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Offshore Transmission: Draft Cost Assessment for the Triton Knoll Transmission Assets

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This document sets out the cost assessment for the Triton Knoll Offshore Windfarm Limited offshore Transmission Assets. This assessment of costs will be used by the Gas and Electricity Markets Authority (the **Authority**) to determine the value of the Triton Knoll offshore Transmission Assets to be transferred to the successful bidder in the Tender Process.

The Final Transfer Value of the Triton Knoll offshore Transmission Assets is established as £572.7m. This value is published in the licence consultation under section 8A of the Electricity Act 1989 (the **Act**), and we do not expect any further changes to the Assessed Costs. However, we do not intend to finalise the Final Transfer Value until the Authority has determined to grant an offshore transmission licence to the successful bidder.

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Contents

Executive summary

This report sets out the cost assessment work that Ofgem has undertaken from the Invitation to Tender (**ITT**) stage of the Tender Process in relation to the Triton Knoll Offshore Windfarm Limited (**Triton Knoll**) offshore Transmission Assets (the **Transmission Assets**). This work has been used by the Authority[1] to derive the Assessed Costs and will be used to set the Final Transfer Value (**FTV**) for the assets. Unless otherwise stated or defined in-text, capitalised terms in this report are defined in the Glossary at Appendix 1.

The cost assessment process involves the below three key stages:

- The Initial Transfer Value (**InTV**) for the Transmission Assets was published in the preliminary information memorandum in 30 November 2020[2] and was set at £612.5m based on information provided to Ofgem by Triton Knoll Offshore Wind Farm Limited (for the purposes of this report, the **Developer**)[3];

- The Developer submitted a revised cost assessment template (**CAT**) on 19 November 2020, and again on 23 December 2020. A further updated CAT was submitted by the developer on 1 February 2021. Ofgem reviewed and analysed the cost information and calculated the Indicative Transfer Value (**ITV**) as £576.8m. This updated calculation was communicated to the Developer in April 2021 and the formal ITV letter issued in July 2021; and

- The Developer submitted a further CAT dated 02 July 2021 with a value of £585.9m (the **FTV CAT**). Ofgem reviewed this further cost information to calculate the final assessment of costs as £572.7m (the **Assessed Costs**). This is a reduction of £13.1m from the submitted FTV CAT. It is intended that the incoming Offshore Transmission Owner (**OFTO**) will be able to obtain the full benefit of all available

[1] References to the "Authority", "Ofgem", "we" and "our" are used interchangeably in this document. The Authority refers to GEMA, the Gas and Electricity Markets Authority. The Office of Gas and Electricity Markets (Ofgem) supports GEMA in its day to day work.
[2] https://www.ofgem.gov.uk/publications/offshore-transmission-tr7-generic-preliminary-information-memorandum
[3] RWE Renewables UK Limited managed the development process of Triton Knoll Wind Farm on behalf of Triton Knoll Offshore Windfarm Limited.

capital allowances. Therefore, the final Assessed Costs of £572.7m is the amount that will be used to set the Final Transfer Value (**FTV**) at licence grant.

The key components of the InTV, the ITV and the FTV, together with the Developer's submission (the FTV CAT) are set out in Table 1 below.

Table 1: Summary of costs components*

Category	InTV	ITV	Developer submitted cost for FTV review (FTV CAT)	FTV
	Oct 20 (£m)	July 21 (£m)	July 21 (£m)	Dec 21 (£m)
Capex	462.6	465.1	466.9	466.2
Development**	77.4	57.8	58.7	51.6
Contingency	4.3	3.9	-	-
IDC	65.7	47.5	57.6	52.2
Transaction	2.6	2.6	2.6	2.6
Total	612.6	576.8	585.9	572.7

**these figures may not add to totals due to rounding*

***Development represents all costs within the cost category 'Other' (CR8) in the Cost Assessment Template. This includes development costs, as well as other common costs.*

Sections 3.30 – 3.69 of this report set out details of the Assessed Costs and any reductions made to the values submitted in the FTV CAT and against the ITV. The main increases/decreases in the Assessed Costs, against the ITV figures, are as follows:

a) the capital expenditure (**Capex**) component of the FTV has increased by £1.1m;
b) the development costs have decreased by £6.2m;
c) the ITV contingency amount of £3.9m was removed in its entirety;
d) the Interest During Construction (**IDC**) amount increased by £4.7m; and
e) the transaction costs have increased by £0.1m.

Below we summarise the main increases and decreases to each cost category as shown in Table 1 and detailed in sections 3.30 – 3.69. Please note that the figures set out in this section have been rounded.

Capital expenditure (Capex)

The Capex of the FTV has increased by £1.1m since ITV. The main changes are:

a) reductions to allocations due to the capex split;
b) addition of costs due to new methodology for calculating generator weight contribution to the offshore substation platform (OSP);
c) removal of costs originally disallowed at ITV stage that developer added to the FTV submission;
d) removal of costs related to an OSP delay claim;
e) removal of costs related to fibre optic cables for generation use; and
f) other minor adjustments.

Development costs

The development costs at FTV have decreased by £6.2m since ITV. The decrease is due to a reduction in allocation percentage applied to the capex split between transmission/generation.

Contingency

We included £3.9m of contingency in the ITV in other costs. This has now been removed in its entirety as it has been released or realised at this stage of the transaction, and hence there is no contingency included in the FTV.

Interest During Construction (IDC)

The IDC amount has increased by £4.7m since the ITV. This overall increase in IDC is the result of negative adjustments (for disallowed costs, extended duration prior to Financial Investment Decision (**FID**), and changes to the timing of when assets are considered available for use) and increased costs submitted by the developer at FTV.

