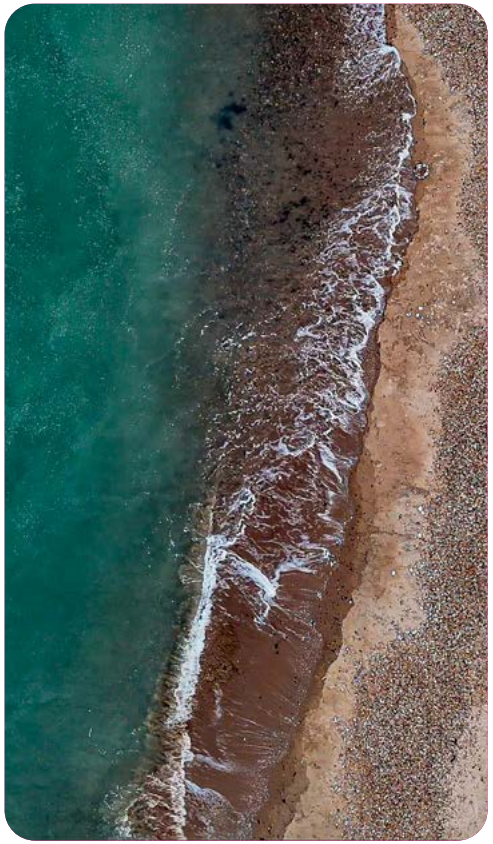
Built to Last

Climate resilient infrastructure needs transformative investment



LLOYDS BANKING GROUP

September 2026

Foreword

Built to Last

Climate resilient infrastructure needs transformative investment

Andrew Walton,
Chief Corporate Affairs and Chief Sustainability Officer,
Lloyds Banking Group

At Lloyds Banking Group, we recognise that resilience is central to infrastructure. As climate change and extreme weather intensify, the costs of repairing and rebuilding infrastructure could rise, alongside insurance premiums, and the disruption experienced by the households, businesses and communities that depend on these assets. In many countries and regions; ageing infrastructure and competing pressures on public finances are straining resilience efforts and underscoring the scale of the challenge ahead.

We face a gap on two fronts: the challenge of delivering sufficient infrastructure at the scale and pace required, and building infrastructure to a higher specification so it is resilient to climate change impacts. Developing infrastructure that embeds climate resilience considerations is essential to meeting adaptation needs, and to protecting the critical functions of society and the economy – this is the task we call Built to Last. Delivering this vision requires more than engineering expertise and long-term planning. It requires capital efficiency, and a clear understanding of the financing structures that make resilience investable.

As a major financier of the UK's infrastructure, we have spent decades structuring the deals that turn community need into fundable, resilient projects. Since 2022, we have provided over £80 billion of sustainable finance. We use financing structures that link institutional capital to critical national infrastructure and are committed to ensuring our own portfolios and clients are prepared for the conditions ahead – reflected in our commitment to provide more than £100 billion in sustainable and transition finance between 2027 and 2030, including for adaptation and resilience to climate change.

This report examines the need for climate-resilient infrastructure and the challenge of financing it at the scale and pace required. It explores not only the physical risks that climate change poses to infrastructure systems, but also the economic opportunity presented by resilience investment. Drawing on Lloyds Banking Group's experience, the report highlights how public and private capital can be combined to support resilient infrastructure and unlock investment at scale. We present three case studies that the Group has recently financed spanning water, energy and the built environment. The projects are UK-based, but the challenge they respond to is a global one – and the models of public-private collaboration shown here offer a template for transformation well beyond the UK.

The solutions and capital exist. The challenge is bringing them together to match the urgency of the challenge ahead. If we can do that, we have the opportunity to build infrastructure that is genuinely **Built to Last**, helping Britain prosper now and in the future.

Executive summary

Climate change and extreme weather–including heat, flooding, drought and storms–already cost the UK economy billions of pounds each year and disrupt hospitals, agriculture, energy and water systems. Infrastructure standards based on the past climate are no longer fit for today's changing conditions.

The Climate Change Committee's report, A Well Adapted UK (CCC 2026), the most comprehensive national assessment of its kind, identifies an estimated £11 billion annual gap in UK adaptation investment. Closing it requires engineered and nature-based solutions across three critical priorities: cooling, flood preparedness and drought resilience.

As capital interest grows, regulatory focus rises and the shared economic dividends are better understood, the case for resilience finance strengthens. The average return on evaluated adaptation investments is 27% (World Resources Institute 2025), while nature-based solutions can deliver up to £4.62 in economic and social benefits for every £1 invested (Lloyds Banking Group 2024).

Closing the financing gap will require improved data and analytics, investable revenue models, stronger adaptation and resilience expertise, common frameworks, and deeper partnerships that share risk and attract private capital. Lloyds Banking Group has already helped mobilise finance across UK energy, water and the built environment; these examples combine supportive policy frameworks, blended public and private capital, and strong coordination between stakeholders, including the partnership between Lloyds and the National Wealth Fund.

Scaling climate resilience will require policymakers, financial institutions and businesses to develop tailored investment models that can be standardised and replicated over time. Policymakers must create the conditions for private investment and a stronger pipeline of investable projects, while finance providers and businesses must embed physical climate risk in decision-making, develop investable resilience opportunities and make adaptation a strategic priority so the next generation of infrastructure is **Built to Last**.

"At Lloyds, we see every day how investment in infrastructure can drive economic growth and create long-term value. Building infrastructure that meets future needs is about more than managing risk. It helps create the confidence businesses need to invest, improves productivity and strengthens competitiveness. These major infrastructure projects can attract private capital and support sustainable growth in every region of the UK."

John Langley,
Chief Executive Officer, Corporate & Institutional Banking (CIB),
Lloyds Banking Group

"Resilient infrastructure is more than a response to the impacts of climate change. It is an investment in economic growth. The projects that strengthen our energy, water, transport and built environment systems support jobs, skills and private investment, while creating the foundations for long-term prosperity."

