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For the attention of Christine Brown

Sent by email to: box.OffshoreCoord@nationalgridESO.com

Response to ESO Offshore Coordination Project Consultation

Dear Chrissie,

As National Grid Ventures (NGV) we welcome the ESO Offshore Coordination Project and are pleased to be able to contribute to and support its objectives. We recognise the value of the work carried out to date and think that this work has revealed potential benefits of undertaking further investigation.

As a developer, builder and operator of energy projects in the marine environment, having successfully developed five large-scale high voltage direct current (HVDC) subsea interconnector projects over the last fifteen years, NGV have first-hand experience of the many challenges facing offshore energy projects today. Many more demands are being placed on nearshore, coastal and inshore environments in order to safeguard a cleaner future. A natural step is to combine offshore projects wherever possible, to reduce nearshore, coastal and inshore impacts. And so it is encouraging that the first phase of the ESO Offshore Coordination Project has highlighted the opportunity for and recognised the benefits of multi-purpose interconnectors (MPIs) in such an integrated offshore transmission approach - to connect offshore wind between GB and other European markets.

Our detailed response is attached with this letter, but I highlight a few key points:

In relation to Holistic Planning and technology availability: we agree that technology is available to deploy multi-terminal HVDC solutions this decade and DC Circuit Breakers (DCCBs) are not necessary to enable the first MPIs to connect offshore wind between GB and other European markets by 2030.

In relation to CBA: we note the significant potential savings in Capex and Opex and it would be beneficial to understand how these savings are split between onshore & offshore transmission. We note that the CBA was undertaken based on a methodology similar to ENTSO-E CBA V2. With support from Baringa consultants, NGV undertook a socio-economic welfare (SEW) analysis of MPIs based on the ENTSO-E CBA V3 methodology where we start to quantify some of the wider benefits. At a high level, we found that 6.4GW of MPIs, connecting up to 12.8GW of offshore wind between GB and other markets, could provide benefits of up to £2.2billion for GB consumers over a 20-year period. We submit our findings in our detailed response in order that this can complement your analysis and we are happy to have a more detailed discussion of the study findings with the ESO. We certainly suggest that moving to a CBA methodology akin to ENTSO-E V3 that considers the quantification of wider benefits would be beneficial.

With regard to the Connections Review: apart from the CION process, we think that the ESO and host TOs can undertake more anticipatory preparatory work to identify strategic grid connection locations to enable future offshore projects – rather than being reactive to developer-led activity. An enhanced, public domain, NOA process could deliver this information to identify strategic grid locations for offshore projects and their grid reinforcement dependencies. In this way, it should be possible to signal at a regional level information such as the economic capacity potential of different grid connection locations over time. We do not expect the ESO to design offshore transmission solutions but to provide the framework for TOs and other developers to do so. To be able to deliver innovative alternatives more quickly, ensuring flexibility and responsiveness regarding connection arrangements for projects is also very important.

In terms of future work: we do think that basing the study on the SQSS frequent infeed loss of 1320MW is a limitation and that should certainly be reviewed in subsequent analysis. We also agree that future work is necessary regarding the Grid Code – in particular to consider more holistically the functionality of any HVDC interface (whether "bootstrap", interconnector or offshore wind connection). We also think that the prospect of meeting the offshore & net zero targets will be significantly impacted without sufficient coordination and cooperation with our European neighbours. Extending the dialogue about coordination and cooperation to our European TSO partners is recommended.

Finally, I'd like to thank the ESO and wider project team for the transparent approach to industry engagement on the Offshore Coordination Project. There has certainly been ample opportunity to engage and participate. Well done to all involved. This is an excellent standard to set for subsequent phases of this work.

Yours sincerely,

Morris Bray

Senior Business Development Manager

Offshore Coordination project
Consultation feedback form – National Grid Ventures

We launched our consultation on **30 September 2020** and it closes on the **28 October 2020.**

Please use this form to send in your written feedback If you would like to feedback via this route. We are also working with stakeholders to receive verbal feedback. Please contact us if you would prefer to provide feedback verbally.

We would like to publish responses to our consultation following its closure. Please can you confirm whether you would like us to treat your response confidentially by selecting one of the options below: (delete those that do not apply)

Non-confidential – you can publish the full response

Throughout the consultation document we have asked some questions on our three reports that we would like your feedback on to shape our final documentation. These are below and do not need answering if you do not have views. If you would like to provide any other feedback, please feel free to do so.

Holistic Approach to Offshore Transmission Planning Report

Q1. Do you agree with our assessment of the key technology and system risk barriers coming from the Holistic Approach to Offshore Transmission Planning Report?

With regards to HVDC circuit breakers (DCCB), the functionality required is to break DC fault currents. This can also be achieved by use of full bridge technology. Working closely with both our project partners and key supply chain partners (Siemens, Hitachi-ABB etc.) it has been concluded that there is no technical necessity to implement DCCBs for multi-purpose interconnectors. Using the same designs as NSL and Viking Link for point-to-point bipole interconnector configurations, any fault which causes a trip of any of the converters leads to a shutdown, reconfiguration and restart. This process happens in seconds and restart time is limited only by the ESO. A fault on proposed MPI projects can be effectively contained by tripping of the AC circuit breakers which connect the generation to the HVDC MPI system and onshore networks. The impact on the onshore transmission and energy supply is no different to that associated with a conventional interconnector or large windfarm connection today. This technical approach delivers the same resilience and reliability as existing interconnectors and does not increase the risk to GB security of supply i.e. is still within the maximum ESO in-feed loss parameters. By connecting windfarms does increase the number of points of potential failure on the MPI, and this could be reduced by adding DCCBs to the MPI but the cost is significant, and the additional benefit (in resilience & reliability) not justified. In a future world where offshore HVDC grids become increasingly interconnected, DC circuit breakers will be required to segregate the offshore grid to reduce the amount of transmission or generation lost as a result of a fault.

