Written evidence submitted by MCS Foundation to the Great British Energy Bill Public Bill Committee (GBEB20)

The MCS Foundation

Our vision is to make every UK home carbon-free. The MCS Foundation helps drive positive change to decarbonise homes heat and energy through our work programmes, grants and advocacy. The Foundation also oversees the Microgeneration Certification Scheme (MCS) which defines, maintains and improves quality standards for renewable energy at buildings scale.

1. Executive Summary

- The MCS Foundation is supportive of the overall vision for Great British Energy (GB Energy) and consider it an important contribution to decarbonising the electricity grid by 2030. We broadly agree with the content and wording of the eight clauses in GB Energy's Bill.[1]
- We agree with most of the objects outlined in Clause 3 of the Great British Energy Bill. However, we do not support the wording of ***"(b) the reduction of greenhouse gas emissions from energy produced from fossil fuels"*** and suggest this change to ***"(b) the reduction, and eventual phase out, of fossil fuel use for energy thus leading to a decrease in greenhouse gas emissions".***
- There are also elements of the Founding Statement[2] where we have concerns. Specifically, the commitment to *Hydrogen* and *Carbon Capture and Storage (CCS)* might conflict the goal of enhancing energy security, as these technologies could maintain the UK's reliance on natural gas and other fossil fuels, potentially exposing households to future price spikes.
- Importantly, we feel that GB Energy should not solely focus on large-scale infrastructure projects. It is equally important to commit to the development of local, small-scale renewable energy projects, which can provide direct benefits to communities, and when accumulated, can have a big impact on the overall energy system. This could be achieved through the proposed Local Power Plan.[3]
- Furthermore, while we strongly support the emphasis on energy efficiency improvements, there is currently little detail on how GB Energy intends to achieve this or what types of energy efficiency improvements it will focus on. We would advocate for energy efficiency improvements to homes and buildings to be a key priority, as our housing stock contribute 18% of the UK's carbon emissions.
- Lastly, while GB Energy has the potential to be transformative, its success will depend on parallel workstreams, such as reinforcing grid infrastructure and reviewing electricity market arrangements.

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[1] https://publications.parliament.uk/pa/bills/cbill/59-01/0005/240005.pdf
[2] https://www.gov.uk/government/publications/introducing-great-british-energy/great-british-energy-founding-statement#case-for-great-british-energy
[3] https://www.gov.uk/government/publications/introducing-great-british-energy/great-british-energy-founding-statement#case-for-great-british-energy

2. Clause 3 - Objects

The four objects listed in Clause 3 are broad statements that underpin the primary aims of GB Energy. Below, we review these areas.

"The statement must provide that Great British Energy's objects are restricted to facilitating, encouraging and participating in—

2.1 "(a) the production, distribution, storage and supply of clean energy"

We agree that this should be a main object of GB Energy but also believe that the following should be considered within this key objective.

2.1.1 Investing in energy storage should be equally as prioritised by GB energy as generation

2.1.1.1 To decarbonise the electricity grid by 2030,[4] innovative approaches will be needed to balance electricity supply and demand. Traditionally, flexibility has been provided by thermal power stations which can increase or decrease their energy generation in response to national energy demand (supply-side flexibility).[5]

2.1.1.2 In 2019, almost 75% of installed flexibility in the UK was thermal generation from natural gas,[6] incompatible with our net-zero goals. Electricity demand is expected to double by 2035 due to the electrification of heat and transport[7] and the majority of electricity generation will be from fluctuating renewables, reducing the amount of supply-side flexibility in the system. [8] Thus, innovative low-carbon types of flexibility will be essential, including more interconnectors, battery storage, thermal storage, demand-side response, and long-term storage, like green hydrogen.[9]

2.1.1.3 A decarbonised power system will see more frequent and longer periods of excess renewable power generation,[10] and storing this is key to a cost-effective transition in the power sector. An Aurora Energy Research report found that 46 GW of energy storage is required to support a decarbonised energy sector, 19-22 GW of which will need to be 0-4 hour short-term battery storage.[11] Therefore, GB Energy projects should not only focus on generation, but also aim to support the uptake of these flexibility solutions, including both short-term and long-term storage.

