis indicated that we no longer consider that there is sufficient certainty that applying CPM to HSB would be in the interests of consumers. We expect to publish our decision on the regulatory model for funding HSB in spring 2020.

1.53. As set out in our October 2019 consultation in relation to HSB, we will continue to monitor changes in macro-economic circumstances and forecasts as these are likely to impact on the analysis that informs future decisions on whether to apply the CPM to projects during RIIO-2, or relevant qualifying projects within RIIO-T1.

How to respond

1.54. We want to hear from anyone interested in this consultation. Please send your response to the person or team named on this document's front page.

1.55. We have asked for your feedback in each of the questions throughout. Please respond to each one as fully as you can. However, stakeholders should not feel constrained by those questions in their response and we welcome wider feedback on the matters discussed.

1.56. We will publish non-confidential responses on our website at www.ofgem.gov.uk/consultations.

Your response, data and confidentiality

1.57. You can ask us to keep your response, or parts of your response, confidential. We will respect this, subject to obligations to disclose information, for example, under the Freedom of Information Act 2000, the Environmental Information Regulations 2004, statutory directions, court orders, government regulations or where you give us explicit permission to disclose. If you do want us to keep your response confidential, please clearly mark this on your response and explain why.

1.58. If you wish us to keep part of your response confidential, please clearly mark those parts of your response that you do wish to be kept confidential and those that you do not wish to be kept confidential. Please put the confidential material in a separate appendix to your response. If necessary, we'll get in touch with you to discuss which parts of the information in your response should be kept confidential, and which can be published. We might ask for reasons why.

1.59. If the information you give in your response contains personal data under the General Data Protection Regulation 2016/379 (GDPR) and domestic legislation on data protection, the Gas and Electricity Markets Authority will be the data controller for the purposes of GDPR. Ofgem uses the information in responses in performing its statutory functions and in accordance with section 105 of the Utilities Act 2000. Please refer to our Privacy Notice on consultations, see Appendix 3.

1.60. If you wish to respond confidentially, we'll keep your response itself confidential, but we will publish the number (but not the names) of confidential responses we receive. We won't link responses to respondents if we publish a summary of responses, and we will evaluate each response on its own merits without undermining your right to confidentiality.

General feedback

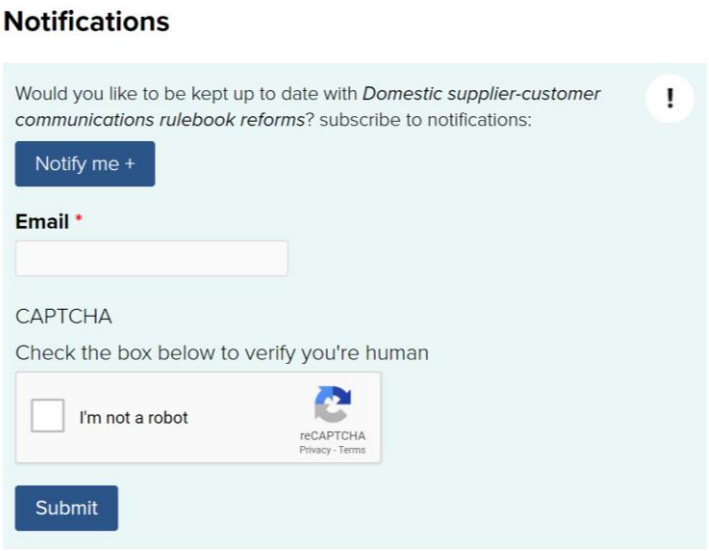
1.61. We believe that consultation is at the heart of good policy development. We welcome any comments about how we've run this consultation. We'd also like to get your answers to these questions:

1. Do you have any comments about the overall process of this consultation?
2. Do you have any comments about its tone and content?
3. Was it easy to read and understand? Or could it have been better written?
4. Were its conclusions balanced?
5. Did it make reasoned recommendations for improvement?
6. Any further comments?

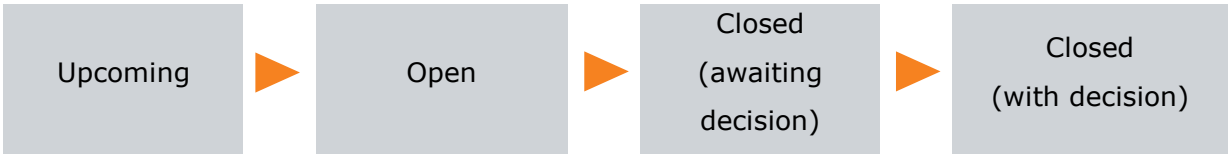
1.62. Please send any general feedback comments to stakeholders@ofgem.gov.uk

How to track the progress of the consultation

You can track the progress of a consultation from upcoming to decision status using the 'notify me' function on a consultation page when published on our website. Ofgem.gov.uk/consultations.



Once subscribed to the notifications for a particular consultation, you will receive an email to notify you when it has changed status. Our consultation stages are:


Upcoming
Open
Closed (awaiting decision)
Closed (with decision)

2. Final Needs Case assessment – Inputs and Assumptions

Section summary

This chapter covers our assessment of the inputs and assumptions in SHE-T's revised (January 2020) Final Needs Case submission for the Shetland Isles project, including:

- The generation scenarios presented by SHE-T;
- The demand sensitivities presented by SHE-T;
- The reinforcement options presented by SHE-T;
- The technical design of the project and its costs; and
- Where appropriate, our views on specific points raised in response to the March 2019 consultation.

Questions

Question 1: What are your views on the generation scenarios developed and updated by SHE-T? We are particularly interested in views on the likelihood of wind generation on the Shetland Isles developing to the levels predicted by SHE-T's scenarios and any further changes or updates since SHE-T's October 2018 Final Needs Case submission that you think should also be considered.

Question 2: What are your views on the demand sensitivity explored by SHE-T?

Question 3: What are your views on the link options considered by SHE-T? We are also interested in views on the options proposed by SHE-T to mitigate against the risks of a second link being needed.

Question 4: What are your views on the technical design and costs of the proposed Shetland link?

Introduction

2.1. SHE-T submitted its revised Final Needs Case for the Shetland transmission project in January 2020. SHE-T continues to propose the construction of a HVDC subsea transmission link, electrically rated at 600MW, between mainland Scotland and the Shetland Isles to be delivered in quarter 1 2024. The proposed project continues to integrate with the existing Caithness-Moray project via a multi-terminal system. SHE-T continues to propose that approval of the transmission link should be made conditional on the progression of VEWF. It proposes that Ofgem approve the Final Needs Case for the Shetland transmission project if VEWF reaches Final Investment Decision (FID).

2.2. We summarise in this chapter key aspects of the inputs to SHE-T's revised Final Needs Case submission and our assessment of the submission to date. This includes our assessment of the proposed generation scenarios, demand sensitivities, reinforcement options considered and proposed technical design and costs of the project.

Future Shetland generation scenarios used in SHE-T analysis

2.3. SHE-T's revised Final Needs Case submission continues to assume that a significant level of wind generation on the Shetland Isles would progress to operation by 2032 (the date used in the generation scenarios) if a transmission link to the mainland were to be built.

2.4. SHE-T's revised submission presents generation scenarios that it has developed with the assistance of its consultants, Gutteridge Haskins & Davey (GHD), and Future Energy Scenarios (FES – developed by National Grid in its role as ESO), as they pertain to generation on the Shetland Isles. SHE-T's revised submission says that the GHD scenarios are based on a bottom-up assessment approach taking into account specific projects identified through transmission contracted and distribution connected data, along with further independent research.

2.5. The GHD generation scenarios are primarily comprised of combinations of 'known' generation projects. A 'known' project may range from the very early stages of development (with a developer only identifying sites) to a well developed project with planning permission. Once all of the 'known' projects have been identified a 'scoring' approach is applied to each project based on a probability assessment tool. The lowest generation scenarios only include projects with the highest scores, whilst the highest generation scenarios include projects with

lower scores. No scenarios assume all projects are developed, as a degree of project attrition is generally assumed.

2.6. The generation scenarios submitted with SHE-T's January-2020 revised Final Need Case are primarily comprised of combinations of the known generation projects presented in Table 1 below.

Table 1: Generation projects in the generation scenarios.

Generation category	Detail
Transmission-connected contracted	VEWF (457MW) Beaw Field (57.8MW/72MW)[26] Mossy Hill (50MW) Energy Isles (120.3MW/200MW)[27]
Distribution-connected (potential)	Various (38.8MW maximum)

2.7. SHE-T says that the generation projects included within the generation scenarios have been updated to reflect the latest information available, following engagement with Shetland stakeholders, analysis of the March 2019 Ofgem consultation responses and further research since SHE-T's October 2018 Final Needs Case submission. The scenarios do not include more uncertain generation such as tidal, floating wind or interconnectors.[28]

2.8. SHE-T's October 2018 Final Needs Case submission used the ESO's FES2017 scenarios.[29] The revised January 2020 Final Needs Case submission uses the FES2018 scenarios.[30]

[26] Beaw Field is consented with a capacity of 57.8MW, but has a connection agreement in place for 72MW.
[27] At the time of Final Needs Case submission Energy Isles had a TEC of 120MW and an additional 80MW in application.
[28] Please see Table 2 in our March 2019 Consultation for details of the generation projects included in the October 2018 generation scenarios.
https://www.ofgem.gov.uk/system/files/docs/2019/04/shetland_consultation_updated_30042019.pdf
[29] The four FES17 scenarios were; Two Degrees (TD), Consumer Power (CP), Slow Progression (SP) and Steady State (SS).
[30] The four FES18 scenarios are; Two Degrees (TD), Community Renewables (CR), Consumer Evaluation (CE) and Steady Progression (SP). TD and CR meet the UKs 2050 carbon reduction target with different levels of decentralisation. CE and SP do not meet 2050 targets. On Shetland the assessment of potential generation under each of the scenarios produces the same assumption that 484MW will progress.

2.9. The FES2019 scenarios were published in July 2019, however FES2019 was not used for SHE-T's January 2020 revised Final Needs Case submission, because although the scenarios were available, the Network Options Assessment (NOA 19/20) results were not available, i.e. the necessary baseline reinforcements recommended for each scenario could not be incorporated into the ESO's modelling. To explore this further the ESO has considered the impact of including FES2019 in the CBA. This is discussed further in paragraph 3.13.

2.10. Table 2 summarises the GHD and FES scenarios provided by SHE-T in its October 2018 Final Needs Case submission and its January 2020 revised Final Needs Case submission.

Table 2: GHD and FES generation scenarios up to 2032

Generation scenario	GHD - S1	FES – SS/SP	FES – CP/CE	FES – SP/CR	FES – TD	GHD - S2	GHD - S3	GHD - S4
October 2018 - total new generation connected on Shetland (MW)	414.1	0	412	484	484	581.4	655.5	742
January 2020 - total new generation connected on Shetland (MW)	459	484	484	484	484	640	711	818

2.11. In the generation scenarios provided with SHE-T's January 2020 revised Final Need Case submission, all four FES2018 scenarios assume 484MW of generation comes forward. This level of generation sits within the GHD S1 and GHD S2 generation scenarios. As such, SHE-T agreed with the ESO that it would only include the four GHD scenarios (GHD S1, S2, S3 and S4) in the cost benefit analysis (CBA) undertaken by the ESO, which was submitted alongside SHE-T's revised Final Needs Case.

Our minded-to views for consultation

Our views on relevant responses to our March 2019 Consultation

2.12. In response to our March 2019 consultation most respondents (including a range of local generators on the Shetland Isles) argued that the generation scenarios used in SHE-T's October 2018 Final Needs Case submission were too low and underestimated the amount of wind generation projects already in development. However, we also received responses to our March 2019 consultation which said that there is no appetite amongst some Shetland Isles residents for significantly more wind generation to be developed at this time.

2.13. Most respondents to our March 2019 consultation also commented on SHE-T's underlying assumptions related to the generation scenarios. In particular, we received 34 responses[31] which commented on Ofgem's 2014 assessment of the Caithness-Moray link[32] and drew comparisons to wider policy reports (such as the Net-Zero Report of BEIS' Energy and Emissions Report) and positions such as the Scottish Government's commitment to net zero by 2045. These respondents said the scenarios are currently too low and should consider forecasts and trends within these reports and policy positions.

