

Final Project Assessment of the IFA2 interconnector to France

Decision

Publication date: 17 July 2018

Contact: Stuart Borland and Mohamed Hassan

Team: Wholesale Markets and Commercial

Tel: 020 7901 7134

Email: Cap.Floor@ofgem.gov.uk

Overview:

This decision sets out our analysis and provides our position on the Final Project Assessment (FPA) of the IFA2 interconnector to France. This includes our decision on the provisional cap and floor levels for the project, which will apply to National Grid IFA2 Limited's 50% share of the interconnector.

Context

Electricity interconnectors can provide significant benefits to GB energy consumers. We confirmed our cap and floor regulatory regime in 2014, to provide a clear and transparent regulatory approach for the development of new electricity interconnector projects between GB and other countries.

This is our decision on the Final Project Assessment (FPA) of the IFA2 interconnector to France. The IFA2 project is being jointly developed by National Grid IFA2 Limited (NGIFA2) and by Réseau de Transport d'Electricité (RTE), the French transmission system operator. Our cap and floor regulatory regime applies to NGIFA2's 50% share of the cost and revenues of the project.

In this decision we will provide provisional cap and floor levels for the project. We will then modify IFA2's interconnector licence to give effect to our decision. We will then confirm the final cap and floor levels for the project prior to operation at our post-construction review (PCR) stage.

Associated documents

[Cap and floor regime: Open letter on procedural changes to our Final Project Assessment stage](#) (November 2017)

[Decision on the Initial Project Assessment of the IFA2 interconnector to France](#) (July 2015)

[Cap and floor regime: Initial Project Assessment for the IFA2 interconnector to France](#) (March 2015)

[Decision on the Final Project Assessment of the NSL interconnector to Norway](#) (July 2017)

[Decision to roll out a cap and floor regime to near-term electricity interconnectors](#) (August 2014)

[The regulation of future electricity interconnection: Proposal to roll out a cap and floor regime to near-term projects](#) (May 2014)

Contents

Executive Summary	4
1. Background	7
Project overview	7
Our cap and floor regime	8
Purpose and structure of this document	10
2. Cost assessment	12
Scope of our cost assessment	12
Our view on IFA2's submitted costs	13
3. Annual reporting and our post-construction review	21
Annual reporting	21
Scope of the post-construction review	22
Timing of the PCR	22
4. Other aspects of our Final Project Assessment	24
Cap and floor financial model	24
Technical assessment	25
Availability incentive	26
Other regime design considerations	26
Appendices	28
Appendix 1 – Regime summary for IFA2	29
Appendix 2 – Risk-related eligibility at the PCR	33

Executive Summary

We confirmed our cap and floor regulatory regime in 2014, to provide a clear and transparent regulatory approach for the development of new electricity interconnector projects between GB and other countries. This aims to incentivise commercial investment in interconnectors where it benefits consumers.

This decision provides our position on the Final Project Assessment (FPA) of the IFA2 interconnector to France. The IFA2 project is being jointly developed by National Grid IFA2 Limited (NGIFA2) and by RTE (Réseau de Transport d'Electricité), the French transmission system operator (TSO).

Background and scope

The IFA2 project is a 1 GW HVDC electricity interconnector between GB and France. Our cap and floor regime applies to National Grid's 50% share in the IFA2 project.¹

The cap and floor regime is the regulated route for interconnector development in GB. There are three main stages to our cap and floor regime – the Initial Project Assessment (IPA), the FPA and the post-construction review (PCR). We assessed the needs case for the IFA2 project at the IPA stage and decided in July 2015 to grant the project a cap and floor regime in principle. This was based on our assessment that the project is likely to significantly benefit GB consumers and GB as a whole. This decision was subject to the costs of the project not materially increasing.

This document sets out our decision on the FPA of the IFA2 interconnector.

Overview of our assessment

The cap and the floor levels are set based on building blocks of development costs, capital costs, operations and maintenance costs, replacement costs, decommissioning costs, tax and allowed return.

NGIFA2 submitted the incurred and forecast project costs to Ofgem in August 2017, with a complete and revised version received in January 2018. We have assessed whether or not these costs are economic and efficient.

We have concluded that the majority of the project's firm costs (such as development costs and the firm prices in supply contracts) are reasonable. We have considered the procurement process that was followed for the major contracts (primarily the cable and converters), and decided that this was competitive and efficient.

The IFA2 project is exposed to a number of uncertainties. These uncertainties include variation orders and risk-related changes in cost that may occur during the

¹ National Grid IFA2 Ltd – or NGIFA2 – is the licenced entity on the GB side of the interconnector. This licensee is a part of National Grid's interconnector business, NGIH.

construction period (which is not already covered in the contracts). Costs relating to uncertainties will become clearer by the time of the PCR, and may result in higher or lower total project costs. The provisional cap and floor levels set out within this paper include a provisional value to cover these uncertainties. This reflects an economic and efficient estimate for the additional costs likely to be incurred by NGIFA2 between the FPA and the PCR.

Within Chapter 3 and Appendix 2 of this document, we have provided clarity on the scope of our PCR and our principles for considering any risk-related changes in cost. If such cost variations are deemed to be eligible for the PCR, and then assessed to have been efficiently incurred, these costs will be included in the final cap and floor levels.

Based on our assessment, we will set NGIFA2's development and capital costs at £347m, a reduction of approximately 6% from the submitted £368m.² Our view on the costs covers development costs (£10m), firm capital expenditure costs (£307m) and provisional costs allocated for risk and uncertain costs (£30m). We have also set the provisional values of operational costs (£480m), replacement costs (£14m) and decommissioning costs (£14m) as those submitted by NGIFA2 at the IPA stage. These provisional values will be assessed at the PCR stage.

As part of this decision we have confirmed the financial parameters that will apply to the IFA2 project. These are based on methodologies set out in our cap and floor regime policy. These have predominantly been set based on the date of NGIFA2's final investment decision (9 November 2016). We have also decided to set a target of 96.59% for IFA2's availability incentive, based on our review of the project's technical design. The cap level can increase or decrease by up to 2% based on performance against this target.

Our provisional cap and floor levels, based on our allowed costs and relevant financial parameters, are £50.7m and £27.6m (in 2016/17 prices).

These are lower than the indicative levels used at our IPA stage, which were £55.4m and £33.0m (in 2016/17 prices). This reflects a combination of our decisions on allowed costs and cost savings against the project's IPA forecasts made by the developer. We think the project can therefore be reasonably expected to provide greater benefits to consumers than expected, as (all else being equal) the current cap and floor levels would reduce the likelihood of floor payments and increase the likelihood of cap payments.

² All costs submitted by NGIFA2 were in nominal terms, unless stated otherwise. These costs were converted to 2016/17 prices within the Ofgem cap and floor financial model in order to set the cap and floor levels.

Next steps

Following this decision, we will consult on proposed changes to IFA2's interconnector licence in order to give effect to our decision. This will follow our statutory licence modification process.

NGIFA2 will need to report to us throughout the construction period. As part of this reporting, NGIFA2 should provide notice of any significant variations from the project delivery schedule, including in response to unexpected events that have a significant impact on project costs. We will review any expenditure relating to such risks at the PCR stage.

