



ICE submission to the EFRA Committee's long-term inquiry into climate and weather resilience

October 2025

About the ICE

The Institution of Civil Engineers (ICE) is a 97,000-strong global membership organisation with over 200 years of history.

It is a centre of engineering excellence, qualifying engineers and helping them maintain lifelong competence, assuring society that the infrastructure they create is safe, dependable and well designed.

Its network of experts offers trusted, impartial advice to politicians and decision makers on how to build and adapt infrastructure to create a more sustainable world.

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Submission

The ICE welcomes the Environment, Food and Rural Affairs Committee's inquiry. Too little is known about both the condition of existing assets and the performance of the infrastructure system when it comes to climate resilience and adaptation. Infrastructure is an interconnected 'system of systems' that provides the essential foundations for society. It must be managed as such, which requires us to better understand interconnections between asset classes and climate risks and to intervene more effectively.

This submission focuses on a select number of the committee's topics of interest as part of its long-term inquiry and draws on the ICE's previous work on climate resilience and adaptation.

The ICE would welcome the opportunity to put forward a representative to present oral evidence to the Committee.

The nature and scale of changing climate and weather risks to communities and the economy.

The Climate Change Committee anticipates that by 2050, the UK will face warmer, wetter winters, hotter, drier summers, and continued sea level rises. Sea levels, which have already risen by 16cm since 1900, could place a third of England's coastline at significant risk of flooding. Similarly, over a third of UK railway and road kilometres are currently at flood risk, predicted to rise to around half by 2050. Extreme heat can disrupt infrastructure systems via rail buckling and power line sagging. Rising drought risk will increasingly put water supplies under pressure each summer¹.

¹ Climate Change Committee (2025) [Progress in adapting to climate change: 2025 report to Parliament](#)

While the UK has been relatively aware of the impacts of flooding, other climate change induced weather events including heat waves and wildfires are less well understood.

In 2022, the UK recorded the warmest year on record with temperatures reaching over 40°, putting pressure on infrastructure and the people it serves. One of the real risks with infrastructure is the impact of cascading failures for including flooding of electricity substations disrupting air travel, heatwave impacts on IT and communications services causing freight and travel delays, and impacts on one transport system. For example, canal breaches can cause further damage to other assets by causing the flooding of railways. The infrastructure system is interconnected and inter-reliant which amplifies the risk, cost and impacts of service failures.

These networks also play a critical role in recovery and emergency response to extreme climate events, compounding the issue.

But the impacts of climate change and weather events shouldn't simply be measured by their impacts on assets themselves. Climate change will create challenges to economic prosperity. As the Committee notes, estimates suggest that unchecked climate change could impact UK economic output by up to 7% of GDP by 2050, creating challenges for driving sustainable long-term growth across the country. And in 2022, a fifth of hospitals in the UK cancelled elective surgeries as a result of a heatwave². The economic and human impacts of climate change need to be front and centre in the narrative about the nature of the threat.

The public recognises this impact. A Public First poll found that over half (57%) of the British public say that hot weather causes too much disruption, with significant impacts on work, study, and commutes³. Similarly, only 16% of the public think progress on flood defence investment is tracking well⁴.

The nature and scale of climate change and its effects on weather in the UK is substantial, pressing and only going to worsen, making it cheaper and safer to invest up front rather than wait for the impacts of climate change to erode the UK's ability to protect its citizens.

This requires a proportionate response as investment needs to be targeted to where it will have the greatest impact – it is unrealistic to immediately adapt every piece of the infrastructure system in every location, and there will be a need for infrastructure owners and operators to manage public expectations about disruption to infrastructure networks brought on by climate change.

The UK's infrastructure system was designed for the needs of a country facing different and less severe weather and climate events, and, while some new infrastructure is being built to withstand extremes, this must be a consistent approach, and existing assets must be adapted to deal with known climate threats and new extreme weather events. Well-timed and designed infrastructure interventions make communities more able to respond to climate events, or avoid their impacts altogether.