2.14. We consider it important to note that the Caithness-Moray project connects a wider region of Scotland to the wider GB network to alleviate thermal (capacity) constraints driven over time by a geographically wider range of new generation, including onshore and offshore windfarms, and planned interconnectors to other countries. Our assessment of the Caithness-Moray link required more general assumptions around future generation and interconnection to be made, across a large number of possible future projects. In contrast, in the case of the proposed Shetland transmission project there are fewer generation projects driving the need for the link, within a narrower geographic area, which allows a more 'bottom up' approach to deriving generation scenarios.

2.15. Similarly, while the policy reports referred to by a number of respondents concern national trends and targets, which may give indications of future development, they do not look into the detail of specific projects within a narrow geographical area such as those driving the proposal for specific transmission reinforcement on the Shetland Isles. SHE-T has not applied an assumed general uplift in generation growth in its revised Final Needs Case submission, which appears to be a reasonable assumption since the generation scenarios have been created on a 'bottom up' basis, i.e. by considering combinations of individual local projects rather than more general regional predictions.

Our minded-to views for consultation

2.16. Consistent with our minded-to position set out in our March 2019 consultation, we continue to consider that there is potential for the development of additional renewable generation on the Shetland Isles.

[31] We received 34 responses from stakeholders who were affiliated to and/or investors in a local renewable developer group, 'Energy Isles'.
[32] Whereby the Ofgem generation growth projection was 7% per annum

2.17. We continue to consider that the network on the Shetland Isles would need reinforcing to accommodate any new generation intending to connect on the Shetland Isles. We note that most of the responses to our March 2019 consultation were supportive of this view.

2.18. Whilst we acknowledge that the Shetland Isles are an area of significant wind potential, we consider that the progression of future generation on the Shetland Isles beyond the VEWF project (which appears to be the most advanced project in terms of possibility of Final Investment Decision) continues to remain uncertain. We consider that the approach taken by SHE-T to base development of the generation scenarios on known projects, and not significantly more uncertain projects such as floating offshore wind or further interconnection with Norway, appears robust. We have received no evidence that floating offshore wind is likely to develop to any scale to utilise the Shetland project within the 2032 timescale considered in the generation scenarios. While we have approved some future interconnection to Norway[33], its location means it is not relevant to the Shetland project. Although a further interconnector to Norway is being considered, that might be relevant to the Shetland project, it is at a much earlier stage of development; for example we have not yet received an application to consider it for our interconnector cap and floor regulatory regime and therefore it would be subject to a future, as yet unconfirmed, cap and floor Initial Project Assessment (IPA) round.

2.19. Consistent with our March 2019 consultation view, and based on the new information we have reviewed as part of SHE-T's revised Final Needs Case submission, we consider that there are several factors that continue to raise doubts about how much generation will progress to full commissioning by 2024 (the year by which SHE-T propose the link would be completed) or by 2032 (the date used in the generation scenarios), as explained below:

2.19.1. While four potential transmission level wind projects (equating to 699.3MW of generation) on the Shetland Isles have connection agreements in place with the ESO, only 579MW of this currently has planning consent. It is therefore possible that not all of the projects with connection agreements will secure planning consent and be able to progress.

[33] As part of our July 2017 FPA decision, we granted a cap and floor regime to the North Sea Link (NSL) interconnector to Norway. In our January 2018 IPA decision, we granted a cap and floor regime in principle to the NorthConnect interconnector to Norway.

2.19.2. We note that another CfD auction is currently proposed for 2021 and this may provide an opportunity for more projects on the Shetland Isles to come forward in the future. However, that generation would first need to secure planning consent in order to be eligible to participate in the next CfD auction, and even then may not be successful in the auction. We are aware that other routes to market are still being considered by generators following the results of the 2019 CfD auction (for example long-term power purchase agreements); however, the economic feasibility of this approach for delivering significant volumes of generation in areas of high transmission charging such as Shetland is currently uncertain.

2.19.3. As referred to in paragraphs 1.38 - 1.42 there are a number of proposed changes to transmission and distribution charging being considered which may impact the financeability of generation projects on the Shetland Isles. Some of the proposed modifications may change charges for transmission-connected generators on Shetland and therefore support additional generation. However, the extent of these changes is not yet known, and even if the changes are made, overall transmission charges may still remain significantly higher than in other parts of GB. As referred to in paragraph 1.39, distribution-connected generation in areas such as Shetland may pay some form of the transmission charge in the future, which may limit the amount of such generation that proceeds.

2.20. The effect of the above is that the range of generation scenarios set out in Table 2 appears representative of a reasonable range of possible outcomes. For example, it seems doubtful at this stage that high generation scenarios on Shetland are likely, i.e. scenarios with levels of generation at, or materially higher than, the levels modelled in S4 in Table 2.

Future Shetland demand sensitivity used in SHE-T analysis

2.21. SHE-T presented, within its revised Final Needs Case submission, a demand sensitivity to be included within its submitted CBA. This sensitivity explores the potential for up to 200MW of industry demand to connect to the Shetland Isles from the west of Shetland oil and gas fields, i.e. an additional source of demand from the Shetland Isles, beyond Shetland's security of supply requirements. This follows discussions between SHE-T and representatives from the oil and gas industry, who are considering opportunities to provide platforms with renewable energy from shore in order to reduce carbon emissions. We understand that the oil and gas platforms would require baseload demand (i.e. require constant access to power), hence the need for energy from shore rather than directly from a renewable generation

source. We understand that industry has explored the feasibility of direct connections between oil and gas platforms and renewable generation sources but that this would not meet the platforms' demand requirements.

2.22. SHE-T is still considering the feasibility of this new demand, as it understands that the oil and gas industry is looking at various options for decarbonising its operations, of which connecting to the Shetland Isles is one. However, if the additional demand did eventuate, it would reduce the levels of electricity generated on the Shetland Isles that would need to be exported to the mainland via SHE-T's proposed transmission link.

2.23. On the basis of its discussions with the oil and gas industry stakeholders, SHE-T estimated in its revised Final Needs Case submission that there is 50-80MW of baseload demand per platform, and that it considers there is potential for up to 250-300MW of industry demand in total to connect to the Shetland Isles. Due to the reasons outlined in paragraph 2.22, SHE-T consider there remains significant uncertainty with the capacity and timing of this demand and has assumed in its revised Final Needs Case submission, the demand phasing set out in Table 3 below.

Table 3: Assumed Shetland demand profile from oil and gas

Year	2026	2030	2032	2034
Demand Capacity	50MW	100MW	150MW	200MW

2.24. SHE-T has presented the CBA in its revised Final Needs Case submission both with and without this demand sensitivity included.

Our minded-to views for consultation

2.25. Following engagement with the Oil and Gas Authority and other relevant stakeholders, we are comfortable with the approach taken by SHE-T in the development and inclusion of the demand sensitivities to capture the potential impact of additional industrial demand from the West of Shetland oil and gas fields.

2.26. The approach to include the range of demand estimates set out within Table 3 appears reasonable as we understand that there is significant uncertainty associated with both the timing and potential volume of demand from industry. It is also possible that no additional demand eventuates, which is also considered in the CBA.

Link options considered by SHE-T

2.27. In SHE-T's October 2018 Final Needs Case submission it considered twelve link options across three different geographical corridors. Further information on the twelve link options and a map outlining the routes can be found in our March 2019 consultation.[34] In its October 2018 submission, SHE-T focused on five of the link options (1, 2, 3, 11 and 12) in the CBA after applying three optioneering filters: reviewing capacity, programme and cost. The option proposed by SHE-T in its October 2018 submission was option 2, the 600MW link between the Shetland Isles and Caithness.

2.28. In its January 2020 revised Final Needs Case submission SHE-T has reviewed the five options that it progressed to the CBA as part of its October 2018 submission (1, 2, 3, 11 and 12). Of these five options, SHE-T has included only three (1, 2 and 3) in its revised CBA. These are the three options SHE-T considered performed best in the CBA in its October 2018 Final Needs Case submission, i.e. the least worst regret (LWR) option (option 2 – the Shetland – Caithness 600MW link), and the two next LWR options (option 1 – the Shetland - Caithness 450MW; and option 3 – the Shetland - Caithness 800MW option).

2.29. SHE-T says in its revised Final Needs Case submission that it has not included options 11 and 12 in its CBA for the following reasons: option 11 (the Shetland – Moray 800MW link) would deliver the same export capacity as option 3 (Shetland – Caithness 800MW link) but at additional cost; and option 12 (the Shetland – Moray 1000MW link) is for significant additional capacity, which is not supported by the generation scenarios considered.

Table 4: Summary of options considered by SHE-T in October 2018 and January 2020

SHE-T Option Number	Description	Capacity (MW)	October 2018 FNC		January 2020 FNC	
			EISD[35]	SHE-T Cost Estimate (18/19 prices)	EISD[35]	SHE-T Cost Estimate (18/19 prices)
1	Shetland – Caithness	450	Q1 2024	£674m	Q4 2025	£590m
2	Shetland – Caithness	600	Q1 2024	£709m	Q1 2024	£632m
3	Shetland – Caithness	800	Q4 2025	£753m	Q4 2025	£672m
11	Shetland – Moray	800	Q4 2025	£1,109m		
12	Shetland – Moray	1000	Q4 2025	£1,153m		

[34] https://www.ofgem.gov.uk/system/files/docs/2019/04/shetland_consultation_updated_30042019.pdf
[35] Earliest in service date, i.e. the earliest date SHE-T considers the link could be operational

2.30. SHE-T's revised Final Needs Case submission also provides SHE-T's updated view on costs for the three options included in the CBA. This is detailed further in paragraphs 2.44 – 2.46.

2.31. SHE-T's revised Final Needs Case submission also provides SHE-T's updated view on the completion dates (Earliest in Service Dates, EISDs) for the three options included in the CBA. The options have different completion dates because of the progress made to date on each option. The proposed 600MW option (option 2) has the earliest EISD because it is the most developed. SHE-T states in its revised submission that the other two options (1 and 3) have later EISDs because of the need to revisit design, consenting and procurement processes that would be required in order to progress those options. For example, SHE-T has updated the EISD for option 1 (the 450MW link), changing it from Q1 2024 to Q4 2025. SHE-T states in its revised submission that this is the earliest practical delivery date for this option due to the need to revisit the procurement process.

2.32. In response to our March 2019 consultation several respondents raised concerns in relation to the timescales set out by SHE-T for delivery of option 3 (the Shetland – Caithness 800MW HVDC link) and stated that they considered more evidence was required to validate that a 800MW HVDC link would take materially longer than a 600MW link to complete. In its revised submission, SHE-T has provided a series of documents that provide further detail on the changes it considers would be required and which would make delivery materially longer. These documents are published alongside this consultation and summarised below.

2.33. In summary, the documents provided by SHE-T with its revised submission suggest that progressing option 3 would involve:

2.33.1. Materially changing the existing developed and tendered design to incorporate an increased capacity converter station and cable system within the existing multi terminal design;[36]

2.33.2. Further technical studies to determine the extent of changes that may be required to the existing operational Caithness-Moray system. Initial indications

[36] SHE-T has confirmed that although the 800MW HVDC integration is technically feasible as part of a multi-terminal HVDC system, it needs to consider the impact of changes that would be required to the development and engineering work already undertaken on the 600MW HVDC design.

are that these studies would have to be initiated at least 12 months prior to the start of any new main contract;

2.33.3. As part of SHE-T's October 2018 Final Needs Case submission, Mott MacDonald explored the implications for delay. This has been re-assessed as part of SHE-T's January 2020 revised Final Needs Case submission. SHE-T has stated that the assessment is broadly unchanged and in addition to the pre-contract works (outlined in 2.27.2) there would be a post-contract delay of 10-15 months;

2.33.4. In relation to planning consent, SHE-T has set out that it has planning in principle for assets up to 600MW at Kergord (the location of the new substation on the Shetland Isles). SHE-T's says that to change the option, additional planning consents would be required based on a revised concept layout design. SHE-T also says that the AC switchgear (also located at Kergord) for an 800MW option would require more space than currently available within the consented site boundary. However, SHE-T says it would expect these could be done concurrently within the procurement window.