2.1.2 GB energy should consider the potential of co-location

2.1.2.1 Co-location refers to the practice of situating different energy generation assets, such as onshore wind and battery storage, in the same physical location. This strategy allows for more efficient use of land and infrastructure, improves grid stability, and optimises

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[4] Delivering a reliable decarbonised power system - Climate Change Committee (theccc.org.uk)
[5] Flexibility: Literature review on concepts, modeling, and provision method in smart grid - ScienceDirect
[6] https://www.carbontrust.com/our-work-and-impact/guides-reports-and-tools/flexibility-in-great-britain
[7] https://www.regen.co.uk/wp-content/uploads/Building-a-GB-electricity-network-ready-for-net-zero.pdf
[8] https://www.theccc.org.uk/publication/delivering-a-reliable-decarbonised-power-system/
[9] For more detail on these technologies see https://www.carbontrust.com/our-work-and-impact/guides-reports-and-tools/flexibility-in-great-britain
[10] https://auroraer.com/wp-content/uploads/2022/02/Aurora-Report-Long-Duration-Electricity-Storage-in-GB.pdf
[11] https://auroraer.com/wp-content/uploads/2022/02/Aurora-Report-Long-Duration-Electricity-Storage-in-GB.pdf

energy production by enabling energy generated at one time (e.g., when the wind is blowing) to be stored and used later.[12]

2.1.2.2 Co-location could be increasingly important to address the rising constraint issues we are seeing in the grid, which have resulted in an increased amount of wind curtailment.[13] This is when the grid cannot physically carry all the electricity generation from one area to the area of demand, and as a result, wind turbines (or other forms of generation) are turned off. Siting energy generation with some type of energy storage (e.g. green hydrogen) could help reduce the need for curtailment. If onshore/offshore wind is sited with green hydrogen, it also reduces the production cost of green hydrogen, which is an important long-term flexibility asset.[14]

2.1.3 The success of GB Energy will be dependent on there being a grid that can support new connections

2.1.3.1 The electricity grid is a limiting factor of net-zero: [15] it doesn't matter how much renewable investment there is, if the grid will not accept new connections. The long-wait times for connections, (7-10 years for solar power and battery storage energy projects[16]), and the increasing cost of congestion management indicate a grid management system that is no longer fit for purpose.

2.1.3.2 Connections queue reform could go some way to addressing the long connection wait times, but ultimately strategic upgrades to both the transmission and distribution networks will be necessary. We need an anticipatory model, in which grid development takes place in advance of connections. This would significantly reduce wait times. With the new Government's ambitious target to decarbonise the electricity grid by 2030, the volume of applications is likely to remain this high, or even increase further.[17]

2.1.4 Locational strategic decisions should be taken from GB Energy projects

2.1.4.1 One challenge we currently face in the energy system is the inefficient dispatch of electricity. Energy generation is not always located in the same areas of energy demand and market signals can sometimes result in generators acting in a way that is inefficient to the operation of the grid. For example, renewable energy technologies receiving a Contract for Difference payment are always incentivised to generate at full capacity when the reference price in the day ahead market is positive, even if it has adverse impacts on the system by causing grid constraints.

2.1.4.2 Constraint costs have increased significantly between 2021 and 2023, and these costs have ultimately been levied onto consumer energy bills.[18] GB Energy could go some way towards addressing these issues of inefficient dispatch by investing in areas that would

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[12] onshore_co_location_final.pdf (ymaws.com)

[13] https://www.scottishrenewables.com/assets/000/003/642/Constraint_Management_Report_FINAL_original.pdf?1705495695

[14] https://www.climatexchange.org.uk/projects/redirecting-excess-renewable-energy-to-produce-hydrogen/

[15] https://www.regen.co.uk/wp-content/uploads/Building-a-GB-electricity-network-ready-for-net-zero.pdf p.22

[16] https://solarenergyuk.org/news/mps-to-be-told-grid-delays-are-descending-into-farce/

[17] https://www.regen.co.uk/preparing-britains-electricity-network-for-net-zero/

[18] https://www.scottishrenewables.com/publications/1488-exploring-options-for-constraint-management-in-the-gb-electricity-system-the-potential-for-constraint-management-markets

help to reduce constraints. For example, investing in green hydrogen where there is significant surplus onshore wind in Scotland could help reduce curtailment and improve system efficiency.[19] Strategic locational investment decisions should be informed using the Strategic Spatial Energy Plan (SSEP), the Centralised Strategic Network Plan (CSNP), and Regional Energy Strategic Plans (RESPs).

