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Decision

Offshore Transmission: cost assessment for the Race Bank transmission assets

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This document sets out the cost assessment for the Race Bank 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 Race Bank transmission assets to be transferred to the successful bidder.

The Final Transfer Value of the Race Bank offshore transmission assets is established as £472.5m. This value is published in the section 8A licence consultation, 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.

Contents

Executive summary

This document sets out Ofgem's assessment of the economic and efficient costs which ought to have been incurred for the development and construction of the transmission assets (**the Transmission Assets**) for the Race Bank (**RB**) offshore transmission project (**the Project**). It also details the cost assessment process we have undertaken.

The cost assessment process involved the three key stages indicated below:

- The initial calculation of costs based on Race Bank Wind Farm Limited's initial estimate, the Initial Transfer Value (**InTV**), was £530.4m. This was communicated by Ofgem to the Developer and published in the preliminary information memorandum in September 2016;
- The indicative estimate of costs, the Indicative Transfer Value (**ITV**), was £500.8m. The estimate was calculated as a result of further information regarding the development and construction of the Project being made available by the Developer and continuing analysis by Ofgem and its advisors. This updated calculation was communicated to the Developer in November 2017. The ITV was made available to bidders at the Enhanced Pre-Qualification (**EPQ**) stage of the tender process, and was the transfer value assumed for the purpose of Invitation To Tender (**ITT**) stage submissions; and
- The final assessment of costs is £472.5m (**the Assessed Costs**). This is a reduction of £22.3m from the Developer's final submission of £494.8m. The Developer has confirmed that the incoming Offshore Transmission Owner (**OFTO**) will be able to obtain the full benefit of all available capital allowances. Therefore, the final assessed cost of £472.5m is the amount to be paid to the Developer by the OFTO for the Transmission Assets, i.e. the Final Transfer Value (**FTV**).

The key components of the Initial, Indicative and Final Transfer Values, together with the Developer's submission for the latter, are given in table 1 below.

Table 1: Summary of costs components*

Category	InTV Sep 16 (£m)	ITV Nov 17 (£m)	Developer Proposed Transfer Value Jul 18 (£m)	FTV Jan 19 (£m)
Capex	£356.0	£375.0	£376.8	£382.1
Development	£103.2	£73.0	£72.4	£51.8
Contingency	£21.4	£12.7	£0.0	£0.0
IDC	£46.4	£36.8	£42.1	£35.0
Transaction	£3.4	£3.4	£3.5	£3.4
Total	**£530.4**	**£500.8**	**£494.8**	**£472.5**

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

Capital expenditure

The Capital expenditure (**Capex**) component of the FTV has increased by £7.1m since the ITV. The main increases and decreases to Capex costs are set out below, specified for each cost category within the cost assessment template (**CAT**) submitted. The totals may not add up accurately, due to rounding.

Increases of:

a) £1.9m due to extended schedule and scope of cable burial works due to complexity of seabed conditions;
b) £2.5m due to extended construction time of the onshore substation;
c) £18.7m for re-allocated costs from Development.

These increases were offset by the following reductions:

a) £0.3m due to favourable weather conditions reducing time of completion for Offshore Substation Platform (**OSP**) installation works
b) £0.2m in disallowed costs for Unexploded Ordnance (**UXO**) and Explosive Ordnance Disposal (**EOD**);
c) £1.1m for contribution to weight of generator kit on OSP disallowed at ITV but still included in FTV;
d) £2.6m for additional waiting time for OSP topside load out;
e) £1.8m due to negotiation with contractors for the onshore cable
f) £0.2m due to unsubstantiated costs for civil works design;
g) £5.3m for onshore cable installation design change and associated delays;
h) £0.4m for cost recovery from contractor due to delay in delivery of reactive substation;
i) £0.1m for adjustment proposed by the Developer for connection costs not incurred;
j) £0.6m in disallowed foreign exchange variations;
k) £3.3m in personnel costs adjustments;
l) £0.4m for other minor adjustments.

Please note that the overall increase in Capex as well as the above figures have been rounded and are subject to rounding errors.

Development costs

The Project's development costs have decreased by £21.2m as indicated below. Please note that total may not add up due to rounding.

a) £18.7m for re-allocated costs to Capex;
b) £1.5m in resources adjustments;
c) £0.2m due to costs allocation in accordance to Capex ratio;

d) £0.1m for minor adjustments including apportionment of land transferred to the OFTO.

Contingency

£12.7m of contingency was allowed in the ITV. This has been removed by the Developer in its final cost submission.

Interest during construction

The Interest During Construction (**IDC**) amount has decreased by £1.8m since the ITV. This decrease is due to a change in interest calculation to account for incremental grid connection of the Project as well as hedging gains and cash flow adjustments from disallowed costs.

Transaction costs

Transaction costs have been assessed at £3.4m. The transaction costs are composed of both internal and external resource costs arising from the Developer's participation in the tender process. These have increased by £0.1m since the ITV. The increase is due to transaction close being extended to the second half of 2019, in accordance with updated Ofgem tender timings and schedule. This has been offset by a corresponding decrease for personnel cost adjustments.

Final Transfer Value for the Race Bank Transmission Assets

In accordance with Regulation 4(2)(b) of the the Electricity (Competitive Tenders for Offshore Transmission Licence) Regulations 2015 (**the Tender Regulations**), the Assessed Costs of the Transmission Assets are £472,460,769. The FTV as determined by the Authority under Regulation 4(8) of the Tender Regulations is £472,460,769.

1. Introduction

Context and related publications

1.1. In accordance with the offshore electricity transmission regime, the Authority[1] grants an offshore electricity transmission licence to an OFTO following a competitive tender process run by Ofgem.