The UK isn't alone in responding to these challenges. The Intergovernmental Panel on Climate Change, in a report in 2022, found that globally, infrastructure, including transportation, water, sanitation and energy systems, have been compromised by extreme and slow-onset events with resulting economic losses, disruptions of services and impacts to wellbeing⁵.

² University of Birmingham (2023) [2022 heatwave struck off surgeries in a fifth of UK hospitals](#)

³ Public First (2025) [Monthly polling](#)

⁴ ICE (2025) ICE roundtable with the Environmental Audit Committee: How to ensure collaboration, policy and funding enhance flood risk management?

⁵ IPCC (2022) [Sixth Assessment Report](#)

Key infrastructure systems, including sanitation, water, flood defences, health, transport, communications and energy, will be increasingly vulnerable if design standards do not account for changing climate conditions. Historically, there has been underinvestment in maintenance which means infrastructure systems are not as resilient as they could be.

While the UK has benefitted from cross-party consensus on the threat of climate change and the broad policy architecture required to respond to it (encapsulated by the Climate Change Act 2008), this agreement has splintered⁶.

The threat of climate change is amplified by policy uncertainty which hampers private investment, risk taking when it comes to new engineering solutions and technologies, and erodes progress when there is a lack of proactive investment in built and non-built solutions. The degree to which asset owners and communities are enabled to respond to its effects will depend on data availability, active policy choices and early investment by government.

Resilience to extreme weather including heatwaves, drought and increased rainfall

In its latest report on the UK's progress on climate adaptation, the Climate Change Committee has highlighted a lack of progress, saying that adaptation efforts have been wholly inadequate⁷. Not a single climate adaptation outcome shows evidence of 'good' delivery or implementation, and progress has not been made to address these concerns since the change in government. There is much more to do to address the scale and nature of climate change and the need to adapt and protect communities by building and maintaining resilient infrastructure.

Data collection and availability to support improved understanding of asset-level resilience, and the nature of potential cascading failures across asset classes is an enduring challenge.

The ICE's 2023 policy position statement on resilience recommends making adaptation reporting mandatory under the UK Climate Change Act for all infrastructure owners and operators⁸.

The information collected would fill in data gaps and help identify the most urgently needed adaptation measures. Mandating quantitative assessment, including financial quantification of expected damages/losses or impacts in a 'do nothing' scenario, would focus resilience efforts on the most material risks.

To ensure that information regarding asset status is shared and made available to the relevant parties, Defra, under the remit of the Adaptation Reporting Power (ARP), should have the authority to oversee standards of protection for key infrastructure that would be relevant at a systems level and to address concerns around data-sharing by providing equal access.

This would ensure that owners and operators have the information and data they need on the level of resilience of infrastructure their assets depend on to provide contingency and protect them from extreme weather events. It would also provide a clearer picture of how infrastructure works as a 'system of systems'. The government can only plan effectively for future resilience challenges if they have a complete picture of how the UK's infrastructure systems are linked.

The ICE also recommends that National Policy Statements (NPS) include a list of climate hazards and desired standards of protection for selected climate scenarios. In general, nationally significant infrastructure projects take account of flood risk and the impact of climate change on it, but other climate hazards are not always assessed. It was encouraging to see mention of work to map and develop further resilience standards in the 10 Year Infrastructure Strategy. This would be supplemented well by additional detail in NPSs.

⁶ BBC (2025) [Tories pledge to scrap landmark climate legislation - BBC News](#)

⁷ Climate Change Committee (2025) [Progress in adapting to climate change: 2025 report to Parliament](#)

⁸ ICE (2023) [ICE policy position statement: How can the UK's infrastructure system be made more climate resilient?](#)

The ICE has also previously recommended that the UK Government undertake a national review of the economics of adaptation.

In order to incentivise investment in infrastructure climate resilience and adaptation, there is a need to first understand the value it provides. One of the challenges with making infrastructure climate resilience and adaptation a priority is that it does not have a market value. Currently, it is not measured or rewarded.

