

Office of Gas and Electricity Markets (Ofgem)
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United Kingdom

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RESPONSE TO OFGEM'S CONSULTATION ON THE INTERCONNECTOR POLICY REVIEW: WORKING PAPER 2 – SOCIO-ECONOMIC MODELLING

Introduction

AQUIND Interconnector welcomes the opportunity to provide feedback on the socio-economic modelling that has been undertaken in support of Workstream 2 of the interconnector policy review.¹

AQUIND Interconnector is a proposed high voltage direct current (“HVDC”) interconnector between Great Britain (“GB”) and France that will improve electricity transmission connection between the two markets. The subsea cable will connect the South Coast of England with Normandy and provide 2,000 megawatts (“MW”) of additional capacity.² The project is expected to make energy markets more efficient, improve security of supply, help meet decarbonisation targets and ensure greater reliability and affordability for consumers.

Summary

We welcome the opportunity to provide feedback on the socio-economic modelling that has been undertaken by AFRY in support of Workstream 2 of Ofgem's interconnector policy review.

We agree that there is clearly a strong case for further GB interconnection going forward to help meet national decarbonisation targets, and a need for a regulatory regime to incentivise future investment. We have provided feedback on proposed changes to the regulatory design of the Cap and Floor (“C&F”) regime and assessment framework in our response to Ofgem's consultation on Working Paper 1 of the interconnector policy review.

However, we consider that the approach adopted to the socio-economic modelling conducted by AFRY is fundamentally flawed. This is for two main reasons:

- ▶ **First, the socio-economic modelling starts from an initial baseline that is unrealistic as it includes all interconnection projects that are currently operational, under construction or under development with regulatory approval and assumes that all these**

¹ <https://www.ofgem.gov.uk/publications/interconnector-policy-review-working-paper-workstream-2-socio-economic-modelling>

² <http://aquind.co.uk/>

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projects (that is, a total of 15.9 GW of interconnection capacity) will become operational by 2025. However, it is recognised that several projects with regulatory approval do not have a clear route to becoming operational, and some projects that are assumed to be operational by 2025 are still at the planning stage. Ofgem recognises that these baseline assumptions will inherently undervalue the likely benefits of future interconnection to the detriment of GB consumers.³

- ▶ **Second, the modelling adopts an iterative approach to determine which interconnector projects might achieve an internal rate of return (“IRR”) of 7% before considering their socio-economic benefits.** However, the fundamental principle of the C&F regime is that developers use their insight and judgement to assess the potential return of a project and compare this against any potential risks to assess its commerciality. It is then Ofgem’s role to assess whether commercially viable projects (as identified by developers) should be awarded a C&F regime, based on socio-economic analysis that considers the benefits to society. By setting a minimum IRR for future interconnector projects, the socio-economic analysis risks filtering out potentially viable and socio-economically beneficial projects based on unsupported assumptions about how commercial developers operate and assess risk, and the future evolution of the market. This is a fundamentally flawed approach.

We also have significant concerns regarding the results of the AFRY report, which suggests that new GB interconnection capacity would not be beneficial to GB consumers and, in many cases, to GB as a whole. This finding is unprecedented in the context of the body of work that has been undertaken in recent years to assess the benefits of new GB interconnection and, indeed, our own analysis. We therefore disagree that the AFRY report is a sound basis for determining future GB interconnector policy. We strongly encourage Ofgem to reconsider the assumptions that drive the results of the analysis and its reliance on the findings of the report.

In the remainder of this response, we set out our detailed concerns regarding the approach, scenarios, assumptions, and findings of the socio-economic modelling conducted by AFRY. We enclose a number of further documents as appendices to our response. These include expert opinions on the AFRY study and copies of socio-economic analysis undertaken by AQUIND.

For any questions regarding our response please do not hesitate to contact me at kirill.glukhovskoy@aquind.co.uk.

Yours faithfully,

Kirill Glukhovskoy
Managing Director

³ Ofgem recognises that the “*adjustments*” made in the AFRY modelling “*have a negative bearing on the modelling results*”. See: Working Paper 2, paragraph 2.31 (second bullet).

Response to specific consultation questions

Section 2

Question 1: Do you agree with the approach we have taken to workstream 2?

No, we do not agree with Ofgem’s approach to workstream 2.

We recognise the need for Ofgem to assess, in-house, the socio-economic benefits of proposed interconnector projects when considering whether to grant a specific project access to the C&F regime. This clearly helps to protect GB consumers from the risk of underwriting projects that are unlikely to be socially beneficial.