2.34. SHE-T has also confirmed that a re-run of a tender exercise would be required for both option 3 (800MW) and option 1 (450MW), which SHE-T has estimated to take up to 24 months and is a key driver of the earliest in service date (for both options). In relation to option 3, SHE-T has confirmed that the procurement and tender exercises required could be run in parallel to the re-design work required for option 3 summarised in paragraph 2.33.

Our minded-to views for consultation

2.35. We are comfortable that SHE-T has considered an appropriate range of potential technical options (i.e. options 1, 2, and 3) in its revised Final Needs Case submission. To test this view, we asked the ESO to comment on the impact of also including options 11 and 12 in the CBA. This is discussed further in paragraph 3.11.

2.36. Based on the information submitted we consider that different EISDs for the options are possible given the likely need to revisit consenting, design and procurement processes. However, it is also possible that any additional time required for option 1 (450MW) and option 3 (800MW) could have been at least partially, or potentially fully, mitigated if all three link options had been progressed to similar levels prior to the Final Needs Case process.

2.37. As flagged in our March 2019 consultation, we appreciate that it may not be feasible or desirable from a cost/resourcing perspective to progress all link options to the same level prior to the Final Needs Case process. It may also not be possible or desirable from a planning consent perspective. However, notwithstanding these challenges, we expect TOs to robustly consider a number of possible link size options and ensure they are deliverable before prioritising an option.

2.38. For the above reasons and to address specific points raised by stakeholders in response to our March 2019 consultation we have sought to address any uncertainty caused by over-reliance on SHE-T's EISDs by ensuring that the CBA considers both SHE-T's EISDs and the possibility that EISDs are aligned for each link option. The impact of different EISDs on the CBA is detailed further in chapter 3, and our overall views are set out in chapter 4.

Need for a second link

2.39. In response to our March 2019 consultation, most respondents set out their support for a larger (800MW/1000MW) transmission link, and that they considered there to be a significant risk of a second link from the Shetland Isles to the mainland being needed if a 600MW link proceeds.

2.40. SHE-T has stated in its revised Final Needs Case submission that, at present, existing industry arrangements mean that any further generation connection applications beyond those already contracted will be offered a connection on the basis of a second HVDC link from the Shetland Isles to the mainland. However, SHE-T has flagged that it will actively pursue existing and new network options on the Shetland Isles to facilitate further connections and optimise the proposed 600MW link, without the need for a second HVDC link. These include:

2.40.1. Increased generation connection through the use of Active Network Management (ANM) schemes. ANM can limit generation outputs and manage constraints on the network. SHE-T has flagged that it would allow the System Operators to manage more than 600MW of generation within the local system.

2.40.2. Offsetting generation with new demand. Specifically SHE-T has indicated that the interest from oil and gas developers in connecting additional industrial demand to the Shetland system could provide a baseload demand for a 30-40 year period (as summarised in paragraphs 2.21 - 2.23).

2.40.3. Enabling increased export potential through the deployment of energy storage solutions to manage link constraints at times of high wind.

2.40.4. Increased generation connection through industry proposals for the implementation of a GB approach to queue management to manage connection dates for customers on Shetland.[37]

Our minded-to views for consultation

2.41. We consider that SHE-T has considered an appropriate range of options to facilitate further connections on the Shetland Isles without the need for a second link. Whilst we appreciate this may not provide sufficient certainty, at this stage, that more generation can progress on the Shetland Isles without the need for a second link, we consider that the above options should be explored further, both in terms of maximising efficient use of any link in general, and in terms of helping to mitigate against the need for a second link in the future.

Technical design and costs

Technical design

2.42. We reviewed the technical design of SHE-T's proposed transmission link options to the Shetland Isles in full ahead of our March 2019 consultation. There have been no material changes in the revised Final Needs Case submission to the technical design of SHE-T's proposed transmission link options.

2.43. In response to our March 2019 consultation, a small number of respondents raised concerns in relation to the proposed design of a single cable solution for the Shetland transmission project. Respondents questioned both the energy security of this as a network option and the need for standby generation. SHEPD has confirmed that it would secure

[37] SHE-T stated in its revised submission that it is continuing to build on experience in developing queue management policy for the Orkney transmission project and working with GB DNOs and TOs through the Energy Networks Association Open Networks Project to deliver a GB queue management policy. SHE-T also stated in its revised submission that this will ensure there is a mechanism to allocate capacity to customers that are ready to connect where there are projects ahead in the queue that are unable to progress.

backup solutions to provide security of supply for link outages, and that this would be required irrespective of whether a distribution or transmission link proceeds.[38]

Costs

2.44. SHE-T's estimate of the capital cost[39] for its preferred 600MW option for the Shetland project has reduced from c. £709m (in the October 2018 Final Needs Case submission) to c. £632m.

2.45. SHE-T's estimate of capital cost for the 600MW option provided in its January 2020 Final Needs Case submission has been informed by the supply chain following receipt of initial tender returns. The previous cost estimate (£709m) provided in its October 2018 Final Needs Case submission was based on historical tender returns and benchmarks for the proposed solution.

2.46. As SHE-T has not received tender returns or negotiated prices for the other reinforcement options (option 1 the 450MW or option 3 the 800MW link), it has instead updated the cost estimates for these options in line with the commercial position reached so far for the 600MW option - this applies to both construction and non-construction costs.[40] SHE-T's cost estimates are detailed in Table 4.

2.47. However, SHE-T has suggested that the procurement savings achieved on the 600MW link may not be achievable for the 450MW or 800MW options in future markets due to supply chain constraints.

Our minded-to views for consultation

2.48. We remain comfortable with the technical design of SHE-T's preferred connection option. We remain comfortable that the technical design would meet the export requirements that SHE-T has identified for the Shetland transmission project in the next few years. We are also comfortable with SHEPD's proposals that backup solutions are likely to be required in order to ensure security of supply on Shetland. We agree that a derogation from Section 2 of

[38] As referred to in paragraph 1.30, the indicative capex costs associated with the backup generating station in the NGSLL-Aggreko bid for a distribution link was £24.6m.
[39] Capital costs are in 2018/19 prices.
[40] This approach was agreed with Ofgem prior to the revised Final Needs Case submission.

the Security and Quality of Supply Standard (SQSS) would be required to allow the project to proceed on a single cable basis.

2.49. We remain comfortable that SHE-T has appropriately considered both the risks and opportunities of using a multi-terminal solution at Caithness.[41]

2.50. In our March 2019 consultation, we highlighted that the cost estimates included as part of SHE-T's Final Needs Case submission in October 2018 appeared to be significantly higher than the costs we might expect. We set out that applying our benchmarking analysis, we would expect the capital costs for the Shetland transmission project to be significantly lower – in the range of £368m to £395m – unless there were project-specific reasons we are currently unaware of for increased costs. Our view on this remains unchanged at this stage.

2.51. Our internal benchmarking analysis is based on costs we have observed and determined through our regulatory arrangements for comparable transmission assets in other areas – specifically offshore transmission, onshore transmission and interconnector assets. Two respondents to our March 2019 consultation stated that we should be relying on relevant cost data from the Caithness Moray project to ensure we assess the right level of capital cost for the proposed Shetland link. We can confirm that we included relevant cost data from the Caithness Moray project as part of our benchmarking analysis.

2.52. If we ultimately approve the Final Needs Case for the Shetland project, our decision will confirm that SHE-T will be funded for the efficient delivery of the project under the delivery model we ultimately select. This funding will not include any areas of cost that we do not consider efficient or appropriate to fund following our Project Assessment. At the Project Assessment stage, should such a stage be required, we will review in detail all the proposed costs for the Shetland project before making our decision on cost allowances. As is the case for other major network projects (i.e. large onshore transmission projects, interconnector or offshore transmission projects), cost benchmarking will be one of tools we use to help inform our determination of cost allowances.

[41] SHE-T is proposing that a three terminal HVDC scheme be established. This would be achieved by integrating the proposed Shetland link into the Caithness Moray HVDC link, making use of anticipatory capacity and technical capabilities built into elements of the design. To establish the multi-terminal scheme, an HVDC switching station will be constructed at Noss Head which would permit the interconnection of the 800MW Spittal, 1200MW Blackhillock and Shetland cable.

3. Final Needs Case assessment – CBA and Methodology

Section summary

This chapter covers our assessment of and minded-to position on the following aspects of SHE-T's revised (January 2020) Final Needs Case submission for the Shetland project:

- The CBA methodology and results submitted by SHE-T; and
- Where appropriate, our views on specific points raised in response to the March 2019 consultation.

Questions

Question 5: What are your views on the CBA put forward by the ESO?

Question 6: What are your views on other approaches we have taken to assess the costs and benefits to GB consumers?

Cost Benefit Analysis

3.1. The ESO has produced a CBA to accompany SHE-T's revised Final Needs Case submission. The ESO's CBA was produced in line with its licence obligation to support the assessment of SWW proposals by carrying out a cost benefit analysis of reinforcement options identified by a TO. This analysis considers the Shetland transmission project in a GB context taking account of boundary capabilities throughout the wider transmission network.

3.2. The methodology used in the ESO's CBA is consistent with that which has been used on previous SWW projects, including the CBA accompanying SHE-T's October 2018 Final Needs Case submission for the Shetland transmission project, and with that which is used each year when the ESO undertakes the Network Options Assessment (NOA). This methodology offsets the construction and operational costs of various different transmission

project options against the constraint costs[42] that each of these options relieve to give a Net Present Value (NPV). This is then calculated across a variety of generation scenarios - in this case, the four GHD scenarios presented in Table 2.

3.3. The ESO's CBA determines the preferred option based on a LWR approach. The regret of each option is determined by the difference between its NPV value and the option with the highest NPV value. The option with the smallest regret across all generation scenarios is then determined as the option with the LWR. The ESO's CBA determines the preferred option based on a LWR approach, assuming each of the generation scenarios has an equal probability of occurring.

3.4. The methodology is designed to test the need for a reinforcement based on network costs, specifically constraint costs. A key factor in forecasting constraint cost within the CBA is the 'bid' price needed to pay a generator to turn down its output. Historically, the assumptions for the 'bid' price of wind farms has been based on ROCs (renewable obligation certificates) - this is the basis upon which the CBA submitted as part of SHE-T's October 2018 Final Needs Case submission was run.

3.5. However, a number of generators on Scottish islands have been awarded CfDs in the 2019 CfD auction and some others are committing to proceed without a CfD or ROC, therefore the ESO considers that the price of their constraint cost 'bids' going forward may be more closely related to the 2019 CfD price, which is lower than the ROCs price. Using the CfD price rather than the ROC price to inform the constraint cost would, therefore, reduce the cost savings that each reinforcement option delivers, because it would be less expensive to constrain off (turndown) generation, on the Shetland Isles, for example.

3.6. The ESO has flagged that changing the bid pricing strategy within its modelling is a significant undertaking, which requires robust and detailed analysis. The ESO is continuing this work in preparation for inclusion in the sixth NOA methodology later in 2020. The ESO has therefore provided the output of both bid strategies (i.e. ROC and CfD) for the purposes of the CBA provided with SHE-T's revised submission for the Shetland project.[43]

[42] Constraint costs are payments made to generators by the ESO to stop generators producing electricity. It will make these payments when the electricity transmission network in a particular area does not have the capacity to safely transport all of the electricity that is being produced in that area.
[43] In the absence of a long-term adjustment to its bid pricing strategy the ESO considered it appropriate

Results

3.7. The CBA submitted in SHE-T's revised Final Needs Case submission includes twelve different runs (cases) to capture the changes that have taken place since SHE-T's October 2018 submission.[44] Specifically:

3.7.1. Updated GHD generation scenarios as set out in Table 2 (S1 to S4);

3.7.2. Updated cost inputs and delivery dates (EISDs) for reinforcement options 1, 2 and 3 as detailed in Table 4 and aligned delivery dates across the reinforcement options as set out in paragraphs 2.38;

3.7.3. Potential changes to the constraint cost as set out in paragraphs 3.4 - 3.6; six of the cases use the CfD constraint cost, the remaining six use the ROCs constraint cost; and

3.7.4. Potential impact of oil and gas demand, as set out in Table 3.

3.8. Table 5, below, shows a summary of the results of the LWR analysis for the CBA produced by the ESO. The full CBA results are published in the ESO CBA Report published alongside this consultation document.