Transaction costs

Transaction costs have been assessed at £2.6m. The transaction costs are composed of both internal and external resource costs arising from the Developer's participation in the Tender Process. These have seen an increase since the ITV of £0.1m.

Assessed Costs and FTV for the Transmission Assets

In accordance with Regulation 4(2)(b) of the Tender Regulations, the Assessed Costs of the Transmission Assets are £572,728,720. The Assessed Costs will be used as the FTV in accordance with Regulation 4(8) of the Tender Regulations.

1. Introduction

Context and related publications

1.1. In 2009, the Government introduced the regulatory regime for offshore electricity transmission to connect significant amounts of renewable offshore generation to the onshore electricity network (the **OFTO regime**).

1.2. Offshore Transmission Owners (**OFTOs**) are appointed through a competitive tender process (the **Tender Process**). OFTOs are granted an offshore transmission licence (**OFTO Licence**) with a fixed revenue stream for a specified time.

1.3. From the outset, the OFTO regime has encouraged innovation and attracted new sources of technical expertise and finance, whilst ensuring that grid connections are delivered efficiently and effectively.

1.4. The Electricity (Competitive Tenders for Offshore Transmission Licences) Regulations 2015 (the **Tender Regulations**) provide the legal framework for the Tender Process. The Tender Regulations require the Authority to calculate, based on all relevant information available to it, the economic and efficient costs which ought to be, or ought to have been, incurred in connection with developing and constructing the offshore Transmission Assets in respect of a qualifying project.

1.5. Where the Authority has determined to grant an OFTO Licence for a particular project, the assessment of costs must be used by the Authority to determine the value of the Transmission Assets to be transferred to the successful bidder. This value will be reflected in the revenue stream in the granted OFTO Licence.

1.6. This report should be read in conjunction with the "Offshore Transmission: Guidance for Cost Assessment" (the **Cost Assessment Guidance**)[4].

[4] https://www.ofgem.gov.uk/system/files/docs/2019/05/offshore_transmission_guidance_for_cost_assessment_april_2019.pdf

Associated publications

- The Electricity (Competitive Tenders for Offshore Transmission Licences) Regulations 2015 Link
- Tender Process Guidance Document TR7 Link
- Offshore Transmission: Guidance for Cost Assessment Link

2. The cost assessment process

Section summary

The Tender Regulations require the Authority to calculate, based on all relevant information available to it, the economic and efficient costs which ought to be, or ought to have been, incurred in connection with developing and constructing the offshore Transmission Assets in respect of a project. This section sets out the process that Ofgem followed in carrying out the cost assessment for the Triton Knoll offshore transmission project (the **Project**).

Overview of the cost assessment process

2.1. The Tender Regulations provide the legal framework for the process we follow for granting offshore electricity transmission licences. This process includes calculating the economic and efficient costs of developing and constructing the offshore Transmission Assets to be transferred to the new OFTO.

2.2. The calculation of those costs shall be:

a) where the construction of the Transmission Assets has not reached the stage when those Transmission Assets are available for use for the transmission of electricity, an estimate of the costs which ought to be incurred in connection with the development and construction of those Transmission Assets; and
b) where the construction of the Transmission Assets has reached the stage when those Transmission Assets are available for use for the transmission of electricity, an assessment of the costs which ought to have been incurred in connection with the development and construction of those Transmission Assets.

Cost assessment principles

2.3. The cost assessment principles, the reasoning for such principles, and the overall process we have adopted can be found in the Cost Assessment Guidance.

2.4. We have applied these principles in our cost assessment process for the Project and, where appropriate, have taken into account project-specific circumstances.

2.5. The remainder of this section describes some of the key elements of the cost assessment process. Section 3 provides the detail as to how these have been applied to the specifics of the Project.

Data collection

2.6. To undertake cost assessments we gather and review a range of information and supporting evidence. These relate to the forecast and actual costs of developing and constructing the Transmission Assets that will transfer to the OFTO. Detailed cost information is provided by the developer in the form of cost assessment templates (**CAT**s), contract values, asset cost schedules and cashflows. The developer also provides supporting evidence to substantiate its cost submissions including, amongst other things, contract documentation, supplier payment lists, invoices and receipts.

2.7. We work closely with the developer to gather information relating to the following cost categories in the development and construction of the relevant Transmission Assets:

a) capital expenditures;
b) development costs;
c) contingency provisions;
d) interest during construction; and
e) transaction costs.

Process stages for cost assessment

2.8. The cost assessment process involves the key stages described below.

Initial Transfer Value (InTV)

2.9. The InTV value is based on cost submissions by the developer for the relevant project. This value is made available to bidders at the Pre-Qualification or the Enhanced pre-qualification (**EPQ**) stage of the tender process. The letter we send to the developer at this time indicates that the calculation might be updated as a result of any further information provided by the developer and our continuing analysis.

Indicative Transfer Value (ITV)

2.10. We provide the estimate of costs for the Transmission Assets (the **ITV**) for the commencement of the Invitation to Tender (**ITT**) stage of the tender process. This value is used as an assumption underlying the tender revenue stream (**TRS**) bids submitted by bidders at the ITT stage. The ITV letter we send to the developer at this stage confirming the ITV indicates that the calculation might be updated as a result of any further information provided by the developer and our continuing analysis.

Assessed Costs

2.11. As soon as reasonably practicable after the ITV has been completed, we are satisfied that the assets are available for use, and we have obtained any further information that we require, we commence the exercise to determine the Assessed Costs.