However, we have significant concerns about using such socio-economic analysis to assess, *a priori*, whether Ofgem should accept further applications from project developers for C&F support. This is because the degree of reliance on the outcomes of such socio-economic modelling and the significance of decisions made on its basis will far outweigh the actual reliability of the analytical tools that can be used for such a high-level analysis.

A key underlying principle of competition in the provision of interconnection is that it incentivises project developers to identify the best opportunities for interconnection. Centrally conducted modelling that identifies the need for new capacity and implies where it should be located goes against this principle in a fundamental way. It also risks setting an unhelpful precedent or understanding regarding the location, size, cost, and profitability of different projects based on incomplete information.⁴

There is clearly a strong case for further GB interconnection going forward to help meet national decarbonisation targets. Specifically, the 2020 Network Options Assessment (“**NOA**”) by National Grid Electricity System Operator (“**NG ESO**”) found that additional interconnection capacity of 18-23 GW between GB and European markets “*would provide the maximum benefit for GB consumers*”.⁵ ⁶ The recent Energy White Paper published by the UK Government subsequently set a specific target for “*at least 18GW of interconnector capacity by 2030*”.⁷ The latest 2021 NOA from NG ESO found that up to 28 GW of interconnection capacity may now be required going forward to deliver the UK Government’s decarbonisation policies.⁸

⁴ Ofgem suggests in its Working Paper 2 consultation document that the AFRY report does not “*provide Ofgem’s view of an optimal level of interconnection*” or “*indicate the suitability of any real or notional project for a possible future regulatory regime*”. However, the entire modelling exercise is misleading, and the assumptions made in the AFRY modelling may, in fact, set a precedent for how stakeholders perceive the value and societal contribution of potential future interconnector projects.

⁵ National Grid ESO, Network Options Assessment, January 2020 ([link](#)).

⁶ The 2020 Ten-Year Development Plan (“**TYNDP**”) published by the European Network of Transmission System Operators for Electricity (“**ENTSO-E**”) also found that delivering decarbonisation targets set in the Paris Agreement would require 18-20 GW of interconnection capacity between GB and mainland by 2030. See: ENTSO-E, TYNDP Datafile, ‘Distributed Energy’ and ‘Global Ambition’ Scenarios ([link](#)).

⁷ BEIS (2020), Energy White Paper: Powering our Net Zero Future ([link](#)).

⁸ National Grid ESO, Network Options Assessment, January 2021 ([link](#)).

Overall, we believe very strongly that socio-economic modelling would be a more appropriate step in the process of evaluating individual interconnector projects that apply for access to the C&F regime. When conducting this kind of socio-economic analysis, it is important to ensure that input scenarios and modelling assumptions are determined and communicated in a transparent way and that the findings are clear and replicable. In this respect, we have significant concerns regarding the scenarios and assumptions that AFRY adopted in its analysis, as set out in our response to Questions 2-4 below. We also believe that the modelling tool used by AFRY, BID3, is not suitable for evaluating the investment decision in respect of a specific project, as it is designed for the purposes of large-scale system optimisation and makes a number of simplified assumptions that are not appropriate in this context.

Furthermore, as we have explained to Ofgem in response to earlier stakeholder engagement, we are concerned that the approach to this workstream and the socio-economic modelling adopted by Ofgem and AFRY has not been to conduct a socio-economic assessment of potential future interconnectors, as communicated to stakeholders originally. Indeed, the modelling approach adopted by AFRY first considers network costs, then return to investors, and only then does it assess the socio-economic welfare of a limited number of projects that pass the earlier hurdle criteria.⁹ Several critical assumptions and methods used by AFRY are unclear and the overall modelling approach lacks transparency. As we explain in our response to Questions 2-4 below, this leads to prejudicial results that inherently undervalue the likely benefits of those projects that intend to apply to the C&F regime in the future, to the detriment of GB consumers.

Finally, we are concerned that undertaking socio-economic modelling at this stage will result in duplication and significant delays to the actual application of the C&F regime to projects that are already underway, which will deny GB consumers of substantial socio-economic benefits in the form of reduced electricity prices, greater security of supply, and more sustainable energy mix. We therefore encourage Ofgem to create routes for new projects to apply for C&F support without further delay.

Question 2: What are your views on the scenarios, assumptions and methodology that AFRY has used to model notional future interconnectors and the impact of cross-border interconnector flows?

As set out in our response to Question 1 above, we have significant concerns regarding the modelling approach and assumptions that AFRY adopted in its socio-economic analysis. We also have significant concerns regarding the findings of the AFRY report, which understates the socio-economic benefits of future interconnection in a significant way and concludes that future interconnectors will not be to the benefit of consumers. These findings are unprecedented in the context of the body of work that has been undertaken in recent years to assess the benefits of new GB interconnection.

