



IFOA RESPONSE TO EAC CALL FOR EVIDENCE - HM TREASURY AND THE ECONOMICS OF CLIMATE AND NATURE

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Key points

The IFoA is of the view that:

- *Treasury needs to integrate nature/biodiversity risks in their consideration of climate risk, since climate and nature risks are mutually reinforcing and must be modelled together*
- *Cost-benefit analysis alone is inadequate; scenario analysis and uncertainty assessment are needed to fully understand potential implications*
- *Transition costs are significant but likely underestimated*
- *New metrics for quantifying “wealth” should be developed which include consideration of planetary health in addition to GDP*
- *Regulation and demand incentives work better than regulatory mandates alone in terms of changing behaviour*

With the above in mind, we recommend use of our “Planetary Solvency” framework and the “Triple Dividend of Resilience” approach in this context.

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The Institute and Faculty of Actuaries (IFoA) welcomes the opportunity to respond to the Environmental Audit Committee’s call for evidence on HM Treasury and the economics of climate and nature. This response was prepared by the IFoA Sustainability Board and Biodiversity Working Party. It is written in the public interest.

Actuaries have a crucial role to play in promoting the understanding and integration of climate risks and opportunities within decision-making, and in making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development. By evaluating systemic sustainability impacts on the financial systems, actuaries are involved in assessing how sustainability topics and the transition to net zero may impact on our assessment of future liabilities and the adequacy of returns to meet these future liabilities.

The IFoA has worked collaboratively with Earth System scientists, policymakers and systems risk specialists for over a decade, to bring to bear the actuarial skill set on the climate and nature topics. Actuarial review of influential modelling approaches that inform policy choices on climate change and nature has revealed concerning trends for underlying models to significantly understate or even ignore material risks completely, producing benign results that are falsely reassuring and at odds with scientific output.

At the heart of this is the challenge that our current dominant economic philosophy is blind to nature and climate change, with ongoing biosphere stability is an unquestioned implicit assumption. This assumption is now called into question, with accelerating global warming increasing the likelihood of climate tipping point activation, exacerbated by nature loss and the degradation of natural carbon sinks. We urge the Treasury to adopt Planetary Solvency principles¹ and commission a Planetary Solvency risk assessment from the Government Actuaries Department, as an urgent priority.

1. What role does HM Treasury play in shaping the UK’s response to climate change, nature loss and wider environmental sustainability through economic policy and public spending decisions?
 - a. To what extent are climate and nature considerations incorporated into Treasury decision making and how do these considerations influence funding decisions?
 - b. Does HM Treasury have the expertise, data and tools needed to assess environmental risks and opportunities, and what developments in modelling or valuation would better reflect the economic value of nature and environmental sustainability?

Climate and nature considerations should be incorporated into Treasury decision making. The OBR’s 2025 fiscal sustainability report² outlines how climate change creates risks to the public finances through damage, transition and adaptation costs. The degradation of natural assets act as a risk multiplier on the impacts of climate change and vice versa. Whilst progress has been made on climate impacts, there is limited to no engagement on systemic nature risks, which are “equal or greater” to climate risks over the next ten years³.

A challenge is making decisions in an era of uncertainty. IFoA research shows that climate change impacts are materialising at lower temperatures than estimated^{4, 5}. Ecological interdependencies, tipping points and systemic risks mean that there are many plausible climate outcomes for our world which could result in material deviations from our usual ‘best estimate’ assumptions.

¹ IFoA [Planetary Solvency: Tipping into the wild unknown](#)

² OBR [Fiscal risks and sustainability – July 2025](#)

³ IFoA [Planetary Solvency: Tipping into the wild unknown](#)

⁴ IFoA/ Exeter University [Planetary Solvency – finding our balance with nature](#)

⁵ IFoA/ Exeter University [Parasol Lost: Recovery plan needed](#)

Public expenditure can play an important role in managing uncertainty. Initial public spending on transformational projects can have high marginal benefit in dispelling uncertainty, shaping markets and creating preconditions for private participation, which in turn can lead to 'positive tipping points'⁶.

