

## Consultation: Strategy and Policy Statement for Energy Policy in Great Britain May 2023

### About the IET

The IET is a trusted adviser of independent, impartial evidence-based engineering and technology expertise. We are a registered charity and one of the world's leading professional societies for the engineering and technology community with over 155,000 members worldwide in 148 countries. Our strength is in working collaboratively with industry, academia, and government to engineer solutions for our greatest societal challenges. We believe that professional guidance, especially in highly technological areas, is critical to good policy making.

### Overall observations

The IET recognises that this is the first time that the Secretary of State has designated a 'Strategy and Policy Statement for Energy Policy in Great Britain' which we believe is an important initiative.

We therefore welcome this consultation and agree that the Statement broadly identifies the most important strategic priorities and policy outcomes for government, whilst also broadly identifying the key roles for Ofgem and the Future System Operator (FSO).

These priorities and policies will be key to delivering Britain's energy transition in respect of decarbonisation, energy security, and energy independence. We note and wholly endorse the recognition in the Strategy and Policy Statement of **the need to encompass all energy vectors and related infrastructure**, and for this to be made practical by establishing a central body **accountable for a strategic and co-ordinating role** to ensure coherent whole-system outcomes.

However, to be effective as an enabler for the energy transition, we believe **there is a need within the Strategy and Policy Statement for further clarification and consideration** (particularly with regard to the future roles of the FSO and Ofgem, and interactions with DESNZ) and for further development or acceleration of delivery (particularly in respect of enabling clean energy and net zero infrastructure, and ensuring an energy system fit for the future) as outlined in The IET's report: UK renewables – limitless energy or a precious resource?<sup>1</sup>

Moreover, whilst we agree that the future framework for the detailed technical and commercial rules of the energy system needs to be fit for purpose and facilitate net zero by enabling the innovative change at a pace required to meet targets, this will require **governance reform beyond the appointment by Ofgem of code managers as a new class of licensee to deliver its new strategic code functions**.

Achieving the strategic priorities and policy outcomes set out in this Strategy and Policy Statement will require **an approach to governance that is able to take a whole energy system, all-stakeholder, perspective, and respond rapidly to emergent threats and opportunities** in an agile, holistic, and inclusive way.

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<sup>1</sup> <https://www.theiet.org/impact-society/factfiles/energy-factfiles/energy-generation-and-policy/uk-renewables-limitless-energy-or-a-precious-resource/>

Hence this is the focus of our response to the consultation with the following 20 high-level observations which we then expand on in our answers to the consultation's three specific questions ...

### High-Level Observations - Strategic Priorities

- i. There is an urgent need to establish a strategic and integrated planning capability for the whole energy system, including all energy vectors and related infrastructure such as carbon capture and storage. Only through cross-vector coordination will the FSO be able to plan an efficient and economical whole energy system. It follows that delivery of the UK Hydrogen Strategy must be a priority.
- ii. We believe that the Strategy and Policy Statement should acknowledge the need to develop sufficiently specific outputs in terms of a long-term spatial and temporal development plan describing the type, capacity, and location of strategic assets such as new generation; energy storage; hydrogen (production, infrastructure, and storage); CCUS facilities; and gas and electricity transmission and distribution systems. Broad policy outcomes are the starting point, but they do not describe the outputs necessary to deliver these outcomes.
- iii. A Central Strategic Network Plan (CSNP) will be essential to ensuring a coherent strategy for electricity infrastructure. It will need to extend beyond offshore and onshore transmission to include electricity distribution systems, beyond-the-meter systems, and community enterprises. Ultimately the CSNP will need to be part of a wider cross-vector strategic whole energy system plan.
- iv. The Energy Security Strategy includes an ambition of 24GW of nuclear capacity by 2050. Achieving this ambition will almost certainly require small modular reactors (SMRs) in addition to conventional nuclear plant. Advancing SMR technology to a level where it is capable of deployment is therefore a strategic priority.
- v. In addition to a strategic and integrated planning capability, of equal importance is a comprehensive *delivery plan* for energy system infrastructure, including measures that will assure delivery of outputs and associated policy outcomes.
- vi. There is a need to reinstate a comprehensive Industrial Strategy aligned to net zero objectives. Importantly this would provide clarity on how the manufactured components of a future zero carbon energy system would be sourced (home-produced or imported) as well as essential raw materials.
- vii. Smart appliances, smart heating systems and smart EV (and V2G) charging will provide valuable Customer Energy Resources to help deliver an efficient, coordinated, and economic whole electricity system whilst also benefitting customers directly.
- viii. Thermal insulation improvements targeted at poorly insulated homes would also help deliver an efficient, coordinated, and economic whole electricity system through avoided marginal costs of energy production and infrastructure capacity, whilst further reducing dependency on fossil fuelled generation.
- ix. It will be essential to ensure that planning and delivery of energy-dependent and energy-interdependent sectors and systems (including industry, agriculture, transport, and water) receives a similar strategic oversight to the energy system itself.