We set out our detailed concerns regarding the modelling approach, specific assumptions, and findings of AFRY's socio-economic modelling in turn below.

⁹ See, for example, AFRY report, Section 2.1.

Baseline

Contrary to AFRY’s claims, the interconnector baseline for the socio-economic analysis undertaken by AFRY is not realistic or consistent with the Future Energy Scenarios (“FES”) published by National Grid (“NG”). This is because the socio-economic analysis begins from an initial baseline that includes all interconnection projects that are currently operational, under construction or under development with regulatory approval. In our view, it would be reasonable and logical to consider at least one sensitivity where some of these projects do not become operational, given that several projects with regulatory approval do not have a clear route to becoming operational, while some projects that are assumed to be operational by 2025 are still at the planning stage. We have shared a more detailed analysis of this issue with Ofgem as part of earlier stakeholder engagement. Critically, we note that these baseline assumptions will inherently undervalue the likely benefits of future interconnection to the detriment of GB consumers.¹⁰

As we set out in our response to Ofgem’s consultation on Working Paper 1, we consider that this review presents an opportunity for Ofgem to review its approach for considering projects that were previously awarded the C&F regime, but which have failed to make substantial progress towards completion and are obviously delayed past 2025. We recommend that Ofgem develops a more realistic and up-to-date view of the level of interconnection capacity that is likely to materialise going forward (that does not simply equal the sum of the projects that have been granted the C&F regime) and use this view as a new baseline against which to assess the benefits of future interconnection.¹¹ Doing otherwise would risk undervaluing the likely benefits of new interconnection projects to the detriment of GB consumers.

As we have explained previously, we consider that this would be consistent with the existing provisions of the C&F regime. In the past, Ofgem set 3-year deadlines for submitting Final Project Assessment (“FPA”) applications for projects that had been granted Initial Project Assessment (“IPA”) decisions. After this time, projects could be re-assessed to ensure that they still remain in consumers best interests.¹² Given these limits, it would seem reasonable and logical and fair for Ofgem to re-assess all projects that were awarded the C&F regime in previous windows and that are yet to begin construction – and, indeed, to develop a more realistic and up-to date view of the baseline level of interconnection going forward.

“Overall system cost minimisation”

As we have explained to Ofgem in the past, we have significant concerns regarding the way in which 1.4-8.8 GW of additional notional interconnection capacity has been added to the initial baseline to maintain “*internal consistency of scenarios*” in “*subsequent modelling years*”. Specifically, it is unclear

¹⁰ Ofgem recognises that the “*adjustments*” made in the AFRY modelling “*have a negative bearing on the modelling results*”. See: Working Paper 2, paragraphs 2.31 (second bullet).

¹¹ For example, Ofgem could consider projects that are not on track to obtain an FID from its baseline.

¹² See, for example: Ofgem, 21 July 2015, Decision on the Initial Project Assessment of the FAB Link, IFA2 and Viking Ling Interconnectors ([link](#)); Ofgem, 19 June 2017, Cap and floor regime: An update on “Window 1” interconnector project ([link](#)); Ofgem, Cap and floor regime: An update on the timing of the Final Project Assessment (FPA) for “Window1” Interconnector projects ([link](#)); Ofgem, 09 January 2018, Decision on the Initial Project Assessment of the GridLink, NeuConnect and NorthConnect Interconnectors ([link](#)).

to us how much capacity has been added to different borders, and the specific basis for doing so. Neither Ofgem nor AFRY explains the reasoning for these adjustments in clear terms. The consultation document and AFRY report simply refer to “*overall system cost minimisation*” without explaining what this means or entails.¹³

We do not agree that setting a baseline level of interconnection that will serve as the basis for considering potential future interconnection should be on the basis of “*overall system cost minimisation*”. In any case, the use of this type of adjustments should be accompanied by a clear and transparent discussion of the underlying methodologies and assumptions.¹⁴

We note that, as a result of these adjustments, baseline level of interconnection assumed by AFRY is inconsistent with that assumed in FES. Specifically, the AFRY baseline anticipates the addition of interconnection on different borders at different times as compared to FES. The AFRY report confirms that the baseline level of capacity in the AFRY analysis deviates from that in National Grid’s FES, due to the inclusion of this extra capacity.¹⁵

We have shared a more detailed analysis of this issue with Ofgem as part of earlier stakeholder engagement. Critically, we note that these adjustments will inherently undervalue the likely benefits of future interconnection to the detriment of GB consumers.

Internal rate of return (IRR)

AFRY’s modelling adopts an iterative approach to determine which interconnector projects might achieve an internal rate of return (IRR) of 7%. We have significant concerns regarding the way in which this “IRR test” is used in the socio-economic analysis to identify potential future interconnection capacity to add to the baseline.

