

Response to Eastern HVDC – LOTI Final Needs Case

Ofgem LOTI Questions Response:

Question 1: Do you agree that meeting the technical requirement with the two proposed HVDC links is appropriate? No – see below.

Question 2: Do you agree with our conclusions on the appropriateness of the options considered? No – see below

Question 3: Do you agree with our conclusions on the technical design and the costs of the proposed E2DC and E4D3 projects? No – see below

Question 4: Do you agree with our conclusions on the cost benefit assessment and the appropriateness of taking forward the E2DC and E4D3 options? No – see below

Question 5: Do you agree that considering the proposed investment reinforcements in the context of wider network reinforcements (reinforcement pathways) is an appropriate approach? No – see below

Question 6: Are there any additional factors that we should consider as part of our Final Needs Case assessment? No – see below

Question 7: Do you agree with our minded-to decision to retain the two Eastern HVDC projects within the LOTI arrangements under RIIO? No – see below

Question 8: Do you agree with our approach to LPD? No – see below

Question 9: Do you agree that reprofiling (rather than a milestone-based approach) is an appropriate mechanism for the Eastern HVDC project? No – see below

Overview:

The requirement for the Eastern HVDC projects is based on current market arrangements, market structure and forms of regulation of the electricity Supply Industry, under the Electricity Act 1989 (as amended). These arrangements have been in place for around 20 years, with the 2001 NETA and the 2005 BETTA schemes defining the electricity market structure. Notably these were adapted in 2010 by the ‘Connect and Manage’ scheme¹, to allow generators to connect to the transmission system before ‘wider works’ were completed.

These current market arrangements provide a guarantee to transmission connected generators with compensation paid to generators when transmission system is constrained.

¹ National Grid. Connect and Manage Guidance 2013.

As a consequence of the EU Regulation 838/2010 (EU Cap) limitations are applied to generator transmission charges, resulting in the bulk of transmission costs falling on suppliers and ultimately on consumers². The consequences of this are that generators are insulated from the full transmission constraint issues and costs. The result of the current market arrangement is that economically inefficient generator locations decisions fall on consumers rather than generators themselves³. Rather than being given clear locational and dispatchability pricing signals, generators are compensated for when constraint boundaries become an issue and curtailment is necessary. The proposed expansion of transmission capacity (by the Eastern HVDC) between Scotland and England to address the B6, B7 and B7a constraint boundary is based on these current market arrangements.

The electricity system has become unbalanced, particularly with an excess of wind energy generation in Scotland. This generation is far beyond Scottish indigenous energy demand. Due to intermittency of Scottish wind energy this creates flows of excess power southward at unpredictable times (when the wind is blowing).

While the 2012 Electricity Market Reform and Connect and Manage have successfully driven down the cost of renewable energy and substantially increased the volume of wind generation, it is generally acknowledged that there is now a need for further Electricity Market Reform (ERM2)⁴. Consequently, the UK government has announced a Review the Electricity Market Arrangements (REMA)⁵ to address these significant imbalances. Balancing and constraint costs have got out of hand and now unsustainable. The need for Connect and Manage now appears to have passed and it now creates major problems for an efficient development of the network. It is notable that the Electricity System Operator has been directed to undertake a review of Net Zero Market Reform and other respected bodies have been looking at this⁴. The proposals for a review of market arrangement are at a formative stage. The proposals coming forward suggest moving market arrangements to a 'locational marginal pricing' (LMP) model. LMP takes account of 'system energy price', 'transmission congestion cost' and the 'cost of marginal losses. It looks likely that the ESO will recommend nodal pricing LMP⁶. The analytical consensus is that nodal LMP would "encourage generators and providers of flexibility to locate and operate assets efficiently, taking account of the real physical constraints in the network"⁴.

Is there a Physical Need for the Eastern HVDC?

