SEAS proposal

for an

An Offshore Grid

for Wind Energy

Britain's Winning Solution

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An Offshore Grid for Wind Energy: Britain's Winning Solution

1. Background

Suffolk Energy Action Solutions (SEAS) is promoting a better solution for the Offshore Network Design and Onshore Infrastructure, relating to offshore wind power in the North Sea Corridor[1]. We were spurred to found SEAS in 2019, realising from conversations with Belgium's ESO (Elia) that there were superior offshore transmission solutions involving an integrated offshore grid[2]. These solutions offer **lower costs** to Industry and Consumers, and **a faster path to Net Zero.**

2. The Solution

Switching to an offshore grid[2] for the transmission network design off East Anglia (EA), will **help achieve Net Zero** faster and with greater certainty, whilst supporting economic growth and regeneration.

This offshore grid will use subsea cables to transport energy closer to demand, bringing energy onshore at brownfield sites (e.g. Bradwell or Isle of Grain) which can become Energy Superhubs.

2.1 Taking Power to Where it's Needed

Helps mitigate significant constraint costs associated with network capacity issues. The cost to consumers from wind power oversupply and need for curtailment payments was estimated at £806m[3] (2020-21), expected by National Grid to increase to c.£2.5bn[4] per annum by 2025. Carrying energy closer to demand can reduce the need for future infrastructure, otherwise required to manage constraint costs.

This also avoids the need to restart fossil fuel power plants closer to energy demand, which jeopardise our climate commitments (e.g. c.2 million tonnes of CO2 from 2030 to 2032, equivalent to grounding all UK domestic flights for a year[5]).

2.2 Brownfield Onshore Landing Sites are Better All-round

Brownfield sites need and would hugely benefit from regeneration, with significant local business revenues to be expected (this would also allow c.£40m[6] p.a. of nature-based coastal tourism revenue to be retained).

Brownfield sites are also more suited for major infrastructure investment leading to local growth. Energy technologies could include Carbon Capture, Green Hydrogen generation & storage, and Battery storage.

3. Key Benefits - Reduced Consumer Costs

Based on previous ESO analysis, an integrated offshore grid for EA could offer **cost savings of > £2bn[7]**

4. Key Benefits - No Delay and Lower Delivery Risk

In order to build an offshore grid, no delay is necessary relative to the current timetable, now proposed by National Grid as a 2032 operational date. An offshore grid lets wind farms connect to pooling platforms when they are ready, allowing greater flexibility and efficiency of offshore integration.

An offshore grid is **realistic and achievable**, Belgium's ELIA has already shown that pooling energy at offshore platforms is viable, with none of the delays caused by onshore impacts.

ELIA launched their Modular Offshore Grid MOG I[8] in September 2019, a platform operational since then which took only 3.5 years to build. All other leading European wind power countries have chosen an offshore grid taking power to where it's needed and going onshore at brownfield sites.

5. Environmental and Community Benefits

An offshore grid will mean significantly reduced onshore impact, with fewer onshore substations and cable trenches and correspondingly, reduced negative impact on environment and communities. An offshore grid will demonstrate Government action towards the legally binding commitments regarding Net Zero and its 30-by-30 biodiversity pledge.

6. Conclusion

Current delays offer DESNZ and ESO a golden opportunity to switch to an Offshore Transmission Network Design that will prove key to achieving offshore wind power capacity of 50GW by 2032 (83GW by 2050), more speedily and with greater certainty.

This offshore grid will deliver power to where it is required, when it is needed and at lower cost to consumers. Developers benefit by having greater flexibility, reduced connection delays and reduced planning costs.

Better for Energy Security, Better for Consumer Pricing, Faster to Net Zero.

7. ACTIONS REQUIRED:

1. Establish the independent FSO in 2023 to provide strategic vision, planning and direction
2. Ensure National Grid ESO's East Anglia Offshore Review is independent, based on HND criteria and involves a wider scope than is currently proposed, with assessment of the full benefits of an integrated offshore grid, including consideration of network designs linking all consented and non-consented windfarms and interconnectors to offshore platforms[9], with power then coming onshore at suitable brownfield landing sites (e.g. Bradwell[10] and Isle of Grain)
3. FSO to lead the deployment of the Offshore Grid in collaboration with developers
4. Ofgem to ensure that economic benefits flow through to consumers

An Offshore Grid is the winning solution for all stakeholders, and we urge you to support our proposal.

