

Consultation on IPA minded-to decision for OHA Pilot Projects

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Dear Ofgem,

NGV Response to the consultation on Ofgem's Cap and Floor regime: Initial Project Assessment of the Offshore Hybrid Asset Pilot Projects

Thank you for the opportunity to respond to the above consultation.

National Grid Ventures (NGV) welcomes the opportunity to respond to Ofgem's minded-to IPA decisions on the OHA Pilot projects.

NGV, together with our European TSO partners, successfully operates six point-to-point (P2P) interconnectors connecting the electricity grids of five North Sea countries to GB. This includes the GB to the Netherlands interconnector, BritNed, which we jointly developed and operate with TenneT. As the UK and EU progresses the decarbonisation of its power generation sector, underpinned by legally binding targets, there will be many more offshore wind assets developed in the North Sea, providing North Sea countries with a huge renewable energy resource. The development of the North Sea grid, underpinned by coordination and collaboration, with infrastructure such as Offshore Hybrid Assets, will be essential to achieving these goals.

This response is on behalf of NGV with respect to LionLink, one of the two Offshore Hybrid Asset (OHA) projects selected for Ofgem's Cap and Floor OHA Pilot scheme. NGV is submitting a separate joint response with Elia for the second OHA project, Nautilus. Please consider this to be a public response, except for those annexes marked as confidential.

NGV welcomes Ofgem's minded-to approve IPA position on LionLink. The project offers significant long-term value to GB consumers and is strategically vital for both the UK and the Netherlands. NGV

and our EU TSO partner, TenneT, remain committed to the project and has secured Project of Mutual Interest (PMI) status.

Within this response, we outline the strong and broad benefits that the LionLink project offers to GB consumers and the UK. Some of these can be quantified into monetary terms, while other less tangible long-term advantages are more difficult to model. In our view, the quantified elements that form Ofgem's CBA of LionLink have resulted in an under-estimation of the project's monetised net benefits and we do not consider the CBA to be representative of the full value of progressing the project.

The key role that OHAs can play in enabling the deployment of offshore renewables to meet the UK's decarbonisation policy objectives and targets was clearly articulated by Ofgem in its Interconnector Policy Review¹ and recognised in its decision to open a dedicated pilot scheme for OHAs. This is a progression of both offshore transmission development and infrastructure coordination which both support offshore wind targets that have been set by governments. In the case of these early hybrid interconnection opportunities, it is right that alignment with government policy direction and strategic benefits contribute to Ofgem's assessment of the pilot projects, and we agree with Ofgem's conclusion that the benefits offered by the LionLink project justify its approval for award of an OHA pilot regulatory regime.

The regulatory assessment of new cross-border infrastructure needs to recognise the strategic value of offshore hybrid projects for delivering security of supply, enabling decarbonisation, as well as consumer affordability, and avoid adopting narrow and short-term interpretations of quantified benefits.

All the views and evidence presented in this response further strengthen the case for LionLink's approval of a regulatory regime.

Ofgem's minded-to position raised concerns regarding the potential impact of Offshore Bidding Zone (OBZ) arrangements in the Netherlands on the distribution of congestion revenues and whether this would result in an outcome that is fair to GB consumers. NGV is fully committed to ensuring that the commercial arrangements for the project result in an equitable outcome that is in the interests of GB (and Dutch) consumers. The specific cost and revenue sharing condition that Ofgem appended to its minded-to approve position on LionLink is directly addressed within the confidential annex of this response.

If you have any questions or require further details on the content of this response, please contact Miles Ten Brinke (miles.brinke@nationalgrid.com).

Yours sincerely,

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¹ <https://www.ofgem.gov.uk/sites/default/files/2021-12/ICPR%20Decision%20Paper.pdf>

Executive Summary

We welcome Ofgem's minded-to approve position on the Initial Project Assessment of LionLink.

- NGV agrees with Ofgem's conclusion that the benefits offered by the LionLink project justify its approval for award of an Offshore Hybrid Asset (OHA) pilot regulatory regime.
- LionLink will:
 - Deliver huge benefits to both British and Dutch consumers, producers and both economies.
 - Facilitate the build-out of offshore wind by increasing the export capabilities of GB, reducing the need for wind curtailment and reducing overall carbon emissions across GB and Europe.
 - Enhance the security of supply of both GB and Europe.
 - Pave the way for the UK's delivery of coordinated hybrid infrastructure in the North Sea.
- LionLink is the most mature interconnector project in this IPA application window and the most mature OHA in the UK. We are proceeding with seabed surveys and our partner has an advanced programme of work that is ready for a Non-Standard Interconnector (NSI) connection.
- Ofgem's minded-to position is conditional on agreeing a cost and revenue structure that results in arrangements that are in the interests of GB consumers. NGV is fully committed to ensuring that the project's commercial arrangements result in an outcome that is in the interests of GB (and Dutch) consumers.

Regulatory delays have had material impacts to this project and presents risks to the viability of UK participation in future projects. Now is the time to act and proceed.

- Ofgem's IPA process has endured successive regulatory delays. A firm IPA decision was originally anticipated by the end of 2023. These delays have materially impacted programme cost, schedules and NGV's (and the UK's) position and perception as a project partner. Further delays could be catastrophic for LionLink.
- The prevailing regulatory uncertainty prevents NGV from entering firm commitments with our partner, TenneT, and our supply chain, which would help mitigate the risks of escalating costs within an increasingly constrained global supply market.
- The pace of change across the global supply chain, industry and policy environment means that a drawn-out regulatory assessment process is at risk of being undermined by external factors even before it concludes. Ofgem needs to act with urgency to enable the build-out of this strategic offshore energy infrastructure.
- European TSOs will be watching this GB regulatory process to assess the viability of developing hybrid projects with the UK. It is essential that the UK can signal its ability proceed with these complex multi-party delivery programmes at a reasonable pace.