- x. Enabling a smart, digital, and secure energy system depends critically on having data and communications systems able to provide the necessary capacity and resilience.

#### **High-Level Observations - Roles and Relationships**

- xi. The relationship between the FSO, DESNZ and Ofgem in terms of responsibility and accountability for strategic decision-making and delivery must be clear from the outset. A relationship similar to that between government and the Climate Change Committee would be helpful in protecting the 'independence' of the ISOP.
- xii. The FSO's role should be proactive in nature – taking the initiative in providing independent advice, analysis, and information to Ofgem and government, not only in response to requests but also as a routine part of its duties.
- xiii. It would be helpful to clarify how the FSO's budget (or allowed expenditure) would be set in respect of its strategic planning activities (independently of its activities as an electricity system operator and potentially a single flexibility market facilitator).
- xiv. The 'Independent System Planning' activities of the FSO would benefit from a 'light-touch' regulatory approach and a single source of energy policy guidance (DESNZ only).
- xv. We would urge firming-up of the target date for establishing the FSO, and that work starts in a 'shadow form' ahead of finalising its formal establishment.
- xvi. Development of Regional System Planning capability should be regarded as a priority for the FSO and government, noting that these entirely new arrangements will take time to bed-in.
- xvii. Cross-sector interdependencies beyond the energy system requires co-ordination to be extended to relationships between government departments and regulators (including DESNZ, DEFRA, DoT, DSIT, DLUHC, The Treasury, Ofgem, Ofwat, and Ofcom).
- xviii. Given Ofgem's wider regulatory remit under The Electricity Security Bill in respect of heat networks, CCUS and (by implication) hydrogen it will be important to ensure that no barriers to cross-vector or inter-vector optimisation arise from separate regulatory frameworks.
- xix. Ongoing development and delivery of energy strategy and policy requires a governance framework with a whole energy system perspective capable of responding in an agile, holistic, and inclusive way. The governance changes in hand are helpful but not sufficient.
- xx. Notwithstanding the urgency of creating a whole energy system planning capability, it should be expected that roles and responsibilities will evolve as experience is gained and as key aspects of transformation emerge. Hence the governance structure must be designed to embrace learning that can be used by all stakeholders to continuously refine energy strategy and update energy policy.

**The above high-level observations are developed further in our response to the three questions, as follows ...**

1. Does the strategy and policy statement identify the most important strategic priorities and policy outcomes for government in formulating policy for the energy sector in Great Britain? If not, please provide details of the priorities that you think should be included.

### Enabling Clean Energy and Net Zero Infrastructure

- 1.1. The Government's Strategic Priorities stated on Page 16 should include a requirement to establish a **strategic and integrated planning capability for the whole energy system, including all energy vectors: electricity, gas (methane and hydrogen), heat networks, and related infrastructure such as carbon capture and storage, telecommunications, and transport**. Until that is in place, there is an increasing probability of misaligned investment in individual vectors (for example in electricity infrastructure) which will prove inadequate or suboptimal once a whole energy system strategy is established.
- 1.2. By way of example, the extent to which Britain adopts a hydrogen economy, including the production of green hydrogen through electrolysis supplied by surplus wind generation output, and the use of stored hydrogen for power generation, will have a **material impact on the need for alternative sources of dispatchable firm generation capacity and the locational need for new electricity network infrastructure**.
- 1.3. For this reason, the **delivery of the UK Hydrogen Strategy must also be a priority**. The extent to which hydrogen will contribute to a whole-energy system will be determined by the degree of success in delivering the specified UK Hydrogen Strategy 'Outcomes by 2030' and achieving the 2020's Roadmap milestones. Subject to techno-economic appraisal **the establishment of a hydrogen 'backbone' pipeline system throughout the UK could both support a net zero electricity system by 2035 and provide a pathway to net zero** through providing a complementary route to decarbonisation of heat and transport.
- 1.4. Whilst a Strategy and Policy Statement is an essential precursor to enabling strategic planning, **of equal importance is a comprehensive *delivery plan* for the required energy and data infrastructure**, addressing potential barriers such as planning and consents for new power stations, interconnectors, and both transmission and distribution network infrastructure.
- 1.5. The delivery plan should also take account of supply chain implications in respect of skilled human resources, manufacturing capabilities, and the issues we currently observe as 'connection delays'. **In the absence of such a delivery plan the FSO in its capacity as an ISOP will have no reference against which it would be able to meet its obligation to inform the Secretary of State that a policy outcome in the Statement is unachievable**.
- 1.6. In terms of supply chain capability, **we would emphasise the need to reinstate a comprehensive Industrial Strategy aligned to net zero objectives**. Importantly this would provide clarity on how the necessary base of skilled human resources would be developed, and how the manufactured components and essential raw materials of a future zero carbon energy system would be sourced (home-produced or imported). In the absence of clarity over sourcing, there is a risk of reducing the nation's Scope 1 and 2 emissions whilst inadvertently increasing our Scope 3, 4 and 5 emissions. **Clarity over sourcing will be important not only from an a 'energy independence'**

