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MISSION CLIMATE READY

Unleashing finance and investment for a prosperous Climate Ready economy

Nicola Ranger, Catherine Bremner, Kathryn Brown, Kit England, Sam Fankhauser, Ingrid Holmes, Emma Howard Boyd

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FOREWORD

Last year's record-breaking 40°C heatwave in England meant schools had to close, hospital operations were cancelled as systems crashed, wildfires caused the busiest day for the London Fire Brigade since the Second World War, and the high temperatures brought unprecedented numbers of heat-related deaths. I hope we don't have another heatwave like that this year, but we know we will do soon, and we should be preparing for it.

Every day, around the world new extremes of heatwaves, floods, droughts, wildfires, cyclones, and storm surges upend lives and livelihoods. The acceleration of physical climate impacts like these is a well-understood feature of 21st century life. Yet climate security – by which I mean getting ready to live through them and recover quickly - is not given the same focus as energy security or food security. This is an ongoing missed opportunity.

The UK government's key mechanism for preparing for climate change impacts is the National Adaptation Programme, or the NAP. Earlier this year, the Climate Change Committee said of the second NAP that ran from 2018 to 2023: *"Our assessment has found very limited evidence of the implementation of adaptation at the scale needed to fully prepare for climate risks facing the UK across cities, communities, infrastructure, economy and ecosystems."* This summer, the plan will be updated. Ironically, the NAP must be a wake-up call. It must provide an opportunity to complement the ambition of the government's Green Finance Strategy with concrete actions and an urgency consistent with the scale of the risks facing the UK**.**

Responding to events and repairing damage is much more costly than investing in resilience measures. An official inquiry after an event can never turn back the clock but good preparation and planning can provide returns on investment; skills and jobs; healthier, safer, and greener places to live and base your business, and the soft power of UK leadership among nations racing to find answers to these very same questions.

Climate change is a whole world problem so the solutions must come from every sector, but the UK finance sector has the potential to be game-changing. The Infrastructure and Projects Authority estimates that total infrastructure investment over the next 10 years, including private investment, will be nearly £650 billion. That is 35 times larger than the adaptation costs estimated for climate-proofing infrastructure. The key question that is considered in this report is how to unleash this firepower and we make 25 specific recommendations about how to do it.

UK financial institutions, from Edinburgh to the City of London, together with our world-leading engineers, scientists and technology, are well positioned to address these challenges and support the transition to a prosperous, secure and Climate Ready UK. However, a mixture of policy gaps and hubris borne of the UK's climate leadership in recent decades, mean we risk losing the advantage.

Adaptation is an investable asset class. This report is about securing a prosperous, nature positive and secure UK. The UK financial sector could, and should, be a global leader on climate adaptation and that would, among other social and environmental benefits, make the UK an even more attractive place for global businesses. This report shows that the failure to grasp that opportunity should be added to the list of climate risks facing the UK in 2023, and it also shows how to fix it.

Emma Howard Boyd CBE

Chair, Green Finance Institute

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EXECUTIVE SUMMARY

The UK has long been viewed as a global leader on climate change mitigation and many aspects of that leadership are still strong[1]. It was the first country to establish a long-term legally binding framework to cut emissions in 2008 and the first G7 country to commit, in 2019, to net zero by 2050. The UK has also led the way on green finance, being the first major country to publish a green finance strategy in 2019. In 2021 the UK became the first G20 nation to require the largest companies and financial firms to make public how they are responding to financial risks and opportunities from climate change. Since 1990, UK carbon dioxide emissions have declined by nearly 50%, while GDP increased by around 80% meaning we need three times less carbon per unit of GDP. We need to continue and move even faster in transitioning our economy to net zero, but we are now also living in a world where we are facing severe impacts of climate change and we are not ready.

Action on adaptation is lagging behind and the risks are mounting. This report argues that keeping the UK at the forefront of action on climate change requires not only building a net zero economy, but a net zero, resilient and nature-positive economy. Progress on adapting to the inevitable impacts of climate change is insufficient compared to the pace of change and those impacts are now literally hitting home. Almost 3000 excess deaths[2] were recorded in the summer 2022 heat wave periods; and excess deaths are projected to rise to over 7000 per year by 2050. That summer, UK temperatures breached 40^{o}C for the first time and scientists say with statistical confidence that this would have been extremely unlikely without man-made climate change[3]. The record-breaking temperatures brought unprecedented wildfire incidents, air pollution and significant infrastructure disruption to the UK, as well as major disruptions to supply chains across Europe. School closures in summer 2022 meant that children in London alone lost 22,000 days of learning and health care services were under strain as hospitals overheated. Concurrently, the UK has seen rising risks from flooding and from droughts.

[1] We note the 2023 Progress Report of the Climate Change Committee and letter from Lord Deben, Committee Chair, to the Prime Minister, which states "*the UK has lost its clear global climate leadership while game-changing interventions from the US and Europe, which will turbocharge growth of renewables, are leaving the UK behind. Inaction has been compounded by continuing support for further unnecessary investment in fossil fuels".* https://www.theccc.org.uk/publication/letter-2023-progress-report-to-parliament-to-rt-hon-prime-minister/

[2] https://www.gov.uk/government/publications/heat-mortality-monitoring-reports/heat-mortality-monitoring-report-2022#:~:text=used%20are%20available.-,Observed%20excess%20all%2Dcause%20mortality,number%20in%20any%20given%20year

[3] World Weather Attribution (2023) https://www.worldweatherattribution.org/without-human-caused-climate-change-temperatures-of-40c-in-the-uk-would-have-been-extremely-unlikely/

The UK is underprepared for climate change, putting lives, livelihoods, assets and well-being at increasing risk. Urgent and decisive action is needed to build a Climate Ready UK.