The strategic value of LionLink to the UK as crucial infrastructure should not be underestimated. OHAs are the first step towards integrated North Sea coordination that offer direct GB consumers benefits, enable the integration of renewable energy, and strengthen the resilience of our power system.

- The rapid expansion of offshore wind is a cornerstone of the decarbonisation policies of both the UK and EU, and further deployment of interconnection enables us to integrate and manage this renewable energy.
- The UK government has set decarbonisation targets to create 50GW of offshore wind and 18GW of interconnector capacity by 2030. Our European neighbours have similar ambitions with the European Commission committing to 300GW of offshore wind by 2050 alongside interim combined targets that the UK government supported in various North Sea summits.

- The strategic direction expressed by European TSOs and policy makers is that future cross-border projects should take the form of hybrid interconnections, as the offshore build out moves towards renewable integrated grids. The strategic direction expressed by European TSOs and policy makers is that future cross-border projects should take the form of hybrid interconnections, as the offshore build-out moves towards renewable integrated grids.
- In contrast to point-to-point interconnector projects, the case for OHAs is no longer primarily commercial. As strategic grid infrastructure extends to offshore, the traditional economic assessment undertaken by Ofgem is too narrowly focused and does not capture the full value to be gained from progressing OHAs, especially critical benefits such as security of supply, carbon reduction and reduced curtailment.
- The vision of the future GB decarbonised energy system relies on the integrated North Sea cross-border network supporting a more variable renewables-based energy system. We need to make progress and ensure the UK learns, gains experience and credibility if we are to influence the rules and framework for this coordination. NSIs are the first step in this development, and this is a critical window of opportunity - we need to act.
- Ofgem's net zero duty enables it to take into account decarbonisation targets in key energy infrastructure decisions that are aligned to decarbonisation policy objectives. The strategic value of OHAs must be factored into Ofgem's assessment of LionLink. This will strengthen the already positive assessment of LionLink.

Ofgem's economic assessment undervalues the case for LionLink and there is continued uncertainty around some of the fundamental assumptions that will impact results. The monetised results should not be interpreted as precise evaluation of project impacts in the way it appears they have been.

- Ofgem's economic assessment has been narrow and appears to be primarily based on the traditional approach to assessing point-to-point interconnectors. This framework is no longer representative of the drivers or benefits of progressing OHA projects.
- It is unclear how much value is assigned to the critical benefits, such as security of supply, decarbonisation impacts and reduction in wind curtailment. These elements, along with the strategic opportunity that the project represents, all contribute to its economic and societal value. If hybrid projects continue to be tested based on socioeconomic welfare, there will be a high risk of stagnation (which we are already observing with UK interconnector projects) in the essential build-out cross-border infrastructure.
- The modelled GB constraint costs are over-estimated and should not be interpreted as consumer disbenefits when in fact they provide a signal for network reinforcement.
- Ofgem's CBA assumes Offshore Bidding Zone (OBZ) market arrangements and, while we do not disagree with this approach, it is important to note that the operation of the Dutch energy hub as OBZ has not been confirmed and represents a sensitivity to the distribution of benefits in Ofgem's results compared to the potential Home Market (HM) model.
- Ofgem's analysis grossly underestimates the benefits of LionLink and overestimates the costs associated with the project due to the methodology adopted and assumptions applied.
 - The economic assessment relies on extreme decarbonisation and price trajectories for GB and EU countries which make GB predominantly the net exporter and which will drive distribution of welfare benefits, congestion revenue allocation and decarbonisation benefits. Against other studies and projections, we have found Ofgem's CBA to be an outlier.
 - Referencing the Marginal Additional results will lead to a pessimistic view of benefits, especially in the context of IPA minded-to positions on projects in this window. To derive a more reflective view of benefits, a Marginal Additional analysis on a smaller pool of the highest scored projects could be performed.

- The economic assessment assumes an inflated interconnector capacity baseline which results in undervaluing the incremental impact of LionLink, which, as discussed, is exacerbated by the focus on Marginal Additional results only.
- The cumulative impact of the assumptions and modelling decisions that Ofgem has made has resulted in an extremely pessimistic view of net project benefits (due to undervalued benefits that have been further reduced by inflated constraint costs).

It is right that OHAs are being assessed within the pilot scheme and this should be treated as a process that is distinct from the established regime for point-to-point interconnectors.

- The purpose of the pilot scheme is to recognise different regulatory framework requirements for new asset types. This provides a great opportunity to learn and adapt and the pilot regime should avoid rigid constraints which are not suited to this new type of asset which will ultimately assist the UK meet its ambitions.

We have a highly experienced and motivated team ready to deliver LionLink and realise the broad benefits the project offers GB. Regulatory certainty is needed now to progress a cost efficient and timely project.

1.1. We welcome Ofgem's minded-to approve position on the Initial Project Assessment of LionLink

We agree with Ofgem's conclusion that the benefits offered by the LionLink project justify its approval for award of an Offshore Hybrid Asset (OHA) pilot regulatory regime.

LionLink will deliver tremendous strategic value to GB. The insights and practical experience gained from the development of hybrid technology will place the UK in a leading position to shape the regulatory arrangements and deliver these new types of assets.

