Baringa

OEUK OFFSHORE ENERGIES UK

The future of the North Sea

Written by Baringa for Offshore Energies UK (OEUK)

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Preface

The North Sea has powered homes and businesses at home and across Europe for decades, contributing billions to the economy and supporting jobs in our industrial heartlands and beyond.

The long-term policy needed to deliver secure, clean and affordable energy remains central to decision making across the UK. Today, around 75% of the UK energy needs are met by oil and gas, with around 50% of coming from the UKCS. By 2050, oil and gas will still account for around a fifth of the UK's energy mix, according to the Climate Change Committee. As we scale up renewable opportunities, this must be done in a pragmatic way to meet demand which means continuing to produce oil and gas in the UK.

Resilient, forward-looking industrial and economic policy must be underpinned by an integrated energy system that ensures consumers and businesses have access to reliable, affordable energy. The UK must leverage all available energy sources to create a flexible system that can respond to domestic demand and position the UK competitively in global markets. This report outlines the opportunity for low-cost, high value energy if we get this right.

Energy security is national security and maximising our own resources will be fundamental to the economic growth the country continues to strive for.

Reconsideration across all public spending areas is ongoing which will include many of the funding mechanisms for the offshore energy sector. The need to industrialise and meet new and stretching spending commitments on defence means that there must be a prioritisation of economic growth sectors.

This sector is a lever for economic growth. The Comprehensive Spending Review, industrial strategy and 10-year infrastructure strategy are all fundamental milestones and the success of each will underpin the opportunity this report proposes.

It is clear in the report how the North Sea can continue to transform and decarbonise to support national ambitions. The North Sea is a national strategic asset. Policy decisions made in the coming months will shape the energy landscape and economy for decades to come.

The UK must continue to prioritise domestic energy production which includes continuing to produce oil and gas in the UK to deliver on long-term goals. With a pragmatic approach underpinned by partnership, governments can realise the full potential of the UK's integrated, homegrown offshore energy industry.

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Executive summary

This report sets out a vision for how the North Sea can transform and decarbonise to remain a bastion of the UK's energy landscape and play an important role in international markets. It also outlines how the UK can achieve this vision – including by establishing an Offshore Energy Mission Control. It looks beyond energy generation to take a more holistic approach to the energy transition. This includes moving away from considering renewable energy separate from conventional oil and gas production, towards an integrated strategy that also includes energy storage and carbon capture.

Producing low-cost, high-value energy for the benefit of households and businesses is the core objective

Our North Sea vision aims to ensure a manageable transition to a low-carbon future encompassing decarbonised oil and gas, renewables, carbon capture and storage (CCS), and hydrogen. It's driven by the core objective of delivering low-cost, high-value energy, which is defined as being:

- affordable for UK consumers and businesses
- competitively priced, compared to other countries
- resilient through robust physical security, cybersecurity and price security
- flexible – responding to fluctuating demand and variable renewable power output
- low-carbon and sustainable

Low-cost, high-value energy will drive economic growth, international competitiveness and help to decarbonise the industrial sector

Low-cost, high-value energy has the power to make UK businesses more competitive and attract more investment to the country – particularly from energy-intensive companies such as data centres.

Moreover, new energy infrastructure, such as energy islands and European interconnectors, will enable the UK to become an exporter of low-carbon electricity and a market leader in CCS. It will also bring investment to help the UK's strong oil and gas supply chains and workforce continue to support a decarbonised future – ensuring that these highly skilled jobs and valuable industries remain in the UK.

Achieving the 2035 vision across the energy system requires getting six things right

1. **Delivering/repurposing substantial amounts of complex physical infrastructure at pace**, including large- and small-scale generation, energy and carbon storage, hydrogen production, networks, and demand-side low-carbon technologies.
2. **Securing new routes to market, and finding domestic and international buyers for renewable energy, hydrogen and carbon storage** by adopting new commercial models to facilitate private-sector investment.
3. **Developing specialised supply chains** for offshore wind, hydrogen, and CCS by leveraging and broadening the existing expertise, skills, and supply chains built up through decades as a leader in oil and gas.

