11 October 2024

Dear Chris Stark and Fintan Slye,

Re: The faster, more cost-efficient way to Net Zero

Congratulations on your respective appointments to head up Mission Control 2030 and to be the CEO of the new NESO.

You have been tasked with identifying how to achieve our twin energy security and net zero objectives as fast as possible.

We note that the newly created NESO (the ISOP) has as three priority objectives as stated in the Energy Act 2023 at s.163(1):

(1) The ISOP must carry out its functions in the way that it considers is best calculated to promote -

(a) the net zero objective;

(b) the security of supply objective;

(c) the efficiency and economy objective.

Sections 163(2)-(5) explain each of the three objectives.

We believe that In order to achieve those objectives, Britain needs to create a **meshed offshore grid** as part of its overall offshore and onshore electricity grid network.

It is this offshore grid which will transform the cost efficiencies and speed of deployment which you are seeking, and achieve security of supply, whilst keeping us on track for net zero.

We know that NESO will be working immediately on three key publications: a Strategic Spatial Energy Plan; a Future Energy Pathways report; and a Centralised Strategic Network Plan. An offshore grid should be at the heart of the NESO's thinking from Day 1.

It is generally acknowledged that there is a need to see the bigger picture and transform our infrastructure from 20th century to 21st century.

The innovators and leaders in renewable energy infrastructure delivery systems are our North Sea neighbours, from Scandinavia to the Low Countries, including Denmark, Germany, Holland and Belgium.

They have implemented, albeit with smaller wind farms, the new technology available to carry electricity more efficiently, securely, flexibly and directly from wind farms to the locations of population and usage demand.

Why Britain needs a meshed offshore grid

With offshore pooling of wind farm energy, an offshore meshed subsea HVDC grid transports energy closer to demand and connects to the onshore AC grid at brownfield sites, offers a faster, more secure, cheaper and better solution for Britain's transmission network.

Looking at how a meshed offshore grid can deliver NESO's objectives:

Faster and Safer to Net Zero:
Offshore integration results in less than half the onshore infrastructure being required, community buy-in will therefore be swifter, and with more strategic routing offshore, fewer planning permissions will be required, hence a shorter planning cycle.

Large scale offshore wind deployment faces logistical challenges connecting to the onshore grid. A meshed offshore grid maximises offshore wind integration, connecting multiple wind farms to several countries' grids, enabling efficient use of wind energy from different locations. By reducing the need for individual grid connections, more wind farms can come online faster, which accelerates the deployment of renewable energy.

A meshed interconnected offshore grid ensures a more constant and reliable supply of wind power, countries can reduce their dependence on gas or coal plants that are typically used to fill gaps when renewable generation dips. This predictability speeds up the decarbonization of the electricity grid.

Increased Security and Flexibility:
Increased security is achieved as a meshed grid connects multiple offshore wind farms and interconnectors to several onshore points, creating a network with multiple pathways for electricity to flow. If one part of the grid experiences a failure, power can be rerouted through other connections, reducing the risk of outages. This redundancy makes the grid more resilient to technical issues, bad weather, or faults in the network.

Flexibility is improved because the meshed design allows for more dynamic load balancing and optimization of power flows across the grid. It can adjust to variations in electricity generation (e.g., when wind output fluctuates) and demand. This flexibility ensures that power is distributed efficiently, and that supply continues even when individual components are offline for maintenance or in case of faults.

In addition, offshore wind farms are often built in stages. A meshed grid allows new wind farms to connect to the network more efficiently, using existing infrastructure, rather than requiring separate connections for each new project. This streamlining increases the capacity and availability of renewable energy for the grid, which is essential for meeting energy demands in a low-carbon future and for achieving Net Zero.

More Efficient and Economic:
A meshed offshore grid is cheaper for consumers in the medium to long term. National Grid ESO's reports have consistently shown significant overall transmission network cost savings (Capex) from greater offshore coordination sooner, e.g. its December 2020 report (Offshore Coordination Phase 1 Final Report) showed a c.£2 billion saving for East Anglia alone with greater offshore integration. For Britain as a whole, the same report suggests a saving of c. £6 billion and this would be available if we pivot now to a solution involving an offshore grid.

Cost savings come from the sharing of infrastructure resulting from the pooling of wind farm energy offshore and also from transporting energy offshore and connecting it to the onshore AC grid closer to demand, saving on curtailment payments and grid constraint costs (associated with the need for fossil fuel-based power plants as backup for renewable energy oversupply). Taking power offshore closer to demand can also reduce the need for infrastructure required to achieve the same result (e.g. taking power from wind farms directly to London and the South East as opposed to via Suffolk would negate the need for Sea Link saving c.£1.8bn). Brownfield sites for onshore infrastructure

allow the potential for economic upside with the economic regeneration of pre-industrialised areas.

Better for the Environment and Communities:
A significantly reduced onshore infrastructure footprint and the use of brownfield sites for onshore infrastructure and Energy Hubs, results in greatly reduced negative impact on the environment (including biodiversity loss), communities and local economies.

N.B. To further support the arguments above we refer you to a May 2024 report '[Multi -terminal HVDC Grid: Current status and next steps]', produced for the US Department of Energy by independent, industry-leading energy consultants DNV, frequently used for previous ESO cost benefit analysis reports.

What has got in the way to date, and how to clear the blockages

National Grid plc's expertise lay in onshore pylons and connections. Their brief was cheapest price for point-to-point connections.

The concept of a meshed offshore grid has been around since 2011. Tim Yeo proclaimed the possible benefits. Thirteen long years have passed with reports gathering dust on shelves.

This is no time for a blame game. It's time to identify the barriers to progress.

We think these are some of the blockages, and some of the solutions:

1. Outdated plans presented by NG plc in their old role as connection point selector where sites were chosen using very short-term narrow criteria.

