Response to the Tarchon Cap and Floor Consultation
Sir Bernard Jenkin

The Tarchon interconnector, a proposed project linking Great Britain (GB) and Germany, has been set out as a solution to make energy supply cleaner, cheaper, and more secure.

However, work by Arup and National Grid Electricity System Operator (ESO) for Ofgem in support of Ofgem's minded-to decision with respect to a cap and floor agreement reveals that Tarchon fails in respect of each of these promises as well as, importantly, the assessment criteria set out by Ofgem.

This paper is submitted in response to the current consultation.

- Arup has demonstrated that Tarchon, if built, would increase prices for GB consumers by £5 billion over the lifetime of the project (NPV 2022).[1] Granting a cap and floor agreement to the project would therefore be inconsistent with Ofgem's primary objective as outlined in Section 3A of the Electricity Act 1989: to protect the interests of existing and future consumers.

- During the consultation discussions, Ofgem suggested that future electricity prices are likely to be lower than current prices. They argued that Tarchon would lead to a smaller reduction in prices, but prices would still decrease. However, this is the wrong way to measure the impact of Tarchon. The benefits to consumers should be assessed by comparing future scenarios with and without Tarchon. Many factors will determine whether electricity prices fall in the future, and there is no guarantee. It is wrong to assume that they will be lower than today. Regardless of the modelled scenarios, Tarchon will cause an increase in the market price for electricity in the GB when measured against the same circumstances without Tarchon. This is the only objective measure.

- Ofgem is inclined to approve a cap and floor agreement for Tarchon. They argue that while GB consumers are expected to bear a cost of £5 billion, this would be offset by a benefit of around £7.5 billion to GB producers, making Tarchon beneficial for the country overall.[2] However, Ofgem has not considered that the

[1] Multi-Criteria Assessment framework report for Cap and Floor W3 and Offshore Hybrid assets Pilot Projects p. 29 link
[2] Market Modelling Analysis for Cap and Floor W3 and Offshore Hybrid Assets Pilot Projects, p. 87 link

generation in the East of England, where Tarchon is proposed to be connected, is largely owned by foreign investors. Although the wind farms are built on the GB seabed, the profits would be paid to foreign investors. When properly accounting for the flow of profits to foreign investors, Tarchon would result in a net loss of £4.3 billion for the GB, with consumers losing £5 billion, only marginally offset by a profit of around £1.2 billion for GB producers. The £5.8 billion balance of the Producer Socio-Economic Welfare (SEW) will accrue to foreign companies.

- Ofgem has said that Tarchon will contribute to GB energy security. Modeling by ESO for Tarchon has demonstrated that it will be expected to export 85% of the time. The remaining capacity does not leave sufficient headroom to allow Tarchon to make any reasonable contribution to GB energy security. Whilst it might be true that interconnectors can contribute to GB energy security, Tarchon is not expected to do so. Arup modeling concluded that Tarchon does not make any meaningful contribution to GB energy security, except in one extreme scenario where it made a marginal contribution but also resulted in an additional £2 billion in costs.[3]

- Ofgem has stated that Tarchon will reduce constraint costs in the form of payments to wind farms at times of high wind. ESO has demonstrated that this is untrue, and Tarchon will increase constraint costs by £530 million. This is due to the need to take additional rebalancing actions elsewhere in the network. ESO's finding is supported by Arup's modelling, which found thermal generation will be required to offset the exports of wind energy made via Tarchon.

- The presence of Tarchon has led to systematic bias and poor design choices in work by ESO in support of the government's Offshore Coordination Support Scheme, which Ofgem's report fails to address. ESO modelled alternatives to the Norwich to Tilbury project, assuming that the North Falls and Five Estuaries wind farms would be connected offshore via Sealink. However, they failed to ensure that their network designs were able to carry the electricity to areas of high demand in London, instead relying on export of electricity via Tarchon to avoid constraint payments to wind farms. When this issue was highlighted to ESO, they confirmed and agreed with the analysis. ESO then made a change to one of their scenarios, publishing it as option 5B in their report. While this reduced costs for that option by approximately £8.5 billion and produced the only network design which had no "red" in their analysis, ESO solved the problem by moving Tarchon

[3] Market Modelling Analysis for Cap and Floor W3 and Offshore Hybrid Assets Pilot Projects, p. 113 link

to another location and it still resulted in exporting power to Germany by system constraints as opposed to being driven by market forces.[4]

- ESO confirmed that additional capacity between Tilbury and Kent would be necessary to avoid exporting power but stated that they had not conducted detailed modeling for their other designs. This issue likely applies to all of ESO's alternatives (save for their offshore Alternative 1) and emphasizes that power will be exported via Tarchon at or near full capacity under all scenarios.[5]

- Given the similarity in network topology to designs where North Falls and Five Estuaries do not connect via Sealink, we stated that the same must also be true for the Norwich to Tilbury project. ESO confirm this in their submission in support of Ofgems minded-to-decision, demonstrating that Tarchon will export 85% of the time.

- Arup have demonstrated that Tarchon would lead to an increase in GB Emissions in the region of 5 million tonnes of carbon.[6]

Ofgem must assess each interconnector on its merits and ensure that it contributes to cleaner, cheaper, and more secure energy for GB consumers. Interconnectors should only proceed when there is a clear benefit to the consumer, an appropriate balance of interests for each connected country and certainly not when the scales are as imbalanced as in the case of Tarchon.

If an interconnector is shown to be in the GB national interest but not in the GB consumer interest, then it would be appropriate for the project to proceed without a cap and floor agreement. If a cap and floor agreement is needed to ensure financial viability, the project must not form part of the rate base and, therefore, not impact consumer prices. Instead, the cap and floor agreement together with any costs arising from it should be contracted with and financed by the Treasury out of general taxation.

In its current location, Tarchon would lead to increased domestic carbon emissions, higher consumer prices, and negligible contributions to energy security. It would therefore be incompatible with government policy and the regulation of the electricity sector. Ofgem should therefore not grant a cap and floor agreement to Tarchon.

---

[4] ESO East Anglia Network Study, link pp. 35-37
[5] Ibid. p. 37
[6] “Figure 55 - Changes in CO2 emissions due to Tarchon (Mt)”, Market Modelling Analysis for Cap and Floor W3 and Offshore Hybrid Assets Pilot Projects, p. 90 link

Arup and ESO reports demonstrate that Tarchon is not in the financial interest of Great Britain as a whole, least of all the British Consumer.

