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ESO Responses to:

- **Consultation on the Regulatory Framework for Offshore Hybrid Assets: Multipurpose Interconnectors and Non-Standard Interconnectors; and**
- **Consultation on the Market Arrangements for Multipurpose Interconnectors**

Dear Nick, Bartosz and Kevin,

Thank you for the opportunity to respond to the above consultations, which we welcome to provide further clarity to ourselves and developers of multi-purpose interconnectors.

Who we are?

As the Electricity System Operator (ESO) for Great Britain, we are at the heart of the energy system, balancing electricity supply and demand second by second.

Our mission, as the UK moves towards its 2050 net zero target, is to drive the transformation to a fully decarbonised electricity system by 2035, one which is reliable, affordable, and fair for all. We play a central role in driving Great Britain's path to net zero and use our unique perspective and independent position to facilitate market-based solutions to the challenges posed by the energy trilemma.

Our transformation to a Future System Operator (FSO) is set to build on the ESO's position at the heart of the energy industry, acting as an enabler for greater industry collaboration and alignment. This will unlock value for current and future consumers through more effective strategic planning, management, and coordination across the whole energy system.

Our key messages

Market Arrangements - bidding zones and auction types

Both the EU and GB have electricity market reform programmes underway, including the Department for Energy Security and Net Zero (DESNZ)'s Review of Electricity Market Arrangements (REMA), that could fundamentally change the design of electricity wholesale markets and dispatch arrangements. Consequently, we do not believe that final conclusions can be made at this time on future cross border market design, until there is more certainty around the future design of the respective domestic markets.

- We recognise that theoretically the Offshore Bidding Zone (OBZ) model has several advantages over the Home Market (HM) model:
    - The OBZ model removes the requirement for the Transmission System Operators (TSOs) to calculate and allocate the right volume of cross border capacity for the offshore wind farms (OWFs) based on wind generation forecasts.
    - Provided the OBZ boundary correctly reflects transmission network congestion, the OBZ implicit model optimises and allocates capacity more efficiently and would therefore inherently reflect congestion on the offshore network, reducing both the need and cost associated with curtailing wind following over-allocation.
    - In contrast, under the HM model, all OWF output is allocated to the GB market, leading to possible flows against the price differential when the MPI is exporting.

- At this stage we do not have a preference between implicit or explicit auction design option. We recognise the theoretical benefits of implicit trading at day-ahead but believe the Multi Regional Loose

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Volume Coupling (MRLVC) design and market reform initiatives in both GB and the EU will inform the extent to which implicit allocation is practical and economic. More analysis is also needed to understand the extent to which the proportion of traded volumes at day-ahead will reduce by the early 2030s, as more intermittent generation and flexible demand comes online.

- We consider that all permutations described in this consultation could be workable. Nevertheless, we believe that some options would become more difficult to support depending on the market rules and outcomes that are evolved from the implementation of the Trade & Cooperation Agreement (TCA) and MRLVC.

Contractual Arrangements

Under a Home Market arrangement, the ESO would have a direct contractual relationship with both the OWF and the multi-purpose interconnector (MPI) in terms of the transmission assets. Under an OBZ arrangement, we could keep the same arrangement as the Home Market model or the ESO could have a direct contractual relationship with the MPI only in which case the control of the OWF would be via the MPI.

Whilst the various scenarios are being reviewed under our contract frameworks activity in Ofgem's MPI Framework Discussion Group (MFDG), our initial preference is to keep the same contractual relationships as in a Home Market Arrangement.

Operability and links with the contractual framework

We are leading development of the details for operability with relevant stakeholders through the MFDG Workstream 4. Decisions on the contractual frameworks, which we are working on in parallel, will help set the background for our operability proposals. Our current preference on the model is an interconnector build-type approach where the offshore network is built by the interconnector party and once completed, ownership of the cable between the connection of the OWF into the MPI and the GB onshore connection point is transferred to an Offshore Transmission Owner (OFTO)-type ownership.

This is as a result of some of the key underpinning principles set out in the consultation:

- Economic viability – Using a process that is similar to existing OFTO-type build that the offshore wind developers are familiar with.
- Integration in energy systems – Allows for future expansion via Generator Build or OFTO build which enables a project to easily connect to an MPI and vice versa
- Level playing field – The OWF and interconnector/ OFTO parties are treated equally as they would have their own agreements with us.

