Whole Energy Market Strategy

Whole Energy Market Forum

November 2024

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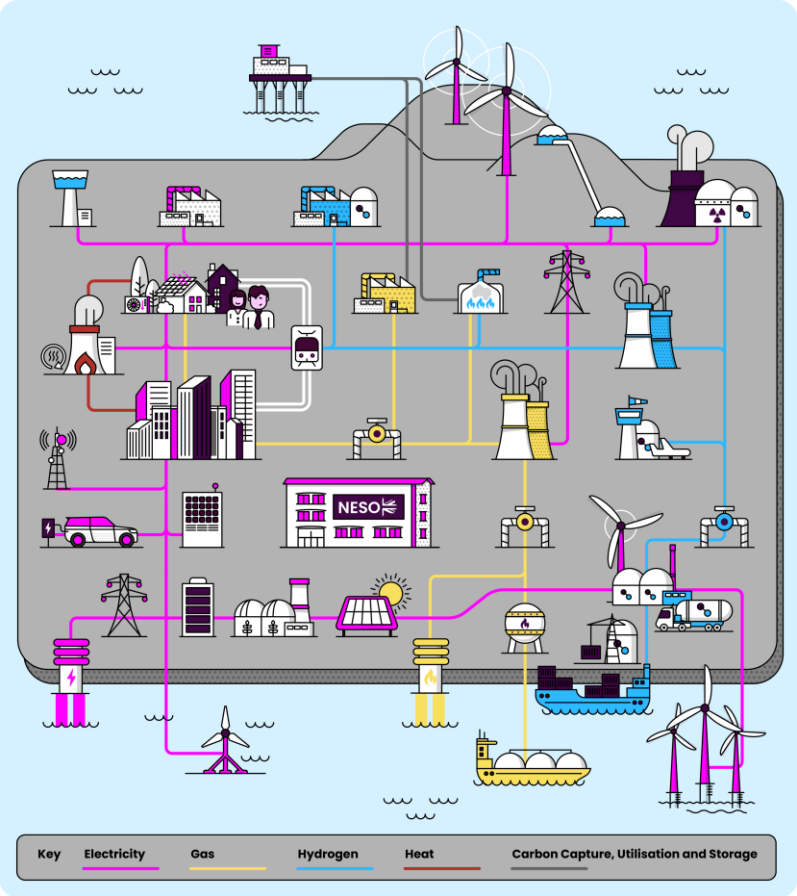
National Energy System Operator

NESO's strategic remit, following the 2023 Energy Act, includes Whole Energy Market Strategy as part of its advisory role



NESO's Whole Energy Market Strategy (WEMS)

A Whole Energy Market

Whole Energy Market Strategy (WEMS)

Electricity **Gas** **Hydrogen** **Networked heat**
Networked carbon

The value provided by a **Whole Energy Market Strategy** includes:

- Exploring how **interactions between markets impact the energy trilemma**
- Identifying opportunities for **greater coordination across markets**
- Shaping the **evolution of whole energy market arrangements.**

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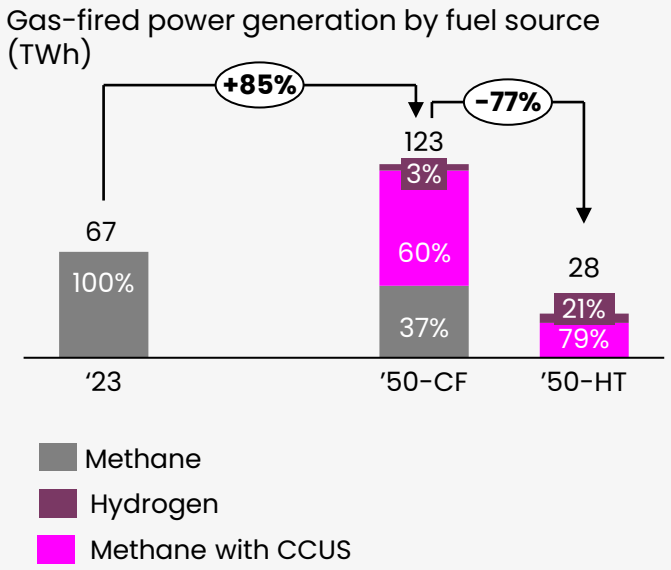
Context | On the 2050 trajectory, we can expect an increasing number & complexity of interactions between vectors

Power Generation

Dispatchable gas-fired generation decarbonisation



2023 – 2050 Case Study across our most ambitious FES scenario and the counterfactual