Section 3A of the Electricity Act 1989 states,

> The principal objective of the Secretary of State and the Gas and Electricity Markets Authority (in this Act referred to as 'the Authority') in carrying out their respective functions under this Part is to protect the interests of existing and future consumers in relation to electricity conveyed by distribution systems or transmission systems.[7]

Therefore, Ofgem is required to consider carefully and should not approve proposals that are not in the interest of Great British (GB) consumers.

Alongside their "Initial Project Assessment of the third cap and floor window for electricity interconnectors" published on 1 March, Ofgem have published three reports:

1. "Market Modelling Analysis for Cap and Floor W3 and Offshore Hybrid Assets Pilot Projects" by Arup (hereafter "ARUP A").[8]
2. "Multi-Criteria Assessment Framework Report for Cap and Floor W3 and Offshore Hybrid assets Pilot Projects" by Arup (hereafter "ARUP B").[9]
3. "Cap and Floor Window 3 and OHA pilot scheme Needs Case Assessment" by ESO (hereafter "ESO A").[10]

Ofgem acknowledges its obligations, referring to its document "Cap and Floor Third Application Window and MPI Pilot Regulatory Framework—Guidance on our Needs Case Assessment Framework." This framework states, "Projects may only be awarded a cap and floor regime in principle if the CBA indicates that the project provides benefits in the defined impact categories and Ofgem confirms this position."[11]

Ofgem further recognises the importance of location of an interconnector together with its impact on system operability stating, "the decision recognised that future windows would require targeting (by location, timing or capacity) to meet the evolving needs of the transmission network, ensure more strategic investment to meet Government

[7] Section 3A, Electricity Act 1989, link
[8] Market Modelling Analysis for Cap and Floor W3 and Offshore Hybrid Assets Pilot Projects, link
[9] Multi-Criteria Assessment framework report for Cap and Floor W3 and Offshore Hybrid assets Pilot Projects, link
[10] Cap and Floor Window 3 and OHA pilot scheme Needs Case Assessment: ESO modelling report, link
[11] Cap and Floor Third Application Window and MPI Pilot Regulatory Framework – Guidance on our Needs Case Assessment Framework, p. 9, link

ambitions" and "needs case assessment framework would consider system operability, decarbonisation, flexibility and security of supply, alongside the traditional socio-economic model".[12]

Ofgem states that "The applicants for Window 3 were assessed using an expanded assessment framework to consider wider benefits of interconnectors beyond socioeconomic welfare (SEW), acknowledging interconnectors' potential to capture new security of supply and decarbonisation benefits, which bring additional value to consumers beyond the impact on wholesale prices."[13] Ofgem state that in assessing the benefits of each project they have relied upon the work by Arup and ESO.

A. Impact of Tarchon on consumers

Arup's Market Modelling Analysis demonstrates that Tarchon will increase prices for GB consumers.

Figure 1 is a tabel taken from Arup B. The first line is measured in £ billions of Net Present Value. In every scenario the Socio-Economic Welfare (SEW) to consumers is negative. The estimates of cost to consumers range from £5.56 Billion in the central 'Consumer Transformation' scenario in which government targets are met, to -£2.31 Billion in the much more aggressive 'Leading the Way' scenario. In the Falling Short scenario the cost to consumers is £4.56 Billion. In all three scenarios, consumers pay more with Tarchon.

Figure 1: Socio-Economic Welfare for Tarchon

Tarchon

Impact category	Indicator	Unit	FA				MA			
			LW	CT	FS	RAG	LW	CT	FS	RAG
SEW	Consumers SEW	£bn real 2022, NPV	13.42	(4.86)	(5.69)		(2.31)	(5.56)	(4.56)	
SEW	Producers SEW	£bn real 2022, NPV	(7.65)	6.86	7.12		4.26	7.14	5.64	
SEW	Interconnectors SEW	£bn real 2022, NPV	(0.18)	0.55	0.45		0.39	0.51	0.31	
SEW	Total SEW	£bn real 2022, NPV	5.58	2.55	1.89		2.34	2.09	1.39	

Multi-Criteria Assessment framework report for Cap and Floor W3 and Offshore Hybrid assets Pilot Projects p. 29 link

This data is repeated graphically in Figure 2, taken from Arup A, where it is also compared to other projects under consideration.

[12] Cap and Floor Third Application Window and MPI Pilot Regulatory Framework – Guidance on our Needs Case Assessment Framework, p. 7, link
[13] Initial Project Assessment of the third cap and floor window for electricity interconnectors, link

Figure 2: GM Consumer SEW of Each Project

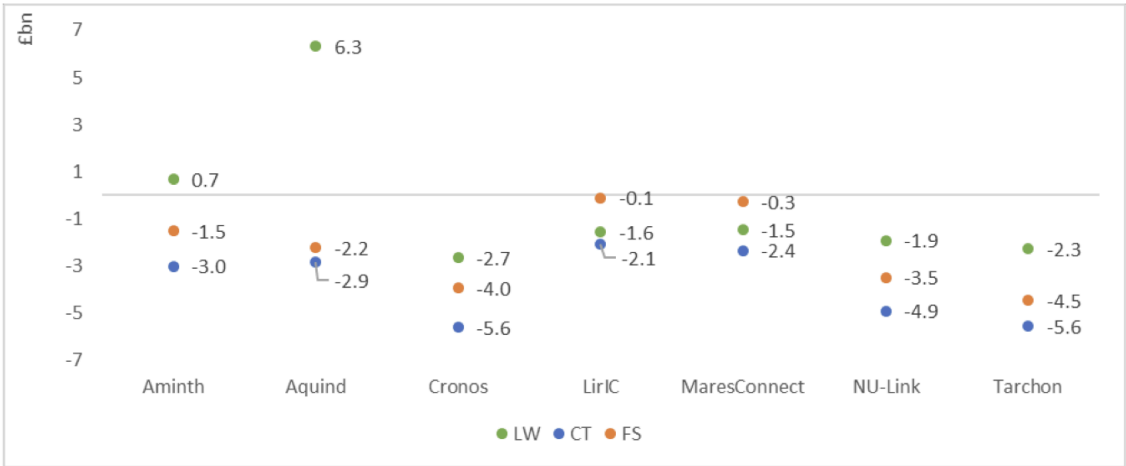


Figure 2 - GB consumer SEW impacts of each W3 IC project (£bn, real 2022)

"Figure 2 - GB consumer SEW impacts of each W3 IC project (£bn, real 2022)", *Market Modelling Analysis for Cap and Floor W3 and Offshore Hybrid Assets Pilot Projects*, p. 16 link

> Despite the negative Consumer SEW, Ofgem nonetheless issued a minded-to-approve decision for Tarchon, arguing that it benefits GB despite increasing consumer prices because it is in the overall benefit of the country. Their argument is that the value to Producers (£7.14 billion in the central CT scenario) outweighs the cost to Consumers. This is illustrated graphically in Figure 3, again taken from Arup A.

