

## Written evidence submitted by About Energy System Catapult

### About Energy Systems Catapult

Energy Systems Catapult was set up to accelerate the transformation of the UK's energy system and ensure UK businesses and consumers capture the opportunities of clean growth. The Catapult is an independent, not-for-profit centre of excellence that bridges the gap between industry, government, academia, and research. We take a whole systems view of the energy sector, helping us to identify and address innovation priorities and market barriers, in order to decarbonise the energy system at the lowest cost.

### Our Evidence

#### Energy Systems Catapult Report – 'The Net Zero Strategy and COP26: An Opportunity for UK Leadership in Net Zero Policymaking'

The below is an extract from the report, which can be found in full here:

<https://es.catapult.org.uk/reports/net-zero-strategy-and-cop26-an-opportunity-for-uk-leadership/>

#### **Summary for Policymakers**

*In the first two decades of the 21<sup>st</sup> century the UK has been a leader in the fight to mitigate dangerous climate change. Think of the Stern Review in 2006, the Climate Change Act in 2008, the creation since 2010 of a world-leading offshore wind sector, and the formal adoption of a Net Zero emissions target in 2019.*

*Hosting COP26 in 2021 – along with the forthcoming Net Zero Strategy – presents the UK with a new opportunity for global influence, this time as a leader in shaping the markets and policy reforms needed to deliver Net Zero. The need to reach Net Zero emissions by the middle of the century across all major emitting sectors – travel, heating, manufacturing, power generation, and farming practices – is clear. While many countries have followed the UK's lead in adopting Net Zero emissions targets<sup>1</sup>, few if any have reformed policies sufficiently to drive the investment and innovation at anything like the required pace and scale.*

*Net Zero targets have been rightfully lauded, but without enduring policy frameworks that drive both the supply of, and demand for, low, zero, and negative carbon technologies and behaviour changes, those targets will not be achieved. Stable and enduring policies that cover all key emitting economic sectors and reward investment and innovation in reducing emissions will be needed. Aligning market incentives across the economy should be a central part of the UK's Net Zero Strategy.*

*The UK now has a unique opportunity to show leadership in building a credible and enduring framework of policies capable of driving the transition to a Net Zero economy. The establishment of the UK's own Emissions Trading System (ETS) opens up opportunities to extend the sectoral coverage of carbon policy<sup>2</sup> and to increase the level of ambition. This is allied with a growing recognition of the*

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<sup>1</sup> ECIU (2021). Net Zero Tracker. <https://eciu.net/netzerotracker>

<sup>2</sup> Throughout, we use the term 'carbon policy' as a shorthand for all policies that require or incentivise action to reduce or remove greenhouse gas emissions, including pricing, regulation, subsidies, and standards.

*need to radically reshape incentives across the major emitting sectors of the economy, through policies and standards that reward or require zero carbon choices.*

*Our work has highlighted how current UK policies create incentives (or 'effective carbon prices') that are uneven and too weak to drive change for most emitting activities. Indeed, the relative prices facing actors in many sectors continue to favour high rather than low and zero carbon choices. Notably, current gas and electricity prices drive most consumers to stay with the high carbon status quo of gas boilers for home heating.*

*In this briefing, we set out how the UK can build on its existing regime of carbon targets to create a framework of policies and governance capable of delivering Net Zero (see Figure 1). In doing so, the UK can play a key leadership role on the international stage, in approaches to Net Zero carbon policy design across key sectors, in ensuring robust carbon accounting, and in developing carbon markets and emissions trading as the basis of a genuinely economy-wide policy framework for Net Zero. These insights build on Energy Systems Catapult's thought leadership in Net Zero Carbon Policy<sup>3</sup> and its past work on Rethinking Decarbonisation Incentives<sup>4</sup>.*