The UK must urgently double down on adaptation action and set the right policies, institutions and capabilities in place to ensure it remains prosperous and secure in the face of climate change, not just today but also in the decades to come. This was the clear message of the Climate Change Committee (CCC)'s 2023 progress reports on adapting to climate change: ***"****The second National Adaptation Programme has not adequately prepared the UK for climate change. Our assessment has found very limited evidence of the implementation of adaptation at the scale needed to fully prepare for climate risks facing the UK across cities, communities, infrastructure, economy and ecosystems".* We are only just beginning to glimpse the impacts of climate change to come at home and internationally. Scientists predict that the world is likely (that is a 66% chance) to breach the 1.5°C level for at least one year in the next five years. Right now, buildings, cities and infrastructure in the UK are built for climate conditions that will no longer exist in five years, locking in future problems of overheating, economic disruption and rising damages from weather extremes. The UK, and indeed all countries, must act urgently to decarbonise their economies to avoid the most catastrophic changes in climate, but robust action is also needed at home to adapt to and manage the inevitable impacts of climate change now and over the next decades.

The UK has been viewed as a leading country on national adaptation policy in the past, but that leadership position is now at risk as other parts of the world start channelling significant resources into adaptation. On the back of a forward-looking legal framework, established in the Climate Change Act 2008, the UK was one of the first countries to start publishing statutory UK climate change risk assessments (the first in 2012). In the 1990s, the UK launched ambitious programmes, such as the UK Climate Impacts Programme, to support businesses and local authorities to adapt, yet these have since waned. Progress has been slow in embedding ambitious adaptation policies and actions across sectors and in increasing adaptation investments in line with increasing climate risk. The UK's 3rd Climate Change Risk Assessment (CCRA3) clearly concluded that action is required across all sectors: agriculture, the natural environment, infrastructure, health, supply chains, water, buildings and SMEs.

UK finance, from Edinburgh to the City of London, is competitive, innovative and can be catalytic for the delivery of a prosperous Climate Ready economy.

Private sector finance can play a catalytic role in enabling adaptation at scale. While estimates vary, around £5 – 10 billion per year will need to be invested in adaptation in the UK across both the public and private sector. This can be looked at as a challenge or as an investment opportunity and an opportunity for financial institutions (FIs) to support their clients with new products and services to help them adapt. The UK's FIs, together with its world-leading engineers, scientists and technology, are well positioned to address these challenges and support the transition to a prosperous, secure and Climate Ready UK. Pension funds and insurers, for example, are expected to be able to invest up to £190 billion in infrastructure over the next ten years. **The Infrastructure and Projects Authority estimates that total**

infrastructure investment over the next 10 years, including private investment, will be nearly £650 billion; that is, 35 times larger than the adaptation costs estimated in CCRA3 for climate-proofing infrastructure. The key question that is considered in this report is how to unleash this firepower and how to ensure it is aligned with our national resilience goals.

The basic financing mechanisms exist and the commercial imperative is clear.

Adaptation projects are not new; resilient infrastructure and buildings, better health services, sustainable agriculture, data and analytics are well known assets. Research by Impax Asset Management for this report, found that adaptation sectors collectively delivered total cumulative returns 16.3% higher than the market over the past five years, and while this is not necessarily an indicator of continued outperformance, it does indicate that competitive returns are feasible. The UK also has established approaches for mobilising private capital into such sectors, even where there is a strong public good aspect, for example the Regulated Asset Base (RAB) model that is used extensively to unlock private investment energy infrastructure and in water. More than a tenth of allocations from 2020-21 green gilts contributed to adaptation in the UK and internationally. Arguably more is needed and collaboration is needed to ensure societal resilience goals are fully embedded.

Finance is often framed as a barrier to adaptation, but a new contribution of this report is to argue that the core issue is not finance per se but a lack of targeted policy. The report provides a diagnostic tool to assess the gaps in policies required to align finance with a climate-resilient economy and mobilise investment in adaptation. Based upon this, we argue that adaptation action and investment is not happening at scale today because an adequate policy, fiscal and regulatory environment is not in place to enable it to do so. Some of the biggest challenges in unlocking financial flows are on the demand-side: for example, how to support, incentivise or require the private sector and households to invest in adaptation; how to build pipelines of investible nature-based adaptation projects; how to encourage corporates to develop credible adaptation plans; how to ensure that new infrastructure is designed in ways that are resilient; as well as closing gaps in data, capability and knowledge. There are few clear targets or sectoral plans that identify 'top 10' investments analogous to those for mitigation. The UK also lacks the mechanisms to allow market failures to be addressed, for example allowing monetisation of the positive resilience benefits of investments, to overcome the upfront costs of resilience and payback over long periods - an adaptation tax credit may assist in overcoming these barriers - and to fully embed resilience within our regulated utilities to ensure investments align with resilience goals. In many areas, public investment needs to scale up and be used more strategically to crowd in and leverage private sector investment, with climate resilience better included as a clear goal within regulation, standards and policies.