Figure 3: Socio-Economic Welfare Impacts of Tarchon

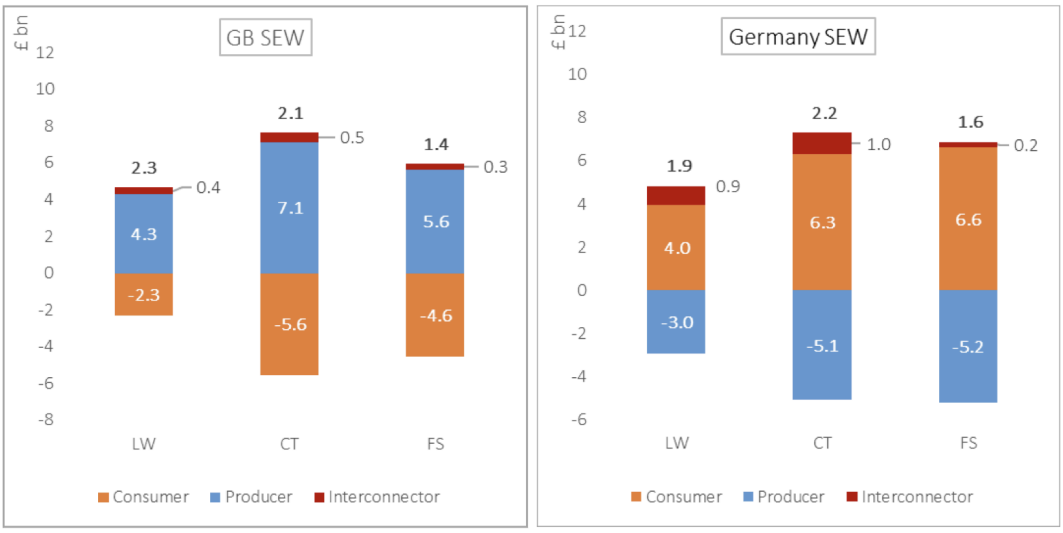


Figure 51 - SEW impacts of Tarchon in GB and Germany (£bn, real 2022, NPV)

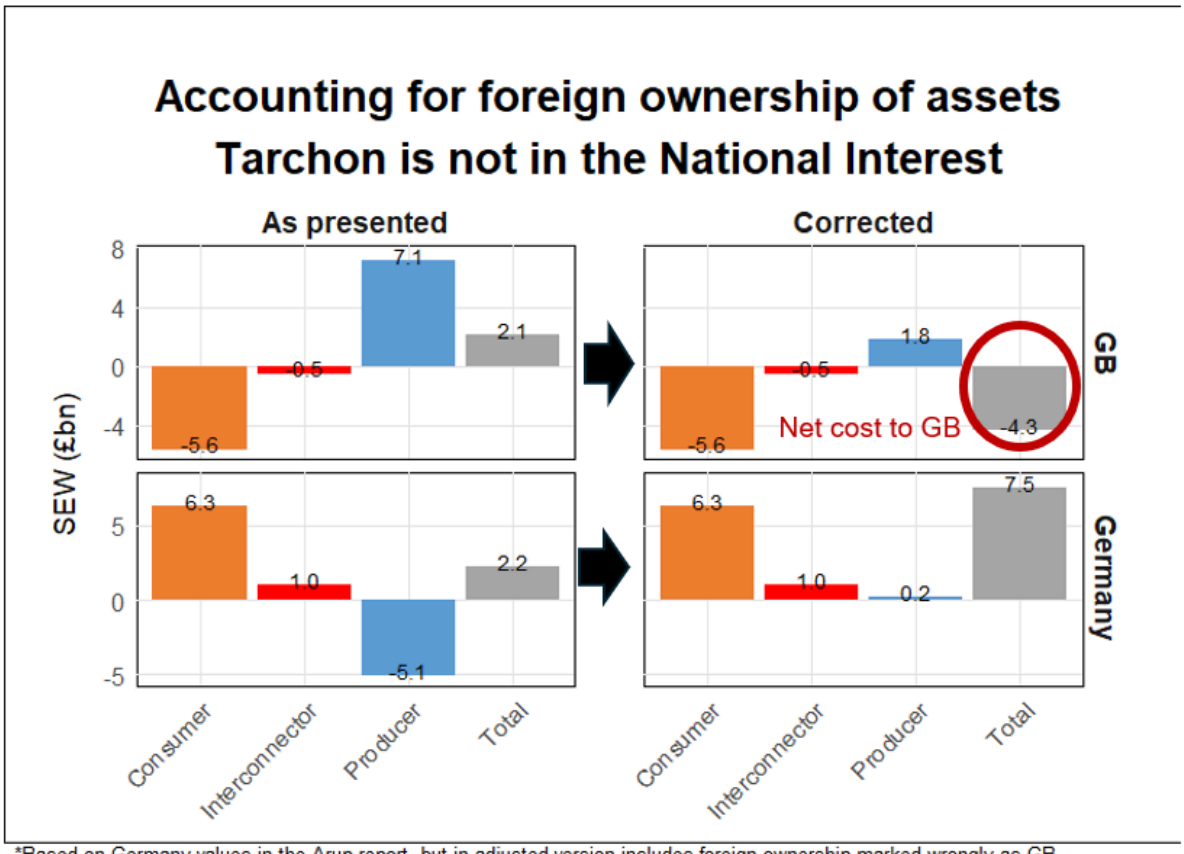
"Figure 51 - SEW impacts of Tarchon in GB and Germany (£bn, real 2022, NPV)", *Market Modelling Analysis for Cap and Floor W3 and Offshore Hybrid Assets Pilot Projects*, p. 87 link

This figure also demonstrates that in all scenarios, while GB consumer prices increase, German consumer prices decrease through an increased supply of cheaper electricity. For example, in the Consumer Transformation scenario, GB consumers lose £5.6 billion due to Tarchon, and consumers in Germany benefit to the tune of £6.3 billion. In the Falling Short scenario, GB consumer costs increase by £4.6 billion, whilst German consumers benefit by £6.6 billion. Not only do German consumers benefit each time GB consumers suffer higher costs, but the balance of rewards is highly asymmetric: German consumers benefit by more than GB consumers lose.