- There is **a broad range on the future** role of gas-fired power generation.
- **Growing roles** for **hydrogen**
- To meet **Clean Power by 2030**, unabated gas-fired power generation will need to **decline** by **95%.**

Interaction energy changes from 2023–2050 across least and most ambitious FES scenarios: Counterfactual (CF)[1] and Holistic Transition (HT)[2]
1. Holistic Transition is a FES pathway with credible decarb., achieved with a mix of electrification and hydrogen 2. Counterfactual is FES scenario with slowest decarb., involving minimal behavior change and low decarb. of heat and industry
Source: Future Energy Scenarios (FES) 2024

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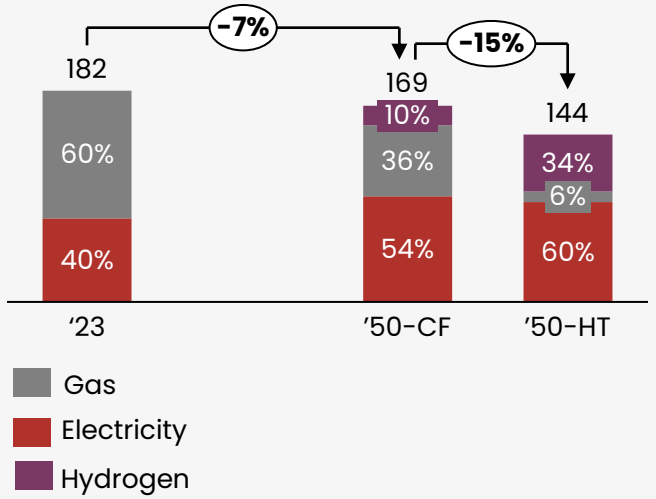
Context | On the 2050 trajectory, we can expect an increasing number & complexity of interactions between vectors

Industrial consumption

Industrial process heat decarbonisation

Industrial energy demand by technology (TWh)



2023 – 2050 Case Study across our most ambitious FES scenario and the counterfactual

- Increasing **interactions with electricity and hydrogen**, to decarbonise industrial heat.
- There is a **broad range on the role** of **hydrogen**, providing between **17 TWh** and **49 TWh** of energy for industrial heat decarbonisation.

Interaction energy changes from 2023–2050 across least and most ambitious FES scenarios: Counterfactual (CF)[1] and Holistic Transition (HT)[2]
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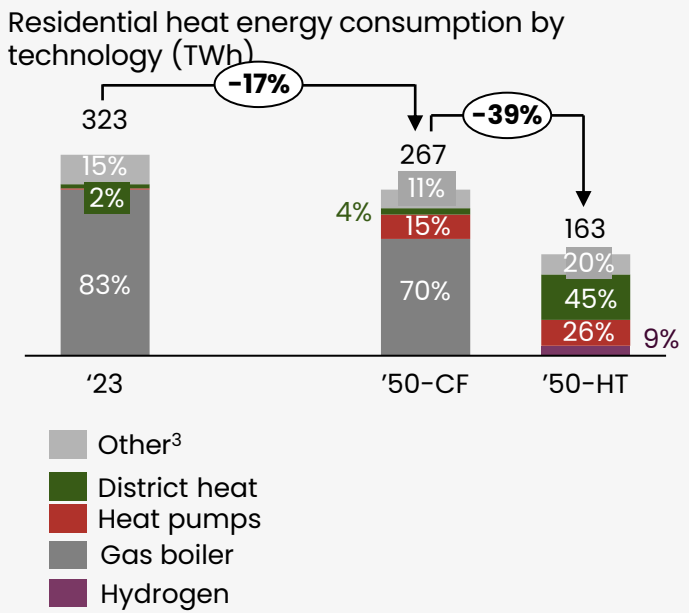
Context | On the 2050 trajectory, we can expect an increasing number & complexity of interactions between vectors

Residential consumption

Residential heat decarbonisation



2023 – 2050 Case Study across our most ambitious FES scenario and the counterfactual

- Broad **range of vector interactions** and **role of technologies**, especially the role of **heat pumps** and **district heat.**
- In the Holistic Transition FES, there is a **100% substitution of natural gas boilers;** predominately by heat pumps and district heating.