The financial sector itself also has much more to do, including better assessing and managing physical climate risks and incorporating those risks into financial decision making. How and where FIs choose to lend or invest today can have a big influence, positive and negative, on the resilience of the UK economy for decades to come. Evidence from the Taskforce on Climate-related Financial Disclosures (TCFD) and the Bank of England show that physical climate risks are not being fully accounted for – or *'priced'* - in financial decision-

making. Yet at least one survey indicates that financial professionals, regulators and economists see physical climate risk as the top risk over the next 30 years, and most of those surveyed believe that markets are underestimating those risks now. Without more accurate risk pricing, investment flows into critical climate-vulnerable real-economy sectors like infrastructure, buildings and agriculture may be unknowingly pushing the UK in the wrong direction, as well as leaving the UK financial sector itself exposed to systemic financial risks. Globally, we lack standard frameworks and metrics to ensure financial flows are aligned with societal resilience goals. These issues require action not just by FIs but also by regulators and government, both in the UK and internationally. Policy should support the introduction by firms of reporting on the locations of assets and key supply chain nodes whose loss or damage would be a material event and what companies are doing to mitigate these risks. In summary, by gearing up FIs to manage physical climate risks, develop strong adaptation strategies, innovate in how they support their clients and invest in the UK's resilience, we can unleash the power of finance to support a Climate Ready UK.

Mobilising finance for adaptation is as much about good policy as it is about finance. Policy is needed now to address market failures and create the right enabling environment for finance to flow, in the same way that it has started to do for net zero.

The UK's 2023 Green Finance Strategy stated a welcome and clear intention to take action to prepare the UK for the physical impacts of the changing climate, to seek to align financial flows with a climate-resilient economy, and to increase investment in adaptation. Yet, four conclusions are clear from an analysis of this strategy when compared, for example, with its commitments on net zero: commitments on adaptation are substantially weaker; there is a lack of concrete goals and actions, milestones and plans to address the key barriers to adaptation; government has given no new financial commitments on adaptation; and there is a lack of scale and urgency in action compared with the magnitude and proximity of the risks. As with net zero and nature recovery, to unleash private financial flows into adaptation at scale, key market failures and bottlenecks need to be addressed. A clear vision needs to be set of the role of the public versus private sector in adaptation finance and what are the measures are of success for resilience outcomes. Action to create the enabling environment for adaptation has lagged behind that for net zero; it's time for adaptation policy to catch up. The third National Adaptation Programme (NAP3) provides an opportunity to complement the ambition of GFS2023 with concrete, costed actions, a clear vision for the role of the private sector in both adapting overall and in financing UK and international adaptation, and an urgency consistent with the scale of the risks facing the UK**.**

Climate Ready, net zero and nature goals are interdependent and interlinked. Reflecting this across all government policies is essential for any of these three goals to be achieved, and creates a huge opportunity for a prosperous and secure UK.

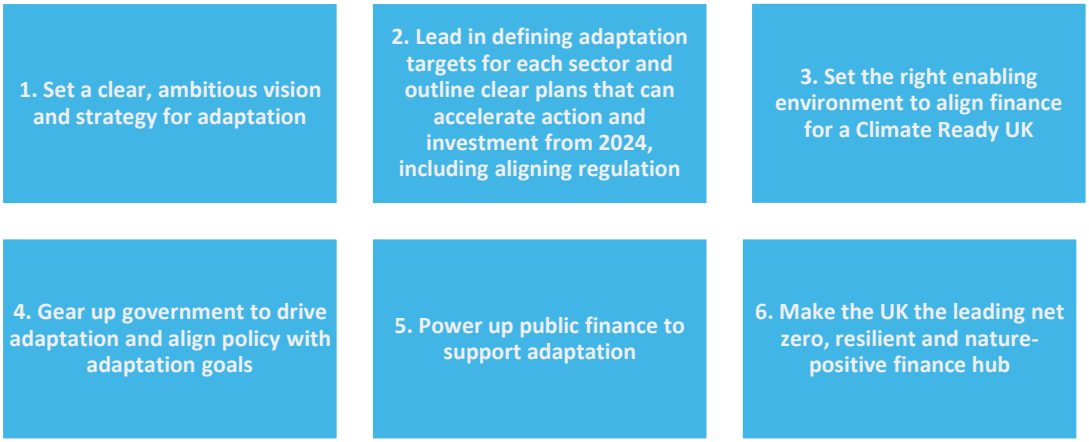
This report is calling not just for action but for a major policy shift. The UK must act urgently to tackle three linked environmental challenges in the coming years; the transition to net zero, nature recovery and climate readiness. All three require major investments in people, similar industries, infrastructure and landscapes. This is a **win-win**. To tackle these challenges,

the UK government, and corporates, need an integrated vision, policies and plans for a net zero, climate resilient and nature-positive economy.

SUMMARY OF RECOMMENDATIONS

In support of the upcoming National Adaptation Programme NAP3 (2023-28), this report builds upon the 2023 Green Finance Strategy (GFS2023) to propose a roadmap of concrete actions that the government can take to 2025 to strengthen investment in the UK's preparedness for climate change. This report identifies six pillars of action and twenty-five specific recommendations to the government to act on by 2025 (summarised in Table 1).

Figure 1: Six Pillars of Action for a Climate Ready Economy



Our six pillars operationalise the following core conclusions from our analysis:

First, set a clear, ambitious vision and strategy for adaptation.

Setting clear and measurable goals for adaptation, and the actions to deliver them, is an essential first step in mobilising action and investment. Until now, the private sector has lacked a clear steer on the role they are expected to play on adaptation at the sector and local level and the policy certainty necessary to enable them to align their plans and investments. As part of the NAP3, the government must set out its vision for a well-adapted England, commit to make the country resilient to climate change by 2030 (not 2050 as in previous policies), and set a goal to mobilise £1bn per year of private finance for adaptation by 2030. This ambition would be consistent with the UK's call to other countries at COP26[4].

Table 1: Six proposed pillars of action and twenty-five specific recommendations for 2025.