Table 5: Summary of CBA inputs and Least Worst Regret (LWR) results

CBA Input	1	1a	1b	2	2a	2b	3	3a	3b	4	4a	4b
Basis of constraint cost	ROCs	ROCs	ROCs	ROCs	ROCs	ROCs	CfDs	CfDs	CfDs	CfDs	CfDs	CfDs
EISD	Not aligned	Aligned 2024	Aligned 2026	Not aligned	Aligned 2024	Aligned 2026	Not aligned	Aligned 2024	Aligned 2026	Not aligned	Aligned 2024	Aligned 2026
Oil and gas demand sensitivity included	No	No	No	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes

to run the analysis for Shetland using a bid price based on CfDs, as well as a bid price based on ROCs.

[44] The load factors assumed in the CBA modelling are unchanged from those used in the October 2018 Final Needs Case.

LWR Option	600MW	600MW	600MW	600MW	450MW	450MW	450MW	450MW	450MW	Smaller than 450MW	Smaller than 450MW	Smaller than 450MW

3.9. When the CBA is run using the CfD price to forecast the constraint cost, the LWR option produced by three of the CBA results is a 450MW transmission link to the Shetland Isles. When the CBA is run using the same constraint cost assumptions as in October 2018 (ROCs price), four of the cases present the 600MW transmission link as the LWR option. Three of the twelve CBA cases suggest that a link smaller than those considered by SHE-T (e.g. 237MW), or potentially no link at all, might be more efficient.[45]

3.10. The ESO has carried out a further cost sensitivity assessment to establish what level of cost increase on the 450MW link is needed to tip the LWR option in the CBA cases to a 600MW link. The ESO determined that a c. 5% cost increase for the 450MW option would flip two of the CBA cases (CBA cases 3 and 4), leading to the 600MW option becoming the LWR option in six of the twelve cases and, thereby, the most common LWR option of the twelve cases.

3.11. To address points raised by respondents to our March 2019 consultation (referred to in paragraph 2.35) the ESO has considered the impact of the inclusion of two further reinforcement options, a 800MW Shetland-Moray link and a 1000MW Shetland-Moray link (i.e. options 11 and 12 shown in Table 4). The ESO has stated that similarly to option 3 (the 800MW link between Shetland and Caithness, which is never the LWR option in any of the 12 cases), it can be concluded that neither of the Shetland-Moray link options would be the LWR solution in any of the cases considered. This is due to a significant increase in capital costs for both options, with no opportunity for an increase in constraint saving benefits.

3.12. The Slow Progression (SP) scenario has been used to model generation on the wider GB network and for the reasons set out in paragraph 2.11, the generation scenarios used on the Shetland Isles are S1 to S4 and not the FES scenarios (as detailed in Table 2). The ESO has stated that the inclusion of the FES in the CBA does not change the LWR result option in any of the cases.

[45] In cases 4, 4a and 4b the NPVs are negative under every generation scenario. This means the benefits produced by the reinforcement in terms of the value of the constraint costs the reinforcement option relieve are not greater than the cost of the reinforcement itself.

3.13. In addition, the ESO has also considered the impact of inclusion of the FES 2019 scenarios. The ESO has stated that whilst the generation scenarios resulting from FES 2019 has not been used in the CBA, the generation predicated within FES 2019 sits within the latest GHD scenarios; TD & CR at 649MW sits within GHD S2 & GHD S3, CP & SP at 529 MW sits within GHD S1 & GHD S2 and inclusion of these scenarios would not have a material impact on the results of the CBA. Further to this the ESO has flagged more generally, that as the proposed connection design to the Shetland Isles is a radial connection, the particular FES scenario year used is likely to have less impact than the capacity of generation modelled to be connected.

Expected NPV approach

3.14. As in our March 2019 consultation (paragraphs 2.28 – 2.30) we have also considered the results of the CBA on an 'expected NPV basis' considering the generation scenarios with both an equal probability of occurring and varied probabilities.

3.15. The expected NPV approach differs to the LWR approach. The expected NPV approach determines the preferred option based on the average NPV for each reinforcement option across all of the generation scenarios. The option with the highest NPV overall is then determined as the preferred option.

3.16. We first considered the results of the ESO's CBA on an 'expected NPV' basis with an assumption of uniform probability across the scenarios, i.e. each generation scenario is given the same probability weighting (known as the Laplace criterion). The rationale for doing this being we do not have sufficient information to weight the scenarios (i.e. the principle of insufficient reason). This approach does not change what is considered to be the preferred option under any of the twelve CBA cases considered.

3.17. We also considered how 'probable' the highest generation scenario would need to be to change the preferred option to the option with the next lowest NPV, i.e. the 'switching probability'. Where the EISDs are aligned[46], assigning a weighting of over 60% is required to change the LWR option, i.e. setting the probability of the highest generation scenario (S4) to less than 60% does not change the result, and in several cases the probability assigned

[46] EISDs are aligned to 2024 in cases 1a, 2a, 3a and 4a and aligned to 2026 in cases 1b, 2b, 3b and 4b.

needs to be 75% or higher.[47] Based on the generation scenarios and project background we do not consider it would be appropriate to place a probability in excess of 60% on the highest generation scenario (S4 which assumes 817MW) coming forward due to the reasons set out in paragraph 2.19.

Our minded-to views for consultation

3.18. The results of the ESO's CBA are mixed and inconclusive. They are also highly sensitive to various factors such as constraint costs, EISD, demand requirements on the Shetland Isles and capital costs.

3.19. A strict interpretation of the ESO's CBA, based on the most common outcome from the twelve CBA cases might support a 450MW link. However, the results can be interpreted as supporting either a 450MW link, a 600MW link, or even no link at all, depending on how much probability is placed on EISD or demand requirements on the Shetland Isles. Furthermore, as referred to in paragraph 3.10, when a cost sensitivity is applied the 600MW link becomes the most common option across the twelve CBA cases.

Other approaches assessing costs and benefits to consumers

3.20. In light of the sensitivities of the CBA as flagged above and given the finely balanced CBA results, we have worked alongside the ESO to consider other methods of assessing SHE-T's revised Final Needs Case submission proposal, to enable us to consider a wider body of analysis in order to assess the potential costs and benefits for GB consumers.

3.21. The ESO has carried out additional analysis using Levelised Cost of Energy (LCOE) to compare a Shetland onshore windfarm with an equivalent capacity offshore windfarm option, including the cost of transmission links. The LCOE of a particular generation technology is the ratio of the total asset costs of a plant (including both capital and operating costs), to the total amount of electricity expected to be generated over the plant's lifetime. Both are expressed in net present value terms (NPV), hence the future costs and outputs are discounted when compared to costs and outputs today. The LCOE therefore allows comparison between approximately equivalent technologies on a £/MWh basis.

[47] This changes the results in 6 of the CBA cases 1a. 1b, 2a, 2b, 3a and 3b.

3.22. The analysis has been undertaken using the latest BEIS LCOE model and using BEIS input data,[48] supplemented with Shetland generation output data from National Grid ESO's pan European market model (BID3), which was used for the ESO's Shetland CBA referred to above.

3.23. The analysis shows that when the estimated costs of the Shetland transmission link[49] are included, the 600MW and 800MW HVDC link options if fully utilised, produce lower LCOEs than the equivalent offshore windfarm and associated transmission link. These link options show a decrease in LCOE as the generation capacity on Shetland increases, because the increase in construction costs for the larger HVDC link and larger amount of generation is more than offset by the increasing levels of generation output that is not constrained by the larger sized link.

3.24. The analysis shows that when the estimated costs of the 450MW HVDC link option are included there is an increase in the LCOE as the generation capacity on Shetland increases, this is because of the increase in construction costs while generation output volumes are constrained, i.e. the additional generation is limited by the size of the HVDC link.

3.25. This suggests that a fully utilised 600MW or 800MW link would likely offer better value for GB consumers from an overall cost of generation perspective than a fully utilised 450MW link. We note however that the results of this analysis are also sensitive to various assumptions around capital costs, generation load factors and hurdle rates[50] assumed and so therefore should not be taken as definitive in assessing the GB consumer value of the Shetland transmission project.

Conclusions

3.26. The results of the ESO's CBA provided with SHE-T's revised submission are finely balanced between the 450MW and 600MW link options, with the results sensitive to various inputs. As a result, as set out in paragraphs 3.21 - 3.23, we also considered the 'expected NPV' and the LCOE methods to assess costs and benefits to GB consumers. The LCOE method explores whether a transmission link could bring forward potentially cheaper sources of

[48] The underlying data is commercially sensitive.
[49] This assumes the transmission asset construct cost element of the LCOE is the HVDC cost less the SHEPD contribution.
[50] A hurdle rate is the minimum rate of return on a project or investment required by a manager or investor.

electricity, whilst the CBA (both LWR and expected NPV approaches) explores which transmission link produces the lowest combination of constraint cost and link capital cost. While these methods do not provide a definitive basis for deciding on the most appropriate sized link, they suggest that: a) a transmission link will provide good value for GB consumers if it is fully utilised, and b) that a fully utilised 600MW or 800MW link would likely offer better value for GB consumers, from an overall cost of generation perspective, than a fully utilised 450MW link.

4. Our minded-to view on the revised Final Needs Case, including proposed conditions for approval

Section summary

This chapter covers our overall assessment of and minded-to position on SHE-T's revised (January 2020) Final Needs Case submission for the Shetland project, including:

- Our overall views on the revised Final Needs Case as presented and our proposed conditions of approval; and
- Where appropriate, our views on specific points raised in response to the March 2019 consultation.

Questions

Question 7: What are your views on our minded-to position to conditionally approve the revised Final Needs Case? Specifically:

i) Do you agree with our proposal to approve a 600MW link subject to Ofgem being satisfied, by the end of 2020, that Viking Energy Wind Farm is likely to go ahead?
ii) Do you have any views on the type of evidence we should expect to see that would confirm that Viking Energy Wind Farm is likely to go ahead?
iii) Do you agree with the factors we have considered to reach our minded-to position?
iv) Are there any other factors that you consider we should take into account when assessing this proposal?

4.1. We have considered a number of factors in our analysis of SHE-T's revised Final Needs Case submission in order to assess the costs and benefits to existing and future consumers in GB. These include interactions with security of supply requirements on the Shetland Isles, the merits of different link sizes and the level of certainty we would need that the link will be sufficiently used.

Interactions with security of supply on Shetland

4.2. As set out in paragraphs 1.30 - 1.34, we consider that a link from the Shetland Isles to the mainland is likely to be needed before 2030 in order to ensure long-term security of supply on the Shetland Isles.

4.3. While a transmission link would cost more than a distribution link, in addition to ensuring long-term security of supply, a transmission link would have the benefit of allowing potential additional renewable generation to be built. This generation would contribute towards decarbonisation targets while also providing downward pressure on the electricity wholesale market price.

Size of transmission link

4.4. The results of the cost benefit assessments are inconclusive. The ESO's CBA provided with SHE-T's revised submission is finely balanced and sensitive to various inputs. The LCOE CBA undertaken by the ESO also does not provide a definitive basis for deciding on the most appropriate sized link.

4.5. We have therefore also considered decarbonisation and the potential impact of delay, in combination with the cost benefit assessments referred to above, in coming to our minded-to position. We consider, on balance, that the combination of these factors indicates that a 600MW link (option 2 in Table 4) is likely to offer the best value to GB consumers. We set out our reasoning below.

Potential impact of delay

4.6. Any delay to delivery of a transmission link would likely lead to additional costs to consumers to address security of supply on the Shetland Isles. As part of our review of SHE-T's revised Final Needs Case, we asked SHEPD to explore the impact of extending the life of LPS to seek to address the potential impact of delay.[51] SHEPD has indicated that while extension of LPS would be technically possible, it would cost c. £20m per year to extend LPS to 2026/2027.[52]

4.7. There may also be other consequences of delay to stakeholders on the Shetland Isles, albeit these consequences are not as clearly related to our consideration of the costs and benefits of the transmission link to GB consumers. Firstly, based on our engagement with oil

[51] Further detail on LPS is set out in paragraphs 1.28 - 1.34.
[52] SHEPD confirmed it would cost c. £60m to extend LPS from 2024/25 – 2026/27. We are reviewing this figure and continuing to engage with SHEPD. SHEPD has indicated this cost would include capital investment in three 6MW engines to enable the extension as well as further operational costs including works at the power station (overhauls, spares etc.), fuel, consents and permits, amongst other staffing and insurance costs.

and gas industry stakeholders, we understand that a material delay may mean it is not possible to meet potential electricity demand for oil and gas platforms west of the Shetland Isles via a Shetland link, as decisions could be made to address that demand in other ways. Secondly, we note that a material delay to a transmission link would likely push back VEWF's currently contracted connection date, and may also push back the connection dates of other generation projects currently being developed, which may have negative consequences for the economics of those projects. This in turn may lower the generation scenarios underpinning the need for a link.