### **Summary of Recommendations for Policymakers**

- 1. Commit to establishing a Carbon Monitoring, Reporting, and Verification and Accounting Regulator.*
- 2. Commit to expanding the scope of the UK Emissions Trading System to cover heating and road transport emissions.*
- 3. Commit to fully adopting long-term carbon performance standards in the buildings sector by 2035.*
- 4. Commit to adopting a Net Zero emissions by 2035 policy driver for the electricity sector.*
- 5. Commit to developing an enduring set of incentives for deep industrial decarbonisation with appropriate mechanisms to mitigate competitiveness impacts.*
- 6. Commit to linking new agricultural reward schemes to the adoption of climate friendly farming practices and land use changes.*
- 7. Commit to creating a linked Greenhouse Gas Removals Marketplace.*

### **Energy Systems Catapult Response – BEIS Committee: Net Zero Governance Call for Evidence**

The below is an extract from our response, which can be found in full here:

<https://es.catapult.org.uk/consultations/business-energy-and-industrial-strategy-committee-net-zero-governance-call-for-evidence/>

*ESC believes that the Climate Change Act 2008 provides a strong governance foundation to support cross-Government action to deliver Net Zero. The Act established the Climate Change Committee (CCC), providing the discipline of strong independent and expert scrutiny, which is world-leading and has been copied by other nations.*

*But while the CCC is focused on the what needs to be done and monitors the Government's progress against its binding targets, its role is not to advise how such a transition takes place. The governance to support the delivery of Net Zero needs significant improvement.*

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<sup>3</sup> ESC (2021). Net Zero Carbon Policy. <https://es.catapult.org.uk/impact/projects/net-zero-carbon-policy/>

<sup>4</sup> ESC (2019). Rethinking Decarbonisation Incentives: Future Carbon Policy for Clean Growth. <https://es.catapult.org.uk/reports/rethinking-decarbonisation-incentives-future-carbon-policy-for-clean-growth/>

*The challenge of achieving the 2050 Net Zero target is truly whole system; it will require change from all parts of the UK and all sectors of the economy. Helping 70 million people transition to a low carbon economy within a generation is likely to be a more complex and complicated challenge than the NASA moon landing in 1969. The UK should aim to provide a compelling example of decarbonisation for the rest of the world, building on its significant achievements in recent years, and thereby unlocking the considerable economic opportunities of the move to a cleaner economy.*

**The characteristics of Net Zero as a challenge – complexity, the need to bring together many disparate actors, agility, pace, uncertainty – underscore the need for strong central co-ordination of activity.** *This is not the same as central planning or central control; such approaches are unlikely to be successful when faced with such a multifaceted, cross-economy challenge and where there are significant unknowns, including the behaviour of millions of people. This is about architecting markets, regulatory processes, planning and infrastructure, and innovation support so that they are working together to achieve Net Zero, and unlocking the necessary innovation.*

*The discipline of systems engineering was established to address challenges of such complexity. The paper by the Council for Science and Technology's (CST), 'A Systems Approach to Delivering Net Zero' paper<sup>5</sup>, provides an essential guide to how systems engineering could support the Government's approach to this defining challenge. Energy Systems Catapult (ESC) supports such an approach in providing the framework of how the Government should be approaching a challenge like Net Zero. Systems engineering principles and approach can help support the delivery of a **credible, viable and adaptive plan – a 'Living Roadmap' – to achieve Net Zero**. It can also help manage risks in the transition and ensure that it supports wider societal goals, ranging from economic growth to improved air quality. Systems engineering does not attempt to design a 'perfect' Net Zero end-state in a prescriptive or deterministic way. Rather it aims to create the enabling conditions and environment ("system of systems") in which innovative and desirable solutions can emerge.*

*ESC notes the introduction of the two Cabinet Committees focused on Net Zero, and the National Strategy Implementation Group (NSIG) for climate change. These are potentially powerful bodies to provide the co-ordinating role that is necessary for meeting the challenge of Net Zero, and are a welcome innovation. However, it is very difficult to assess the effectiveness of these bodies as their work is not transparent to those outside Government<sup>6</sup>.*