Interaction energy changes from 2023–2050 across least and most ambitious FES scenarios: Counterfactual (CF)[1] and Holistic Transition (HT)[2]
1. Holistic Transition is a FES pathway with credible decarb., achieved with a mix of electrification and hydrogen 2. Counterfactual is FES scenario with slowest decarb., involving minimal behavior change and low decarb. of heat and industry 3.Other entails community, electric heating, biomass CHP, biofuel and biomass boilers
Source: Future Energy Scenarios (FES) 2024

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Phase 1: Whole Energy Market Strategy Case for Change

Our aim

To collaborate with industry to develop new and innovative whole energy market thinking, supported by NESO market experience and existing NESO programmes including:

Establish case for change

Bringing industry experts together to collaborate on developing a holistic energy market strategy

We want to engage with you to proactively progress whole energy market evolution.

Review of Electricity Market Arrangements (REMA), Future Energy Scenarios, Clean Power 2030 and Strategic Energy Planning

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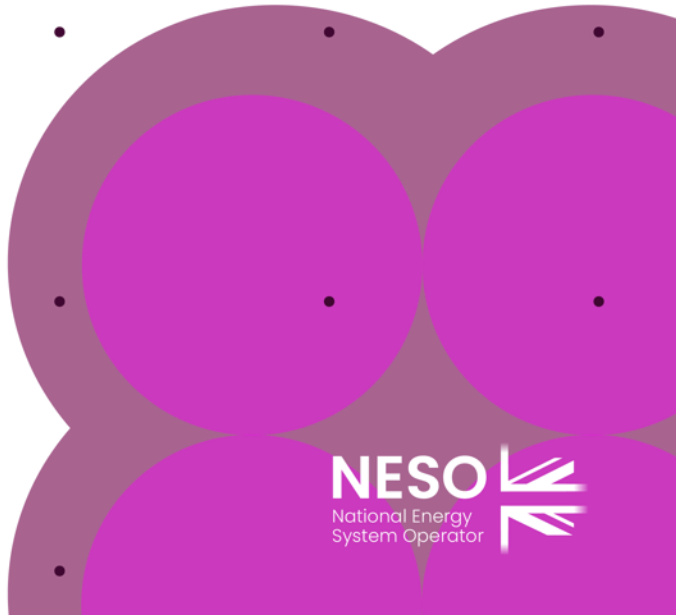
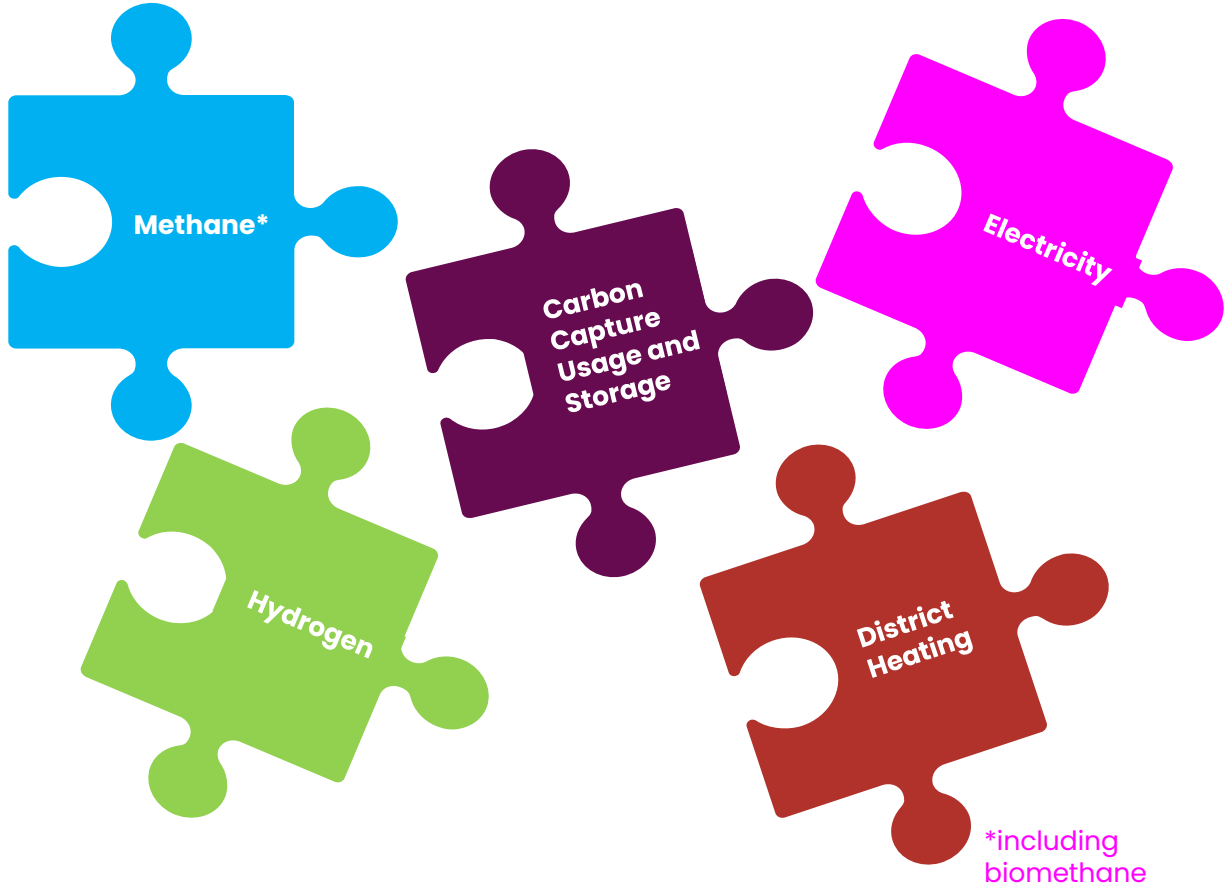
Whole Energy Market Strategy