Twenty-Five Recommendations to the UK Government to Mobilise Finance for a prosperous and Climate Ready UK	
Pillar 1: Set a clear, ambitious vision and strategy for adaptation	1. Commit to make the country resilient to climate change by 2030 and outline specific and costed goals and delivery

[4] https://www.gov.uk/government/news/uk-calls-for-world-to-be-climate-resilient-by-2030-as-cop26-delivers-billions-for-most-vulnerable

	plans for each sector by 2025, and envisaged public/private sector roles. 2. Commit to mobilise £1bn per year of private finance into UK adaptation by 2030.
Pillar 2: Lead in defining adaptation targets for each sector and outline clear plans that can accelerate action and investment from 2024, including aligning regulation	3. Establish public-private task forces by the end of 2023 to define adaptation roadmaps for sectors and clear investment plans aligned with national goals. To enable timely action, the government should respond with clear commitments to adaptation finance by 2025. 4. Commit to develop an Adaptation Markets Framework. 5. Explicitly incorporate climate resilience within the mandate and priorities of all regulatory frameworks and bodies. 6. Introduce natural capital as the 14th critical infrastructure sector.
Pillar 3: Set the right enabling environment to align finance for a Climate Ready UK	7. Government and financial regulators to build upon TCFD and ensure that the TPT standards set expectations for the assessment and disclosure of physical climate risks and adaptation plans across the economy and ensure consistency between the Adaptation Reporting Power and corporate reporting frameworks. 8. The Bank of England and the Financial Conduct Authority should work with the Climate Financial Risk Forum (CFRF) and the academic community to strengthen financial risk management for physical climate risks, including through improved data, scenarios and guidance. 9. HM Treasury (HMT) should commit to ensure financial regulatory frameworks, including the UK Green Taxonomy, are aligned with a climate resilient economy, and in 2023, implement a task force to examine explicit integration of adaptation and nature across existing disclosure and accounting frameworks, with commitment for HMT to review and set roadmap for implementation by end of 2024. 10. Through the new Adaptation Working Group of the CFRF, financial institutions should work with government to identify barriers to investment in adaptation and opportunities to overcome barriers and investment in adaptation
Pillar 4: Gear up government to drive adaptation and align policy with adaptation goals	11. Establish a National Office for Climate Readiness 12. Mainstream consideration of climate change risk into spending and policy decisions by government, using the Green Book to screen policy and programme decisions and implement the recommendations from the Coalition of Finance Ministers for Climate Action to mainstream climate into the role of Finance Ministries, including the use of Green Budgeting techniques. 13. Strengthen local planning and local government planning regimes for adaptation and resilience by 2030. Reintroduce a statutory duty to adapt to climate change for the public sector in England. 14. Integrate adaptation and nature into the UK's national fiscal risk management frameworks and set out plans for how these can be managed that protect national resilience and incentivise action across the economy. 15. Commission work to examine public-private risk pooling architecture of the UK and how this can evolve to support insurability and adaptation. 16. As part of its 2025 Progress Report to Parliament, the CCC should assess and report on the preparedness of the corporate and financial sector for climate change and the alignment of financial flows with UK adaptation goals.

Pillar 5: Power up public finance to support adaptation	17. Amend the UK Infrastructure Bank Bill and British Business Bank to include economic prosperity, net zero and adaptation as a priority on equal footing, including through targeted concessional finance. Grants instruments and guarantees should allow for capacity building and blended finance options, similar to the UK Export Credit Agency. 18. Re-establish an adaptation support programme (£3 – 5 million per year), including capacity building and foundational investment in R&D. 19. Increase investment in open data, guidance and tools to support financial institutions to upscale adaptation investments, including publication of foundational risk data by end of 2025. 20. Issue first dedicated UK adaptation bond in this government, supporting local, municipal and national adaptation projects. 21. As a special topic report in 2024, CCC to independently review implementation of adaptation - including how UK regulation (financial, economic and environmental) and fiscal and economic policies can work together to better support adaptation in the UK.
Pillar 6: Make the UK the leading net zero, resilient and nature-positive finance hub	22. Set ambition to make the UK the world's first Climate Ready, Nature Positive, Net Zero-aligned financial sector. 23. Government and financial institutions to work together to identify opportunities to strengthen the UK's market for international adaptation finance and services, including through the Climate Financial Risk Forum. This includes ensuring the global interoperability and conduciveness of a UK taxonomy and standards and environment for new innovations in adaptation finance. 24. Invest in science and innovation as a public good in the UK to capture the growing demand for information and professional services globally on adaptation, including building upon existing initiatives such as the UKCGFI. 25. Advocate and lead on the implementation of Paris Article 2.1c globally on ensuring financial flows are consistent with climate ready and resilient economy.

Second, lead in defining adaptation targets for each sector and outline clear plans that can accelerate action and investment from 2024, including aligning regulation.

Government should work closely with corporates and the financial sector to outline plans, unlock barriers, power up markets, and mobilise investment, sector by sector. Progress has been mixed across sectors, with areas like water already having clear targets and plans. To fill the gaps, we recommend that the government immediately establishes dedicated task forces by the end of 2023 to define sectoral adaptation roadmaps and clear, concrete investment plans, co-led by senior officials and senior private sector representatives. This can follow the approach taken by the Net Zero Council established this year. Plans should specify targets and outline sector-specific delivery plans and associated costs, and the envisaged role of the private sector in financing them and the needs from the public sector. This should include a 'top 10' investments for each sector to guide banks and investors. Local authorities should also play a role in defining specific needs for their localities and helping to identify interdependencies. The task forces should deliver outputs by the end of 2024 and the government respond with clear commitments for finance and policy in response by 2025. This is much faster than the pace suggested by the GFS2023, but it is justified by the urgency.