**Successful delivery of Net Zero will require governance that fulfils four functions: analysis, strategy, delivery, and learning.** *Any new governance proposals should be tested against how they deliver those functions. There are various models that could deliver them: they could be delivered within departments or in the Cabinet Office, through independent institutions (including the newly-proposed Future System Operator). Reform of current roles and responsibilities is essential in ESC's view. We support a systematic review and reform of roles, responsibilities, competences, and coordination between key institutions, including delivery bodies, as well as for decision-making processes.*

*Key elements of a systems approach to governance reform would include:*

- **Alignment of economic incentives to shift to low carbon.** *The current set of carbon incentives across the economy are inconsistent and chaotic (see chart below). Strengthening incentives and rebalancing relative prices in favour of low and zero carbon choices is an*

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<sup>5</sup> Council for Science and Technology (2020). A Systems Approach to Delivering Net Zero. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/910446/cst-net-zero-report-30-january-2020.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/910446/cst-net-zero-report-30-january-2020.pdf)

<sup>6</sup> Institute for Government (2021). Net zero: how government can meet its climate change target. <https://www.instituteforgovernment.org.uk/publications/net-zero>

essential part of the shift to a Net Zero economy (there will also need to be a wide range of complementary policies to deliver Net Zero in a way that is practical and addresses barriers to change, including protecting the vulnerable). Complementary policies will be needed, for example, to develop the new workforce skills and supply chains for low and zero carbon technologies or to unlock finance for key infrastructure investments.

- **A focus on the achievement Net Zero and decarbonisation outcomes** (not input or intermediate targets or technology-specific strategies) as this enables an innovation-friendly approach that is necessary for a market economy like the UK. ESC's analysis (such as our *Innovating to Net Zero report*<sup>7</sup>) shows the importance of a whole systems approach, and how there are a range of societal pathways to achieve Net Zero. By focusing governance on delivering decarbonisation **outcomes**, rather than particular technology-specific targets, we can ensure that whole systems thinking informs the UK's approach to delivering the scale of change required by Net Zero. High-performing markets and non-distorted economic signals and incentives are crucial for driving efficient market participant behaviour and investment. Outcome-based policies can be designed to work with economic signals and markets rather than against them.
- **A much greater role for sub-national actors, including city regions and local authorities.** Reflecting that some of the challenges of Net Zero are local in character (transport and heating, in particular). Apart from devolved powers on sectors like heating to Scotland, Wales and Northern Ireland, sub-national actors have very few powers in relation to Net Zero. This makes delivery and choices about important infrastructure, like heat networks, a switch to hydrogen heating, or electric vehicle charging difficult. Steps that are needed include:
  - A clear pathway to meeting ambitious national decarbonisation objectives, based on locally specific, viable, and cost-effective plans.
  - A mandate to deliver credible **Local Area Energy Plans**<sup>8</sup> that establish a basis for assessing or contesting energy developments in local spatial planning applications.
  - A compelling and locally specific narrative for meaningful engagement with local citizens and businesses in the national effort to decarbonise, adding a democratic element to the significant changes ahead.
  - Expansion of local authority competencies and resources is required to ensure the capacity and capability for delivering Net Zero is available (e.g. accessing funding streams, project appraisals, local economic development).
- **People/consumer focus** must be at the heart of the definitions of roles, responsibilities of new institutions and governance framework:
  - Delivering Net Zero is a huge societal challenge, requiring the maintenance of long-term social consent and significant change for all parts of society. Voices of all parts of society must be heard and the impacts on different parts of society must be managed fairly.
  - Relative to industry, consumers have less resources, information and expertise to engage in policymaking processes. Improving representation is not enough. Both balanced

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<sup>7</sup> ESC (2020). *Innovating to Net Zero*. <https://es.catapult.org.uk/reports/innovating-to-net-zero/>

<sup>8</sup> ESC and CSE (2020). *Local Area Energy Planning: The Method*. <https://es.catapult.org.uk/reports/local-area-energy-planning-the-method/>

stakeholder engagement and greater consumer focus in developing policy underpinning the development of policy/regulation could be achieved through a systems engineering approach<sup>9</sup>. This would require policies to be tested and iterated with real consumers, through approaches such as ESC's Living Lab of hundreds of real homes<sup>10</sup>.

