

**Written Evidence Submitted by Dr Amama Shaukat, Brunel University of London,
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We welcome the Committee's inquiry into public engagement with the energy transition. Drawing on our research, especially Natural Environment Agency Theory (NEAT),¹ we offer evidence-informed responses to the Committee's four questions, with practical and economically grounded recommendations.

We summarise our recommendations immediately below, with a following section justifying our recommendations in more detail.

1. Has the Government properly explained the potential benefits of the energy transition to the average citizen?

No – Government communication has fallen short in conveying the tangible, near-term benefits of the energy transition to households and communities. As the NEAT framework illustrates, effective transitions require the alignment of business and societal goals. For this, the public must understand the environmental and economic returns of energy transition investments.

Key benefits like improved public health, reduced energy bills via renewables, enhanced energy security, and future-proofed jobs remain under-communicated. This absence allows misinformation to flourish.

Recommended action:

- Commission a *Ladybird-style book on Net Zero and the energy transition*, using accessible language, visuals, and pricing to build public understanding. This mirrors the success of the “Ladybird Guide to Climate Change” and could be subsidised for wider reach. (Current Ladybird climate change book retails at £6.99.)
- Another option would be to produce a book along the style of “Cranky Uncle versus Climate Change” (for details see our section “Justification for the above recommendations” below).
- In addition, or alternatively, an interactive Web-based booklet can be produced, built on platforms like Readymag, Canva Docs, or Notion for immersive storytelling. The e-book can be hosted on gov.uk, Ofgem, or Committee on Climate Change websites. It can also be added to school and library digital platforms.

¹ Amama Shaukat, Rajesh Tharyan, Grzegorz Trojanowski, 2024. Towards the Natural Environment Agency Theory (NEAT), SSRN Working Paper 4519832, <https://papers.ssrn.com/sol3/Delivery.cfm?abstractid=4519832>

2. Is there a clear understanding of the costs of the energy transition to householders and businesses?

No – The picture is often fragmented, lacking transparency and consistency. While costs of action are sometimes discussed, the *costs of inaction* (e.g. through environmental degradation, climate-related economic losses, or rising fossil fuel dependency) are largely absent from public discourse.

The NEAT framework identifies these unaddressed burdens as *natural environment agency costs* (NEACs), imposed when businesses (and by extension, governments) fail to internalise environmental harms. These costs are real, rising, and disproportionately borne by vulnerable communities.

Policy recommendation:

- Require *energy providers to publish annual emissions intensity* (gCO₂-equivalent per kWh) and the associated costs (based on a climate-protective estimate of the social cost of carbon, likely in excess of \$300 per ton), aggregated by source without permitting these figures to be adjusted using offsetting. This low-cost policy improves transparency and empowers consumer choice, without relying on offsetting or bespoke analysis.

3. Is there a need for public campaigns to counter the anti-net zero narrative?

Yes – The rise of climate scepticism and anti-net zero messaging demands a coordinated, values-based response. Anti-net zero narratives often succeed by appealing to perceived fairness, cost, or freedom. An effective campaign must counter these with trustworthy, science-backed, and locally relevant messaging.

NEAT demonstrates that *monitoring, incentives, and bonding mechanisms*—tools traditionally applied in economics and corporate governance—are equally powerful in fostering public trust and behavioural change.

Policy recommendations:

- *Highlight co-benefits* of climate action (cleaner air, local jobs, warmer homes) in public campaigns, rather than abstract carbon targets.
- Use *trusted messengers*—e.g., local leaders, teachers, medical professionals—to reach diverse audiences.
- Showcase UK innovation and business leadership in green technologies to generate pride and optimism around transition.

4. How should the Government be more positively engaging the public with this goal?

NEAT's key insight is that when the public (as principal) is empowered to monitor and influence business (agent), societal alignment becomes possible. Government should apply this logic to itself—becoming transparent, accountable, and participatory in the transition.

Positive engagement requires both *education* and *enablement*. Citizens need both the knowledge to act and the tools to do so. This includes access to clear energy information, affordable green options, and a stable policy environment.