Our stakeholder engagement has also helped us understand MPI developer priorities for operability including:

- The same process and standards to be used as the current OFTO regime, which provides more certainty to the OWF from a curtailment perspective.
- Minimal changes to be made to the Security and Quality of Supply Standard (SQSS) and current connection process beyond those taken forward as part of our wider connections reform
- No changes being made to the charging and dispatch rules.

We will work through within the ESO and with stakeholders whether these preferences can be accommodated and if so how.

We look forward to engaging with you further. Should you require further information on any of the points raised in our response please contact Thomas Ireland Cross Border & EU Manager or Manjinder Dhesi Senior Multi-Purpose Interconnector Lead.

Our response is not confidential.

Yours sincerely

Alice Etheridge

Alice Etheridge

Head of Offshore Coordination Policy

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Appendix 1 – Responses to the Consultation on the Regulatory Framework for Offshore Hybrid Assets: Multipurpose Interconnectors and Non-Standard Interconnectors

Licensing Arrangements

Question 1 Do you have any views on our proposal to use, when appropriate, a wider common term of an offshore hybrid asset that could apply to both: category 1 assets (NSIs) and category 2 assets (MPIs)?

We support the term offshore hybrid asset; this ensures alignment with the terminology used in Europe - notably by ENTSO-E - when describing assets that combine interconnection and offshore transmission.

We also feel that consideration should also be given to whether the term offshore hybrid asset should also relate to a broader context (i.e. to energy islands) as outlined in the EU Renewable Energy Strategy 2020, which outlines *'A hybrid project can be set up in different ways, including energy islands and hubs & Offshore wind production that is directly connected to a cross-border interconnector.'*

Question 2 Do you have any views on our proposal to use the term of non-standard interconnectors (NSIs) for category 1 assets?

We agree with the use of a sub-term to differentiate NSIs from MPIs as they will be treated differently from an operability, licensing and contractual aspect.

Question 3 Taking into account the relevance of the provisions of the Electricity Act for the type of the licence that can be granted to an applicant, do you have any views on how we propose to license the operators of category 1 assets (NSIs) and category 2 assets (MPIs)?

We have no strong view on this; we see that minimal change will be required between a current Interconnector Licence type and a new category 1 NSI Licence (e.g. definitions of OHA and NSI).

As a category 2 asset, the MPI would be performing a dual activity of offshore transmission and interconnection to GB, and therefore, we envisage the current Standard Licence Conditions being used from both an OFTO licence and an interconnector licence, together with additional Special Licence Conditions, for example relevant revenue developments.

Regulatory Regime for MPIs and NSIs

Principles

Question 4 Do our proposed principles capture the basis upon which the OHA Pilot Regulatory Framework should be designed and developed?

We believe the proposed six principles broadly capture those that the OHA regulatory framework should be built upon, with slight amendments and additions:

- A further principle should be added to capture enabling renewable energy. Whilst this is mentioned under Economic Viability, we believe it is important enough to be a principle in its own right.
- Under 'Integration in energy systems', we would like increased reliability to be highlighted.

Cross Border sharing of cost & revenues

Question 5 How should the cost and revenue sharing boundaries of an MPI or NSI be defined?

We believe these need to be viewed holistically to incorporate charges between multiple generators and knock-on impacts to the wider network (e.g. boundary reinforcements) in GB and the connected EU TSO.

Question 6 How should costs and benefits of MPIs and NSIs be shared with connecting countries?

In general, any sharing of costs and benefits should be fair, proportionate and should align with current interconnector arrangements.

Costs, revenues and risks

Question 7 Do you agree that the Reasonable Delay Event mechanism should also apply to MPIs and NSIs?

We agree that the Reasonable Delay Event mechanism, as was recently consulted upon and introduced for Window 3 point to point interconnectors, is equally applicable to MPIs and NSIs and should be applied to provide a level playing field between similar investments.

Question 8 Are there any additional risks faced by MPIs and NSIs relative to point-to-point interconnectors?

We agree that the three primary areas of increased risk for an MPI/ NSI compared to point-to-point interconnectors are the novel technology being used in a difficult location, the significant amount of bespoke equipment needed for the construction and the need to coordinate the delivery of the various components in the right sequence.