The opposite is said to be true for producer SEW: GB producers are said to benefit and German producers to suffer. However, this analysis is based on flawed assumptions that do not account for foreign ownership of assets. In reality, the Tarchon interconnector is 85% owned by Copenhagen Infrastructure Partners. Each of the generation assets in the East of England is also owned in the major part by foreign investors. Appendix 1 to this document details the most recent ownership of each relevant asset. The two projects with the HIGHEST proportion of British ownership are the Greater Gabbard wind farm and the North Falls wind farm. In each case, the proportion of British ownership is 50%. All other projects have far lower British ownership, and the majority are 0% – entirely

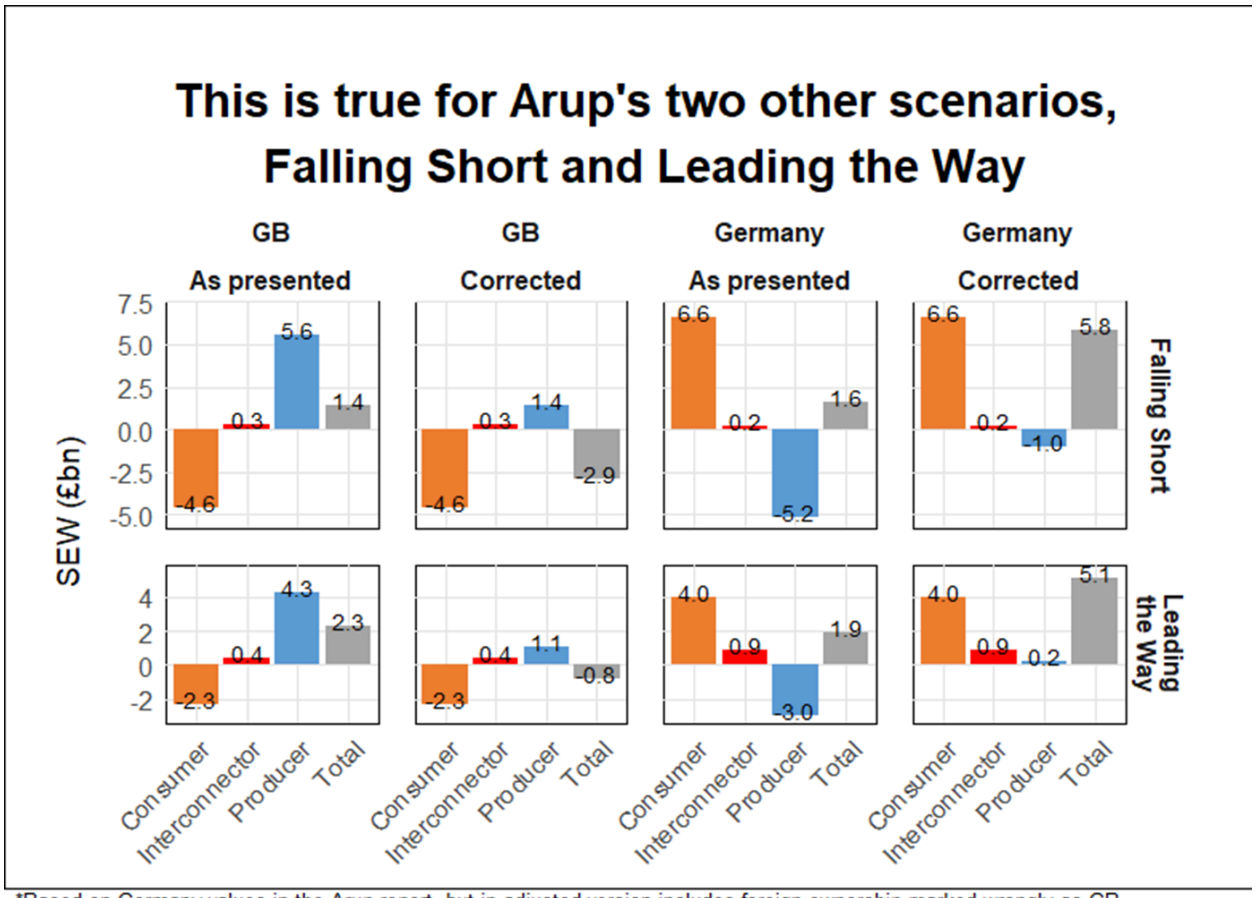
foreign-owned. In such cases, the UK Treasury might benefit from taxation on profits; however, the profits themselves will accrue and be transferred to the foreign investors. It is wrong, therefore, to claim that these represent a GB SEW or that they accrue to the UK. When properly accounting for the foreign ownership of assets, Tarchon results in a net loss to GB of £4.3 billion and a minimum net gain to the rest of the world of £7.5 billion (figure 4).

Figure 4: SEW in the CT scenario corrected for foreign ownership



*Based on Germany values in the Arup report, but in adjusted version includes foreign ownership marked wrongly as GB.
**Data taken from the Consumer Transformation Scenario of the Arup Market Modelling Anaysis p. 87.

Figure 5: Other Ofgem Scenarios



*Based on Germany values in the Arup report, but in adjusted version includes foreign ownership marked wrongly as GB.
**Data taken from the Consumer Transformation Scenario of the Arup Market Modelling Anaysis p. 87.