2.12. Following this assessment exercise, Ofgem sends the developer a draft cost assessment report (in the form of this report) setting out the amount of the Assessed Costs. This gives the developer the opportunity to correct factual errors and propose the redaction of commercially sensitive information.

2.13. The draft cost assessment report is also sent to the preferred bidder, to allow it to incorporate the Assessed Costs into its estimate of the TRS payable to the OFTO. This TRS amount, incorporating the Assessed Costs, is published in a consultation pursuant to section 8A of the Electricity Act 1989, by which the Authority proposes modifications to the standard conditions of the OFTO Licence on a project specific basis (the **Section 8A Consultation**).

2.14. The draft cost assessment report is published alongside the Section 8A Consultation. The report remains in draft form until the conclusion of the Section 8A Consultation and the Authority has determined to grant the OFTO Licence to the successful bidder.

Final Transfer Value

2.15. If a developer retains some of the benefit of the available capital allowances, we reduce the relevant amount from the Assessed Costs before we derive the FTV. The FTV is confirmed once the Authority has determined to grant an OFTO Licence to the successful bidder. After licence grant, the final cost assessment report and supporting appendices are published on the Ofgem website.

2.16. Ofgem normally finalises the assessment of costs prior to commencement of the Section 8A Consultation. The FTV is taken into account when the TRS for the full licence period is published.

Cost assessment analysis

2.17. Throughout the cost assessment process, Ofgem applies two key tests to the cost information submitted by the developer. These are:

Test 1 - Assessing if a developer's cost submissions are accurate and allocated appropriately

2.18. As a first test, we check the accuracy of the data provided by the developer and the appropriateness of cost allocations, in particular, between the offshore generation and Transmission Assets. Throughout the cost assessment process, the developer provides cost information to us on an ongoing basis. Where we identify discrepancies in how the developer has allocated these costs, we check with the developer to assess if they have been allocated to the correct asset category and make adjustments accordingly.

2.19. To support the cost assessment process, we undertake a forensic accounting investigation. The scope of this investigation is shared with the developer in advance. This investigation is based on the final costs that the developer provides to us, and applies to a sample of contract costs. The actual sample for each project varies due to the different contracting strategies adopted by the developer and the specific needs of the project, but generally focuses on the most expensive contracts and/or contracts that materially increase in cost.

2.20. The forensic accounting investigation scrutinises the cost allocations provided by the developer. This may indicate the need for amendments to the developer's submissions to reflect, for example:

a) the actual costs incurred (e.g. in respect of exchange rates on foreign currency payments); and/or
b) more relevant metrics for the allocation of shared service costs.

2.21. Where amendments, in our opinion, are required and, in the absence of further evidence from the developer to substantiate the original allocation, we incorporate the recommended changes from the forensic accounting investigation.

Test 2 - Assessing if a developer's costs are economic and efficient

2.22. Under test two we assess whether the costs reported to date by the relevant developer have been economic and efficient.

2.23. We undertake benchmarking analysis using cost reporting data from other projects. This is used to identify cost outliers reported by offshore developers. Where cost outliers are identified on a project, these are further reviewed and Ofgem may use external consultants to investigate the reasons for this and evaluate whether the costs are economic and efficient.

2.24. We also consider the procurement processes adopted by the developer to obtain economic and efficient Transmission Asset costs.

2.25. When undertaking the assessment of costs to derive the FTV, we review updated information provided by the developer, as well as any cost areas flagged for further investigation at the ITV stage. Where costs have increased since the ITV, we ask the developer to provide supporting documentation to justify these increases. We may undertake a technical investigation that focuses on, for example, a particular cost component, such as an increase of costs in a contract or multiple increases across several contracts.

3. Triton Knoll Offshore Windfarm cost assessment

Section summary

This section sets out a short description of the wind farm and the Transmission Assets, based on information provided by the Developer. It then summarises how we have undertaken our cost assessment for the Transmission Assets, from the InTV to the FTV and provides a breakdown of the key cost categories that we have considered and highlights the decisions that we have made.

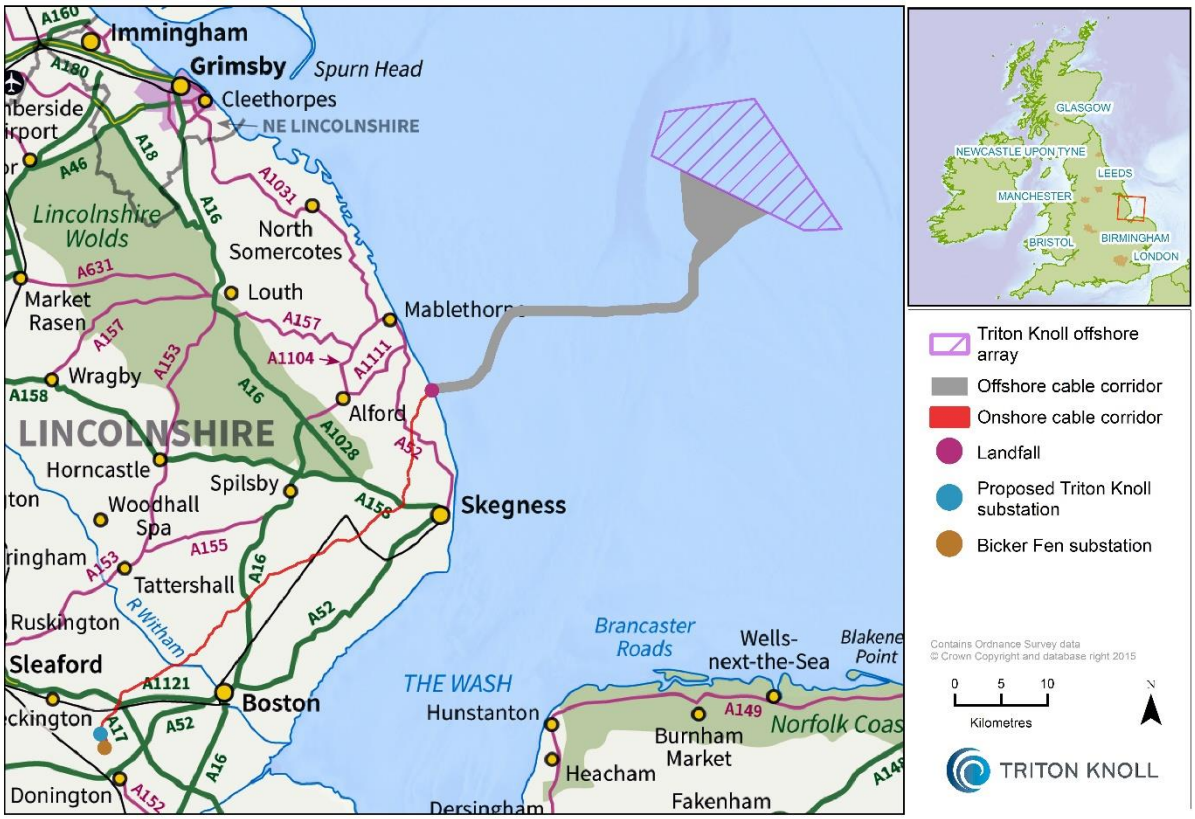
Transmission Assets[5]