4. **Driving down production and operating costs**, which are currently high compared to other producing regions.
5. **Accelerating learning curves on the development of new technologies**, such as long-duration energy storage (LDES), CCS and hydrogen production, to achieve economies of scale.
6. **Coordinating across agencies and industries** to reduce competing demands on the seabed and better align investment.

Establishing an Offshore Energy Mission Control that spans the entire energy system is critical to driving and overseeing work to meet the set ambitions

The Offshore Energy Mission Control should span the entire energy system and have the ability to cut through different government departments, connecting the various stakeholders, policies, plans, and regulations applying to the offshore sector. This will help accelerate the coordinated and efficient deployment of new infrastructure and incentivise investment in the UK.

The Offshore Energy Mission Control should have the ability to:

1. Develop an integrated delivery plan which ensures strategic allocation of government funding to:
    - Accelerate technology commercialisation
    - Establish routes to market for renewable energy, hydrogen, and CCS by creating an attractive investment environment and working with financial institutions to remove barriers to private investment
    - Oversee offshore and onshore infrastructure for the energy transition
2. Streamline processes and harmonise the various administrations, industry bodies, and regulators involved in planning, issuing permits, and granting licences to accelerate decision-making and facilitate efficient infrastructure deployment
3. Coordinate with Europe to:
    - Enable increased cross-border electricity trading and hydrogen transport
    - Establish a larger, unified carbon market with mutual recognition of EU and UK emissions trading schemes and a well-implemented carbon border adjustment mechanism to prevent carbon leakage and support the UK's CCS services to other countries by incentivising international CO_2 imports.

The bottom line? The North Sea must transform to retain its strong position at the heart of the UK energy system. This vision outlines what the future could look like, and how to get there.

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Introduction

Background

This report, written by Baringa for Offshore Energies UK (OEUK), sets out a vision for the North Sea in 2035. Its aim is to support energy security, seize opportunities arising from the energy transition, and outline a more holistic approach to delivering the energy transition through an integrated plan. It reveals the potential to drive fundamental improvements at the heart of the UK's energy landscape.

It's hard to overstate the importance of the North Sea. In 2024 alone, it added more than £25bn to the UK economy.[1] It supports more than 200,000 skilled jobs across the UK, including 90,000 in Scotland.[2] Plus, its vast oil and gas reserves provide energy security.

This engine of energy and economic growth is also no stranger to change. For decades, the North Sea region has been a critical hub for hydrocarbon extraction. More recently, it's become the largest European deployer of offshore wind producing energy for domestic use and international exports whilst continuing to support our oil and gas needs. And as the world shifts towards a low-carbon economy in response to climate change and net-zero targets, the North Sea's transformation is expanding and accelerating.

The UK government's commitment to achieving net-zero emissions by 2050 has spurred a drive toward cleaner energy sources and the decarbonisation of key industrial sectors. The North Sea is uniquely positioned to play a pivotal role in the energy transition due to its abundant offshore wind resources, hydrocarbon reserves, carbon storage capability, existing infrastructure, highly skilled workforce, and mature supply chains. The region's future will be defined by its ability to decarbonise, including:

- Managing the full infrastructure lifecycle through to decommissioning
- Integrating and scaling low-carbon technologies such as offshore wind, hydrogen production, and carbon capture and storage (CCS)
- Ensuring that the transition remains manageable and affordable for consumers and businesses in the UK and beyond.

For the North Sea to continue playing a key role in a decarbonised world, the different industries involved will need to align on strategic planning, significant investment, and coordinated efforts. Harnessing its full potential will not only support the UK's climate and energy ambitions but also position the region as a resilient, innovative, and competitive player in the global energy landscape.

The UK government has actively advanced offshore wind, hydrogen, and CCS initiatives by introducing market mechanisms and developing supporting policies. Now is the time to build on this progress by addressing current investment and operational challenges to accelerate decarbonisation and achieve the scale of transition required.

At this critical juncture, our report illuminates a path forward. It reveals a vision for an integrated offshore sector by 2035 that achieves the North Sea's full potential and industry ambitions. It also provides a high-level overview of the key elements fundamental to achieving this bold vision.