After construction, we will finalise our cost assessment at the PCR stage. We will take into account changes in cost due to eligible risks materialising, as long as those costs are efficiently incurred. We will also assess the project's operational and maintenance costs. The cap and floor levels will be finalised accordingly and be set out in the updated licence conditions prior to operation.

1. Background

Project overview

1.1. The IFA2 project is a 204 km, 1 GW HVDC electricity interconnector between GB and France. At the GB side the cable landfall is at Lee-on-Solent, followed by 2 km of onshore cable to an AC/DC converter station located on Daedalus airport. This is followed by approximately 10 km of double circuit AC cable, including 5.5 km of offshore cable, which connects to the grid at Chilling substation. The French end of the HVDC cable lands at Merville-Franceville-Plage, followed by 24 km of onshore DC cable to a converter and substation in Tourbe.

1.2. IFA2 is shown alongside other proposed interconnector projects in Figure 1 below.

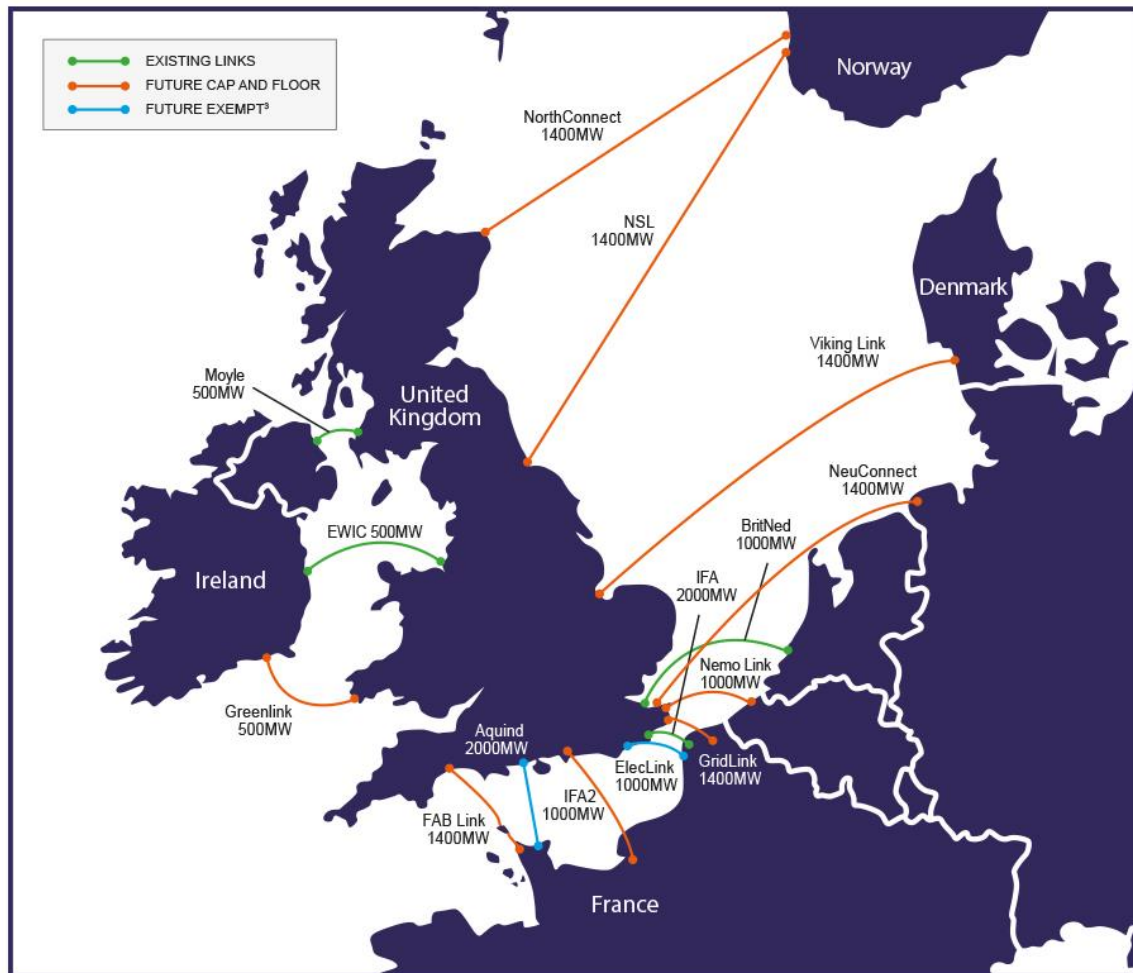


Figure 1 - Map of existing and proposed GB electricity interconnectors

1.3. The IFA2 project is being jointly developed by National Grid Interconnector Holdings (NGIH) and RTE, the French TSO. Our cap and floor regime applies to National Grid's 50% share in the IFA2 project.^{3,4} RTE's share in the project is regulated by the French regulator, CRE. This is the same approach that was adopted for the NSL interconnector to Norway. More information on the regime design for IFA2 is set out in Appendix 1.

Our cap and floor regime

1.4. The cap and floor regime is the regulated route for interconnector development in GB. It sets a minimum and maximum return that interconnector developers can earn. We developed the cap and floor regulatory model jointly with the Belgian regulator, CREG, for the Nemo Link interconnector. We then extended the cap and floor regime to other interconnectors in August 2014.⁵

1.5. There are three main stages to our cap and floor regime – the Initial and Final Project Assessments (IPA and FPA), followed by the post-construction review (PCR). These main stages are supported by annual reporting, which takes place between the FPA and PCR stages. At the FPA stage we confirm the grant of a cap and floor regime and set the provisional cap and floor levels. These levels are then confirmed at the PCR stage. This is shown in Figure 2 below.

³ National Grid IFA2 Ltd – or NGIFA2 – is the licenced entity on the GB side of the interconnector. This licensee is a part of National Grid's interconnector business, NGIH.

⁴ The cap and floor regime covers half of the investment. However, in some specific areas, the costs are shared differently. More information is provided in Chapter 2 and Appendix 1.

⁵ We extended the cap and floor regime to near-term projects in August 2014, and then confirmed this as our enduring approach to interconnector regulation in March 2015 as part of our Integrated Transmission Planning and Regulation project conclusions.