2.2 "(b) the reduction of greenhouse gas emissions from energy produced from fossil fuels"

2.2.1.1 The phrasing of this object needs reviewing. In line with GB Energy's goal of clean energy by 2030, not only do fossil fuels for energy production need to be reduced to lower greenhouse gas emissions, but they need to be phased out completely and replaced by renewables and low-carbon flexibility solutions. Greenhouse gas emissions from energy produced from fossil fuels cannot be directly reduced unless fossil fuels *themselves* are reduced, or unless the emissions are captured after fossil fuel combustion via Carbon Capture Utilisation and Storage (CCUS). However, as engineering-based approaches such as direct air carbon capture and storage (DACCS) are not yet fully established in the UK, their GHG removal potential for the foreseeable future is uncertain.

2.2.1.2 For example, at present, there are no commercial operational CCS facilities in the UK successfully capturing and storing CO2 at the rate needed. Relying heavily on these technologies that have not yet proven to be scalable could delay necessary immediate decarbonisation actions and risk meeting GB Energy's goal of clean energy by 2030. Instead, efforts to decarbonise without depending on GGR should be prioritised through effective policy.

To reflect this stance, the statement could be phrased as follows:

➔ *"(b) the reduction, and eventual phase out, of fossil fuel use for energy thus leading to a decrease in greenhouse gas emissions".*

2.3 "(c) improvements in energy efficiency"

Similarly to Clause (b) above, this statement could benefit from further clarification of what specific energy efficiency measures.

2.3.1 More clarity on what role GB Energy will play in improving energy efficiency

2.3.1.1 We strongly support the objective to improve energy efficiency, as demand reduction should be considered a primary mechanism to achieve a resilient and decarbonised power sector. A stringent demand reduction pathway could reduce energy demand by 52% by 2050.[20] This would require significant reductions in energy demand in all sectors, namely agriculture and food, industry, buildings, and transport. The added benefit of a stringent demand reduction pathway is that net-zero goals can be achieved without Carbon Dioxide Removal (CDR) technologies, which have yet to be proven at scale in the UK.[21]

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[19] https://www.scottishrenewables.com/publications/1488-exploring-options-for-constraint-management-in-the-gb-electricity-system-the-potential-for-constraint-management-markets

[20] https://www.nature.com/articles/s41560-022-01057-y

[21] Energy demand reduction options for meeting national zero-emission targets in the United Kingdom | Nature Energy

2.3.1.2 Without investment in demand reduction, net-zero becomes extremely expensive;[22] the UK energy system will have to expand by four times by 2050, whereas effective demand reduction pathways limit this to just two times.[23] Energy efficiency plays a crucial role in reducing this demand, yet there is limited detail on this objective in the GB Energy Founding Statement.

2.3.1.3 One critical area that needs particular attention is the energy efficiency of homes. Our housing stock currently contributes to 18% of our overall carbon emissions in the UK.[24] To bring all homes to an Energy Performance Certificate (EPC) rating of C by 2035, over 1 million homes would need to be retrofitted annually.[25] The recent 2023 ESO Future Energy Scenarios recommend accelerating energy efficiency measures through the implementation of government incentives and grants[26] which aligns with the recent CCC progress report (2024) finding that the UK is significantly off-track for both energy efficiency policies.[27]

2.3.1.4 Improving the energy efficiency of homes has a positive impact on the energy system by reducing overall electricity demand from electric forms of heating. Upgrading a home from Energy Performance Certificate (EPC) band D, which is the average rating in the UK, to EPC band C, on average reduces heat demand of a home by 20%.[28] Recent research modelled the benefits of energy efficiency in improving the performance of heat pumps based on in-situ heat pump data. It found that if every home was fitted with a heat pump in the UK and their space heat demand were decreased by 25% through energy efficiency improvements, peak demand in 2050 could reduce by 10GW.[29]

2.4 "(d) measures for ensuring the security of the supply of energy."