[1] Economy & People Report 2024 | Offshore Energies UK (OEUK)
[2] North Sea Oil & Gas - Unlocking Potential

The North Sea 2035 vision

Our North Sea 2035 vision focuses on:

Transforming the North Sea into an integrated hub that produces low-cost, high-value energy for the UK and its neighbours by capitalising on the existing resources, supply chains, skills, and expertise built up over decades serving as an offshore energy power-house. This will drive economic growth and technological development, making the UK a world leader in the energy transition.

Our vision demonstrates how the North Sea can continue to play a long-term, strategic role in the UK's future. It underscores how leveraging existing offshore resources and expertise can ensure a manageable transition to a low-carbon future encompassing renewables, CCS, hydrogen, and decarbonised oil and gas. The aim is to maximise the opportunity of the energy transition domestically to keep highly skilled jobs and specialist technology expertise in the UK, driving economic growth and enabling the export of high-value products and services.

The 2035 vision is underpinned by the need to deliver low-cost, high-value energy, which we define as follows:

Low-cost energy is...

Competitive
- Making the UK the most attractive location in Europe for large energy consumers, such as data centres

Affordable
- Ensuring that UK consumers and businesses have some of the lowest energy bills in Europe

High-value energy is...

Resilient
- Providing physical security due to robust infrastructure and supply diversity
- Maintaining cybersecurity through robust network security
- Delivering price security by protecting from shocks in global fuel markets

Flexible
- Enabling management of significant seasonal and weather-driven fluctuations in energy demand
- Responding to variability in renewable power generation

Low-carbon and sustainable
- Using deployment of renewables, storage of carbon and hydrogen, and decarbonisation of oil and gas production
- Producing/generating/transporting energy in a safe and environmentally friendly manner, maintaining social license to operate

In a nutshell, the aim of low-cost, high-value energy is to reduce household and business energy bills whilst enhancing energy resilience, flexibility, and sustainability of supply.

Low-cost and high-value aren't an either/or – the successful transition of the North Sea can deliver both. However, this will require a clear vision and coordinated strategy. This report sets out an approach to achieve that.

Five ways that low-cost, high-value energy enables economic growth, decarbonisation, and international competitiveness

1. **Enhancing the international competitiveness of UK businesses**
   The provision of low-cost energy will reduce operational expenses, enabling businesses to offer more competitive pricing. It will also help the UK attract investment from energy-intensive sectors, such as data centres. Furthermore, it will free up capital for investment in innovation and expansion, which in turn drives job creation.

2. **Creating and securing highly skilled jobs across the UK**
   Investment in energy infrastructure such as offshore wind, hydrogen production, CCS and advanced energy storage technologies will require a highly skilled workforce. The current oil and gas workforce – such as engineers, geologists, construction workers, maintenance technicians, project managers, and delivery specialists – is ideally placed to transition into these technologies. In addition, new jobs will be created.

3. **Supporting and strengthening domestic supply chains for offshore energy providers**
   Transforming the North Sea for the energy transition will significantly increase demand for energy infrastructure. This can be met by broadening domestic supply chains that have traditionally served the oil and gas industry. For example, subsea service providers can use their expertise to support the development of floating offshore wind farms.

   This approach will enable the UK to pivot and strengthen existing expertise in technical engineering and specialist manufacturing to serve the wider offshore energy industry and export markets. This in turn reduces reliance on non-domestic supply chains.

