Appendix: Climate Change

Climate Change

Policy and Guidance Background

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Policy and Guidance Background

European Guidance

Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment[1]

1 The European Commission published this Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment document in 2013. The aim of this guidance document is to *"help Member States improve the way in which climate change and biodiversity are integrated in Environmental Impact Assessments (EIAs) carried out across the EU"*.

2 The main concerns to consider as part of the EIA are climate change mitigation, climate change adaptation and biodiversity. The Guidance stresses that it is important to *"investigate and use options to eliminate GHG emissions as a precautionary approach in the first place, rather than having to deal with mitigating their effects after they have been released"*. The mitigation measures listed in the Guidance include, but are not limited to:

- consideration of technologies, materials and supply modes to reduce direct GHG emissions;
- planning carbon off-setting measures;
- building energy efficiency into the design of the project;
- using recycled/reclaimed low carbon construction materials; and
- making use of renewable energy sources.

National Planning Policy

National Planning Policy Framework[2]

3 The National Planning Policy Framework (NPPF) sets out planning policy for England and highlights the importance of the UK's transition to a low carbon future in a changing climate, and stresses the need for the increased use and supply of renewable and low carbon energy.

4 Paragraph 152 states that the planning system should *"support renewable and low carbon energy and associated infrastructure"* and *"shape places in ways that contribute to radical reductions in greenhouse gas emissions"*.

Climate Change Act (2008)[3]

5 The overarching Act in relation to climate is the Climate Change Act 2008. The Act introduces a legally binding target to reduce the UK's GHG emissions to at least 80% below 1990 levels by 2050. It also provides for a Committee on Climate Change (CCC) with power to set out carbon budgets binding on the Government for 5-year periods.

6 At present, the Third, Fourth, Fifth and Sixth Carbon Budgets, set through The Carbon Budget Orders 2009, 2011, 2016 and 2021, are 2.54 GtCO2e for 2018-2022, 1.95 GtCO2e for 2023-2027, 1.73 GtCO2e for 2028-2032 and 0.97 GtCO2e for 2033-2037 respectively. The Sixth Carbon Budget is the first Carbon Budget that is consistent with the UK's net zero target, requiring a 78% reduction in GHG emissions by 2035 from 1990 levels.

[1] *European Commission (2013) Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment.*
[2] *Ministry of Housing, Communities and Local Government (2023) National Planning Policy Framework, Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf*
[3] *His Majesty's Stationery Office (2008), 'Climate Change Act 2008'*

7 The CCC also produces annual reports to monitor the progress in meeting these carbon budgets. Consequent upon the enactment of the Climate Change Act, a raft of policy at national and local level has been developed aimed at reducing carbon emissions.

Climate Change Act 2008 (2050 Target Amendment) Order 2019[4]

8 In June 2019, the Government passed an order to amend the 2050 carbon emissions target in the Climate Change Act 2008 from 80% below 1990 levels to zero net carbon (i.e. 100% below 1990 levels). This new target will essentially end the UK's contribution to climate change by 2050.

Energy Act (2013)[5]

9 The Energy Act makes a provision for the setting of a decarbonisation target range, duties in relation to it and for the reforming of the electricity market for the purposes of encouraging low carbon electricity generation.

Climate Change and Sustainable Energy Act (2006)[6]

10 The Climate Change and Sustainability Act enhances the contribution of the UK to combating climate change and securing a diverse and viable long-term energy supply by boosting the number of heat and electricity microgeneration installations in the United Kingdom.

The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting[7]

11 The National Adaptation Programme sets out government's response to the second Climate Change Risk Assessment, showing the actions government is, and will be, taking to address the risks and opportunities posed by a changing climate. It forms part of the five-yearly cycle of requirements laid down in the Climate Change Act 2008 to drive a dynamic and adaptive approach to building our resilience to climate change.

The Clean Growth Strategy[8]

12 The Clean Growth Strategy sets out a comprehensive set of policies and proposals that aim to accelerate the pace of "clean growth", i.e. deliver increased economic growth and decreased emissions. In the context of the UK's legal requirements under the Climate Change Act, the UK's approach to reducing emissions has two guiding objectives:

- To meet our domestic commitments at the lowest possible net cost to UK taxpayers, consumers and businesses; and
- To maximise the social and economic benefits for the UK from this transition.