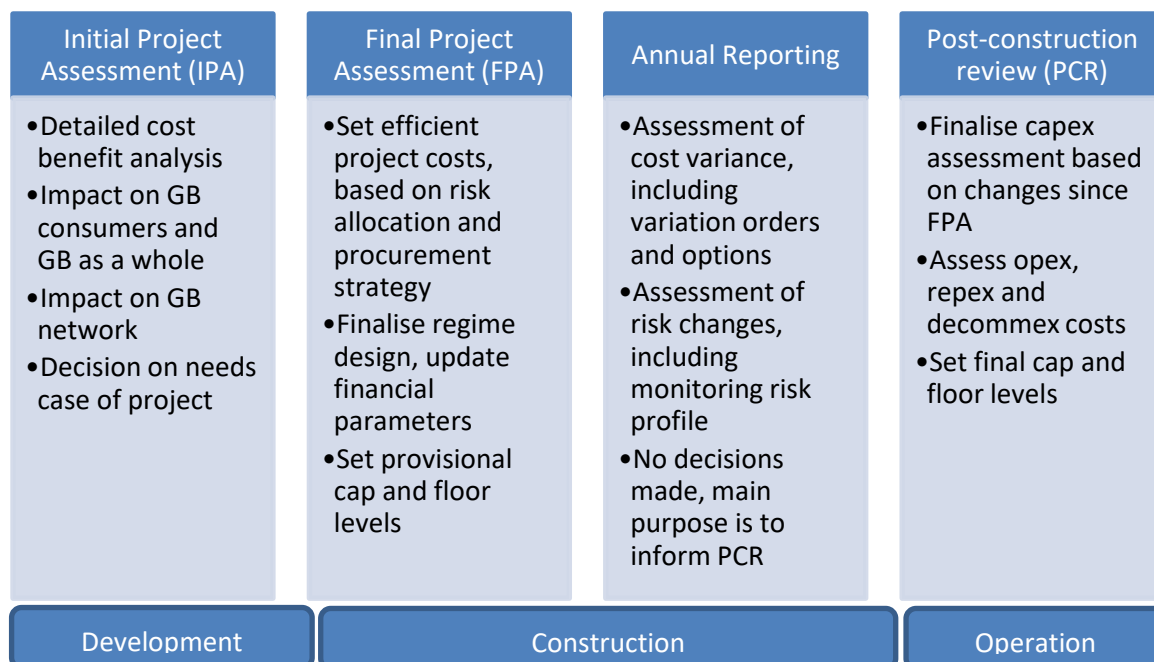


Figure 2 - Cap and floor assessment framework

1.6. We assessed the needs case for the IFA2 project at the IPA stage and decided in July 2015 to grant the project a cap and floor regime in principle.⁶ This was based on our assessment that the project is likely to significantly benefit GB consumers and GB as a whole. This decision was subject to the costs of the project not materially increasing.

1.7. We published a procedural update to our assessment framework in November 2017.⁷ This noted that we no longer intend to consult on the FPA stage of our assessment, except in cases where information has significantly changed since our IPA stage. This would include situations where:

- project costs have materially increased;

⁶ [Decision on the Initial Project Assessment of the FAB Link, IFA2 and Viking Link interconnectors](#)

⁷ [Cap and floor regime: Open letter on procedural changes to our Final Project Assessment stage.](#)

- we think the expected impacts of the project have changed significantly since our IPA decision;
- the project has requested variations to the default regime design that we are minded to approve;
- the project does not meet the conditions that were attached to our IPA decisions; or
- the project has otherwise changed significantly.

1.8. We made this change because our decisions at the FPA stage typically follow principles established in our cap and floor regime policy. In addition, due to commercial confidentiality of some cost information, it is difficult for third parties to provide meaningful comments on our conclusions.

1.9. Based on the information provided by NGIFA2, and our analysis set out in this document, we don't think that the FPA for IFA2 matches any of the criteria for consultation set out above. This document is therefore our final decision on the FPA of IFA2.

Purpose and structure of this document

1.10. This document sets out our FPA decision for the IFA2 interconnector. We have provided our view on NGIFA2's costs by confirming which costs we see as firm, and which we view as uncertain. We have assessed whether the costs are economic and efficient. We have updated the cap and floor levels according to our assessment of these costs, and by updating the relevant financial parameters that set the levels of the cap and floor.

1.11. The following areas are in the scope of this document:

- Assessment of the firm costs (e.g. development expenditure, construction contracts, insurance);
- Assessment of the uncertain costs (e.g. risks, non-exercised options and variation orders);
- Technical aspects, including review of the technical design and setting the project-specific target for the availability incentive; and
- Confirmation of the appropriate financial parameters for IFA2 and an update of the cap and floor financial model.

1.12. The following areas will be assessed and decided at the PCR stage and are therefore not within the scope of this document:

- Adjustments to EPC contract values and non-contract costs as a result of eligible risk materialisation, Variation Orders and options exercised following the FPA submission; and
- Assessment of the operational (opex), replacement (repeX) and decommissioning (decommex) costs.

1.13. The provisional cap and floor levels presented in this document will include placeholders for the items mentioned above, provided by NGIFA2 at the IPA stage.

1.14. This decision document is structured as follows:

Chapter 2 provides our cost assessment, which includes an assessment of firm costs and our views on uncertain costs.

Chapter 3 provides information on the annual reporting requirements, the scope and timing of our PCR stage and high-level principles on eligibility. More information on eligibility for assessment at the PCR stage is included in Appendix 2.

Chapter 4 sets out our views on the financial and technical aspects of the FPA. This includes the cap and floor financial model and the associated financial parameters, our review of the technical design and our setting of the project-specific target for the availability incentive. This also includes the provisional cap and floor levels for IFA2.

2. Cost assessment

Chapter Summary

This chapter gives our view on NGIFA2's proposed costs for the link, including an explanation where we are disallowing certain costs. We have used the final cost figures presented in this chapter to inform the provisional cap and floor levels.

Scope of our cost assessment

2.1. During the IPA we took a provisional view on the project costs, based on the high level estimate that was provided by NGIFA2 at the time. At the FPA stage, the cost estimate provided by NGIFA2 is much more mature, as the majority of costs are now agreed.

2.2. Since the cap and floor levels are largely based on IFA2's costs, at the FPA stage we assess the costs to ensure these are economic and that consumers do not underwrite inefficient costs.

2.3. NGIFA2 initially submitted its incurred and forecast costs to Ofgem at the end of August 2017, with a complete and revised version received in January 2018. We have assessed these costs and engaged with the project developer through various meetings and workshops to ensure that we understand the rationale behind these costs, as well as the project's scheduled activities.

2.4. In setting the cap and floor levels, we assess the project costs as a whole, to ensure that spending is efficient. We then use the NGIFA2 share of this spend to inform the cap and floor levels for the GB share of the project.⁸

2.5. The key cost components that we assess during the FPA are the GB development costs (devex)⁹ and the capital costs (capex). The capex consists of two cost components – firm costs that have been agreed (either incurred or forecasted), and uncertain costs that are currently estimates. Our position on the devex and firm capex

⁸ The costs that inform our cap and floor levels are: 100% of NGIFA2's development costs; 0% of RTE's development costs; 50% of the total costs of cable, converters, site preparation (at both GB and France); 100% of GB-specific separate costs; and 0% of France-specific separate costs.

⁹ These costs are now firm, apart from potential income from the European Union's Connecting Europe Facility. If this income is different to that anticipated at this stage, we will confirm our position at the PCR.

costs is decided at this FPA stage and, unless otherwise stated within this document, will not be revisited at the PCR stage.

2.6. We have not assessed the project’s opex, repex and decommex costs during the FPA. We have used the high-level estimates for these costs, which NGIFA2 provided at the IPA stage, to calculate the provisional cap and floor levels.

2.7. A final review is conducted at the PCR stage, once most (c.90-95%) of the construction costs have been committed or commercial operations have started (the earlier of the two). NGIFA2 will present more details on their opex, repex and decommex costs at the PCR.

2.8. Following the PCR assessment, we will determine the final cap and floor levels.

Our view on IFA2’s submitted costs

Table 1 provides an overview of our current view on the efficient costs for the IFA2 project.

