



CORNWALL INSIGHT

CREATING CLARITY

CMP344 Additional Workgroup Analysis

RWE Renewables UK

November 2024

Alex Asher, Steven Britton, Andrew Enzor,
Kate Mulvany & Rowan Hazell

Contents

| | |
|--|----|
| About Cornwall Insight..... | 3 |
| Authors | 4 |
| 1 Executive Summary | 5 |
| 1.1 Introduction | 5 |
| 1.2 Key findings | 5 |
| 2 Background..... | 7 |
| 2.1 Income Adjusting Events | 7 |
| 2.1.1 Overview | 7 |
| 2.1.2 Recovery of IAE costs | 8 |
| 2.2 Activity prior to this report | 8 |
| 2.3 Methodology | 8 |
| 3 Value and occurrence of IAEs | 10 |
| 3.1 IAE timeline | 10 |
| 3.2 Value of IAEs | 10 |
| 3.3 IAE information availability for CfD ARs..... | 11 |
| 3.3.1 AR2 (sealed bid window: August 2017) | 11 |
| 3.3.2 AR3 (sealed bid window: August 2019) | 11 |
| 3.3.3 AR4 (sealed bid window: May-June 2022)..... | 12 |
| 3.3.4 Summary across AR2 to AR4..... | 12 |
| 4 Calculation of revenue associated with risk premia | 13 |
| 4.1 Risk premia calculation | 13 |
| 4.2 Revenue quantification | 14 |
| 5 Comparison of IAE premia and Opex..... | 15 |
| 6 Potential windfall vs CMP344 benefit..... | 16 |

About Cornwall Insight

Getting to grips with the intricacies embedded in the energy market can be a daunting task. There is a wealth of information online to help you keep up to date with the latest developments, but finding what you are looking for and understanding the impact to your business can be tough. That's where Cornwall Insight can help, by providing independent and trusted expertise.

We offer a range of services to suit your business' needs, including:



Analysis

Our market insight reports cover the full breadth of the energy industry to help you keep pace in a fast moving and complex market. Our experts collate all the "must-know" developments and break-down complex topics, in a way that is easy to understand.



Consultancy

We provide a range of advisory, research and bespoke consulting services to support organisations through their business and financial planning, strategy development, investment due diligence, policy design, risk management and regulatory assessments.



Training

Cornwall Insight's training courses are delivered by industry experts and range from an introduction to the sector through to advanced-level learning. Our trainers make the courses fun and engaging by using practical examples and interactive tasks.

For more information about us and our services contact us on enquiries@cornwall-insight.com or contact us on 01603 604400.

Disclaimer

While Cornwall Insight considers the information and opinions given in this report and all other documentation are sound, all parties must rely upon their own skill and judgement when making use of it. Cornwall Insight will not assume any liability to anyone for any loss or damage arising out of the provision of this report howsoever caused.

The report makes use of information gathered from a variety of sources in the public domain and from confidential research that has not been subject to independent verification. No representation or warranty is given by Cornwall Insight as to the accuracy or completeness of the information contained in this report.

Cornwall Insight makes no warranties, whether express, implied, or statutory regarding or relating to the contents of this report and specifically disclaims all implied warranties, including, but not limited to, the implied warranties of merchantable quality and fitness for a particular purpose. Numbers may not add up due to rounding.

Authors



Rowan Hazell

Consultant

r.hazell@cornwall-insight.com



Steven Britton

Consultant

s.britton@cornwall-insight.com



Andrew Enzor

Managing Consultant

a.enzor@cornwall-insight.com

1 Executive Summary

1.1 Introduction

RWE Renewables UK Ltd (“RWE”) has commissioned Cornwall Insight (“we”, “us”, “our”) to provide additional analysis to support the final modification report for its CUSC modification proposal *CMP344 Clarification of Transmission Licensee Revenue Recovery and the Treatment of Revenue Adjustments in the Charging Methodology*. We previously provided supporting analysis for the [2nd Final Modification Report](#) in 2022, but Ofgem has now sent the modification back to the workgroup for development on specific points that require further work.

Modification CMP344 proposes that the additional revenue allowances for Offshore Transmission Owners (OFTOs) in relation to Income Adjusting Events (IAEs) should be recovered from all demand users. The current recovery approach is not clearly set out in the CUSC, but the current expectation is that those costs are ultimately recovered from the offshore generator directly affected by the IAE. All offshore wind operating under a Contract for Difference (CfD) is subject to the OFTO arrangements, and so the recovery of IAE costs impacts how generators bid into CfD allocation rounds (ARs) and ultimately the costs borne by consumers in the CfD levy.