The provisional Final Needs Case justification of the Eastern HVDC proposal is driven by the need to reduce constraint costs, between Scotland and England, under current market

² ESO. Forecast TNUoS Tariff for 2022/23, Aug 2021. Shows less than 25% of transmission cost fall on generators while 75% of costs fall on suppliers and then consumers.

³ ESO. Net Zero Market Reform – Case for change presentation, November 2021.

⁴ Energy Systems Catapult. Introducing nodal pricing to the GB power market, October 2021

⁵ UK Government. British Energy Security Strategy 2022.

⁶ ESO. Imminent Report on Net Zero Market Reform. Due by end April/ early may 2022.

arrangement. Under revised market arrangements it is not clear that the Eastern HVDC would be required. It is therefore worth considering the physical need for the proposal.

It is notable that when the Western HVDC link ⁷ was approved and built that the link provided mutual benefit at either ends of the link. It allows renewable energy to flow from Scotland to the Midlands in England, while also providing protection in Scotland to allow sufficient dispatchable energy to flow north, so that all Scottish demand can be met. It was no coincidence that the Longannet coal power station closed at around the same time. In many ways the Western HVDC enabled and covered for the closer of Longannet.

However, that situation, of mutual benefits does not apply to the proposed Eastern HVDC links. As the Needs Case states the prime purpose of the Eastern HVDC links is to facilitate the flow of renewable energy south. In other words, the prime beneficiaries of the Eastern HVDC links are generators in Scotland.

Table 1 shows the current operational, committed and planned wind energy capacity, for both on and offshore wind energy, in Scotland. The current capacity is 10,332 MW. By 2030, if the current programme is built, Scotland will have around 44,788 MW of wind energy. With other renewables, such as the current hydro-power, Scotland could have around 50,000 MW of generating capacity by 2030. In all the current programme of wind energy development in Scotland is around 66,000 MW.

Table 1: Scottish Onshore and Offshore Wind Energy Programs			
MW capacity	Onshore	Offshore	Combined
Operational	8,440	1,892	10,332
Under construction	430	1,948	2,378
Consented	4,640	2,362	7,002
Leased awaiting consent		4,250	4,250
Scotwind auction 2022		24,826	24,826
Repowering & Extensions	^a 11,320		11,320
Imminent auctions		^b 6,000	6,000
Total	24,830	41,278	66,108
NB: a: includes 10,000 repowering old wind farms and 1,320 extensions to wind farms. B: includes 1,500 ScotWind re-auction and 4,500 INTOG auction. The 44,788 MW by 2030 figure incorporates operational, under construction, consented, leased awaiting consent and the Scotwind auction 2022. Source: Scottish Government. Onshore Wind Policy Statement – consultative draft Refresh 2021. Scottish Enterprise – offshorewindscotland.org.uk/scottish-offshore-wind-market. And BEIS Renewable Energy Planning Database 12/2021.			

⁷ Western HVDC link between Hunterston, Scotland and Connah’s Quay, Flintshire providing 2250 MVA bi-directional transmission capacity. Originally intended to enter service 2015, became fully operational in 2019. Approved by Ofgem on unspecified date before this.

However, this programme far exceeds Scottish indigenous electricity demand. Like elsewhere, Scotland's peak and average electricity demand has been gradually falling over recent years. Peak demand is now well below 5,000 MW, with an average year demand of the order of 3,500 MW. When the wind is blowing, Scottish wind energy capacity is more than double indigenous peak demand and three-fold its average demand. When the wind is not blowing, Scottish demand can be met by the existing B6/ScotEx transmission capacity, of 5,700 MW, from the south⁸. Even with increased demand in the future, for the electrification of heating and transport, Scottish demand could be met by the existing transmission capacity, its other low carbon generation and Scotland's last remaining dispatchable power station (Peterhead) (even assuming Torness closes in 2028).

In terms of meeting Scottish indigenous electricity demand, what is needed is not increased B6 transmission capacity (such as the Eastern HVDC proposal). What is needed is energy storage. Energy storage would provide Scotland with the ability to time-shift some of its excess wind energy to the periods when Scotland has a shortage of electricity.