Khadija Ali,
Group Director, Sustainability and Responsible Business,
Lloyds Banking Group

1. Pressing need

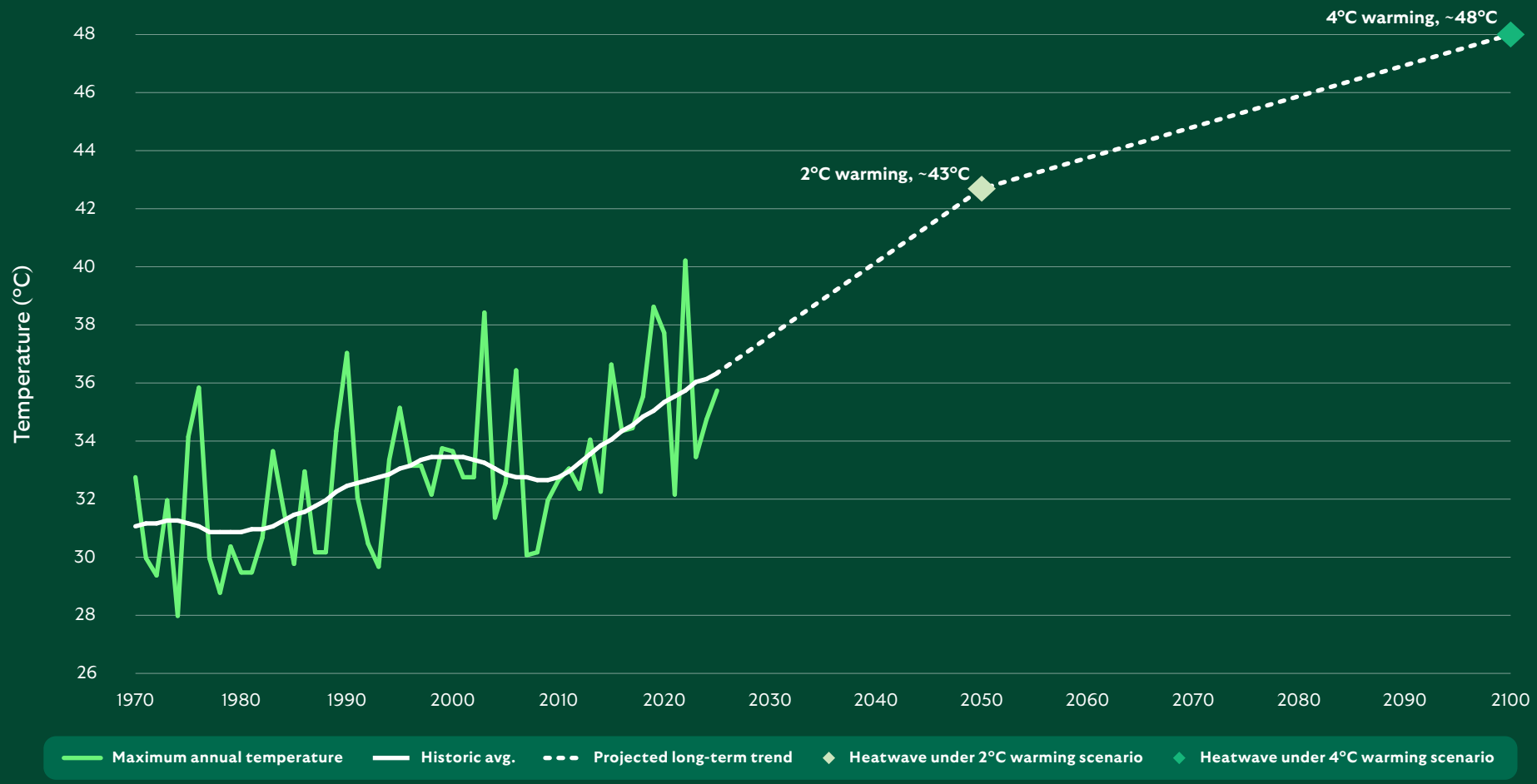
In the face of current, costly climate effects, there is a clear need to build resilience and close the infrastructure funding shortfall.

In the UK, annual temperatures have been rising, summer 2026 was the UK's hottest on record, with 40 days exceeding 30°C (fig 1), and the third driest July ever recorded (Met Office 2026). The latest analysis from the United Nations Environment Programme (UNEP) indicates that the most optimistic pathways could see warming temporarily reach around 1.8°C above pre-industrial levels, increasing the likelihood of extreme weather events (UNEP 2026). Extreme weather is not limited to hotter, drier summers, as successive winters of flooding across the UK have highlighted a broader shift in weather patterns, with risks to property and other critical infrastructure like roads, railways and power systems (fig 2).

The costs of these events are becoming evident. The 5 record-breaking heatwaves in the UK between May and July this year were estimated to have cost the UK economy more than £4.4 billion in lost productivity (Verdant 2026). Annual flooding has a similar economic impact, with the costs estimated to be around £2.3 billion every year (UK Government 2026). In the UK, the costs of climate effects, up to 2% annually, are already being felt, and are material in many sectors, including energy, water, and the built environment (CCC 2026). Similar impacts are evident globally, demonstrating that climate effects are universal and that adaptation and resilience is essential to managing increasing physical risks.


South Downs, UK

Figure 1 Hottest temperatures recorded each year in the UK



Description: The hottest temperature recorded each year in the UK has been increasing since 1970, with the trend increasing from around 31°C to 36°C, and the highest temperature of over 40°C recorded in 2022. Under 2°C warming by 2050 and 4°C warming by 2100, extreme temperatures could be as high as 43°C or 48°C respectively.
Source: Met Office (2025) Met Office Integrated Data Archive System (MIDAS) Land and Marine Surface Stations Database; Met Office (2025) UKCP Local Projections – on a 5km grid, bias corrected using scaled distribution mapping over the UK.
Notes: (1) Data shows the maximum temperature recorded at UK meteorological stations for each year. (2) The long-term trend line is a loess smooth with a 50-year span that reveals the general trend in the data over a 50-year period. (3) Projection data are chosen to provide a similar likelihood to the 2022 40°C event. (4) The maximum temperature shown uses the fifth highest temperature value to avoid occasional single-cell hotspots in the UKCP Local Projection data.

Fig. 1 – The hottest temperatures recorded each year in the UK. The long-term trend in the UK's annual hottest temperature has increased from 31°C in 1970 to 36°C today, with 2022 the first year the UK saw temperatures rise above 40°C. Source: CCC, A Well Adapted UK (2026)

Figure 2 Impacts of extreme weather on wildfires, drought and flooding in the United Kingdom by 2050 and 2100