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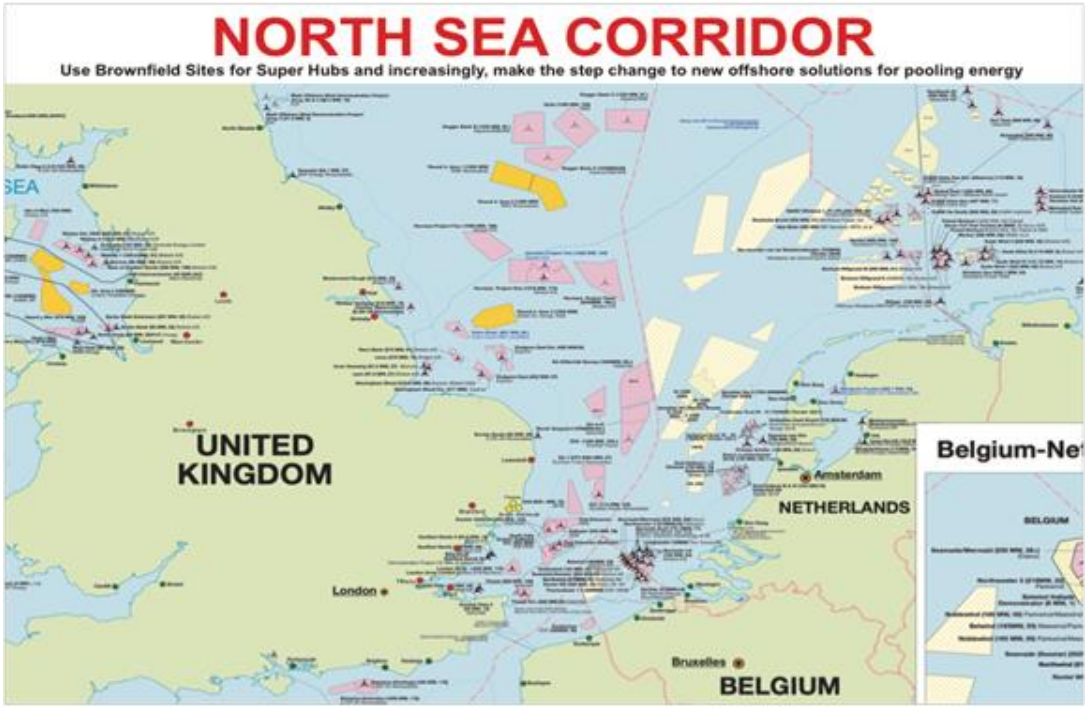
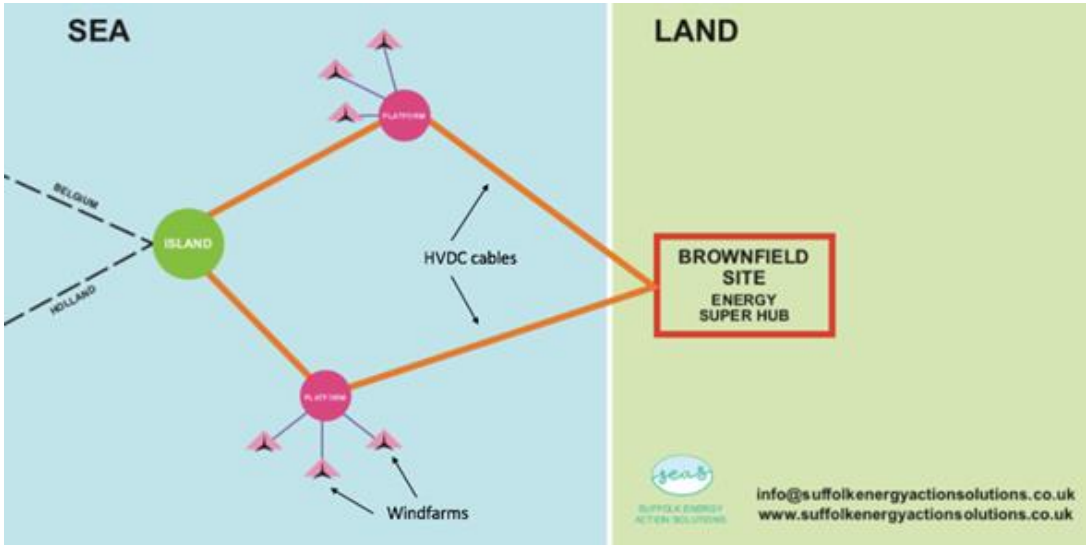
Appendix:

1. North Sea Corridor



2. Offshore Grid Theoretical Model



A simplified diagrammatic model for an offshore grid in which offshore platforms pool wind energy and carry it to landfall at brownfield sites. Offshore platforms can be located where wind farm subsea cables/converter cable routes intersect to maximise pooling opportunities. In the mid-term artificial islands could be constructed to support further energy infrastructures (e.g. green hydrogen electrolysers). A series of brownfield sites along the shoreline close to demand should be considered, designed to provide for future energy infrastructures (e.g. energy storage). Larger brownfield sites could develop into super hubs, to share more diverse energy storage/conversion. This system is called a Modular Offshore Grid (MOG) and has been implemented successfully by Elia for Belgium. There are cost efficiencies for developers and consumers with faster implementation benefits. By 2032, this offshore grid can be GB's main arterial corridor for offshore wind.