**perspective, but also in terms of being able to measure the overall carbon footprint of creating a decarbonised energy system.**

- 1.7. In terms of business skills, access to funding should be more flexible for employers to use where they need it most, with targeted support for SMEs who may find it more challenging to provide training and upskilling for their employees. **The IET recommends that using the unspent apprenticeship levy will support a workforce needed for the future of energy systems engineering.** This might include offering a bursary to attract engineers specifically for the nuclear and hydrogen industries which look set to become key to ensuring a national energy system fit for the future.

### **Ensuring An Energy System Fit for the Future**

- 1.8. On Page 26 (Government's Strategic Priorities) the Statement correctly notes the key role for energy market design with coordinated national and local electricity markets. However, it omits to include the importance of the **Central Strategic Network Plan (CSNP)** which will be essential to ensuring a coherent strategy for electricity infrastructure. Bullet 2 is ambiguous and should start with 'Ensuring'.
- 1.9. **The CSNP must be based on sound power engineering and systems engineering principles** which can be implemented and used to monitor progress via detailed concept shaping, engineering, and construction, through to implementation. Well defined engineering-based plans and pathways to net zero will be essential to ensuring a power and wider energy system fit for the future. The IET Energy Panel is available to work with DESNZ in helping define this.
- 1.10. **In terms of a CSNP, consideration should be given to incorporating higher capacity assets, for example utilising transmission voltages above 400kV** which is not uncommon elsewhere in the world. A spatial plan will help identify priority geographic areas and ensure optimisation of transmission capacity and new infrastructure investment whilst considering interactions from a whole energy system perspective. NG ESO's Holistic Network Design might consider this approach in the context of the Crown Estate's ambition to realise some 24GW of floating offshore wind in the Celtic Sea by 2045. In this context we would recommend The IET's report regarding the challenges of offshore energy networks in the Humber region<sup>2</sup>.
- 1.11. Given that by 2050 electricity distribution systems will experience a probable doubling of consumption and peak demand whilst accommodating up to 41% of supply capacity in the form of distributed generation (based on ESO's 2022 FES 2050 scenarios), it follows that **the CSNP needs to extend beyond offshore and onshore transmission to also include electricity distribution systems.** Only by doing so will the FSO, working in conjunction with DSOs, be able to consider opportunities to shift and manage demand through smart solutions, such as electricity storage, flexibility, and other forms of distributed energy resources (DER).
- 1.12. Whilst all NGESO's current GB future energy scenarios assume a major increase in weather-dependent renewables, **there needs to be a techno-economic appraisal of the options for ensuring sufficient supply-side (as well as demand-side) flexibility for real-time electricity**

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<sup>2</sup> <https://www.theiet.org/impact-society/factfiles/energy-factfiles/energy-generation-and-policy/the-challenges-of-offshore-energy-networks-in-the-humber-region/>

**system balancing** under all future credible real-time generation and demand scenarios. **This should extend to consideration of the minimum requirement for firm dispatchable generation capacity necessary for secure and stable system operation.**

- 1.13. Moreover, given an increasing dependency on inflexible generation, it will be essential to incorporate new sources of flexibility as means of managing sustained deficits and excesses in generation output. **Developing a whole energy system approach will enable access to a new range of short and long-duration flexibility sources** – including options for energy arbitrage and conversion - for example hydrogen production by electrolysis, hydrogen storage, and hydrogen-fuelled generation.
- 1.14. Notwithstanding an increasing dependency on inflexible generation, there will remain an important role for flexible synchronous generation for the purposes of ensuring electricity system security and stability. Nuclear could play a key role here but achieving the Energy Security Strategy ambition of 24GW of nuclear capacity by 2050 will almost certainly require a nuclear portfolio including small modular reactors (SMRs) in addition to conventional nuclear plant. **Advancing SMR technology to a level where it is capable of deployment in time to meet decarbonisation and security of supply objectives is therefore a strategic priority.**
- 1.15. It is important in the context of customer engagement to recognise that the whole electricity system extends beyond the boundary meter. **Smart appliances, smart heating systems and smart EV (and V2G) charging represent valuable Consumer Energy Resources which, properly coordinated, can play a valuable role in electricity system balancing and ancillary service provision.** This will be particularly important with a future electricity supply portfolio dominated by inflexible sources of power.
- 1.16. In terms of whole energy system efficiency, **thermal insulation improvements targeted at poorly insulated homes would benefit all consumers through avoided marginal costs of energy production and infrastructure capacity**, and at least in the interim, reduced need for dispatch of unabated fossil-fuelled generation. In terms of social obligations, such measures would be particularly beneficial to low income and vulnerable customers.