3.1. The Triton Knoll Offshore Wind Farm is located 20 miles off the coast of Lincolnshire and 28 miles from the coast of north Norfolk in English territorial waters.

3.2. The wind farm has an 857MW capacity, comprising 90 Vestas v164-9.5 MW turbines. The power is collected via two Offshore Substation Platforms (**OSPs**), via 66kV array cables and associated equipment. Power is stepped up to 220kV on the OSPs and is exported to the onshore substation at Bicker Fen, Linconshire, via circa 108km of offshore and onshore export cables using two circuits. At the onshore substation, the power is stepped up again to 400kV and connected via 2km of 400kv cable to the National Grid substation where it joins the National Electricity Transmission System (**NETS**).

[5] The technical information contained in this section of the Report is based on information provided by the Developer and has not been independently verified by Ofgem.

Figure 1: Location of the Triton Knoll Offshore Wind Farm and Transmission Assets



3.3. Triton Knoll is owned by RWE (59%), J-Power (25%) and Kansai Electric Power (16%). RWE Renewables is managing the construction and will also manage the operations of the Project on behalf of the shareholders.

3.4. In addition to equity funding from the owners, Triton Knoll has also secured project financing from a group of commercial banks. The Project went through a comprehensive technical and legal due diligence process before Financial Close was reached in August 2018.

3.5. The Transmission Assets connect to the Triton Knoll Offshore Wind Farm at the two offshore platforms. The Transmission Assets that are transferring to the OFTO comprise:

a) two offshore substation platforms (**OSPs**) including two 220/66kV grid transformers, two 66/0.4 kV earthing and auxiliary transformers, six 220 kV Gas Insulated Switchgear (**GIS**) bays, two 220kV 43MVar Shunt Reactor and associated auxiliary systems;

b) two offshore export cables (with associated fibre optics) – 2 x 220kV submarine cable circuits of circa 50 km. Each circuit includes a cable Transition Joint Bay (TJB) to connect the submarine and land cables;
c) 2 Land cables (with associated fibre optics) – 2 x onshore 220 kV underground cables of 58 km length;
d) 1 onshore substation – Including 400 kV Air Insulated Switchgear (AIS), two 400/220/33 kV Super Grid Transformers, 220 kV AIS, two 143MVAr Static VAr Compensators (SVC) and four x 162.8MVAr mechanically switched reactors, 33 kV AIS, two 172MVAr shunt reactors, and associated auxiliary systems;
e) Two 400 kV cables – Two 400 kV circuits linking the onshore substation to NGET's Bicker Fen substation; and
f) SCADA - including OFTO SCADA servers and separate OFTO SCADA network.

3.6. The onshore and offshore boundary points proposed by the Developer are as follows:

a) Offshore (Grid Entry Point) - the busbar side of 66kV Grid Transformer incomer circuit breakers on each Offshore Substation Platform; and
b) Onshore (Transmission Interface Point) – between the NGET owned busbars at Bicker Fen substation and OFTO owned circuit breaker bays (at busbar clamp to the disconnectors).

3.7. The spares included in the Transmission Assets that are transferring to the OFTO are:

a) 1.5km of 1000mm^2 subsea cable;
b) various joints (transition, straight and cable repair joints);
c) cable terminations; and
d) other miscellaneous spares.

Overview of cost assessment process for Triton Knoll project

3.8. We received the first cost information from the Developer in September 2020. Since then we have worked with the Developer and our advisers to reach an assessment of the costs which ought to have been incurred in connection with the development and construction of the Transmission Assets. We set out below an outline of the steps taken, and to be taken, in the cost assessment process for the Project.

a) **November 2020**: InTV (£612.5m) published.
b) **November 2020**: Developer submitted the ITV CAT (the **ITV CAT**)
c) **December 2020 - April 2021:** forensic accounting and ITV investigation undertaken.
d) **April 2021**: ITV figure (£576.8m) determined and communicated to Developer.
e) **May 2021:** ITT process (bidding and evaluation).
f) **July 2021**: formal ITV letter issued.
g) **July 2021:** Developer submitted a revised CAT (the **FTV CAT**).
h) **July - December 2021**: final cost reporting updates and supporting information received for the FTV from the Developer.
i) **March 2022:** this draft cost assessment report released to the Developer for comment and the Preferred Bidder for information.
j) **TBC 2022:** draft cost assessment report published alongside the Section 8A Consultation.
k) **TBC 2022:** The Authority to determine the FTV when granting the licence to the successful bidder. The final cost assessment report will be published after licence grant.