In addition, LionLink will deliver significant benefits to GB, the Netherlands and Europe. The project will provide reliable and affordable energy supplies to British and Dutch consumers, as well as maximise the use of clean energy by providing mutual cross-border access to those resources. This, in turn, will help reduce overall carbon emissions across Europe. Crucially, LionLink will enhance the security of supply of both GB and Europe and pave the way for the UK's development and delivery of coordinated hybrid infrastructure in the North Sea.

LionLink is the most mature project in this IPA application window and the most mature OHA in the UK. An advanced programme of work is already underway with substantial commitments having been made to progress the project, notably proceeding with seabed surveys, with our partner TenneT and our supply chain. We are dedicated to moving forward with this project and committing to key investment decisions, for which regulatory certainty is now essential.

1.2. Regulatory delays can have material impacts, both to this project and present risks to the viability of UK participation in future projects. Now is the time to proceed.

Ofgem's IPA process has endured successive regulatory delays, a firm IPA decision was originally anticipated² by the end of 2023, the delays experienced materially impact programme cost, schedule and the perception of NGV as a viable project partner.

Our OHA pilot projects are part of broader programme of work led by the Netherlands and Belgium. These are leading the way in Europe for the successful deployment of major hubs for offshore wind. Now is a critical window of opportunity for UK partnerships in these early flagship European programmes. Participation requires developers to keep pace with multi-party timelines against the backdrop of an increasingly constrained global supply market. It is critical that the OHA pilot projects proceed now. Inability to proceed may result in future opportunities being more limited for the UK or only available at a significantly higher cost to the consumer. Learnings which can build towards future energy islands or meshed offshore hubs would also be lost.

The prevailing regulatory uncertainty prevents NGV from entering firm commitments with our project partner, TenneT, as well as with the supply chain. Through its expected connection to the Nederwekk 3 offshore platform, LionLink forms part of TenneT's flagship 2GW Program³ and this is following an advanced delivery programme. Our project partners reasonably expect NGV to make the necessary

² 'Update following our consultation on the Multi-purpose Interconnector interim framework' Dec-22

³ [The 2GW Program | TenneT](#)

commitments to mitigate against the risks to costs and schedule of the increasingly constrained global supply market. Given the multi-party interactions, as well as the lead time for various components, very early firm supply chain commitments need to be made to secure timely delivery. Delays to the regulatory certainty required to enable positive investment decisions will not only impact costs and schedule but, more broadly, will put into question NGV's ability to proceed with these complex multi-party delivery programmes. This in turn is likely to send an unhelpful signal to other European TSOs who will be watching this GB regulatory process to assess the viability of developing future hybrid projects with the UK.

The pace of change across the global supply chain, industry and policy environment means that a drawn-out regulatory assessment process is at risk of being undermined by external factors even before it concludes. Ofgem needs to act with urgency to enable the build-out of this strategic energy infrastructure.

OHAs are strategically critical for the UK's position in the build-out of the North Sea and, ultimately, enabling a decarbonised energy system.

2.1 OHAs enable the integration of renewable energy and strengthen the resilience of the GB power system.

The accelerated deployment of offshore wind is central to the decarbonised energy systems envisaged by government policy in both the UK and EU, with UK targets to create 50GW of offshore wind by 2030 and the EU's target of 300GW of offshore renewable energy by 2050. These ambitions have been reinforced by the collective commitments made by the North Seas Energy Cooperation (NSEC) countries for the expansion of offshore wind in the North Sea. At the second North Sea Summit in April 2023 in Ostend the expanded group of nations, which included Great Britain, agreed to enhance the network of interconnected infrastructure across the North Sea with combined offshore wind targets of 120GW by 2030 and 300GW by 2050. Cross-border infrastructure built on the foundation of clear policy and planning is critical to enable this. The UK government has an interconnector capacity target of 18GW by 2030 and we are failing to deliver this with only 9.8GW operational today and a further 1.9GW under construction. Similarly, the 2035 GB interconnector capacities anticipated in the latest 2023 Future Energy Scenarios appear increasingly unlikely to be realised⁴, particularly those under Leading the Way and Consumer Transformation.

Significant flexible cross-border transmission capabilities will be needed to ensure that the rapid expansion of offshore wind capacity is cost-effective such that the operation of that capacity avoids renewable curtailment, and, in periods of low generation, consumer demand is met at the most affordable prices. OHAs play a critical role in delivering these ambitions.

2.2 OHAs are the first step towards integrated North Sea coordination.

Combining interconnection and offshore wind, OHAs are the next generation of transmission assets that can bring the UK closer to the decarbonised, affordable and secure whole energy system envisioned by government. Representing a departure from traditional point-to-point interconnectors and radial wind connections, these cross-border connections offer more efficient use of clean energy, reduced offshore electricity infrastructure and a reduced onshore footprint of projects landing at UK coastlines. Participation in the delivery of these complex first-of-a-kind projects represents a strategic opportunity for the UK to position itself as a committed and influential player in the development of the North Sea, learn through their development and ensure that this learning is fed into the UK's

⁴ [FES23](#): 12-17GW by 2030, 15-24GW by 2035

strategic planning of transmission build-out. The UK's policymakers, regulators and developers will be able to gain invaluable first-hand experience and learnings that can be applied to the benefit of future projects as offshore electricity infrastructure development accelerates. Importantly, demonstrable experience and commitment in these early hybrid opportunities, will bolster the UK's ability to influence the development of the regulatory frameworks and supply chain practise that will determine the coordination of energy resources in the North Sea.