4.8. We have considered whether SHE-T's decision to prioritise the 600MW link (and therefore introduce delay risk to the 450MW and 800MW links) was reasonable, i.e. whether it was made based on appropriate evidence and whether it has led to any detriment for GB consumers. In this case we consider that there is no clear or conclusive evidence that SHE-T's decisions were unreasonable, or that they would have changed our minded-to position. We therefore consider that in this case, where the cost benefit assessments are inconclusive, mitigating the risk of delay (via a 600MW link) outweighs any potential additional benefits to GB consumers of a 450MW link or 800MW link.

Decarbonisation considerations

4.9. Compared to a 450MW link, a 600MW link allows headroom for additional generation beyond VEWF (457MW) to connect in the future at an additional cost significantly below the cost of building another link.[53] Similarly, an 800MW link would allow further headroom for additional generation. In line with our Decarbonisation Action Plan,[54] published in February 2020, we consider that some investment ahead of need will be necessary to achieve decarbonisation at the lowest cost to consumers. Our position is to remain open to anticipatory investment as long as clear and robust evidence of potential costs and benefits is provided.

4.10. Furthermore, approving a 450MW link, based on VEWF proceeding, significantly increases the chances that another link may be required if further generation projects progress, notwithstanding the potential actions identified by SHE-T in paragraph 2.40 to mitigate the need for a second link. As the costs of building a second new link are significantly

[53] The additional cost of c.£42m for the 600MW link over the 450MW link as set out in Table 4.
[54] https://www.ofgem.gov.uk/publications-and-updates/ofgem-s-decarbonisation-action-plan

higher than the costs of oversizing the first link, reasonable levels of anticipatory investment may well benefit GB consumers over the longer term in this instance.

4.11. However, we consider that approving an 800MW link would place too much risk on GB consumers. As set out in paragraph 2.19 the generation that would be needed to underpin the need for an 800MW link is not in a position to progress over the coming year or more, if at all, due to a combination of challenges. Even if significant additional generation did come forward, it is possible that generation would be used to service local electricity demand from oil and gas rather than use the transmission link. These factors, alongside the mitigations proposed by SHE-T in paragraph 2.40 to avoid the need for a link beyond 600MW, suggest there is a low likelihood that an 800MW link would be fully utilised.

Conditions for approving a 600MW link

4.12. We consider that we should only approve a 600MW transmission link from the Shetland Isles to the mainland, so long as we can be comfortable that this link will be appropriately utilised.

4.13. SHE-T has proposed that we approve the 600MW link if VEWF progresses to FID.

4.14. We agree that we should only approve a 600MW transmission link if we can be sufficiently confident that the VEWF is likely to be built. We therefore propose to make our approval of the Final Needs Case for the 600MW Shetland project conditional on VEWF providing an appropriate level of evidence regarding the likelihood of the VEWF project progressing.

4.15. In relation to the specific conditions, we consider that VEWF securing FID, in addition to submitting evidence to us of meeting a key development milestone e.g. entering into a major supply contract, would provide an appropriate level of comfort that the VEWF project is likely to progress. We consider that FID, in this instance, given our understanding of the project, does not provide sufficient evidence by itself, and should therefore be supplemented by additional evidence of progress. We intend to discuss with VEWF what evidence it might be able to provide to our satisfaction within a reasonable timescale.

4.16. We consider that a backstop date should be included in our conditions to ensure we are able to balance setting a clear and achievable target, whilst not allowing any significant delays to VEWF to risk material additional costs to consumers or concerns regarding securing long-term security of supply on the Shetland Isles.

4.17. We note that in response to our March 2019 consultation, some respondents drew comparisons to the conditions for approval we set for other Scottish island projects.[55] We consider it is important to note that the conditions for approval are considered project-by-project, with the reasonable likelihood that they are different for each of the Scottish islands, as they reflect the results of individual project cost benefit assessments and the different characteristics of each project (e.g. size and cost of link, nature/volume and timing of generation, security of supply considerations, etc.). We consider that it is in the interest of GB consumers for us to consider all relevant factors transparently on a case-by-case basis in order to determine our conditions for approval.

4.18. In summary, we are therefore minded-to approve the revised Final Needs Case for the Shetland transmission project subject to the following conditions:

For Ofgem to approve the Final Needs Case for the proposed 600MW Shetland transmission connection, Ofgem must be satisfied, by the end of 2020, that Viking Energy Wind Farm is likely to go ahead.

Ofgem would expect to be satisfied that Viking Energy Wind Farm is likely to go ahead if Ofgem is provided with:

1) Evidence of Final Investment Decision being reached (this may be in the form of board minutes)
2) Evidence of project information on the basis of which that Final Investment Decision has been taken (this may be in the form of the board submission pack and supporting information); and
3) Evidence of the Final Investment Decision triggering a major development milestone which indicates project commencement (this may be in the form of entry into a major supply contract or commitment of significant development spend).

4.19. The deadline for complying with the above conditions would be 31 December 2020. We would be happy to consider information submitted at an earlier date.

[55] Respondents highlighted that the conditions for approval proposed by Ofgem on the Orkney Final Needs Case equate to approximately 61% (derived from the ratio of generation required for approval against the size of the link), whereas the equivalent on Shetland was far higher (69%-76%)

5. Delivery Model

Section summary

This section summarises how we have revised the analysis carried out in March 2019 to consider whether the CPM is likely to deliver a saving to consumers for the Shetland transmission project relative to the RIIO counterfactual. It explains how we have reached our minded-to position not to apply the CPM to the Shetland transmission project.

Questions

Question 8: Do you agree with the findings of our analysis?

Question 9: Are there any additional factors that we should consider as part of our analysis and/or decision on whether to apply the CPM for the Shetland transmission project?

Background on our delivery model assessment for the Shetland project

5.1. As set out in our March 2019 consultation[56], we assessed the Shetland transmission project against the criteria for competition. Our view is summarised in the paragraphs below.

New

5.2. Our view remains that all of the Shetland transmission project as currently proposed by SHE-T meets the new criterion.

Separable

[56] https://www.ofgem.gov.uk/publications-and-updates/shetland-transmission-project-consultation-final-needs-case-and-delivery-model

5.3. Our view is that all of SHE-T's proposed Shetland transmission project continues to meet the separable criterion. We consider that project interfaces are clearly separable points (for example, substations and switching stations), and therefore clearly manageable under existing industry arrangements.

High Value

5.4. Our view is that the proposed Shetland transmission project meets the high value criterion. The expected cost of the project, as detailed in paragraphs 2.44, significantly exceeds the £100m capex threshold.

5.5. In our March 2019 minded-to consultation we set out that we were minded to apply the CPM to the Shetland transmission project. This was based on our analysis of the likely consumer savings from funding the project through the CPM rather than the default RAV-based RIIO arrangements, referred to as the "RIIO counterfactual".

5.6. Below we set out how we have revisited and updated the analysis underpinning our March 2019 minded-to decision. We also explain why, on balance, we now consider that, in light of significant changes to some of the inputs into our analysis since March 2019, we are no longer minded to apply the CPM to the Shetland transmission project.

Cost of capital under CPM

5.7. As referenced in paragraph 1.47, the CPM relies on the benchmarking of the allowed financing costs of qualifying projects at the level expected from an equivalent project subject to a competitive tender. To do this, we contracted Cambridge Economic Policy Associates (CEPA) in 2017 to develop a benchmarking methodology to set a feasible range of the allowed financing costs for the HSB project.

5.8. In our March 2019 minded-to consultation on the Shetland transmission project, we set out how the benchmarking methodology would be applied in the context of the Shetland transmission project, based on the methodology described in the September 2018 Update on the CPM delivery model.

Summary of analysis underpinning our March 2019 minded-to position

5.9. The analysis that informed our March 2019 minded-to position compared the indicative revenue for the Shetland transmission project derived from funding the project through the CPM, via the cost of capital methodology for the CPM developed by CEPA, to the indicative

revenue under a counterfactual RIIO approach, the 'RIIO counterfactual'. The CPM cost of capital rates specified in the March 2019 consultation were determined through this methodology using September 2017 input data.

5.10. As explained in our March 2019 minded-to position, the RIIO counterfactual reflected the range of allowed financing costs for RIIO-2 set out in our December 2018 RIIO-2 sector specific methodology consultation. For the purposes of our modelling for the Shetland transmission project we used the cost of equity range, forecasts of the 10-year trailing debt index,[57] and the level of gearing (60%).

5.11. If funded through RIIO, the costs associated with the Shetland transmission project would be recovered over a 45 year period. It is impossible to know the exact level of revenue until the end of this 45 year period. This is because the allowed cost of debt and equity under RIIO will be set through the future price control reviews that will cover the 45 years. At each review these financing costs will be determined based on contemporary market and macroeconomic evidence. It is difficult to capture this uncertainty in our analysis and it is unlikely that the final rates set for RIIO-2 will remain unchanged for 45 years. We set out in paragraphs 5.39 - 5.43 how we have factored the consideration of the wider benefits of CPM and market uncertainty in our analysis and minded-to position.

Updates to previous analysis

5.12. Below we set out the inputs into our analysis that have changed since our March 2019 minded-to consultation, and the impact of these changes on the benefit case for applying the CPM to the Shetland transmission project.

Updated cost estimate from SHE-T

5.13. As referenced in paragraph 2.46, in its revised Final Needs Case submission, SHE-T has revised its cost estimate for the Shetland project from £709m to £632m. It has also updated its delivery plan to reflect delivery over 4 years. In the specific case of this project, it appears that the reduced cost and number of years of construction has weakened the case for applying the CPM. Our analysis suggests that this shortening of the period between when construction would start and the TO starts to receive revenue offsets the cost saving for

[57] Based on current ten-year trailing average adjusted for forecast movements in Government gilts

consumers of having one less year in which the construction period CPM cost of capital is applied.

Updated Cost of Debt inputs into the CPM cost of capital methodology

Background

5.14. The cost of capital methodology for the CPM includes the benchmarking of cost of debt derived from the iBoxx bond market indices.

5.15. The allowed cost of debt during the construction period is benchmarked against a combination of the spot yield and one-year average rate of the iBoxx non-financial corporate debt, with the debt tenor aligned with the length of the construction period. The Shetland transmission project is expected to have a 4 year construction period, and shares a lot of characteristics with offshore wind and interconnector projects. Therefore the cost of debt range for the construction phase of the project under the CPM would be set as follows:

- **Low end of the range:** 3-5 year tenor, A-rated non-financial corporate
- **High end of the range:** 3-5 year tenor, BBB-rated non-financial corporate

5.16. The allowed cost of debt during the CPM operational period is benchmarked from the spot yield and one-year average rate of iBoxx non-financial corporate debt indices with the debt tenor aligned with the length of the operational period. The A-rated 10+ year index yield is specified as the bottom of the range, and BBB-rated 10+ year index yield as the top of the range.

Updated inputs and the impact of these changes

5.17. The CPM cost of capital values used for the consumer savings analysis underpinning our March 2019 minded-to consultation were based on input data from September 2017.

5.18. We have used input data from January 2020 for our updated consumer savings analysis for the Shetland transmission project. This draws on our work to update the inputs into the allowed Interest During Construction (IDC)[58] to be applied during 2020/21 to offshore

[58] Decision on Interest During Construction (IDC) rates to be applied during 2019-20 to offshore transmission projects and electricity interconnectors granted the cap and floor regime: https://www.ofgem.gov.uk/system/files/docs/2019/05/2019-20_idc_decision_letter.pdf

electricity transmission projects and electricity interconnectors granted the cap and floor regime[59].

5.19. As referenced in our October 2019 HSB consultation on our updated delivery model minded-to position,[60] the market yield for cost of debt derived from the CPM cost of capital methodology, using the relevant iBoxx index for January 2019, was significantly higher than the equivalent yield derived from the cost of capital methodology using the iBoxx index for September 2017. This was the result of increases in the market-wide cost of debt over that time period. Such an increase in the cost of debt would increase the cost of funding a project under the CPM.