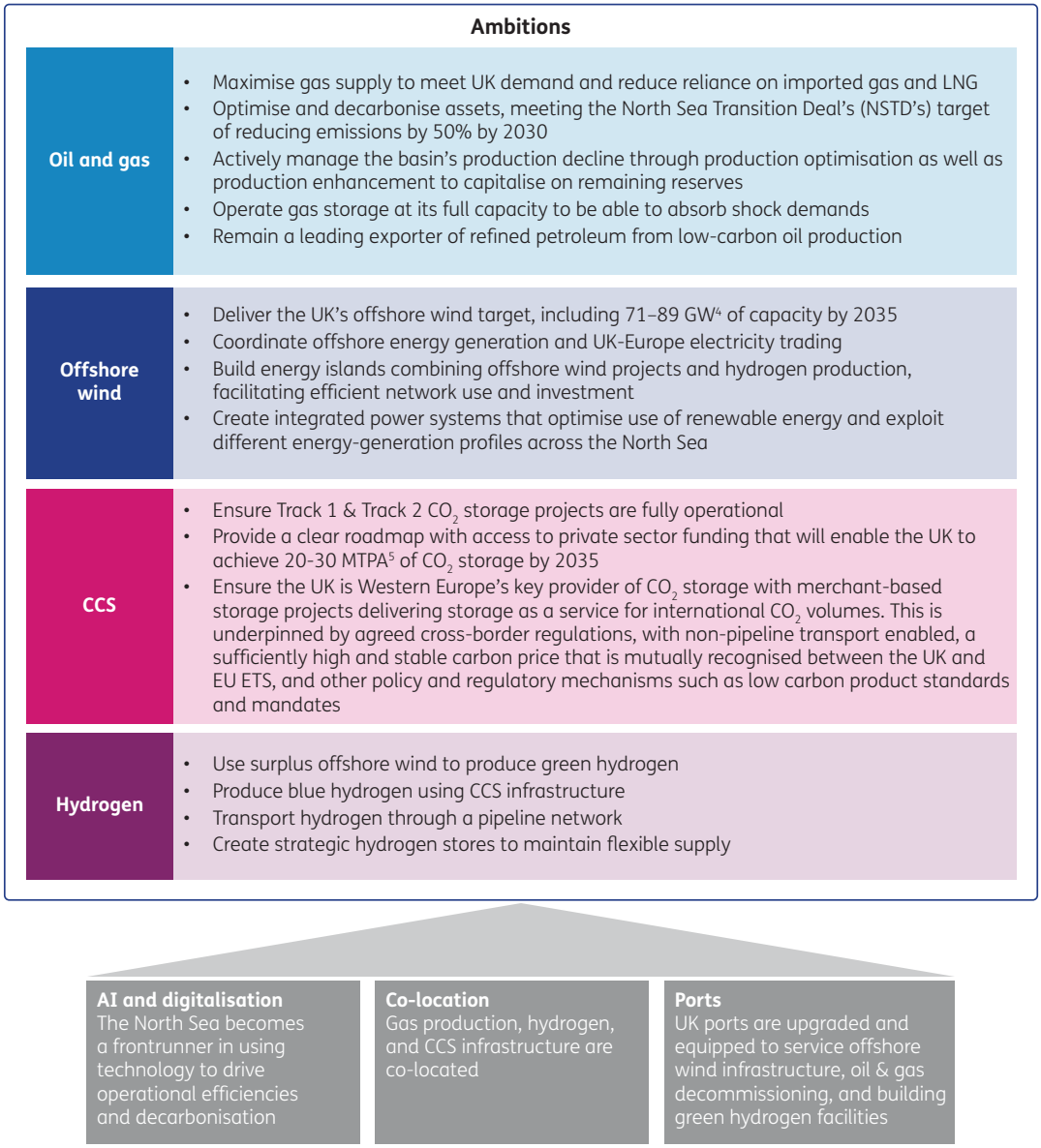
4. **Cementing the UK as a key exporter of low-carbon energy (such as electricity and hydrogen), CCS services, plus associated knowledge services and supply chain components in new technologies**
   Low-cost, high-value energy will allow the UK to generate competitively priced energy for export, strengthening trade relationships and securing a strategic foothold in emerging international energy markets as countries strive to meet net-zero targets. This will enable an expanding supply chain and our skilled service sector to export knowledge and products to other regions.

5. **Using low-carbon energy and CCS technology to power and decarbonise industry**
   The provision of high-value energy will support the decarbonisation of energy and carbon-intensive industries, such as cement and lime, refined products, fertilizer, chemicals, and metal production.

