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Dear Jon,

Offshore Transmission - potential measures to support efficient network coordination

The planning of networks in an environment of high uncertainty is difficult, and an approach based on separate financial optimisation for each individual connection and avoidance of stranding risk will tend to lead to an incremental approach that costs more in the long run. There is a serious risk that separate financial optimisation of network investment would ignore potential end games of international interconnection and/or offshore networks forming part of the wider GB network and hence assisting in the relief of onshore bottlenecks.

The IET therefore very much welcomes Ofgem's consultation on anticipatory investment. In this response, rather than answer individual questions we have sought to comment on issues of general principle and in areas where additional insight seemed helpful from an engineering and delivery perspective.

Positive support for Anticipatory Investment (AI)

The offshore network is an enabler of low carbon energy delivery but takes a long time to build and the regulatory framework makes it difficult for co-ordination to take place even when this is obviously sensible in the public interest. Our general view therefore is that there should be a presumption towards anticipatory investment where cost-benefit analysis supports it, and that this assessment should be undertaken within a **strategic framework** rather than triggered solely by connection applications.

The Offshore Transmission Coordination Project Report (The Report) quantified the benefits of coordination if applied to the UK offshore network, and reinforces previous studies with similar findings. Ofgem and DECC have acknowledged that these benefits are significant, hence the consultation on how to manage anticipatory investment that will enable coordination. We suggest that there should be a presumption that interconnected networks yield long term benefit by creating new possibilities for network usage and by making best use of scarce resources. The regime should therefore actively support coordination wherever a cost benefit case can be made. **Given the many factors that naturally inhibit coordination this means the regime should err on the side of encouragement for coordination rather than remain "neutral"**.

Network Planning

Scenario based planning for each wind zone and the whole offshore programme should be undertaken to develop a guiding strategy against which planned investments can be tested. This

will allow a rational decision process as to whether particular connections could or should be a part of this strategy or should be treated on a stand-alone basis. As such we support Ofgem's objectives for a reformed network planning document, including its integration with European level planning over longer time horizons.

Harmonisation of Regimes

We also support efforts to harmonise, or at least remove the perverse incentives that come from the different regulatory regimes for Offshore Transmission, Onshore Grid and interconnector assets. We recognise that harmonisation will present a major challenge, but feel it is necessary. The inability to gain consent for onshore works, especially overhead lines, is already causing offshore and underground options to be sought and this will increasingly blur the distinction between the main Interconnected Transmission System and offshore transmission connections.

COMMENTS ON KEY ASSUMPTIONS

Within this framework we comment further on some of the underpinning assumptions:

Route corridors (Landfalls and pinch points)

Landfalls – in practice these are a scarce resource, both because of seabed conditions and for environmental reasons. This means that allocating them on a first come first served basis could well preclude or create high environmental and investment costs for future connections. We would **suggest** a strategic environmental assessment of GB's potential landfall sites is undertaken and made public to aid decision making on appropriate use of the landfall capacity.

Pinch Points – similarly if a first cable route runs diagonally when passing between two seabed constraints it could prevent future cables taking an adjacent route, resulting in expensive detours. We **suggest** that the Crown Estate, as landlord of the sea bed, use its existing powers, or be given new ones, to ensure that cable routes allow for future circuits.

(This is needed because it is technically difficult and expensive for transmission lines to cross over each other. A diagonal line through a pinch point would make it difficult for other lines to use the route whereas running a parallel line through a pinch point, with angles as required before and after, leaves options open for subsequent lines and for the angles either side of the pinch point to become future hubs.)

Offshore wind project life

Comment is made in the consultation document concerning the assumed 20 year life of the wind projects versus the 40 year life of transmission assets. For offshore wind, the turbine is a significant but not overriding part of the total project cost and one likely to decrease in the future. Most projects envisage re-use of foundations and other infrastructure at the end of the turbine life through fitting replacement turbines. Hence whilst it cannot be guaranteed, it seems very likely that the transmission assets will have the opportunity to use their extended lives.