We also believe that the development of the required regulatory, legislative, and contractual changes to enable the first MPI to go live will be significant, especially as such changes will need to be coordinated and aligned with every country they connect to.

Question 9 Which of our proposed regime concepts - Pure RAB, Narrow Cap and Floor, Partial RAB or Cap and Floor with IRR, do you consider most appropriate and why?

We have no comment.

Proposed regulatory regime packages

Question 10 Do you agree with applying the features of a RAB regime to the offshore platform element of an MPI project? Is there a better form of regime for the offshore platform element and, if so, what would be the rationale for it?

We are supportive of the features of the RAB regime as the offshore platform is an asset used to enable, coordinate and facilitate the development of offshore transmission in an economic and efficient way.

Question 11 Which of our proposed offshore hybrid asset package options is most appropriate for MPIs and NSIs in your view and why? We invite you to consider if there are other viable options not shortlisted here, if we can disregard any options entirely, and which options best reflect the draft principles.

We have no comment.

Design parameters of the regime

Question 12 Do you agree that these regime parameters would be applicable for MPI and NSI pilot projects as described above? If not, what changes should be considered?

We have no comment.

Question 13 Should the offshore converter platform be treated differently?

We have no comment.

Question 14 What would be an appropriate availability target for MPIs and NSIs? Could a similar methodology as used for interconnectors be applied?

We believe that the any agreed availability target should be consistently applied to all MPIs.

Question 15 What would be an appropriate regime length for the cost recovery of the offshore platform? Would it be appropriate to align the regime length to the one for the cable or can it differ?

We believe the current period for an OFTO licence of 25 years and should be consistently applied to all offshore projects.

Other Issues

Anticipatory Investment

Question 16 Do you support, in principle, the extension of AI policy to MPIs?

We support in principle extending the AI policy to MPIs. Irrespective of the type of MPI (interconnector-led or OFTO-led), it is important that a suitable arrangement is in place, so we are able to charge users' TNUoS for the AI elements of a MPI asset.

Question 17 Do you support our minded-to position that AI policy should not apply to NSIs?

We support the minded-to position that AI policy should not apply to NSIs. As the offshore wind farm would fall outside the jurisdiction of GB territory and outside the regulatory regime in GB, it is reasonable and logical that AI policy would not apply to an NSI.

Question 18 Do you agree with the set of scenarios set out for simultaneous and sequential build projects, and our conclusions on where AI policy could/could not apply?

We consider this reasonable, however, the same points outlined in by our response to question 16 would apply to this question.

Question 19 Do you agree with our suggestions surrounding AI risk mitigation and assurance for MPI developers, namely extending User Commitment (or analogous) arrangements to the later user and developing a process analogous to the Early Stage Assessment (ESA)?

We agree that the later user(s) in this scenario should have AI Liabilities to ensure a consistent approach with other coordinated non-radial offshore connections. The ESA for producing an agreed AI cost would again mean that it is consistent with other AI projects

Question 20 Do you agree with our suggested high-level mechanisms for the recovery of AI cost from the later user, and from the consumer in the instance where the later user fails to connect or reduces the capacity of its project?

We agree with the recovery mechanism principles as we believe that they align with the AI decision on Early Opportunities and Pathway to 2030.

Question 21 If the RAB model applies, would AI policy still be required for the assets covered by the RAB, given that the consumer would in theory cover these costs?

We have no comment.

Ownership unbundling

Question 22 Do you have any views on how the ownership unbundling requirements applicable to MPI and NSI operators may influence the delivery of these assets (and/or delivery of offshore generators connected to MPI assets)?

We have no comment.

Regulatory safeguards and compliance requirements for MPIs and NSIs

Question 23 Do you have any views as to the regulatory safeguards and compliance requirements that should apply to MPI licence holders, taking into account the dual activity (interconnection and transmission) that they will perform?

We have no comment.

Question 24 Do you agree that the inclusion of a RAB as part of the regulatory regime for MPIs should be subject to appropriate safeguards, including appropriate compliance requirements? If no, please explain why. If yes, do you have any specific suggestions?

We have no comment.

Question 25 Would the regulatory safeguards as well as compliance and independence arrangements already applicable to standard interconnector licence holders constituting subsidiary companies under a single parent company be sufficient if MPI licence holders were added, as subsidiary companies, to this corporate structure? If yes, please explain why. If not, what additional safeguards should be implemented?