- Consideration of new Governance and system architecture needed for the **digitalisation of the energy system**. This is to ensure positive consumer outcomes from the shift to a digitalised energy system, as well as avoiding the creation of new digital monopolies. The work of the Energy Data Taskforce and the Energy Digitalisation Taskforce is essential in that process<sup>11</sup>.
- Achieving Net Zero in a way that will unleash innovation, and the needed investment and societal change, **will require stakeholders' confidence in markets and policy**. This in turn requires confidence in Government's science, evidence base, data and metrics that underpin interventions:
  - A 'Carbon Monitoring, Reporting, and Verification and Accounting Regulator' could play a pivotal role in ensuring<sup>12</sup>:
    - Robust empirical and scientific methods for measuring or accurately estimating emissions.
    - Emissions reduction actually occurs in line with Carbon Budgets and the Paris Agreement.
    - Reductions in, and removals of, emissions are counted and rewarded appropriately by policymakers through support measures and other incentives, thus boosting investor confidence.
  - **Enhanced power market monitoring** - ideally by an independent body - with improved, timely communications and sufficient resourcing will provide information of the quality needed for: decision-makers to take appropriate and agile decisions/action; investors to better manage policy/regulatory risk; market participants' decision-making in relation to changing markets; and policy/media to understand state of the market/transition.
- The **Net Zero Innovation Board** will have a crucial role in aligning innovation needs with policy development. The Board – which replaces and builds on the work of the Energy Innovation Board - was established to ensure a co-ordinated and strategy approach to Research, Development & Demonstration (RD&D) funding across public bodies, and to enhance the alignment of the public and private sectors in support of the Government's wider strategy to achieve the UK's Net Zero target.<sup>13</sup>

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<sup>9</sup> ESC. Future Power Systems Architecture. <https://es.catapult.org.uk/capabilities/systems-integration/future-power-systems-architecture/>

<sup>10</sup> ESC. Living Lab: Innovation for the Home Energy Market. <https://es.catapult.org.uk/service-platforms/living-lab/>

<sup>11</sup> ESC. Energy Digitalisation Taskforce. <https://es.catapult.org.uk/impact/projects/energy-digitalisation-taskforce/>

<sup>12</sup> ESC (2021). The Case for an Economy-Wide Carbon Regulator. <https://es.catapult.org.uk/reports/the-case-for-an-economy-wide-carbon-regulator/>

<sup>13</sup> HM Government. Net Zero Innovation Board – Terms of Reference.

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/994255/nzib-tor.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/994255/nzib-tor.pdf)

- *Sector led approach:*
  - *The Climate Change Act 2008 provides an essential economy-wide legal framework for emissions reduction, but needs to be complemented by carefully designed policies to drive and incentivise investment in emissions reduction across each of the key emitting sectors.<sup>14</sup>*
  - *In our Accelerating to Net Zero<sup>15</sup> report, we set out how a sector led approach can open up a pathway to a genuinely economy-wide carbon policy framework. This allows carbon policies to be designed at a sector level to integrate efficiently with the complementary policies that are essential for addressing social and technological barriers specific to each. Sectoral incentives and regulations can also be combined with complementary co-ordination mechanisms (such as infrastructure regulation or multi-vector local energy planning processes) to enable a whole systems approach to the transition. This enables market incentives and regulated investments to combine with infrastructure decisions that are consistent with the Net Zero target.*

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<sup>14</sup> CCC (2020). Policies for the Sixth Carbon Budget and Net Zero. <https://www.theccc.org.uk/wp-content/uploads/2020/12/Policies-for-the-Sixth-Carbon-Budget-and-Net-Zero.pdf>

<sup>15</sup> ESC (2020). Accelerating to Net Zero: A sector led approach to an economy-wide carbon policy framework. <https://es.catapult.org.uk/reports/accelerating-to-net-zero-a-sector-led-approach-to-an-economy-wide-carbon-policy-framework/>

