SEAS proposal

for an

An Offshore Grid

for Wind Energy

Britain's Winning Solution

Suffolk Energy Action Solution (SEAS)
info@suffolkenergyactionsolutions,co.uk
www.suffolkenergyactionsolutions.co.uk

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 – an offshore grid

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. Pilot Projects lead the way to an offshore grid

As offshore wind Developers and Government are at loggerheads over the price of offshore wind it gives the Government the perfect opportunity to re-negotiate contracts and announce an offshore grid strategy that can get Britain back on track.

There are immediate steps which will help achieve Britain's future wind capacity goals and the Future Framework: **PILOT PROJECTS** involving pooling energy from two or three offshore windfarms at sea at an offshore interconnector platform which transports the power by one set of subsea cables closer to demand with landfall at brownfield sites.

Pilot 1: Nautilus interconnector
This approach is already being planned by wind farms Five Estuaries and North Falls combining with the Nautilus Interconnector and taking power to West Grain, and is expected to be announced soon as part of the Governments Offshore Coordination Support Scheme results (evidence that this solution makes sense for all stakeholders).

Pilot 2: LionLink interconnector
Scottish Power's EA1N, EA2 and LionLink can combine energy offshore and take power to the brownfield site of Bradwell closer to London, which has an existing substation and pylons that can be upgraded. We understand the local MP and landowner are in favour of this onshore solution.

EASIER, CHEAPER, QUICKER.
These solutions are better value for money for British consumers, quicker to execute than current plans and have a greatly reduced negative environmental and community impact.

4. Key Benefits - Reduced Consumer Costs

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

In Pilot 2 above, taking power to Bradwell gives significantly reduced constraint costs through power reaching the grid closer to demand, with the key consequence that Sealink becomes unnecessary, as a means to move excess power from Suffolk Coast. We have been told by National Grid at a recent meeting that Sealink would currently cost £1.8bn, so going offshore to Bradwell could give **an additional saving of c.£1.8bn**.

5. Key Benefits – Quicker Delivery 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.

In fact the combination of transporting energy offshore and using brownfield onshore sites leads to **accelerated planning permissions** (e.g. recent Eastern Green Link 2 experience[8]) with associated cost savings on route permissions/compulsory purchases (typically adding 33% to onshore costs[9]).

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[10] 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.

6. 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.

7. 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[11], 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, with power then coming onshore at suitable brownfield landing sites (e.g. Bradwell and Isle of Grain). To alleviate the current offshore wind CfD hiatus DESNZ should mandate the two Pilot Projects above, they will save the developer millions and benefit consumers.
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.

Fiona Gilmore, Founder

Suffolk Energy Action Solution (SEAS)

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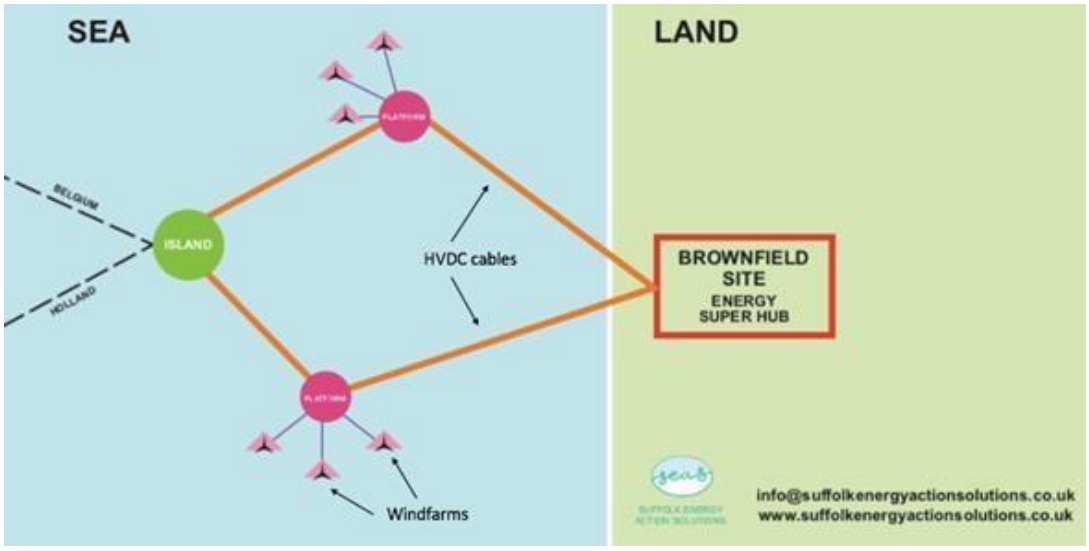
Appendix:

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-Renewablecurtailment-report-1.pdf

4. Nation Grid estimate of future curtailment payments https://news.sky.com/story/britonspaying-hundreds-of-millions-to-turn-off-wind-turbines-as-network-cant-handle-the-power-theymake-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. EGL2 Planning approvals https://renews.biz/87695/scotland-england-cable-link-clears-planning/

9. IET blog 28Feb 2019,'The Cost of Building New Electricity Transmission Lines' referencing costing study https://www.theiet.org/media/9376/electricity-transmission-costing- study.pdf

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

11. 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.
    - 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.