Unlike risk, uncertainty defies quantitative assessment such as cost-benefit analysis. This is of particular concern given that Green Book users often over rely on cost-benefit analysis results relative to the other assessments. The IFoA's paper on Green Book Reform⁷ recommends the following:

- High levels of uncertainty
 - Increase emphasis on qualitative assessment criteria for transformational projects relative to those which elicit marginal change and reduce reliance on cost-benefit analysis and the economic case.
 - Incorporate scenario analysis and other more uncertainty-driven quantitative assessments.
 - Recognise the value of initial investments that reduce uncertainty in the system.
- System-based change
 - Assess the value of transformational systems as a collective, and not on an individual project basis, for example using the carbon curve to assess the benefits from carbon reduction/ transitional projects.
 - Where individual projects are assessed, evaluate co-benefits as part of quantification approaches.
- Long-term benefits
 - Reconsider the discounting of all projects (both time-steps of decline and/or to the rate of decline at each time-step) to account for greater uncertainty in possible future growth rates and target intergenerational fairness.
 - Consider a lower discount rate for appraisal of transformational projects (relative to other projects), noting their unique characteristics.
 - Explicitly assess the cashflows from inaction to compare to the cost of investment.

The challenges of uncertainty and non-linearity are beginning to be recognised by financial regulators (e.g. §4.52 of PRA SS 5/25 "be aware of the limitations of the climate scenarios and models they use, which may not capture the full range and scale of climate-related risks, such as non-linearities and potential tipping points"). However, there remain institutional-wide gaps in the integration of Biodiversity risks, which are equal to climate risk in scale, and whose risks are deeply interlinked and mutually reinforcing⁸. This integration is critical to Treasury projections on inflation, interest rates and GDP, to DEFRA and DESNZ on energy and food security and the path to net zero, and to Health, DWP and DHCLG for the impacts on health, creating good housing and cost of living.

Actuaries specialise in quantifying, managing, and navigating uncertainty. The Treasury may draw on the expertise of the Government Actuary's department (GAD) in the use of climate scenario analysis, stress testing and modelling to estimate potential outcomes and their financial impact.

2. How does HM Treasury assess and reflect the role of climate, nature and environmental sustainability in supporting economic growth, productivity and resilience, including through the measures it uses to assess economic performance and national prosperity?

⁶ Exeter University [A positive tipping cascade in power, transport and heating](#)

⁷ IFoA [Green Book Reform - An actuarial perspective on transformational change and the Green Book discount rate](#)

⁸ IFoA [Nature at Risk, Models at Fault, Why Biodiversity Can't Wait](#)

- a. What role do environmental sustainability, natural capital and wider measures of inclusive wealth play alongside GDP in Treasury decision-making, and how are these reflected in practice?
- b. How does HM Treasury assess the contribution of climate action, nature recovery and environmental sustainability to economic growth and productivity?

As highlighted in the Dasgupta review, “The economics of Biodiversity” nature is a wealth asset of our nation. It sustains manufactured, financial, human and social capitals⁹. Nature capital should be considered when pricing externalities, reforming incentives and aligning balance sheets.¹⁰ Others are better placed to say if the Treasury is using sustainability and natural capital in their decision making; we are not aware of evidence of this. As Dasgupta report highlights, GDP is a poor measure of the government’s stewardship of our national wealth and our collective prosperity and security. GDP ignores ecosystem damage and societal wellbeing. We advocate for the development of a range of metrics that monitor planetary health, as well as human societal indicators such as the economy, health, equity, food and water security¹¹. This would be a start to developing goals and system incentives.

It may be possible to limit the most egregious environmental damage through regulation, but if there are no financial costs incurred the fundamental incentive remains to maximise the exploitation of natural capital. In our response to the Environmental Audit Committee’s inquiry into aligning the UK’s economic goals with environmental sustainability¹², we made the following points:

- There is a need for regulation to shape action so that everyone is playing by the same rules.
 - The role of the regulator should be considered including market-based disclosures. A capital-based regime should be developed that helps capital flow to areas of the economy that are compliant with biodiversity preservation (e.g. higher capital requirements for assets related to areas that are disruptive to biodiversity).
 - Direct prohibition of financing and underwriting activities may be needed for business activities that hasten biodiversity loss where inadequate transition plans are in place.
 - Transparency is required and this means a need for disclosures that focus on not only risks to a business from biodiversity loss but also the impact the business has on biodiversity loss (akin to scope 1, 2 & 3 carbon emissions)
 - Regulation should consider which stakeholder voices get heard and should reflect differences in terms of valuation from different points of view.
3. How do fiscal rules, taxation, and spending constraints affect climate and environmental investment, and how does HM Treasury ensure that decisions do not increase economic vulnerability by delaying or underfunding early action?
 - a. How do HM Treasury’s tax policies and reliefs support or hinder climate and environmental objectives, and what assessment is made of their impact?
 - b. What plans does the Treasury have for changes in tax revenues associated with the transition to net zero?