1.2. The Tender Regulations came into force on 3 August 2015. The Tender Regulations set out the tender process framework for granting an OFTO licence, including how Ofgem will run tenders under both the generator build and OFTO build options.

1.3. The Tender Regulations require that the Authority calculates, based on all relevant information available to the Authority at that time, 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. The Tender Regulations provide for an estimate, followed by an assessment of costs, in relation to offshore transmission assets.

1.4. Where the Authority has determined to grant an offshore electricity transmission 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 offshore electricity transmission licence granted to the OFTO.

Associated publications

- The Electricity (Competitive Tenders for Offshore Transmission Licences) Regulations 2015 Link
- Tender Process Guidance Document TR5 Link
- Interest During Construction for Transitional Tender Rounds Link
- Offshore Transmission: Guidance for Cost Assessment Link

[1] The Gas and Electricity Markets Authority (GEMA) is the regulator of gas and electricity markets in Great Britain. Ofgem is the Office of Gas and Electricity Markets, which supports the Authority in performing its statutory duties and functions. In this document the terms, 'Authority', 'Ofgem', 'we' and 'us' are used interchangeably.

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 chapter sets out the process that Ofgem followed in carrying out the cost assessment for 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 overall process we have adopted can be found in the document 'Offshore Transmission: Guidance for Cost Assessment'[2] (hereafter "**the Guidance**).

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

2.5. The remainder of this chapter describes some of the key elements of the cost assessment process. Chapter 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 reporting templates, 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 and invoices and receipts.

2.7. We have worked closely with the Developer and gathered information relating to the following cost categories in the development and construction of the transmission assets:

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

[2] Offshore Transmission: Guidance for Cost Assessment 2019

Process stage for cost assessment

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

Initial Transfer Value

2.9. The InTV value is based on cost submissions by the Developer for the Project. This value is made available to bidders at the Pre-Qualification or, as was the case for the Project, 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

2.10. We provide the ITV for the commencement of the 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 letter we send to the Developer, 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. Once the transmission assets are complete or are close to completion, and the Developer indicates that they have documentation to support an assessment, we commence an exercise to determine the Assessed Costs.

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

2.13. The draft report is also sent to the preferred bidder, to allow it to incorporate the Assessed Costs into their 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 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 an offshore transmission licence to the successful bidder.

Final Transfer Value

2.15. If the Developer retains some of the benefit of the available capital allowance, we will 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 offshore transmission 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, with the section 8A TRS accounting for 100% of the FTV.

Cost assessment analysis

2.17. We apply two tests when calculating the estimate and assessment of costs:

Test 1 - Assessing the accuracy and allocation of Developer's cost submissions

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 contract and/or contracts which 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

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 incurred costs are economic and efficient

2.22. Under the second test, we assess, through appropriate analysis, whether the costs incurred by the Developer have been economic and efficient. Where possible, we apply benchmarking and where industry wide cost indices are unavailable, we review data from projects in the tender rounds. This analysis includes benchmarking across the projects and analysis in relation to funding interest rates. We consider such approaches to be an important tool in assisting us in determining what the economic and efficient costs should be.

2.23. To inform our cost estimate and assessment, we undertake a benchmarking exercise. This is carried out using comparable costs across all completed projects and any wider industry data is used to identify any cost outliers across the main cost categories. Any identified cost outliers are subject to further review.

2.24. We also consider the procurement processes adopted by the Developer to obtain economic and efficient transmission asset costs. We will keep the efficiency of Developer procurement and contract management approaches under review for future cost assessments.

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 Capex or development costs have increased since the ITV, we will ask the Developer to provide supporting documentation to justify these increases. We may undertake a technical investigation which focuses

on, for example, a particular cost component, such as an increase of costs in a contract or multiple increases across several contracts.