Arup are correct in one regard: the British consumer is worse off in all scenarios as a result of Tarchon. Arup state, "In GB, Tarchon delivers negative consumer SEW impacts in all scenarios."[14] This is because "The project largely exports electricity from GB to Germany, driving higher wholesale prices in GB". They conclude, "CT (the Consumer Transformation scenario) represents the worst-case scenario in terms of additional cross-border capacity." Lower prices in GB from greater installed renewable generation capacity result in "high and continuous GB exports, putting upward pressure on GB prices."[15]

However, Arup are not correct in their other conclusion. Rather, the total SEW impact of Tarchon in the UK is also negative in all scenarios. Moreover, the balance of rewards is entirely skewed: in all scenarios, Germany benefits and the UK loses. Ofgem rejected two other applications to Window 3 IPA (LirIC,

[14] Market Modelling Analysis for Cap and Floor W3 and Offshore Hybrid Assets Pilot Projects, p. 87 link
[15] Ibid. p.15

MaresConnect) on the grounds of “Reservations surrounding negative SEW”.[16] Each of these projects was found by Arup to be less damaging to GB (- £0.9 billion and - £0.8billion costs respectively) than Tarchon (- £4.3) after correcting for foreign ownership.[17] Tarchon too must be rejected on the grounds of damage to GB and Consumer SEW.

B. Tarchon fails to improve Flexibility and Security of Supply

The impact of Tarchon on GB Energy Security is considered in Arup A. Arup state, “only in LW (Leading the Way) from 2040, energy supply fails to meet demand in periods of system stress, leading to significantly high wholesale prices”. Arup then notes, “In CT (Consumer Transformation and Falling Short), no USE (Unserved Energy) hours are observed before and after the introduction of the project”. They summarise, “Tarchon does not have a positive nor negative impact on SoS (Security of Supply) in GB”.

Arup conclude that Tarchon will not increase GB electricity security under any reasonable scenario for the reason that the UK will already have sufficient supply without Tarchon. This is further detailed in Figure 6, taken from Arup A.

Figure 6: Change in cost of unserved energy in GB

Table 23 - Change in cost of unserved energy in GB following the introduction of a new IC project (£m, real 2022)

Project	LW	CT	FS
Aminth	- 371.5	0	0
Aquind	- 547.9	0	0
Cronos	- 298.2	0	0
LirIC	- 64.7	0	0
MaresConnect	- 69.7	0	0
NU-Link	- 311.6	0	0
Tarchon	- 347.6	0	0

“Table 21 - Change in cost of unserved energy in GB following the introduction of a new IC project (£m, real 2022)”, *Market Modelling Analysis for Cap and Floor W3 and Offshore Hybrid Assets Pilot Projects*, p. 113 link

[16] Initial Project Assessment of the Third Cap and Floor Window for Electricity Interconnectors, p. 15 link
[17] Ibid. p.87

Even in the most extreme Leading the Way scenario, the security benefit is just £347 million. This compares very unfavorably to the increased cost to consumers of £2.3 billion in the same scenario and even to the increased cost to GB as a whole of £800 million (Figure 5). Simply put, the GB consumer would be about 700% better off just to suffer a shortage in supply. The country as a whole would be 250% better off. Tarchon must be rejected on the basis that it does not contribute to or enhance Energy Security in the UK except in one outlier scenario, and even in that scenario it does so at a cost that is dramatically worse than suffering a shortage in supply.

C. Tarchon results in increased Carbon Emissions in the UK.

The impact of carbon production in the UK is considered in Arup A. Arupe conclude,

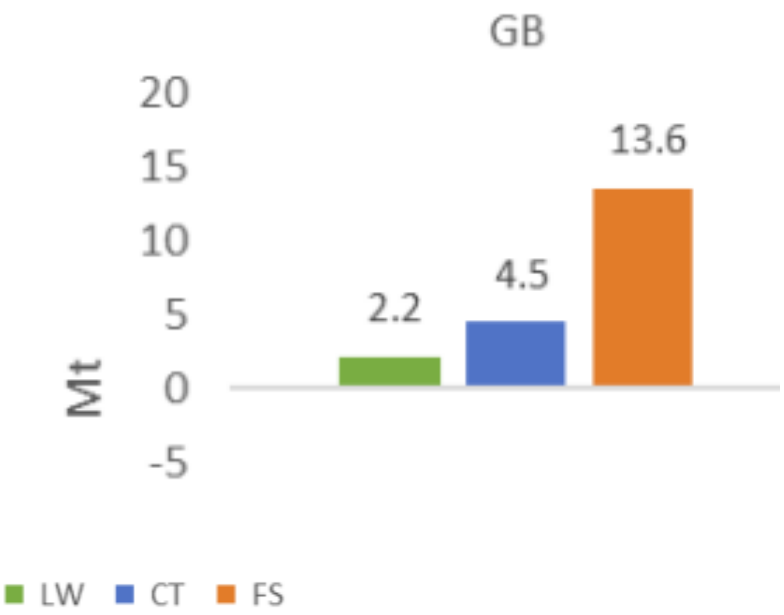
> Most of the W3 IC (Window 3) projects assessed lead to an increase in CO2 emissions in GB in all scenarios, compared to the counterfactual. On average, these projects are used primarily to export electricity from GB to the relevant connecting country, increasing GB wholesale prices compared to the counterfactual. This leads to more thermal generation being dispatched and to higher emissions.[18]

In short, the export of green electricity from wind farms via Tarchon directly results in the UK continuing to burn gas and coal to maintain domestic power supply. This has a twofold negative impact on the UK. Firstly, it undermines our efforts to decarbonise the electricity grid and meet our climate change commitments. Secondly, the increased CO2 emissions lead to greater demand for carbon credits, driving up prices and thereby imposing additional costs on our manufacturing sector, which is already struggling to remain competitive in the global market.

The net increase in carbon emissions in the UK is assessed by Arup to be 4.5 million tonnes in the central CT scenario, 2.2 million tonnes in the Leading the Way scenario, and a staggering 13.6 million tonnes in the Falling Short scenario (Figure 7)

[18] Initial Project Assessment of the Third Cap and Floor Window for Electricity Interconnectors, p. 108 link

Figure 7: Impact of Tarchon on Domestic Carbon Emissions



"Figure 55 - Changes in CO2 emissions due to Tarchon (Mt)", *Market Modelling Analysis for Cap and Floor W3 and Offshore Hybrid Assets Pilot Projects*, p. 90 link

There is a material risk that the Falling Short scenario is realised. The fact that Tarchon increases UK carbon emissions is bad enough; the dramatically skewed outcome in the Falling Short scenario highlights that the impact of Tarchon is worst precisely when the country needs domestic green energy. Proceeding with such a project cannot be prudent or sensible carbon-risk management.