13 The Strategy contains policies relating to the delivery of clean, smart and flexible power, and details specific policies through which this can be achieved:

- Policy 33 of the report states the government's intention to phase out the use of unabated coal for electricity production by 2025;
- Policy 35 sets government's intentions to improve the route to market for renewable technologies, with up to £557 million for further Contract for Different auctions;
- Policy 36 details plans to target a total carbon price in the power sector which will give businesses greater clarity on the total price they will pay for each tonne of emissions.

[4] *His Majesty's Stationery Office (2019). The Climate Change Act 2008 (2050 Target Amendment) Order 2019.*
[5] *His Majesty's Stationery Office (2013). Energy Act 2013.*
[6] *His Majesty's Stationery Office (2006). Climate Change and Sustainable Energy Act 2006.*
[7] *Defra (2018). The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting.*
[8] *HM Government (2017). The Clean Growth Strategy.*

14 The Strategy discusses a potential low-carbon pathway whereby annual emissions are as low as 16 MtCO2e by 2032. The report states this is only likely to be achieved if low-carbon power generation including renewables and nuclear has the capacity to provide at least 80% of generation demand. The report also states the penetration of low-carbon power to this extent will rely on a smarter, flexible electricity network through the use of energy storage and demand-side management. Furthermore, the report highlights the Government's plans to invest £177 million in further reducing the cost of renewables.

Energy White Paper: Powering Our Net Zero Future, 2020[9]

15 The Energy White Paper builds on the Ten Point Plan to set energy-related measures in a long-term strategic vision, working towards the net zero emissions target for 2050 (HM Government, 2020). It establishes a shift from fossil fuels to cleaner energy in terms of power, buildings and industry, whilst creating jobs and growing the economy. In addition to this, the best solutions should be determined for very low emissions and reliable supply, keeping cost low for consumers.

16 Focusing on electricity is key for the transition away from fossil fuels and decarbonising the economy by 2050. Some commitments from this white paper include:

- Accelerate the deployment of clean electricity generation through the 2020s;
- Invest £1 billion in UK's energy innovation programme to develop the technologies of the future such as advanced nuclear and clean hydrogen; and
- Ensure that the transformation of the electricity system supports UK jobs and new business opportunities, at home and abroad.

17 The Net Zero Innovation Portfolio has been developed and aims to *"accelerate the commercialisation of innovative low-carbon technologies, systems and processes in power, buildings and industry to set the UK on the path to net zero and create world-leading industries and new jobs."* It looks to focus on ten priority areas, including energy storage and flexibility to decarbonise the energy system.

18 Key commitments relating to the energy system include:

- *"Publish a new Smart Systems Plan in spring 2021, jointly with Ofgem, and define electricity storage in law, legislating when Parliamentary time allows;*
- *Through the Net Zero Innovation Portfolio, we will launch a major competition to accelerate the commercialisation of first-of-a-kind longer duration energy storage, as part of our £100 million investment in storage and flexibility innovation, with delivery from spring 2021; and*
- *We will legislate, when Parliamentary time allows, to enable competitive tendering in the building, ownership and operation of the onshore electricity network."*

National Infrastructure Strategy, 2020[10]

19 The National Infrastructure Strategy focuses on the investment and delivery of infrastructure, which is fundamental to delivering net zero emissions by 2050 (HM Treasury, 2020). The strategy sets out the UK Government's plans to deliver on this target, decarbonising the economy and adapting to climate change:

- Work towards meeting the net zero emissions target by 2050 – Decarbonise the UK's power, heat and transport networks, and take steps to adapt to climate change impacts. This will require increased investments in network infrastructure, storage and increased low carbon generation capacity.
- Reducing emissions across whole sectors of the economy must be done in a sustainable way that minimises cost.

[9] *HM Government (2020). Energy White Paper: Powering our Net Zero Future. [Online] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945899/201216_BEIS_EWP_Command_Paper_Accessible.pdf*
[10] *HM Treasury (2020). National Infrastructure Strategy. [Online]*

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The Sixth Carbon Budget: The UK's Path to Net Zero, 2020[11]

20 It has been advised that *"the UK sets its Sixth Carbon Budget to require a reduction in UK emissions of 78% by 2035 relative to 1990. This will be a world-leading commitment, placing the UK decisively on the path to Net Zero by 2050 at the latest, with a trajectory that is consistent with the Paris Agreement"* (Committee on Climate Change, 2020a).