HVDC technology and Standardisation

We note that National Grid's Offshore Development Information Statement (ODIS) is based on existing available technology and that multi terminal HVDC is not assumed to be available or indeed necessary before 2020. However, the linear assets (subsea cables) are likely to have operating lives much longer than those of other components of the offshore transmission network. It is therefore important that they be capable of being incorporated into a future HVDC network. The early adoption of standard voltages for offshore DC cables would be beneficial.

The Report lists standardisation initiatives at a European level and suggests that there is no additional role for government or regulator on the subject. Whilst these initiatives will result in standards in the medium term we believe there is a short term opportunity to set some key

performance standards that would allow the UK industry to optimise around common technology. **The UK offshore transmission market currently represents a large share of the global market, creating a window of opportunity for a limited period for Britain to set what would become de-facto global standards.**

Standard capacity and voltage links would facilitate interoperability, promote competition and reduce risk, cost and lead time for projects through economies of scale and the ability to use common designs. They would also make AI easier as assets could be diverted for use on more than one site.

Manufacturers of HVDC systems have yet to announce their next generation systems. Round 3 wind farms are still considering what block sizes to build their zones in. Given a clear steer from the GB National Electricity Transmission System Operator (NETSO), suppliers and wind farm developers would optimise around the chosen standard capacities to the benefit of all. These parties will have to decide their strategies in the next few months. If there has been no move to standardise then the potential benefits will be lost at least until the next generation of HVDC technology.

We therefore recommend that NETSO and Crown Estate convene a group to standardise wind farm block size (as a sub-multiple of new standard transmission link capacities). This would assist the working of the market by reducing some of the variables and thus reducing the risk in anticipatory investment in network capacity. Such a group could also debate any uprating of the maximum single in-feed loss and consider the ability to finance and construct wind farm blocks of certain sizes, especially where there is single circuit risk for early phases of the project. The IET would be delighted to convene such a group if this is considered helpful.

Readiness of multi terminal HVDC technology

Given that the first multi-terminal offshore HVDC implementation in UK waters is in the final stages of procurement and consent (Moray Firth – SSE), it is clear that the question should be based on what components are still missing for a future HVDC network (e.g. HVDC disconnectors vs load break switch) and at what cost. This 50% European funded project is to test the capabilities of current technology and to push the current application of technology into a real offshore environment, allowing both wind and marine generation to be connected.

Some of the key hurdles that have been identified are not technical but regulatory, for example the need for better integration of on- and off-shore regulatory regimes.

The real deployment of new offshore HVDC switchgear will only come with the clarity that a market will exist and a sustainable volume of equipment will be ordered, providing return on investment for the substantial research, design, testing, certification and deployment testing that will be incurred.

Anticipatory investment

We recommend that the high level criteria for AI make specific reference to the reformed network planning document, to test whether proposed AI is in line with the core strategy for the network.

We feel the straw man proposal errs on the side of avoiding any risk of asset stranding and in fact is not really anticipatory at all, as all generator works would be secured before any investment is made. We suggest that a specific cost / benefit / risk analysis be done for any proposed network extension. The risk and possible duration of any potential asset stranding should be quantified and compared with the benefit that AI would have on the end solution. Provided AI is more than marginally more beneficial Ofgem should authorise the anticipatory investment.

The IET is one the world's leading professional bodies for the engineering and technology community. The Institution provides a global knowledge network to facilitate the exchange of knowledge and to promote the positive role of science, engineering and technology in the world.

This response has been prepared by the IET's Energy Policy Panel and incorporates comments received from the wider membership.

Should Ofgem wish us to assist further in this, for example by assisting in convening a group to discuss standardising wind farm block size and related issues, we would be pleased to discuss this further.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Paul Davies', with a stylized flourish at the end.

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