Solution: NESO, taking a long-term, strategic view.

2. There are three Ministries involved in the decision-making: ESNZ, DH Levelling up, DEFRA. The risk is plans that fail to address at least one of the key objectives: security.

Solution: The Ministry of Defence or Home Office should also be involved.

A multidisciplinary team needs to include members from all these Departments and also from the Crown Estate, Ofgem, NESO, GBE, along with specialists with relevant experience.

3. The security issues are pertinent given the geopolitical situation. These have not been fully considered by NG ESO in their plans for bringing over 30% Britain's electricity onshore via Friston, one of the most eastern points of Britain and next to Sizewell B/C. In very simple terms, there is the risk of a huge blow to Britain's energy infrastructure with a strike at a single land-based location. Think of what has happened to Ukraine. These security issues are significant.

Solution: The electricity coming onshore should be brought directly to a series of major hubs closer to London using a family of subsea cables. These plans need to be reassessed in terms of minimising target risk issues. A meshed offshore grid is more secure because if one subsea cable is sabotaged, the rest of the grid (a latticed network) continues to operate.

4. Communities have not been consulted at the outset and they have been understandably opposed to NG ESO and developers' plans, leading to judicial reviews and delays. The Nick Winser report (July 2023) signalled the need to include communities in upfront stakeholder discussions.

Solution: Inclusion in upfront discussions alongside a more strategic meshed offshore grid plan, where future hub sites are chosen as part of a spatial strategy in pre-industrialised zones such as Isle of Grain, West Grain, Bradwell, Tendring, Bramford, would ensure earlier buy-in, swifter acceptance, lower discontent and fewer judicial reviews, avoiding delay and associated costs. This can be of great benefit to developers too, giving greater certainty of project delivery and execution.

5. A meshed offshore grid is a new infrastructure concept and as such there is no funding mechanism or legal system set up to pool energy at sea between different developers. These issues need to be resolved before an offshore grid is workable.

Solution:

i) The ownership and financing of an offshore grid needs to be decided. Who will own the offshore platforms? Who will own the subsea cables?

We recommend that GBE owns a 51% controlling share of this meshed offshore grid.

A public sector/private sector partnership is the way forward as demonstrated by Elia (Belgium), TenneT (Netherlands), Orsted (Denmark).

A shared anticipatory investment scheme where first stage developers share the risk with second stage is a practical solution.

The Treasury will need to work together with ESNZ to create this new approach.

ii) New legislation needs to be fast-tracked to enable this grid to happen, giving GBE the authority to set up this scheme, working with the new impartial NESO to determine the spatial energy strategy which has been absent from all previous plans.

6. Recent cost benefit analysis has not looked at overall system costs or included holistic network design (HND) principles, and has not taken into account the cumulative impact of multiple projects.

Solution: The cost benefit analysis (CBA) should look at cost savings and impact on consumer price, but also the cost benefits of reduced adverse impacts on society, environment and local economies, across the cumulative projects proposed under current plans.

For example, the cost of the tourism decline for the Suffolk Coastal area has been estimated at c.£1billion over the 12 years of construction. This makes brownfield sites such as Bradwell-on-Sea more attractive and cost-effective sites for a major Energy Hub, particularly in this case as Bradwell is already a substation site which simply needs upgraded pylons (and underground cabling in part) but is much closer to demand.

Independent HND cost benefit analysis, based on a spatial strategy which creates Energy Hubs at brownfield sites, can significantly increase buy-in and reduce delays and associated costs.

You will see from our Briefing Paper attached: "The Great British Offshore Grid" that the cost savings using offshore grid design principles could exceed £6billion (source: ESO December 2020 report 'Offshore Coordination Phase 1 Final Report' as referenced above).

Ofgem also point to an offshore grid reducing the expected onshore infrastructure by over 50% (source: Ofgem March 2024 report 'Offshore Hybrid Assets').

The timeline

Speed of deployment is critical.

According to Belgium's Elia, the construction of offshore platforms takes only two years.

By 2034, Britain can have the first section of an offshore grid up and running.

By 2034, Britain will be manufacturing for itself 10GW capacity superconducting cables, leveraging the legacy of the clear spatial strategy and transmission network design we propose above.

Until then, 2GW subsea cables can be used.

In the short term, whilst the offshore grid is being designed, we propose that existing brownfield sites are used for urgent connections. We give as an example, SPR EA2. This could be connected at Bramford along with EA3 and EA1 or Tendring where there are existing substations and connection points to the grid. It would be needlessly destructive to use a new site for this Hub when there are existing Hubs ready and with the space for additional substations.

What needs to be done

We are sure that you are establishing a Mission Control Team, recognising the scale of the challenge ahead.

It is a time for bold, innovative thinking. This can be the greenest government Britain has ever had, but just like the late 1800s railway revolution, or post-war 1940s housing boom, or the worldwide web, this is a moment which requires vision and will define our nation's energy infrastructure for future generations.

If we take this once in a lifetime opportunity to build something that lasts and matters, we can affect positive change for the next 50 to 100 years. Other leading European wind power countries have seen the way forward. With ambition and vision, all of the challenges and obstacles discussed above can be overcome. We urge you to recognise that a step change idea is available and required here, and we urge you to seize this opportunity to realise its full potential.

Offshore4sure is a group of like-minded community organisations emerging across the country, connected by our belief that using offshore grid design principles and brownfield sites, offers better solutions and a better future for all. We represent thousands of supporters, and our members include engineers, economists, architects, ecologists, tourism business leaders, innovators and legal counsel.

We stand ready to assist you in this process in whatever way we can.

We believe there is a win/win solution available here for the benefit of all stakeholders.

Best wishes,

Fiona Gilmore

on behalf of Offshore4sure