Policy recommendations:

- Refresh *PAS 2060* (carbon neutrality standard), updating it for scientific developments and correctly relabelling it as a Net Zero standard, with clear KPIs and explicit exclusion of so-called “scope 4” (avoided emissions), reducing greenwashing and improving public trust.
- Support *mandatory labelling of products and services* with emissions footprint data (e.g., CO₂-equivalent per unit), enabling consumer action.
- Seek advice or support research for a *climate-protective yet realistic estimate of the social cost of carbon*, that adequately reflects the anticipated consequences of emissions, likely in excess of \$300 per ton. Support *mandatory labelling of products and services with the estimated cost* based on this social cost of carbon.
- Incorporate environmental science expertise into policy and communication strategies to ensure accuracy and clarity.
- Promote *NEAC-focused KPIs* in executive remuneration across public-private partnerships, sending a strong signal of alignment and accountability.

Justification for the above recommendations

1. Has the Government properly explained the potential benefits of the energy transition to the average citizen?

There is a pressing need for improved public communication around net zero that is accessible, trusted, and engaging. Current government efforts have largely failed to translate abstract environmental goals into everyday relevance for citizens. Without clear articulation of personal and societal co-benefits—such as cleaner air, reduced bills through energy efficiency, or health improvements—public understanding and buy-in remain limited.

Educational tools such as the *Ladybird Book on Climate Change*² have demonstrated the effectiveness of simple, visual storytelling in breaking down complex topics for the public. Similarly, John Cook’s *Cranky Uncle vs Climate Change*³ shows how humour, cognitive science, and critical thinking can debunk misinformation while building climate literacy.

Commissioning a digitally distributed or print-on-demand eBook on net zero, modelled on these examples, would offer a low-cost, low-carbon route to public education. Subsidising an initial print run could increase accessibility, particularly for schools and libraries. By explaining how the transition benefits people directly—and not just in terms of climate science—such a resource can address the “why” of net zero in a way that resonates.

² HRH The Prince Charles, Prince of Wales, Tony Juniper, Emily Shuckburgh, Aleesha Nandhra (Illustrator) (2023). *Climate Change. Ladybird Books*, ISBN: 9780241545669, 48 pages.

³ Dr. John Cook (2020). *Cranky Uncle Vs. Climate Change: How to Understand and Respond to Climate Science Deniers* Paperback. Citadel, ISBN-13: 978-0806540276, 160 pages.

This approach aligns with NEAT’s core proposition: that trust and alignment between society and business (or government) require *transparent communication* and *credible commitments*—what the theory frames as “bonding.” A government-backed, accessible educational resource is a bonding mechanism with the public.

2. Is there a clear understanding of the costs of the energy transition to householders and businesses?

Public confusion persists regarding the real versus perceived costs of the energy transition. The absence of clear, comparable data—particularly on the carbon intensity of different energy providers—prevents households and businesses from making informed choices. This confusion is exacerbated by inconsistent emissions reporting practices and the misuse of offsets as proxies for emissions reduction.

A straightforward, government-mandated requirement for energy providers to publish **aggregate emissions intensity figures (gCO₂e/kWh)** annually—based on standardised life-cycle emission estimates for each energy source—would dramatically increase transparency. For example, lifecycle emissions estimates place coal at ~1000 gCO₂e/kWh, and, in the same units, oil at ~800, gas at ~500, and wind and solar at <60.⁴ Requiring energy providers to report on the weighted average of their energy mix, without allowing offsets to obscure these figures, would empower consumer choice while driving competition among providers to decarbonise.⁵

As well as the above required emissions intensity figures, a government-mandated requirement to publish the estimated costs associated with these emissions, based on an estimated social cost of carbon (monetary cost per ton of CO₂e emissions). The social cost of carbon should use a standard government-provided figure. Determination of the appropriate monetary value for the social cost of carbon will require expert guidance and possibly further research, as the true cost is not settled in the literature.⁶ While some literature suggests between \$50 and \$300 per ton of CO₂, such low costs appear inconsistent with the conclusions of Nicholas Stern and others⁷ who point to the immense risks and challenges of climate change. De Ridder and Rachel identify more recent estimates of the social costs of

⁴ Approximate figures for each generation type would be sufficient for this purpose, as indicated in the text. Sources: C. Thomson, and G. Harrison (2015). Life Cycle Costs and Carbon Emissions of offshore Wind Power. Edinburgh: Scotland's Centre of expertise connecting climate change research and policy, and T. Clancy (2025) “Analysing the investment criterion of ‘good quality renewable energy’ appraising definition and ‘fit or purpose’”, Bologna Business School, Master’s dissertation.