2.3 The strategic plans of European TSOs and policy makers for cross-border projects is hybrid interconnection.

With the strategic targets for offshore wind and further interconnection both in the UK and in Europe, it's becoming increasingly clear that point-to-point cross-border links and radial offshore wind will not be sufficient for an expansion of this magnitude. This is particularly true for the North Sea region where more offshore coordination of energy transmission and rationalisation of the connection framework will be required, to fully benefit from the plentiful supply of renewable energy within that geographical area.

At the European level, the overall direction of travel is clear. Various studies undertaken by both the European Commission as well as the European Network of Transmission System Operators for Electricity (ENTSO-E) have highlighted that multi-purpose and hybrid projects will play a key role in facilitating the evolution of offshore transmission infrastructure. They are also the essential first step towards the eventual construction of more complex 'meshed' grid structures, which could allow clusters of offshore wind farms to be connected to offshore hubs that connect to each other between various onshore terminals⁵.

Echoing this, the most recent policy positions and messaging from European TSOs is that the appetite for future point-to-point connections is now limited and that opportunities to collaborate on increasing cross-border capacity will be hybrid projects. Statnett has been commissioned by The Norwegian Ministry of Petroleum and Energy to investigate potential grid solutions of hybrid offshore wind connections, which will inform future offshore policy decisions⁶. In a recent consultation by the French regulator CRE on the opportunity for new interconnection capacity between France and the UK, the indication from RTE's assessment is potential support for one further 1GW interconnector project⁷. Meanwhile, TenneT and Elia, NGV's partners on LionLink and Nautilus have respectively published leading thought pieces on progressing hybrid projects and their market arrangements⁸.

2.4 Ofgem's Net Zero Duty provides latitude to make strategic decisions in line with long-term objectives.

Ofgem's recently acquired net zero duty strengthens its ability to consider a broader view of policy alignment and long-term environmental, economic and fiscal growth impacts when making regulatory decisions such as this on strategic energy infrastructure. In our view, the assessment of the OHA projects should also reflect on this new mandate, which directly links consumers' interests to specific net zero targets.

Given their economics, and in a net export scenario, the regulatory case for OHAs can no longer primarily be based on the typical commercial and consumer welfare drivers that have been successful in delivering point-to-point projects under the developer-led regime. Being strategic infrastructure, the OHAs offer a number of broader benefits, many of them being much harder to monetise and some being more anticipatory in nature. The

⁵ European Commission, Directorate-General for Energy, Antoine, O., Papangelis, L., Michels Alfaro, S., et al., Technical requirements for connection to HVDC grids in the North Sea, Publications Office, 2020; ENTSO-E, Third ENTSO-E position paper on Offshore Development on interoperability (January 2021).

⁶ [Options for future offshore grid | Statnett](#)

⁷ [Public consultation no.2024-01 of 5 March 2024 on the opportunity for new electricity interconnection capacity between France and the United Kingdom \(cre.fr\)](#)

⁸ [Paper on making hybrids happen published March 2024; Offshore bidding zone paper published April 2024](#)

traditional economic assessment undertaken by Ofgem is too narrowly focused and does not capture the full value to be gained from progressing the OHA projects.

The monetised results from Ofgem's CBA assessment fail to capture the full value to GB of delivering LionLink.

3.1 Ofgem's economic assessment undervalues the case for LionLink and the monetised results should not be interpreted as precise evaluations of project impacts.

We welcome Ofgem's minded-to approve position for LionLink but consider that the CBA underestimates the value of the benefits that delivering the project offers to GB, which should account for key wider benefits beyond socioeconomic welfare, such as security of supply, avoided curtailment of renewable energy sources and CO₂ savings.

NGV agrees with Ofgem's conclusion that the benefits offered by the LionLink project justify its approval for award of an OHA pilot regulatory regime. Having secured Project of Mutual Interest (PMI) status⁹, LionLink represents a valuable opportunity for the UK to extend its energy cooperation with the Netherlands, and the EU more broadly. We are pleased that in forming its minded-to position, Ofgem has recognised that proceeding with this pilot project is 'strategically beneficial' (for GB). In our view, while these strategic benefits cannot be monetised easily, they are critical to realising the UK's long-term decarbonisation ambitions and it is right that they contribute to Ofgem's overall IPA assessment. However, the monetised costs and benefits that have formed Ofgem's CBA, have underestimated the net benefits to be gained from delivering the project.

In summary:

- All cost benefit analysis (CBA) modelling is necessarily subject to limitations and sensitive to the input assumptions taken at the point of analysis. In our view, some of Ofgem's CBA choices have resulted in an underestimation of the quantifiable net benefits of LionLink.
- The socioeconomic welfare (SEW) assessment is not reflective of the primary drivers for progressing OHA projects.
- OHA projects offer significant wider benefits through enabling the future decarbonised energy system: avoided renewable curtailment, avoided CO₂ emissions, avoided loss of load and redispatch savings. This value is not fully captured in the assessed monetised benefits.
- The modelled GB constraint costs are over-estimated and should not be interpreted as consumer disbenefits.

3.2 Sensitivities and Interpretation of the CBA analysis

All cost benefit analysis (CBA) modelling is necessarily subject to limitations and sensitive to the input assumptions taken at the point of analysis. In our view, some of Ofgem's CBA choices have resulted in an underestimation of the quantifiable net benefits of LionLink.