In addition, it is not clear how the regulatory framework which sets out the parameters for funding these investments values resilience. This requires an economic review of resilience and adaptation, led by HM Treasury – this can then feed into developing resilience standards. A clear understanding of the economics of adaptation and the reality of a counterfactual where nothing is done, would support improved community engagement and strengthen the narrative around climate investment.

Resilience is a significant challenge. The solutions lie, in part, in better data on the likely impacts of climate and weather events, better ownership of the problem by asset owners, a complete understanding of the economic value of climate resilience and adaptation and an effective strategy for change, including one that works with nature and its capacity for natural restoration.

Resilience of critical national infrastructure including food and water security

Incidents such as the North Hyde Substation fire, which resulted in the closure of Heathrow airport in March 2025, demonstrate the fundamental importance of resilience across the UK's Critical National Infrastructure (CNI). The National Energy System Operator's report into the incident highlighted lessons for UK government policy on resilience, in the energy sector and other CNI sectors including food and water security, which align with the steps set out in the government's Resilience Action Plan.

It is positive that this plan specifically calls out the impact of cascade failures and the need to continue development of the UK's knowledge base tool.

CNI assets are facing a combined threat from the effects of climate change, including weather events, and those cyber and defence threats associated with an increasingly complex geopolitical environment.

Coastal assets now for example face the threat of erosion and flooding from local water sources in some areas, as well as being increasingly vulnerable from a defence point of view given their coastal exposure and accessibility to malign actors operating close to the shoreline.

There is a need to consider the threats to critical national infrastructure in an integrated way given the increasingly relevant geopolitical environment that these assets now operate within.

The National Infrastructure Commission has identified gaps in key sectors, including:

- Digital and Telecoms: a lack of resilience standards for private networks and a need to review consumer information on public network service quality.
- Energy: there is a need for a forward looking asset health standard incorporating climate change risk and a need to consider future energy supply resilience.
- Transport: there is a need for a forward looking asset health standard incorporating climate change risk and a need to set out resilience requirements for key routes and nodes.

- Water: Forward looking asset health standard incorporating climate change risk are also needed, as well as an expected peak demand capacity and a reduction of the number of households at risk of loss of water supply and at risk of sewer flooding in a 1 in 50 year storm⁹.

In a wider sense, a lack of focus on the interdependencies between heat waves, wildfires and water quality is a challenge to water security. While in the United States, there has been work done to understand the impact of increased demand on the water network to fight wildfires, as well as the impact of ash on reservoirs and resulting water quality, this hasn't been as front and centre as yet in the UK, but may need to be as heat and dry conditions become an increasing challenge for the country.

How land use changes can affect the impact of climate and weather-related events

This interdependence needs to be better reflected in land use planning.

There is a need for a clear land use strategy which is joined up with other sectors and their needs. For example, guidance which acknowledges the trade-offs between productive land used for flood plains versus England's agricultural needs would be useful.

This must be accompanied by a change to the split between prevention or resilience building budgets and disaster response funding which is a major issue. Instead of coordinating to prevent flooding via adequate investment in flood defences – both built and nature-based solutions – funding is often allocated in a reactive or ad-hoc way which prioritises recovery ahead of well-planned, longer-term investment in the context of public pressure to respond.

Climate adaptation and nature-based solutions

Climate adaption will need to be part of the standard design approach to engineering in order to bake it into the full swathe of infrastructure development.

This is an approach some organisations have taken on climate change mitigation.

PAS 2080:2023 is the internationally recognised specification for carbon management in buildings and infrastructure. It provides a consistent framework to measure, manage, and reduce carbon emissions across the entire project lifecycle – from design and procurement through to construction, operation, and eventual decommissioning.

National Highways has confirmed that from December this year, all contractors and sub-contractors must implement PAS 2080 carbon management systems.

The ICE and the British Standards Institution are developing a publicly available specification (PAS) on climate adaptation pathways. Mandating use of guidance such as the upcoming PAS presents an opportunity to embed climate resilience into business-as-usual infrastructure delivery.