Case for Change

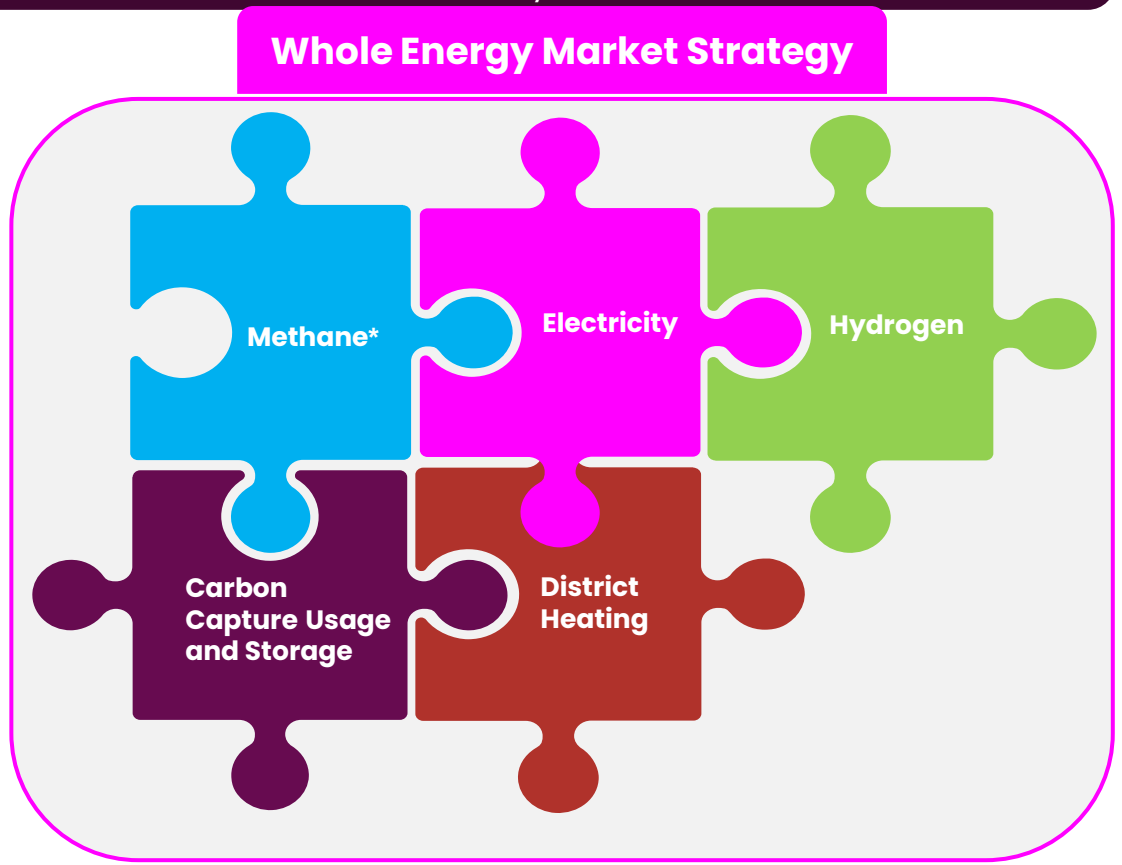


Whole Energy Market Strategy:

Currently, energy markets are designed independently of each other, in a fragmented approach



Transitioning to a clean energy system requires an exploration of how markets can work better together to net zero in an affordable and secure way



The new role of NESO includes exploring how energy markets can work better together

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Whole Energy Market Strategy:

What are the components of "Markets"?