3. Race Bank cost assessment

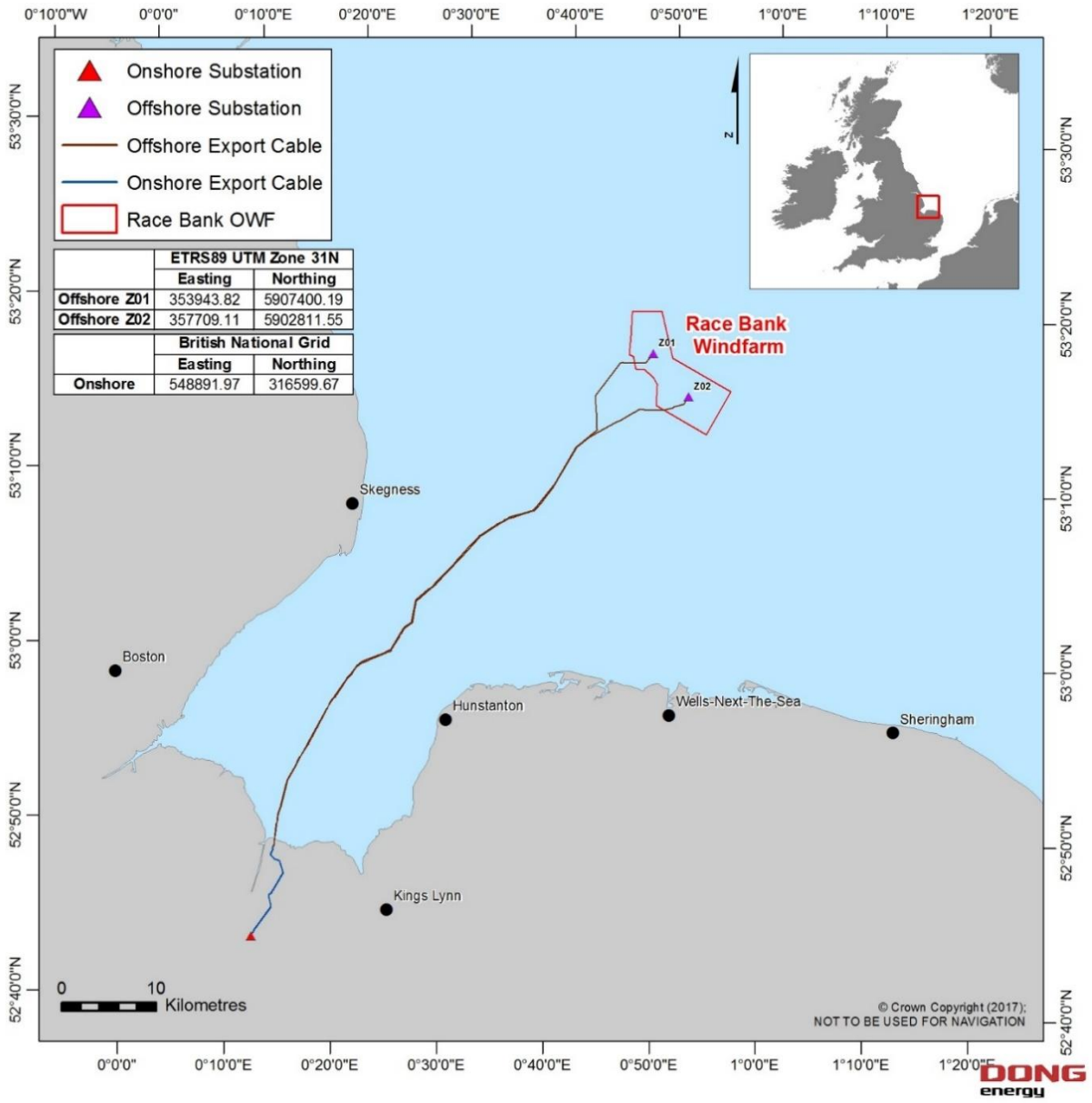
Section summary

This chapter summarises how we have undertaken our cost assessment for the RB Transmission Assets, from the InTV to the FTV. It provides a breakdown of the key cost categories that we have considered and highlights the decisions that we have made.

Race Bank Transmission Assets

3.1. The RB Wind Farm is located 27km north of Blakeney Point off the coast of Norfolk, and 28km east of Chapel St. Leonards off the Lincolnshire coast in the North Sea, partially within UK territorial waters. The wind farm itself is outside the 12 nautical mile limit but within the Renewable Energy Zone (largely coextensive with the Exclusive Economic Zone) within which the UK has sovereign rights for the purpose of the economic exploitation of the zone for the production of wind energy. The RB Offshore Wind Farm is about 18km east of Lincs, 23km east of Inner Dowsing, 25km east of Lynn and 14km west of Sheringham Shoal offshore windfarms.

Figure 1: Location of the RB Wind Farm and Transmission Assets



3.2. The RB Wind Farm is owned by Race Bank Wind Farm Limited, which is jointly owned by Ørsted A/S (50%), Macquarie Infrastructure Fund 5 (25%), a fund established by Sumitomo, Sumitomo Mitsui Banking Corporation and Development Bank of Japan (12.5%) and funds advised by Macquarie Capital (MacCap) (12.5%) (collectively "**the Developer**").

3.3. The Transmission Assets connect to the RB Wind Farm at two offshore platforms. The Transmission Assets that are transferring to the OFTO comprise:

a) two offshore platforms and associated electrical equipment;

b) two subsea export cables of approximately 71km each;
c) two onshore cables of approximately 11.6km;
d) a subsea cable interlink between the two OSPs of approximately 6.5km;
e) one onshore substation at Walpole St. Andrew.

3.4. The boundary points for the RB transmission system are defined below:

a) offshore: located at the sealing ends of the 34 kV medium voltage ("MV") switchgear connecting from the grid transformers on the OSPs;

b) onshore: located in the complete fixed contact assembly bolted to the busbar above the isolator (pantograph type disconnector) for both main and reserve 400 kV busbars within the existing NGET Walpole substation. NGET own the fixed contact assemblies of the pantograph disconnectors and the OFTO will own all other HV equipment in the generator bays.

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

a) 1 x 1.1 km, 1 x 1.0 km and 1 x 0.4 km of 220 kV subsea cable (950 mm^2);
b) 2 km of 220 kV landfall section of subsea cable (1600 mm^2);
c) 2 x 0.8 km of 220 kV land cable (1400 mm^2);
d) 1 x 0.4 km of 400 kV land cable;
e) Various joints (transition, straight and cable repair joints);
f) Cable terminations; and
g) Other miscellaneous spares.

Race Bank cost assessment process overview

3.6. We received the first cost information from the Developer in June 2016. 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. Set out below is an outline of the steps taken in the cost assessment process for the Project.

a) September 2016: InTV (£530.4m) published.
b) November 2017: ITV (£500.8m) determined.
c) December 2017 – May 2018: ITT process ongoing.
d) July-September 2018: forensic accounting and FTV investigation undertaken.
e) October-December 2018: Final cost reporting updates and final supporting information received from the Developer.
f) April 2019: Draft cost assessment report released to the Developer for comment and the preferred bidder for information.
g) August 2019: Draft cost assessment report published alongside the Section 8A Consultation.
h) October 2019: The Authority determines the FTV when it determines to grant the licence to the successful bidder. The final cost assessment report is published after licence grant.

Summary of Indicative Transfer Value determination

3.7. The InTV calculated in September 2016 was £530.4m. This value was based on information received from the Developer at an early stage in the construction and development of the Project. A number of the Developer's contracts were in the process of being finalised at the InTV value stage and these were considered in greater detail when the ITV was set.

3.8. The ITV of £500.8m was established in November 2017. Our estimate was supported by our forensic accounting advisors, Grant Thornton (**GT**), our internal analysis and the supporting information provided by the Developer.