- **For OHAs, the choice of assumed market arrangements, which are still uncertain, will fundamentally impact the distribution of benefits in the CBA.** The results from the CBA

⁹ Projects of Mutual Interest (PMI) are key cross-border energy infrastructure projects between the EU and non-EU countries, which contribute to EU energy and climate policy objectives. Alongside the Projects of Common Interest (PCI) which link EU countries, PMIs are internationally recognised for contributions to energy and climate goals and benefit from streamlined planning and regulatory approvals.
https://ec.europa.eu/commission/presscorner/detail/en/qanda_23_6048

assessment of OHAs should not be interpreted as precise. There are several sensitivities that could fundamentally impact these results, including the market arrangements in GB, the EU and those that will govern these assets. Ofgem's CBA has assumed an Offshore Bidding Zone (OBZ) model for the Dutch energy hub. We agree that this is a reasonable assumption for the purpose of modelling, however, when inferring conclusions from the analysis, it is critical to note that, at time of writing, there is continued uncertainty in this area. For example, OBZ has not been confirmed and questions remain regarding how an OBZ would be implemented¹⁰. A Home Market model would fundamentally change the allocation of benefits across the OHA and windfarm developers.

Now is the time to proceed with critical infrastructure investment that we know will reinforce network resilience and security of supply across GB and Europe. While we do not suggest that further analysis should be undertaken by Ofgem based on different market arrangement scenarios, these uncertainties should be understood when considering the distribution of congestion revenues.

- **The interconnector capacity baseline in Ofgem's CBA is inflated at 14.3GW**, of which 2.6GW (~20%) represents projects that have not yet taken final investment decision and there is no clear path to delivery (primarily because of lack of support in the connecting country). The modelling effect of this is to dilute credible project benefits, and this will be particularly true for quantified security of supply benefits. This effect, of producing suppressed project benefits, is considerably exacerbated in the results of the Marginal Additional (MA) approach, for which the interconnector capacities of the seven projects being assessed in the third interconnector application window and the second OHA pilot project are assumed within the baseline.
- **Primary reference to MA results will provide the most conservative view of project benefits.** The combined use of the First Additional (FA) and MA modelling produces an envelope of upper and lower bounds for potential project impacts. However, in the context of Ofgem's minded-to positions for projects in this application window, the prioritisation of MA results risks distorting system margins and significantly understating expected benefits that the project will deliver. Only one Window 3 project has a minded-to approve position and the reject positions have sometimes been on grounds external to the main CBA metrics, such as maturity or deliverability in the connecting country. The effect of this is to dilute the benefits of the other projects being assessed, in contrast to the FA results which will be a closer reflection of reality based on Ofgem's consultation position. This is particularly the case for security of supply results for which the value of benefits, as discussed later in this section, are underestimated.

In forming its final evaluations of likely project benefits, Ofgem should consider either reviewing the FA results of the strongest three to four projects or undertaking a second iteration of MA analysis on that smaller pool of strongest projects. Doing so would better reflect the benefits of those projects being progressed.

- **The choice of EU energy scenario implies an extreme projection of GB as a net exporter.** An interconnector project's CBA will be highly sensitive to the energy scenarios used in the modelling, on both sides of the cross-border connection. While three FES 2022 scenarios are used in Ofgem's analysis for GB, for EU countries a single scenario is used based on the 2020 Ten Year Network Development Plan (TNYDP). Consequently, the EU assumptions do not fully capture the more

¹⁰ See ['The offshore bidding zone – a blueprint by TenneT'](#)

recent government policy positions of connecting countries, resulting in a faster trajectory of decarbonisation for GB than in the Netherlands and EU.

This will fundamentally impact the projected price differentials and interconnector flows, which in turn will affect the profile of SEW benefits and projected constraint costs. The results of assessments undertaken by NGV and TenneT have indicated different distributions of economic benefits from LionLink to those produced in Ofgem’s CBA (e.g. positive consumer welfare impacts over the 25-year period in four out of five studies), and we expect that one of the key differences has been the European input assumptions. Most importantly, these studies use the more recent TYNDP 2022 scenarios. We note that the IPA CBA is an outlier, resulting in the highest net exports from GB –other CBAs undertaken by NGV had more varied results, predominantly GB export but at far less pronounced levels based on a less exaggerated difference in assumed GB and EU connecting country decarbonisation trajectories.

While we recognise that all CBA modelling is subject to limitations, we have highlighted some of the main areas where there is a risk that Ofgem’s assumptions and approaches have resulted in an underestimation of the benefits of LionLink. Ofgem’s appraisal of LionLink is positive, in our view this is based on the most conservative quantification of project benefits which would be significantly higher.

3.3 Interpretation of socioeconomic welfare (SEW) results

The socioeconomic welfare assessment (SEW) is not reflective of the primary drivers for progressing OHA projects.

The total welfare benefits modelled for LionLink are comparable to those of interconnector projects previously approved to the cap and floor regime, which are now delivering value to GB. The SEW assessment has been the conventional approach for providing a quantitative assessment of interconnector projects in the cap and floor application windows. With GB having typically been projected to be the higher priced market and net importer in previous windows, for previous interconnector projects it has been relatively simple to demonstrate their direct consumer welfare benefits. However, it should be noted that the CBA net *total* welfare impacts of these projects were still relatively marginal and it appears that the economic case was based on the modelled consumer benefits (see Table 1 for total welfare impacts of the Windows 1 and 2 projects that have taken Final Investment Decision (FID)). NSL, IFA2 and Viking Link are now all operational and, alongside the wider GB interconnector portfolio, have delivered demonstrable value to GB consumers, especially through their contributions to security of supply¹¹. Ofgem was right to approve these projects for the regulatory regime but might not have done so had a narrow focus been taken on the total welfare alone.

