Delivering a reliable decarbonised power system

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1. Outline

This report illustrates what a reliable, resilient, decarbonised electricity supply system could look like in 2035, and the steps required to achieve it. It provides new insights and new advice on how such a system can be achieved by 2035, using real weather data and hourly analysis of Great Britain's power system (Northern Ireland is part of the all-Ireland system). It also looks at the implications for hydrogen.

2. Key messages

- A reliable, resilient, decarbonised electricity system can be delivered by 2035. This is needed to deliver emissions reductions in line with the path to Net Zero, while ensuring a reliable and resilient electricity supply and substantially reducing the UK's dependence on imported fossil fuels.
- The Government must give equal focus to low-carbon flexible solutions as to the full delivery of its existing renewables and nuclear commitments.
- Decarbonising and expanding the electricity system will rapidly reduce the UK's dependence on imported oil and gas, reducing in turn our exposure to volatile international prices.
- Transforming the electricity system provides opportunities for growth. Currently, over 31,000 people across the UK are employed in offshore wind alone – this is set to rise to 97,000 by 2030, driven by £155 billion in private investment, with further investment and employment in solar and onshore wind.

3. Supporting information, charts and data

- Delivering a reliable decarbonised power system - Charts and data (XLSX • 1MB)

4. Recommendations

Table 1

Recommendations - Delivering a reliable decarbonised power system

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Type	Location	Recommendations	Owner (Timing)
Priority	Ch 2, section 3	Publish a comprehensive long-term strategy for the delivery of a decarbonised, resilient, power system by 2035.	DESNZ (2023)
Priority	Ch 4, section 2 (d)	Set out, in NAP3, the Government's vision for what a well-adapted and climate resilient energy system will look like.	Defra (2023)
Priority	Ch 2, section 3 (a)	Clarify urgently and formalise the institutional responsibilities of the FSO, Ofgem and ministers, for strategic planning and delivery of the decarbonised, resilient system.	DESNZ (2023)
Priority	Ch 4, section 2 (d)	Conduct a review of governance arrangements for resilience to climate hazards in the energy system, to ensure they are fit for the new expanded and more diverse low-carbon system given increasing societal reliance on electricity.	DESNZ, Ofgem (2024)
Priority	Ch 2, section 3 (a)	Develop a long-term cross-sectoral infrastructure strategy to adapt and build respectively the distribution of liquid and gaseous fuels, electricity, CO2 and heat networks over the next decade.	DESNZ, FSO (by 2025 at the latest)
Priority	Ch 2, section 3 (d)	Identify a set of low-regret electricity and hydrogen investments that can proceed now.	DESNZ, FSO (by 2024 at the latest)
Priority	Ch 2, section 3 (a)	Create a Minister-led infrastructure delivery group, advised by the new Electricity Networks Commissioner, to ensure enabling initiatives for energy infrastructure build are taken forward at pace, and necessary policy changes are implemented across the UK, to deliver a decarbonised and resilient power system by 2035.	Electricity Networks Commissioner, UK, Scottish & Welsh Governments (2023)
Priority	Ch 2, section 3 (b)	Through the Review of Electricity Market Arrangements, develop a strategy as soon as possible on market design for the medium- to long-term for a fully decarbonised, resilient electricity system in the 2030s and onwards.	DESNZ (2023)
Priority	Ch 3, section 2 (e)	Finalise funding mechanisms and allocate funding to support the development of 10 GW of low-carbon hydrogen production by 2030.	DESNZ (2023)

Type	Location	Recommendations	Owner (Timing)
Priority	Ch 3, section 3 (c)	Fast-track the development of new business models for hydrogen transportation and storage infrastructure, with a view to keeping options open for larger scale hydrogen use by 2030.	DESNZ (2023)

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5. Supporting research

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A report to the Climate Change Committee

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