Ofgem explains that the IRR is simply a “*high-level proxy of commercial attractiveness*”.¹⁶ However, the fundamental principle of the C&F regime is that developers use their insight and judgement to assess the potential return of a project and compare this against any potential risks to assess its commerciality. It is then Ofgem’s role to assess whether commercially viable projects (as identified by developers) should be awarded a C&F regime, based on a socio-economic analysis that considers the benefits to GB consumers and to society. By setting a minimum IRR for future interconnector projects, AFRY’s socio-economic analysis risks filtering out potentially viable and socio-economically beneficial projects based on unsupported assumptions about how commercial developers operate and assess risk, and the future evolution of the market. This is a fundamentally flawed approach.

We also have significant concerns regarding the information that has been used to set this metric and how it has been applied to projects linking different markets, facing unique costs, and seeking a differentiated level of return on risk. Specifically, it is unclear how AFRY has calculated the cost

¹³ Working Paper 2, paragraphs 2.18 and 2.31 (second bullet). See also AFRY report, paragraph A.4.

¹⁴ We understand that it may not be possible to publish proprietary models. However, this should not prevent methodologies and assumptions from being clearly presented.

¹⁵ AFRY report, paragraph B.4.

¹⁶ Working Paper 2, paragraph 2.13.

component of the IRR. It also appears that such standardised, but undisclosed, assumptions were applied uniformly across all borders.¹⁷

Furthermore, IRR as a financial metric tends to favour projects with shorter construction periods (even if the benefits of such projects are relatively lower) and penalise projects with longer construction periods (even if such projects are relatively more beneficial). In finance, IRR is typically used alongside the net present value (“NPV”) assessment, which in our view is more robust and objective. In the context of the AFRY report, the socio-economic welfare analysis should ultimately play a role of the NPV analysis. However, AFRY used the IRR test to pre-select projects for the NPV analysis. In terms of corporate finance, this type of approach is likely to lead to incorrect capital budgeting decisions.

Furthermore, IRR is also very sensitive to assumptions used for its calculation. As we explain further below, the AFRY analysis did not consider interconnector revenue earned through participation in capacity markets or through the provision of ancillary services. It is also not clear whether this IRR threshold was set on the post-tax or pre-tax basis, using nominal or real (net of inflation) returns, and which type of financing, leverage and cost of debt were assumed. It is therefore, by AFRY’s own admission, incomplete. We enclose as **Appendix 1A** and **Appendix 1B** two expert opinions prepared by Dr van der Weijde of the University of Edinburgh, which provide further comments regarding the use of IRR for in the context of the AFRY report.

We also provide an independent expert opinion from Mr de Nooij as **Appendix 2**. This demonstrates that the IRR approach is inconsistent with UK Government guidelines for assessing capital projects, as set out in HM Treasury’s Green Book.¹⁸

Finally, the AFRY Report finds that IRR threshold is met by projects with low utilisation rates.¹⁹ This seems to be fundamentally inconsistent with the idea of identifying the most economically viable projects.

Overall, as well as starting from a proper baseline, a better approach, in our view, would be to undertake an iterative analysis that would identify notional interconnectors on the basis of maximising socio-economic welfare (rather than on the basis of whether earned congestion rents provide a certain return to investors). Under this approach, new notional interconnector projects would continue to be identified until the marginal socio-economic costs of a notional project are greater than its marginal socioeconomic benefits. This approach would seem to be more in line with Ofgem’s statutory duty.

Indeed, once projects have been filtered on basis of a socio-economic assessment, then developers, under the developer led approach, would consider whether, in their view the commercial attractiveness of a project justifies making the necessary investments to apply for the C&F regime.

We enclose as **Appendix 3** to this response an expert opinion from Mr Perkins, which provides a further assessment of AFRY’s baseline level of interconnection and use of the “*overall system cost minimisation*” criterion and IRR threshold.

¹⁷ See Working Paper 2, paragraph 2.21, the AFRY report, p. 28.

¹⁸ See **Appendix 2** (Expert Opinion of Mr de Nooij, 16 July 2021).

¹⁹ AFRY report, Exhibit 4.2 and p. 32.

Scenarios

As we have explained to Ofgem in the past, we have significant concerns regarding the design and application of the AFRY scenarios, particularly the way in which public datasets (FES and TYNDP) have been combined in the AFRY analysis and the way in which the Net Zero scenario was developed and implemented. We firmly believe that, as a result, the benefits of future interconnection for GB consumers are significantly underestimated in the AFRY study.