The OBR estimates that achieving the CCC’s balanced pathway will reduce government receipts by £76.1 billion by 2073-74. At the same time, climate damage and transition costs will push up public sector net

⁹ Forum for the Future [The Five Capitals Model – a framework for sustainability](#)

¹⁰ L&G [No more free nature: The global economy can no longer afford its nature-risk blind spot](#)

¹¹ IFoA/ Exeter University [Planetary Solvency – finding our balance with nature](#)

¹² IFoA [response to EAC inquiry into Aligning the UK’s Economic Goals with Environmental Sustainability](#)

debt by 108% of GDP¹³. Given the lack of attention to Biodiversity risks, these are almost certainly underestimates in addition to the report noting that the risks to these climate damage estimates are skewed to the downside.

It is widely recognised that decarbonising the economy faster is economically beneficial and provides opportunities for policy interventions that can trigger positive economic tipping points, driving investment, jobs and growth. Clean technology mandates which provide certainty for businesses, investors and consumers can be some of the most effective ways to reach positive tipping points, enabling faster transitions in multiple sectors.

Positive fiscal impacts include the future phaseout of free UK ETS allowances for sectors covered by the UK CBAM, which could provide some additional revenue (almost USD 2 billion by 2034¹⁴), and the introduction of Vehicle Excise Duty for electric and plug-in hybrid electric cars will offset some of the losses from fuel duty.

A transition to net zero is not sufficient on its own. Alongside climate, the Government needs to think about the nature crisis and social and inequality crisis - there will be mitigation and adaptation costs around these as well. At the moment, we see very little evidence of these being joined up.

These need to be considered together to avoid regressive outcomes. For example, a carbon tax on energy fuels will hit low-income households disproportionately. There is space to consider fiscal incentives (tax offsets, zero or lower rating VAT) to incentivise pro-transition, poverty alleviating measures. For example, incentivising home insulation, especially for landlords and local governments, for low-income tenancies; local government grants to install wind and solar in public buildings, possibly based on a share on cost-savings. These would reduce individual energy costs and the total strain on the energy system which would reduce the supply costs for all. (Lower energy costs also boosts UK industry and competitiveness.)

Potential policy insights can be gained from the EU Social Climate Fund, which was created to sit alongside the forthcoming EU Emissions Trading Scheme 2. The Social Climate Fund is intended to provide vulnerable sectors and groups with financial support in the transition to net zero¹⁵. Redistributing part of the revenues from carbon taxation to low-income and fuel-poor households through, for instance, energy efficiency measures, can support a balanced, fair approach.

4. How effectively is HM Treasury working with other departments and public bodies to deliver a fair and coordinated transition across the UK?
 - a. How are departments required to demonstrate the contribution of spending and investment proposals to climate and environmental objectives, including adaptation and resilience, and how are these assessments scrutinised and used in final funding decisions, and reflected in outcomes for climate and the environment, including any direct and indirect impacts of these decisions?
 - b. To what extent do HM Treasury's funding and processes support or constrain coordinated cross-government delivery of climate and environmental objectives, including through the Government's Mission Boards?

The current demonstration of the contribution of spending and investment proposals to climate and environmental objectives is primarily through mandatory adherence to HM Treasury's Green Book and its supplementary guidance.

¹³ OBR [Fiscal risks and sustainability July 2025](#)

¹⁴ Dongzhe Zhang and L. Alan Winters, [The Revenue Potential of Phasing Out the Free Allowances Received by UK CBAM Sectors](#), Centre for Inclusive Trade Policy, April 2024

¹⁵ europa.eu [About the ETS2](#)

The IFoA Green Book paper recommends a number of ways climate and environmental impacts can be better assessed, including a better reflection of managing the uncertainties and downside risks. More work should be done on robust decision-making amongst deep uncertainty and how agility, adaptations and mitigation can be brought the governance process for long-term projects.

Climate and nature risks are cross-cutting systemic risks. Hence more integrated cross-departmental governance and shared resilience objectives may improve coordination and more consistent long-term policy.

5. How effectively do HM Treasury’s appraisal frameworks, including the Green Book, incorporate climate and environmental risks and benefits in policy and investment decisions?
 - a. To what extent are statutory environmental duties such as the Environmental Principles Policy Statement and other environmental duties applied in practice, and what impact do they have on policy decisions?
 - b. How consistently are these frameworks and duties applied across departments, and how is the quality of their application assessed?