Table 1 - Summary of costs (nominal, NGIFA2 share)

Cost		NGIFA2 IPA Submission (£m)	NGIFA2 FPA Submission (£m)	Ofgem FPA Allowance (£m)
Devex		10	10	10
Capex	Firm Costs	394	312	307
	Uncertain Costs*		46	30
Opex	Provisional Placeholders†	480	480	480
Repex		14	14	14
Decommex		14	14	14
Total		912	876	855

*Placeholders for uncertain costs cover the risk-related expenditure, future Variation Orders and contingencies.

† Placeholders for opex, repex and decommex costs, which we will assess at the PCR stage.

2.9. The above costs form the basis of the provisional cap and floor levels. **Based on these costs, the cap on revenues that NGIFA2 can earn will be £50.7m a year. The floor will be £27.6m a year (2016/17 prices).**¹⁰ This represents an average reduction of 11% compared to our expectation of £55.4m (cap) and £32.9m

¹⁰ These cap and floor levels are only applicable to National Grid share in the IFA2 project. The RTE share of the project will be regulated independently by CRE, the French regulator.

(floor) at the IPA stage. Further information on how the cap and floor levels have been calculated is provided in Chapter 4 and Appendix 1.

2.10. NGIFA2’s FPA submission set out their rationale for the devex and capex costs incurred to date, and the projected capex spend over the construction period. The majority of these costs relate to the engineering, procurement and construction (EPC) contracts that NGIFA2 awarded for the project. We present our analysis of these costs in the sections below, which cover the assessments of:

- firm devex costs;
- firm capex costs; and
- uncertain capex costs.

Assessment of firm costs

2.11. A summary of the firm costs and Ofgem’s adjustments are presented in Table 2. We explain our cost assessment of the different components and reasoning behind each adjustment under the following sections. Unless otherwise stated, all costs and adjustments mentioned in the following sections refer to NGIFA2’s share of the overall project costs.

Table 2 - Firm costs and Ofgem adjustments (nominal, NGIFA2 share)

Cost description		NGIFA2 FPA Submission (£m)	Ofgem Adjustments (£m)	Adjusted cost total (£m)
<i>Devex</i>	<i>Total Devex</i>	10.0	0.0	10.0
<i>Capex</i>	<i>Converters</i>	139.0	-1.9	137.1
	Commissioning Power	1.4	-1.4	0.0
	Onshore Staff Costs	5.1	-0.5	4.6
	<i>Subsea and Underground Cables</i>	147.8	0.0	147.8
	<i>Common Costs</i>	25.5	-3.7	21.8
	DSU Insurance	3.2	-3.2	0.0
	Insurance Lead Staff Costs	0.2	-0.1	0.1
	Implicit Auction Costs	1.7	-0.4	1.3
Total*		322.2	-5.6	316.6

* The individual values within this table are rounded to one decimal place.

Assessment of firm devex costs

2.12. The developer submitted a cost of £10.0m for the project’s devex. This cost covers items such as studies, assessments and project management costs, incurred prior to the project’s final investment decision (FID), which was taken in January 2017.

2.13. We assessed and benchmarked the devex costs against similar projects. The results of the benchmarking and our assessment indicate that the costs incurred were economic and efficient.

Assessment of firm capex costs

2.14. Our assessment of the firm capex costs considered the following elements:

- the suitability of the tender processes and subsequent award of contracts; and
- the firm capex costs on an overall basis and by component (converters, cables and common costs).

The following sections look at each of these in turn.

Tender processes and EPC contracts award

2.15. In order to secure the most efficient EPC contracts, the developer engaged with the market by running a tender process with three different lot options:

- Lot 1: HVDC converter stations
- Lot 2: HVDC and HVAC land and submarine cable supply and installation; and
- Lot 3: HVDC converter stations, HVDC and HVAC submarine and land cables and cable installation.

2.16. These tender processes were run in line with relevant EU legislation and were published on the OJEU.¹¹

2.17. After evaluating all of the proposed solutions, the developer decided to offer two separate contracts, one for the converter stations (lot 1) and one for the cable supply and installation (lot 2).

¹¹ OJEU stands for the Official Journal of the European Union. This is the publication in which all public sector tenders above a certain financial threshold (as specified in EU legislation) must be advertised.

2.18. ABB won the tender for the converter stations and were awarded the lump-sum contract to supply and construct them. Prysmian won the EPC lump sum contract to supply and install the land and submarine cables. Both contractors won the tenders on a combination of commercial and technical grounds.

2.19. Our review of the tender documents indicated that the tender process was run competitively. In addition, since the developer adopted a procurement process in line with EU legislation, we are satisfied that IFA2 managed and delivered the tender processes in a transparent and efficient manner.

Firm capex components

2.20. The firm capex costs consist of costs associated with the EPC contracts, which form the majority of the capex, and the developer costs for managing those contracts.

2.21. The EPC contracts include options for further work, limited in scope and at a specified price, which may be exercised during the construction process. Each of these options have an expiry date. The developer may need to renegotiate the cost of an option, if they choose to exercise it following the expiry date. Options that were exercised prior to the FPA submission have been included as part of the NGIFA2 firm costs.

2.22. We carried out benchmarking analysis of the firm capex costs. The results indicated that on an overall project basis these costs benchmark reasonably, when compared to similar projects. However, our assessment of specific cost items showed that some costs should be adjusted.

Converter Capex:

2.23. NGIFA2 submitted a cost of £139.0m for the supply and construction of the converter stations. The majority of this cost is related to the EPC contract for the converters. It also covers the developer costs associated with managing this contract, as well as costs related to options exercised by IFA2 prior to the FPA submission.

2.24. Following our assessment of these costs, we have made the following adjustments:

- **Commissioning Power¹²:** NGIFA2 submitted a cost of £1.4m for this item. We believe this cost to be a commercial cost that NGIFA2 can trade, as part of the commissioning process. We do not expect it to form a part of the cap and floor levels. If NGIFA2 provides evidence that it cannot

¹² Commissioning Power is the power required for testing the interconnector during the commissioning.

trade this out (i.e. they are unable to trade the power used to commission the link), then we may consider it as an eligible cost for inclusion at the PCR stage.

- **Onshore staff costs:** NGIFA2 submitted a cost of £5.1m for the project's onshore staff costs. We assessed this cost and reviewed the associated resource profile and deemed elements to be inefficient. We reduced this cost by £0.5m, which brought the NGIFA2 cost to a level that we believe is more appropriate for this item.

2.25. Considering the above, we believe that the adjusted capex cost for the converter stations of £137.1m is economic and efficient.

Subsea and Underground Cables Capex:

2.26. NGIFA2 submitted a cost of £147.8m for the supply and installation of the cables. The majority of this cost is related to the EPC contract for the cables. It also covers the developer costs associated with managing this contract and costs related to options exercised by IFA2, prior to the FPA submission.

2.27. Our assessment of the total cables cost, based on a documentation review, benchmarking and supplementary questions to the developer indicates that these costs are economic and efficient.