2.4.1 We agree that GB Energy's "Local Power Plan" should provide funding towards community-based renewable energy projects which contribute to local energy security

2.4.1.1 We would like to highlight that not only large-scale UK based renewable energy projects, such as offshore wind installations and large nuclear, can contribute towards energy security. Localised, small-scale energy, including community energy projects, are as valuable to the system. As mentioned in GB Energy's founding statement (Section 6.3), a Local Power Plan will be one of GB Energy's key roles. Though this is not listed as one of the GB Energy's Bill objects, we agree with the notion laid out in this section: "*having local power generation is an essential part of the energy mix, ensuring communities own and benefit from clean power projects, and reducing pressures on the transmission grid*."

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[22] https://www.creds.ac.uk/publications/the-role-of-energy-demand-reduction-in-achieving-net-zero-in-the-uk/
[23] https://www.creds.ac.uk/publications/the-role-of-energy-demand-reduction-in-achieving-net-zero-in-the-uk/
[24] https://assets.publishing.service.gov.uk/media/6424b8b83d885d000fdade9b/2022_Provisional_emissions_statistics_report.pdf
[25] https://mcsfoundation.org.uk/wp-content/uploads/2024/08/MCSF-Ramping-Up-Retrofit-Report-FINAL.pdf
[26] https://www.nationalgrideso.com/document/283101/download
[27] https://www.theccc.org.uk/publication/progress-in-reducing-emissions-2024-report-to-parliament/
[28] https://www.carbonbrief.org/analysis-why-uk-energy-bills-are-soaring-to-record-highs-and-how-to-cut-them/
[29] How building characteristics affect heat pump consumption (edol.uk)

2.4.1.2 Furthermore, we agree the plan laid out to roll out small and medium-scale renewable energy projects, including shared ownership projects. Specifically, we agree that GB Energy should provide funding and support to Local and Combined Authorities and Community Energy Groups, as this is one of the biggest barriers they currently face.[30]

2.4.1.3 The Climate Change Committee has warned that it *"will not be possible to get close to meeting a net-zero target without engaging with people or by pursuing an approach that focuses only on supply-side changes"*[31] and how *"people need to be brought into the decision-making process and derive a sense of ownership of the net-zero project"*.[32] Community energy projects empower local communities, bolster the local economy, and foster a sense of ownership in the transition to clean energy.

2.4.1.4 The benefits of successful community energy projects are extensive, and not just economically - positive social outcomes such as behavioural changes, stronger community identity and increased local cohesion have been demonstrated because of these ventures.[33] Moreover, community energy projects have the potential to provide clean and affordable electricity to the public,[34] and with an estimated 6 million people in fuel poverty in the UK,[35] we are fully supportive of GB Energy's plan to put local authorities and communities at the heart of restructuring our energy economy.[36]

2.4.1.5 Community owned projects are beneficial for the local economy, as they are more likely to give contracts to locally owned contractors, use local banks, and provide investment opportunities to local citizens.[37] Examples of community ownership already exist in the UK such as Awel Aman Tawe charity in Wales. Awel Co-op is a two-turbine, 4.7 MWp community windfarm which generates enough power for 2500 homes (12,000 MWh of clean, low carbon energy per year).

2.4.2 GB Energy should prioritise providing energy security via investing in readily deployable renewables such as wind and solar over supporting Great British Nuclear with investing in new nuclear

2.4.2.1 The MCS Foundation acknowledges existing nuclear's role in zero-carbon electricity but opposes new nuclear plants in the UK as there are a number of significant drawbacks associated with its development. This position is based on considerations of safety, environmental impact, economic viability, and long-term sustainability. Many leading energy efficiency and environmental organizations share our view that investing in nuclear energy does not address the most pressing energy security issue: ensuring stable

[30] https://www.sciencedirect.com/science/article/pii/S0360544224012519
[31]https://www.theccc.org.uk/wp-content/uploads/2019/05/Net-Zero-The-UKs-contribution-to-stopping-global-warming.pdf
[32]https://www.theccc.org.uk/wp-content/uploads/2020/12/Policies-for-the-Sixth-Carbon-Budget-and-Net-Zero.pdf
[33]https://www.sciencedirect.com/science/article/abs/pii/S1364032118304507
[34]https://www.un.org/sustainabledevelopment/energy/
[35]https://commonslibrary.parliament.uk/research-briefings/cbp-8730/
[36] Great British Energy Founding Statement (publishing.service.gov.uk)
[37]https://friendsoftheearth.eu/wp-content/uploads/2017/05/the_benefits_of_community_ownership.pdf

and affordable prices for consumers.[38] New nuclear power cannot shield households from immediate effects of higher energy bills, due to the long timescales of construction.