The UK Treasury’s Green Book, updated in February, now formally embeds climate and environmental objectives directly into spending appraisals. Our concern is that there is a risk that viable UK transformational - and other long-term - projects do not progress. This is both due to technicalities in the Green Book discount rate guidance and an overreliance on numerical results, in the form of cost benefit analysis, when appraising projects.

We recommend that, for transformational projects, cost-benefit analysis should form a smaller proportion of the decision-making criteria and assessment of co-benefits should be embedded into the Green Book. We believe that a useful starting point for this framework could be the ‘Triple Dividend of Resilience’ approach used to assess climate adaptation projects (see table below). This would encourage acknowledgement of the existence of co-benefits, and support analysts to assign quantitative values to them (where possible) when cost benefit analysis is undertaken¹⁶.

	Triple dividend of resilience approach for climate adaptation projects (taken from table 9, page 29)	Potential for adapting three tier approach for wider adoption in transformational guidance
First dividend / tier	Avoided losses	Project benefits / avoided losses
	The reduction in damages from climate change that would have occurred without adaptive action (for example, the reduction in productivity loss from overheating)*	The benefits and avoided losses that would not have occurred without the project taking place.*
Second dividend / tier	Dynamic market benefits	Unlocked investment and benefits
	Dynamic market effects such as induced investment and productivity gains independent of climate change (for example, investing in flood barriers can enhance investor confidence and boost local economy).	Induced investment and productivity gains unlocked which are independent of the initial transformational project (for example investing in regeneration of an area can enhance investor confidence and boost local economy)

¹⁶ IFoA [Green Book Reform - An actuarial perspective on transformational change and the Green Book discount rate](#)

Third dividend / tier	Social and environmental benefits	Social and environmental benefits
	Wider social welfare benefits from adaptive measures (for example, improved habitats for biodiversity, wellbeing gains from natural landscapes being protected).	Wider social welfare benefits from transformational measures (for example, improved health impacts associated with reduced carbon emissions).

* The first tier represents the project specific benefits and avoided losses that underpin traditional cost benefit analysis

A number of environmental issues are cross-departmental and a whole of government approach is required to successfully address them.

6. How transparent are HM Treasury's decision making and funding processes in demonstrating how climate and environmental considerations are assessed and reflected in decisions?
 - a. To what extent can the outcomes of those decisions be measured and evaluated, including through published reporting, and the availability of an audit trail for Spending Reviews and other funding decisions?

We leave to others to comment on HM Treasury's transparency. As a profession specialised in the analysis in the assessment of risk over long-term horizons, we have two points.

The first is that climate-scenario modelling is fraught with complexity due to high uncertainty, limited historical data, and the rapid, often non-linear, evolution of physical and transition risks. We have highlighted that many climate-scenario models significantly underestimate climate risk¹⁷. Climate and biodiversity risks are mutually reinforcing and must be modelled together. It is important to understand and be transparent about the model limitations, judgements and assumptions used. The potential impacts of the model limitations, particularly in regard to underestimates of damages, nonlinearities and tipping points, should be explicitly recognised using narrative scenarios if further quantification is not possible.

Secondly, because there is so much uncertainty, there should be reflection on the ways that decisions may need to adapt as more information becomes available.

7. What progress has the Government made in implementing the recommendations of the Dasgupta Review on the Economics of Biodiversity, and what further action may be required to embed its principles in economic policy and decision making?
 - a. Does the Government have any target date for final implementation of the recommendations which were made in 2021?

The Dasgupta Review highlights significant opportunities to transition to a nature-positive economy by embedding the value of biodiversity into economic systems. Key opportunities include investing and incentivising investment in natural assets, developing natural capital markets, and transforming financial systems to reduce degradation.

More than half of global GDP is moderately or highly dependent on natural systems such as water regulation, soil fertility and pollination¹⁸. The recent National Security Assessment on Global Ecosystems from the UK Government has shown that the potential collapse of nature is a realistic possibility. In our latest

¹⁷ IFoA/ Exeter University [The Emperor's New Climate Scenarios](#)

¹⁸ WEF [Nature Risk Rising: Why the Crisis Enveloping Nature Matters for Business and the Economy](#)

report, 'Planetary Solvency: Tipping into the wild unknown'¹⁹, we show how the breakdown of critical ecosystem services threatens not only environmental stability but also economic and societal resilience.