It is essential to ensure that climate resilience is fully incorporated across all relevant existing policies and regulatory frameworks to unlock investment, in particular water, environment, energy, telecoms, health, education, buildings, transport and land use. Regulation has played a vital role in driving private investments in hard (and soft) infrastructure that deliver critical services to people and the economy and ensures standards are met, including on safety, service provision, risk and environmental protection. Major new investment is needed to make the UK's core systems Climate Ready. For example, the Joint Committee on the National Security Strategy noted that critical energy and transport infrastructure – both important to the UK's transition to a net zero economy – is vulnerable to cascading physical risks from climate change. In addition, our wider critical national infrastructure is unprepared; for example schools and hospitals had to close in recent heatwaves and care homes had specific challenges. The Environment Agency and the National Infrastructure Commission have highlighted the need to update regulation to meet the climate challenge and mobilise investment. Resilience standards need to be designed and implemented. The NAP3, alongside the devolved adaptation programmes, provides an opportunity to progress this. The CCC should be asked to advise on *implementation* alongside progress- how regulation, environmental, fiscal and economic policies can work together to mobilise investment in a climate resilient economy.

Adaptation must learn from the mitigation playbook on mobilising investment. Market-based mechanisms have played a big role in mobilising private investment to decarbonise the UK economy and yet are largely unexplored for adaptation. Similarly for adaptation, there is a market failure to be resolved; the huge positive resilience 'spill overs' from investing in resilience today and in the future for society are difficult to capture and monetise, leading to a common underinvestment by the private sector. As part of NAP3, the government should commit to develop an Adaptation Markets Framework to explore the role that market-based approaches can play, and also ensure adaptation is integrated within net zero and nature market frameworks. This could include, for example, '*resilience net gain'* credits for activities, or the extension of codes and standards such as the ISO standards on adaptation planning.

Make natural capital the 14th critical infrastructure sector. Nature-based solutions, and nature protection and recovery more widely, are an important part of adaptation. For example, urban green spaces and green buildings can be a key adaptation to heat and flooding risks in cities, as well as enhancing biodiversity and acting as natural carbon stores. Protecting natural capital is also important for water quality. In 2020, the value of the natural capital services that the government currently quantifies were estimated to be worth at least £1.8 trillion. Natural capital clearly meets the UK definition of *critical national infrastructure*; as noted by the Dasgupta Review, the loss of natural capital would have a major detrimental impact on critical services in the UK and national security. The UK is already one of the most nature-depleted countries in the world and the government has committed to reverse biodiversity loss, but progress is not being made fast enough. The economic value of nature needs to be recognised in policy in order to power up the necessary regulatory frameworks, and mobilise investment. Doing so will create significant co-benefits for the UK's resilience to climate change.

Third, set the right enabling environment to align finance for a Climate Ready UK.

Government and financial regulators are taking positive steps to align finance with a climate-resilient economy, including for example world-leading work by the Bank of England, UK Research and Innovation, and the Transition Plan Taskforce, but more must be done to manage risks and catalyse adaptation investment. Both the TCFD and Bank of England identified challenges in how firms are accounting for physical climate risks that could be leading to insufficient action to manage those risks. An urgent priority is to set clearer expectations and guidance around the reporting of physical climate risks and adaptation plans, as well as bring together financial institutions, the best science, government and regulators to generate improved data and standards to fully incorporate physical risks. This should be an urgent priority for the Climate Financial Risk Forum in 2023/4. To support and encourage greater alignment of finance with a climate-resilient economy, a task force should also be established to examine how adaptation and natural capital are integrated across existing disclosure, regulatory and accounting frameworks, including the upcoming UK Green Taxonomy and building upon activities such as the Transition Plan Taskforce and the Land, Nature, and Adapted Systems Advisory Group, and to provide recommendations on how gaps can be filled and capabilities to deliver enhanced. HM Treasury should commit to set a roadmap for implementation by end of 2024. This would set a clear direction of travel.

More data is required to make better decisions and enable more finance to flow. Ensuring that financial institutions, government (national, devolved, regional and local) and the real economy have access to the same basic reference data on risks and adaptation opportunities is essential to catalyse action, manage risks and avoid greenwashing. Investing in UK science and technology to deliver this is a cost-effective win-win for government that can be transformative in driving action across the real economy and financial sector. A coherent and open set of information needs to underpin investment decision making, otherwise it can lead to information asymmetry and market distortions between government, FIs, corporates and the public, e.g. heat, drought and flood hazard and benefits of adaptation. The UK can leverage its strength in climate services and build upon the success of past investments such as the UK Climate Projections and the UK Centre for Greening Finance and Investment to provide the open data, tools and frameworks that financial institutions and corporates need to act. The NAP3 is an opportunity for government to commit to a roadmap of investments in this area.

Finally, the government, regulators and financial sector should work together to identify and unlock barriers to adaptation investment. This includes, for example, removing any unnecessary regulatory barriers that can hold back investments with longer-term returns, developing investible pipelines and sandboxing the design of financial products.

Fourth, gear up government to drive adaptation and align policy with adaptation goals.