Arup and Ofgem argue that Tarchon should nevertheless proceed because it has a positive impact on carbon emissions in Europe (excluding GB). Whilst this may be true on paper, it is only as a result of allowing Germany to turn off its thermal generation capacity. This provides a negative incentive which removes the need for German (and other EU) generators to take care of modernisation and decarbonisation of their own systems. This has the further impact of reducing the demand for and hence price of EU Allowances, thereby reducing the incentive for manufacturers across Germany and the wider EU to decarbonise. Once more, it is German and EU consumers and producers who benefit at a cost to Britain and British consumers.

The approval of the Tarchon interconnector would severely undermine the UK's ability to meet its decarbonisation targets set by the government. Under the Climate Change Act and the Paris Agreement, the UK has a legal obligation to prioritise the reduction of its territorial greenhouse gas emissions.[19] As the regulatory authority, Ofgem must carefully consider the impact of any proposed interconnector on the UK's progress towards these targets. The central Consumer Transformation scenario predicts that Tarchon will lead to a substantial increase in UK emissions by 4.5 million tonnes. This alarming projection clearly demonstrates that the Tarchon project is incompatible with the UK's decarbonisation goals and, therefore, must be rejected by Ofgem.

D. Impact of Tarchon on Constraint Costs

Ofgem's press release from 1st March 2024 addresses the potential impact of the Tarchon interconnector on constraint costs. The release suggests that "The cable would connect the two countries' energy markets and enable renewable energy to be exported, at times when generation exceeds demand, thereby boosting security of supply and cutting consumer bills, by reducing payments to wind farms to switch off during times when they are generating more electricity than can be used domestically".[20] However, this assertion warrants closer examination.

The Electricity System Operator (ESO) has conducted extensive analysis on the relationship between interconnector location, import/export flows, and constraint costs. This analysis, which informed Ofgem's third Cap and Floor Window and Offshore Hybrid Asset (OHA) pilot regulatory framework, revealed that the geographical position of an interconnector and the direction of its energy flows significantly influence its impact on overall constraint costs. The ESO's findings emphasise that:

> Previous analysis undertaken by the ESO, such as the analysis to support Ofgem's third Cap and Floor Window and OHA pilot regulatory framework, has highlighted how the location of an interconnector or OHA and the import and export flows for the project can have a significant impact on whether a project will cause an increase or decrease in total constraint costs. *The analysis has shown that only interconnectors connecting to Northern England or Scotland and that are exporting for the majority of the*

[19] Part 6, Section 89 of the Climate Change Act 2008 link
[20] “Ofgem gives provisional green light to projects to power millions of homes” link

time will reduce overall constraint costs, as they will be helping to reduce north to south flows across GB and hence reduce balancing actions." (emphasis added)[21]

Furthermore, the ESO cautions that:

> Any interconnector or OHA that connects in the Midlands or southern England and that is exporting for most of the time is likely to lead to increased constraint costs as more balancing actions will need to be taken to relieve constraints across various boundaries.[22]

The proposed Tarchon interconnector falls squarely into the latter category, as it is intended to connect in the south of England. Given the ESO's analysis, it is evident that Tarchon is likely to contribute to higher constraint costs rather than provide the benefits suggested in Ofgem's press release.

Detailed modeling by ESO demonstrates that the introduction of Tarchon increases constraint costs in GB (Figure 8).

Figure 8: Impact of Tarchon on Domestic Carbon Emissions

FA Constraint costs results

NPV, real 2022, £bn, +ve = additional costs	LW	CT	FS
Aminth	1.68	1.97	0.48
AQUIND	7.22	6.33	2.26
Cronos	6.25	7.07	2.99
LionLink	1.92	1.61	0.31
LirIC	0.22	-0.05	0.20
MaresConnect	0.53	0.66	0.35
Nautilus	4.40	5.20	2.40
NU-Link	1.90	2.08	0.57
Tarchon	1.95	0.52	0.04

Table 2: change in constraint costs due to the addition of each interconnector and OHA for the First Additional case.

The table above shows the change in constraint costs in Present Value[4] (PV) terms for each of the nine projects for the First Additional case, for each of the three FES scenarios. Positive numbers represent an increase in constraint costs and negative numbers represent a constraint saving. The figure below shows the same results but in chart format.

"Table 2: change in constraint costs due to the addition of each interconnector and OHA for the First Additional case." *Cap and Floor Window 3 and OHA pilot scheme Needs Case Assessment, p. 10* [Link]

[21] Cap and Floor Window 3 and OHA pilot scheme Needs Case Assessment, p. 13-14 Link
[22] Ibid.

Contrary to what is written by Ofgem, the ESO demonstrates that in the central scenario, Tarchon would, in fact, increase constraint costs by £520 million, rising to £1.95 billion in the Leading the Way scenario. The ESO explains that although savings in constraint payments to wind farms may occur, these are more than offset by the need to take other actions across the UK network in order to rebalance within the UK, including the need to pay generators elsewhere to produce electricity. It is noteworthy that the increase in constraint costs is greatest in the Leading the Way scenario, which is also the only scenario that contributed to an increase in UK Energy Security. The costs here, as was the case for the consumer impact, are dramatically higher than the energy security savings.

Finally, we also note that the Ofgem claim that Tarchon would reduce costs to consumers through reducing constraint payments to wind farms is also contradicted by Arup A. Arup A demonstrates that there is an increase in carbon emissions due to the introduction of Tarchon, stating that it is due to increased thermal generation at times of export. The obvious economic solution at times of strong wind would be to make use of the excess green wind power in the UK, balancing the networks by turning off thermal capacity instead of exporting via Tarchon. This would, of course, lead to a reduction in carbon emissions as well as savings in fuel costs at thermal power stations. This is fully consistent with the ESO's statement that it is often necessary to pay producers elsewhere on the network to generate in circumstances where power has been exported to avoid constraint payments to wind farms. Ofgem are wrong to conclude that Tarchon has a positive benefit to UK constraint payments and must reverse their minded-to decision in respect of Tarchon.

