Written evidence submitted by The Dalton Nuclear Policy Group, University of Manchester (IND0013)

The Dalton Nuclear Policy Group

Part of The University of Manchester's Dalton Nuclear Institute, the Dalton Nuclear Policy Group takes an objective, evidence-based and independent view of policymaking in relation to the nuclear and wider energy sectors. Our areas of interest include considerations of energy security, affordability and the broader interactions between energy markets and society.

In developing its advice and recommendations, the group works closely with others across the university and – where appropriate – engages with colleagues elsewhere in academia, industry and Government to complement the insight and experience which exists within the group itself. The group's output is intended to be both novel and impactful, offering advice and recommendation to policymakers and other stakeholders, founded on impartial and evidence-based analysis.

Response to Inquiry

This inquiry alludes to the Committee's previous inquiry on "Securing the domestic supply chain", to which we did not respond. Given this context, we provide a short response to the inquiry below, rather than answering the questions posed directly. The Dalton Nuclear Institute will be responding to the open Business and Trade Committee's Industrial Strategy call for evidence[*] on 21st February. We will CC this response to you in case this is of value.

This inquiry is concerned with a 2035 timescale for a decarbonised electricity sector. We are unclear if this is an alternative timescale for the aim to decarbonise the grid by 2030 [1, pp. 4–6, 2, p. 6], or if this is a separate objective. We believe that achieving a net-zero grid by either of these timescales would be extremely difficult and cannot foresee a way in which this could be practically achieved.

Our latest position paper [3, Ch. 2.2] (also adapted for the academic literature [4]) examined the "High Electrification" scenario developed by DESNZ [5], which does not achieve full decarbonisation by 2050 and incorporates electricity generation from unabated gas as part of its total electricity mix. Our study pitches an alternative scenario to replace the unabated gas use and achieves zero emissions by 2050 by making heavy use of nuclear cogeneration in place of gas, however this would be no way practicable by 2030 or 2035.

Fully decarbonising the grid is an enormous undertaking, and we believe that nuclear is essential if such an ambitious task is to be realised without significant and potentially damaging demand-side controls. This is because of the intermittent nature of the renewables available to the UK, and thus a need to support the grid with dispatchable power sources. Batteries and other storage means are not suited to accommodate long periods of low renewable output at the scale required, and our paper describes this challenge in some depth [3, pp. 25–29]. The lengthy time horizon required to deliver substantial nuclear capacity means that a sizeable contribution from nuclear energy (i.e. much beyond the 3.2 GW from Hinkley Point C[†]) to the grid is unlikely this decade.

A recent paper from NESO lays out a strategy for clean power by 2030, with a stated aim to "reduce the share of unabated gas generation to below 5%" [6, p. 8]. This is distinct from achieving net zero emissions over the period. There is also a reliance on effective implementation of Carbon Capture and

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[*] https://committees.parliament.uk/call-for-evidence/3574/

[†] Hinkley Point C is currently expected to be completed between 2029 and 2031 [7, p. 33].

Storage before 2030, and delivery of a large storage capacity well beyond that currently available, with ambitious build rates. The emissions from power derived from waste combustion and combined heat and power sources are also not included in the accounting of power generation. We therefore question the desire to focus on the timeframe of 2030/2035 for decarbonising the electricity grid, when the target date for full decarbonisation is 2050.

The "Flexible Nuclear" scenario described in our paper uses nuclear cogeneration to support a largely renewable-powered grid (thus alleviating the need for standby gas plants), with the primary focus of the nuclear plants being to deliver heat for industry and hydrogen production [3, Ch. 4] (i.e. decarbonising beyond the electricity grid).

As a recommendation for this brief response, we would urge Government to provide clarity around its net zero ambitions and aim to be transparent about what it wants to achieve in this short timeframe. Achieving net zero by 2050 is already extremely ambitious and, given the long lead times involved with many infrastructure projects, the addition of near-impossible milestones may be detrimental to efforts towards the ultimate ambition.

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References

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[2] "Make Britain A Clean Energy Superpower," Labour Party, (2024). Online: https://labour.org.uk/wp-content/uploads/2024/03/Make-Britain-a-Clean-Energy-Superpower.pdf.

[3] J. Matthews, W. Bodel, and G. Butler, "The road to net zero: renewables and nuclear working together," Dalton Nuclear Institute, (2024). Online: https://documents.manchester.ac.uk/display.aspx?DocID=74463.

[4] J. Matthews, W. Bodel, and G. Butler, "Nuclear Cogeneration to Support a Net-Zero, High-Renewable Electricity Grid," *Energies*, vol. **17**, no. 6219, pp. 1–38, (2024). DOI: 10.3390/en17246219.

[5] "Energy and Emissions Projections 2021 to 2040, Annex O: Net Zero and the power sector scenarios," BEIS (Department for Business, Energy and Industrial Strategy), (2023). Online: https://assets.publishing.service.gov.uk/media/6464ac150b72d30013344604/annex-o-net-zero-power-sector-scenarios.pdf.

[6] "Clean Power 2030: Advice on achieving clean power for Great Britain by 2030," NESO (National Energy System Operator), (2024). Online: https://www.neso.energy/document/346651/download.

[7] "2024 Half Year Results," EDF, (2024). Online: https://www.edf.fr/sites/groupe/files/2024-07/half-year-results-presentation-2024-07-26.pdf.