3. LCP Report: Renewable curtailment and the role of long duration storage. (Report for Drax, May 2022, p.3). https://www.drax.com/wp-content/uploads/2022/06/Drax-LCP-Renewable-curtailment-report-1.pdf

4. Nation Grid estimate of future curtailment payments https://news.sky.com/story/britons-paying-hundreds-of-millions-to-turn-off-wind-turbines-as-network-cant-handle-the-power-they-make-on-the-windiest-days-12822156

5. ESO's July 2022 'Pathway 2030 - Holistic Network Design' p.6 https://www.nationalgrideso.com/document/262681/download

6. The Energy Coast Report 2019 (Max Clapham: Research Director, BVA-BDRC): Implications, impact & opportunities for tourism on the Suffolk Coast of Sizewell C and SPR wind projects.

7. >£2bn cost saving for an integrated offshore grid for East Anglia in ESO's December 2020 Report 'Offshore Coordination Phase 1 Final Report, p.29 (East Anglia labelled as Eastern Regions). https://www.nationalgrideso.com/document/183031/download

8. Elia's MOG I https://www.offshorewind.biz/2019/09/11/elia-inaugurates-its-modular-offshore-grid/

9. The ESO Review should not be restricted to 'Early Opportunities' projects. This ignores key projects on the road to Net Zero by 2050 and reduces the scope for a fully integrated offshore grid. OTN design scenarios to be analysed should include:
   - SPR's EA1N and EA2 to be given an offshore connection at a pooling platform also combined with the LionLink MPI, with power transported to Bradwell or another brownfield site. Given the constraint/curtailment costs saved in this scenario, it's questionable if Sealink would still be required. Alternatively, a reduced Sealink from Bradwell to Richborough should be considered.
   - The Nautilus MPI to be pooled with Five Estuaries and North Falls wind farms, with landfall on the Isle of Grain
   - Network design scenarios should be considered that involve the full range of possible outcomes. This should include the renegotiation/offering of different connection points, or even the reversal of previous BEIS SoS approvals by the current DESNZ SoS, where economic arguments are compelling or where OTN design options and other circumstances have significantly changed.
   - ESO should also consider ownership models where Government/FSO are full or part owners of offshore network infrastructure (e.g. pooling platforms or energy islands) with developers offered a connection point on this offshore network.
   - Legislation may need to be updated to enable this holistic strategy to be implemented, but given the compelling economic & Net Zero arguments, all this requires is the political will.

10. Excerpt from 'Summary of the Written Representations of Suffolk Energy Action Coalition(SEAC) in relation to East Anglia ONE North Offshore Windfarm – Planning Inspectorate Reference: EN010077 (29 October 2020)':

"The Applicant has failed to explain why connection to the substation at Bradwell was disregarded for both EA1N and EA2.

4.2.8 Chapter 4 of the ES does not mention Bradwell once despite the many submissions of the Rt Hon Therese Coffey MP setting out her concern about

the location of the substation(s) at Friston and her assertions that Bradwell would be a more appropriate location.

4.2.9 In addition, it is known that there is a redundant substation at Bradwell, labelled on the below map….. as "Electricity Switching Station". This is the point at which the overhead power lines start and the redundant substation has a sign on its fence saying "National Grid"…

4.2.10 It is understood and appreciated that a substation would never be built on a site that is contiguous to a nuclear facility, however, although the site identified for the construction of the new Bradwell B nuclear power station (at stage 1 of the planning process) is large and occupies a significant part of the redundant land, there remains a lot of brownfield land available for a substation.

4.2.11 In addition, given that Bradwell is built directly on the coast, substations in this location would obviate the need for the construction of lengthy onshore cable runs from the landfall of the marine cables to the onshore substations. In many instances, including as would be the case if the substation(s) were to be located at Friston, and as set out in the relevant representation of the Rt Hon Therese Coffey MP, such cabling would be incredibly destructive and would go through sensitive landscapes, including AONB and sensitive areas of ancient woodland.

4.2.12 Further, as a result of Bradwell's use as a wartime base, it is a significant area of semi-industrialised land and subsequently, constructing substations here would avoid the unnecessary destruction of greenfield land and large areas of the countryside.”