We have no comment.

Charging

Question 26 Do you agree with the above principles relating to connection and onshore charges for offshore generators connecting to an MPI and NSI?

With regards to an NSI, we broadly agree that the local charging arrangement for offshore wind farms should be subject to rules and regulations in foreign jurisdictions. The following also need to be considered:

Regardless of the market approach, if MPI assets are not classified as an OFTO*,* the costs of these assets would not be recovered via TNUoS (local charge) from the offshore generator. In addition, at present all offshore generators located in GB waters connected to an OFTO are also subject to the TNUoS wider charge, to reflect the associated wider onshore network reinforcement works.

Currently, the ESO licence allows us to specifically collect charges (or repay if appropriate) for OFTOs and interconnectors. The licence defines those as:

- OFTO – "means the holder for the time being of a transmission licence in relation to which licence the Authority has issued a Section E (offshore transmission owner standard conditions) Direction and where Section E remains in effect (whether or not subject to any terms included in a Section E (offshore transmission owner standard conditions) Direction or to any subsequent variation of its terms to which the licensee may be subject)."
- Interconnector – "means the holder for the time being of an electricity interconnector licence in relatio*n to which licence the Authority has issued a Section G (Cap and Floor Conditions) Direction and in which Section G remains in effect (whether or not subject to any terms included in the Section G (Cap and Floor Conditions) Direction or to any subsequent variation of its terms, to which the licensee may be subject)."*

Although not strictly relevant to these consultations, we would like to highlight that we are only allowed to deal with charges specified in an electricity transmission licence held by an OFTO or an amount specified / calculated in an electricity interconnector licence. A new category (MPI) will need to be introduced if we are to recover any costs associated with an MPI.

Appendix 2 – Responses to the Consultation on the Market Arrangements for Multipurpose Interconnectors

Question 1 Do you agree with the ranking of options (OBZ-implicit, HM-implicit, HM-explicit, OBZ-explicit) presented in the table?

Both the EU and the UK government are currently undertaking reviews of existing electricity market arrangements. In the UK, REMA is considering substantive wholesale market reform and changes to the dispatch mechanism which would both impact the feasibility of implicit or explicit allocation of offshore wind. The future of the Multi Regional Loose Volume Coupling (MRLVC) implicit day ahead cross border market design, obligated under the Trade and Cooperation Agreement (TCA), is also not clear.

Our preferred ranking of options for Offshore markets are:

- First preference: OBZ (Implicit or Explicit)
- Second preference: HM (Implicit or Explicit)

Our rationale is explained in our answer to Question 3 of this consultation.

Question 2 Do you believe that some of the permutations not workable and should be ruled out? Why?

At this time, we consider that all permutations could be workable. Nevertheless, we believe that some options would become more difficult to support depending on the market rules and outcomes that are evolved from the implementation of the TCA and MRLVC.

For example, under a Home Market (HM) model, it needs to be considered how offshore injections with priority access align with the rules on efficient use of electricity interconnectors and market based, transparent and non-discriminatory capacity allocation on the interconnectors as required under the TCA. Also, to allocate capacity within a HM design, part of the interconnector capacity must be automatically allocated to the OWF. This means any over-forecasting of OWF generation could potentially lead to MPI capacity being unnecessarily constrained, whilst under-forecasting could result in unnecessary OWF curtailment.

Once there is further clarity, for example once the future direction for implementation of MRLVC is clearer, we agree it would be wise to discount any non-workable options for efficiency's sake. However, this may not be possible at this time.

Question 3 Which of the four options is preferred, and why?

While we believe it would be prudent to wait until the direction of future GB and EU market arrangements is clearer before developing firm conclusions on market arrangements for MPIs, we provide below some initial views on the theoretical advantages and disadvantages of the models under consideration:

Offshore Bidding Zone vs Home Market:

Firstly, we note that the OBZ model has several advantages over the HM model:

- The OBZ model removes the requirement for the TSOs to calculate and allocate the right volume of cross border capacity for the OWFs based on forecasting wind generation.
- The OBZ implicit model optimises and allocates capacity more efficiently and therefore, inherently deals with congestion on the offshore network, reducing both the need and cost associated with curtailing wind following over-allocation.
- In contrast, under the HM model, all OWF output is allocated to the GB market, leading to possible flows against the price differential when the MPI is exporting.