E. Impact of Tarchon on System operability

The Ofgem consultation report does not take into account the Offshore Coordination Support Scheme, which is funding explanatory work to connect the North Falls and Fives Estuaries wind farms via Sealink. This has two major disadvantages. Firstly, National Grid Electricity System Operator's work implies that there are system constraints that make Arup's Tarchon modeling too optimistic. The above estimated costs to GB should therefore be considered a floor, not a ceiling. National Grid ESO has published the East Anglia Networks Study. It included Option 5, which excluded the Tendering substation and the capital costs of undergrounding through the Dedham National Landscape (formerly Area of Outstanding Natural Beauty). However, this option resulted in

constraint payments of around £10 billion.[23] When challenged regarding the high-constraint payments observed in Option 5 ESO explained that these constraint payments are due to the reduced interconnector export capability from East Anglia, the need for power to traverse the constrained southeast network to reach the interconnector at Grain, and the insufficient export capacity from East Anglia.

ESO proposed two potential solutions to mitigate these constraint costs, which they detailed as: "Reinforce the electricity network (via overhead lines) between Tilbury in Essex and Grain in Kent, or within Kent itself" or "Change the interconnector location from Grain to behind the EC5 electrical boundary encompassing East Anglia within the model, moving all three interconnectors back into the region – with two at Friston and one (nominally) at Bramford."[24]

ESO only modelled the change in interconnector location, which resolved the constraint payments related to Option 5 but left all other metrics unchanged. They did not model the solution that would have resolved the constrained LE1 boundary to London. This means power that could otherwise have been used domestically was still exported via Tarchon regardless of price.

This fault applies to the majority of network designs produced by ESO in the East Anglia Study (including all plausible designs). Worryingly, many of those designs have comparable network capacity and topology to National Grid's proposed Norwich to Tilbury (N2T) scheme, which implies that this too may suffer from the issue. Further evidence is found in the fact that National Grid had originally proposed a connection between Tilbury and Grain termed TENC which was designed to overcome the constraints at the northern LE1 boundary to London. ESO failed to support TENC stating that it was not required, a conclusion which now appears to be undermined in the East Anglia Study but which they have not modelled.[25]

As a result, GB is not able to use wind farm power domestically and is therefore reliant on interconnectors to export the electricity to Europe in order to avoid constraint payments to wind farms. (This said, see D above, ESO have separately concluded that avoiding constraint payments to wind farms may in fact not be the optimal economic strategy for the county given that it leads to significant increases in network constraint costs elsewhere in the system which more than offset the savings).

[23] ESO East Anglia Network Study, link pp. 35-37
[24] Ibid. p. 37
[25] "Strategic Options Back Check and Review", p 11 link

Importantly Norwich to Tilbury without North Falls and Five Estuaries coordination via Sealink is expected to face the same challenges because of similarities in network topology. In discussions with Ofgem, the Department of Energy Security and Net Zero and ESO, all stakeholders agreed with this analysis, and the department is considering instructing ESO to model options that resolve the constrained LE1 boundary into London.

The Ofgem commissioned report assumes prices drive interconnector flows. This assumption is inconsistent with ESO's analysis of system constraints, which suggests power will be exported regardless of price. The constrained northern boundary into London means Tarchon is expected to export power at 80% of its capacity regardless of UK domestic need or prices. It will not be available for import when we need it most. The reality for the UK is therefore likely even worse than the Arup report states.

Alternatives to Norwich to Tilbury which exclude the substation in Tendering have multiple benefits. It would reduce damage to precious landscapes like the Dedham Vale Area of Outstanding Natural Beauty by allowing the removal of a substation in Tendring. The Norwich to Tilbury proposals will cost £200 million less without the need for underground cables through the Dedham Vale. It would enable British consumers to benefit from our ample renewable generation rather than forcing exports. The Ofgem consultation assumes that this work is not taken forward. The report therefore understates the environmental, societal, and economic impact of approving the Tarchon interconnector in its current location. If Tarchon is approved, it may well be the sole determinant of additional infrastructure in Tendering.

F. Tarchon will contribute significant damage to the landscape and environment in a treasured (and legally protected) National Landscape, designated as being of the highest value. The impact on the community will be similar. It would be grossly negligent to rely upon manifestly biased statements to the contrary made by the developer.

Arup B lists the "hard-to-monetise" impacts of Tarchon, stating that these are provided by the developer.[26] Setting aside the fact that the developer failed entirely to address some of the metrics (such as noise), it is clear that they have

[26] Multi-Criteria Assessment framework report for Cap and Floor W3 and Offshore Hybrid assets Pilot Projects p. 6 link

adopted a narrow and biased approach, looking only at their asset and failing to take into account the wider impact caused by other infrastructure required to be delivered by others in support of their project.[27]

In the case of Tarchon, this wider damage includes the necessity for National Grid to build cables beneath the highly valued (and legally protected) Dedham Vale National Landscape, together with the accompanying infrastructure at the East Anglia Connection node in Ardleigh (adjacent to the Dedham Vale) and the line of cables carried primarily by pylons through North Colchester and alongside the Dedham Vale. National Grid themselves have admitted that the impact will be difficult to mitigate and will cause lasting damage to the setting of the Dedham Vale.

As highlighted by the ESO East Anglia Study, and confirmed afterwards by National Grid, if the offshore coordination proceeds, Tarchon will be the sole determinant of the substation in Ardleigh and new infrastructure in this area. In the case that the North Falls and Five Estuaries wind farms (both of which have voluntarily offered to vary their connection agreements and connect offshore) do not ultimately connect via Sea Link as foreseen in the Offshore Coordination Scheme, Tarchon will remain a very significant component in the damage caused to the Dedham Vale and its setting. To assign a green rating to the impact of Tarchon on landscape, environment, and community is nonsensical. Ofgem must take a holistic view of the impact and determine on that basis, commissioning independent reports as necessary. To proceed with approval on the basis of such manifestly misleading statements by the project developer would represent gross negligence.

G. Publications by Ofgem contain misleading statements and demonstrate prior bias in favor of Tarchon.

On 1 March 2024, Ofgem published a Press Release entitled: “Ofgem gives provisional green light to projects to power millions of homes”. This publication includes numerous statements which are not supported by the documents published alongside the consultation.[28]

- “...to power millions of homes”.[29] The title itself is highly misleading. The UK public are entitled to believe that it is UK homes to which the UK regulator is referring. However, it is demonstrably the case on the basis of

[27] Ibid. p. 25
[28] “Ofgem gives provisional green light to projects to power millions of homes” link
[29] Ibid.

the ESO report that the homes which are referred to must be in Germany, because Tarchon will be exporting at 85% of its capacity.