Summary of the InTV and ITV determination

3.9. The InTV of £612.5m was published in November 2020. This value was based on information received from the Developer at an early stage in the construction and development of the Project. This value was included in the EPQ document and Preliminary Information Memorandum (**PIM**) for the commencement of the EPQ stage of the Project.

3.10. The ITV of £576.8m was established in April 2021, with the formal ITV letter issued to the Developer in July 2021. Our estimate was supported by our forensic accounting advisors, Grant Thornton (**GT**), our internal analysis, and the supporting information provided by the Developer.

3.11. We conducted an in-depth cost analysis at ITV, however some costs could not be fully investigated and were highlighted as needing further attention at the FTV stage. This included but was not limited to costs related to sea cable supply, onshore cable, fibre optic cables, resource costs, allocation of shared capex and development costs to the Transmission Assets, and review of the period and duration in which IDC is applicable.

3.12. Below are the main points arising from our review, the forensic review, and a description of the adjustments applied at ITV. Full details are set out in the ITV letter issued by Ofgem on 02 July 2021 (**the ITV Letter**).

Ofgem review – Crosscutting issue

3.13. In conducting the ITV cost review, we identified a crosscutting issue, that is, an area that applies across more than one cost category, in addition to specific cost category adjustments.

3.14. The personnel costs submitted by Triton Knoll included resources were supplied by external contractors and also provided by RWE to Triton Knoll under a management service agreement. We stated that this would be reviewed at the FTV stage.

Ofgem review – Individual cost categories

3.15. We undertook a detailed review of each cost category. Below we summarise the adjustments made to each category.

Offshore Substation Platforms (OSPs)

3.16. At ITV we reviewed the costs for the design, supply, installation, commissioning and project management of the two OSPs and increased this category by £0.4m overall. This adjustment was made up of the following adjustments:

a) a positive adjustment based on the updated re-measurable bill of quantities instead of costs based upon milestone payment amounts;
b) a reduction for costs of communications related to the generation portion of the project; and
c) a reduction for unsubstantiated costs.

Submarine cable supply and installation

3.17. We adjusted the costs submitted for the design, fabrication, installation and project management of the submarine cables which resulted in an overall reduction of £0.6m. This consisted of the following reductions:

a) fibre optic cables used by the generator;
b) a variation for a delay caused by the Developer's decision on how to manage access to the OSP by the pull-in teams that we did not consider economic and efficient;
c) a desktop engineering exercise in the event that a late topside delivery required the installed export cables to be wet stored;
d) consultancy services pertinent to the generator part of the project;
e) cables type testing, which should be recovered from the contractor; and
f) forecasted costs unlikely to be incurred.

Onshore cables

3.18. We adjusted the costs submitted for the design, fabrication, installation and project management of the onshore cables which resulted in an overall reduction of £0.3m. This adjustment included:

a) two reductions for standby costs, related to delays in obtaining permission in advance of starting works;
b) a reduction for costs related to post-construction crop compensation;

c) a reduction for fibre optic cables that are used for the benefit of the generator; and
d) a positive adjustment identified during GT's forensic review.

Onshore substation

3.19. We calculated an overall reduction of £0.6m to the onshore substation cost category. This adjustment included:

a) costs related to tariff metering and other generation-related costs;
b) the area of the onshore substation occupied by generation-related equipment;
c) costs to accelerate the access track construction which we consider were in order to keep generation related targets on track;
d) a wind turbine generator model needed for onshore substation commissioning that contained errors and inconsistencies; and
e) unsubstantiated costs highlighted in GT's review.

Reactive and harmonic equipment

3.20. The Developer submitted costs for the Project's reactive and harmonic filtering equipment. We applied a reduction of £15k in this category for unsubstantiated costs highlighted by GT in their review.

Connection works

3.21. The Developer submitted costs for the connection works undertaken by National Grid. We applied a reduction of £0.1m to the Developer's submitted costs for items as follows:

a) interface issues between the Developer and the contractor;
b) additional costs not specified at the time of contract; and
c) costs related to Covid which had not been justified.

Other costs

3.22. We made an overall reduction of £7.0m to this cost category, made up of the following components:

a) a reduction to devex costs due to the allocation method used to shared costs between generation and Transmission Assets; and
b) costs highlighted by GT during their review.

Transaction costs

3.23. At ITV stage these costs were not fully defined. We stated we would review these costs at the FTV stage.

Interest During Construction (IDC)

3.24. We made an overall reduction of £15.7m to this cost category, based on:

a) adjusting the duration of the pre-FID period in line with other projects under the Development Consent Order (DCO) regime;
b) the point in time when IDC should cease; and
c) the proportionate reduction in capex caused by costs not being included in the ITV.

Forensic Review

3.25. When establishing the ITV, we took into account the results of the forensic investigation conducted by our independent consultant GT. They assessed the level of contingency, as a proportion of total costs, and found it to be reasonable. GT found that most other costs in the CAT were appropriately stated. For those costs that were not appropriately stated, GT have proposed adjustments. They highlighted the following items for further review by Ofgem:

a) to request supporting information for legal transaction costs;
b) to review internal staff rates; and
c) to review the allocation rates used by the developer where costs are split between generation and Transmission Assets.