In our 2022 analysis, we examined the risk premia that bidders would potentially include in future CfD bids to reflect the risk of being subject to IAE recovery. In this report, we instead analyse the likelihood and magnitude of risk premia having been included in historic CfD bids, to assess the potential that existing generators might make windfall gains if CMP344 were implemented.

1.2 Key findings

IAE claims have been rare, with only seven having been made to date over an effective 250+ collective years of OFTO operations across all offshore windfarms. Of these, four have been rejected, two approved, and one is pending.

We focused our analysis on AR2, AR3 and AR4. This is because no offshore wind cleared in AR5, and the recovery of IAE costs from the affected windfarm’s local circuit charges only became widely understood to be current practice after AR1.

We have attempted to isolate the likely risk premia a prudent generator may have included in its CfD bid in each AR. This analysis is not a perfect representation of the likely risk premia involved. Generators typically do not view each risk in isolation, and instead will consider the plethora of risks to which they are exposed when determining the risk premia required on their bid. We consider that isolating the risk premia associated with IAEs following our approach will give a reasonable order of magnitude for the likely uplift to CfD strike prices that resulted from generators being exposed to the risk of IAEs, but this is not an exact science and reflects a reasonable approximation rather than definitive statement on the level of risk premia included.

Central to our approach has been establishing what information on IAE cost and frequency was known to bidders in each AR at the time they were pricing their bids. For each AR, we evaluated how many IAE claims had been made, rejected or approved at the start of the sealed bid window, the average value of those claims, and the number of collective years OFTOs had been operating for at that time. This is summarised in Figure 1 below.

Figure 1: Summary IAE statistics for AR2 to AR4

| Round | IAE claims at start of sealed bid window | Year of OFTO operation | IAE claim frequency | Average IAE claim value (2011-12 prices) |
|-------|--|------------------------|---------------------|--|
| AR2 | 4 (one pending, three rejected) | 91 | 1 in 22.8 years | £8.90mn |
| AR3 | 4 (one pending, three rejected) | 132 | 1 in 33 years | £8.90mn |
| AR4 | 6 (two pending, four rejected) | 200 | 1 in 33.3 years | £9.20mn |

Source: Cornwall Insight

We then developed optimistic, central and pessimistic cases for each AR based on how a bidder of those mindsets might use this information. Combining these with the assumed lifespans, load factors and MW capacity of a windfarm in each AR (based on contemporary government data), we calculated assumed risk premia in £/MWh that reflected the cost and likelihood of an IAE occurring and affecting that bidder's asset. This is shown in Figure 2 below.

Figure 2: Calculated risk premia for ARs 2-4 (real 2011-12)

| Round | Optimistic | Central | Pessimistic |
|-------|------------|-----------|-------------|
| AR2 | £0.01/MWh | £0.02/MWh | £0.10/MWh |
| AR3 | £0.01/MWh | £0.01/MWh | £0.06/MWh |
| AR4 | £0.01/MWh | £0.02/MWh | £0.06/MWh |

Source: Cornwall Insight

We combined these risk premia with an estimate of the generation volume of each successful bidder over the remaining duration of the CfDs after an assumed CMP344 implementation date of 1 April 2025. This allowed us to calculate the additional revenue offshore wind generators may receive as a result of their inclusion of IAE risk premia, as shown in Figure 3.

Figure 3: Revenue associated with estimated IAE risk premia by AR (real 2023-24)

| Round | Optimistic | Central | Pessimistic |
|---|----------------|----------------|----------------|
| AR2 | £2.72mn | £5.45mn | £21.80mn |
| AR3 | £3.47mn | £6.95mn | £27.79mn |
| AR4 | £4.25mn | £8.50mn | £25.51mn |
| Total | £10.5mn | £20.9mn | £75.1mn |
| Total as percentage of revenue at CfD Strike Price | 0.02% | 0.04% | 0.16% |

Source: Cornwall Insight

In isolation, implementation of CMP344 would remove the exposure of generators to IAE risk, so these could be considered windfall gains for existing generators. However, this would be an oversimplification. The same could be said of a generator which included a risk premium in its CfD bid and did not go on to suffer an IAE, as is the case with most offshore generators to date. As noted above, IAE risk is one of many risks to which generators are exposed. This risk having not materialised does not, by default, represent a windfall gain to generators. Other risks will doubtless have been realised, which will eat into (or perhaps entirely use up) the

full risk premia included within a bid. Hence, we would caution these figures being represented as a true windfall gain to generators should CMP344 be implemented.

Associated revenues vary significantly between the different cases, with the total pessimistic values totalling £75mn. However, we consider this to assume bidders took a very conservative approach and it should be remembered that these values are spread over two decades across many generators with more than 12GW of capacity between them. When comparing these values to modelled total revenue of AR2-4 offshore wind generators under their respective strike prices, they represent 0.02-0.16% of total revenue.