3.9. When we set the ITV, we reduced costs by £38.7m against the submitted ITV cost. Some costs could not be fully investigated at ITV and were parked to be assessed thoroughly at FTV. These include definition of cost for the Centrica acquisition, cost

for project management and for submarine cable installation (including fisheries and UXO). Below are the main points arising from our review, and the forensic review, and a description of the adjustments applied at ITV. Full details are reported in the ITV letter.

3.10. In conducting the cost review, Ofgem highlighted some crosscutting issues, i.e.issues which apply across more than one cost category, in addition to specific cost category adjustments. These are all described below.

Ofgem Review – crosscutting issues

3.11. Reallocation of costs - To ensure the costs categories were consistent with previously assessed projects, we reallocated the Digital Temperature Sensing equipment from the onshore cable to the OSP (67%) and the onshore substation (33%); we moved landowner agreements from the Common costs to the onshore cable and jack-up accommodation vessel from the Common costs to the OSP.

3.12. Shared costs allocation method - Ofgem observed that the Developer used a number of different allocation methodologies to apportion shared costs to the Transmission Assets. The Developer applied allocation rates that were higher than those applied to other projects. We expect the allocation methodology to follow the transmission to generation direct Capex ratio, unless project-specific, evidence-based justification is provided. For the purposes of establishing the ITV, we applied the Capex ratio proportion to elements of the Common Cost category. A total reduction of £20.9m has resulted when applying this rate to shared Capex (£0.7m), Development costs (£5.1m) and acquisition costs (£15.1m).

3.13. Project management (PM) costs - The cost for PM submitted, excluding the PM costs included into development costs and the Centrica acquisition, were higher compared to similar projects. The Developer is of the view that their multi-contracting approach results in a higher PM, offset by a lower Capex expenditure. We considered this explanation, however we did not find any evidence supporting this, once existing risk estimates were incorporated. For the purposes of establishing the ITV, we adopted a position whereby the shared PM costs were allocated to the OFTO assets at a uniform rate based on the shared costs allocation methodology described above. This resulted in a reduction of £8.1m to the PM costs submitted in the "common cost" category of the Cost Assessment Template.

3.14. Foreign Exchange (**Forex**) movements - Ofgem expects developers to protect project costs from Forex movements. The Developer stated that it did not hedge against Forex movements when it made its Final Investment Decision (**FID**) in June 2015. In May 2016, we clarified how we would treat the impact of Forex movements during the cost assessment process. The Developer then placed an initial tranche of hedges for the committed costs and continued to place additional hedges on a monthly basis as additional costs were committed or payment timings were revised.

3.15. The CAT submitted by the Developer showed all costs at a spot rate or a forecast rate and included an offset in the "Other costs" category of the CAT that adjusted for the Developer's calculation of the difference between hedged and spot rates or hedged and forecast rates in the period from June 2016 onwards. We expected the exchange rates used throughout the CAT to reflect the hedged rates, rather than the spot or forecast rate. We discussed with the Developer an adjustment to reflect our view of the appropriate hedged rates. This also included an adjustment for some resource costs, which the Developer elected not to hedge, but which we determined were sufficiently certain to be treated as committed costs for hedging. As a result, we made a net reduction of £1.5m to the ITV.

Ofgem Review – Individual cost categories

3.16. To note, the Developer chose a design based on 2x220 kV cables rather than a more typical one using 4x132 kV cables. We reviewed the technical basis for this higher voltage design and were satisfied that it constitutes a reasonable alternative to the lower voltage design. Our focus was then to compare the costs of the 220 kV system with those of previous projects.

3.17. We also undertook a detailed assessment of the submitted costs by category. Below we discuss each category where an adjustment or further review at FTV were deemed necessary.

<u>Offshore substation platform</u>

3.18. The cost submitted by the Developer for the OSP was high when compared to similar projects. The Developer explained that the 220 kV design necessitated the installation of heavier equipment on the OSP, leading to higher costs. The Developer argued that the higher OSP cost would be more than offset by cost savings on the supply and installation of the subsea cable.

3.19. We considered carefully the justification for the level of submitted costs and were satisfied that the costs incurred by the Developer on the OSP could be considered economic and efficient, based on the additional weight of equipment required to support a 220 kV cable design. We also analysed the additional cost of the OSP due to weight of the generator equipment. Our view was that the weight of generator equipment is significant enough to justify a contribution from the generator to the overall cost of the OSP. We estimated this cost to be £1.1m and reduced the ITV by this amount.

Submarine cable installation

3.20. The Developer submitted costs for the submarine cable installation which included internal resource and travel costs assigned to designing, developing and constructing the asset. Our assessment indicated these costs were higher than estimated costs for projects with a similar cable length.

3.21. The Developer highlighted a number of project-specific costs incurred related to the presence of environmental constraints and significantly large numbers of UXO and boulders. The Developer submitted a set of quantified information to justify the costs of the submarine cable installation. Given the timing of the ITT, we were not able to fully scrutinise this information and we decided to investigate this at FTV. In the meantime, we allowed all of the submitted costs, with the intention of following-up at FTV costs related to UXO and EODs, Fisheries, horizontal directional drilling (**HDD**) works and sea defence breach.

Interest During Construction

3.22. IDC refers to the cost of financing the development and construction of offshore transmission assets. The deductions applied to the Project's Capex costs for the ITV resulted in a consequential IDC reduction of £8.4m. Estimating an IDC deduction of this size is dependent on detailed information relating to the spend profile of included costs, and so we decided this estimate would be subject to further review at FTV stage once more detailed information was available and we had more certainty regarding disallowed costs. The estimate of the IDC value for the ITV was £36.8m. This included a deduction to the Developer's submitted value as a consequence of reaching 'first power' one month earlier than scheduled.