Process for determining the Assessed Costs

Accuracy and Allocation

3.26. The Project was constructed using a multi-contract strategy. An ex-post forensic accounting investigation was undertaken by GT to ensure that the costs reported to us by the Developer were accurate, in that they represented the actual costs incurred by the Developer during the development and construction of the Project.

3.27. This investigation considered the following main contracts in respect of the Transmission Assets:

a) Foundation supply;
b) Transportation and Installation contracts (WTG, Foundation and OSP);
c) Cable contracts (onshore, offshore export, offshore array) – supply and installation; and
d) Substation contract.

Efficiency

3.28. After costs had been appropriately identified and allocated, we performed an assessment of whether these costs were economic and efficient, which involved an internal benchmarking review as well as a wider review of costs incurred in each cost category.

Summary of Assessment

3.29. Following completion of the development and construction of the Transmission Assets, the Developer submitted costs in the July 2021 FTV CAT amounting to a value of £585.9m. Our assessment of the economic and efficient costs which have been or ought to have been incurred, in connection with developing and constructing the Transmission Assets, has established an Assessed Costs value of £572.7m. Table 2 below provides a breakdown of the cost categories for the Project at each stage and the changes between the ITV and the FTV stages, and paragraphs 3.30 – 3.69 set out the issues considered as part of the FTV stage.

Table 2: Summary of cost categories*

Category	InTV Oct 20 (£m)	ITV July 21(£m)	FTV Dec 21 (£m)	FTV-ITV	Reasons for change between ITV and FTV
Capex	462.6	465.1	466.2	1.1	Increase of: **1.8m** in submitted costs by developer **1.2m** adjustment to account for new methodology for calculating the generator weight contribution to the OSP **70k** for Crown Estate lease costs Decrease of: **0.9m** for reduction in allocation % to the capex split **0.5m** for inclusion of costs disallowed at ITV in the developers FTV submission (this includes some generator fibre costs) **0.3m** for OSP delay claim **0.2m** for generator use of fibre optic cables (onshore and offshore) **30k** for generator share of onshore substation site works **10k** for settlement agreement **3k** for spare cable storage after first power
Development**	77.4	57.8	51.6	-6.2	Increase of: **0.9m** in submitted costs by developer Decrease of: **7.1m** for reduction in allocation % to the capex split
Contingency	4.3	3.9	-	-3.9	Decrease of: **3.9m** due to realisation of the other costs contingency
IDC	65.7	47.5	52.2	4.7	Increase of: **10.1m** in submitted costs by developer Decrease of: **2.2m** for extended duration prior to FID **2.4m** for ION B dates and amount of assets that had been commissioned **0.8m** prorate adjustment for disallowed costs
Transaction	2.6	2.6	2.6	-0.0	Increase of: 52k in submitted costs by developer Decrease of: **£17- for reduction in allocation % to the capex split**
Total	612.6	576.8	572.7	-4.1	

these figures may not add to totals due to rounding.

***Development represents all costs within the cost category 'Other' (CR8) in the Cost Assessment Template. This includes development costs, as well as other common costs.*

Capital expenditure

3.30. The Capex element of the Assessed Costs is £466.2m. Overall, the Capex has increased by £1.1m from the ITV to the FTV stage as set out in more detail in Table 2 above.

Accuracy and allocation of Capex costs

3.31. For the majority of Capex costs incurred on the Project, it was clear whether they should be allocated to the Transmission or the Generation Assets in their entirety. For costs shared between Generation Assets and Transmission Assets, the Developer allocated a proportion of costs to the Transmission Assets using the Capex ratio between Generation and Transmission Assets.

Efficiency of Capex costs

3.32. All cost categories showed a decrease. This overall decrease is the result of cost updates from the Developer and adjustments applied following our cost review, which are detailed below.

Crosscutting Issues

Shared Resource Costs

3.33. The personnel costs submitted by the developer included resources that were supplied by external contractors and also provided by RWE to Triton Knoll under a management service agreement. At ITV we stated that this would be reviewed further at the FTV stage as we had made adjustments to the shared resource costs at ITV. This was due to the level of the allocation to the Transmission Assets being higher than we had seen previously and the methodology used to apportion costs not being clear and robust. For the FTV, the developer used an allocation termed 'general management' and this was applied to the shared resource costs, at 45.55% to the Transmission Assets.

Ofgem's view

3.34. At the ITV the developer used Cost Allocation Keys (CAKs) to apportion costs that could not be attributed directly to either the generation or the transmission parts of the project. A similar methodology was used ats the FTV and again, we do not agree on how some CAKs have been applied. The method used was not transparent and the level of the

allocation to the Transmission Assets at 45.55% is far higher than we would expect and higher than observed on previous projects.

3.35. Therefore we reverted to the capex split, in accordance with the (Cost Assessment) Guidance:

> *'In the event that a Developer is unable to provide a metric and has based allocations on an estimate, or we do not consider that a clear, transparent and appropriate allocation methodology has been used, we may allocate these costs based on an estimate of the percentage of Transmission Assets' cost versus the total costs of the project'*

3.36. As a result, adjusted the percentage of the shred resource split to 25% OFTO and 75% Generator, as per our cost assessment guidance. As a result, we have disallowed a total of £8.0m pro-rated across the capex, development and transaction cost categories.

Offshore Substation Platforms (OSP)

Generation assets Weight Impact

3.37. The generator has equipment on the OSPs, which adds to the dimensions for the topside and therefore the support structure required. The additional weight of generation equipment will ultimately drive additional costs to support this equipment, such as an increase in size of jackets needed. The developer therefore made an adjustment to the construction costs of the OSPs to reflect the cost contribution from the generator to the overall cost of the OSPs. They included this adjustment in their ITV submission.