To mobilise action across the economy, the government itself needs to further gear itself up to tackle the challenges of climate change over the coming decades, including integrating adaptation as a priority across all relevant policies, regulatory bodies and spending in line with the government's initial 25 Year Environment Plan. This should be a core priority of NAP3. In line with progress in other regions, for example across Europe, this

should be supported by a detailed Adaptation Investment Plan. The UK should also consider how the machinery of government could be geared up to deliver this, as well as ensure better integration across the triple challenges of climate change adaptation, net zero emissions and nature protection and recovery. A new National Office of Climate Readiness hosted within the Cabinet Office for example could ensure better integration with the National Resilience Framework and a more coherent approach across government.

It is also vital to integrate physical climate risks within the government's own financial risk management engine. When crises happen, government often acts as an insurer of last resort, supporting homes and businesses to recover, as well as rebuilding public infrastructure. Measuring and proactively managing these risks is not just efficient for the taxpayer but can create more risk sharing with the private sector. An example is flood risk in the UK, where Flood Re helps to maintain the insurability of homes. As part of NAP3, the government should take actions to explore how pooling mechanisms like Flood Re can be scaled-up and applied more widely. Government should also build its capability to monitor physical climate risks and adaptation across the economy. As a starting point, as part of its 2025 Progress Report, the CCC could assess the preparedness of the private sector for climate change and the alignment of public and private financial flows based on disclosures. Supporting local and devolved government in England should also be a key priority for the NAP3, including through a statutory duty for public bodies to adapt to climate change (as has worked well in Scotland), strengthening capacity and empowering local authorities to define sector-based adaptation targets and financing arrangements, learning from examples such as Climate Ready Clyde.

Fifth, power up public finance to support adaptation.

The UK's public financial institutions, like the UK Infrastructure Bank, can be more fully mobilised to serve UK adaptation goals. Other institutions, like the European Investment Bank and the European Bank for Reconstruction and Development, provide good models for how this could work, offering a mix of technical assistance and targeted concessional financing. As part of NAP3, the UK Infrastructure Bank (UKIB) and other public financial institutions should be mandated to support adaptation as a priority on equal footing with net zero and other goals and provide technical assistance alongside financial. The UKIB, for example, is already mandated to lend to local authorities and could be a vehicle to provide concessional support to local resilient infrastructure and housing.

Investment in public goods, including capability building, information and data, is essential and a no-regrets way to catalyse action across the economy. Part of the UK's leadership in adaptation globally has come from its continued investment in important public goods, including major programmes such as the Met Office Hadley Centre and UK universities to generate data and information to inform adaptation. However, investment in support services to give businesses, local government and the third sector the capacity to adapt has stopped over the past ten years. The UK government should re-establish a national adaptation support programme, with investment of at least £3-5 million per year and including capability building and foundational R&D, to provide businesses and investors (as well as local government and the third sector) the guidance and tools to help them integrate climate risks,

identify adaptation opportunities and ensure that actions that are needed urgently are being undertaken. NAP3 is an opportunity to lay out plans to do more to mobilise UK scientific strength and technology innovation and support public goods for adaptation.

Building on the successful issuance of UK green gilts, and the allocation of some 13% to Climate Change Adaptation in 2021/22, the UK should issue a first dedicated adaptation bond to mobilise resources for government funding and financing from the private sector. The allocation should be aligned with the priorities of the NAP3, building on the Green Financing Framework which financed UK flood defences.

Finally, make the UK the leading net zero, resilient and nature-positive finance hub.

One of the objectives of the GFS2023 was to make the UK financial sector the world's first UK Net-Zero-aligned Financial Sector. The NAP3 should set the ambition to make the UK the world's first Climate Resilient, Nature Positive, Net Zero-aligned financial sector. Mobilising international adaptation finance can be a growth opportunity for the UK. The UK has unparalleled strengths in this area, including through its world-leading insurance market; leading scientific institutions; technology innovators; professional services; international banking and borrowing, asset management, international debt issuance, financial services and foreign exchange trading. HM Treasury should work with the London Market, the Climate Financial Risk Forum, financial regulators and others to respond to this opportunity and ensure the continued competitiveness of the UK.

To maintain the UK at the forefront of climate action for the next decade and to 2050 and beyond, government, regulators, industry, finance and the best science must come together. The UK financial sector has the appetite, expertise and capability to become the global hub for adaptation finance and NAP3 is the moment to commit to unleash this).

INTRODUCTION

The UK is not climate ready – people and businesses across the UK are already feeling the effects of climate change. The record-breaking temperatures seen in summer 2022 brought unprecedented numbers of heat-related deaths, wildfire incidents and significant infrastructure disruption to the UK, and major disruptions to supply chains across Europe. More than 3,000 excess deaths were recorded in the UK during the summer 2022 heat wave period; and excess deaths are projected to rise to over 7,000 per year by 2050. School closures in summer 2022 meant that children in London alone lost 22,000 days of learning. Climate Ready means not just managing these risks but also capturing opportunities.

Adaptation is a crucial part of the transition to a net-zero, resilient and nature-positive economy and requires urgent action both to ensure the resilience of the UK economy and financial sector to climate-related risks and to scale up investment. The transition to net zero will not deliver on its promise unless we also tackle adaptation and nature recovery.

Finance is just one enabler of adaptation but a vital one – financial flows in the billions will be needed to adapt the UK economy to climate change. In addition, how and where financial institutions choose to invest or lend can have a significant influence on the resilience of the UK economy for decades to come, positive or negative. If climate risks are not fully accounted for in financial and policy decisions, particularly in critical areas such as infrastructure, buildings, agriculture and land-use change, this can undermine economic incentives to invest in adaptation in the real economy and lock-in risks. Conversely, financial innovations such as resilience-linked bonds and loans are win-win and can support businesses and households to invest in adaptation. This report is about scaling finance and investment for adaptation in the UK.