Forensic Review

3.23. When establishing the ITV, we took into account of the results of the forensic investigation. This showed inaccuracies in the CAT submission, which resulted in a number of cost increases and decreases. The net result of this review was an increase of £1.57m to the submitted ITV, which was agreed with the Developer. The investigation also highlighted £0.3m of costs where justification of the value of the estimate was insufficient. We removed these costs from our estimate at ITV. We further investigated unsubstantiated costs at FTV.

Process for determining the Assessed Costs

Accuracy and Allocation

3.24. The Project was constructed on a multi-contract basis. 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

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

a) fabrication of the OSP;
b) installation of the OSP;
c) cable supply (offshore and onshore) and termination;
d) installation and burial of the offshore cable;
e) onshore substation civil engineering works;
f) dynamic reactive compensation plant;
g) supply of the 220/34 kV transformers.

3.26. We also checked that the costs were allocated to the correct asset category, in particular between generation assets and Transmission Assets. To assess whether the costs were allocated correctly we took into consideration the following:

a) metrics used when allocating costs between generation and transmission;

b) the Developer's submissions using our cost reporting template;

c) the findings of the forensic accounting investigation;

d) cashflow payments related to the Transmission Assets.

Efficiency

3.27. 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

3.28. Following completion of the development and construction of the Transmission Assets, the Developer submitted costs amounting to a value of £494.8m. 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 a FTV of £472.5m. 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.

Table 2: Summary of cost categories*

Category	InTV Sep 16 (£m)	ITV Nov 17 (£m)	FTV Jan19 (£m)	Reasons for change between ITV and FTV
Capex	£356.0	£375.0	£382.1	Increases of: £1.9m in extended schedule and scope of cable burial works due to complexity of seabed conditions; £2.5m in extended construction time of the onshore substation; £18.7m for re-allocated costs from Development Decreases of: £0.3m due to favourable weather conditions reducing time of completion for OSP installation works; £0.2m in disallowed costs for UXO and EOD; £1.1m for contribution to weight of generator kit on OSP disallowed at ITV but still included in FTV; £2.6m for additional waiting for OSP topside load out; £1.8m due to cost reduction for the onshore cable; £0.2m in unsubstantiated costs for civil works design; £5.3m for onshore cable installation design change and associated delays; £0.4m for delay in delivery of reactive substation; £0.1m for adjustment proposed by the Developer for connection costs not incurred; £0.6m in disallowed foreign exchange variations; £3.3m in personnel costs adjustment; £0.4m in other minor adjustments
Development	£103.2	£73.0	£51.8	Decreases of: £18.7m for re-allocated costs to Capex; £1.5m in personnel costs adjustment; £0.2m in costs allocation in accordance to Capex ratio; £0.1m in minor adjustments including apportionment of land transferred to the OFTO.
Contingency	£21.4	£12.7	£0.0	Decrease of: £12.7m due to contingency being released.
IDC	£46.4	£36.8	£35.0	Decrease of: £1.8m due to correction of IDC calculation for timing, hedging gains and cash flow adjustments from disallowed costs.
Transaction	£3.4	£3.4	£3.4	Increase of: £0.1m due to transaction budget increase offset by Decrease of: £0.1m for personnel costs adjustment.
Total	**£530.4**	**£500.8**	**£472.5**	

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

3.29. The issues we have considered in setting the FTV are detailed below.

Capital expenditure

3.30. The Capex element of the FTV is £382.1m. Overall the Capex has increased by £7.1m from the ITV to the FTV. This increase is the result of balancing a series of costs increases and decreases as described in more detail below.

Increases from:

a) costs re-allocated from the Development/common cost category;
b) extended schedule and scope of works for submarine cable burial;
c) extended construction time of the onshore substation.

Decreases from:

d) favourable weather conditions reducing time for OSP installation completion;
e) reductions for the contribution to weight of the generator kit on the offshore platform;
f) additional waiting related to OSP topside load out;
g) adjustments for UXO and EOD costs;
h) cost reduction for the onshore cable;
i) additional complexity of work and delays due to onshore substation cable installation design change and associated delays;
j) costs for civil works design not yet substantiated;
k) delay in delivery of reactive substation;
l) adjustment for connection costs not incurred;
m) personnel costs adjustments;
n) movements in the exchange rates used to convert costs denominated in foreign currency into GBP;
o) other minor adjustments.

3.31. GT undertook a forensic investigation of a selected number of Capex contracts. The main Capex contracts investigated were:

a) JV Cofely Fabricom-Lemants – fabrication of the OSP;
b) SHL OFFSHORE CONTRACTORS B.V. - installation of the OSP;
c) NKT – cable supply and termination;
d) Jan De Null NV Luxembourg S.A.– installation of the offshore cable;
e) J. Murphy and Sons Ltd. – civil works construction of the onshore substation;

f) RXPE – Dynamic Reactive Compensation Plant;
g) ABB AB - supply of the220/34 kV transformers.

Accuracy and allocation of capital expenditure costs

3.32. 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 and Transmission Assets, the Developer allocated certain proportions to the Transmission Assets using cost allocation metrics, which differed depending on the nature of the work undertaken. Only those costs related to the Transmission Assets were allowed in the FTV.

3.33. In conducting our own analysis of these costs there were a number of items whose accuracy and allocation we have discussed with the Developer. These items are described below.

Updated cost estimates

3.34. In its final cost submission, the Developer included an overall cost decrease of £6.1m due to updating of estimated contract and variation order costs to reflect their final values. This included a £0.3m decrease in OSP costs, £1.9m increase in submarine cable costs, £1.8m decrease in land cable costs, £2.5m increase in onshore substation costs, £0.4m decrease in reactive substation, £13.3m decrease in the common costs, mostly due to contingency removal, and £5.4m increase in IDC.