5.20. However, in the last 12 months this trend has reversed, with the cost of debt again falling towards the levels reflected in our March 2019 minded-to consultation on the Shetland transmission project. Based on updated January 2020 data, the cost of debt range during the construction period under the CPM has fallen back in line with the equivalent range referenced in our March 2019 consultation, which was based on September 2017 rates.

5.21. The cost of debt range for the operational period under the CPM has fallen relative to the figures from the equivalent January 2019 input data but remains higher than the range in our March 2019 consultation, which was based on rates from September 2017. The impact of this is a reducing of the benefit case for the CPM versus the RIIO counterfactual.

Updated Cost of Equity input into the CPM cost of capital methodology

5.22. In the construction period under both the CPM and the SWW mechanism under RIIO, the allowed cost of equity is built up from the following inputs:

- **Total Market Return (TMR) –** the measure of the typical return on equity observed in the market as a whole.
- **Risk free rate –** the indicative rate of return for a hypothetical investment that is risk-free. Under both the CPM and RIIO this is benchmarked against UK gilts.
- **Equity beta –** the indicative ratio of riskiness (measured in terms of volatility) of the assets in question relative to the average risk faced by the market as a whole.

[59] https://www.ofgem.gov.uk/publications-and-updates/decision-2020-21-interest-during-construction-idc-rates-offshore-transmission-projects-and-cap-and-floor-interconnectors
[60] https://www.ofgem.gov.uk/system/files/docs/2019/10/hsb_cpm_consultation.pdf

These inputs are combined to estimate the cost of equity, as follows:

$$\text{Cost of Equity} = \text{Risk free rate} + \text{Equity Beta} \times (\text{TMR} - \text{Risk free rate})$$

5.23. Our March 2019 minded-to consultation on the Shetland transmission project assumed that the TMR range for the CPM should be slightly lower than the TMR range for RIIO-2. In line with the cost of capital methodology, this reflected the view that the shorter investment horizon and one-off nature of the sorts of assets potentially delivered under the CPM provided grounds for assigning greater weight to short-term market expectations and forward-looking approaches than to long-run trends.

5.24. However, as referenced in our decision on the IDC for 2019/20, published in May 2019[61], we recognise that capturing market expectations robustly is challenging.

5.25. To inform our policy decisions for the RIIO-2 price controls for regulated networks, we undertook a thorough review of TMR and published our proposed methodology and range in May 2019, as part of the Finance Annex to the RIIO-2 Sector Specific Methodology. This range was determined using a wide pool of evidence, including both historical averages and forward-looking measures, and following an extensive consultation exercise. The findings of this review were not available to us when we set out the cost of capital methodology for the CPM in the September 2018 CPM Update, or our March 2019 consultation on the Shetland transmission project.

5.26. Given the complexity in estimating TMR, and the significant work undertaken for RIIO-2, we concluded that it is appropriate to align our approaches, and use the same TMR range to set the allowed cost of capital for regulated networks and the IDC rates applying to new assets. Therefore, we decided that the RIIO-2 TMR range is the most appropriate to use to set TMR during the construction period of projects funded through the CPM. We note also that CMA's recent provisional findings in NATS En-route Limited's (NERL) appeal against the Civil Aviation Authority, align its view on TMR with our assumption for RIIO-2[62].

[61] Decision on Interest During Construction (IDC) rates to be applied during 2019-20 to offshore transmission projects and electricity interconnectors granted the cap and floor regime: https://www.ofgem.gov.uk/system/files/docs/2019/05/2019-20_idc_decision_letter.pdf
[62] https://www.gov.uk/cma-cases/nats-en-route-limited-nerl-price-determination

5.27. The aligning of the TMR for the construction period under the CPM with the TMR for setting the allowed cost of capital for regulated networks and the IDC rates for new assets has effectively increased the financing cost of funding a project through the CPM. The RIIO counterfactual TMR has remained unchanged. As a result, the consumer savings range for the CPM which we identified in our March 2019 minded-to decision on the Shetland transmission project has reduced.

Updated RIIO counterfactual Cost of Equity

5.28. For the purposes of the consumer savings analysis underpinning our March 2019 minded-to consultation, we used the RIIO-2 indicative cost of equity range, published in the RIIO-2 framework consultation on 7 March 2018, as the basis for the RIIO counterfactual[63]. This included a high end of the potential RIIO range of 5% (CPI-real). Since our March 2019 consultation on the Shetland transmission project, the Finance Annex of the RIIO-2 Sector Specific Methodology Decision published on 24 May 2019 identified 4.8% as our expectation for the return on equity during the RIIO-2 period. We also identified evidence of the potential for systematic outperformance within the price control and estimated that this could be worth up to 0.5% in equity returns. We therefore used, as a working assumption, a 'baseline' return on equity of 4.3% (4.8% minus the 0.5% relating to outperformance).

5.29. Our updated analysis compares the expected financing costs under the CPM to two versions of the RIIO counterfactual.

5.29.1. The first, referred to in this document as "RIIO Low", uses the baseline RIIO-2 equity return of 4.3%. This represents an estimation of the baseline return to equity investors during RIIO-2 excluding the outperformance of RIIO-2 financial incentives.

5.29.2. The second, referred to as "RIIO High" in this document, uses the expected RIIO-2 equity return of 4.8%. This represents an estimation of the total return to equity investors during RIIO-2 including the outperformance of RIIO-2 financial incentives.

[63] RIIO-2 Draft Determinations are scheduled for July 2020. This will include any relevant updates to our proposals on the cost of equity for RIIO-2

5.30. We recognise that ultimately under both of these counterfactuals, the expected return that would be funded by consumers would be 4.8%. However, just using 4.8% within the counterfactual would not appropriately capture circumstances under which an equivalent level of outperformance can also be achieved within the CPM. Under these circumstances, a direct comparison between the baseline returns, rather than the expected returns, is appropriate.

5.31. As the CPM represents a new regulatory model, we do not consider it appropriate to make an assumption around the likely level of equity return outperformance relative to under a RIIO price control at this time. However, as the CPM shares certain key incentive properties of the RIIO price control, including the sharing of cost efficiencies and protections from cost over-runs with consumers, we do not consider it appropriate to rule out such a level of outperformance being possible.

5.32. The updated RIIO High counterfactual effectively means that the high end of the RIIO counterfactual range within our updated analysis has reduced from 5% in our March 2019 analysis, to 4.8%. This has the effect of reducing the maximum cost of funding projects under the RIIO counterfactual. As a result the consumer savings range for the CPM which we identified in our March 2019 minded-to decision has reduced.

Use of the detailed CPM Financial Model in our analysis to identify costs of project finance

5.33. Our July 2018 decision on HSB referenced that we used a financial model developed by our consultants, Amberside. This model was used to cross check whether the financing costs, combined with assumptions around capital and operational costs based on data provided by the developing TO, NGET, can deliver a viable investment that meets the required ratios that are expected in project finance. We also specified that we would use this financial model to ensure that the annual revenue allowance would be the most efficient for consumers, if NGET confirmed that it intended to fund HSB through a project finance approach.

5.34. Following our July 2018 decision on HSB, we worked with the TOs to develop the licence drafting to implement the CPM into their electricity transmission licenses during RIIO-1. We worked on drafting which would use a financial model to capture the detailed financing structure of the project. In the absence of alternative models proposed by the TOs, we consider that the model developed by Amberside could be a model used to set project revenues under the CPM. The capturing of the detailed financing structure of the project within the Amberside model provides a more accurate quantification of the likely costs to consumers of pursuing a project finance type approach for the Shetland transmission project.

Therefore, we have used the Amberside model to generate the revenue under the CPM that feeds into our updated consumer saving analysis set out in this consultation.

Results of consumer savings analysis

5.35. Overall the consumer savings range has reduced as a combined result of each of the factors summarised in this chapter.

5.36. In the table below, we summarise the updated results of our consumer savings analysis covering the application of the CPM to the Shetland project.

5.37. The updated range for the CPM financing costs that has fed into this analysis is provided in Appendix 2 of this document.

Table 6: Updated results of benefit case analysis for Shetland project

	Consumer savings presented in March 2019 consultation		**Updated consumer savings**	
	2019 RIIO Low	*2019 RIIO High*	*Updated RIIO Low (4.3%)*	*Updated RIIO High (4.8%)*
March 2019 CPM Central Scenario[64]	£6m	£43m		
Updated CPM Central scenario (Cost of Debt as per 31 Jan 20)			**-£17m**	**-£11m**

[64] See page 49 here: https://www.ofgem.gov.uk/system/files/docs/2018/07/hinkley_seabank_project_decision_on_delivery_model.pdf#page=49

Other considerations

Hard to Monetise potential benefits of applying CPM

5.38. There are potential benefits to applying the CPM to Shetland that are difficult to capture within our analysis. Below we consider several key impacts of not applying the CPM to Shetland that are difficult to monetise.

The benefits of locking in current rates

5.39. One of the key potential benefits of the CPM is that it allows for current rates, which despite recent fluctuations remain historically low, to be locked in for the length of the regulatory regime under the CPM (the length of construction and 25 years operation). In contrast, under the RIIO counterfactual, rates are set every 5 years based on prevailing market evidence and macro-economic factors over a 45 year depreciation period (with the last costs being recovered from consumers 45 years after the final expenditure on the project). Against the future uncertainty of this RIIO counterfactual, it is not possible to robustly monetise the benefit of locking in current rates.

5.40. For this reason, we remain of the view that relying on the RIIO-2 cost of equity range to set the RIIO counterfactual for future RIIO price controls (RIIO-2, RIIO-3, and beyond) could be considered a conservatively low counterfactual. Using a counterfactual cost of equity which reflects recent low rates without anticipating future increases may understate this key potential benefit of the CPM. However, based on the current available evidence it is difficult to identify an alternative quantitative estimate of future RIIO cost of equity ranges on which to base our counterfactual.

5.41. One useful source of evidence is the long-term forecast of UK gilts, which can be used to derive a long-term forecast of the risk-free rate over time. This evidence has allowed us to include a long-term forecast of the risk-free rate to capture a forecast of future movements in the cost of equity within the RIIO counterfactuals beyond the end of the RIIO-2 period. However, there is a limit to how reliable this is as a long-term measure of the future UK risk free rate. In recent times, the market has observed falls in forecast UK Gilt returns which may have reflected investors seeking to use gilts to hedge against broader market uncertainty in the short term, rather than a longer-term expectation that returns on UK gilts will necessarily remain low.

5.42. It is possible that over the long-term, market rates will move back towards average historical levels, rather than remain at the current historically low rates. However, if rates do

revert back towards average historical levels, it is almost impossible to forecast how long such a reversion might take, nor whether rates will reduce further first.

5.43. Ultimately, we think our analysis may undervalue the benefit of enabling rates to be locked in for the long term, but there is a limit to the range of useful evidence that can be relied upon to make long-term macro-economic predictions, and their impact on future allowed cost of equity under RIIO.

Making use of market-revealed project-specific benchmarks

5.44. The CPM uses market-derived evidence from the OFTO regime as a direct benchmark for the project's allowed cost of equity during the operational period. Establishing the use of such benchmarks, derived directly from competitive bids, in setting the financing costs of monopoly network company projects, could ensure that consumers ultimately pay less than they do from the administrated financing cost allowance calculated as part of each RIIO price control. Again, it is not possible to credibly monetise this potential benefit. Both the financing costs under the CPM for future projects, and future RIIO price controls are uncertain, and the relationship between the two over time is likely to remain dynamic and difficult to estimate.

Our minded-to position

5.45. We consider this decision to be finely balanced. Nevertheless, having considered the updated consumer savings results, which are based on the information and analysis currently available to us, and all other relevant considerations, we do not consider that there is clear evidence that applying the CPM to the Shetland transmission project (and therefore departing from the existing SWW arrangements under RIIO) would be in the interests of consumers.

5.46. We are therefore consulting on a minded-to position not to apply the CPM to the Shetland transmission project.

6. Next steps

Section summary

This chapter briefly outlines our expected decision making timeline for the proposed Shetland transmission project

Next steps for the Shetland Final Needs Case

6.1. Following the close of this consultation on 18th June 2020, we will consider the responses received before reaching decisions on both the Final Needs Case and the delivery model for the Shetland transmission project.