We also note that even the largest potential windfall in £/MWh terms is heavily outweighed by the likely opex cost assumptions bidders will have had to make, to the extent that if OPEX costs outturn higher than forecast by 1%, this will more than cancel out the potential windfall that our most pessimistic IAE assumptions would produce.

Additionally, we have undertaken a high-level update of our 2022 analysis to estimate the savings CMP344 would provide in future auctions if all capacity to meet the government's 2030 offshore wind target comes forward in future ARs. We calculated these at £34mn for the optimistic scenario, £41mn for the central scenario, and £95mn in the pessimistic scenario in 2011-12 money, significantly outweighing the hypothetical windfall. The changes to our previous analysis reflect the additional IAE claims that have been made since then, and more materially that at the time of our analysis, the sealed bid window for AR6 has closed so the opportunity for reducing consumer costs which could have been achieved had CMP344 been implemented prior to AR6 has been missed.

2 Background

2.1 Income Adjusting Events

2.1.1 Overview

When a developer builds an offshore windfarm, under the current framework they also have the option to build the assets to connect to the transmission network, e.g. offshore and onshore substation platforms, subsea export and onshore cabling. Ofgem then holds a tender to competitively appoint an Offshore Transmission Owner (OFTO) to ultimately own and run these assets, instead of them simply passing to the local onshore Transmission Operator to operate. All offshore windfarms to date have used this "generator build" option.

OFTOs are awarded a licence under which they have an annual allowed revenue starting at asset transfer. This is used to determine a charge for the windfarm for flowing power over the OFTO's assets in exchange for running them, which is factored into each generator's Transmission Network Use of System (TNUoS) offshore local circuit tariff, set by National Grid Electricity System Operator (NGESO).

When an OFTO incurs certain costs beyond its control, it may be able to apply to Ofgem to approve an Income Adjusting Event (IAE). IAEs can be force majeure events, amendments to the System Operator Transmission Owner Code, or any other event approved as an IAE by Ofgem. If Ofgem approves an IAE request, it will grant an adjustment to the OFTO's allowed revenue reflecting the unforeseeable costs incurred.

Seven IAE claims have been submitted to Ofgem by OFTOs to date. Two of those have been approved by Ofgem, four rejected, and one is pending. The root cause of claims vary, but a recurring example is any issue with subsea cabling that was not – and could not have been – identified by previous inspections, and was therefore not reasonably foreseeable. In such cases, the IAE value reflects the associated repair costs.

2.1.2 Recovery of IAE costs

When an OFTO's allowed revenue is adjusted, the current process is for NGESO to make an increase to the offshore local circuit tariff for the relevant generator, adjusted from the start of the next transmission price control period. We are currently in RIIO-ET2, running from 1 April 2021 to 31 March 2026. Any IAEs approved between these dates will be passed through in the next period, RIIO-ET3, likely to run 1 April 2026 to 31 March 2031.

This current approach has been in place since July 2017, when NGESO published an [open letter](#) clarifying the topic. Prior to this point, it was understood by the industry that IAE costs would be recovered from demand consumers via wider TNUoS. Generators entering the CfD after this date will have considered the risk of IAE costs when determining their bid prices.

2.2 Activity prior to this report

[CMP344](#) *Clarification of Transmission Licensee Revenue Recovery and the Treatment of Revenue Adjustments in the Charging Methodology* is a proposed modification to the Connection & Use of System Code (CUSC) that was raised by RWE in May 2020. It argues that the CUSC is currently not clear on the process for recovering IAE costs and seeks to provide clarification and address a perceived disparity about who pays for the cost of IAEs.

The modification would amend the recovery of OFTO revenue adjustments for IAEs to be recovered in the long term from all demand users via TNUoS charges, whereas currently it is solely recovered through the offshore local circuit charges of the affected windfarm. The modification highlights how recovering IAE costs from a windfarm effectively imposes a “windfall loss” on it, as the windfarm is impacted by cable faults twice: first through lost generation revenue as a result of the outage, then through incurring additional network charges to cover the OFTO's repair costs.

CMP344 was developed by a workgroup and sent to Ofgem in January 2021 for a decision. The regulator [sent back](#) the modification to the workgroup in May 2021, seeking clarity on:

- Whether CMP344 would be better progressed under the Offshore Transmission Network Review
- Which costs it would apply to and how the legal text would be adjusted to reflect those
- Providing quantitative information about how the change would impact different network users

Cornwall Insight provided supporting analysis to RWE on the final point. The workgroup reconvened and work progressed until the modification was again sent to Ofgem in February 2023, but this led to a [second send back decision](#) in February 2024. Ofgem identified further concerns that it would like to see addressed, which included:

- The extent to which the onshore and offshore arrangements currently differ and would be better aligned by CMP344
- A clear explanation of the recovery process National Grid Electricity System Operator currently follows
- The possibility of windfall gains to generators who had priced IAE-related risk premia into their CfD bids, were that risk to be removed by CMP344

The final point is the focus of our analysis presented in this report.