In summary, the need for the Eastern HVDC links is not to improve reliability of electricity supply within Scotland. The need is purely to increase Scottish export of electricity, to increase the flow southward from Scotland.

Is the Eastern HVDC in the Best Interest of Consumers?

The key question for the decision on the Eastern HVDC is, are these links in the best interests of consumers. Ofgem has a duty under Section 3 of the Electricity Act to serve the best interests of consumers. The Needs Case makes clear that "the purpose of the ... project the transmission of electricity generated in Scotland down ... to England"⁹. This confirms that the needs is not, like the Western HVDC, to provide mutual benefits.

Given this sole purpose of the proposal is to support Scottish generation export, the question is whether this is in the interests of consumers. That means all GB consumers. Since this is Transmission Owner network infrastructure development the cost of the links will arise under the TNUoS transmission charges. The cost of these transmission links will overwhelmingly be borne by consumers.

The current market arrangements mean that generators pay for the grid connection between their own generating location and the nearest main grid connection point (this is a 'sole use' assets). This means that wind energy developments offshore around England and Wales pay for the sole use connections between their wind farm and the main parts of the grid in the Midland and southern England. However, wind energy generators in Scotland only pay directly for the sole use connection to the transmission grid in Scotland. Both also pay for 'wider' transmission charges, but (as shown above) 75% of this is paid for by

⁸ ESO. Electricity Ten Year Statement 2020.

⁹ Ofgem. Eastern HVDC – Consultation on the project's Final Needs Case 30/3/22. Executive Summary – Needs Case, p5.

consumers. Thus, in terms of connecting wind energy to the Midlands and southern England, the Scottish exporting generators are creating an additional cost to consumers, which would not arise with similar developments around England and Wales.

The central question, which Ofgem should consider for the Eastern HVDC decision, is whether it is fair to consumers that they incur increased costs because of generator connections in Scotland. There is clearly ample wind energy available around the coast of England and Wales, which does not require consumers to incur additional transmission costs, such as the proposed Eastern HVDC. On this basis the economic cost to consumers, as set out as a statutory duty on Ofgem in the Electricity Act, shows that the proposed Eastern HVDC is not justified.

Conclusion and Recommendation to Ofgem

Overall, it is clear that the Eastern HVDC is being proposed and decided under the current market arrangements. These market arrangements have been found to be economically inefficient and do not give adequate price signals to generators. This results in generators locating inappropriately. An example of this is the substantial oversupply of wind energy in Scotland. The preliminary prospects of the Market Reviews indicate that Locational Marginal Price provides a much better arrangement which give far stronger signals to generators.

The physical requirement of the Eastern HVDC links is in question. Scotland has a considerable excess of generation, well beyond its indigenous needs. The current programme of wind energy shows this excess will grow much larger in the future. This seem to show that, at 2GB per link, some twenty links would be required, between Scotland and England, to accommodate all of the expected Scottish wind energy. It therefore appears there will never be enough transmissions capacity over the B6 constraint boundary.

The cost of the Eastern HVDC links and any other later capacity to increase transmission around the B6 constraint boundary will fall on consumers. However, there are plenty of alternative locations for additional generating capacity, which do not need or result in additional costs to consumer. The needs case for the Eastern HVDC links therefore do not stand up to the statutory test of the 'best interests of the consumer'. Accordingly, the Needs case for the Eastern HVDC should be declined.

The Needs Case assessment has been based on the current market arrangements, where generators in Scotland are insulated from the cost of curtailment and the constraint boundary. The market arrangements are being reviewed. It is therefore recommended that Ofgem should delay any decision on the Final Needs case until the shape of future market arrangements is clear. It seems quite likely that future market arrangements will show that further cost to consumers, from the expense of the Eastern HVDC links, is not necessary.

CDF
May 2022