Economic Regulation

The structure of the energy market across vectors, value chains and market participants

E.g., Licensed activities, Codes, Standards

Investment Policy

Market interventions employed to achieve specific policy objectives

E.g., Supply decarbonisation support mechanisms (such as Contract for Difference)

Operational Design

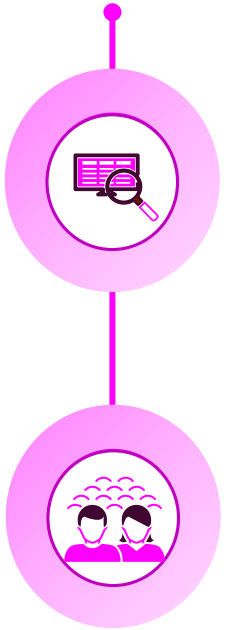
The structure of wholesale and short-term operational energy markets to match physical supply and demand

E.g., Settlement period, energy balancing mechanism design, ancillary services

Cost Allocation

Cost recovery for networks and investment policy

E.g., Investment policy cost allocation, network cost allocation



Analysis:
Comparing market design to assess and prioritise areas that could benefit from greater coordination

Engagement:
Built through engagement with industry

We seek to collaborate with industry to develop a structured approach to identify & prioritise areas that could benefit from greater whole energy market coordination

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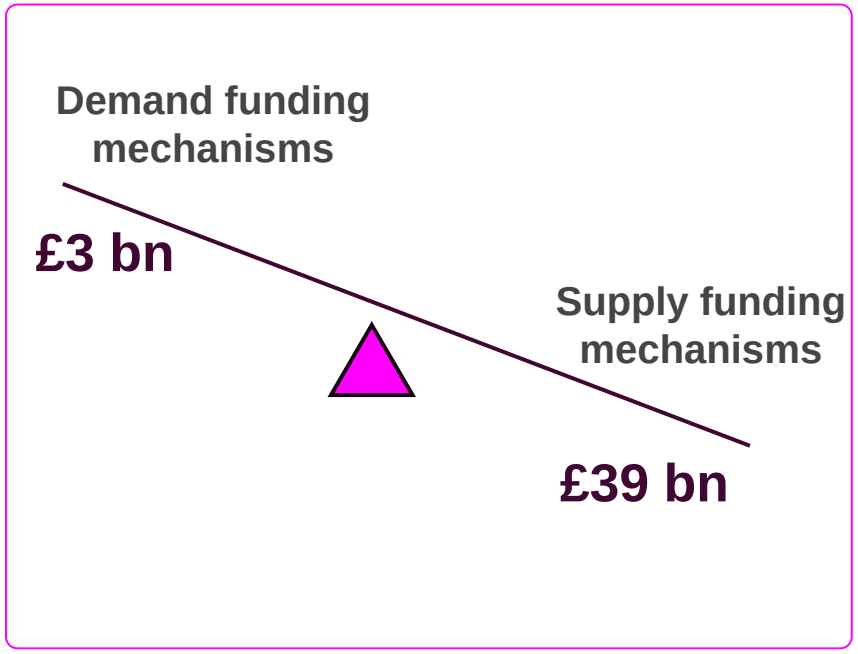
Case study of focus area for whole energy market strategy consideration:

Funding for energy decarbonisation

Decarbonisation investment policy



There is more committed supply side than demand side funding for decarbonisation

What is the market design difference?

There is more funding to support the production of low carbon energy, than funding to support energy end users to decarbonise.

Why it matters?

An imbalance in funding support could result in producers of low carbon energy having low confidence consumers will be able to use it. This could be a challenge to supporting decarbonisation objectives, especially for emerging vectors, who do not have established markets for their product.

What is the value from whole energy market strategy?

- What should be the balance between supply and demand funding mechanisms?
- Unlock emerging energy markets through securing a route to market
- Stimulating more demand-led engagement on decarbonisation.