2.3 Methodology

Our approach to this analysis was as follows:

- We reviewed the IAE applications to Ofgem and its decisions on them at the start of the sealed bid window to understand their frequency, what information AR bidders knew when, and to inform the potential additional TNUoS costs that would be incurred by generators under current arrangements

- We determined central, optimistic and pessimistic cases for what assumptions a generator might make about the likelihood of an IAE impacting their operation and the weight they would apply to claimed and approved IAEs. This was based on the total claims made to date, with three cases as follows:
 - For our central case, we have assumed a prudent generator would consider the number of claims to date which have either been approved by Ofgem or are awaiting Ofgem decision (weighting these as equal)
 - For example, if at the time there had been one IAE claim approved, one rejected, and one outstanding, the bidder would consider this to be 2 IAE occurrences
 - For the optimistic case, we have assumed a less risk-averse generator would still count approved IAE claims to date, but would weight claims awaiting Ofgem decision lower than this. Thus if an approved IAE equals one IAE occurring, an outstanding IAE claim would equal 0.5 IAEs occurring
 - For example, if at the time there had been one IAE claim approved, one rejected, and one outstanding, the bidder would consider this to be 1.5 IAE occurrences
 - For the pessimistic case, we have assumed a more risk-average generator would look at the total number of claims made regardless of outcome. In other words, every IAE claim made is counted as a whole IAE occurring
 - For example, if at the time there had been one IAE claim approved, one rejected, and one outstanding, the bidder would consider this to be 3 IAE occurrences
- For each case, we then determined an assumed claim frequency based on the aggregate length of OFTO operation across all offshore wind assets. For example, in the central case, if two claims had been approved or were awaiting decision at the time of the sealed bid window, and there had been an aggregate of 100 years of OFTO operation at that time, the assumed frequency is two in 100 years, or one every 50
- We therefore determine the likelihood of an IAE occurring based on that frequency over the lifetime of a typical asset in that AR. Continuing the example above, if typical lifetime for that AR was 20 years, the frequency of one every 50 years results in an assumed 40% likelihood of an IAE occurring to be costed into the CfD bid
- Across all scenarios, we use the average value of claims submitted prior to each AR to represent the magnitude of an IAE bidders in that AR assume
- We then modelled the impact of IAE TNUoS risk on CfD costs. This considered how much generator CfD bids (required strike prices) would change if they did not need to take into account the risk of additional TNUoS costs related to IAEs using the assumed likelihood and magnitude determined
- Based on the calculated risk premia under each scenario, we calculated an indicative view of the total revenue associated with the premia. This was based on the amount of successful capacity under each round and a modelled view of total output for the remainder of the contracts under each round, based on an implementation date of 1 April 2025.

3 Value and occurrence of IAEs

3.1 IAE timeline

We have identified seven Income Adjusting Event claims since the OFTO regime was implemented. Two IAEs have been approved since the original analysis was undertaken in 2022, both for Gwynt y Môr OFTO. These approvals took place either side of the AR5 sealed bid window.

Figure 4: Summary of IAE claims to date

| Windfarm | Outage date | Status | Decision date | Value (unadjusted) | Value (real 2023-24) ¹ |
|------------------------------|--------------------------------|----------|------------------------------|--------------------|-----------------------------------|
| London Array | RY 2014-15 | Rejected | October 2016 | £1.8mn claimed | £2.7mn |
| Gwynt y Môr | March 2015 | Rejected | May 2017 | £10.2mn claimed | £15.2mn |
| Thanet | February 2015 | Rejected | May 2017 | £11.7mn claimed | £17.4mn |
| Gwynt y Môr | September 2015 | Rejected | June 2020 | £14.2mn claimed | £21.15mn |
| Gwynt y Môr | October 2020 | Approved | July 2023 | £11.37mn awarded | £14.64mn |
| Gwynt y Môr | October 2020 ² | Approved | March 2024 | £15.55mn awarded | £16.95mn |
| Gwynt y Môr | October 2020 and December 2023 | Pending | N/A | £7.7mn claimed | £7.82mn |

Source: Various, compiled by Cornwall Insight

Five of the seven IAE claim examples available to draw upon are associated with the same windfarm, and that this is a potential limitation in our approach. However, we consider that Gwynt y Môr's experience still demonstrates the potential risk exposure for a windfarm, and that for two of the three ARs we will examine, Gwynt y Môr claims represent only 50% of the claims that had been made at the time.