Fisheries management

3.35. The fisheries management costs were submitted under the common costs category and we reallocated them to OSP and submarine cable in the proportion 50:50. These costs were higher than we have seen in previous projects and were highlighted at ITV as needing investigation, therefore we further considered them at FTV. The compensation granted to fishermen was commensurate to the difficulties encountered in negotiating an agreement between the Developer and the fishermen. These difficulties arose from the previous experience of fishermen with the results of similar negotiations.

Ofgem's view

3.36. Although the cost submitted is higher than what we expected based on previous projects, we have examined the reasons for these increased costs and recognised the difficulties incurred in establishing an agreement. We consider that in this instance the Developer acted prudently in reaching an agreement so as to execute the Project on time and within budget. We also accepted the allocation methodology followed, based on the distribution of those fishing activities within the area occupied by the windfarm.

Unexploded Ordnance removal and Explosive Ordnance Disposal

3.37. The UXO and EOD costs were also submitted under the common cost category and we moved to OSP and submarine cable in the proportion 50:50. At FTV, the Developer submitted costs for UXO and EOD and they were allocated to the Transmission Assets at a split that is higher than the transmission to generation Capex split. At ITV, these costs were highlighted as needing further attention and GT reported at its ex-ante review that, although the values could be traced, the cost allocation methodology was unclear.

Ofgem's view

3.38. We reviewed at FTV the allocation method followed for the allocation of UXO and EOD costs along with the disaggregated costs and related data supporting the method. We consider that costs can be allocated at a different ratio compared to the Capex ratio when evidence is provided. We have analysed and accepted the calculated split based on the proportion of targets in relation to the transmission and generation areas, for those costs supported by objective data. We reverted to the Capex split ratio where the cost split was not supported with objective evidence. As a result of our analysis, we reduced Capex costs by £0.2m.

Reallocation to Capital expenditure from common costs

3.39. In addition to the costs related to Fisheries and UXO and EOD, the Developer allocated a number of category-specific Capex costs to the common cost category. These are mostly costs shared between generation and Transmission Assets and have been moved from the common cost category as follows:

a) costs related to office and outdoor facility and equipment commissioning, we reassigned to OSP and onshore substation in the proportion 50:50;

b) costs related to:

   a. fuel for construction activities;
   b. guard vessels;
   c. installation of harbour base;
   d. OSP costs during construction;
   e. offshore construction site, and
   f. marine coordination

   were reassigned to the OSP category in their entirety.

As a result, £10.7m was reassigned to the OSP, £7.6m to the submarine cable and £0.4m to the onshore substation categories.

Ofgem's view

3.40. We have reviewed the submitted costs and allocated them to the correct categories. This ensured that cost categories were consistent and could be compared when conducting the benchmarking exercise, and better informed our assessment of the Project's FTV. As a result, we have a reallocated £18.7m from common costs to various asset specific categories.

Efficiency of Capital expenditure costs

3.41. The FTV has a net Capex increase of £7.1m compared with the Capex value at ITV. Some cost categories showed a decrease while others had a cost increase with respect to costs submitted at ITV. The overall Capex increase is the result of: cost updates from the Developer (see paragraph 3.34), reallocation of costs to the correct category (see paragraph 3.41) and adjustments applied following our cost review, which are detailed below.

3.42. The Developer has provided additional information to support the costs submitted at the FTV stage, including those whose review was not completed at ITV. For the purposes of informing our assessment of the efficiency of the Project's Capex costs, we have reviewed these costs along with the additional information submitted. Our

views on whether these costs are economic and efficient are discussed in the following paragraphs.

Offshore substation

3.43. The OSP showed a higher cost than expected following our benchmarking analysis. Amongst other things, the following issues have been considered further in our assessment. The RB design is based on 220 kV voltage level. The Developer's project team has made the argument that the OSP would benchmark higher than a 'normal' 132 kV design because larger, heavier equipment had to be installed on the offshore platform. However, this higher cost would be more than offset by lower subsea cable supply and installation costs. We analysed and accepted this argument at the ITV stage, subject to a cost reduction relating to a contribution from the generator due to weight of generator equipment (see paragraph 3.19).

3.44. We also evaluated cost variations, in order to ensure they were legitimate and in line with an efficient construction of the substation. We detected costs associated with additional waiting time topside load and consequential additional barge rental costs which could not be justified as economic and efficient on the basis of information provided.

Ofgem's view

3.45. We reviewed at FTV the costs related to the OSP. We analysed at ITV the additional cost of the OSP due to weight of the generator equipment. Our view is that the additional weight of the generator equipment is significant enough to justify a contribution to the higher cost of the OSP. We estimated this additional cost attributable to the generation equipment to be £1.1m. We applied the reduction at FTV in line with the approach taken at ITV.

3.46. We investigated the costs related to the variations for topside load and additional barge rental however we could not establish the root cause of cost increases resulting from variations. After discussion with the Developer, we agreed the amount of £2.6m would be deducted from the FTV, as these costs were not justified as economic and efficient.

Submarine cable installation

3.47. The Developer submitted costs for this sub-category which we benchmarked and found that they compared high for expected results for a project of similar size. The Project is within a conservation area and the export cable route and the landfall location were consented in one of the most protected marine areas of the UK and Europe.

3.48. The Project's marine licence, issued by the Marine Management Organisation, includes a condition requiring the Developer to reach agreement with a number of named stakeholders on the Export Cable Installation Plan presented by the Developer. This condition is also reflected in the planning permissions awarded by King's Lynn and West Norfolk Borough Council and South Holland District Council for works in the intertidal and onshore areas. Additionally, the Developer applied to The Environment Agency (EA) for an Environmental Permit for flood defence consent in order to undertake cable installation works through the primary sea defences.