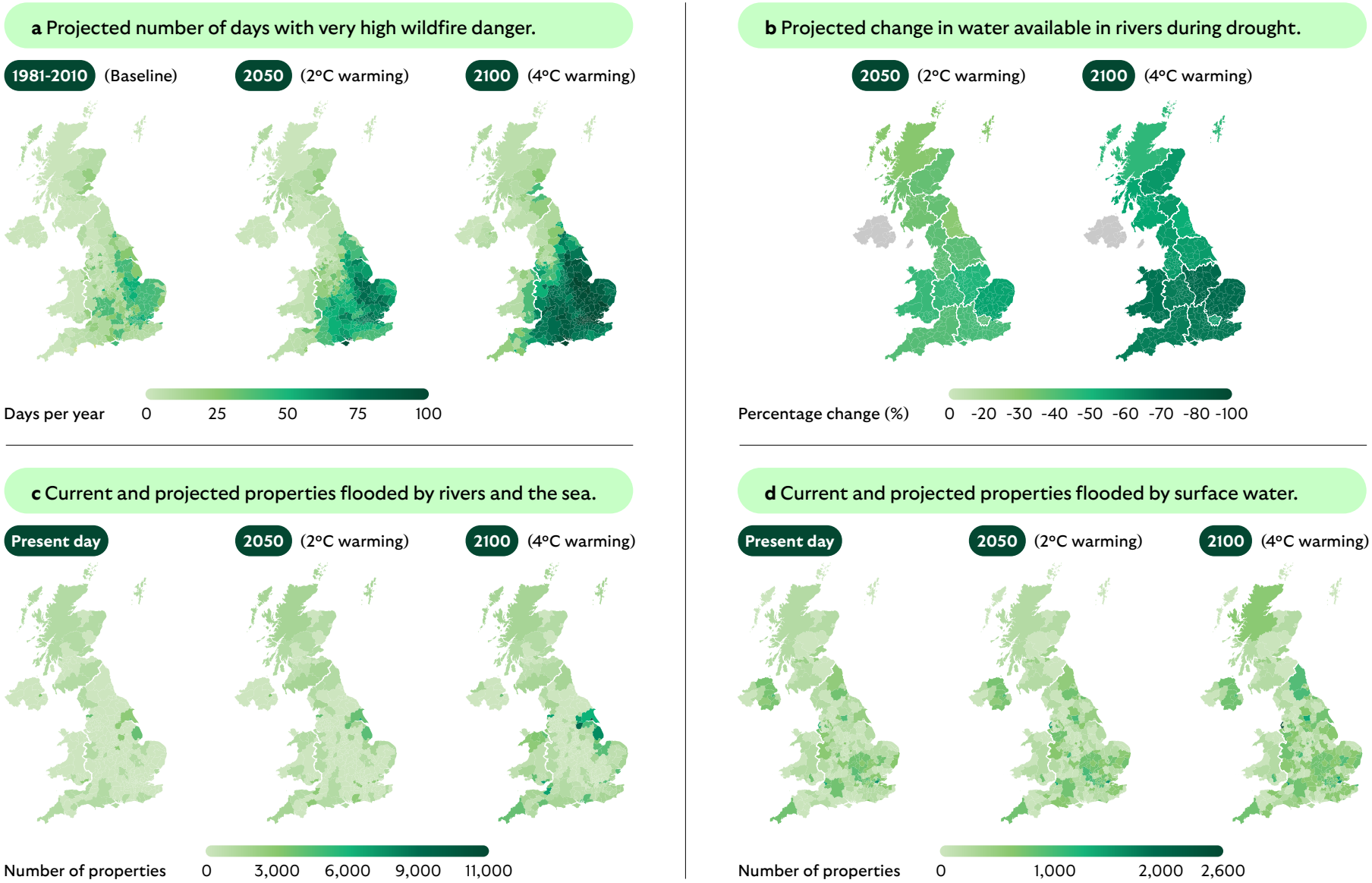


Fig. 2 – Impacts of extreme weather on wildfires, drought and flooding in the United Kingdom by 2050 and 2100. Source: CCC, A Well Adapted UK (2026).

Infrastructure is among the sectors most exposed to physical climate risks, with disruptions cascading across businesses, households and wider society. Estimates suggest that globally, the wider economic costs could be more than seven times the cost of direct damages to infrastructure assets, from interruptions in trade to lost jobs and livelihood opportunities (Coalition for Disaster Resilient Infrastructure 2025).

- **Extreme heat can disrupt energy infrastructure and critical systems** – 2026, heatwaves have overwhelmed hospital cooling capacity, disrupting digital systems and critical clinical services (NHS 2026).
- **The January 2025 floods in Greater Manchester disrupted transport and utility networks,** with floodwaters closing rail routes, damaging infrastructure and leaving hundreds of residents without power and water supplies (UK Government 2025).
- **The 2026 drought exposed the vulnerability of the UK's water infrastructure,** with reservoir storage falling to 69% of capacity, more than 25 million people subject to water-use restrictions, and widespread pressure on rivers, groundwater and water networks (UK Government 2026).

It is expected that costs could rise to up to 4% of GDP by mid-century for a below 3°C scenario. Under this scenario, annual flood damages could reach £4.5 billion (fig 3), hotter heatwaves could see over 92% of homes overheat, and the UK could face a 5 billion litre daily shortfall in public water supplies – equivalent to a third of current daily use (CCC 2026; Environment Agency 2025).

Developing climate-resilient infrastructure is essential to meeting adaptation needs and protecting society and the economy; however, the scale of investment required is compounded by decades of underinvestment. The global infrastructure gap is projected to reach $15tn by 2040 (World Economic Forum 2025), and annual adaptation needs will rise to $1.2tn by 2050 under a 2°C warming scenario (McKinsey 2025).

Within the UK, the Climate Change Committee (CCC) have produced the Well Adapted UK report (2026) – a comprehensive analysis of the physical risks facing the UK, and a roadmap for the extensive adaptation and resilience measures needed in response across sectors and regions. Few countries have such an extensive national-level analysis, which is, in many cases, a precondition for a serious debate about how to plan and adapt to a changing climate. The report conservatively estimates the gap between current levels of funding and a climate-resilient UK at around £11 billion per year. It is imperative that we start addressing these gaps – this is the task we call **Built to Last.**