The 2023 UK Green Finance Strategy (GFS2023) committed to align financial flows with a climate-resilient economy and mobilise finance for adaptation. This is timely and welcome. Yet, there is a gap between this ambition and action by government and the financial sector. The recent progress reports of the Climate Change Committee (CCC 2023) and the Task Force on Climate-related Financial Disclosures (2022) demonstrate this gap. New analyses detailed in this report identify the gaps in the policy landscape for financing adaptation in the UK, including within the GFS2023. The UK can no longer afford to delay.

If the goal is to mobilise more finance for adaptation, then we must also look beyond finance itself and address the underlying bottlenecks to adaptation in the UK. Adaptation finance is as much about good policy and regulation as it is about finance. Demand must be built at the level of businesses, households and government itself. Analyses show that UK businesses are unprepared for climate change[5]. CCC (2023) found insufficient adaptation progress across business, nature and across almost every critical national infrastructure sector: water, food, energy, transport, telecoms and health. Indeed, research by the University of Oxford suggests that the government itself may be not fully integrating resilience within its

[5] https://www.aviva.com/sustainability/climateready/

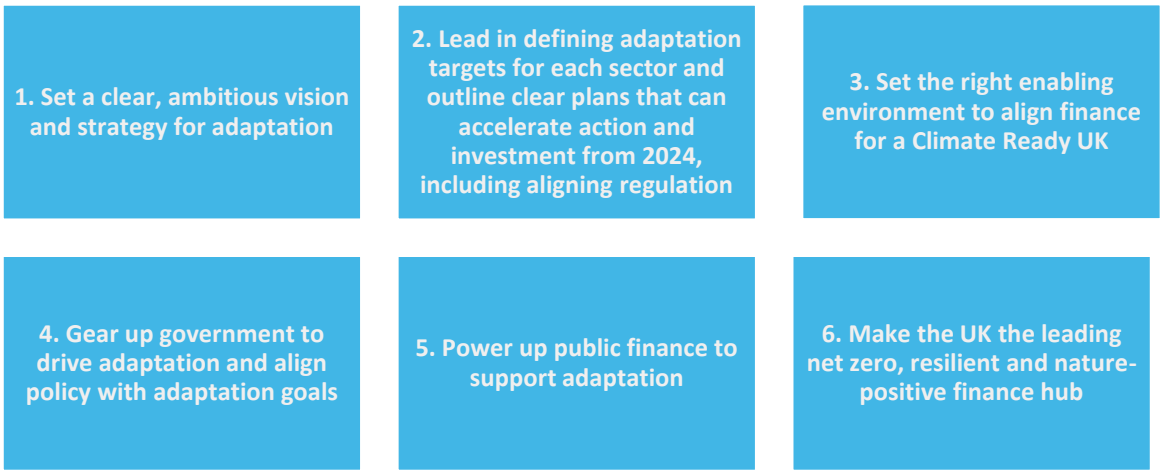
own spending[6]. **The 3rd National Adaptation Plan (NAP3) is a perfect opportunity for the government to address these gaps**. Mobilising finance is also about designing appropriate financing modalities and the right mix of public and private finance to secure the right balance between social objectives, resilience and commercial interests both at a sectoral level through regulation and at the project level. Accordingly, this report takes an integrated approach to consider not just the supply side issues in mobilising finance, but also the demand side, as well as the wider enabling policy and regulatory environment.

The report is divided into four parts:

- Part 1: Opportunity for a Climate Ready UK
- Part 2: A Climate Ready Economy and Financial Sector
- Part 3: A Climate Ready Government
- Part 4: Toward a Climate Ready, Net Zero, Nature-Positive Financial Sector: Capturing the global opportunity

Part 1 briefly lays out the fundamentals; the evidence base for a Climate Ready UK from a societal and business perspective and the linkages to net zero and nature recovery. Parts 2 and 3 then focus on the actions that need to be taken by government to unleash finance and investment for a Climate Ready economy between now and 2025. Part 4 concludes on the opportunities for the UK to build a leading financial sector on adaptation.

Figure 1: Six Pillars of Action for a Climate Ready UK



Across the four parts we propose six pillars of action (Fig 1) with twenty-five specific recommendations for 2025 (Table 1).

The report intends to be short and accessible, providing concise facts and targeted policy recommendations to set the enabling environment to unleash finance and investment for

[6] Fankhauser et al. (2023) Case studies in adaptation finance (Expert Advisory Group) https://www.theccc.org.uk/publication/case-studies-in-adaptation-finance-expert-advisory-group/

adaptation[7]. It takes the 2023 Green Finance Strategy as a starting point, identifying gaps and proposing next steps to be implemented over the next NAP cycle. It builds upon existing evidence, including the third UK Climate Change Risk Assessment (CCRA3) and the Progress and Special Reports of the Climate Change Committee. The focus is on actions that need to be taken by governments and regulators, albeit the information will have relevance to private financial institutions, corporates and civil society organisations. We focus on mobilising finance for adaptation domestically. It is also important to consider how the UK can better support the mobilisation of international adaptation finance and this will be covered in a subsequent report.

This paper primarily focuses on UK-level Adaptation and Green Finance policy. Given its focus on adaptation policy to drive finance, many of the recommendations are also relevant to the devolved administrations in Scotland, Wales and Northern Ireland as they continue their climate adaptation efforts, including the preparation of updated National Adaptation Plans

PART 1: THE OPPORTUNITY FOR A CLIMATE READY UK

The UK is underprepared for climate change and lives, livelihoods, assets and wellbeing are at risk. The government must act urgently and decisively to build a Climate Ready UK.