3.2 Value of IAEs

IAE claims are made in money of the financial year in which the related costs were incurred. This is because, if approved, they result in a retrospective adjustment to the OFTO's allowed revenue for that year.

Our 2022 analysis used £10mn as the archetypal cost for an IAE based on the non-inflated average value of the claims that had been made to date. For our backwards-looking analysis, we have analysed the average cost of IAE claims made to date at the time when bidders would be calculating their bid prices for AR2, AR3 and AR4. Presenting these in the 2011-12 money used in the CfD scheme, these result in IAE claim values of:

- AR2 – £8.9mn (average of four claims; one pending, three rejected)
- AR3 – £8.9mn (average of four claims; one pending, three rejected)
- AR4 – £9.2mn (average of six claims; two pending, four rejected)

Importantly, this is the information that would be available to investors in generation assets for risk modelling purposes at the time of making their strike price bids. Note Gwynt y Môr's September 2015 claim was initially approved, then subsequently quashed, showing how finely balanced the risk is.

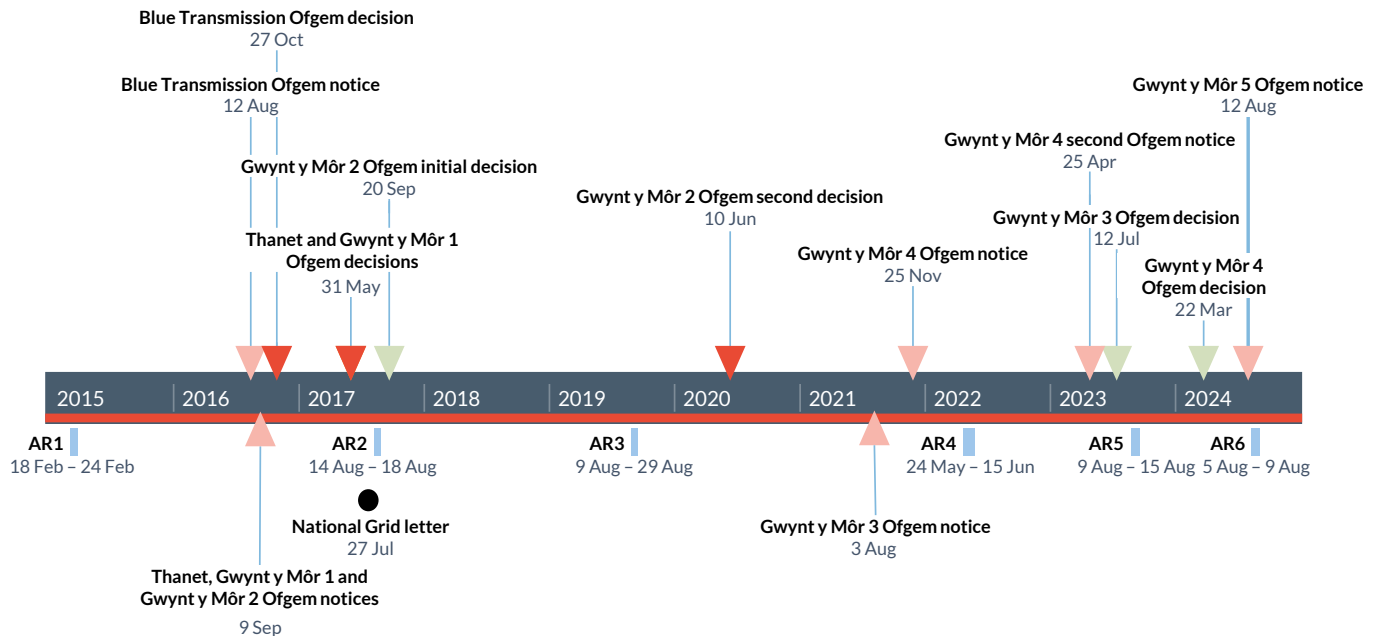
¹ Adjusted using RPI inflation as per OFTO framework

² Gwynt y Môr OFTO submitted multiple claims for the same incident due to repairs taking place over several phases

3.3 IAE information availability for CfD ARs

In order to evaluate the extent to which CfD bidders will have priced in IAE-related risk premia, we must first consider what information was available to them at different times. Figure 5 illustrates when the various IAE-related announcements and decisions occurred in relation to the various CfD AR bidding windows, which allows us to assess what information was available to bidders at the time.