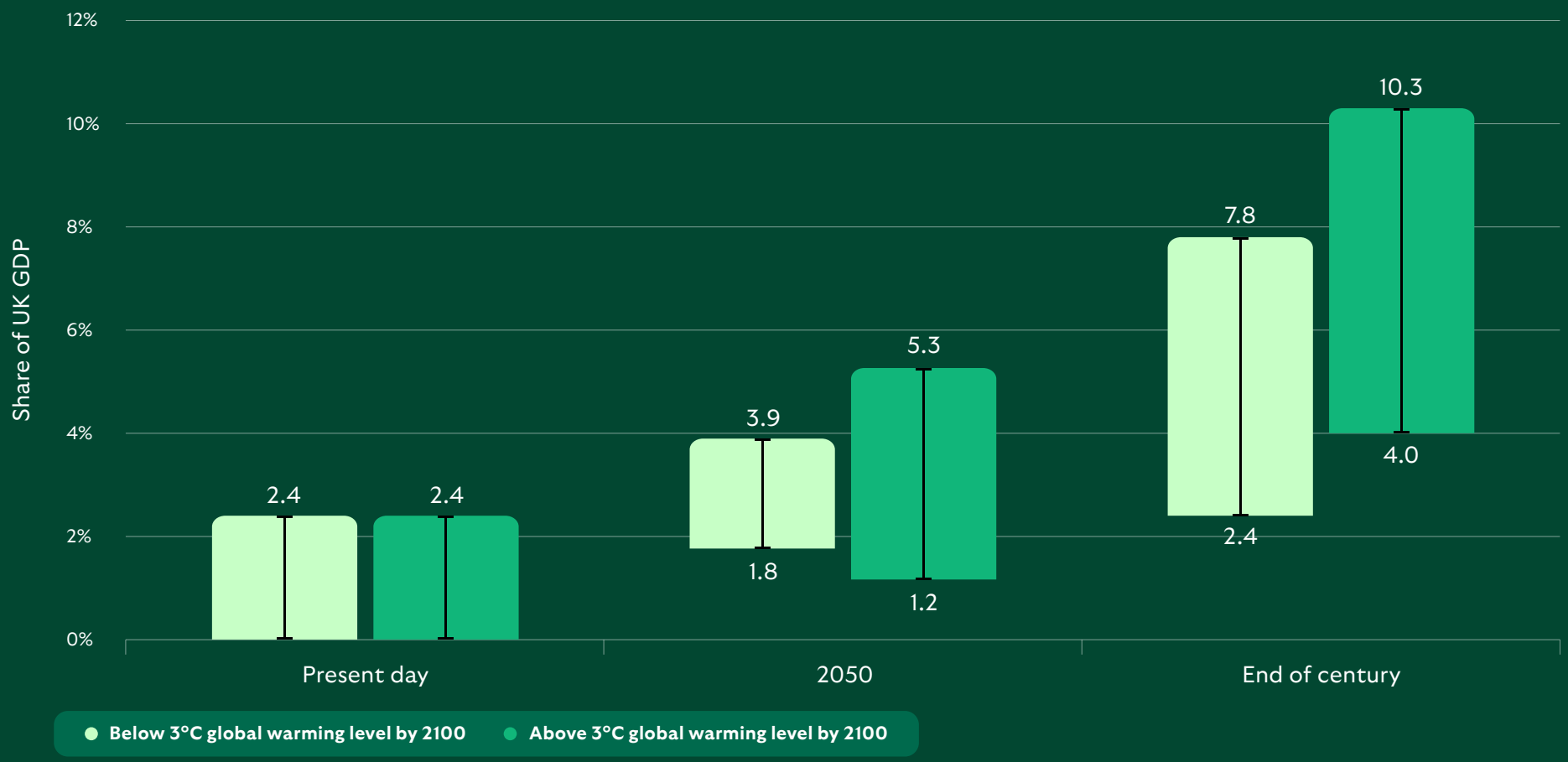
In practice, this means upgrading, retrofitting and constructing a holistic mix of infrastructure across the most crucial and climate-exposed sectors of the economy. Yet resilient infrastructure is not simply stronger infrastructure; it is infrastructure designed to remain reliable as climate risks intensify. Drawing on insights from OECD, National Preparedness Commission and the CCC, resilient infrastructure should be:

Characteristics of resilient infrastructure

- Informed by climate risk assessments and future scenarios rather than historical conditions alone, engineered to withstand increasingly frequent and severe hazards.
- Capable of evolving as climate conditions, technologies and user needs change.
- Combine engineered and nature-based solutions to reduce vulnerability and deliver wider environmental benefits.
- Recognise that resilience depends on coordinated action across infrastructure systems and organisations.
- Supported by monitoring, data and digital technologies that enable operators to identify risks early and respond effectively.

The challenge is not only to protect infrastructure from climate effects, but to redesign systems so they can anticipate, absorb and recover from increasing disruption. Delivering this will require sustained investment in both the resilience of existing assets and the resilience of new infrastructure, combining engineered, natural and digital solutions and reflecting regional climate risks, infrastructure needs and stakeholder priorities.

Figure 3 Estimates of the total cost of the impact of climate change as share of UK GDP



Description: Climate change is expected to have severe impacts as a share of UK GDP by the end of the century.
Source: CCC analysis; OBR (2024) Fiscal risks and sustainability – September 2024; Rising, J. et al (2026) A methodology for comprehensive national climate damage assessments applied to the UK; Rising, J. et al (2022) What will climate change cost the UK? Risks, impacts and mitigation for the net-zero transition; Kahn, M.E. et al (2021) Long-term macroeconomic effects of climate change. For present day estimates only: Watkiss, P. (2021) Monetary Valuation of Risks and Opportunities in CCRA3; Feyen, E. et al (2020) Macro-financial aspects of climate change.
Notes: (1) For the CCC's 'below 3°C global warming level by 2100' scenario, the upper bound roughly aligns to the 'Current policies (central estimate)' and the lower bound roughly corresponds to the 'More ambitious policies' scenario. (2) The CCC's 'Above 3°C global warming level by 2100' scenario roughly corresponds to the 'Current policies (upper estimate)' scenario. Both scenarios correspond to a global warming level of around 2°C in 2050. (3) OBR (2024) is linearly interpolated from 2073 by CCC to establish an end of century estimate. (4) CCC analysis from COACCH (2020) was considered but excluded due to difficulties aligning results.

Fig. 3 – Estimates of the costs of climate change as share of UK GDP. Source: CCC, A Well Adapted UK (2026).

2. Opportunity

Investing in resilient infrastructure is a potentially transformative opportunity to transition to a better-adapted, more prosperous economy.

There is a $100–130 billion adaptation financing opportunity for banks (Boston Consulting Group 2026). This opportunity is being driven by three reinforcing forces: growing capital interest, increasing prudential and regulatory focus and the shared economic dividends for society. Together, these are strengthening the case for investment in resilient infrastructure.

Preston, UK

1. Capital interest: A growing body of evidence is showing how resilience can protect asset value, enhance returns and maintain insurability.

The investment case is strengthening. First, resilience measures can reduce losses: research suggests that property developers in the UK can avoid £2.27 in losses for every £1 invested in flood resilience (Public First 2026). Second, resilience investments can generate attractive returns. The World Resources Institute highlights the strong investment case for adaptation and resilience, finding that adaptation investments generated average returns on investment of 20-27% (World Resources Institute 2025). Finally, resilience can help maintain insurability and long-term asset performance by reducing exposure to environmental risks. Infrastructure companies disclosing to the Carbon Disclosure Project (CDP) estimate a median US$7 of benefit for every US$1 spent responding to environmental risk (CDP 2026) – compounding the stable long-term income and low default rates that already make infrastructure attractive (Macquarie 2024).

Capturing this opportunity requires all forms of capital in concert: equity to own the assets, institutional debt to fund them for the long term – and, critically, bank finance to structure deals, carry construction-phase risk, and bridge projects to the point where long-term capital can take over. The private sector will play a vital role in closing the adaptation investment gap, either as a blend with public sources or as a standalone (United Nations Environment Programme (UNEP) 2025).

Partnerships are equally important. Many banks are already pursuing or considering partnerships with public sector institutions, insurers, development finance institutions and solutions providers to scale adaptation financing. In the UK, public financial institutions such as the National Wealth Fund, together with fiscal reforms, are increasing the capacity to invest in resilient infrastructure and attract private capital. **Box 1** sets out the priority actions identified by the CCC relating to the adaptation of infrastructure – relating to critical infrastructure, buildings, flood risk and water security. Although focused on the UK, many of these recommendations are applicable in other countries facing similar climate risks.