- “We’ve assessed all the proposed projects on their individual merits against our published criteria and recommended regulatory support for the ones which we believe will deliver for consumers in terms of energy security and the economy.”[30] However, the Market Modelling Analysis concludes, the project does not contribute to GB Energy Security, and will have a negative impact on both consumers. Our analysis also demonstrates it will have a negative impact for GB as a whole.

- “The cable would connect the two countries energy markets and enable renewable energy to be exported, at times when generation exceeds demand, thereby boosting security of supply and cutting consumer bills, by reducing payments to wind farms to switch off during times when they are generating more electricity that can be used domestically.” ESO state that the cable will be used in export mode 85% of the time. This is caused by system constraints, not just wholesale prices. The Arup Market Modelling Analysis demonstrates Tarchon will increase consumer bills not reduce them. Arup further conclude that Tarchon will NOT result in an increase in system security under most scenarios. As detailed above, the statement that Tarchon leads to reductions in constraint costs is contradicted in ESA A.

Elsewhere, equally misleading quotes by Ofgem staff include:

- "Ofgem director of major projects Rebecca Barnett said: 'Interconnectors can make energy supply cleaner, cheaper and more secure. It's a win-win and helps further harness the vast potential of the North Sea.'"[31] Arup A demonstrates that Tarchon would increase carbon emissions in the UK and will do nothing to make the UK supply cheaper or more secure. The analysis above shows that Tarchon is far from a win-win: the UK and UK consumers lose in almost every regard, while foreign investors, Germany, and German consumers win in almost every regard. This would be better called a "lose-win.

[30] Ibid.
[31] Ibid.

The note to editors restates Ofgem's statutory obligations under the Electricity Act:

- "Ofgem sets very high standards for approving projects – if projects are not likely to be successful, it is households and businesses who pay for it on their bills – and Ofgem will only back projects which can demonstrate they benefit consumers."[32] Tarchon does not benefit GB consumers.

Taken together with the minded-to decision, these comments seem to demonstrate a clear bias on behalf of Ofgem in favor of Tarchon, despite the evidence of their own work and that of consultants on their behalf. If Ofgem proceeds to confirm its minded-to-approve decision in respect of Tarchon it will likely fail at Judicial Review.

Conclusion: Tarchon Fails to Meet the Standards for a Cap and Floor Agreement

- The evidence presented in this response demonstrates that the Tarchon interconnector, in its current form and location, fails to meet the standards set forth in the Electricity Act 1989 and does not serve the interests of Great Britain's consumers. The key issues with Tarchon are:
    - Increased costs for GB consumers: Modeling by Arup shows that Tarchon will drive up domestic electricity prices by approximately £5 billion, while benefiting German consumers.
    - Net loss for GB: When accounting for the foreign ownership of assets, Tarchon results in a net loss to GB of £4.3 billion.
    - Minimal contribution to energy security: In most scenarios Tarchon contributes no improvement to UK energy security
    - Although Tarchon does result in an improvement in UK energy security in one outlier scenario, the benefit (£347million) is marginal and a small fraction of the £2.3 billion cost to consumers of achieving it
    - Tarchon increases UK constraint costs by £530 million in the CT scenario as a result of its impact on the overall network , and by dramatically more in the LW scenario.
    - Due to system constraints, Tarchon is expected to export power at greater than the 85% capacity modelled regardless of UK domestic need or prices.

[32] Ibid.

- Increased carbon emissions: Tarchon would increase GB's carbon emissions by 4.5 million tonnes, as the surplus wind power cannot reach high-demand areas like London, forcing greater reliance on fossil fuels.
- Negligent risk-management: the impact of Tarchon is worst in the case that we area already falling short in our decarbonisation efforts. This is precisely the scenario that our risk-management efforts must target in order to comply with our domestic and international obligations.
- Negative environmental and societal impact: If approved, Tarchon may be the sole determinant of additional infrastructure in Tendering, damaging precious landscapes like the Dedham Vale Area of Outstanding Natural Beauty.

Given these significant drawbacks, Ofgem must not grant a cap and floor agreement to the Tarchon interconnector in its current form and location. Doing so would be inconsistent with Ofgem's primary objective of protecting the interests of existing and future consumers, as outlined in the Electricity Act 1989.

Appendix 1

Name	Ownership	Per cent British	Source
Fives Agreeing to a cap and floor agreement that does not benefit GB consumers is arguably outside of Ofgem's regulatory remit. If there are other advantages for GB of interconnectors that do not benefit consumers, the correct mechanism is not a cap and floor agreement financed by a levy on consumer bills, but rather a different	RWE/Germany (25%), a Macquarie-led consortium/Australia (25%), Siemens/German financing arm, ESB (20.83%), Sumitomo Corporation/Japan (20.83%)	0%	Source

financing scheme directed by the Treasury.Estuaries			
North Falls	SSE/British (50%), RWE/Germany (50%)	50%	Source
Norfolk Vanguard	RWE/Germany (100%)	0%	Source
Norfolk Boreas	RWE/Germany (100%)	0%	Source
Scroby Sands	RWE/Germany (100%)	0%	Source
East Anglia ONE N	Scottish Power/Spanish owned (100%)	0%	Source
East Anglia TWO	Scottish Power/Spanish owned (100%)	0%	Source
East Anglia THREE	Scottish Power/Spanish owned (100%)	0%	Source
Greater Gabbard	SSE/British (50%), RWE/Germany (50%)	50%	Source
Galloper	RWE Renewables/German (25%), Equitix/British (25%), Siemens Financial Services/Germany (25%), Spring Infrastructure/Japan (12.5%), ESB/Ireland (12.5%)	25%	Source
London Array	RWE/German, Orsted/Danish, Masdar & La Caisse de dépôt et placement du Québec/Canada (CDPQ)	0%	Source
Thanet	Vattenfall/Swedish	0%	Source

Gunfleet Sands	DONG Energy/Danish (50.1%), Marubeni Corporation/Japan (49.9%)	0%	Source
Kentish Flats	Vattenfall/Swedish	0%	Source

Appendix 2

Name	Power	Source
Fives Estuaries	In excess of 300MW	Fives Estuaries
North Falls	In excess of 100MW	North Falls