Specifically, it is unclear to us how AFRY combined information from FES and TYNDP, and what “adjustments” were made to “ensure internal scenario consistency”. These are, in many cases, not explained and, in some cases, not justified.²⁰ (By way of example, in the AFRY scenarios, the use of biomass carbon capture and storage (“CCS”) technology was replaced with Gas CCS, despite Biomass CCS being a key component of long-term UK policy as set out in the Energy White Paper.²¹ This has likely led to a negative impact on the future value of interconnectors.²²

Given the lack of transparency around these adjustments, it is impossible to assess whether the AFRY scenarios are indeed “plausible” (or even true to FES and TYNDP) and to ensure that the findings of the study are not unduly impacted by such “adjustments”.

Furthermore, while it is clear that any socio-economic analysis conducted at this stage should be based on scenarios that are consistent with Net Zero decarbonisation targets across Europe.²³ We have significant concerns regarding the way in which AFRY’s Net Zero scenario has been designed and implemented. Specifically:

- ▶ In our view, the Net Zero scenario (or a high case) should have been based on the “Leading the Way” scenario in FES2020.
- ▶ AFRY’s Net Zero scenario is not consistent with AFRY’s High/Low scenarios. Rather, AFRY’s High/Low scenarios relate to a base case that was developed as part of a separate study and is not considered fully in AFRY’s current report.
- ▶ There are systematic differences between AFRY’s Net Zero and High/Low scenarios. For example, the AFRY High/Low scenarios appear to systematically understate the development of solar and offshore wind capacity in France relative to the Net Zero scenario. This is not consistent with robust scenario development.

Socio-economic analysis

We have several concerns regarding the way in which AFRY has undertaken its socio-economic modelling, having determined its input parameters.

²⁰ Working Paper 2, paragraph 2.8.

²¹ The AFRY Report, Exhibit 3.1.

²² See **Appendix 1A/1B** for further information.

²³ Indeed, our own socio-economic analysis has been based on scenarios that are consistent with meeting Net Zero decarbonisation targets since 2020. See, for example, **Appendix 4**.

Specifically, it is unclear whether AFRY has confirmed that generating plants earn sufficient revenue to be economic in its analysis.²⁴ There are two significant risks that need to be considered in this respect:

- ▶ First, that the wholesale prices calculated as part of AFRY’s modelling might be systematically understated relative to the prices that would actually prevail in the market in practice, particularly at times of system peak. This would inherently undervalue interconnection.
- ▶ Second, AFRY does not consider the effect of subsidy schemes such as Contracts for Difference (“CFDs”) that have been designed and implemented to support the roll-out of offshore wind generation in GB. Under the CFD regime, consumers pay a fixed price for electricity to suppliers who have a CFD in place irrespective of the prevailing wholesale electricity price.²⁵ Therefore, an increase in wholesale prices from greater levels of interconnection would not impact the price paid by consumers for generators with CFDs. Given the presence of such subsidy schemes, an increase in wholesale prices due to a greater level of interconnection would be neutral to GB consumers and not negative – as the wholesale price would be offset by a corresponding change in the CFD price. (The same is true of decreases in prices, of course).

In this regard, we would like to further direct you to the independent expert opinion by Mr de Nooij in **Appendix 2**.

Additional revenue sources

The socio-economic modelling undertaken by AFRY omits a major source of revenue for interconnectors that will derive from the GB capacity market (“CM”). However, the EU-UK Trade and Cooperation Agreement (“TCA”) indicated that existing capacity market arrangements will remain in place going forward.²⁶

We are aware that there is consideration at the European level of changes to the way in which interconnectors participate in CMs in Europe. Such a model would seek to allow generators to participate directly in the CMs of neighbouring countries. The most recent proposals envisage a process that will allocate the “Maximum Export Capacity” (“MEC”) of an interconnector through an auction process, with the resulting revenues accruing to the relevant interconnector owner.²⁷ Our view is that this will, in the case of constrained links such as those between GB and Europe, lead to the majority of CM revenues falling to the interconnector owner rather than foreign generators.

²⁴ There is a brief mention of this issue in Appendix 3 of the AFRY report, but no further discussion.

²⁵ Under the CFD regime, generators bid for a fixed price (indexed to inflation) to receive per unit of electricity supplied, which is known as the ‘strike price’. This strike price is usually specified in £/MWh. If wholesale prices are below this strike price, then consumers provide a top-up to generators. If the opposite is true, then consumers receive a payment from generators. This arrangement ensures that the price paid by consumers is fixed regardless of wholesale prices.

²⁶ TCA on Capacity Mechanisms: “Neither Party is required to permit capacity situated in the territory of the other Party to participate in any capacity mechanism in its electricity markets.” (Article Ener 6, ¶13, [link](#)).