Government policy is also helping to create a growing pipeline of investable resilience opportunities. Within the £725 billion pipeline set out in UK Infrastructure: A 10-Year Strategy, the UK Government has committed £7.9 billion in the flood management sector from 2026 to 2036. The Nature Markets Framework targets £1 billion of private investment into nature in England annually by 2030, naming flood risk reduction and resilience to climate shocks among the outcomes that private capital should fund. While modest in scale today, mechanisms like environmental markets, are expected to become an increasingly important source of adaptation finance.

Box 1: Priority actions for resilient infrastructure in the UK (CCC 2026)

Adapting critical infrastructure

- New water, energy and transport infrastructure should be designed to be well-adapted
- For shorter-lived infrastructure assets, replacements at the end of life with upgraded alternatives
- Longer-lived assets will need to be retrofitted

Protecting from heat

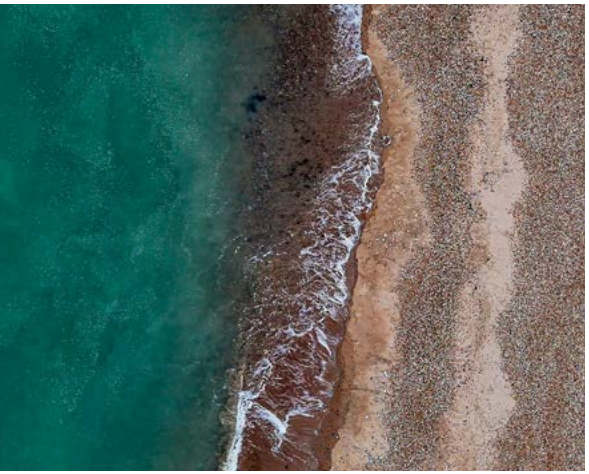
- New buildings designed to be cool
- Passive cooling measures from natural shading
- Active cooling from air conditioning
- Heat pumps providing low-carbon heating and cooling

Managing flood risk

- Long term flood defence programmes looking both traditional engineered assets and nature-based options
- Adequate drainage through green spaces in towns and cities
- Ensuring new builds are not built in undefended areas

Avoiding water shortages

- Investment in large scale water storage
- Improving leakage rates in water system
- New developments should be drought sensitive



2. Prudential regulatory focus: Regulators are increasingly requiring banks to assess physical and transition risks within credit origination and risk management.

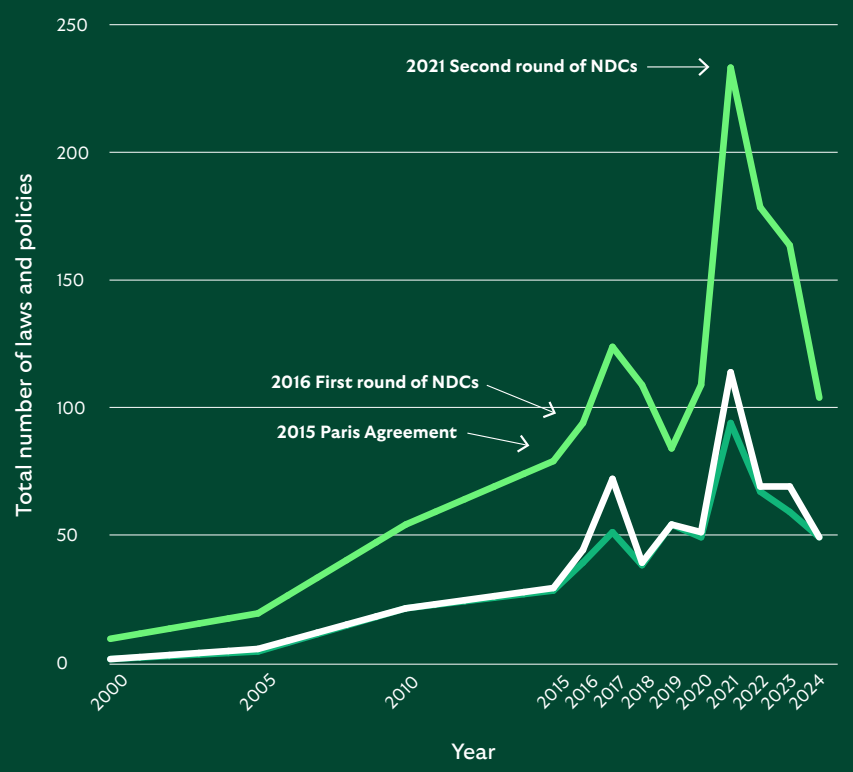
In the UK, the Bank of England's Prudential Regulatory Authority (PRA) updated its guidelines in December 2025 (Supervisory Statement 5/25), raising expectations for how UK banks and insurers identify and manage physical climate and transition risks. Firms are expected to assess counterparties' exposure to physical climate hazards, the credibility of their adaptation plans, and how these factors may affect risk. SS5/25 also expects banks to articulate the impact of physical and transition risks on their traditional risk types and exposures, and underlying assumptions.

Similarly, in Europe, climate and nature-related risks are becoming increasingly embedded within prudential regulation. The European Central Bank has strengthened supervisory expectations for banks, while the EU's Capital Requirements Directive (CRD VI), requires banks to demonstrate how they will manage physical climate risks. The European Banking Authority guidelines require banks to collect clients' data on locations of the key assets, resilience capacity, business model and supply chain vulnerability. Similar approaches are starting to emerge from regulators in Hong Kong, Canada, Japan, Australia and Singapore.

An additional global driver for increasing corporate focus on resilience is the growing adoption of the International Sustainability Standards Board's (ISSB)'s sustainability disclosure standards, which requires companies to assess and disclose the resilience of their strategy and business model to climate-related disclosures. The guidance suggests disclosing a climate resilience strategy and business model, which includes adaptation, response actions and the actual or anticipated financial effects of climate risks and opportunities. As of mid-2026, the ISSB report that around 35 jurisdictions[1] have adopted the guidance on either a mandatory or voluntary basis, with a further group of jurisdictions planning adoption.

This is consistent with an overall trend in adaptation moving into domestic statute. Across 35 countries, 75% of the 902 identified adaptation laws and policies have been introduced since 2015 and 46% since 2020. Notably, the trend remains strong even when Nationally Determined Contributions (NDCs) are excluded from the analysis (fig 4).

Figure 4 Number of national adaptation laws and policies between 2000 and 2024



Notes: Values are digitised by LBG from the underlying data table at five-year intervals to 2015 and annually thereafter; 1982-1999 and 2025 are not shown. NDCs= Nationally Determined Contributions.