Common Costs Capex:

2.28. The developer submitted a cost of £25.5m for NGIFA2's share of the project's common costs. This cost category includes items such as insurance, legal support and operational readiness costs. Following our assessment of this cost, we have made the following adjustments:

- **DSU Insurance:** NGIFA2 submitted a cost of £3.2m for Delay in Start Up (DSU) insurance for the project. After assessing this cost and discussing it with the developer, we do not believe that this insurance provides a tangible benefit to consumers. We acknowledge that this insurance could prove to be beneficial for NGIFA2, in the event of a loss of projected revenue, but we do not believe it is a necessary cover for the transmission element of the project. Therefore, we consider this cost to be ineligible and should not sit within the cap and floor.
- **Insurance Lead Staff Costs:** We consider that £0.1m is a more appropriate level of cost for this element, and have adjusted the submission accordingly.

- **Implicit Auction Costs**¹³: NGIFA2 submitted a cost of £1.7m for operational readiness costs, associated with the implicit auction system. During the FPA the developer acknowledged that this cost should be updated, to reflect a more accurate estimate. Following this update, the implicit auction costs were reduced by £0.4m to give a new cost total of £1.3m. We believe that this cost is a reasonable estimate at this stage. However, we reserve the discretion to reconsider these allowances following our recent consultation on cost recovery for European Network Code implementation.¹⁴

2.29. Considering the above, we believe that the adjusted level of £21.8m for common capex costs is economic and efficient.

Assessment of uncertain costs

2.30. The IFA2 project has areas of cost uncertainty, which can be classed into the following categories:

- Non-exercised options;
- Variation Orders (VOs); and
- Risk-related expenditure.

2.31. The uncertain nature of these cost areas is one of the reasons why the cap and floor levels set at the FPA are provisional. We included placeholders to cover what we deem to be economic and efficient values for these costs.

2.32. These placeholders form a part of the FPA cap and floor levels. At the PCR, we will assess the actual spend in relation to these cost as they become firm and update the cap and floor levels accordingly.

Non-exercised options

2.33. The costs for all options were agreed as part of the relevant contracts. However, the developer has not exercised a number of these options yet, as it is unclear at this stage if these particular parts of the scope are required. Preparatory work, such as

¹³ The costs associated with IFA2's operational readiness are not fixed at this stage; they will be reassessed during the project's PCR.

¹⁴ [Updated minded-to position on approach to cost sharing and cost recovery under the Capacity Allocation and Congestion Management \(CACM\) Regulation](#)

surveys, might play a significant role in determining if these options will be exercised over the construction period.

2.34. Each of these options has an expiry date. The developer may need to renegotiate the cost of an option if they choose to exercise it following the expiry date.

2.35. Within IFA2's cable contract there are three optional trials for jetting tools, trenching tools and nearshore tools. The total value of these optional trials is £10.0m.¹⁵ NGIFA2 has stated that they do not expect to exercise these options during the project construction. If these are exercised, and submitted within the project's annual submissions or PCR, we will reinvestigate the necessity of these trials, as well as the costs involved.

2.36. NGIFA2 have not included the costs associated with non-exercised options in the cost submission, and hence, these costs have not been included within the cap and floor levels.

Variation Orders

2.37. We did not receive any VOs as part of NGIFA2's FPA submission, and hence, no costs in relation to VOs have been included within the cap and floor levels at this stage.

2.38. The contract schedules provided by NGIFA2 included the staff and vessel rates the contractor proposes to use, if VOs are required for both the cable and converter contracts.

2.39. Given that no costs related to VOs are included at this stage, we are not taking a final view on the VO rates presented in the contracts. Based on our provisional analysis, we think some aspects of the rates agreed appear excessive. NGIFA2 will need to demonstrate that any rates are economic and efficient during our consideration of any VOs.

2.40. We will assess VOs as they arise during the project's annual submissions. We will then make a final decision on these costs at the project's PCR.

¹⁵ Converted from €11.7m using an exchange rate of 0.855.

Risk-related expenditure

2.41. The cap and floor should not include risk allowances that are resulting from inefficiencies. Furthermore, for risks which consumers should be (at least in part) underwriting, the developer should have appropriate mitigation measures in place.

2.42. The eligible risks must be related to force majeure or caused by an external party or event, and that could not have been better mitigated by IFA2 using appropriate foresight. Examples of potentially eligible risks are set out in Appendix 2.

2.43. IFA2 is forecasting to incur £46.1m of costs (NGIFA2 share) from a wide range of risks materialising. This includes, for example, estimated costs to manage logistical delays or those due to extreme weather conditions.

2.44. We have assessed the risk drivers included in the cost submission, based on the criteria mentioned above. We determined that some should not be included in the FPA cap and floor calculation. For example, we rejected risks relating to cable damage, as we believe they are covered by the project's construction insurance. In addition, we have reduced various costs for other risk drivers, based on our views of what constitutes economic and efficient behaviours and data we obtained from similar projects. We consider £30.4m as an appropriate placeholder to cover NGIFA2's share of the eligible risks for the project. This is a reduction of £15.7m from NGIFA2's £46.1m submission.

2.45. We will monitor the project's risk profile and materialised risk expenditure throughout the annual submissions. We will take a view on the materialised risks at the PCR stage, applying the principles for risk eligibility that we set out in Appendix 2.

3. Annual reporting and our post-construction review

Chapter Summary

This chapter gives our view on how we will approach the annual reporting and post-construction review (PCR), explaining the nature of cost variations that might be allowed into the final cap and floor levels.

Annual reporting

3.1. Following the FPA, NGIFA2 will be required to submit annual reports during the construction phase, including cost variations from those set at the FPA. NGIFA2 will be required to submit detailed financial information and explanations annually.

3.2. NGIFA2 will need to maintain high quality financial records, according to the requirements set out by Ofgem, and to provide evidence of expenditure during construction. Part of this information will be submitted included in the annual reporting. As a minimum NGIFA2 will need to:

- Ensure a clear paper trail of expenditure for all items submitted as part of the annual reporting. For example, NGIFA2 need to differentiate clearly between expenditure on the original contract and any variations to it. If we are unable to distinguish the expenditure, we may assume it is expenditure for items already assessed at the FPA and therefore not eligible for further review.
- Evidence will need to be provided for all expenditure, such that a forensic audit can be carried out by Ofgem if required. Items which cannot be evidenced (e.g. no invoice and proof of payment) may be disallowed by Ofgem entirely.

3.3. All changes in cost (including risk-related costs and VOs) will need to be transparently documented, against the scope of works and expectations at the FPA, so that they can be assessed separately from FPA items. In addition, the link between these cost changes and NGIFA2's FPA risk allowance should be noted within the annual submissions. These costs will need to be evidenced and documented in the same reporting year in which they occurred.

3.4. If any risk-related cost variance is deemed eligible, only efficient costs will then be allowed. We expect IFA2's decisions taken in response to such risk-related factors to be evidence-based and the developer to be responsible for proving that decisions taken in response to such variations were efficient. Appendix 2 provides further information on risk-related eligibility at the PCR.

Scope of the post-construction review

3.5. The FPA determines our current view of the economic and efficient costs to feed into the cap and floor levels. For many reasons the outturn costs may be different. The PCR will adjust the FPA's provisional cap and floor levels for costs we deem to be eligible and efficient. The eligible items are:

- Opex, repex and decommex: At the PCR stage we expect to conduct a full assessment of the efficient costs of operation, replacement and decommissioning of the IFA2 interconnector.
- Variations and uncertain contracted items: The 'Annual reporting' section, above, details which of these items are eligible for assessment at the PCR.