Implicit vs Explicit:

Theoretically, implicit allocation has several advantages over explicit allocation, including:

- Implicit auctions would reduce any adverse flows (i.e. against price direction), provided that the zone boundary correctly reflects thermal congestion.

- Explicit auctions may have lower utilisation during periods when it is difficult for a user to accurately forecast the value direction.

Considerations in favour of an explicit regime include:

- Under an implicit regime, there would be less scope for the ESO to take mitigating actions when interconnector flows exacerbate network constraints, potentially resulting in higher GB balancing costs. The trade-off between more efficient allocation of flow in the wholesale market against higher GB balancing costs must therefore be considered[1].
- Significantly more alignment between GB and EU market designs would be required to facilitate implicit allocation. We expect implicit allocation would seek to build upon the MRLVC methodology under discussion; however, the current MRLVC implementation timeline of at least 4 years and 4 months indicates cross-border initiatives of this scale can be lengthy and require greater levels of regulatory, commercial, and technical coordination.

At this stage we do not have a preferred option between implicit and explicit. We recognise the theoretical benefits of implicit trading at day-ahead, but believe more analysis is needed to understand:

- The extent to which the proportion of traded volumes at day-ahead will reduce by the early 2030s, as more intermittent generation and flexible demand comes online.
- What a volume coupling mechanism would look like, and in particular how far it would require alignment between the GB and Single Day Ahead Coupling (SDAC) clearing processes. We note that both mechanisms are currently being assessed.

Question 4 Under implicit trading (loose volume coupling), which bidding zone configuration (HM or OBZ) best supports:

a) market efficiency?
b) consumer benefits?
c) integration of renewables?

	Implicit Trading
Market Efficiency	**Best suited option = OBZ** Will allow for more efficient dispatch, minimising the occurrence of power flowing against wholesale market price differential, which is inherent in a potential Home Market model.
Consumer benefits	**Best suited option = OBZ** Enables more efficient dispatch, enables the market to work without distortion provided the zone boundary reflects thermal constraints, reducing the need for the TSO to take balancing actions and thereby reducing costs for consumers. Under an implicit setup, TSOs can manage forecast deviations within the OBZ more efficiently.

[1] In order to manage system security and constraints on both the onshore and offshore networks, and to be able to balance the system efficiently, we require a way to manage cross border flows, preferably via a market-related tool. Currently this is achieved onshore by the use of third-party trades via the interconnector explicit intraday markets. For an offshore implicit intraday market to be feasible an equivalent tool must be developed and made available. Operationally, conditions are complex in timescales close to real time where intraday markets operate, and so associated flow control tools would have to interface with such complexity on the GB end and on every system that interconnectors connect to.

Integration of renewables	**Best suited option = OBZ/HM** This statement applies for both Implicit and explicit arrangements. Broadly, market arrangements which support the integration of renewables are those which: 1. Reflect renewables' near zero marginal cost which means these assets are dispatched before more expensive assets 2. Are sufficiently accurate and dynamic to reflect renewables' intermittent output (for example prices which change close to real time and are temporally and locationally accurate). Such price signals also enable flexible resource to shift around renewables' output to mitigate or avoid renewables' curtailment Under the HM model, production from the OWF is dispatched to the home market before the cross-border market, regardless of whether it is needed in the home market. While renewable generation output is prioritised, when wind generation is not needed in the Home Market but could be used in the cross-border market, the price signals would not reflect the economic value of the wind generation across both jurisdictions and may result in unnecessary curtailment of the renewable generation. Under the OBZ model, OWF injections become a part of general cross-zonal flow, ensuring a better capacity allocation across the two jurisdictions. We believe the OBZ model better addresses both the need to maximise renewable output and ensure minimal curtailment. We recognise, however, that generally the OWF will receive lower revenues relative to the HM design, potentially resulting in a weaker investment case for these renewable assets.

Question 5 Under explicit trading, which bidding zone configuration (HM or OBZ) best supports:
a) market efficiency?
b) consumer benefits?
c) integration of renewables?