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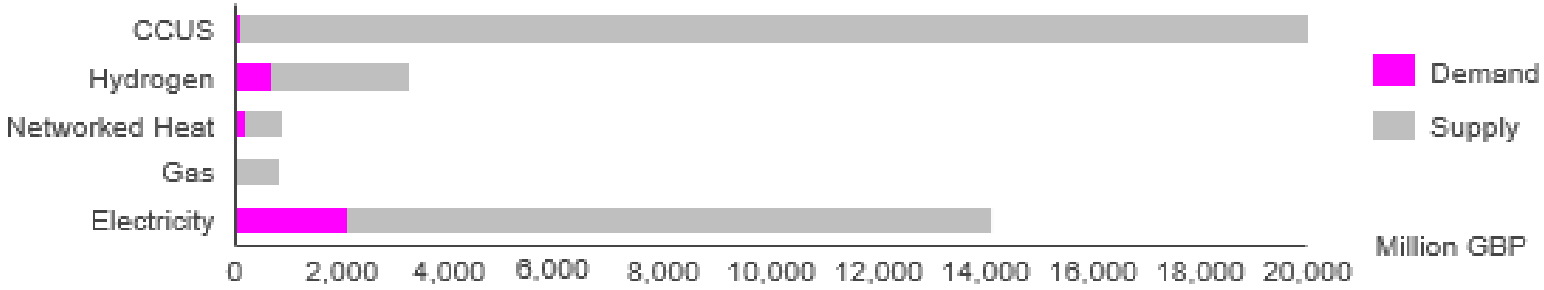
Case study of focus area for whole energy market strategy consideration:

UK Govt support for decarbonised energy supply vs demand[1]



Global Government support for hydrogen by market and target area demand[2]

- **There is a clear disparity between UK supply and demand side decarbonisation funding across vectors**
- This decarbonisation funding **imbalance is also present globally**, as seen in the global hydrogen market
- **Only 11% of hydrogen projects globally have a guaranteed consumer**

1. Commitment periods may vary
2. Note: EU + MS = European plus its member states. Both also includes support for Hydrogen midstream (storage and transport)
3. Sources: 1. UK Government, Ofgem,. 2. BloombergNEF Hydrogen Subsidies Tracker (web | terminal)

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Call for engagement

We will collaborate with decision makers and industry participants to proactively explore opportunities for greater market design coordination, as we accelerate towards meeting net zero objectives and addressing the energy trilemma.

Whole Energy Market Forum: Regular industry events to gain strategic guidance and leadership from industry representatives

Whole Energy Market Strategy workshops: To engage with industry to harness cross-vector expertise and a range of experiences

Webinars / Podcasts: To share programme development

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Whole Energy Market Strategy (WEMS) team and contact information

Meet the WEMS team

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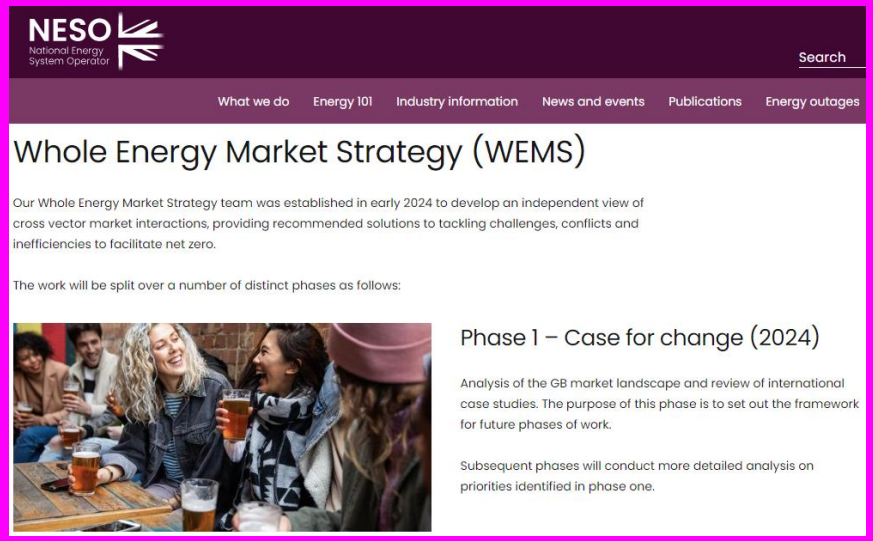

Find us on the NESO website:
Whole Energy Market Strategy (WEMS) | National Energy System Operator

Reach out to us at our dot box:

box.Whole.Energy.Market.Strategy@nationalenergyso.com

Thank you!