²⁷ ENTSO-E, Explanatory document ENTSO-E proposed methodologies, common rules and terms of reference related to cross border participation in capacity mechanisms: “Members States sell so-called “CM access tickets” or “tickets” to eligible foreign capacity that represent an access right to participate directly in a neighboring capacity mechanism” (Section 4.3, [link](#)).

Hence, even if GB were to adopt the CM “generator participation” model that is currently being developed by the European Commission (which, of course, it might not do given the terms of the TCA), the revenue outcomes for GB interconnectors would be broadly similar to the current model of interconnector participation that has operated successfully (and to the benefit of GB consumers) since 2015.

Therefore, not including CM revenue in the socio-economic assessment means that AFRY’s modelling systematically undervalues the revenues that interconnectors will earn and the benefits to GB consumers that arise from greater interconnection.

Ofgem has recognised this in its consultation document.²⁸ Although it is challenging to estimate the scale of such revenues, we consider that the current approach (which is to assume a derating factor of 0% is clearly not right).

We also note that AFRY’s socio-economic modelling does not consider any revenues that interconnectors may earn through the provision of ancillary services to NG ESO. While we recognise and further comment in WS 3 on methodological difficulties of calculating such revenues within the required time horizon, certain reasonable assumptions could have been made on the basis of past studies and historic data. Selecting future interconnectors on the basis of IRR calculations, which miss revenues from the sources of value that considered important by Ofgem in WS 3 appears inconsistent.

Findings

We support the main conclusion of this workstream, that further interconnection is needed and that further C&F application windows need to be initiated to support additional capacity. However, we have significant concerns regarding the results of AFRY’s analysis.

First, the modelling undertaken by AFRY identifies four new notional interconnectors between GB and European markets. This includes two links between GB and an aggregated North West Europe (“**NWE**”) market and two links between GB and the Irish Single Energy Market (“**SEM**”) – with one new notional interconnector added to each border in 2025 and then in 2030. It is unclear why AFRY has chosen to group several European markets with different characteristics into a single North West European border. We consider this to be counterproductive and are concerned that it may have a material impact on the results of the modelling.

Second, AFRY’s analysis implies nearly 5GW of new capacity to Belgium and 3.6 GW to the SEM. It is unclear how AFRY’s proposed capacities have been allocated to each border, but the relative capacities are clearly non-sensical given the relative size of the markets.

Finally, AFRY’s modelling suggests that new interconnection projects will not benefit GB consumers and, in some cases, GB as a whole. This finding is unprecedented in the context of the body of work that has been undertaken in recent years to assess the benefits of new GB interconnection. It

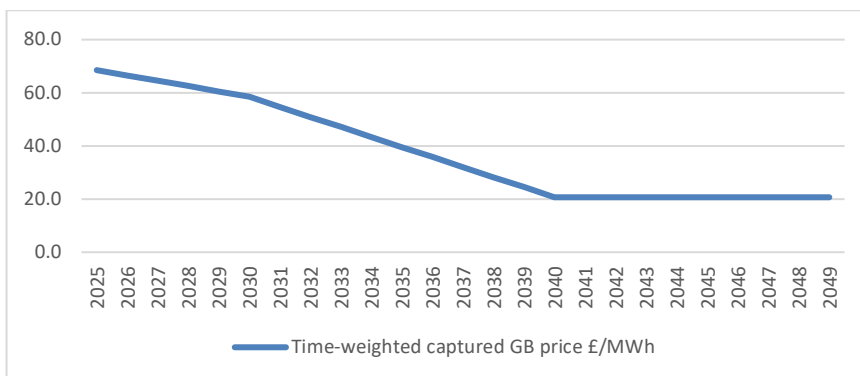
²⁸ See: Working Paper 2, paragraph 2.21 (third bullet).

contradicts analysis that we have undertaken to assess the socio-economic benefit generated by our own project (which we have enclosed as **Appendix 4** to this response) and, also, recent studies published by other stakeholders, including NG ESO and ENTSO-E. AFRY’s conclusions regarding the benefits of interconnectors on different borders are also significantly different from those in earlier studies performed by AFRY (then Pöyry).

We have replicated AFRY’s CBA analysis using the same combination of FES 2020 System Transition and TYNDP 2020 Global Ambition scenarios that was used by AFRY but, critically, without the arbitrary adjustments used in the AFRY report. We find significant benefits to GB consumers associated with additional interconnection capacity in the next 15 years. After this period, we find that wholesale prices in GB fall significantly (from c.£70 to c.£20 per megawatt/hour (“MWh”)) due to a rapid increase in GB renewable capacity (mainly offshore wind) and an associated increase in electricity exports out of GB.