2.4.2.2 Unlike other low-carbon technologies, they take over a decade to come online, with projects continually vulnerable to delays. For example, Finland's Olkiluoto 3 nuclear reactor started construction in 2005 with an end date of 2009, but due to delays this has been pushed back to early 2023, 12 years behind schedule.[39] It is predicted that the delays caused to Hinkley Point C have resulted in a £3 billion overspend.[40] Sizewell Point C is estimated to cost £20 billion for just 3.2 GW of electricity, before accounting for extra costs and potential delays.**Error! Bookmark not defined.**

2.4.2.3 A recent study found that an almost 100% variable renewables system, supported by long-term storage, without new nuclear, is the most cost-effective pathway to decarbonise the electricity grid.[41] We believe this is evidence for the government to prioritise energy efficiency, the electrification of heat, the development of batteries and increase investment in renewable energy. This is a no-regrets, cost-effective pathway, which is an immediate and permanent solution to rising energy prices.

2.4.3 The inclusion of Carbon Capture and Storage (CCS) and Hydrogen seems to conflict with the goal of enhancing energy security, as both technologies could maintain the UK's reliance on natural gas and other fossil fuels, potentially exposing households to future price spikes.

2.4.3.1 The Labour manifesto and GB Energy Founding Statement pledge to cut bills for good through a zero-carbon electricity system, protecting the public from the volatile and expensive fossil fuel market.

2.4.3.2 Although this isn't an explicit goal in the Bill, we also believe that striving towards an affordable and secure energy supply for the Great British public is essential. We are concerned, however, to see mention of CCUS and Hydrogen throughout the GB Energy Founding Statement. Though we support the strategic use of green hydrogen in hard to decarbonise areas, the same cannot be said for blue hydrogen, given that is derived from fossil fuels. Similarly, if carbon capture utilisation and storage is added to a fossil-fuel based power station, this contradicts GB Energy's mission of one hundred percent clean power by 2030.

2.4.3.3 We strongly advise GB Energy to prioritise decarbonisation of the energy system to produce clean power by investing in readily available renewable technologies to meet the goal of doubling onshore wind, tripling solar power, and quadrupling offshore wind by 2030.

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[38] See Craig Bennett's thoughts in: Is nuclear energy actually sustainable? - New Statesman ; https://energysavingtrust.org.uk/energy-saving-trust-responds-to-uk-governments-energy-security-strategy/ ; https://www.greenpeace.org.uk/challenges/nuclear-power/

[39] https://www.reuters.com/business/energy/finlands-ol3-nuclear-reactor-risks-more-delay-after-damage-found-2022-10-18/

[40] https://www.bbc.co.uk/news/uk-england-somerset-61519609

[41] [2109.15173] The role of new nuclear power in the UK's net-zero emissions energy system (arxiv.org)

3. Concluding remarks and recommendations

3.1 We support the overarching vision behind GB Energy and recognise its significant potential to contribute to the decarbonisation of the electricity grid by 2030, reduce electricity costs in the long-term, and enhance energy security. However, it is vital that the development of GB Energy does not occur in isolation. For its full impact, other essential streams of work need to be implemented effectively alongside it to ensure the decarbonisation of the entire energy system.

3.2 In particular, the GB Energy must complement the decarbonisation of other critical sectors, such as heating, rather than overshadowing them. For GB Energy to be most effective, the following policies should be considered in tandem:

- Investment in **grid reinforcement** to accommodate increased renewable energy.
- A **review of electricity markets** to ensure they support low-carbon goals.
- Short-term interventions aimed at reducing electricity costs and making low-carbon heat more affordable, including **moving social and environmental levies from electricity into general taxation.**
- Removing barriers to **low-carbon flexibility solutions**.
- **Extension of the Boiler Upgrade Scheme (BUS)** and the continuation of **0% VAT** on renewable technologies until 2030.

3.3 By ensuring a coordinated approach and implementing these additional measures, GB Energy can maximise its contribution to a decarbonised, secure, and affordable energy future.

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