Fig. 4 – The number of national adaptation laws and policies has risen sharply since the mid-2010s, coinciding with growing international and national focus on climate resilience. Source: London School of Economics Grantham Research Institute, Climate change adaptation laws and policies (2026)[2]

3. Shared economic dividends for society: Resilient infrastructure also creates benefits for society, the economy, and nature.

Analysis of 320 adaptation and resilience investments found that every £1 invested can generate more than £10 in combined economic, social and environmental benefits over a decade. Most of the return on resilience investment arrives whether or not a shock occurs (World Resources Institute 2025). See **Box 2** for more information on the benefits of resilient infrastructure.

Box 2: The WRI Triple dividend of resilience framework identifies three distinct benefits of resilience:

1. **Avoided losses from climate hazards**
2. **Induced economic development, including increased efficiency and productivity from greater resilience**
3. **Additional social and environmental benefits including climate mitigation and sustainable development outcomes**

Dividends 2 and 3 are effectively "no regrets" benefits: they are realised through the ordinary operation of the asset, irrespective of whether a climate shock occurs.

Where a shock does occur, resilience also protects value across the full disruption cycle: strengthening an asset's capacity to absorb the initial impact, respond during disruption and recover more quickly – with the potential to "build back better" rather than simply return to its previous level of performance (Coalition for Disaster Resilient Infrastructure (CRDI) 2025)

Nature-based solutions exemplify these wider benefits. In the UK, average expected returns range from £1.31 of estimated economic and social benefit for every £1 invested in saltmarsh restoration, to £4.62 for peatland restoration (Lloyds Banking Group 2024). These figures do not factor in further benefits that could not be accurately quantified, such as improved air quality, carbon sequestration and physical and mental wellbeing, which carry considerable value to customers and communities.

The direction of travel is increasingly clear. Policy, regulation and economics are aligning behind the case for greater resilience, yet a significant delivery gap remains. While many resilience solutions already exist, deploying them at scale remains a major investment challenge. Translating adaptation needs into investable opportunities will require new approaches to project development, risk allocation and financing – often bringing together public and private capital to turn resilience ambitions into bankable infrastructure projects.


Cleve Hill Solar Park, Kent, UK

3. Paths forward

The resilience financing gap can be narrowed through collaborative and innovative approaches, with early examples already emerging in practice.

Private capital has an increasingly important role to play in financing resilient infrastructure, yet it accounted for less than 3% of global adaptation finance between 2019 and 2022 (Global Center on Adaptation and Climate Policy Initiative 2024). Closing this gap will rely on the following key areas of development:

Leveraging common frameworks and definitions – enables financial institutions to integrate resilience more consistently into planning, assessment and financing decisions.

Building expertise in adaptation and resilience – essential to strengthening risk management, supporting clients and scaling resilience-focused products and services.

Advancing data and analytics – allows financial institutions to better assess asset-level resilience and integrate physical risk considerations into financial decision-making.

Developing revenue models for resilience – helps translate long-term resilience benefits into predictable cash flows and investable returns.

Strengthening partnerships and risk-sharing mechanisms – can improve project bankability, align incentives across stakeholders and unlock greater investment in resilient infrastructure.

While these areas continue to evolve, they are already beginning to shape how resilient infrastructure is assessed, structured and financed in practice.

At Lloyds Banking Group, we are learning by doing, working with customers and partners to test new approaches and support resilient infrastructure across the UK. Here we present three case studies which highlight a range of adaptation and resilience challenges, and the tailored financing models that have helped to overcome them. These emergent models include public capital absorbing the risks markets cannot yet price, private capital funding what it can, with risk-sharing and accountability transparent from the start.

These case studies are not intended to be exhaustive or provide a complete prescription for solving the **Built to Last** challenge. Instead, they show how tailored financing solutions can help deliver resilient infrastructure.

Together, these financing solutions constitute the beginnings of a blueprint to building the systemic resilience needed, that is replicable at scale in the UK and internationally.

Securing drinking water for over 100 years

Haweswater Aqueduct Resilience Programme (HARP) | Water | North West England | 2026-2035

HARP is a £3bn project that will replace six ageing tunnel sections along the 110km Haweswater Aqueduct, which carries around 570 million litres of drinking water each day to approximately 2.5 million people. The tunnels are being designed to last for over 100 years.

Haweswater Reservoir, Cumbria, UK

Photo from original construction

HARP shows that long-life resilience infrastructure can attract institutional capital where a settled regulatory model, predictable revenue and targeted public support are combined. Stakeholder roles were vital to the structure of the project as bankability depended on coordination between United Utilities, the regulator (Ofwat), National Wealth Fund, a delivery consortium and a syndicate of lenders and investors, including Lloyds Banking Group.

Resilience challenge

Built between 1935 and 1955, the existing tunnel sections of the Haweswater Aqueduct are being replaced by new tunnels with a design life of 120 years to maintain a reliable water supply for roughly 5% of England's population.

Actions to support resilience

The desired resilience outcome is to have greater long-term security of drinking water supplies for future generations. Direct actions this project took to support resilience are:

Asset renewal: Six ageing tunnel sections, covering c.50km, will be replaced to improve the reliability of the wider aqueduct.

Climate-informed design: Climate and flood-risk assessments have informed drainage, groundwater management and watercourse crossings under different climate scenarios.

Long-term environmental management: Habitat restoration, biodiversity management and environmental monitoring are embedded in planning conditions and delivery requirements.

Financial solution

Scale: The programme is expected to cost c.£3bn. Scottish Widows, part of Lloyds Banking Group, is committing £120m of long-term debt finance. Lloyds Bank is providing agency, account-bank and other ancillary services as part of a wider lending and investor syndicate.

Capital structure: Public, private and institutional capital is combined, including a £300m subordinated National Wealth Fund credit-enhancement facility backed by a His Majesty's Treasury guarantee.

Revenue model: The first project under Ofwat's Direct Procurement for Customers framework[3] uses a 34-year concession with United Utilities. Project costs are supported through the regulated customer-bill framework, creating predictable long-term revenues. Cascade Infrastructure Ltd is the delivery company responsible for designing, building, financing and maintaining the replacement tunnel sections. Cascade Infrastructure's shareholders are Strabag AG, Equitix and GLIL Infrastructure.

Risk management: The structure includes protections relating to construction delays, cost pressures and severe climate downside scenarios, matching risks to the parties best placed to manage them.

Wider co-benefits

Social: Reliable supply of drinking water for approximately 2.5 million people. The programme is expected to create around 1,200 jobs at peak construction, including local employment and apprenticeship commitments.

Nature: A commitment to at least 10% Biodiversity Net Gain through United Utilities' programme of work, supported by habitat restoration, habitat management and long-term monitoring. Habitats affected during construction are planned to be restored following the works, helping to further strengthen environmental resilience alongside water infrastructure resilience.

Climate: The project includes lifecycle carbon monitoring and a construction-phase approach intended to identify lower-carbon solutions.