Table 1: Total GB welfare impacts, NPV (MA results) for cap and floor regime projects that have taken FID

| £ bn | Base | Low | High |
|----------------------------------|------|------|------|
| NSL (2013 prices) ¹² | 0.3 | -0.8 | 1.0 |
| IFA2 (2013 prices) ¹³ | 0.1 | -0.3 | 0.4 |

¹¹ For further details on how NGV’s operational interconnectors contribute to GB energy security, see [Vital Connections, Dec 2023](#)

¹² [Initial Project Assessment for the NSN interconnector to Norway](#), Dec 2014

¹³ [Initial Project Assessment of FAB Link, IFA2, Viking Link and Greenlink Interconnectors](#), Mar 2015

| | | | |
|--|------|------|-----|
| Viking Link (2013 prices) | 0.2 | -0.6 | 0.6 |
| Greenlink (2013 prices) ¹⁴ | 0.1 | -0.1 | 0.3 |
| NeuConnect (2015 prices) ¹⁵ | -0.3 | -1.0 | 0.4 |

With GB forecast to be a net exporter, the shift in the allocation of welfare derived from additional interconnection to GB was anticipated in the conclusions of Ofgem's Interconnector Policy Review. However, despite direct GB consumer benefits no longer being the principal advantage of additional cross-border capacity, Ofgem rightly proceeded with announcing this latest cap and floor application window based on the opportunity for broader benefits for the UK, in line with government policy ambitions.

While we note that our own analysis suggests a more balanced import/export dynamic than presented in Ofgem's CBA, scenarios with higher projected GB exports will benefit the producer welfare in GB and the consumer welfare in the Netherlands. Ofgem's assessment of SEW impacts of LionLink broadly finds net improvements in total welfare from the project (ranging between -£0.2bn to £1.6bn under the MA analysis). While we agree that under most scenarios the net SEW impacts of LionLink will be positive, **we think it is critical to look beyond a narrow focus on total welfare benefits as the monetised assessment to ensure that the full wider benefits for GB from OHA projects are accounted for.** The key advantages of delivering the OHA projects are captured in wider benefits elsewhere.

3.4 The wider benefits of OHAs projects

OHA projects offer significant wider benefits through enabling the future decarbonised energy system: avoided renewable curtailment, avoided CO2 emissions, avoided loss of load and redispatch savings. This value is not fully captured in the assessed monetised benefits.

OHA, and interconnection more broadly, will be critical to ensuring a resilient decarbonised electricity system. The UK government's energy security strategy and ESO's Future Energy Scenarios (FES) have both identified the importance of increasing the deployment of flexible technologies, specifically interconnectors, to enable security of supply. Interconnectors are one of a few clean, mature flexibility solutions that can be deployed at scale to help the UK meet its 2035 clean power system and 2030 offshore wind targets as part of wider energy security goals.

It is not clear that the principal benefits that LionLink delivers are adequately recognised within the monetised assessment of the project.

- GB security of supply is under-valued in Ofgem's CBA
 - Ofgem's CBA has assessed vast decarbonisation benefits across GB and Europe from delivering but the monetised measure fails to capture this positive contribution, with the decarbonisation impact being represented as a societal cost to GB.
 - Avoided curtailment of renewable energy is an unquestionable wider benefit of increased interconnection capacity, but this is not monetised.
- **GB security of supply is under-valued in Ofgem's CBA.** The transmission-level flexibility that interconnection brings to a decarbonised electricity system provides a vital contribution to

¹⁴ [Update on IPA of the Greenlink interconnector](#), Aug 2015

¹⁵ [Initial Project Assessment of the GridLink, NeuConnect and NorthConnect Interconnectors](#), Aug 2017