Future ambitions for energy in the North Sea

The North Sea involves a complex ecosystem of different energy sources and supporting industries, each of which has its own ambitions. However, there are many interdependencies between the different energy market participants, so achieving significant transformation requires multiple change initiatives across the value chain to proceed in parallel and in a managed way.

The diagram below outlines the ambitions for each energy source, including targets that are aspirational yet achievable, grounded in practical and realistic considerations.[3] The diagram also shows how three common factors – technology, co-location of infrastructure, and upgrades to ports – can help all industries achieve their goals.



[3] Further details are required on emerging technologies such as tidal and geothermal energy.

[4] National Electricity System Operator. Future Energy Scenarios 2024. Retrieved from https://www.neso.energy/document/321051/download

[5] Department for Energy Security & Net Zero. (2023, December). CCUS Cluster Sequencing Track-2 Market Update. Retrieved from GOV.UK: https://www.gov.uk/government/publications/cluster-sequencing-for-carbon-capture-usage-and-storage-ccus-track-2/ccus-cluster-sequencing-track-2-market-update-december-2023

Six critical elements to unlock the 2035 vision

1. **Delivering/repurposing complex physical infrastructure at pace**

   Delivering and maintaining low-carbon energy will require substantial amounts of new infrastructure, including large and small-scale generation, storage, hydrogen production, network, and demand-side technologies. It'll also demand that existing oil and gas infrastructure from depleted fields, such as pipelines and platforms, are repurposed for CCS and hydrogen.

2. **Securing new and expanded routes to market, plus finding domestic and international buyers for renewable energy, hydrogen production and CCS**

   There are many technologies that will need to be deployed at scale to enable decarbonisation. Several of them require the alignment of multiple components within the value chain.

   For example, to support the business case for hydrogen production at scale, companies need guaranteed physical offtake to ensure they can sell the hydrogen they produce. If demand fails to materialise, the best options are to store/export hydrogen or use the gas grid to transport it back to the UK mainland. This means that achieving an optimal pathway for hydrogen development requires coordination across hydrogen production, use of the gas grid, and access to other markets.

   The government's subsidy schemes have helped start coordination across the value chain. However, given that subsidies aren't a long-term solution, the next step is to incentivise merchant-based projects that can operate independently of ongoing government funding to encourage the development of a self-sustaining market.

3. **Developing specialised supply chains serving the offshore energy ecosystem**

   Increasing capacity for offshore wind, CCS, and hydrogen production requires highly specialised infrastructure and components. The longstanding supply chains for the oil and gas industry provide an ideal foundation for this. Greater visibility of future demand will encourage investment in adapting these domestic supply chains to support the UK's energy transition and open up further export opportunities.

4. **Driving down production, generation, and operating costs**

   Currently, production, generation, and operating costs for oil, gas, and offshore wind are higher in the North Sea compared to other regions. To be competitive and enable cheaper production, these costs must be driven down through efficiency and optimisation improvements. This will increase attractiveness for investments and foster affordable rates for consumers and businesses.

5. **Accelerating learning curves on the development of new technologies (such as floating offshore wind, LDES, CCS and H_2 production)**

   Delivering a balanced energy system will require a host of emerging technologies, many of which are not deployed at scale today. For example, net zero consistent scenarios in the National Energy-System Operator's (NESO) Future Energy Scenarios (FES) for 2050[4] include:

   - 93 – 100 GW of offshore wind (some of which will need to come from floating offshore wind farms)
   - 11 – 15 GW of LDES
   - 35 – 75 GW of hydrogen production
   - 29 – 56 GW of dispatchable low-carbon generation capacity (CCS and hydrogen generation) needed to balance out the intermittency of renewables.

   Investment in emerging technologies will help initiate the process of reducing costs and scaling up production. This is critical to achieving the capacity ranges suggested in the FES. Without ongoing state intervention, it will be extremely challenging for market-based signals alone to drive the accelerated commercialisation and learning curves to deploy these technologies at pace. Striking the right balance between exploring a broad range of emerging technologies and focusing on a narrower subset is critical to fostering innovation while enabling deeper investment and faster commercialisation.