More information: www.harpinformation.co.uk

Protecting the UK's largest operational solar park

Cleve Hill Solar Park | Energy | South East England | 2026

Cleve Hill is a co-located solar and battery-storage project with 373MW of solar capacity and a 150MW battery energy storage system. The project demonstrates how nationally significant clean-energy infrastructure can be developed on low-lying flood-prone coastal land while managing physical climate risk.

Cleve Hill Solar Park, Kent, UK

Cleve Hill shows climate-exposed land does not automatically have to be excluded from development if climate risk assessment, asset design, maintenance obligations and financing requirements work together. This is particularly important in the UK with limited land and growing energy transition needs.

Resilience challenge

The site is exposed to coastal flood risk, including risks associated with sea-level rise and more extreme weather. The challenge was not only to protect the asset, but to make climate resilience part of project design, lender due diligence and long-term asset management.

Actions to support resilience

Flood-resilient design: The project incorporates coastal flood defences, enhanced drainage, additional protection for critical electrical and battery assets, and solar panels raised above standard installation height.

Ability to operate through flooding: Parts of the site can flood while generation is designed to continue.

Independent assessment: Technical and flood-risk specialists assessed future flood scenarios, sea-level rise and the effectiveness of the protection measures.

Ongoing asset management: Reserve mechanisms and reporting requirements support continued maintenance and monitoring of the sea wall and wider flood-protection infrastructure.

Financial solution

Scale: 373MW solar generation and a 150MW battery energy storage system. Lloyds Bank and NatWest underwrote on the £238.5m financing for the construction, providing a £218.5m term loan, and a £20m VAT facility.

Capital structure: The project was financed with a combination of private capital and the above-mentioned debt financing.

Revenue model: A power purchase agreement and the UK Contracts for Difference regime[4] provide greater predictability for revenues from the electricity generated.

Risk management: Climate resilience was part of lender due diligence and financing requirements, rather than a separate technical workstream.

Wider co-benefits

Economic: Adaptation measures enabled a nationally significant energy asset to be developed on a climate-exposed site, potentially widening the range of locations that may remain viable for infrastructure when risks are appropriately managed.

Climate: The project combines renewable electricity generation with battery storage – key to the UK's energy transition – while building physical climate adaptation into the asset.

Nature: Designed to deliver a 65% Biodiversity Net Gain, the project includes a dedicated 56-hectare Habitat Management Area and extensive habitat creation measures. These include managed grassland and grazing marsh habitat for bird species, alongside wildflower meadow creation and almost 4km of native hedgerow planting.

More information: www.clevehillsolar.com

Building resilience into the UK's innovation economy

Lloyds Banking Group and National Wealth Fund Higher Education Retrofit Programme | Built environment | UK wide | 2026

Lloyds Banking Group and the National Wealth Fund have launched a financing initiative to support energy-efficiency and climate resilience upgrades across UK university estates. The programme could modernise up to 300 campus buildings, reduce running costs and strengthen the long-term resilience of institutions that support research, skills and regional economies.

University of Salford, UK

The programme shows how a public guarantee can help private lending reach a strategically important but hard-to-abate part of the built environment. It matches long-term finance to long-life assets, while combining estate climate resilience to flooding and heatwaves with benefits for skills, supply chains, innovation and emissions reduction.

Resilience challenge

University estates often contain large, diverse, historic and specialist buildings. Retrofitting them requires material upfront investment, while benefits such as lower energy costs, reduced emissions and improved resilience accrue over a longer period. Long-term, affordable finance therefore needs to match the life of the assets and benefits.

Actions to support resilience

Building upgrades: Eligible investment can support energy-efficiency improvements, low-carbon heating and other estate upgrades.

Physical resilience: Upgraded heating, cooling and building systems can help universities manage overheating, extreme weather and rising energy demands. Measure to enhance resilience to flooding and heatwaves are included in the fund criteria. This will result in modernised buildings that are better aligned with future climate and energy requirements.

Institutional resilience: Lower running costs and better-performing estates can help universities manage resources and maintain the environments needed for education, research and innovation.

Financial solution

Scale: Lloyds Banking Group will make up to £500m of new lending available to UK universities. At launch, Lloyds is the only bank offering this specific funding solution to the sector.

Capital structure: The National Wealth Fund will provide up to £350m guarantees, covering 70% of eligible lending. The structure is intended to support longer-term finance and attractive pricing for university retrofit programmes. Lloyds uses established banking relationships to distribute the public guarantee through lending to universities.

Capital efficiency: The guarantee reduces the capital required to support eligible loans, enabling lending at greater scale while maintaining prudent risk management.

Framework alignment: Eligible lending under the programme is aligned with Lloyds Banking Group's Sustainable Financing Framework, which sets out the criteria used to identify and classify financing for eligible sustainable activities.

Wider co-benefits

Economic and social: The programme could support up to 4,000 skilled jobs, strengthen local retrofit supply chains and build delivery capability for future projects. More resilient and efficient campus buildings can deliver lasting benefits for students, staff and researchers in which education and research take place.

Institutional and regional: Universities are long-term assets that support skills, innovation and local and regional economies. Investment in their estates helps protect this wider role.

Climate: Once deployed, the programme is expected to help avoid up to 2.8 million tonnes of CO2e while reducing energy use and running costs.

Nature: Criteria behind the fund includes projects to support water efficiency and biodiversity, this includes measures such as habitat creation, tree and hedgerow plantation. University estates have relatively large areas, making their impact significant.

More information: Lloyds Banking Group, £500m retrofit boost for UK universities as Lloyds partners with National Wealth Fund

4. Lessons learned

Key takeaways for building adaptation and resilience at scale

Tailored, innovative solutions are required with collaboration across policymakers, financial institutions and businesses. There is no one-size-fits-all approach. Climate risks and infrastructure assets are bound by geography and by the needs of society – so case-by-case investment models are needed to finance resilience. The task for policymakers, financial institutions and businesses together is to make such structures repeatable.

London, UK

For policymakers

Create the conditions for greater private investment in resilient infrastructure:

Governments, regulators, and public finance institutions (PuFins) could explore whether existing frameworks appropriately recognise the inherent benefits of resilience (reducing future losses, disruption and recovery costs) and support the development of projects that reduce physical risks. This could include:

- Clearer articulation of resilience priorities within infrastructure planning.
- Greater integration of resilience considerations into investment and financing decisions.
- Increased alignment between public policy objectives and private investment opportunities with PuFins playing a critical role in mobilising capital through existing mandates that address specific climate risks.

Over time, this could strengthen the pipeline of investible projects and help scale investment in infrastructure that supports long-term adaptation outcomes.