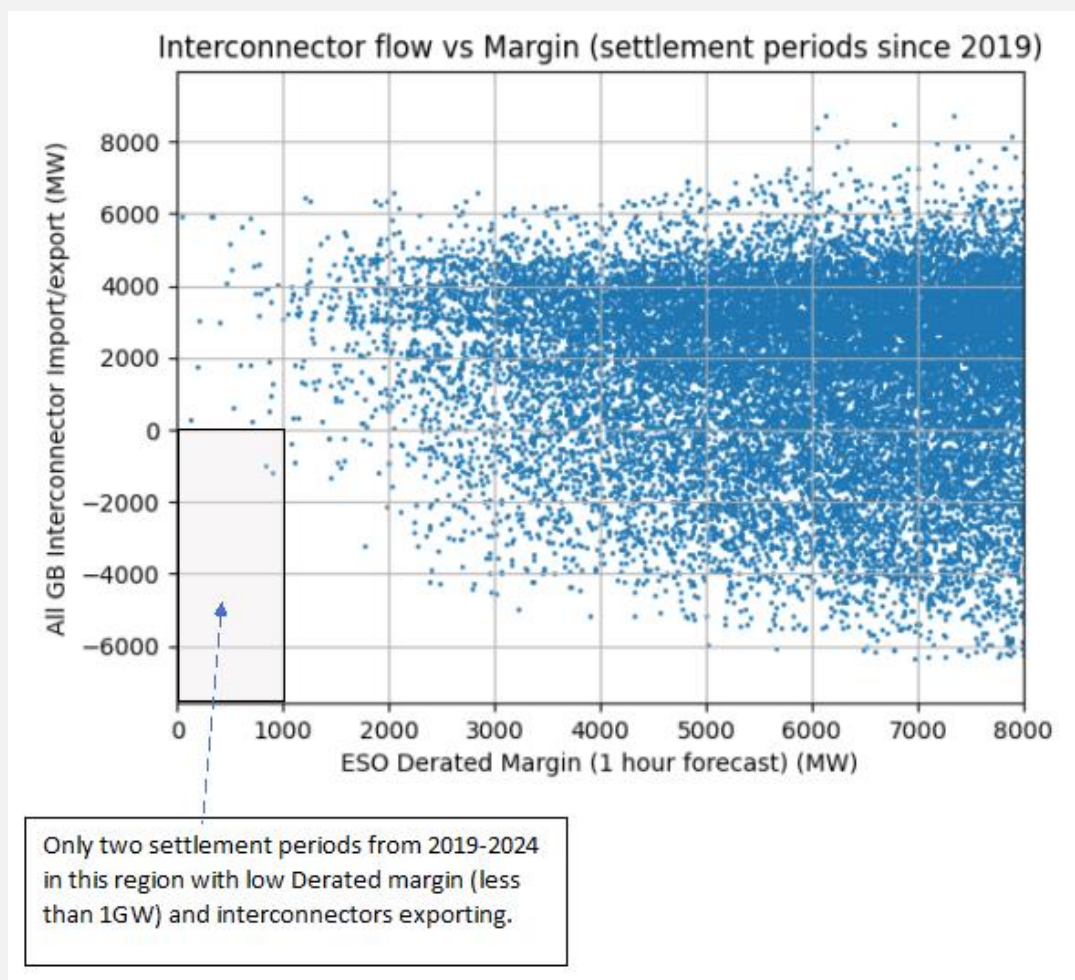
affordable security of supply. It is critical that this is appropriately accounted for in Ofgem’s IPA assessment.

The assumptions underpinning Ofgem’s CBA has resulted in GB being forecast to predominantly be a net exporter by 2030. However, ‘net’ trends will inevitably conceal considerable underlying market volatility and occasional price shocks, and in those periods cross-border interconnection can ensure that consumer demand and security of supply is met at the most affordable prices.

Interconnectors play a key role in supporting GB security of supply during times of electricity system stress

De-rated margin is an indicator of GB system tightness, published each hour by the ESO. A de-rated margin of less than 1GW could be considered ‘tight’ while a margin of less than 500MW is likely to trigger a capacity market warning notice if forecast in advance.

By plotting GB imports/exports against the de-rated margin it is clear that the interconnectors that link GB to continental Europe have a strong tendency to operate in the GB-import direction when GB margins are tight. There were just two instances of GB-exports when de-rated margins have been below 1GW since 2019 and none when the level was lower than 500MW.



In line with the performance of the existing operational GB interconnector portfolio, LionLink would offer robust benefits to GB through its support to security of supply. Offering 1.8GW of capacity, when GB margins are tight LionLink will deliver huge power flows to GB as other operational interconnectors do today. For the future GB electricity system in which intermittent renewables make up a significant share of the generation mix, this magnitude of flexible capacity will provide crucial benefits to system security.

Quantifying the incremental value that additional interconnection brings to security of supply as a monetised benefit is not straightforward. We understand that a quantified metric is preferred by Ofgem and the chosen method was to derive the reduction in unserved hours of energy. This is one approach but has limitations given that, by definition, future energy scenarios are constructed to provide different paths for ensuring there is sufficient system margin to meet demand. It is unsurprising that under the most decarbonised GB scenario in Ofgem's CBA, the **security of supply benefit of LionLink is nearly £6bn using the FA approach**. While it represents one scenario, this quantified benefit should not be discounted from Ofgem's economic assessment on the basis that it is not Ofgem's MA central case. The nature of the risk of security of supply, and the corresponding opportunity cost of not having sufficient system margins, is that it should reflect the worst-case credible scenario, of which this is one.

- An alternative **measure for evaluating the contribution of assets to GB security of supply is to assess the impact they might have on the Capacity Market (CM)**. The CM is the instrument used in the GB electricity market to ensure security of supply for which the total cost in a given year is the cost of providing a targeted GW supply that exceeds peak demand.

For illustrative purposes, NGV conducted analysis to calculate the potential cost savings that LionLink and Nautilus could contribute to the CM, as price takers in the auctions, by providing an additional 2GW de-rated capacity¹⁶ to security of supply from 2032 onwards. We expect the CM to tighten between 2030 and 2035, driven by the exiting of gas plant, potential delays in the Hinkley C nuclear plant and faster electricity load growth from data centres and the electrification of heat and transport. Under these conditions, the CM clearing prices are more sensitive to any change in price taker capacity. Based on our analysis, **including both OHA pilot projects in the capacity mix in 2032 could save consumers an additional £1.2bn in CM payments for 2032 alone**, maintaining the same security of supply levels and CM capacity procurement targets. Extending this analysis, **inclusion of LionLink and Nautilus in the capacity mix over the period 2032-2040 could save consumers an additional £6.7bn**.

- Ofgem's CBA has assessed **vast decarbonisation benefits across GB and Europe** from delivering but the monetised measure fails to capture this positive contribution, with the decarbonisation impact being represented as a societal cost to GB. In any assessment of decarbonisation impacts, it is right to account for the net effect across relevant geographies rather than impact within a single jurisdiction (e.g. GB alone, which would be misleading). The CBA identified **overall net reductions in carbon emissions across GB and Europe of 10.9Mt in Ofgem's MA central case** (Consumer Transformation) and this is a hugely significant project benefit.