Whilst the Climate Change Committee provides updates regarding the progress on the UK economic transition and our mitigation efforts, we are not aware of equivalent reports for Nature and Biodiversity including progress to our National Biodiversity Strategy and Action Plan (NBSAP) to implement the Kunming–Montreal Global Biodiversity Framework. This would support understanding of our progress on natural capital, but further work would be required on both our productive and human wealth capitals,

8. How does HM Treasury assess and manage long term fiscal and economic risks associated with the costs of climate change and environmental degradation, and what influence does this have on Treasury decisions?
 - a. How do climate and nature risks feature in the Treasury's concept of 'securonomics', and to what extent are environmental sustainability and natural capital recognised as foundations of economic and national resilience?
 - b. What role do financial regulators and public financial institutions, including the Bank of England, the Prudential Regulation Authority, the Financial Conduct Authority and the National Wealth Fund, play in identifying and managing climate and nature related financial risks, including through disclosure frameworks and standards for climate and nature related risks?

The Chancellor included green energy and technologies in her Securonomics speech to the Peterson Institute²⁰. We agree that the integration of big systemic risks such as climate and nature will improve chances of achieving a sustainable, resilient future. We advocate a Planetary Solvency²¹ framework to minimise the risk of severe societal and economic disruption caused by the loss of critical support services from nature.

Risk management techniques, such as a dashboard approach²², can help system-level decision-making. It would help specify outcomes and align policy and spending. The IFoA is working with the Global Financial Risk Forum to continue to develop solutions to realistic identification of climate and nature-related financial risk. We would be pleased to meet with the Committee to discuss further.

UK financial regulators play a central role in managing climate and nature-related risk, enforcing sustainability disclosures and facilitating green investment. The IFoA welcomes the PRA's updated supervisory expectations set out in SS5/25, and its recognition of non-linearity and tipping points.

One gap within the financial sector and, we believe, amongst regulators is a belief in the "Washington consensus" that markets price risk and guide economic efforts along a long-term sustainable pathway. However, as noted within Governor Mark Carney's 2016 Speech "Breaking the Tragedy of the Horizon", the impacts of climate change will be felt beyond the traditional horizons of most financial actors²³. This means that traditional regulatory and market price mechanisms fail to price climate risk. This fundamentally contradicts the "Washington consensus" premise and thus the long-term stability of a financial regime if

¹⁹ IFoA/ Anglia Ruskin University [Planetary Solvency: Tipping into the wild unknown](#)

²⁰ Rachael Reeves [Securonomics speech to the Peterson Institute](#)

²¹ IFoA/ Exeter University [Planetary Solvency](#)

²² IFoA/ Exeter University [Planetary Solvency Dashboard](#)

²³ Mark Carney [Breaking the Tragedy of the Horizon](#)

regulation relies on it. Regulators need to think both broader about systemic risk and move away from reliance on security based on liquidity and price.

9. How effectively is the UK's economic framework supporting the transition to a low carbon and nature positive economy, including through investment and economic policy, and how does this compare with other major economies?
 - a. What account is HM Treasury taking of regional and social fairness, sectoral transition and local delivery capacity in delivering a green and low carbon economy?
 - b. How effective is HM Treasury's approach to mobilising private finance in support of climate and nature outcomes, particularly for adaptation, and nature finance?
 - c. How is HM Treasury supporting green growth, in sectors such as financial services, and how does it assess whether this is delivering at the scale required to meet the UK's climate and environmental objectives?
 - d. How is HM Treasury balancing international competitiveness considerations, tax revenues and environmental imperatives in relation to its approach to energy generation?

We believe HM Treasury should create demand incentives within the marketplace to achieve the outcomes it wants rather than trying to mandate the investment. Capital will flow where there is an investment case. For example, if government and UK infrastructure projects were mandated only to use Green Steel from 2035, that certainty of demand would align investment into the supply and disinvestment into high-emission steel.

Frictional barriers can be removed by clarifying aspects such as fiduciary duty and removing regulatory constraints, particularly around access to productive, typically private investments within savings and defined contribution pension investments. However, complex structures to mandate investments will typically add administrative costs and risk efforts into bypassing the true intent. From the individual saver's point of view, either the returns are equivalent – in which case mandating would have been redundant in a free, competitive marketplace – or returns are worse which essentially reflects a hidden tax on the individual saver.

Adaptation investments can generate long-term societal resilience benefits which may not be fully captured by traditional market incentives alone.

Should you wish to discuss any of these points further, please contact Caroline Winchester in the first instance, caroline.winchester@actuaries.org.uk