3.49. In order to obtain consent and proceed with the works, the Developer had to formulate and implement a cable installation plan according to the conditions specified by the marine licence and the local authority's planning permission. The plan could not be approved unless the requirements set by statutory stakeholders (including NE, EA and local ports) as part of a statutory consultation process were satisfied; therefore the Developer had to act to ensure these stakeholder requirements were met.

3.50. Strict environmental conditions were set by statutory stakeholders for intertidal cable installation. This involved working only during set periods and using specialist tools so as to address the physical and environmental challenges posed by the saltmarsh and mudflat environments. The underwater trenching vehicle used was selected to meet the burial specifications required further offshore. As these specialist tools are significantly larger and more sensitive than those commonly used so far for offshore transmission, the scope of boulder removal, sand waves and UXO clearance sites had to be increased to allow the works.

3.51. The geological conditions of the sea bed, in addition to its environmental sensitivity, represented an additional challenge to the cable burial, needing further remedial work. While it was known that ground conditions were difficult, the performance of the trencher in these conditions could not be foreseen.

3.52. Typically projects use HDD method for executing landfall works. HDD was considered by the Developer as this was also the preferred option of the EA, however it was deemed not feasible for technical reasons and had to be abandoned. After evaluating multiple solutions the EA agreed to a sea defence breach, although stringent requirements were set and had to be followed.

Ofgem's view

3.53. We have examined the information and justification provided by the Developer for the cost of the cable installation. We acknowledge the impact of the geological conditions of the sea bed, the environmental restrictions and the related costs incurred as a consequence of meeting the conditions required by the statutory stakeholders involved in the approval of the cable installation plan. We recognise also that most of these costs were not foreseeable from the start of the Project and became more defined as the Project progressed. As these factors were out of the control of the Developer, we have included these costs in the FTV.

Onshore substation

3.54. A number of variation orders have been raised to allow recovery of down time due to lack of access to land. While this issue was resolved by the Developer, the contractor had to relocate the work several times to continue to work and minimise delay. The work was originally planned to be conducted in a linear manner, however to ensure continuity of operations, it had to be conducted in a fragmented manner. This resulted in additional time spent in works relocation. As a consequence, in an attempt to recover some of the lost time, works were conducted during weekends. Both relocation and overtime work caused additional costs.

3.55. The Developer based the contracting strategy for the onshore substation construction on the integration of the electrical equipment and cable works with the civil works. However the plan initially agreed subsequently changed, as the cable pits design was defined after the programme was set. The connection philosophy of the cables also changed from the one originally planned, as a result of changes to the characteristics of the cable pits. This caused restrictions to the construction areas, which resulted in delays to the civil works of circa seven months. In addition to this, a series of cost variations arose for the installation of electrical components. This included:

a) revised requirements for 400 kV cable connection;

b) outside additional works for the gas insulated busbar (**GIB**) installation, including support and flood resilience steelworks;

c) use of cranes and extension to GIB and export cable outside the gas insulated switchgear building to enable cable connection.

Ofgem's view

3.56. The costs documented by the variations orders examined related to both longer time of work and additional costs for work conducted outside normal working hours. This was a consequence of changes to the cable pits design and the related works required to complete the cable connection in the absence of completed civil works. After discussion with the Developer we concluded these additional costs (£5.3m) would not be included in the FTV.

Connection costs

3.57. Connection costs were indicated in the CAT submitted at FTV under a single item corresponding to the contract value. We noted that a series of variation orders were given negative values and at the same time the contract value increased, since ITV, by a corresponding amount to the cost variations. When we enquired about these variations, the Developer explained how the figures were reconciled and proposed an increase of £0.1m.

Ofgem's view

3.58. We considered that the cost movements within the connection costs category are consistent with the level of costs we expect to see for projects of this kind. We have incorporated the adjustment of £0.1m into the FTV.

Foreign Exchange movements

3.59. The project included contracts denominated in either Euros or Danish Krone.

3.60. We recognise that developers will adopt different approaches for paying contracts in foreign currency or for agreeing volatile commodity prices; for example, the

developer may hedge by fixing the forward exchange rate or commodity price in advance. The payment of their contracts should then be based on such fixed rates.

3.61. As set out in the section on ITV costs (paragraph 3.14) the Developer stated that it did not hedge against Forex movements when it made its FID in June 2015; instead, it sought further clarification from us on the treatment of currency exchange movements. Following discussions with the Developer, in May 2016, we clarified our view on how we would treat the impact of Forex movements during the cost assessment process. In alignment with the position in the Guidance, the Developer then placed hedges for the remainder of the committed RB Project costs. The CAT reflects this by putting through all costs at a spot rate, but then including an offset in the other cost categories, that adjusts for the difference between hedged and spot rates in the period from May 2016 onwards.

Ofgem's view

3.62. For the period between FID and May 2016, we understand that the Developer placed no hedges, and therefore used the spot rate to calculate values in pounds. Whilst our policy is to assess projects as if their costs had been hedged from the point of FID onwards, in this instance we have accepted the spot-rate values during this period as this was applied before clarifying which rate had to be used, as mentioned in section 3.61.

3.63. For the period from May 2016 onwards, we reviewed the forward rates submitted by the Developer and concluded that a more favourable rate could have been obtained. We discussed with the Developer adjusting the CAT to reflect our view of the economic and efficient hedged rate. Therefore, we have removed £0.63m of Forex movements from the Developer's submission, relating to the period between May 2016 onwards.

<u>Personnel-related costs</u>

3.64. The CAT included costs of the Developer's employees attributed to the Transmission Assets. Whilst our consultant GT was provided with details of the hours spent by the employees on the Transmission Assets, they were not provided with details of how the hourly rates for each employee/group of employees were calculated or of the constituent parts of those hourly rates. Based upon our experience on completed projects managed by the same Developer and the findings of the GT review, we

requested a breakdown of the hourly rates, to investigate whether they included a profit element.