6.2. If, in line with our minded-to position, we decide to approve the Final Needs Case for the Shetland project subject to conditions, we will also need to decide whether those conditions have been satisfied before giving final approval of the Final Needs Case.

6.3. Where appropriate, our decision on conditional approval of the project, and on whether any conditions have been met, will be covered in a single document that would constitute our final approval of the Final Needs Case for the Shetland transmission project.

6.4. We will confirm the delivery model that we will use to fund delivery of the Shetland transmission project, in the event that we approve the Final Needs Case for the project.

6.5. If our decisions change from our minded-to positions set out in this document, in light of responses and new information received, then we may need to re-consult.

6.6. If the Shetland Isles project (the transmission link) does not go ahead or is delayed, then SHEPD will need to propose to us how it will most efficiently ensure long-term security of supply on the Shetland Isles, including potentially via another competitive process.

Use of CPM for future projects

6.7. As summarised in paragraphs 5.38 - 5.44, we consider that there may be benefits to using the CPM. We will continue to consider the application of the CPM to projects that are

new, separable and high value during the remainder of RIIO-T1 and during RIIO-2 depending on the circumstances of those projects and the information available to us at the time.

Appendices

Index

Appendix 1 – Summary of responses to our March 2019 consultation

In March 2019, we published Shetland transmission project: Consultation on Final Needs Case and Delivery Model.[65] That consultation set out our minded-to position on SHE-T's Final Needs Case submission for the Shetland transmission project, received in October 2018, and our minded-to position on the delivery model for the project.

We received 80 consultation responses in total, 79 of which responded to our questions regarding the Final Needs Case. These came from a mixture of stakeholders, including local generators, Shetland residents, local bodies, politicians and renewable energy associations. We received 34 responses from stakeholders who were affiliated to and/or investors in a local renewable developer group, 'Energy Isles'.

All of the non-confidential responses to our consultation have been published on our website.[66]

Below is a summary of responses to our March 2019 consultation.

Question 1*: Do you agree that the current network on the Shetland Isles needs reinforcing in order to connect additional generation?*

Most respondents agreed with the need to reinforce the network on the Shetland Isles, stating that the network is not sufficient to accommodate the new generation that Shetland's people and economy needs.

Over half of the respondents provided views on the urgency of finding a solution for the Shetland Isles and views on ongoing concerns surrounding LPS approaching the end of its operational life and commented that this (transmission link) solution could help to decrease Shetland's carbon footprint.

The majority of respondents expressed their support for a transmission link, detailing that in their view, the high carbon footprint currently associated with the Shetland Isles could be cost

[65] https://www.ofgem.gov.uk/publications-and-updates/shetland-transmission-project-consultation-final-needs-case-and-delivery-model
[66] https://www.ofgem.gov.uk/system/files/docs/2019/07/shetland_consultation_responses.zip

effectively reduced with a grid connection to mainland GB and the significant renewable generation resource available. Many of these respondents specifically commented that electricity generation on the Shetland Isles is currently very expensive despite being heavily subsidised by GB consumers due to its isolated power system.

Just under half of respondents also stated that they consider there would be benefits to the local community during construction and operation, through community benefits funds associated with the renewable projects and for islanders to invest in projects. These respondents also highlighted that they considered the proposed HVDC link would facilitate further connection to Norway, providing a secure supply on the Shetland Isles.

However, a quarter of the respondents expressed their opposition to the proposed reinforcement (and/or more generally the wind farms on the Shetland Isles). These respondents predominantly stated that the proposed transmission cable is too large for the Shetland Isles and alongside this set out their opposition to the development of wind farms on Shetland in general, raising environmental, visual amenity and health concerns. In particular, these respondents raised environmental concerns in relation to damage to prime peatland; criticism that the wind farm driving the need for the transmission link is not a community project; views that it would be less expensive and more economical to open a new power station; and that they consider the transmission link represents poor value for money and would be cheaper to build elsewhere in GB.

These respondents also stated that there is no need for the reinforcement as the additional generation is not needed and that a link should only be in place to cater for increased demand or improved reliability of supply. Several of these respondents also expressed their support for a replacement of LPS instead of constructing the link and flagged concerns about whether the HVDC link would reduce energy security.

Some local respondents also raised concerns that the approval of the proposed transmission link will lead to an unacceptable scale of development on Shetland with no guarantees of community benefit and a risk that consumers would end up paying for both the CfD subsidy and the link.

***Question 2**: What are your views on the generation scenarios developed by SHE-T? We are particularly interested in views on the likelihood of wind generation on the Shetland developing to the levels predicted by SHE-T's scenarios.*

In relation to the generation scenarios presented by SHE-T in its Final Needs Case submission, a small number of the respondents stated that they consider those represented a reasonable range of potential generation outcomes on Shetland.

However, most respondents (including a range of local generators on the Shetland Isles) argued that the generation scenarios are too low and underestimate the amount of wind generation projects already in development. A summary of the points raised by respondents is included below.

Many of the respondents argued that the wind potential (with wind factors of over 50%) far exceeds the level of transmission-contracted generation with planning consents stated in the consultation. Those respondents argued that the total pipeline of significant projects has already reached 800MW, with approximately 600MW of projects already consented and a further 200MW in early development.

These respondents flagged that the Energy Isles project has submitted an application to increase capacity by 80MW up to 200MW and that the Mossy Hill project has gained planning consent since SHE-T's October 2018 Final Needs Case submission. Respondents argued that both of these changes need to be considered.

A number of respondents commented that the ESO should look at a wider range of generation scenarios within its analysis of the proposed Shetland Isles project and take into account the most up to date Future Energy Scenarios (FES) available.

Several respondents also flagged concerns that the generation scenarios only assume modest growth for renewable technologies such as small-scale solar, tidal and floating offshore wind. Those respondents said that, in their view, more significant growth in wider technologies such as tidal, floating wind, as well as future interconnection to Norway should also be considered.

Several respondents also flagged that even assuming only modest annual growth of 2.4% by 2035 there would be c. 1000MW of generation (starting with 800MW in 2025) and said that this does not align with Ofgem's assessment of the Caithness Moray link in 2014 in which they said Ofgem's generation growth projection was 7% per annum.

Respondents were also concerned that the scenarios do not consider wider policy reports and positions such as the Scottish Government's commitment to net zero by 2045 which will see Scotland become carbon neutral by 2040. Respondents noted that this report projects a doubling of UK electricity demand and a fourfold increase in low carbon generation by 2050.

Respondents also flagged that the scenarios do not consider the recent BEIS Energy and Emissions report in April 2019 which shows the UK is off target to meet 4th and 5th carbon budgets with an increase gap since 2017.

Eight respondents flagged potential upcoming changes to forward-looking network charges[67] and noted that these may create uncertainty for existing distribution-connected generation projects as well as the pipeline of future project development.

More generally in response to this question, several respondents flagged their frustration that they considered GHD had misrepresented local views by stating in its report that there was little local opposition, which several respondents argued was not the case.

Question 3: *What are your views on SHE-T's approach to optioneering, are there other options that SHE-T should have considered?*

One third of respondents responded specifically to this question.

Five respondents specifically stated that they thought a reasonable range of options had been considered by SHE-T as part of its Final Needs Case submission. However, one respondent caveated that this is only on the basis that the large onshore wind farms are assumed to go ahead.

However, more generally respondents were critical of the assessment SHE-T had carried out on options for the transmission reinforcement and suggested that if a 600MW transmission link progresses, SHE-T has not acted in a fair and reasonable fashion to minimise costs to consumers and has also restricted the development of consented projects on the Shetland Isles.

Four respondents flagged that if the objective is to find the best option for consumers then other options should be considered. Further options highlighted by these respondents included: replacement of the existing gas grid plant or construction of a new gas-fired power station and consideration of the additional benefits a larger link might realise if a link to

[67] As outlined in Ofgem's December 2018 decision on the scope of the Electricity Network Access and Forward-looking Charges Significant Code Review (SCR), we are reviewing whether distribution-connected generation should face the same transmission forward-looking charging arrangements as transmission-connected generation. https://www.ofgem.gov.uk/publications-and-updates/electricity-network-access-and-forward-looking-charging-review-significant-code-review-launch-and-wider-decision

Norway were also developed. Respondents specifically stated that this would be cheaper than the works required to build the VEWF and the other generation projects.

Two respondents specifically flagged that they do not consider that all options have been fully investigated. They flagged that Ofgem should not be forced into coming to a particular conclusion because SHE-T has only developed one option fully (the 600MW transmission link).

***Question 4**: What are your views on the CBA put forward by the ESO?*

Several of the respondents asserted that the use of a constraints-based CBA methodology to justify the 'need' for the Shetland Isles link is an established industry approach and that the outcome is consistent with the ESO's NOA report issued in January 2017 which they quoted as stating that the Caithness–Shetland 600MW HVDC link was the "most economic, efficient and coordinated option" to allow the "attractive renewables resources" on the Shetland Isles to be developed. However, one respondent stated they had serious concerns about the process used to establish the 600MW link as the capacity limit, and another stated that the CBA is flawed as it fails to consider other forms of generation and/or supply for the Shetland Isles.

A number of respondents flagged that they consider the local benefits associated with the proposed HVDC link should be more fully considered in the Final Needs Case assessment process, and flagged their views of the additional benefits associated with an 800MW or 1000MW transmission link over a 600MW link.

CBA Inputs

In relation to the generation scenarios used in the CBA, several respondents commented that they thought the scenarios used in the ESO CBA were too low[68] and that Ofgem should instruct the ESO to re-run the CBA with a wider range of generation scenarios. One respondent also flagged that they think the CBA should be re-run with FES18/19 taken into account.

A small number of the respondents argued that they consider the CBA has been run on the basis that an HVDC transmission link is essential for the Shetland Isles and that the Remote

[68] In the ESO CBA the highest scenario, S4 contains 742MW of generation.

Island Wind projects are already confirmed. Respondents stated that in their view the Steady State scenario, which should look at non-HVDC options, has not been considered fully. Respondents suggested that the CBA should have included an assessment of a more self-contained energy grid for Shetland, as at present, but with a replacement for the power station with continued inputs from local scale renewables.

Results of the CBA

On the results of the CBA, several of the respondents commented specifically on the additional information contained in the ESO's CBA Report.[69] In particular, respondents noted that the earliest in service dates (EISDs) for the 600MW HVDC and 800MW HVDC options are 2024 and 2025, respectively. Respondents commented that this means that the CBA includes constraint costs for the 800MW HVDC option for wind generation over an 18 month period, the period of time associated with the later delivery of the 800MW HVDC option compared to the 600MW HVDC option. Respondents questioned whether any delay costs associated with the extra time period should be included in the CBA.

Several respondents also commented that when the EISDs for the 600MW HVDC and 800MW HVDC options are aligned, the 800MW HVDC link becomes the optimal option (the LWR option). Respondents raised concerns in relation to the timescales set out by SHE-T for delivery of the 800MW HVDC link, and stated that they consider more evidence is required to validate that a 800MW HVDC link would take materially longer than a 600MW link to complete.

Several respondents also commented on additional aspects/benefits that they think should be considered. One respondent noted that all Shetland-Caithness link options would improve the utilisation of the now completed Caithness-Moray link and help optimise its value to wider GB electricity consumers. They went on to note that the Caithness Moray link was designed with sufficient headroom to accommodate an export of 600MW from Shetland and that this headroom is currently paid for by wider GB consumers, the burden of which would be shared with exporting generators on Shetland if an HVDC link progresses.

Several other respondents also stated that GHD calculate the increased benefits from a fully utilised 800MW link to be £64m, and for 1000MW to be £133m on top of the benefits of

[69] https://www.ofgem.gov.uk/system/files/docs/2019/05/eso_report_-_shetland.pdf

£143m-£257m for the 600MW option, and that this shows that the larger link brings more local benefit.

***Question 5**: What are your views on the technical design and costs of the proposed Shetland link?*

Design

Almost all respondents either did not provide specific comment on this question, or agreed that the technical design proposed by SHE-T is appropriate. There were a small number of respondents who stated that the design proposed is too big for Shetland and does not represent value for consumers.

A small number of respondents raised concerns in relation to the proposed design of a single cable solution for Shetland and questioned the energy security of this option. Respondents questioned whether there would be a need for standby/back up generation and whether the costs of cable failure have been accounted for.