Figure 5: Timeline of IAE-related announcements and CfD ARs



Source: Cornwall Insight

We note that NGESO published its letter clarifying that IAE costs would be recovered from the affected generator between AR1 and AR2. We have assumed that bidders will have had sufficient time to consider this and therefore would only have included an IAE risk premium from AR2 onwards. However, we acknowledge the possibility that not all bidders may have had sufficient time to factor the letter into their AR2 bid, in which case this may only have been present from AR3 onwards. Additionally, given that no offshore windfarms were successful in AR5, we have not conducted analysis of that round.

3.3.1 AR2 (sealed bid window: August 2017)

By the start of AR2, a total of four IAE claims had been made, with 2011-12 values of £1.7mn, £9.5mn, £13.4mn and £11mn. This averages £8.9mn. Three of these had been rejected, with only the second Gwynt y Môr still pending. There had been a collective 91 years of OFTO operation at this time. Based on this information available at the time, we make the following assumptions:

- A pessimistic bidder would see four IAEs claims have occur in 91 years, or one IAE per 22.8 years
- Our central assumption is based only on the one IAE which is awaiting decision, so occurring once every 91 years
- The optimistic case is de-rates the one claim awaiting decision by half, giving an assumed IAE risk of one per 182 years

3.3.2 AR3 (sealed bid window: August 2019)

During the period when bidders would be making pricing decisions for AR3, there had now been the same four IAE claims made as in the run-up to AR2. Three of these had been rejected, but a fourth had been previously

approved by Ofgem then quashed by the High Court in a [judgement](#) made in March 2019. While Ofgem would subsequently redetermine that the claim was not an IAE, this meant that as of AR3, one IAE claim was still pending and it had been demonstrated that IAEs more generally could receive approval.

These four claims had been made in 132 years of OFTO operations, or roughly one every 33 years of OFTO operation. The average value of the claims was still £8.9mn in 2011-12 money. Based on this information available at the time, we make the following assumptions:

- A pessimistic bidder would see four IAEs claims have occurred in 132 years, or one IAE per 33 years
- Our central assumption is based only on the one IAE which is awaiting decision after the original decision was quashed, so occurring once every 132 years
- The optimistic case de-rates the one claim awaiting decision by half, giving an assumed IAE risk of one every 264 years

3.3.3 AR4 (sealed bid window: May-June 2022)

By AR4, Ofgem had redetermined that the second Gwynt y Môr OFTO claim was not an IAE, but two further claims had been made by the same company and neither of those had yet been resolved. This meant that six IAE claims had been made in 200 years of OFTO operations, which is, again, roughly one every 33 years of OFTO operation. Four had been rejected, and two were still pending. The additional OFTO claims have slightly increased the average claim value to £9.2mn in 2011-12 prices.

Based on this information available at the time, we make the following assumptions:

- A pessimistic bidder would see six IAE claims have been made in 200 years of operation, so assume one IAE per 33.3 years
- Our central assumption is based only on the two IAEs which are awaiting decision, so occurring twice in 200 years or on in 100 years of operation
- The optimistic case de-rates the two claims awaiting decision by half, giving an assumed IAE risk of one every 200 years

3.3.4 Summary across AR2 to AR4

Figure 6 below summarises the data used for each AR and the assumed IAE frequency our methodology results in for the pessimistic, central and optimistic cases each time.

Figure 6: Summary IAE statistics for AR2 to AR4

| Round | IAE claims at start of sealed bid window | Years of OFTO operation | Average IAE claim value (2011-12 prices) | Pessimistic case claim frequency | Central claim frequency | Optimistic case claim frequency |
|-------|--|-------------------------|--|----------------------------------|---------------------------|---------------------------------|
| AR2 | 4 (one pending, three rejected) | 91 | £8.90mn | 4 in 91 years (1 in 22.8) | 1 in 91 years | Half in 91 years (1 in 45.5) |
| AR3 | 4 (one pending, three rejected) | 132 | £8.90mn | 4 in 132 years (1 in 33) | 1 in 132 years | Half in 132 years (1 in 66) |
| AR4 | 6 (two pending, four rejected) | 200 | £9.20mn | 6 in 200 years (1 in 33.3) | 2 in 200 years (1 in 100) | 1 in 200 years |

Source: Cornwall Insight

4 Calculation of revenue associated with risk premia

4.1 Risk premia calculation

The pragmatic bidder will consider the risk of additional TNUoS costs from IAEs when pricing a CfD bid. We have quantified that cost by calculating the potential risk premium that offshore wind generators might have included in their bids for AR2, AR3, and AR4.

In reality, different generators will have had different approaches to quantifying and reflecting such risks in CfD bids. IAE TNUoS risk is one of many risks faced by CfD generators, and generators will each have differing bidding strategies. To account for this, we have focused on the perceived cost of an IAE and the likelihood of an IAE occurring based on the information available at the time of bidding, as well as the expected lifetime generation output of an offshore windfarm to determine a £/MWh figure for that cost.