3.6. The result of the PCR will be an update to the cap and floor levels in IFA2's interconnector licence, which will represent the final cap and floor values for the 25-year duration of the cap and floor regime (subject to a discretionary opex reopener).

3.7. At the FPA stage we have approved a nominal IDC component based on the submitted profile of capex spend over the period of construction. The actual IDC entitlement will be updated at the PCR stage based on actual allowed expenditure.

3.8. We may choose to conduct a forensic analysis of NGIFA2's costs, or any eligible cost variations, to ensure the traceability and substantiation of the cost submission. This analysis can be used to help establish the final PCR values for the project, including any adjustments to values stated within this document.

3.9. More information on our consideration of risk-related expenditure at the PCR stage is included in Appendix 2.

Timing of the PCR

3.10. We intend to start the PCR process at the earlier of:

- 90-95% spend committed; or
- start of the commercial operations date.

3.11. We think that at the time when 90-95% of spend is committed or the commercial operations have started, it is reasonable to expect that majority of works would have been completed.

3.12. If some risks materialise shortly after PCR submission by NGIFA2, we might allow inclusion of these costs into the PCR up to a certain cut-off point. This cut-off point will be specified as part of the PCR guidance to ensure that there is no unreasonable delay to the PCR process.

3.13. If NGIFA2 will have reasonable grounds to believe that some of the remaining construction works might be exposed to certain risks after this point, we intend to provide them with an ex-ante allowance for managing these risks, which would be granted as part of the PCR and would not be reopened.

3.14. If the PCR process doesn't conclude within the first year of operation, we may choose to disallow NGIFA2 any within-period revenue assessments until the PCR is completed and final cap and floor values are established.

4. Other aspects of our Final Project Assessment

Chapter Summary

This chapter details our approach to updating the cap and floor financial model for IFA2, our technical assessment and the availability incentive target set for the project.

Cap and floor financial model

4.1. The cap and floor values are calculated using our cap and floor financial model. Broadly, the cost allowances are fed into the model as building blocks, with benchmark financial measures applied to give the values of the cap and the floor, which are calculated independently of each other.

4.2. Our updated cap and floor financial model for IFA2 is published as a subsidiary document to this decision. We have updated it to include the relevant project-specific parameters.

4.3. Amongst other things, this reflects the financial indices that set the cap and floor – the cost of equity (cap) and debt (floor) benchmarks. These have been set based on the date of NGIFA2's final investment decision (FID) which was taken in November 2016. We provide the full list of these financial parameters in Appendix 1.

4.4. As noted in Chapter 2, we have used a placeholder value for the potential cost of unexpected events and mitigating actions. We have tightly defined the conditions that any such events must meet in order to limit the scope of the PCR.

4.5. The cap and floor financial model also includes values for other aspects that we will assess at the PCR stage, such as operational costs. At this stage we have used the developer's cost estimates for these items to inform the cap and floor levels.

4.6. Our provisional cap and floor levels, based on our allowed costs and relevant financial parameters, are £50.7m and £27.6m (in 2016/17 prices¹⁶).

4.7. These are lower than the indicative levels used at our IPA stage, which were £55.4m and £33.0m (in 2016/17 prices). We think the project can therefore be

¹⁶ All costs submitted by NGIFA2 were in nominal terms. These costs were converted to 2016/17 prices within the cap and floor financial model.

reasonably expected to provide greater benefits to consumers than expected at the IPA stage, as (all else being equal) the current cap and floor levels would reduce the likelihood of floor payments and increase the likelihood of cap payments.

4.8. These cap and floor levels are not final. They will only be finalised following our PCR assessment. The final cap and floor levels will include our assessment of operational costs and our final view on additional spend in relation to certain risks (and hence the placeholder numbers used at this stage to inform the indicative cap and floor levels).

Technical assessment

4.9. At the FPA stage we undertake a high-level assessment of the project's technical design. The aim of this assessment is to ensure that the developers have adopted a sensible procurement strategy which has informed an efficient technical design.

4.10. IFA2 uses a symmetrical monopole configuration with two HVDC cables linking the French and GB ends. For the size of this link – 1 GW – this design choice is in line with current industry practice, and takes into account the environmental factors and costs associated with alternative options.

4.11. A voltage level of 320 kV has been selected for this project for use with cross-linked polyethylene (XLPE) cable technology. The use of higher HVDC voltage, which could have possibly resulted in more efficient engineering, could not materialise due to a lack of suppliers able to meet the reliability and procurement expectations set by the project partners, largely based on the timing of the procurement process (with higher voltage XLPE products being relatively new).

4.12. The AC connection points to the respective transmission systems at the French and GB ends seem well optimised, although the AC connection route at the GB end is quite complex owing to the presence of an airfield, enterprise zone and other local planning restrictions. A short offshore route has to be taken for the 400 kV AC cables at the GB end, which is largely justified by the planning constraints faced by onshore options.

4.13. The overall project design seems to be well informed by feedback from HVDC supply chain and the choices made during the procurement process. The technical design is also in line with our expectations based on publication of our supply chain plans for cap and floor projects.¹⁷

¹⁷ National Grid's August 2017 interconnector supply chain update is available at: https://www.ofgem.gov.uk/system/files/docs/2017/10/ngv_supplychain_aug17.pdf

4.14. We have reviewed the technical choices made by the developer. We are satisfied that these are in line with the initial expectations following the IPA stage, and that the interconnector has been efficiently designed and procured.

Availability incentive

4.15. The availability incentive is a mechanistic incentive which applies to all cap and floor interconnector projects. The incentive aims to ensure that the developers maintain technical availability of the cable, even in periods when they could reasonably expect revenues to exceed the cap or fall below the floor. Incentivising good technical availability will help to ensure that consumers realise the full benefits of interconnection between GB and France.

4.16. The availability incentive gives a potential 2% upside and downside to maximum interconnector revenues at the cap. This is based on performance against a target level of availability. If developers outperform against the target by up to two percentage points, then the cap level increases by the same amount. If developers underperform against the target by up to two percentage points, then the cap level reduces by the equivalent. The specific availability target varies from project to project, depending on a number of technical factors such as project design and cable length.

4.17. The availability target is determined by a Microsoft Excel-based model designed by Sinclair Knight Merz, engineering consultants for Nemo Link in 2013.¹⁸ This was materially updated by GHD consultants for the NSL FPA in 2016, to ensure that the model structure and source data continue to be fit for purpose.

4.18. For this FPA, we asked GHD to update the technical input assumptions to reflect the final design of the IFA2 interconnector. GHD's summary report, as well as the updated availability model are published alongside this decision. GHD's summary report contains details on the updates performed to the availability model. The updated model can be edited by interconnector developers to capture project-specific information.

4.19. Using the updated model and reflecting IFA2's design specifics, GHD propose a base case availability incentive target of 96.59%. **We are applying this target of 96.59% to the project.**

Other regime design considerations

¹⁸ [SKM report - Calculating Target Availability Figures for HVDC Interconnectors;](#)
[SKM model: Target Availability Model for HVDC Interconnectors](#)

4.20. The default cap and floor regime was set out in our August 2014 cap and floor decision document and our December 2014 decision on the Nemo interconnector to Belgium. This regime has been implemented for the Nemo project through licence changes. We consulted informally in February 2016 and published a statutory decision on these changes in November 2016.¹⁹

4.21. NGIH has not requested specific or significant variations from the default regime. However, there are a number of areas where we have updated our regime design to account for the project being split, rather than joint, regulation between the two countries. These changes are captured in Appendix 1, which provides a summary of the regime design that will apply.