Ofgem's view

3.38. During FTV stage we worked with the developer to calculate the weight impact under new methodology. As a result, we have made a positive adjustment of £1.2m, which reflects the increase from the ITV position for this adjustment.

Submarine cable

OSP Delay Claim

3.39. The developer's submission included a variation related to an OSP delay claim for jointing, testing and termination works.

Ofgem's view

3.40. We consider that this delay is the fault of one of the contractors as one of the components was not built to purpose. The majority of the associated costs have been recovered by the developer, but the developer submitted the remaining amount in their FTV submission. We will not include the full £0.3m submitted as we consider that these costs were not economic and efficient and the developer should have recovered these costs from the contractor at fault.

Fibre optic cables for generation related activities

3.41. Both the submarine and onshore cables installed for the Project contain fibre optic cable. These cables are to be owned by the OFTO but a number of the fibre optic cables are used for the transmission of data for the Generation Assets. No costs for this, however, were allocated to the Generation Assets.

Ofgem's view

3.42. Fibre optic cables are installed alongside or within the onshore and offshore export cables for offshore transmission projects. These fibres are used for both transmission and generation control, monitoring, and communication purposes. As projects are now being constructed on an increasingly larger scale and further offshore, cable lengths are increasing, as are the communication requirements. This means that the cost associated with the supply and installation of the fibre optic cables is a significant cost.

3.43. As the fibres used for generation purposes are not available to the OFTO and the OFTO gains no benefit from them, we requested that the Developer provide us with an evaluation of the cost of the generation portion of the Project for its use of the fibre optic cables. Following the generation allocation review, the value of £0.2m was not included in the FTV to reflect the generator's share of their fibre costs and cannot be included in the FTV.

Previously disallowed costs

3.44. During ITV stage, we disallowed £40k of costs relating to a desktop engineering exercise in the event that a late topside delivery required the installed export cables to be wet stored.

Ofgem's view

3.45. In their FTV submission, the developer reinstated the above cost. Our view has not changed relating to the ineligibility of this cost and so we have removed it from the FTV allowance.

Crown Estate leasing costs

3.46. The project obtained a 50 year lease for the use of the seabed from The Crown Estate. This lease must be obtained to allow construction and operation of the project. The project is scheduled to operate for 25 years and the 25-year revenue stream for the OFTO in its licence reflects this.

Ofgem's View

3.47. As the OFTO is scheduled to currently operate for 25 years, Ofgem is of the view that costs associated with the additional time should not be included in the FTV. Therefore we have allowed leasing costs for the duration of this period as well as 2 years' worth of decommissioning time, giving a total of 27 years. As the developer had not initially included the Crown Estate lease cost, this has resulted in an additional £70k being included in the FTV, to reflect the 27 years as described above. The costs for the remaining 23 years left on the lease have not been included in the FTV.

Spare Cable Storage costs

3.48. As part of their submission, the developer included costs for the storage of the spare cable. During our review, it was noted that the duration of the storage extended beyond the date that the Transmission Assets were avaible.

Ofgem's View

3.49. As the costs submitted included some storage costs that would be incurred past the date of first power, we view that part as an operational cost. Therefore it cannot be included in the FTV as it is not a development or construction cost. We have made a negative adjustment of £3k to account for the storage period during the operational phase.

Onshore cables

Previously disallowed costs

3.50. During ITV stage, we disallowed £0.5m of costs relating to:

a) National Grid Gas deed consent delay;
b) Crop compensation payments; and
c) Fibre optic cable usage.

Ofgem's view

3.51. In their FTV submission, the developer reinstated the above costs. Our view has not changed relating to the ineligibility of these costs and so we have removed £0.5m from the FTV allowance to represent these costs.

Onshore fibre optic cables for generation related activities

3.52. As described earlier, both the submarine and onshore cables contain fibre optic cables and a number of these fibres are used for the transmission of generation data and control. At ITV we disallowed £0.2m for generator fibre optic cable usage. As mentioned above, the developer reinstated this cost in their FTV submission and we subsequently removed it.

Ofgem's view

3.53. Following the allocation review at FTV, a further £30k was not included in the assessed costs to reflect the generation share of the wider installation works for the fibre optic cables.

Onshore substation

Generation - Site Works Costs

3.54. As offshore projects are getting larger and their communication requirements increasing, we have observed that the space occupied by equipment housed within the onshore substation for generation purposes is increasing in proportion to the project size. This space is not available for OFTO use and has a cost associated with it.

Ofgem's view

3.55. We routinely scrutinise all costs associated with generation related equipment for new projects to ensure that the apportionment between Generation and Transmission Assets is appropriate and costs remain economic and efficient.

3.56. Therefore, we have apportioned the cost associated with housing and site works for the Generation Assets in the onshore substation and we have not included £30k. This is because it is considered a generation cost and cannot be included in the FTV and is in addition to £200k deducted at ITV.

Settlement Agreement

3.57. The developer included a settlement agreement in their submission related to onshore substation works completed by the contractor. Part of the settlement agreement included costs relating to an WTG (Wind Turbine Generator) electrical model supplied by the developer to the contractor that included inconsistencies and mistakes.

Ofgem's view

3.58. We have disallowed £10k from this cost, a 2.9% reduction of the full amount submitted by the developer. We consider that, had the correct model been supplied by the developer, this cost would not have been incurred and have therefore removed the cost from the FTV.

Development costs

3.59. The assessed development expenditure for the Transmission Assets at the FTV is £51.6m, a decrease of £7.1m from ITV. The detailed cost decrease is set out in Table 2 above and include consists of a reduction due to the allocations of the capex split discussed above.