21 Meeting the recommended budget will require major investment, with the upscaling of low carbon markets and supply chains. These investments should also have climate resilience in mind to account for the impacts of future climate change. Key objectives should be:

- reducing demand and improving efficiency: require changes that will reduce carbon-intensive activities and the improvement of efficiency in the use of energy and resources;
- take-up of low carbon solutions: phase out fossil fuel generation by 2035;
- expansion of low carbon energy supplies: increasing renewables to 80% of generation by 2050; and
- electricity generation: will require a significant expansion of low carbon generation; This includes low cost renewables, with more flexible demand and storage.

22 Increasing the renewables penetration in the UK electricity mix to 80% by 2050 will largely be met with intermittent, non-dispatchable generation types (the CCC suggest that up to 140 GW of offshore wind should be deployed by 2050). In order to facilitate such a high penetration of intermittent energy sources, the CCC emphasise the requirement for a flexible energy network, partially achieved via the use of battery energy storage systems.

23 The budget report also breaks the economy down into sectors and provides emissions projections for each, these show the necessary decarbonisation trends that must be attained to reach net zero. The pathway for the manufacturing and construction sector shows it must reduce emissions by 70% by 2035, and 90% by 2040 from 2018 levels. It is recommended that this will be achieved by fuel switching, carbon capture and storage, and improvements to resource and energy efficiency.

Policies for the Sixth Carbon Budget and Net Zero, 2020[12]

24 This policy report accompanies the CCC's advice on the Sixth Carbon Budget and sets out the broad policy changes that could deliver the budget and the UK's net zero target (Committee on Climate Change, 2020b).

25 The report identifies carbon leakage as an issue of importance to the UK's climate targets, and as such is relevant to consider within the policy context of the Project. Carbon leakage may occur if, for cost reasons related to climate policies, production is transferred to another country resulting in increased emissions in that country.

26 *"The design of policies to reduce UK manufacturing emissions must ensure that it does not drive manufacturing emissions overseas"*. While this would reduce reported UK emissions, it would not reduce global emissions and would be damaging to the UK economy.

Industrial Decarbonisation: Net Zero Carbon Policies to Mitigate Carbon Leakage and Competitiveness Impacts, 2020[13]

27 This research paper (Sturge, 2020) was commissioned by the CCC to address concerns regarding the impact of carbon policies on carbon leakage. The paper focuses on recommendations to enable deep decarbonisation of UK industry in line with net zero pathways, whilst also mitigating carbon leakage and competitiveness impacts.

[11] *Committee on Climate Change (2020a) The Sixth Carbon Budget: The UK's path to Net Zero. [Online] https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-pathto-Net-Zero.pdf*
[12] *Committee on Climate Change (2020b). Policies for the Sixth Carbon Budget and Net Zero. [Online] https://www.theccc.org.uk/wp-content/uploads/2020/12/Policies-for-the-Sixth-Carbon-Budget-and-Net-Zero.pdf*
[13] *Sturge, D (2020) Industrial Decarbonisation: Net Zero Carbon Policies to Mitigate Carbon Leakage and Competitiveness Impacts. [Online] https://www.theccc.org.uk/wp-content/uploads/2020/12/Energy-Systems-Catapult-Industrial-Decarbonisation-and-Mitigating-Carbon-Leakage.pdf*

28 The suggested policies have not yet been incorporated by the UK Government, however they do highlight that carbon leakage is an issue that must be considered, and work is currently being undertaken to address it.

Environmental Audit Committee: Carbon Border Tax Measures, 2021[14]

29 The Environmental Audit Committee (EAC) has announced an inquiry into carbon border adjustment mechanisms in order to address carbon leakage and reduce the carbon footprint of imported goods. In turn, this may prompt other manufacturing countries to decarbonise (UK Parliament, 2021).

30 This carbon border adjustment mechanism, should it be implemented, will play a role in enabling the UK to meet its environmental objectives whilst considering wider impacts, risks and opportunities.

Net Zero Strategy: Build Back Greener, 2021[15]

31 This strategy sets out the UK's long-term plans to meet net zero emissions by 2050 and gives the vision for a decarbonised economy in 2050 (BEIS, 2021).

32 The policies detailed in the strategy will be phased in over the next decade or beyond in order to continue decarbonisation towards net zero. They also aim to keep the UK on track to meet upcoming carbon budgets.