	Explicit Trading
Market Efficiency	**Best suited option = OBZ:** This is also our preferred option for efficiency, since network congestion would be accounted for in wholesale market clearing regardless of the MPI allocation process.
Consumer benefits	**Best suited option = OBZ:** This option still delivers most benefits for consumers compared to the HM model where the OWF injection is classed as internal flows. In an HM arrangement, the prioritisation of cross zonal flow for an MPI could mean the ESO would need to curtail the OWF if more wind is generated than there is interconnector capacity available in order to free up capacity for imports. This setup would likely transfer those costs to the consumer
Integration of renewables	**Best suited option = OBZ/HM** This statement applies for both Implicit and explicit arrangements. Broadly, market arrangements which support the integration of renewables are those which: 1. Reflect renewables' near zero marginal cost which means these assets are dispatched before more expensive assets

	2. Are sufficiently accurate and dynamic to reflect renewables' intermittent output (for example prices which change close to real time and are temporally and locationally accurate). Such price signals also enable flexible resource to shift around renewables' output to mitigate or avoid renewables' curtailment Under the HM model, production from the OWF is dispatched to the home market before the cross-border market, regardless of whether it is needed in the home market. While renewable generation output is prioritised, when wind generation is not needed in the Home Market but could be used in the cross-border market, the price signals would not reflect the economic value of the wind generation across both jurisdictions and may result in unnecessary curtailment of the renewable generation. Under the OBZ model, OWF injections become a part of general cross-zonal flow, ensuring a better capacity allocation across the two jurisdictions. We believe the OBZ model better addresses both the need to maximise renewable output and ensure minimal curtailment. We recognise, however, that generally the OWF will receive lower revenues relative to the HM design, potentially resulting in a weaker investment case for these renewable assets.

Question 6 Do you think that a transition from HM to OBZ is possible and/or desirable?

Considering the potential market changes for both GB and EU during the next decade, as set out in our answer in question 3, a transitional regime might be a practical solution. We recognise, however, that a transition from HM to OBZ could adversely impact project business cases given that the investment case for Offshore Hybrid assets is highly sensitive to market coupling arrangements.

A transition could result in projects not going ahead, delayed timelines, or requiring greater financial support. Any interim period should look to minimise the additional risk that is added to the investment case for Offshore Hybrid Assets. The terms of the transition should be predictable and stable for MPIs, OWFs and both System Operators.

Question 7 What conditions must be met so that a transition from explicit-HM to implicit OBZ configuration would be viable for developers?

There must be a clear and reliable timetable that covers the changes in roles, system, revenue stream, rights, contracts, obligations etc. As the ESO, we would need a firm programme with sufficient time to plan, prepare and initiate any changes to ensure security of supply.

A potential transition should not introduce more risks to the investment case and should offer warranties and stability for the first operational years of any Offshore hybrid project such as developing all the required systems, contracts, and rules.

If a transition was unavoidable, it would be sensible to coincide such fundamental changes with other anticipated future market reform changes, for example, the implementation of the output of DESNZ's Review of Electricity Market Arrangements (REMA).

Question 8 How does this relate to other areas such as regime design or charging arrangements?

Under the HM market model, due to OWF having priority access, we assume the OWF will have Transmission Entry Capacity (TEC) in the GB market. Therefore, we expect the TNUoS charge and the locational signal associated with the wider generation zone would apply.

In an OBZ approach, as there is no priority access, and the generator may not have TEC, the separate bidding zone may not be covered under the current TNUoS arrangement. Consideration needs to be given to how to ensure fair access to the GB market.

Question 9 How do you envisage long-term, day-ahead and intraday trading arrangements working for MPIs under both HM-explicit and OBZ-implicit scenarios?

Can explicit capacity allocation work with OBZ configuration, if yes how?

Forwards markets – Some sort of long-term hedge is needed. However, whilst we do not have a strong preference between Physical Transmission Rights (PTF) or Financial Transmission Rights (FTR), we believe FTRs are likely to provide additional flexibility with the potential for secondary trading. There needs to be a long-term capacity calculation step too to ensure that the market values cross border capacity correctly. PTR are more complex to establish. However, it would allow an OWF to buy and nominate access in the longer term without full reliance on the Day Ahead markets.

Day Ahead – Yes, we believe an explicit Offshore Bidding Zone approach could support effective trading at day-ahead. We note that the current emphasis on day-ahead trading is likely to evolve this decade as incentives for intraday repositioning increase. Potential changes to Contracts for Difference (CfD) design posited in REMA may also lessen the importance of day-ahead trading for offshore wind, for example if there is a move to Deemed Generation. Furthermore, GB network is currently highly constrained, and thus requires extensive redispatch in the event wholesale market trading is infeasible.