Ofgem's view

3.65. According to the Guidance, developers are required to sell the Transmission Assets to the OFTO at cost. Therefore we do not accept any mark-up or margin on internal resources costs into the transfer value. Following discussions with the Developer and based on our experience of previous projects, we have reduced the hourly rates included in the CAT for the Developer's internal resource to remove an estimated profit element. This reduced the Capex internal staff costs by £3.3m and by £4.9m overall across all cost categories.

Development costs

3.66. The assessed development expenditure for the Transmission Assets is £51.8m. This value has decreased by £21.2m since ITV. The reductions applied are described in the sections below.

Reallocation of common costs to generation assets

3.67. We analysed at FTV the costs common to the entire Project and allocated all costs to their respective cost categories as appropriate (see sections 3.32 to 3.42). At the ITV stage, common costs had already been analysed and allocated to the Transmission Assets as suitable. Where the allocation rationale was not substantiated by objective evidence, costs were attributed to the Transmission Assets based on the overall Transmission Assets to generation assets Capex ratio. Some costs were incorrectly apportioned using a slightly different percentage: these allocations were corrected at the FTV using the correct Capex ratio. The allocation of land costs being transferred to the OFTO was also updated by the developer who retained part of the land, resulting in a cost decrease of £0.04m, which has been incorporated into other minor adjustments to the allocation of costs totalling £0.1m. In addition, the resources costs allocated to the "common costs" category were reviewed as part of all personnel related costs (see also section 3.66-3.67).

Ofgem's view

3.68. We have ensured at FTV that costs were attributed to the appropriate category in the CAT and reallocated £18.7m of development costs to the Capex. We have also reviewed the methodology followed by the Developer in allocating costs to the OFTO and have ensured that a correct portion of costs was recognised between the generation and Transmission Assets, avoiding cross-subsidy. As a result of applying the correct percentage reflecting Capex ratio, we have incorporated a reduction of £0.2m to the FTV. The portion of land costs transferred to the OFTO resulted in a cost decrease of £0.04m, which has been incorporated into other minor adjustments totalling £0.1m. Finally, our evaluation of resources-related costs resulted in a reduction to the FTV of £1.5m.

Centrica acquisition

3.69. The Developer acquired the RB Project from Centrica at the development stage (including property rights, design, permits etc.) in December 2013. At the time of establishing the ITV it was not possible to determine with certainty whether an element of profit or goodwill was included into the price paid to acquire the development portion of the Project from Centrica. We therefore decided to further review these costs at FTV.

Ofgem's view

3.70. For the purpose of informing our cost assessment, we have reviewed the further information provided by the Developer. We also sought the advice of our financial consultants who, based on the new evidence provided, established that no element of profit or goodwill was included in the cost claimed through the cost assessment.

Contingency

3.71. The Assessed Costs do not contain a separate contingency value. £12.7m of the contingency that was submitted at the ITV stage was either used or not realised and therefore it has been removed by the Developer from its final cost submission.

Interest during construction

3.72. In its final submission, the Developer included £42.1m of IDC, a £5.3m increase since ITV. This is based on the Developer's calculation of the IDC to completion of the assets over a period from December 2013 to September 2017 based on Interim Operational Notices (ION B) provided to the Developer by National Grid and determinining operational export capacity available.

3.73. The decisions that we made with respect to the Project's Capex costs for the FTV have resulted in in IDC reduction of £7.1m to the Developer's submission and of £1.8m since ITV. This resulted from discussions with the Developer, who removed cashflow relating to currency hedging activities from the IDC cashflow, and from changes we applied to the calculation method followed at FTV compared to the one used at ITV.

3.74. The method followed at FTV calculates IDC in line with the value of the completed assets based partially on ION Bs but also other programme milestone dates requested from and provided by the Developer; it takes into account the timings at which IDC payments cease for Transmission Assets and calculates IDC in accordance with those timings once the Project is partially operational. The above reduction therefore takes into account adjustments for hedging gains, for the timing and the value of the completed assets and a pro-rata adjustment for all Capex reductions applied at FTV. The total IDC calculated for the Transmission Assets at FTV is £35.0m.

Transaction costs

3.75. The Developer has submitted a firm estimate of the transaction costs they expect to incur to asset transfer. We have reviewed this estimate and assessed transaction costs at £3.4m.

Accuracy and allocation of transaction costs

3.76. The Developer provided a breakdown of the transaction costs submitted. They included both internal and external costs. The external costs related to professional services in respect of the tender, e.g. legal and technical. We have concluded that the costs provided by the Developer were allocated appropriately.

Efficiency of transaction costs

3.77. Transaction costs increased by £0.1m since the ITV due to the transaction budget being revised to account for more resources being needed to reach asset transfer. As personnel-related costs were adjusted throughout the cost categories (set out at 3.64 and 3.65 above), a reduction of £0.1m was applied. Overall, transaction costs have remained at the same value since ITV.

Ofgem's view

3.78. Transaction costs can only be provided to us by developers to a reasonable degree of accuracy towards the end of the tender process. We have considered the types of resource costs incurred in relation to the Project's tender process and the level of transaction costs incurred appear efficient and economic in comparison with other projects, with the exception of the disallowed costs discussed in section 3.77 above.

Confirmations in relation to tax benefits

3.79. The ITV was calculated on the basis that the purchaser would obtain the full benefit of all available capital allowances. If this were not the case for the FTV, we would reduce the assessment of costs for an amount that reflects the value of the tax benefit retained by the Developer. The Developer has confirmed that the purchaser will be able to obtain the full benefit of all available capital allowances and therefore the FTV will be the same as the assessment of costs.

4. Conclusion

4.1. 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 RB Transmission Assets as £472,460,769.

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