¹⁹ [Decision on changes to the standard conditions of the electricity interconnector licence, the electricity interconnector licences held by Nemo Link and NGIL and the electricity transmission licence held by NGET](#)

Appendices

Index

Appendix	Name of Appendix	Page Number
1	Regime summary for IFA2	29
2	Risk-related eligibility at the PCR	33

Appendix 1 – Regime summary for IFA2

In this appendix we provide a summary of the key cap and floor regime features as well as financial parameters that will apply to the IFA2 project.

We have not received any formal request for regime variations and so our default regime, as set out in our May and August 2014 cap and floor policy documents, applies to the IFA2 project.

The final regime design will be confirmed via changes to the IFA2 interconnector licence, following a statutory modification process.

Table 1: Key regime features

<p>Regime duration and start date</p>	<ul style="list-style-type: none"> • The regime duration is 25 years. • The regime start date for IFA2 will be the earlier of the following: <ul style="list-style-type: none"> ◦ the actual commissioning date ◦ 1 January 2021. • The cap level will come into effect automatically on the regime start date. • The floor level will come into effect following a successful completion of a proving period and will be retrospectively applied from the date when the successful proving period started. • Even where delays are outside the control of the developer, we will start the 25-year cap and floor period from the earlier of the actual commissioning date or 1 January 2021. This means that if delays push the operational date beyond the end of 2020, the length of the regime would be reduced by the length of the delay. • We will grant interest during construction (IDC) and additional incurred costs associated with delays if developers can demonstrate they were outside of their control and were efficiently incurred. Our final view on the application of IDC to the project’s spend will be confirmed at the PCR stage.
<p>Amount of project covered by the regime</p>	<ul style="list-style-type: none"> • The GB cap and floor regime broadly covers 50% of the project’s costs – with minor deviations set out below – and will cover 50% of the total revenues earned by the interconnector. • The detailed costs that inform our cap and floor levels are: 100% of NGIFA2’s development costs; 0% of RTE’s development costs; 50% of the total costs of cable, converters, site preparation (at both GB and France); 100% of GB-specific separate costs; and 0% of France-specific separate costs.

<p>Interconnector revenues</p>	<ul style="list-style-type: none"> • All sources of interconnector revenue, including from selling capacity, capacity market payments and provision of ancillary services will be taken into account for assessment against the cap and floor levels. • Receipts that substitute revenue will also be included, for example: <ul style="list-style-type: none"> ○ business interruption insurance ○ constraint payments. • Certain 'market related costs', defined as firmness, error accounting costs and trip contract costs, will be netted off revenues before comparison against the cap and floor levels (which gives the 'assessed revenue').
<p>Assessment period (assessing whether interconnector revenues are above the cap or below the floor)</p>	<ul style="list-style-type: none"> • Each assessment period is five years. This means that the interconnector's 'assessed revenue' will be compared to the cap and floor levels on a net present value (NPV) neutral basis, every five years. • Each five-year assessment period shall be considered in isolation, with no carry-overs between assessment periods. • Where the interconnector's revenue is below the floor or above the cap (on a cumulative basis) during an assessment period, the developer may request a 'within-period adjustment' on the grounds of: <ul style="list-style-type: none"> ○ financeability; or ○ pre-empting a material end of period adjustment. <p>Such a request can cover from year 1 up to year 4 of any five-year assessment period, but must reflect whole years only (not partial years).</p> <p>Ofgem cannot request a within-period adjustment (i.e. only the developer can trigger a within-period adjustment).</p> • Any within period adjustment will be subject to a true-up on a NPV neutral basis at the end of the relevant assessment period. • The discount rate applied for the NPV-neutrality calculations (the operational discount rate) will be the simple arithmetic average of the floor return and the cap return. For IFA2 this rate is set at 3.95%.
<p>Regulatory reporting</p>	<ul style="list-style-type: none"> • Developers will be required to report annually during the operational phase on revenues, availability and costs. • Developers will also be required to report during construction on construction progress and costs. • This reporting must be in line with the 'regulatory instructions and guidance' (RIGs) issued by Ofgem.

Cap and floor payments	<ul style="list-style-type: none"> • Cap and floor payments will be made between the developer and NGET as the system operator and will be recovered/distributed via the prevailing transmission charging arrangements.
------------------------	--

Table 2: Cap and floor levels

<i>Principles for setting the cap and floor levels</i>	
Building blocks approach	<ul style="list-style-type: none"> • The cap and the floor levels are built from building blocks of development costs, capital costs, operations and maintenance costs, decommissioning costs, tax and allowed return. • The cost related building blocks (capital costs, operations, maintenance and decommissioning) are confirmed at FPA and/or PCR stages, whereas the financial costs (allowed return and tax) are locked in at FID. • The cap and floor levels will be profiled so that they are flat over time in real terms.
Indexation of the cap and floor levels	<ul style="list-style-type: none"> • Cap and floor levels are indexed by RPI.
Currency	<ul style="list-style-type: none"> • Cap and floor levels are expressed in Pound Sterling.
Availability incentive	<ul style="list-style-type: none"> • The target availability level for IFA2 is 96.59% • The cap level will be adjusted annually by up to +/- 2% if interconnector availability exceeds or falls short of a target availability level. This means that availability above (or below) the target level will result in a one-for-one percentage increase (or decrease) in the cap level, up to +/- 2%. • Developers will lose automatic eligibility for floor payments for each individual year if availability is below 80% in that year. • Ofgem will retain the discretion to reinstate eligibility for floor payments if the outage that caused availability to fall below 80% was caused by an 'exceptional event' (e.g. force majeure).
<i>Financial parameters for IFA2</i>	
Returns at the floor	<ul style="list-style-type: none"> • The allowed return at the floor, applied to 100% of RAV, is -0.21% (real). • This is calculated using a 20-day trailing average of the GBP Non-Financial iBoxx index of bonds with 10+ years to maturity, with a credit rating of A/BBB.