6. **Coordinating across agencies and industries on competing uses of the seabed and aligning investment**
   There are opportunities to share infrastructure, reduce operational costs, optimise supply chains, and enable more efficient use of the seabed. The key is creating synergies by aligning efforts across different industries such as offshore wind, oil and gas, and CCS.

... and these 6 elements should be achieved sustainably by protecting the marine seabed, upholding environmental stewardship, and managing incidents in accordance with HSE guidelines

[4] National Electricity System Operator. Future Energy Scenarios 2024. Retrieved from https://www.neso.energy/document/321051/download

Recommendations

Current situation: The need for a holistic approach to achieve low-cost, high-value energy

There is a significant opportunity to deliver low-cost, high-value energy through a managed North Sea transition. However, this will require clarity of vision and a coordinated approach, given the challenges of delivering complex infrastructure and new technologies at pace whilst lowering operating costs.

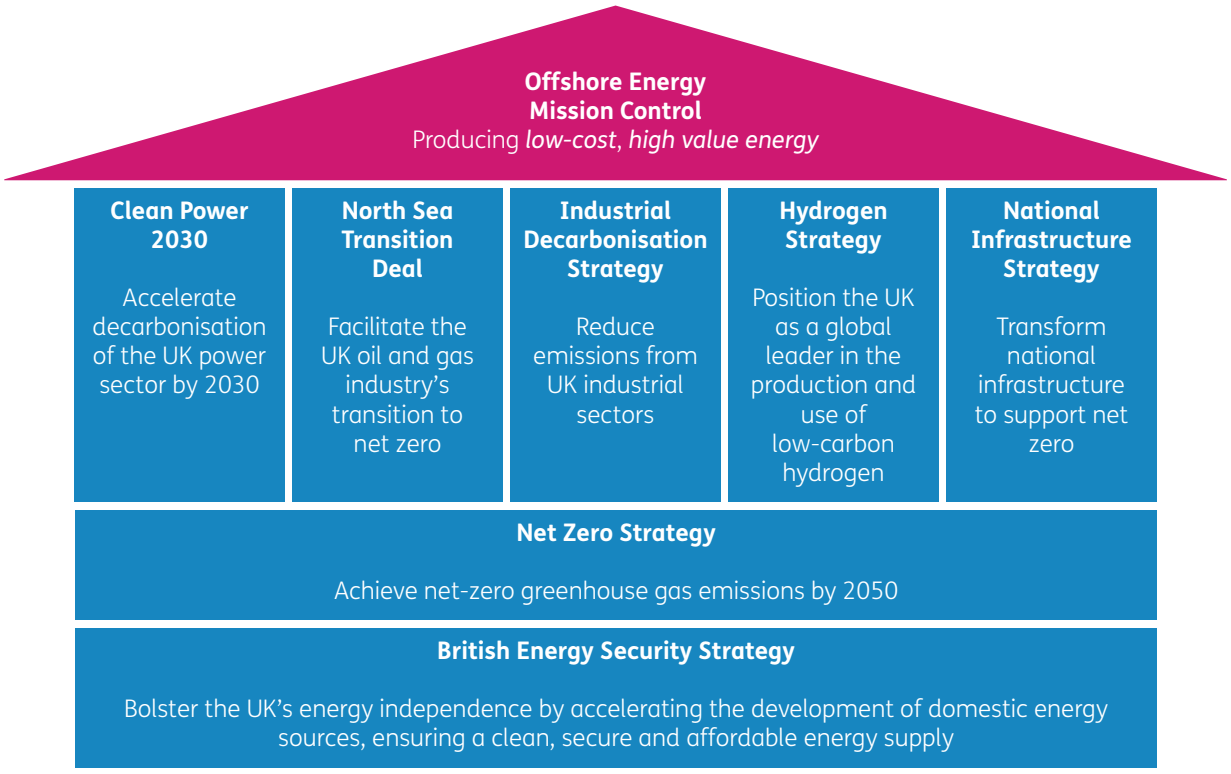
There has been substantial focus on decarbonising power – for example, in the Clean Power 2030 Action Plan. But energy generation is only part of the picture. Other technologies such as energy storage and CCS will play an instrumental role in decarbonising the entire energy landscape.