While the overall decarbonisation impact of LionLink (in reduced volume of CO₂ emissions) is represented in Ofgem's CBA multi-criteria, the monetised CO₂ reduction (as societal value) only references the GB impact. A further consequence of GB being the net exporter is an expected

¹⁶ Applying the de-rating factors of Nemo Link and BritNed from the 2027/28 T-4 auction as proxies.

increase in the dispatch of thermal generation in GB compared to the counterfactual, meanwhile there is a net increase in overall usage of renewable energy sources across Europe. The monetised decarbonisation impact to GB of LionLink is represented by a £0.6bn societal cost in Ofgem's MA central case. This conclusion is deeply misrepresentative of the actual positive contribution that LionLink would make to decarbonisation, as demonstrated in the non-monetised results. It is a fundamental distortion in Ofgem's assessment not to monetise the net European impact of decarbonisation. **In CBA analysis undertaken by NGV we have found decarbonisation benefits of £2.7bn from the delivery of LionLink** (calculated as CO₂ savings).

- **Avoided curtailment of renewable energy** is an unquestionable wider benefit of increased interconnection capacity, but this is not monetised. One of the most compelling wider benefits of increased interconnection is the avoided curtailment of renewable energy sources through increased integration. Again, like the overall decarbonisation impact, this is not monetised in Ofgem's CBA, which identifies LionLink as capable of delivering an average benefit of 1.0 TWh/year in the MA central case. We understand that Ofgem's choice not to monetise this indicator has followed ENTSO-E guidance, however, not doing so risks failing to recognise the substantial value to the integration of renewables that is delivered by LionLink. As part of a project CBA undertaken by Afry for NGV, across the 25-year period, **renewable curtailment benefits of £1.5-£1.8bn were identified from the delivery of LionLink.**

Failing to attach monetised values to the wider benefits delivered by OHAs will result in these assets being undervalued. Ofgem's appraisal of LionLink is positive, accounting appropriately for these wider benefits would improve the project's quantified economic assessment even further.

3.5 The modelled GB constraint costs are over-estimated and should not be interpreted as consumer disbenefits. We are deeply concerned that the output of the ESO's GB constraint cost modelling is being used within the overall CBA to infer large-scale consumer disbenefits from the OHA pilot projects, when in fact they should provide a signal for network reinforcement. We note that generation connections are not subject to this form of assessment due to the Connect and Manage regime but are likely to produce significant constraint costs in the absence of wider transmission infrastructure.

In GB, while interconnectors and OHAs are developer-led, ultimately the GB connection location is decided by the ESO. Through the Connection and Infrastructure Options Note (CION) process, developers are given their GB connection point by the ESO. Given that an assessment has already been undertaken and concluded by ESO for the selection of the connection location, it is frustrating that a second assessment can be undertaken by ESO within this IPA process that is capable of discrediting the case for delivering this critical infrastructure.

In our experience, **constraint cost analysis is extremely sensitive to inputs used and chosen modelling techniques**, with the potential for different (reasonable) approaches to the same question to lead to considerably divergent results. Amongst other factors, these results will be extremely sensitive to assumptions on GB network design (the analysis will not use the most recent recommendations from the ESO's Beyond 2030 report¹⁷), the assumed location of GB generation and possible interactions with future market design reforms.

As with SEW analysis, the system constraint impacts of the GB network will be highly sensitive to the direction of flows (and extent to which GB is a net exporter). Depending on the connection location,

¹⁷ <https://www.nationalgrideso.com/future-energy/beyond-2030>

export flows may exacerbate or alleviate existing GB network constraints. As we noted above, the CBA assumptions have resulted in net export flows across LionLink. Were the flows less export dominant or even reversed, as may be produced using different input scenarios and baseline interconnection, the extent of these projected impacts could be reduced.

We would suggest caution is taken in how the ESO results are used against the wider CBA. Interconnectors are transmission assets connecting GB to other markets providing critical flexibility to the GB grid, it is inappropriate both to interpret their existence as the cause of transmission constraints and to directly interpret these results as consumer disbenefits. In our view, **the ESO's analysis undertaken for Ofgem has resulted in over-inflated constraint costs and should be given less weight in the overall IPA assessment**, doing so would improve even further the case for LionLink.

There are distinct differentiators that set OHAs apart from point-to-point interconnectors. The flexibility of the OHA pilot scheme should be harnessed to recognise this.

4.1 It is right that OHAs are being assessed within the pilot scheme, which should be treated as a process that is distinct from the established regime for point-to-point interconnectors.

The pilot scheme offers a valuable opportunity to evolve the cap and floor regime to be suitable for OHA projects. We are pleased that Ofgem has assessed LionLink as demonstrating sufficient net benefits for regulatory approval and in our view the real benefits will be greater still than those monetised values in the CBA results.

The cap and floor regime has successfully facilitated the positive final investment decisions of six point-to-point interconnectors to GB, with NGV being joint partner in the four that are now operational. The enduring regime, which built on the first-of-a-kind regulatory framework developed with the Nemo Link pilot project, has proved to be an effective policy that has been replicated across countries and technologies. However, distinctive benefits, risks and commercial models set OHAs apart from point-to-point interconnectors. This is the first opportunity to test the regime for OHAs and, just as the regulatory process was developed in conjunction with development of the Nemo Link pilot project, the OHA pilot scheme should allow for 'learning by doing' and enable appropriate adjustments in response to the unique features of this new asset type.