Several respondents also went on to query how the proposed Shetland transmission link would interact with the Caithness-Moray transmission link and whether the Caithness-Moray link has sufficient capacity available to allow the Shetland transmission link to operate at full capacity.

Costs

Consistent with responses received to other questions in our March 2019 consultation several respondents questioned whether building wind farms on Shetland and exporting power through, what they considered to be, an expensive cable is the best option for consumers. Those respondents flagged their view that consumers would get better value for money if the same money was spent nearer to the mainland national grid infrastructure.

In relation to the costs of the proposed Shetland link, several respondents stated that they consider costs should be kept down wherever possible. Two respondents raised concerns in relation to the cost of the transmission link and that they would expect the costs to escalate. One respondent said that the proposed cost has more than doubled over the past few years and that the burden of payment would fall on consumers.

Several respondents stated that to ensure Shetland is not disadvantaged against offshore wind in the CfD auction, Ofgem should ensure the link is built cost effectively by applying appropriate benchmarks or via competition. This would be to avoid higher costs which would equate to higher TNUoS charges and impact on CfD competitiveness for generators.

Two respondents stated that Ofgem should be using relevant benchmark cost data from the Caithness Moray project to ensure it assesses the right level of capital cost for the proposed Shetland link. Also in relation to benchmarking, one respondent raised that they would welcome the possibility of asset-specific performance metrics, and would be pleased to see appropriate operational performance metrics applied to the Shetland link.

More generally, several respondents flagged that they considered that a 1000MW link would cost only 12% more than a 600MW link, arguing that with 67% more capacity than a 600MW link it could be considered to be 48% more cost effective.

Question 6: *What are your views on our minded-to position to conditionally approve the Needs Case? Specifically do you agree with our proposal to approve a 600MW link if Viking Energy Wind Farm secures a CfD in 2019?*

In response to Ofgem's minded-to position, most of the respondents set out their support for a transmission link, however a number of respondents objected to the transmission link in its entirety. Many of the respondents who disagreed with the proposed reinforcement for the Shetland Isles raised concerns that proceeding with an HVDC link will prove to be very expensive for GB consumers and is not appropriate for the scale (i.e. size/population) of the Shetland Isles, stating that instead smaller on-island solutions could be looked at.

Support for a larger link

A number of respondents supported our proposed approval of a 600MW transmission link, however the majority of respondents were in favour of either an 800MW or 1000MW transmission link.

Those respondents stated that they do not believe the 600MW link is sufficient, and that it would be a short sighted option stifling further new generation, which would not be in the best interests of Shetlands needs, its economy or consumers. Several of the respondents who expressed their support for a larger transmission link, called for SHE-T's Final Needs Case submission to be sent back to SHE-T by Ofgem on the basis that SHE-T should propose a larger link.

Many of the respondents raised concerns that progressing with a 600MW link now, would mean a second link would be required relatively soon after the proposed 600MW transmission link. Those respondents said that discussions with SHE-T on a second transmission link had already begun.

Other respondents further stated that the likelihood of achieving c.800MW of generation becomes more likely if, from the outset, generators are confident that transmission capacity will be available.

Several of the respondents calling for the larger transmission link options also expressed other concerns. Firstly, those respondents expressed concerns that, as SHE-T is a subsidiary company of SSE and SSE is one of the partners in the VEWF project, SHE-T is putting forward the transmission option that best facilitates VEWF as quickly as possible. Many of the respondents also questioned the timing for the decision on the Final Needs Case, and whether this should be made after the Autumn 2019 CfD auction results are known, and not in summer 2019 as set out in the consultation.

Several respondents also stated that an Initial Needs Case process should have been done and that they think there is a risk that the Final Needs Case was fast-tracked by SHE-T to enable VEWF to bid into the CfD auction. One respondent also added that they consider there is a legitimate expectation of an Initial Needs Case given the Ofgem SWW Guidance.

Disagreement with reinforcement options proposed

As flagged earlier, a quarter of respondents disagreed with the need for reinforcement for Shetland and highlighted that in their view proceeding with an HVDC link will prove to be very expensive for GB consumers and is not appropriate for the scale of Shetland.

Respondents echoed points raised earlier that they do not agree with the proposal to approve the 600MW link without fully considering other options, such as a Shetland stand-alone solution. One respondent stated that this Needs Case process had excluded seeking a best value for money option for GB consumers and that no thought had been given to consumers in the event of a cable failure/need for repair.

Similarly to the above, another respondent stated that the consultation document failed to justify that a transmission link to Shetland is necessary and said that a link is really only necessary so that developers can profit from remote island wind subsidies. That respondent stated that this would come at a high cost to consumers, who will pay the transmission costs.

Several of the respondents were critical of the CfD subsidy in general, and stated that the efficiency benefits associated with high load factors will not exceed the high costs of building and maintaining wind farms on the Shetland Isles and that it would be more sensible to construct a gas fired power station.

More generally several respondents also called for more clarity on the financial contribution towards the cost of the link proposed by SHEPD and how this relates to expected transmission network charges and related costs for those bidding into the CfD 2019 across the Scottish islands.

Proposed conditions for approval

On the proposed conditions for approval of the 600MW transmission option, a number of respondents drew comparison to the total capacity of generation projects as a proportion of the link capacity across the Scottish islands projects. Respondents said that the conditions for approval proposed by Ofgem on the Orkney project equate to approximately 61% (derived from the ratio of generation required for approval against the size of the link), whereas the equivalent on Shetland is far higher (69%-76%). Those respondents set out that Ofgem should therefore approve a larger link (800MW) on Shetland if VEWF and one of the additional transmission projects on the Shetland Isles won CfDs in the 2019 CfD round, as this would equate to the same ratio of generation against the link size as for the Orkney project.

Question 7: *Do you agree with our assessment of the Shetland project against the criteria for competition?*

Respondents were generally in agreement that we had appropriately assessed the Shetland transmission project against the criteria for competition. Respondents generally agreed with our conclusion that the project meets the criteria for competition, though it was noted that the technical complexity of the HVDC terminal within the Shetland transmission project made the assessment of whether the project is separable difficult.

Question 8: *Do you agree with our proposal not to competitively tender the Shetland project using the SPV model or under our CATO framework unless there are significant delays to the delivery timelines?*

The majority of respondents focused on the importance of ensuring the timely delivery of the transmission link. In this context they were supportive of our proposal not to competitively tender the Shetland project using the SPV model or under our CATO framework unless there

are significant delays to the delivery timelines. One respondent did reference that they felt the project could be delivered quicker than the construction timetable identified by SHE-T, meaning that the SPV model could be a viable delivery model for the Shetland transmission project.

Question 9: *Do you agree that the Competition Proxy Model would deliver a favourable outcome for consumers relative to the status quo RIIO SWW delivery arrangements?*

The three incumbent TO respondents focused on the benefits of retaining continuity by keeping the Shetland transmission project within RIIO and criticised the minded-to position to apply CPM. They expressed the view that they consider the application of CPM during the RIIO-T1 period was an inappropriate reopening of the existing price control that would harm consumers in the long-term through increased investor uncertainty. The TO respondents also flagged various concerns with the CPM methodology (in line with the concerns flagged in our previous consultations on the CPM), which they considered significantly underestimated the efficient cost of capital for delivering a link such as Shetland. Generators were supportive of selecting the delivery model that drove the best value for the parties connecting and emphasised the importance of ensuring the impact of CPM on TNUoS charges is understood by generators.

Question 10: *What are your views on the way in which we have applied project specific updates to the Competition Proxy Model methodology to account for the specific characteristics of the Shetland project?*

Most respondents did not respond on the specifics of this question. However, the incumbent TO respondents re-emphasised that they do not consider the use of the CPM has been sufficiently justified or that sufficient detail had been provided on how the model would be applied to the Shetland transmission project.

Appendix 2 – Updated Cost of Capital ranges under CPM

Updated Cost of Capital ranges under the CPM - Construction

The table below shows Cost of Capital ranges for the 4 year Shetland project construction period, as calculated using the CPM cost of capital methodology. It shows the ranges generated by the methodology for our March 2019 consultation and the ranges generated following the updates to inputs referred to in the main document.

Table A1: CPM Construction Cost of Capital inputs for the Shetland project (Jan 2020 vs. Sept 2017)

	Rates used in March 2019 consultation (from Sept 2017)			**Updated rates for this consultation (from Jan 2020)**	
Construction:	Low	High		Low	High
Gearing	37.5%	37.5%		37.5%	37.5%
Cost of Debt (nominal)	1.85%	2.35%		1.55%	2.60%
Post tax Cost of Equity (nominal)	5.79%	9.43%		6.15%	9.87%
Vanilla WACC	4.31%	6.78%		4.43%	7.14%
CPIH real WACC (vanilla)	**2.27%**	**4.68%**		**2.38%**	**5.04%**

Updated Cost of Capital ranges under the CPM – Operational period

The table below shows the Cost of Capital ranges for a 25-year operational period under the CPM, as calculated using the CPM cost of capital methodology.

Table A2: CPM Operational Cost of Capital inputs for the Shetland project (Jan 2019 vs. Sept 2017)

	Rates used in March 2019 consultation (from Sept 2017)			**Updated rates for this consultation (from Jan 2020)**	
Operations:	Low	High		Low	High
Gearing	85%	80%		85%	80%
Cost of Debt (nominal)	3.00%	3.25%		3.31%	3.44%
Post tax Cost of Equity (nominal)	7.00%	8.50%		7.00%	8.50%
Vanilla WACC	**3.60%**	**4.30%**		**3.86%**	**4.45%**
CPIH real WACC (vanilla)	**1.57%**	**2.25%**		**1.83%**	**2.40%**

Appendix 3 – Privacy notice on consultations

Personal data

The following explains your rights and gives you the information you are entitled to under the General Data Protection Regulation (GDPR).

Note that this section only refers to your personal data (your name address and anything that could be used to identify you personally) not the content of your response to the consultation.

1. The identity of the controller and contact details of our Data Protection Officer

The Gas and Electricity Markets Authority is the controller, (for ease of reference, "Ofgem"). The Data Protection Officer can be contacted at dpo@ofgem.gov.uk

2. Why we are collecting your personal data

Your personal data is being collected as an essential part of the consultation process, so that we can contact you regarding your response and for statistical purposes. We may also use it to contact you about related matters.

3. Our legal basis for processing your personal data

As a public authority, the GDPR makes provision for Ofgem to process personal data as necessary for the effective performance of a task carried out in the public interest. i.e. a consultation.

3. With whom we will be sharing your personal data

(Include here all organisations outside Ofgem who will be given all or some of the data. There is no need to include organisations that will only receive anonymised data. If different organisations see different set of data then make this clear. Be a specific as possible.)

4. For how long we will keep your personal data, or criteria used to determine the retention period.

Your personal data will be held for ***(be as clear as possible but allow room for changes to programmes or policy. It is acceptable to give a relative time e.g. 'six months after the project is closed')***

5. Your rights

The data we are collecting is your personal data, and you have considerable say over what happens to it. You have the right to:

- know how we use your personal data
- access your personal data
- have personal data corrected if it is inaccurate or incomplete
- ask us to delete personal data when we no longer need it
- ask us to restrict how we process your data
- get your data from us and re-use it across other services
- object to certain ways we use your data
- be safeguarded against risks where decisions based on your data are taken entirely automatically
- tell us if we can share your information with 3rd parties
- tell us your preferred frequency, content and format of our communications with you
- to lodge a complaint with the independent Information Commissioner (ICO) if you think we are not handling your data fairly or in accordance with the law. You can contact the ICO at https://ico.org.uk/, or telephone 0303 123 1113.

6. Your personal data will not be sent overseas (Note that this cannot be claimed if using Survey Monkey for the consultation as their servers are in the US. In that case use "the Data you provide directly will be stored by Survey Monkey on their servers in the United States. We have taken all necessary precautions to ensure that your rights in term of data protection will not be compromised by this".

7. Your personal data will not be used for any automated decision making.

8. Your personal data will be stored in a secure government IT system. (If using a third party system such as Survey Monkey to gather the data, you will need to state clearly at which point the data will be moved from there to our internal systems.)

9. More information For more information on how Ofgem processes your data, click on the link to our "Ofgem privacy promise".