⁵ There can be significant problems with quality of different offset types and emissions reduction is the most robust means of reducing or preventing climate damages. Source: Q. G. Rayer and P. Walton (2022). Risk-Rating GHG Emissions Offsets Based on Climate Requirements. Chapter 8, pps 161-183. In: Walker T., Wendt S., Goubran S., Schwartz T. (eds) Business and Policy Solutions to Climate Change. Palgrave Studies in Sustainable Business In Association with Future Earth. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-030-86803-1_8.

⁶ De Ridder, M., & L. Rachel (2025). Emissions-Adjusted Total Factor Productivity. Mimeo, London School of Economics. <https://www.lse.ac.uk/CFM/assets/pdf/CFM-Discussion-Papers-2025/CFMDP2025-09-Paper.pdf>.

⁷ Nicholas Stern, Joseph Stiglitz Charlotte Taylor & Charlotte Taylor (2022). The economics of immense risk, urgent action and radical change: towards new approaches to the economics of climate change, Journal of Economic Methodology, 29:3, 181-216, DOI: 10.1080/1350178X.2022.2040740.

carbon of \$923 per ton. It therefore appears advisable to avoid the lowest estimates and consider a social cost of carbon of at least \$300 per ton.

This recommendation reflects NEAT's recognition of the role of *monitoring mechanisms* in correcting information asymmetries. In NEAT, societal stakeholders (in this case, consumers) need access to reliable environmental performance data to hold agents (energy providers) accountable. Transparency, especially when focused on real emissions rather than hypothetical reductions, is a prerequisite for meaningful stakeholder engagement.

Offsets, even when well-intentioned, often suffer from problems of credibility, additionality, and permanence. As Rayer and Walton argue (see footnote 5), offset schemes should be risk-rated, and priority must always be given to *reducing absolute emissions first*.

3. Is there a need for public campaigns to counter the anti-net zero narrative?

Yes. The erosion of public trust in net zero stems in part from a **disinformation campaign**—notably funded and orchestrated historically by fossil fuel interests. As documented by Harvard scholar Naomi Oreskes and Erik Conway in *Merchants of Doubt*,⁸ and further explored in *The Big Myth*,⁹ the strategies used to manufacture doubt about climate science have long undermined effective climate action. Franta's research highlights that fossil fuel firms knew of the risks of global warming as early as the 1970s, yet actively disseminated misleading information to preserve profits.¹⁰

These narratives have found fertile ground in public discourse, especially when reinforced by industry actors and underregulated financial institutions. The **GFANZ (Glasgow Financial Alliance for Net Zero) initiative**, while laudable in ambition, has faced criticism for allowing members to make net zero pledges without substantive implementation plans or accountability mechanisms.¹¹ This risks further public disillusionment and fuels the perception that net zero is symbolic rather than transformative.

We also draw on practical experience from the P1 Investment Services **NZC10 initiative**,¹² which shows how well-designed net zero strategies—supported by measurable KPIs and

⁸ Erik Conway, and Naomi Oreskes (2012). *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming*. Bloomsbury. ISBN-13: 978-1408824832, 368 pages.

⁹ Naomi Oreskes, and Erik Conway (2023). *The Big Myth: How American Business Taught Us to Loathe Government and Love the Free Market*. Bloomsbury. ISBN-13: 978-1635573572, 576 pages.

¹⁰ Benjamin Franta, Associate Professor of Climate Litigation, Climate Litigation Lab, Oxford Sustainable Law Programme, Smith School of Enterprise and the Environment, University of Oxford. Source: B. Franta (2021) Early oil industry disinformation on global warming, *Environmental Politics*, 30:4, 663-668, DOI: 10.1080/09644016.2020.1863703.

¹¹ For example, see the Environmental Audit Committee, *The Financial Sector and the UK's Net Zero Transition inquiry*. Responses received to letters sent to signatories of the Glasgow Financial Alliance for Net Zero. See: <https://committees.parliament.uk/publications/30271/documents/175281/default/> and <https://committees.parliament.uk/publications/31568/documents/177102/default/>. Several such submissions defended the fund managers' position that it was acceptable to sign up to GFANZ and yet do nothing to actively address net-zero (see, e.g. pp 38-42 and 161-164 in the first of the above documents).