Using the information presented in section 3, we have estimated the IAE impact that a bidder might have assumed in each of the three ARs under our three scenarios. For each AR we have also chosen an assumed value of an IAE in 2011-12 money, based on the average value of IAE claims made by the time of that AR.

The additional factor that must be calculated is the number of lifetime generator running hours across which these costs must be defrayed when calculating a CfD bid. Because offshore wind turbine lifespans and average load factors have increased over time, we have reflected this by using the most contemporary information published by the government in its Electricity Generation Costs series, which it revises every few years.

For each auction, we have calculated an assumed size of asset based on the average size of the successful offshore windfarms in the AR. Parameters are shown below.

Figure 7: Calculation parameters for each AR (real 2011-12)

| Parameter | Description | AR2 | AR3 | AR4 |
|----------------------------|---|--|--|--|
| Assumed lifetime | Period of asset operation from government generation cost report data | 23 | 22 | 30 |
| Assumed load factor | Average load factor (net of availability) from government generation cost report data | 0.43 | 0.48 | 0.51 |
| Assumed commissioning year | Commissioning year from government generation cost report data | 2020 | 2020 | 2025 |
| Government data used | Generation cost report year for above information | <u>2016 data</u> for AR2 | <u>2016 data</u> for AR3 | <u>2020 data</u> |
| Assumed size (MW) | Average size of successful offshore windfarm per auction | 1,053.7 | 1,090.8 | 1,057.8 |
| IAE claim every X years | Cumulative number of windfarm operation years per IAE claim at time of bidding window under each scenario | Optimistic: 182 Central: 91 Pessimistic: 22.75 | Optimistic: 264 Central: 132 Pessimistic: 33 | Optimistic: 200 Central: 100 Pessimistic: 33.3 |

| Parameter | Description | AR2 | AR3 | AR4 |
|---------------------------|--|--|--|--|
| IAEs over lifetime | Number of IAEs over assumed lifetime of windfarm at time of bidding window under each scenario | Optimistic: 0.126 Central: 0.253 Pessimistic: 1.01 | Optimistic: 0.092 Central: 0.167 Pessimistic: 0.67 | Optimistic: 0.15 Central: 0.3 Pessimistic: 0.9 |
| Assumed IAE Value | Average claim value at time of bidding window (2011-12 money) | £8.9mn | £8.9mn | £9.2mn |

Source: Cornwall Insight

Based on these inputs, we calculated the average expected lifetime generation output under each Allocation Round, and the expected cost of IAEs over the lifetime of each asset. These figures were then used to calculate risk premia values for each round under the scenarios, with the results down in Figure 8.

Figure 8: Calculated risk premia for ARs 2-4 (real 2011-12)

| Round | Optimistic | Central | Pessimistic |
|------------|------------|-----------|-------------|
| AR2 | £0.01/MWh | £0.02/MWh | £0.10/MWh |
| AR3 | £0.01/MWh | £0.01/MWh | £0.06/MWh |
| AR4 | £0.01/MWh | £0.02/MWh | £0.06/MWh |

Source: Cornwall Insight

4.2 Revenue quantification

While the exact bidding behaviour of successful generators is unknown, an indicative view of revenue associated with IAE risk can be provided by applying the calculated risk premia to an aggregated view of the outputs of the successful offshore wind farms under each auction.

We modelled total offshore windfarm output for the remainder of the contracts after a hypothetical CMP344 implementation on 1 April 2025. This is based on the latest capacity figures and contract start dates published on the CfD register, and assumed load factors at the time of the auction as published by the government. Using the calculated risk premia values, we then calculated the revenue over the remainder of the contracts that could be considered a windfall.

As shown in Figure 9, revenues range from ~£10.5mn under the optimistic scenario to ~£75mn under the pessimistic scenario. It should be remembered that these values are spread over two decades across many generators with more than 12GW of capacity between them, and when comparing these values to modelled total CfD revenue of AR2-4 offshore wind generators, they represent 0.02-0.17% of total revenue, as shown in Figure 10.

Figure 9: Revenue associated with estimated IAE risk premia by AR (real 2023-24)

| Round | Optimistic | Central | Pessimistic |
|--------------|----------------|----------------|----------------|
| AR2 | £2.72mn | £5.45mn | £21.80mn |
| AR3 | £3.47mn | £6.95mn | £27.79mn |
| AR4 | £4.25mn | £8.50mn | £25.51mn |
| Total | £10.5mn | £20.9mn | £75.1mn |

Source: Cornwall Insight

It should be stressed that these are indicative figures only, and revenues allocated to individual windfarms will be dependent on the individual bidding behaviour for each asset. Crucially, in a “pay as clear” auction, the actual revenue achieved by each asset is entirely determined by the behaviour of the bidder which clears the auction. Additionally, other factors that would have been accounted for under CfD bids such as opex, capex, and load factors are not likely to have materialised as expected at the time of bidding, and so the “real” windfall and associated financial benefit may be outweighed by other factors. An assessment of the calculated risk premia compared to changes to opex costs is presented in section 5.