Intraday – An explicit OBZ approach should be used closer to real time in the absence of accurate locational prices in the wholesale market. Implicit intraday trading would be very complex and difficult to dove-tail with EU mechanisms and would need to give the ESO the control we need closer to real time. Historically Day Ahead timescales have always been the key stage for cross border markets. However, the variable nature of the OWF means that an effective intraday market is needed closer to real time. The intraday timescale is important for us to be able to manage flows as real time conditions develop.

Question 10 What are your views on using either PTRs or FTRs in the long-term timeframe? Will OWFs have an active role in long-term capacity allocation?

Please refer to our response to Question 9.

Question 11 Which timeframe is the most vital/relevant for MPIs and why?

Historically, Day-Ahead markets have been the most significant for cross border trading, and whilst we believe they will remain of use for MPIs, their importance may reduce with the intraday market becoming more significant. This could be driven by a number of factors, including potential changes to GB CfD design via REMA or the inherent variability of the OWF output.

Balancing timescales are also important for us as we will need to take balancing actions, especially under a Home Market model.

Question 12 Are there any improvements to commonly understood trading models (explicit trading or implicit price or volume coupling) that can be made to better facilitate efficient market arrangements for MPIs?

In theory, implicit price coupling could be an efficient and accurate trading model for MPIs. However, the current Trade and Cooperation Agreement stipulates that implicit volume coupling should be applied under the Multi Region Loose Volume Coupling (MRLVC) approach. Recent analysis performed by EU and UK TSOs has demonstrated that whilst the MRLVC approach enhances economic welfare for the consumer, its implementation is operationally complex and will take a long time.

An appropriate next step would be to better understand how either of the price coupling or MRLVC model would interact with the anticipated future known industry developments, under EU and GB market reforms or the feasible MPI regimes.

Question 13 Do you agree that OWFs should be compensated for a loss of revenue in OBZ compared to HM? Where should this come from?

We believe that there should be an element of compensation for OWFs in line with the Economic Viability and Level playing field principles specifically outlined in the consultation. The business model of an OWF in an OBZ configuration would be directly impacted by the pricing in the new bidding zone as well by the interconnector's capacity allocation.

There are several alternatives currently considered by the European Commission looking to financially protect OWFs in the offshore hybrid projects from not being able to send its power to consumers, as this is the major risk from an OWF point of view.

It is important to highlight that any alternative should not incentivise cross-subsidisation from MPI to OWF that could lead to a socio-economic welfare detriment, as may happen when implementing congestion income redistribution alternatives such as Congestion Income Financial Transmission Rights (CI-FTR), Congestion Income Contracts for Difference (CI-CFD) or Transmission Access Guarantees (TAGs)[2].

It is also key that any support for OWF should be paid by the same entity that would normally pay subsidies for renewables, preventing discrepancies between renewable support from the Government and the support coming from congestion income. Alternatives to reform current CfDs could be considered, allowing potential OWF generation to be remunerated rather than the physical generation if capacity is curtailed on the interconnectors.

We also believe that each of the various mechanisms mentioned would involve different degrees of legislative change to achieve implementation.

Question 14 How could the existing CfD scheme be changed to support OWFs connected to MPIs, especially considering OBZ market model?

How would you envisage this scheme to work?

Existing Contracts for Difference (CfDs) have delivered significant investment in low carbon generation capacity to date and will be needed to drive necessary investment for 2035 targets. Nevertheless, our Net Zero Market Reform analyses[3] have highlighted that current CfD design disincentivises assets from delivering added system value and has a distorting impact on wider markets. This would apply also for OWFs connected to MPIs, including:

- Bidding distortions in intraday market and balancing mechanism
- Herding behaviour around price thresholds/rules
- Lack of incentives to support the system such as ancillary services, responding to scarcity prices, efficiently scheduling maintenance, investment in system-supporting technologies and repowering/retrofitting based on system needs
- Reduced liquidity in forward markets.

As it now seems likely that the current CfD arrangements will be reformed, the future arrangements should be used as the benchmark against which adaptions should be made for MPIs. This should allow the distortions to be addressed while retaining the benefits of CfDs.