¹² This investor initiative focuses on individual investment funds, requiring defined actions to promote net zero by 2030. See: <https://netzerocarbon.earth/>. Also: Q. G. Rayer, P. Walton, M. Appleby, S. Beloe, E. Heaven, and A. Seery (2019). *Sustainable investing: a target for progress towards carbon-neutrality*, Citywire Wealth

governance structures—can build credibility. But such initiatives must be paired with effective public communication, linking financial action with environmental outcomes.

In NEAT terms, this is a failure of *bonding* and *monitoring* which initiatives such as NZC10 seek to address. The absence of meaningful incentives or penalties has allowed some firms to issue performative commitments with minimal risk. Government-led campaigns must explicitly counter misinformation, highlight credible private-sector leadership, and empower citizens to demand accountability.

4. How should the Government be more positively engaging the public with this goal?

One key barrier to public engagement is a lack of **clear and consistent standards** around what net zero means in practice—particularly in business and finance. The UK government has previously sponsored the British Standards Institution to develop **PAS 7340, 7341, and 7342** for sustainable finance.¹³ The **PAS 2060 carbon neutrality standard**¹⁴ made a valuable contribution to defining net zero. PAS 2060 is consistent with the **Greenhouse Gas Protocol**¹⁵ which, defines greenhouse gas “scopes of emissions” (scopes 1, 2, and 3). So-called “scope 4” or “avoided emissions” seem named to appear consistent with scopes 1, 2, and 3 emissions defined by the Greenhouse Gas Protocol, yet are not recognised by this organisation. It appears that so-called “scope 4” emissions permit ambiguous claims and carry significant risk of being used for greenwashing.

We recommend that the government sponsor a refresh of PAS 2060, ensuring it remains firmly aligned with current scientific evidence and rigorous, internationally accepted frameworks. PAS 2060 should be extended to explicitly discuss and clearly exclude use of so-called “scope 4” (avoided emissions), to reduce risk of greenwashing and thereby improve public trust. Renaming it a **Net Zero standard** would reduce confusion and strengthen consistency in how firms represent their climate impact.

NEAT suggests that aligning business and societal goals requires *credible monitoring and incentives*. Standards that reward genuine decarbonisation while penalising empty claims can serve as both. They create the basis for trust, enable comparisons, and help finance and business professionals take informed, principled decisions. These standards should be embedded in reporting, executive remuneration, procurement policy, and consumer labelling.

Manager®, issue 496, p28-29, 18th July 2019, and Q. G. Rayer (2020). Ethical and Sustainable Investing and the Need for Carbon-Neutrality. In: Walker T., Goubran S., Sprung-Much, N. (eds) Environmental Policy: An Economic Perspective. Wiley-Blackwell. Print ISBN 978-1-119-40259-6, Online ISBN 978-1-119-40255-8. Ch 13, pps 213-232. DOI: 10.1002/9781119402619.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/9781119402619.ch13> .

¹³ See: <https://standardsdevelopment.bsigroup.com/projects/2018-03586>, <https://www.bsigroup.com/en-GB/insights-and-media/insights/brochures/pas-7341-responsible-and-sustainable-investment-management-specification/>, and <https://standardsdevelopment.bsigroup.com/projects/2020-03404>.

¹⁴ <https://www.bsigroup.com/en-GB/products-and-services/standards/pas-2060-carbon-neutrality/>. PAS 2060 is actually mis-named, it is a “net zero” standard as it covers all greenhouse gas emissions, not solely carbon dioxide.

¹⁵ See: <https://ghgprotocol.org/>. Also: A Corporate Accounting and Reporting Standard, REVISED EDITION. World Business Council for Sustainable Development and World Resources Institute. Available at: <https://ghgprotocol.org/corporate-standard>.

By clarifying definitions and enforcing consistency, the government would give both public and private actors the tools they need to make meaningful progress—and restore trust that net zero scientifically-backed rather than a symbolic or moving target.

Final remarks

As researchers and practitioners actively working at the intersection of sustainability, finance, and policy, we believe that NEAT offers a rigorous framework to understand the behavioural and economic dimensions of the energy transition. Our empirical findings show that firms perform better—financially and operationally—when they align with society’s environmental expectations. The same principle applies to governments.

We would be pleased to provide oral evidence to the Committee if invited.

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