In 2030, the UK will still rely largely on non-electrified energy sources that need to be decarbonised through other forms of low-carbon energy for transport and industrial processes. The Strategic Spatial Energy Plan (SSEP), commissioned by the government, recognises the need for more central coordination of the energy system. However, it's limited to electricity and onshore hydrogen, and doesn't yet encompass a range of potential future policy outcomes. The SSEP could go further in terms of:

- breadth to encompass all energies and resources that can be harnessed from the North Sea
- depth, through an even stronger alignment of policy incentives for production and infrastructure creation.

Recommended oversight approach: Establishing an Offshore Energy Mission Control

Given the complexity and interdependencies within the energy system, achieving the 2035 vision will require an integrated approach – one that cuts through the different regulatory bodies and connects the various government initiatives to deliver results on all fronts. This integrated approach should be driven through an Offshore Energy Mission Control.



Simplified version of the current strategies driving the different energy vectors, governed and managed by different regulations and policies

The Offshore Energy Mission Control should have **strategic oversight of the entire energy system**, the **ability to cut through different government and industry bodies**, provide a **stable policy environment** for the North Sea and **minimise bureaucratic expansion**

Recommended responsibilities for the Offshore Energy Mission Control

Developing an integrated delivery strategy

The Offshore Energy Mission Control should develop an integrated delivery strategy that prioritises the supply of low-cost, high-value energy. The strategy should:

- Create an attractive investment environment that incentivises private investment by focusing on bankable opportunities that generate predictable revenue streams and have a proven track record in the energy transition
- Strategically allocate government funding to accelerate commercialisation of emerging technologies and alleviate bottlenecks in the development of a balanced energy system. For example, further government intervention and investment in LDES would help commercialise these technologies that can mitigate the impact of the UK's seasonal demand profile
- Enable coordinated investment in energy projects by financial institutions, identifying and removing barriers to private investment
- Incorporate an integrated infrastructure plan that oversees seabed allocation for the entire energy system as well as the different sectors that occupy the UK marine environment and the required onshore infrastructure that enables the transition.

Streamlining processes

The Offshore Energy Mission Control should bring together various administrations, industry bodies, and regulators involved in planning, permitting, and licensing to streamline decision-making, establish a consistent process across energy infrastructure projects, and accelerate deployment. It should also recognise a number of the existing frameworks, such as the North Sea Transition Forum and North Sea Energy Cooperation, as we continue to position the UK to support domestic and international markets.

Coordination with Europe

The Offshore Energy Mission Control should facilitate collaboration with Europe to achieve higher levels of cross-border electricity trading and hydrogen transport. This would enable the UK to secure new markets for energy produced in the North Sea beyond domestic needs. Coordinating infrastructure design and build – for example, through hybrid assets – can offer significant CAPEX and OPEX savings. Major benefits are anticipated in offshore wind development and coordination with cross-border electricity interconnectors, with potential wider value from cross-technology coordination with hydrogen production and oil and gas electrification.

The Offshore Energy Mission Control should also coordinate with Europe to develop a unified carbon market that ensures mutual recognition of the UK and EU emissions trading schemes, while implementing an effective carbon border adjustment mechanism to prevent carbon leakage and support the UK's CCS services to other countries by incentivising international CO_2 imports.

Conclusion

The time has come to deliver the energy transition by unlocking the full potential of the North Sea. Building upon its rich oil and gas resources and expertise, there's a huge opportunity for the region to evolve into a dynamic hub – one that supports low-carbon oil and gas while expanding into CCS, hydrogen, and renewable energy.

Doing this efficiently will require closer collaboration between the different industries, careful repurposing of end-of-life assets, adaption of existing knowledge, and an Offshore Energy Mission Control to align efforts. The work will be well worthwhile, as it will deliver low-cost, high-value energy to consumers and businesses in the UK and beyond. At a broader level, it will position the UK as a leader in the new, decarbonised energy landscape. And it will keep valuable taxpayer revenues, jobs, and energy security here for decades to come.

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The future of the North Sea