The ICE has also long advocated for the use of nature-based solutions. While nature-based and nature-positive solutions are being implemented globally, this is often in isolated pockets. They have not yet become part of the systemic approach to infrastructure planning.

This has resulted from a range of challenges including:

- A lack of understanding from policymakers and the public of the benefits and outcomes of nature-based solutions.

⁹ ICE (2025) [Developing resilience standards in UK infrastructure](#)

- Regulatory barriers – for example, Part O of the English building regulations does not accept green infrastructure such as living walls and green roofs as a way to mitigate overheating in homes, meaning there is no incentive for developers to consider it in their housing projects.
- A patchy, location-specific evidence base that breeds low confidence from key actors such as regulators.
- A siloed approach to delivering infrastructure and infrastructure services, resulting in conflicting approaches to nature-based solutions and no clear direction on how to best integrate them into strategic infrastructure planning and prioritisation¹⁰.

Departmental responsibilities and co-ordination of cross-government impacts of climate and extreme weather, including health, transport, housing and human costs

Responding to the threat of climate change will require a fundamental shift in governance. We need clear leadership and coordinated policy that crosses the traditional silos of government departments.

Defra has failed to make adaptation a top priority within the department or in other central government departments. It is still not sufficiently resourced, particularly in local government. The present approach coordinating climate adaptation via Defra is not working. Effective cross-government collaboration is needed to ensure all departments are engaged with adaptation and recognise the challenges that climate impacts can have across multiple sectors at any one time.

Tracking climate resilience across all government infrastructure spending would be a step in the right direction.

In addition to this, the ICE's 2025 paper on government structures for climate resilience concludes that global governments should action the following recommendations. There is plenty for the UK to learn.

- Establish clear roles and leadership to coordinate infrastructure resilience across all levels of government and avoid fragmentation.
- Set measurable adaptation targets to ensure national plans drive real progress.
- Create coordination platforms to strengthen collaboration between national, regional and local governments.
- Provide dedicated funding, tools and training to local authorities to enable them to assess climate risks and implement effective adaptation plans.
- Engage communities to build public support and integrate local knowledge.
- Embed climate risk into infrastructure planning to address both current and future risks.
- Align public funding with resilience goals and reform appraisal methods to reflect long-term benefits and avoided damages. Incentivise private investment in resilient infrastructure through incentives and regulation.
- Mandate climate risk disclosure and resilience standards to improve transparency and accountability.

In the UK, specific actions the ICE have recommended include:

¹⁰ ICE (2024) [ICE presidential roundtable: How can governments incorporate naturebased solutions in their infrastructure systems?](#)

- Assign cross-government responsibility for resilience to move beyond Department for Environment, Food and Rural Affairs (Defra) and drive coordinated action outside of Defra’s direct sectoral briefs.
- Set clear, actionable targets in National Adaptation Programme to move from restating plans to urgent action and delivering outcomes.
- Fund and require local authorities to adapt to ensure climate resilience is built from ground up.
- Mandate community engagement in adaptation plans to ensure inclusive and locally informed decisions.
- Integrate climate resilience into the 10-year infrastructure strategy to embed resilience in all future delivery.
- Use the Spending Review to allocate sufficient resources for proactive adaptation, treating resilience as a national investment priority.
- Launch a national review of adaptation economics to ensure decisions reflect full long-term value.
- Make reporting under the Adaptation Reporting Power mandatory for infrastructure operators and local governments.
- Adopt resilience standards to ensure infrastructure can withstand climate impacts and deliver reliable services.

Conclusion

The Committee rightly recognises the pressing need to better understand the nature of the threat of climate change and related weather events, as well as the asset and community level vulnerabilities that amplify the risks to the economy and the public.

Existing research, including the ICE’s identified areas where improved reporting, asset owner-led reporting, governmental responsibility changes, and joined-up rather than reactive and event-led governance and funding could help improve the system’s ability to identify risks and respond adequately. Doing so in advance would save the country money in the long term, and communities from significant harm.