Figure 10: Maximum potential windfall as percentage of indicative total revenue over course of offshore wind CfD contracts

| Round | Optimistic | Central | Pessimistic |
|--------------------------|------------|---------|-------------|
| AR2 | 0.02% | 0.04% | 0.17% |
| AR3 | 0.02% | 0.04% | 0.15% |
| AR4 | 0.03% | 0.05% | 0.16% |
| ARs 2-4 weighted average | 0.02% | 0.04% | 0.16% |

Source: Cornwall Insight

5 Comparison of IAE premia and Opex

We have assessed the extent to which offshore windfarm opex assumptions are likely to have changed over the course of the various ARs. This provides a comparator for the significance of the IAE risk premia and the extent to which a potential windfall arising from CMP344 might be outweighed by the general difference between assumed and actual opex costs.

Figure 11 shows the assumed lifetime £/MWh opex cost for an offshore windfarm in each AR, using the same contemporaneously available government data as used in our IAE analysis, converted to 2011-12 money. This is then compared to the most pessimistic risk premia we have estimated for IAEs.

Figure 11: Government opex assumption vs calculated IAE risk premia (real 2011-12)

| Round | Assumed lifetime opex | Pessimistic risk premium | Difference multiplier |
|-------|-----------------------|--------------------------|-----------------------|
| AR2 | £33.25 | £0.10 | 13,695 |
| AR3 | £23.48 | £0.06 | 27,172 |
| AR4 | £23.63 | £0.06 | 20,790 |

Source: Cornwall Insight

The result is that the calculated most pessimistic IAE risk premium is equal to approximately 0.005% of the assumed opex cost (a 20,000-fold difference). In other words, a bidder underestimating their opex costs by 1% will greatly outweigh the potential windfall that the most pessimistic IAE assumption produces if CMP344 is approved. This differential only increases in the central and optimistic assumptions, emphasising how low the potential windfall is relative to other CfD bid elements.

6 Potential windfall vs CMP344 benefit

We have also compared the potential windfall with the future savings anticipated from the implementation of CMP344 by removing the IAE risk premia from future CfD rounds. This latter topic was the focus of our 2022 analysis in support of CMP344, but with different scenario parameters due to the different frequency of IAE claims at the time. We therefore adjusted the results of that analysis to more directly compare to the scenarios of this latest study to provide indicative figures for the savings CMP344 could reflect in future auctions. Note that this analysis was done at a high level using average figures and is intended to be illustrative. The parameters are shown in Figure 12 below.

Figure 12: Parameters for revised future-looking analysis for AR7 onwards

| | Optimistic | Central | Pessimistic |
|---|------------|------------|-------------|
| IAE claim every X years | 104 | 87 | 37 |
| Assumed IAE cost (real 2011-12) | £10mn | | |
| Assumed load factor from DESNZ data | 0.61 | | |
| AR7+ risk premia (real 2011-12) | £0.014/MWh | £0.016/MWh | £0.038/MWh |

Source: Cornwall Insight

The UK government has a target of achieving 55GW of offshore wind capacity by 2030, although recent media reports have suggested that it is considering reverting to the previous target of 50GW. Using 50GW as a conservative figure, the country requires in the region of 31GW of additional capacity. Assuming that CfD ARs will continue until this 31GW is supported (albeit perhaps not installed in time for 2030), our future-looking analysis suggests that CMP344 could save between £34mn (optimistic scenario) and £95mn (pessimistic scenario) by eliminating the IAE risk premia over these projects' lifetimes. This heavily outweighs the potential windfall to existing generators from CMP344 implementation, as shown in Figure 13.

Figure 13: Indicative benefits from CMP344 implementation vs potential windfall (real 2011-12)

| | Optimistic | Central | Pessimistic |
|---|------------|---------|-------------|
| CMP344 saving for 31GW future capacity | £34mn | £40.8mn | £95.3mn |
| Potential windfall for current CfD generators | £10.5mn | £20.9mn | £75.1mn |
| Difference | £23.5mn | £19.9mn | £20.2mn |

Source: Cornwall Insight



CORNWALL INSIGHT

CREATING CLARITY

**Cornwall Insight
The Atrium
Merchant's Court, St George's Street
Norwich, NR3 1AB**

T: 01603 604400

E: enquiries@cornwall-insight.com

cornwall-insight.com