33 This strategy brings forward the ambition for a fully decarbonised power system by 15 years, building on the targets set out in the Energy White Paper and the 10 Point Plan for a Green Industrial Revolution. The ambition is to fully decarbonise the UK's power system by 2035, through the growth in renewable and nuclear power in addition to an increase in energy storage capacity, gas with CCS, and hydrogen to increase the flexibility of supply.

34 The electricity system will be composed predominantly of wind and solar generation, with a planning increase in offshore wind generation to 40 GW by 2030. To ensure the system is able to reliably meet demand, wind and solar supplied will be complemented by nuclear power and power Carbon Capture Utilisation and Storage (CCUS). Flexible technologies, such as interconnectors, electricity storage, and demand-side response, will be implemented to help to minimise the amount of generation and network capacity is needed to meet demand needs.

35 Further, the strategy outline aims to support the decarbonisation of the construction and building sector. Reporting on embodied carbon in buildings and infrastructure is sought to be improved, alongside reductions in embodied carbon by way of material substitution, where appropriate, and resource efficiency.

36 The strategy recognises the importance of addressing the risks of carbon leakage, so policy interventions within the UK do not lead to increased emissions elsewhere. Options will continue to be explored to mitigate carbon leakage, with key efforts to address it through global action on industrial decarbonisation and climate regulation, with continued monitoring of related global policy developments.

IEMA Assessing Greenhouse Gas Emissions and Evaluating their Significance[16]

37 Guidance to assist EIA practitioners to take an informed approach to the treatment of GHG emissions within an EIA. It sets out areas for consideration at all stages of the assessment and offers options that can be explored. It highlights some of the challenges to the assessment such as establishing study boundaries and what constitutes significance.

[14] *UK Parliament (2021) EAC launches new inquiry weighing up carbon border tax measures. [Online] https://committees.parliament.uk/committee/62/environmental-audit-committee/news/157728/eac-launches-new-inquiry-weighing-up-carbon-border-tax-measures/.*
[15] *HM Government (2021) Net Zero Strategy: Build Back Greener. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1033990/net-zero-strategy-beis.pdf*
[16] *IEMA (2022). Assessing Greenhouse Gas Emissions and Evaluating their Significance – 2nd Edition.*

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Transitioning to a net zero energy system: Smart Systems and Flexibility Plan, 2021[17]

38 Published in 2021 by the Department of Business, Energy and Industrial Strategy (BEIS) and Ofgem, the Smart Systems and Flexibility Plan outlines how energy can be delivered in line with the transition to net zero and the sixth Carbon Budget. This involves increasing flexibility in energy systems according to availability of energy, owing to fluctuations in renewable energy production, as current flexibility on the grid primarily comes from fossil fuel generation.

39 Significant flexibility is anticipated to be required: around 30 GW of total low carbon flexible capacity is to be achieved by 2030, and 60 GW by 2050, up from the current levels of 10 GW. This flexibility would be achieved in several ways, including provisioning of smart technologies, changes to energy storage and rewarding energy flexibility.

40 The Plan predicts that approximately 13 GW of low-carbon energy storage will be needed by 2030, in part through increased battery storage. To further encourage development of energy storage infrastructure, there is a commitment to "*defining electricity storage as a distinct subset of generation in primary legislation"*.

British Energy Security Strategy, 2022[18]

41 Building on the ten point plan for a green industrial revolution and the net zero strategy, this policy paper highlights the importance of flexibility in the energy system, ensuring supply and demand is able to be matched with minimal energy wasted. The Strategy plans to ensure a more flexible, efficient system for both generators and users by encouraging all forms of flexibility with sufficient large-scale, long-duration electricity storage to balance the overall system by developing appropriate policy to enable investment.

Powering Up Britain: The Net Zero Growth Plan, 2023[19]

42 Due to a successful legal challenge on the 2021 Net Zero Strategy, the UK Government published an updated strategy in March 2023, titled "*the Net Zero Growth Plan*". This plan largely restated existing policy contained within previous policy papers above. The plan confirmed the UK's commitment to having a decarbonised power system by 2035, with the majority of power generated from renewable sources such as wind and solar. An increase to 50 GW of offshore wind capacity by 2030 and 70 GW of solar PV capacity by 2035 is targeted.

43 The Government also ensures a more flexible, efficient system for both generators and consumers by "*encouraging all forms of flexibility with sufficient large-scale, long-duration electricity storage to balance the overall system by developing appropriate policy to enable investment"*.