#### **Energy System Roles and Responsibilities**

- 1.17. On page 12 (Energy System: Roles and Responsibilities) it would be most helpful to clarify the relationships between DESNZ, Ofgem and the FSO, for example the extent to which the FSO in its capacity as ISOP will be independent of DESNZ in respect of political influence (noting that the Secretary of State will be the sole shareholder). We would envisage a relationship not dissimilar to that between government and the Climate Change Committee being a good model for protecting the ‘independence’ of the ISOP. **The relationship between the FSO, DESNZ and Ofgem in terms of responsibility and accountability for strategic decision-making should be clear from the outset.**
- 1.18. We note that the FSO will have a statutory duty to provide independent advice, analysis, and information to Ofgem and government ‘when requested’ and that the FSO will be expected to be adaptable to respond to these requests for advice, and flexibly ‘react’ and intelligently engage with government and Ofgem to actively shape the key decisions that will determine the energy system of the future. Whilst we agree with this obligation, we would suggest that **the FSO’s role should be less reactive and more proactive in nature – i.e. providing independent advice,**

**analysis and information to Ofgem and government should be a routine part of its duties**, not least because it is the FSO in its role as ISOP that is most likely to foresee challenges and opportunities that might be overcome or enabled by policy and/or regulatory decisions.

- 1.19. There is a need to recognise Ofgem’s wider regulatory remit under The Electricity Security Bill in respect of heat networks, CCUS and (by implication) hydrogen - and consider the regulatory implications from an integrated multi-vector energy system perspective, in particular **ensuring no barriers to cross-vector or inter-vector optimisation arise from separate regulatory frameworks and settlements** relating to electricity (transmission and distribution), gas (including hydrogen), heat networks and CCUS infrastructure.
- 1.20. The FSO will have the responsibility for the CSNP (and ultimately, we would envisage, a Central Strategic Whole-Energy System Plan). However, an energy system that delivers the desired strategic outcomes efficiently and affordably requires both urgent implementation action and **an approach to decision-making (governance) that takes a whole-system, all-stakeholder, perspective, responding rapidly to emergent threats and opportunities in an agile, holistic, and inclusive way**. Without this there is high risk of poor implementation decisions – building the wrong things and/or in the wrong places – with consequent costs in stranded assets, higher costs of operation, and potentially challenges to security of supply, resilience, and achievement of decarbonisation targets.
- 1.21. In that regard, governance changes currently in hand will be helpful but not sufficient to achieve this objective. **Hence urgent governance reform needs to be at the heart of this Strategy and Policy Statement** whilst acknowledging that reform will inevitably take time to develop and enact. Until this is in place, the urgency and scale of what needs to be delivered makes it necessary to continue delivering within the current governance framework.
- 1.22. In terms of the nature of governance reform required, we would draw attention to the extensive work undertaken by the Future Power System Architecture programme<sup>3</sup> (FPSA) which outlined proposals for fundamental governance change for the power sector. **We believe there would be merit in adopting and extending these principles to the governance of the future energy system**, particularly for regional energy planning where new stakeholders will be involved in the decision-making process.
- 1.23. **We believe that the Strategy and Policy Statement should acknowledge the need to develop sufficiently specific outputs**. Broad policy outcomes are the starting point, but they do not describe the outputs necessary to deliver the outcomes. We would envisage the FSO being responsible for creating a long-term spatial and temporal development plan describing the type, capacity, and the broad location of strategic assets such as new generation; energy storage; hydrogen (production, infrastructure, and storage); CCUS facilities; and transmission and distribution systems (across all vectors) required to meet anticipated future energy demands over a specified timescale. This will necessarily be a flexible, iterative process to accommodate emerging or unforeseen challenges and opportunities. Nevertheless, **if well-managed through suitable governance arrangements it will give asset and infrastructure providers and innovators the confidence to invest** and enable delivery plans to be drawn up and managed successfully to their implementation.