Some of the issues that would need to be assessed for MPIs specifically include:

- The existing CfD scheme uses a reference price based on the GB market price. Under an OBZ model, due to the OBZ price being lower than the GB price when importing, there would be a revenue shortfall for the OWF compared to the HM design or a standalone project with a CfD.
- With either market model, CfDs will need to be carefully considered for MPIs to ensure power flows to another country or territory are not subsidised by the CfD mechanism and therefore GB consumers.

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[2] Support on the use of congestion revenues for Offshore Renewable Energy Projects connected to more than one market – European Commission
[3] Investment Policy Conclusions Net Zero Market Reform programme – National Grid ESO

Question 15 Are there any other alternative approaches that we have not considered that would better incentivise an OWF to connect to an MPI?

Our view on other alternatives is included in our answer to question 13.

Question 16 How do charging arrangements relate to the considerations on support schemes for MPIs, especially under the OBZ scenario?

We believe that a key outcome should be to achieve a level-playing field between the MPI and the OWF and other supported mature technology generation in GB such as solar, onshore wind and offshore wind. In order to ensure maximum GB consumer value, these technologies should be competing against each other on equal terms. The wider economic consideration must take into account a range of system costs, including Transmission Network Use of System charging and any CfD subsidies, so that the total cost should be on the same basis as other technologies to ensure no cross subsidy.

Question 17 Does the chapter on operability capture the key topics that should be included when considering the impact of market arrangement models on system operability?

We believe the chapter captures the high-level topics, such as priority access, curtailment, balancing, provision of ancillary services and changes to existing technical codes. However, there is another level of detail that needs to be worked through with relevant parties to better analyse and understand the key challenges. We are doing this via our work on the contract frameworks for MPIs and engaging through Workstream 4 of Ofgem's MPI Framework Discussion Group (MFDG).

Our initial thinking favours an interconnector build where the offshore network is built and then transitions the OWF to GB shore connection into an OFTO-type regime as there is minimal change required from the current Generator Build Process. The MFDG will continue to work through this to form a clearer view.

This would mean the network between the interconnector and Offshore Wind Farm is built to the same standards as an OFTO and the link behind the OWF to the connecting country is treated as a conventional interconnector.

Are there other important implications that need to be considered?

We would need to understand the level of change potentially required in GB contractual frameworks to assess potential implications.

Question 18 Do you have any views on how curtailment and compensation might work under both HM and OBZ configurations?

Net Transfer Capacity (NTC) is a tool available to System Operators (SOs) to manage interconnector flows if required for operational reasons such as security of supply. In GB, interconnectors are compensated for NTC restrictions according to a compensation methodology; compensation is based on the principle of keeping the interconnector "whole" (i.e. commercially neutral). The GB Commercial Compensation Methodology is market-based in that it uses markets to derive the value of restricted capacity. This can result in payments to or from interconnectors.[4]

In the context of MPIs, it is envisaged that compensation for NTC restrictions will be paid to, or by, one party (the MPI). The MPI and OWF would need to agree subsequent apportionment between the two parties in their own bilateral agreements.

[4] Note that the ESO has recently consulted on the GB NTC Commercial Compensation Methodology, as requested by Ofgem in their decision letter on our C28 derogation request. The Methodology is under revision, following responses received in the consultation.

Question 19 Do you have any comments on how balancing might work under both HM and OBZ models?

Under the Home Market model, the OWF should be an independent Balancing Mechanism entity. This will provide the ESO with control of the OWF and MPI independently if required. The MPI flow will be controlled by either NTC restrictions (if needed for system security), counter trading or the use of a SO-SO flow change tool.

Under the OBZ model the MPI flow is controlled by either NTC restrictions (if needed for system security), trading or an SO-SO flow change tool and the MPI would be responsible for any necessary action on the OWFs connected to its network.

Question 20 What are your views on contractual agreements that will need to be established between the system operator, MPI operator and an OWF? Do they differ depending on HM or OBZ configuration?

Under an HM approach, the ESO would need to have a direct contractual relationship with both the OWF and the MPI via a number of multi-lateral agreements (such as the Operating Protocol and System Operations Agreement). The EU TSO would also be subject to these agreements, which is in line with the approach for existing interconnectors.

Under the OBZ model, the ESO could solely have a direct relationship with the MPI, which in turn would manage the OWF, in terms of operational processes.