In setting out its conclusions that interconnectors may not bring benefits to GB consumers in the future, the AFRY report fails to clearly explain the reason for that. In fact, the dramatic reduction in electricity prices in the second half of the 2030s due to growing renewable capacity results in growing exports from GB.²⁹ This will, in turn, require flexibility, which is provided by interconnectors. However, even after taking these market trends into account, we find that the benefits to GB consumers remain positive over the period.

Figure 1. GB wholesale electricity prices, £m



Source: CEPA, 2021.

The AFRY Report and the consultation document make a disclaimer that many components of interconnector value are not being analysed in the AFRY Report. According to the opinion of Dr van der Weijde (see **Appendix 1A/1B**), the AFRY report also fails to consider social benefits in reducing the costs of long-term generation adequacy, reductions in the costs of renewable energy support mechanisms, the value of flexibility services interconnectors can provide, and overall risk reduction due to greater market integration.

Question 3: Do you agree with our view on the results of AFRY’s modelling? Do you agree that this modelling supports the needs case for further interconnection?

²⁹ The AFRY report recognises this trend in B.7 and other places, but does not connect it explicitly to the impact on benefits.

We agree with some of the views that Ofgem has regarding AFRY’s modelling. Specifically:

- ▶ We agree that the initial baseline for existing interconnection is incorrect, and that it will “*have a negative bearing on the modelling results*”.³⁰
- ▶ We agree in principle about issues around intraday modelling and balancing. However, we consider that most fluctuations should be caught in day-ahead modelling that assumes perfect foresight (which appears to be what AFRY have done).
- ▶ We agree that the modelling excludes capacity market and ancillary services revenues and therefore systematically undervalues the revenues that interconnectors will earn and, indeed, the benefits to GB consumers that arise from greater interconnection.³¹

We agree (based on our own analysis and that conducted by other parties) that there is clearly a strong case for further GB interconnection going forward, to help meet national decarbonisation targets. Indeed, analysis conducted by NG ESO indicates that there is a need for 18-23 GW of additional interconnection capacity between GB and European markets going forward (2020 analysis) and the UK Government has set a specific target for “*at least 18GW of interconnector capacity by 2030*”.³² This is well above the level of interconnection capacity that is currently operational (6 GW) or that might be expected if all projects with current regulatory approval progress through to completion (15.9 GW).

However, as we explain in our responses to Questions 1 and 2 above, we consider that the approach adopted to the socio-economic modelling conducted by AFRY is fundamentally flawed and misses a number of important facts. We would strongly caution against drawing broader conclusions than this from the analysis. For example, we do not agree with Ofgem’s far-reaching conclusion on the basis of the AFRY report that interconnectors will become less beneficial,³³ or that the social economic welfare analysis loses its significance as a tool for assessing interconnectors.

We do not believe that the structure of the AFRY analysis allows for any robust assessment of the specific borders to which future interconnection would be beneficial or otherwise. In addition, the scope of the modelling and assumptions included do not allow for a holistic assessment of socio-economic welfare considerations, either in general or in relation to specific potential future interconnection.

Question 4: Is there any further information or additional studies that you think should be factored into our analysis?

³⁰ Ofgem recognises that the “*adjustments*” made in the AFRY modelling “*have a negative bearing on the modelling results*”. See: Working Paper 2, paragraphs 2.31 (second bullet).

³¹ Working Paper 2, paragraphs 2.21 (bullet 3 and 4).

³² BEIS (2020), Energy White Paper: Powering our Net Zero Future ([link](#)).

³³ Working Paper 2, paragraphs 2.30 and 2.31.

Yes. We provide copies of the following opinions and reports as appendices to our response:

- ▶ Two expert opinions by Dr van der Weijde of the University of Edinburgh (**Appendix 1A** and **Appendix 1B**).
- ▶ An expert opinion by Mr de Nooij (**Appendix 2**).
- ▶ An expert opinion from Mr Perkins (**Appendix 3**), which provides an assessment of AFRY’s baseline level of interconnection and the use of the IRR threshold.
- ▶ A 2020 study by FTI Consulting (**Appendix 4**), which estimated that AQUIND Interconnector will generate over £2.3bn of consumer savings in GB between 2025 and 2050 and unlock £1.2bn of private investment by 2024 across GB and France (including 750 new jobs).³⁴

Section 3

Question 5: Do you agree with our conclusions? If not please explain why and provide supporting information if available.

We set out our feedback on Ofgem’s conclusions and initial proposals regarding the needs case for future interconnection, the role of socio-economic analysis and scenario design, and the assessment of wider benefits of interconnection in turn below.