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<sup>3</sup> IET/ESC report from FPSA programme. [Fast Track to Britain’s Future Power System](#)

**2 Does the strategy and policy statement effectively set out the role of Ofgem in supporting government to deliver its priorities? If not, please identify where these expectations could be made clearer.**

- 2.1. With regard to the relationship between Ofgem and the FSO in its capacity as ISOP (noting that the FSO will be licensed by Ofgem) **it would be helpful to clarify how the FSO's budget (or allowed expenditure) would be set in respect of its strategic planning activities** and differentiated from its currently licensed electricity system operation activities<sup>4</sup>.
- 2.2. From a regulatory perspective, **we believe the 'Independent System Planning' activities of the FSO would benefit from a 'light-touch' regulatory approach to promote efficient activities**, leaving the FSO to develop whole energy system strategies in liaison with DESNZ, and to advise Ofgem on the agreed implications for energy (and energy-related) infrastructure investment and regulation generally. The FSO should not be burdened with the overhead of reporting to two parties on matters of infrastructure policy.

**3 Given the Future System Operator does not exist yet but will need to have regard to the strategy and policy statement once it does, do you consider that we have effectively reflected the Future System Operator's role in this document? If not, please identify where these expectations could be made clearer.**

- 3.1. The consultation notes that the FSO's roles are still in development and will take time to reach full maturity. Whilst references to such roles and responsibilities have therefore been kept at a higher level in the Statement, this should not detract from a recognition of the need for the FSO to be able to deliver a **strategic integrated whole energy system planning** capability as soon as is reasonably practicable. In that regard, **we would urge firming-up of the target date for establishing the FSO** (if practicable, well before the end of 2024).
- 3.2. Part of the development plan for the FSO must be to ensure it has appropriate terms of reference and is adequately resourced, with skills and tools, and empowered to perform the required whole energy system strategic planning function. Liaison, data exchange and joint modelling will be required at entirely new interfaces and will take time to bed-in. Given that many external investment decisions hinge on this **we would recommend that work starts in a 'shadow form' ahead of finalising the formal establishment of the FSO**.
- 3.3. The relationship between the FSO and (yet to be formally established) Regional System Planners (RSPs) will be key to ensuring that national energy policy both informs, and is informed by, local area energy challenges and opportunities which would otherwise be opaque to a central planner in a national role. We note that Ofgem has suggested that the FSO might be responsible for delivering RSP capability and hence, if this position is supported by DESNZ, **the development of RSP capability must also be regarded as a key role and priority for the FSO**.
- 3.4. Given the current regional variability across Britain in terms of public EV charging facilities, **a key output for RSPs, in conjunction with DNOs and EV Charge Point Operators, should include delivering sufficient regional coverage of public EV charging facilities**. The FSO would provide the necessary national oversight and coordination to ensure regional roll-out plans are

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<sup>4</sup> We note Ofgem's recent consultation on funding the transition to a Future System Operator



consistent with national requirements, including in respect of the Strategic Road Network (SRN) comprising some 4,500 miles of motorways and major A roads which will transcend regional planning boundaries.

- 3.5. The Energy Bill sets out that the FSO will be required to promote (inter alia) a coordinated, efficient, and economical energy system for **electricity and gas**. However, **from a whole energy system perspective, such coordination needs to extend to all energy (and energy-related) vectors including heat networks, hydrogen, CCUS infrastructure and transport**. Only through cross-vector coordination will the FSO be able to meet its obligations to plan an efficient and economical whole energy system.
- 3.6. In addition to cross energy vector co-ordination, **it will be essential to ensure that planning and delivery of energy-dependent and energy-interdependent sectors and systems receives a similar strategic oversight to the energy system itself**. Industry, Agriculture, Transport and Water are examples of such infrastructure requiring coordination with energy system infrastructure delivery.
- 3.7. In that regard, whilst we agree that an economic and efficient digital infrastructure is key to **enabling a smart, digital, and secure energy system, its effectiveness depends critically on having a communications system able to provide the necessary capacity and resilience**. The roles of the FSO and other parties in this regard should be made explicit.
- 3.8. Examining these key energy and data interdependencies highlights **the need for accountabilities and coordination to be explicitly addressed between relevant government departments and regulators** (including DESNZ, DEFRA, DoT, DSIT, DLUHC, The Treasury, Ofgem, Ofwat, and Ofcom). Without such coordination, the FSO's ability to develop and deliver a Central Strategic Whole-Energy System Plan risks being compromised by siloed governmental decision making and lack of alignment between departmental strategic objectives.