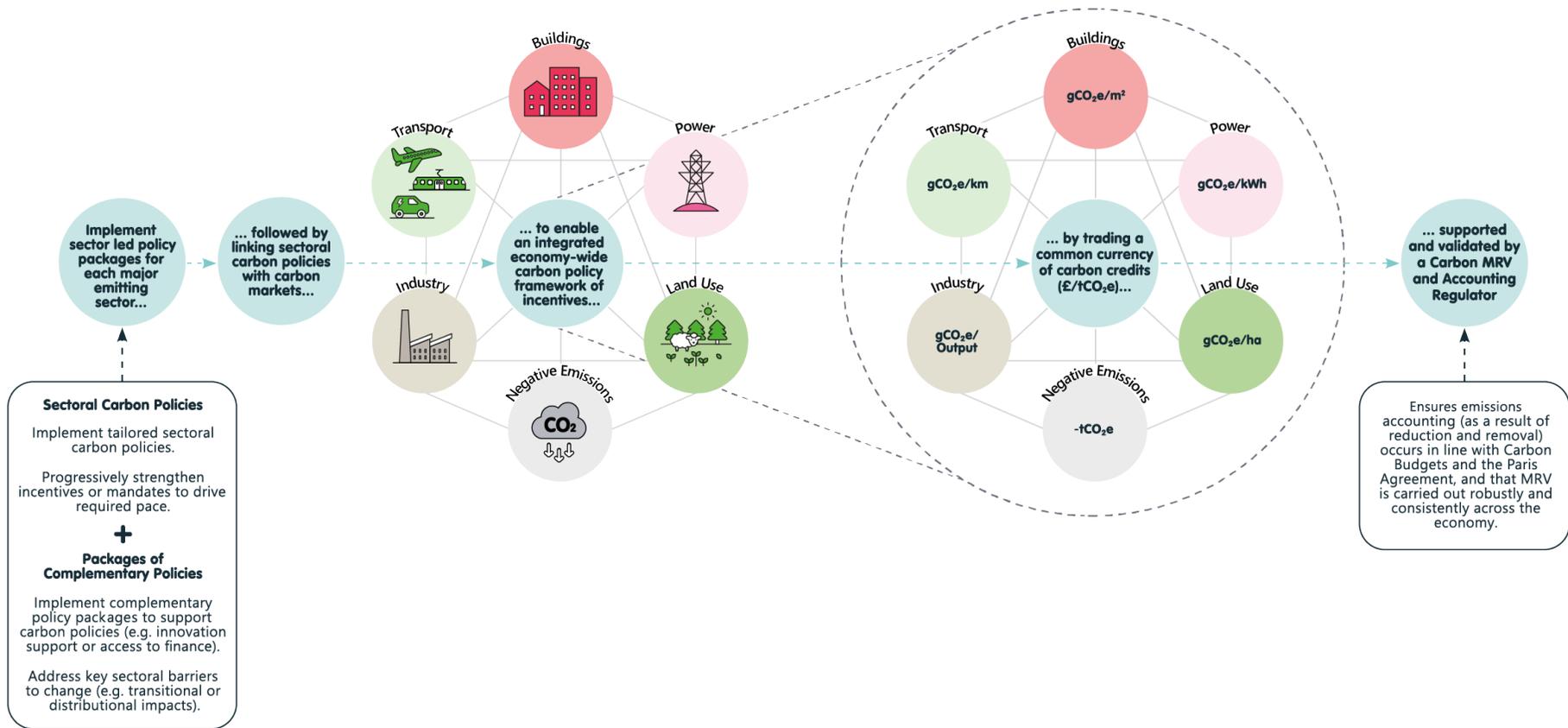


Figure 1 A sector led approach can open a pathway to an economy-wide carbon policy framework for Net Zero, supported by a Carbon Monitoring, Reporting, and Verification and Accounting Regulator