Needs case for further interconnection

We agree with Ofgem’s conclusion that there is *“a positive needs case for further GB interconnection, from a socio-economic perspective, beyond those projects that are currently operational, under construction, and those that are under development with existing regulatory approval”*. We have set out references to wider evidence that supports this conclusion in our response to Question 1 above.

We also agree that there is *“a need for a regulatory regime to incentivise further investment”*. We have provided feedback on proposed changes to the regulatory design of the C&F regime as well as the C&F assessment framework in our response to Ofgem’s consultation on Working Paper 1 of the interconnector policy review.

However, as explained in our responses to Questions 2-4, we have concerns about the way in which Ofgem has arrived at its conclusions and the evidence base that Ofgem has relied upon to support its findings.

We are particularly concerned by the notion that future GB interconnection would not be beneficial to GB consumers from a socio-economic perspective. Studies commissioned by AQUIND Interconnector indicate that our project would have a positive net welfare impact on GB consumers under a wide range of scenarios that support the delivery of ‘net zero’ decarbonisation targets across Europe. Specifically:

- ▶ A 2020 study by FTI Consulting estimated that AQUIND Interconnector will generate over £2.3bn of consumer savings in GB between 2025 and 2050 and unlock £1.2bn of private

³⁴ FTI Consulting (2020) AQUIND Interconnector: Reducing the cost of transition to Net Zero for GB energy consumers ([link](#)).

investment by 2024 across GB and France (including 750 new jobs).³⁵ We have enclosed a copy of the FTI Consulting summary report as Appendix 4 to our response.

- ▶ A 2020 study by Baringa, provided to Ofgem earlier, estimates that AQUIND will bring material savings in the capital and operational costs of infrastructure necessary to achieve Net Zero by 2050.

The finding that future GB interconnection would not be beneficial to GB consumers appears to assume that the GB energy system will develop intermittent renewables earlier than neighbouring countries and, therefore, become a net exporter of energy. We request Ofgem and AFRY to provide further information regarding the information and assumptions that this is based on.

Socio-economic analysis and scenario design

Ofgem considers that “*socio-economic modelling should continue to form an important part of needs case assessments of interconnections in any future regulatory regime*” but that it will be increasingly important to consider “*a range of plausible scenarios and modelling studies*” to assess the socio-economic benefits of interconnector projects, given the challenges associated with developing robust scenarios for transitioning energy systems. However, it is unclear how Ofgem will weigh up such studies in its decision-making, particularly where these lead to diverging findings and conclusions. Critically, it should be possible to understand how differences in input assumptions affect the findings of socio-economic modelling and consider the merits and the likelihood of alternative sets of assumptions. (This has not been the case for the modelling assumptions used in the AFRY analysis.)

Furthermore, it is essential that the approaches adopted by a socio-economic study do not set a precedent for any future process within the C&F regime. In particular, there is no robust basis for incorporating an IRR assessment into socio-economic welfare analysis (as has been done by AFRY), particularly where seemingly arbitrary IRR thresholds are applied to project assessments.

Wider benefits

We agree that it is important to consider the wider benefits of interconnection, including the contribution to meeting decarbonisation targets, providing flexibility, maintaining system operability, and ensuring security of supply. We have considered these issues in relation to our own project in a recent study³⁶ and provide comments on Ofgem’s proposals for evaluating wider benefits in our response to Ofgem’s consultation on Working Paper 3 of the IPR.

However, we firmly believe that an assessment of wider benefits should not push aside a full and robust assessment of the socio-economic benefits of interconnection that includes consideration of capacity market and ancillary services revenues. We would encourage Ofgem to provide greater clarity regarding how it intends to incorporate an analysis of wider system benefits in the socio-economic analysis of interconnection going forward.

³⁵ FTI Consulting (2020) AQUIND Interconnector: Reducing the cost of transition to Net Zero for GB energy consumers ([link](#)).

³⁶ FTI Consulting (2021) Electricity interconnection: The role of cross-border transmission in the European transition to Net Zero ([link](#)).

Other

Question 6: Do you have any further feedback on the work presented in this consultation document?

We have no further feedback on the consultation document for workstream 2 at this time.

Appendices:

- Appendix 1A - Expert Opinion of Dr van der Weijde (13 May 2021)
- Appendix 1B - Expert Opinion of Dr van der Weijde (7 July 2021)
- Appendix 2 - Expert Opinion of Mr de Nooij (27 July 2021)
- Appendix 3 - Expert Opinion of Mr Perkins (28 July 2021)
- Appendix 4 - FTI Consulting socio-economic study (summary report)