Net Zero Innovation Portfolio and the Advanced Nuclear Fund: Progress Report 2021-2022, 2023[20]

44 The Net Zero Innovation Portfolio is a UK government fund delivered by the DESNZ, launched in 2021, and aims to "accelerate the commercialisation of innovative low-carbon technologies, systems and processes in power, buildings and industry to set the UK on the path to net zero and create world-leading industries and new jobs." It looks to focus on ten priority areas, including energy storage and flexibility to decarbonise the energy system.

45 Within the framework of the Net Zero Innovation Portfolio, two programmes have been developed: a £68 million Longer Duration Energy Storage programme which supports energy storage solutions, and a £65 million Flexibility Innovation programme which supports integrating systems for flexibility, and

[17] *Department for Energy Security and Net Zero, Ofgem, and Department for Business, Energy & Industrial Strategy (2021) Transitioning to a net zero energy system: smart systems and flexibility plan 2021. https://www.gov.uk/government/publications/transitioning-to-a-net-zero-energy-system-smart-systems-and-flexibility-plan-2021*
[18] *https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy*
[19] *Department for Energy Security and Net Zero (2023a) Powering Up Britain: The Net Zero Growth Plan. https://www.gov.uk/government/publications/powering-up-britain*
[20] *Department for Energy Security and Net Zero (DESNZ) (2023b). Net Zero Innovation Portfolio and the Advanced Nuclear Fund: Progress Report 2021-2022. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1159092/nzip-anf-progress-report-2021-22.pdf*

markets for flexibility. In 2022, the Net Zero Innovation Portfolio awarded £6.7 million to 24 projects in the first phase of the programme to develop detailed feasibility studies. In November 2022, the first allocation of Phase 2 funding was announced, awarding £32 million to five projects to demonstrate their technologies.

Future Energy Scenarios, 2023[21]

46 The Future Energy Scenarios report is published by the National Grid Electricity System Operator (ESO) each year and outlines four different pathways for the future of energy to 2050. Each pathway considers how much energy we might need and where it could come from, to build a picture of how net zero can be accomplished.

47 Electricity storage capacity is required to increase in all scenarios to ensure that demand can be met reliably in peak times as an increasing proportion of the UK's electricity is generated from renewables which depend on weather conditions. According to the report, the UK will have 72 GW of energy storage installed by 2050 in a best-case scenario attainment of net zero which is just under 200 GWh of capacity. The best-case scenario also foresees the lowest levels of electricity curtailment across all scenarios by 2050, due to the highest level of flexibility.

48 The report details the following main roles for electrical energy storage in providing flexibility:

- managing seasonal differences in supply and demand (longer duration storage, i.e. four hours-plus);
- managing several days of oversupply or undersupply (longer duration storage);
- balancing daily variations in supply and demand (longer and shorter duration storage);
- reserve for unplanned outages/forecast error (shorter duration storage); and
- real-time operability (shorter duration storage).

49 Further to this, National Grid ESO expects battery storage to make up the largest portion of storage power capacity in all scenarios by 2050 to help with changing demand within the day and managing network constraints as the costs of batteries fall.

Regional Policy

Oxfordshire Energy Strategy[22]

50 The Oxfordshire Energy Strategy is underpinned by three guiding principles, including to reduce countywide emissions by 50% by 2030 (compared with 2008 levels) and set a pathway to achieve zero carbon growth by 2050. The Strategy also recognises the need to support the development of strategic and local storage, including battery technology.

Local Policies

Local Plan [23]

51 South Oxfordshire Local Plan 2035, Policy DES9: Renewable and Low Carbon Energy, states:

"The Council encourages schemes for renewable and low carbon energy generation and associated infrastructure at all scales including domestic schemes. It also encourages the incorporation of renewable and low carbon energy applications within all development."

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[21] *National Grid ESO (2023) Future Energy Scenarios. https://www.nationalgrideso.com/document/283101/download*
[22] *Oxfordshire (n/d) Oxfordshire Energy Strategy https://www.oxfordshirelep.com/energystrategy*
[23] *South Oxfordshire District Council. (2020). The South Oxfordshire Local Plan 2011-2035. Available at: https://www.southoxon.gov.uk/south-oxfordshire-district-council/planning-and-development/local-plan-and-planning-policies/local-plan-2035/adopted-local-plan-2035/*