For the finance sector

Scaling investment in resilience and integrating physical climate risks into lending, investment and insurance decisions:

Climate resilience is moving from a largely public-policy concern to a material credit, investment and infrastructure finance priority. Physical risks are already eroding asset performance, insurability and economic productivity, while regulatory scrutiny and evidence of attractive benefit-cost outcomes are strengthening the investment case. The central challenge is not a shortage of resilience solutions but converting into bankable cash flows. To address this challenge financial institutions can:

- Scale resilience investments and integrate physical climate risks into lending, investment and insurance decisions.
- Work alongside governments and the wider public sector, to help translate resilience priorities into investable opportunities by supporting clients to assess risks, strengthen adaptation planning and unlock capital for resilient infrastructure.
- Leverage growing physical risk capabilities within financing decisions, combining bank finance with institutional and public capital, and using guarantees, regulated revenues and transparent risk allocation to turn successful asset-level structures into standardised, replicable models capable of mobilising private capital at scale.

For businesses

Understand the impact of climate risk on business models and develop forward-looking plans:

Adaptation and resilience are non-negotiable responses to rising climate risk – but how organisations respond will shape both the costs incurred and the value created. Forward looking planning and understanding the impact on individual business models are essential. Broadly, adaptation will manifest in one of three ways:

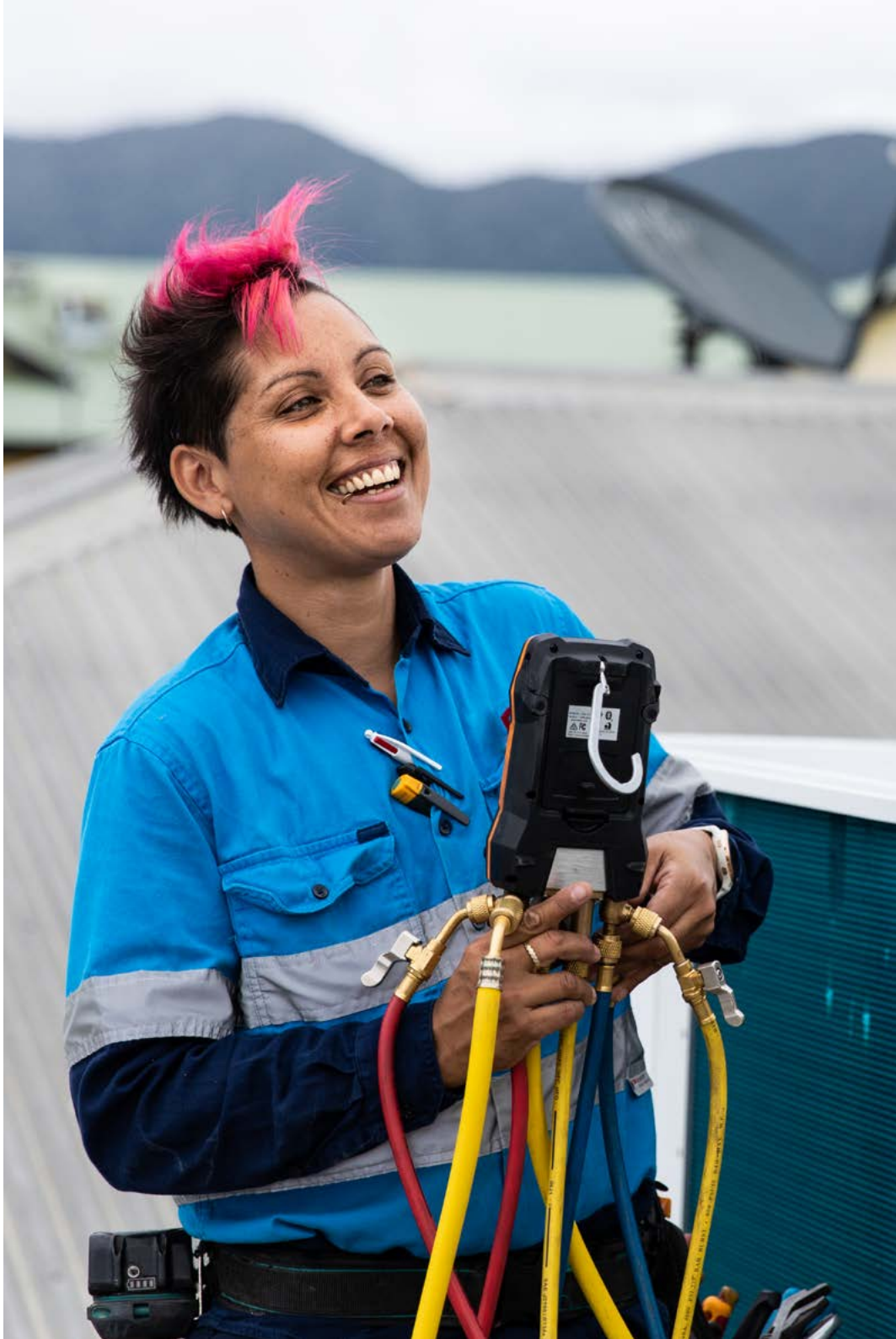
- Investing in resilience measures that reduce exposure.
- Transferring the risk through insurance.
- Withdrawing from impacted geographies.

Delivering on this will mean businesses making resilience a deliberate strategic priority and working with a range of partners, including financial institutions and policymakers, to assess options, build the business case and develop solutions that are fit for the long term.

5. Concluding remarks

The challenge now is not understanding the need for resilience, but financing it at the scale and pace required. While there is no single blueprint, the opportunity is clear: **resilient infrastructure can protect value, improve reliability and create long-term economic benefits.**

Lloyds Banking Group is committed to building capability through action, working with government, investors and infrastructure operators to attract private capital into the solutions the UK needs. Together, we have an opportunity to fund infrastructure that is not only fit for today's challenges, but genuinely **Built to Last**, helping Britain prosper for decades to come.



Footnotes

1. The selected 35 countries cover diversity across geographical regions, income groups, vulnerability to physical climate impacts, exposure to different types of climate hazards and disasters, negotiating groups in the UNFCCC process, and federal or unitary political systems, as explained on page 36 of London School of Economics, Grantham Research Institute on Climate Change and the Environment (Climate change adaptation laws and policies)

2. Climate Change Laws of the World' interface for the Climate Policy Radar Database, https://climate-laws.org . (Climate change adaptation laws and policies) Made available under the Creative Commons CC-BY licence. The data in this database was sourced primarily from the Grantham Research Institute at the London School of Economics. (Climate change adaptation laws and policies)

3. United Utilities, United Utilities set to tender Direct Procurement contract in first for UK water industry

4. Contracts for Difference (CfD): A UK government scheme that helps support investment in low-carbon electricity generation by providing greater revenue certainty through a fixed strike price, reducing exposure to wholesale power price fluctuations.

Head office
33 Old Broad Street, London EC2N 1HZ
+44 (0)20 7626 1500
www.lloydsbankinggroup.com

Registered office
The Mound, Edinburgh EH1 1YZ
Registered in Scotland no. SC095000