TenneT's innovation partnership work on Ijmuiden Ver will hopefully deliver multiple extruded 525kV cable systems for 2GW. If the SQSS is not to be increased, then there is no need for further development in this area. However, it is recommended that a similar study is undertaken by the ESO as the installation parameters defined by TenneT may not be suitable for the UK.

The development of the extruded polypropylene cable technology is limited to one manufacturer, so the statement 'widening of the supply chain' is incorrect.

Section 3.1.2.3 states XLPE jointing takes a day. There could be more context to this, stating if this is in comparison to MIND.

Q2. Do you have any proposals on how to most effectively bring the technology to market for when needed?

MPIs can provide the first step in understanding the multi-terminal HVDC technology challenges.

As recommended above, from a cable point of view the ESO should consider conducting its own trial similar to TenneT, with UK installation constraints.

Q3. Do you have any additional evidence to inform the assessment we have made?

No further evidence.

Q4. Do you have any further feedback on the report?

We agree with the recommendation that the SQSS should be reviewed. Basing the study on the SQSS frequent infeed loss of 1320MW is an obvious limitation. NGV already has a 1800MW connection agreement for a bipole HVDC system so we recommend that the minimum infeed basis of ongoing studies should be 1800MW or similar. To maximise the benefit of offshore coordination ways to increase the present maximum infeed losses should be explored.

Cost-benefit Analysis Report

Q1. Do you agree with our assessment of the costs and benefits?

We broadly agree with the structure of the CBA, the KPIs deployed, the development of factual and the counterfactual.

Some recommendations to enrich the CBA:

- This work has been delivered with ENTSO-E's CBA V2 in mind. Since V3 came into force, the necessary amendments should be made.
- No particular emphasis on addressing the risk of projects being delayed as this is beyond the scope of the CBA. Our proposal would be to expand this component and run the corresponding sensitivities to evaluate the impact of delay factors in infrastructure delivery.

- Extend the scope of the CBA to holistically include the cost of grid reinforcement under the two options. This could be a large gap in the potential benefits case for an integrated approach.
- Cross-border assets are being modelled under the "home market" market design solution. Potentially, the introduction of the "offshore bidding zone" solution will help understand which option creates greater socio-economic benefits.

Q2. Do you have any other evidence to support or challenge the assessment made?

NGV has carried out a socio-economic welfare (SEW) analysis of multi-purpose interconnectors with consultants Baringa. This looked at up to 6.4GW of MPI capacity connecting up to 12.8GW of offshore wind between GB and other neighbouring markets in Europe. This analysis did use the ENTSO-E CBA V3 methodology. This highlighted considerable benefits for GB consumers from connecting interconnectors and offshore wind together. "GW+" scale MPI projects can feasibly offer hundreds of £millions of benefit, and if the full 6.4GW MPI capacity was used to connect 12.8GW of wind between GB and other markets, GB consumers could benefit by up to £2.2billion over a 20 year period (2030-2050).

We attach a brief paper summarising the findings of this work and we would be happy to have a more detailed discussion of the study findings with the ESO.

Baringa MPI Thought Paper GB.pdf

Q3. What do you see as the potential impact on the environment of these proposals, particularly the reduction in the number of assets and landing points?

Reducing the number of assets & landing points is the only way that 2030/2050 targets will be met without significant environmental impact on coastal communities.

Ideally, we would like to see the quantification of all KPIs introduced and expand the environmental benefits to include the carbon footprint of the projects during the construction phase. Also, it would be advantageous to monetise the non-CO2 emissions associated with the construction and the operation of each projects under the factual and counterfactual.

In the broader environmental impact, it should be possible to evaluate local disruption and the impact on shipping, fishing and tourism industry and capture the financial value of this in the analysis.

Q4. Do you have any further evidence on the potential social and community impacts of these proposals? We would particularly welcome responses from local authorities on this question.

National Grid Ventures has practical experience of engaging the local authorities and local communities in East Suffolk over the last 3 years and there is a clear demand to find alternative solutions that create less impact on coastlines and on communities. This experience has made us think about how we could provide greater coordinated solutions – which is why we are now taking forward the multi-purpose interconnector proposition – as an alternative to individual radial connections and the infrastructure required for each project onshore.

Q5. Where do you see value for further work to build on and test these findings? Either from the proposed list or beyond?

We think that increased coordination and integration with the other ongoing reviews and processes that are going on (e.g. OTNR, Interconnector Policy Review, Crown Estate R4 outcome) is vital and it is critical to ensure that this work is taking some directions from the listed reviews and processes. It would be better if the ESO reviews could be visibly branded as "part of the OTNR" in order to assure that alignment.

Offshore Connections Review Report

Q1. Do you think that if the areas we are highlighting were improved, that the ability to coordinate projects would be significantly increased?

Apart from the CION process, we think that the ESO and host TOs can undertake more preparatory work to identify strategic grid connection locations. An enhanced, public domain, NOA process appears most aligned to this. The ESO working with TOs to establish these strategic grid locations and grid reinforcement dependencies should be a priority and this should be used to inform other stakeholders. In this way, it should be possible to signal to developers at a regional level information such as the economic grid capacity potential of a particular location over time. We do not expect the ESO to design the offshore connections but to provide the framework for informed developer decision making.

Q2. Do you think we have missed anything in our offshore connections review that would add value and increase coordination?

Do you have any other feedback, if so please add below. Many thanks for taking the time to provide written feedback. When we publish our final documentation, we will let you know what we have done with the feedback and how it has shaped our work.

If TNUoS is going to be reviewed, ensuring that this happens quickly is crucial as it could significantly impact offshore wind development decisions.