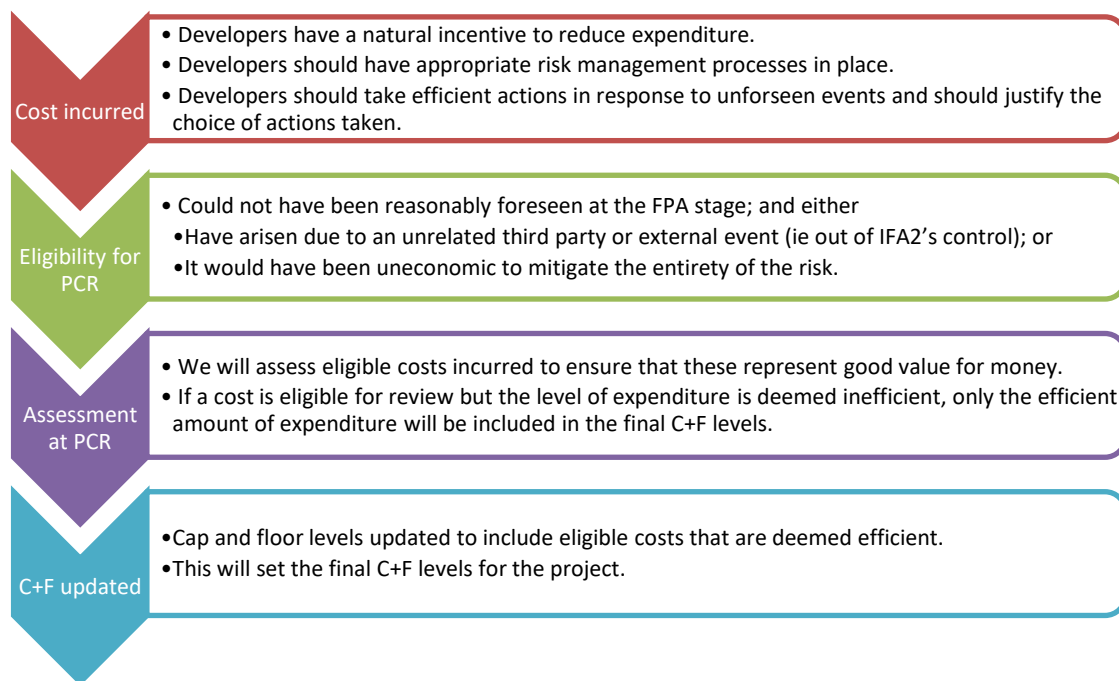
	Inflation will be based on 10-year breakeven inflation data published by the Bank of England.
Returns at the cap	<ul style="list-style-type: none"> • The allowed return at the cap is 8.10% (real). • This is calculated using capital asset pricing model (CAPM) and comprises the following elements: <ul style="list-style-type: none"> ○ Equity beta: 1.25 ○ Risk free rate: 1.6% ○ Total market returns: 7.20% ○ UK RPI adjustment: 0.4%
Interest during construction (IDC)	<ul style="list-style-type: none"> • The IDC rate for IFA2 is 6.75% (real). • This is calculated in line with our IDC methodology, using CAPM. The value comprises the following elements: <ul style="list-style-type: none"> ○ Cost of debt: -0.21% ○ Risk-free rate: 0.14% ○ Market risk premium: 6.66% ○ Equity beta (of a comparator group): 1.34²⁰ ○ Cost of equity: 9.07% ○ Pre-operational gearing: 40.61% ○ Development risk premium: 0.54% ○ Construction risk premium: 0.91%
Tax	<ul style="list-style-type: none"> • Corporation tax rate used for the purposes of calculating cap and floor values is 17%.
Transaction costs	<ul style="list-style-type: none"> • The financial transaction costs (in %) are calculated as a percentage of the opening RAV. The allowances are 2.5% for debt transaction costs and 5% for equity transaction costs. • The final allowance (in £) will reflect the final RAV at the PCR stage.

²⁰In our [May 2017 decision on IDC for OFTOs and interconnectors](#), to apply during 2017/18, we considered the merits of maintaining our comparator group (as set out in our [Nemo IDC consultation](#)) against the converse position. We considered that the former was preferable. This has led to the comparator group equity beta of 1.34 for IFA2.

Appendix 2 – Risk-related eligibility at the PCR

This appendix provides an overview of the principles we'll apply when considering risk-related expenditure at our PCR stage.

Risk-related expenditure is allowable within the PCR where the risk is foreseeable but it would have been uneconomic to mitigate the entirety of it. We present the risk eligibility review process in the diagram below.



Examples of risks

We recognise that interconnector projects are large, complex assets and that they often face unique construction risks on a case-by-case basis. This is why we have not sought to include a definitive list of risks that will or will not be eligible for assessment at the PCR stage. Not all projects will face the same risks, and some projects may encounter risk-related expenditure that neither the project developers nor we could have foreseen.

The section below lists some specific risks where we would expect related expenditure to be eligible, considered on case-by-case basis for eligibility or ineligible for assessment at the PCR stage. These lists are non-exhaustive and it will be the responsibility of project developers to demonstrate that risk-related expenditure meets our eligibility principles in the PCR submission.

Examples of risks that we would expect to be eligible for our PCR assessment:

- Weather conditions (cable) – harsh weather conditions offshore beyond statistical expectations for that time of year.
- Soil conditions are significantly different to those indicated by the survey,²¹ and therefore additional rock placement or ploughing/burial equipment is required.
- TSOs at either end change the connection arrangements or requirements, which leads to new design requirements and/or delays.
- Grid reinforcement works by TSOs are delayed.
- Weather conditions (converter) – site conditions mean that construction is delayed beyond what could have reasonably been expected. This can cover excessive wind, flooding, snow, avalanche etc.
- Unexploded ordnance not detected by adequate surveys result in additional costs.²¹
- Additional remediation costs due to changes in legislation.

Examples of risks that we would consider on a case-by-case basis for eligibility under the PCR assessment:

- Contractors or other related parties fail to deliver on their contracted expectations or obligations.
- Knock-on effects from contractor delivery of other major projects cause delays/additional costs.

²¹ Assuming that the initial survey was conducted in line with industry good practice and therefore should have been deemed reliable. We will not be taking a view on the quality of surveys and therefore the onus is on project developers to ensure these are appropriate. We would expect the developer to have negotiated suitable rates in advance such that they are not a distressed buyer of services.

For both of the above examples, to be considered for inclusion in the PCR, we would expect the following circumstances to apply:

- The additional incurred costs are in excess of contractual penalties.
- The developer had adequate risk monitoring processes in place and took timely action to mitigate incurred cost.
- It would have been uneconomic to insure against the scale of the contractor failure.

Examples of risks that we would expect to be ineligible for our PCR assessment:

- Performance of the project organisation leads to delays or additional costs.
- The cable or converter design is unsatisfactory, leading to additional costs or delays.
- Cable or converters are damaged during transport (unless this is due to third party actions or weather events beyond usual expectations).
- Cable laying vessels break down or are not available as scheduled.
- Cable is damaged during manufacturing.
- Cable damage during installation due to inappropriate practices/use of inappropriate equipment.

Our PCR assessment of eligible risk expenditure

We recognise that there is a strong incentive on developers to efficiently manage and minimise costs within the construction phase, and that this incentive extends to unexpected costs. However, we still think it is necessary to assess the costs incurred in dealing with unexpected events. This is to ensure that the costs have been efficiently incurred, and represent good value for consumers.

We will look to ensure that proper process was undertaken, that risk-related expenditure is well-documented, and that costs incurred were not excessive for that type of action.

In addition, our dialogue with project developers throughout the construction stage as part of our annual RIGs reporting process should provide developers with an opportunity to ensure that costs (including in relation to risk events) are updated regularly and that sufficient supporting evidence is provided to us. Whilst we will not

make any final decisions on cost variations (including risk-related expenditure) prior to the PCR stage, we expect developers to provide us with justification as the project progresses. If we notice large variances from the planned expenditure, we may ask for further evidence during this annual process. We would also ask for further evidence and justification if the PCR submission differs from the iterative updates received as part of the RIGs reporting process.