Contingency

3.60. The Assessed Costs do not contain a separate contingency value. £3.9m of the contingency that was submitted at the ITV stage, in relation to other costs, was either used or not realised and therefore was not included by the Developer in the July CAT.

Interest during construction

3.61. Since the ITV, the Project had been progressing with construction work and incurring additional costs. This has, in turn, resulted in an increase of £10.1m in IDC based on the Developer's updated cost submission in July 2021.

3.62. At the ITV, a reduction of £15.7m was made in relation to the duration of the pre-FID period, the availability of the asset, and our overall disallowances.

Ofgem's view

3.63. At FTV we have made a further disallowance of £5.4m for the IDC.

3.64. Included above is a reduction of £2.2m made in relation to the period from the second DCO being granted and the project achieving FID and the delay between the onshore and offshore DCO applications. Previous projects that have gone through the DCO process achieved FID in a shorter duration in comparison to Triton Knoll. We discussed the reasons for this extended duration with the developer and took their mitigating reasons into account. Subsequently we did not include IDC on 9 months that we considered to be not economic or efficient for the duration of the IDC over this period.

3.65. In addition to this, IDC was ceased in the period between the offshore DCO being granted and the onshore DCO being submitted. We consider that the duration between these applications was not efficient and have not included 4 months IDC over this period to reflect this.

3.66. We have also made a reduction of £2.4m related to our adjustment of the timing of the last period of IDC. The Developer included reduced IDC interest (to reflect 50% of the assets were operational and IDC had stopped on them) in February 2021, the month in which it considered the Transmission Assets became available for transmission. This is based on the Developer's position that the Transmission Assets are available for use when the Interim Operational Notification Part B (**ION B**) provided by National Grid is received, which is the first point at which active power can be exported to the grid. We consider, as stated in the Cost Assessment Guidance, that IDC will cease:

> "*…as soon as Transmission Assets are available for use for the transmission of electricity to the onshore network*"

Therefore, in relation to the economic and efficient commissioning duration, we did not include the IDC for February 2021, as it ceases the month prior to the assets being avaible. In addition, we only included 39% of the IDC for January as we considered that 69% of the assets were avaible for use, against the Developer's submitted 50%.

3.67. Finally, a reduction of £0.8m was made representing the adjustment following the conclusion of the broader FTV cost assessment, for the of all costs not included in the FTV after our final position on the economic and efficient costs.

Transaction costs

3.68. Since the ITV, the Project had been progressing with additional costs being incurred and any estimated cost now made firm. The submitted transaction costs increased by £0.1m between ITV and the FTV submission.

Ofgem's view

3.69. We have considered the level of costs submitted and concluded they are in line with expectations and are considered efficient and economic and were allocated appropriately. We have however made a reduction of £17 related to the capex split between generation and transmission, as noted in the crosscutting issues section.

Confirmation in relation to tax benefits

3.70. The ITV was calculated on the basis that the OFTO would obtain the full benefit of all available capital allowances. If this were not the case for the Assessed Costs, we would reduce the assessment of costs for an amount that reflects the value of the tax benefit retained by the Developer. It is intended that the OFTO will be able to obtain the full benefit of all available capital allowances. At the time of licence grant, when FTV will be defined, this will be translated into the FTV coinciding with the Assessed Costs, should no other conditions change.

Conclusion

3.71. In conclusion, in accordance with Regulation 4 of the Tender Regulations, the Authority has assessed the economic and efficient costs which ought to have been incurred in connection with developing and constructing the Transmission Assets as £572,728,720.

Appendices

Index

Appendix 1 - Glossary

A

Assessed Costs

The final assessment of costs determined by Ofgem through the cost assessment process for the Triton Knoll Offshore Windfarm Transmission Assets.

C

Capex

Capital Expenditure

CAT

Cost Assessment Template

Cost Assessment Guidance

Can be found here

https://www.ofgem.gov.uk/system/files/docs/2019/05/offshore_transmission_guidance_for_cost_assessment_april_2019.pdf

D

Developer

Triton Knoll Offshore Windfarm Limited

E

EPQ

Enhanced Pre-Qualification

EPCI

Engineering, Procurement, Construction and Installation

F

FTV CAT

The Developer cost assessment template submitted on July 2021

FTV

Final Transfer Value

G

GEMA

The Gas and Electricity Markets Authority

Generation Assets

The Triton Knoll Windfarm Generation Assets

GT
Grant Thornton

I

IDC

Interest During Construction

InTV

Initial Transfer Value

ITT

Invitation to Tender

ITV

Indicative Transfer Value

ITV CAT

The Developer cost assessment template submitted on November 2020

ITV letter

The formal ITV letter issued to the Developer in July 2021

M

MW

Megawatt

O

OFTO

Offshore Transmission Owner

OFTO licence

See definition in Section 1 of this report

OFTO regime

See definition in Section 1 of this report

OTM

Offshore Transformer Module

P

PIM

Preliminary Information Memorandum detailing the Project's details released to EPQ bidders through the tender portal.

PM

Project Management

Project

The development and construction of the Transmission Assets

Q

QTT

Qualification to Tender

S

Section 8A Consultation

See definition in Section 2.13 of this report

T

Tender process

The competitive tender process run in accordance with the Tender Regulations through which OFTOs are granted offshore electricity transmission licences

Tender Regulations

The Electricity (Competitive Tenders for Offshore Transmission Licences) Regulations 2015

Transmission Assets

The Triton Knoll Offshore Windfarm Transmission Assets

TRS

Tender Revenue Stream