A Climate Ready UK will materially improve people's lives now and in the future. We are already seeing substantial impacts of climate change and this will only increase. In July 2022, temperatures in England hit 40.3C, a level that was unprecedented and higher than predicted in climate models. Hotter, drier summers will become the norm by 2050, accompanied by heatwaves, wetter winters, flooding, coastal erosion and sea-level rise. More than 3,000 excess deaths were recorded in the summer 2022 heat wave; and excess deaths are projected to rise to over 7,000 per year by 2050[8]. In London alone, during the 2022 summer heatwave, schools reported a total of 33 closed days, equivalent to an estimated 22,000 days of lost learning, and the London Fire Brigade reported the busiest day in London since the Blitz[9]. The heatwave also added dangerously high levels of ozone and particulate matter to the atmosphere. Air pollution is a silent killer; up to 800 people died from inhaling ozone in the earlier 2003 heatwave[10]. The UK also experiences average annual damages from floods of over £700 million per year and studies suggest that this could rise by up to 40% by 2050[11]. While it is difficult to estimate overall aggregate costs of climate change for the UK, studies

[7] The report does not conduct a comprehensive review of the literature on mobilising adaptation finance, but rather takes that evidence base as a starting point to identify specific policy recommendations for the UK. For further resources, see for example: Ranger and Mullan (2022), Fankhauser et al, (2023), Frontier Economics & Paul Watkiss Associates (2023).
[8] Office for National Statistics, 2022, https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/articles/excessmortalityduringheatperiods/englandandwales1juneto31august2022 (accessed 14th June 2023)
[9] https://www.london.gov.uk/mayor-launches-new-review-harnessing-technology-help-london-tackle-climate-threat
[10] Stedman (2004) The predicted number of air pollution related deaths in the UK during the August 2003 heatwave, Atmospheric Environment. https://www.sciencedirect.com/science/article/abs/pii/S1352231003010203
[11] Bates et al.(2023) A climate-conditioned catastrophe risk model for UK flooding https://nhess.copernicus.org/articles/23/891/2023/

show costs increasing every year and estimates of between 1% and over 3% GDP every year by 2045-2050, substantially eroding growth[12] and presenting risks to tax revenues. The impacts seen around the world provide a further signal of what is to come; with parts of Europe experiencing drought and water shortages[13] and rivers such as the Rhine running dry.

CCRA3 laid out clearly the highest priority risks where there is less preparedness, such as risks to power systems, human health, supply chain risks and the natural environment[14]. The UK is also exposed to international (or transboundary) risks, including disruptions to trade, financial risks and geopolitical shocks. These are less well quantified to date, but the nature of the UK economy means it is particularly exposed to such international risks and they could have a significant economic and social impact. For example, sixty percent of global food production occurs in just five countries: China, the United States, India, Brazil and Argentina[15], and only four grains make up half of all calories consumed. Studies have explored the growing likelihood that a climate shock could disrupt these key food producing regions and crops. One study estimated that the likelihood of a 15% shock to grain production – historically, a 1-in-100 year event (1998 – 2017) – doubles by 2030. This could have major knock on effects on prices and lead to widespread social unrest. More intense extreme weather could also lead to rising risks of disruption to supply chains and a more volatile macroeconomic environment, geopolitical stability and migration.

With adaptation, a Climate Ready UK could see some opportunities, for example in agriculture, winter energy requirements, or reduced costs to public services. Investment now can help ensure that we capture the opportunities and mitigate the risks to maintain the prosperity of the UK people and economy in the decades to come.

Reducing UK and global greenhouse gas emissions is urgent and vital, but historic emissions mean further warming and rising climate impacts will continue until mid-century even if we meet our net zero goals. The world is still some way off the goal of limiting warming to 1.5 °C committed to as part of the Paris Agreement. Global temperatures have already passed 1.2 °C above pre-industrial levels and without strong and rapid action by both governments and the private sector to turn their commitments into implementation, temperatures could rise by another 1 – 1.5 °C or more before they begin to stabilise[16]. Sea levels will take even longer to stabilise and as an island nation, the UK coastline is particularly at risk. Action now is vital to build a prosperous and Climate Ready UK.

Despite the clear evidence of risks, the evidence also clearly shows that the UK is underprepared for climate change. The 2023 Report of the UK Climate Change Committee (CCC) on adaptation progress in England provided stark evidence the country is

[12] Watkiss et al. (2023) The Costs of Adaptation, and the Economic Costs and Benefits of Adaptation in the UK https://www.theccc.org.uk/wp-content/uploads/2023/01/The-Costs-of-Adaptation-and-the-Economic-Costs-and-Benefits-of-Adaptation-in-the-UK-Paul-Watkiss.pdf
[13] https://www.reuters.com/world/europe/southern-europe-braces-climate-change-fuelled-summer-drought-2023-05-17/
[14] UK National Climate Change Risk Assessment 2022 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1047003/climate-change-risk-assessment-2022.pdf
[15] Source: McKinsey 2020
[16] See, for example, Climate Action Tracker: https://climateactiontracker.org/

underprepared across multiple dimensions (Fig. 2), something also reflected in its reports on the devolved administrations. Every one of the CCC's thirteen indicators is amber or red; indicating mixed or insufficient progress. It concluded that *"the second National Adaptation Programme has not adequately prepared the UK for climate change. Our assessment has found very limited evidence of the implementation of adaptation at the scale needed to fully prepare for climate risks facing the UK across cities, communities, infrastructure, economy and ecosystems"*. The erosion of the UK's natural capital also continues to seriously undermine the resilience of people and businesses to climate change.

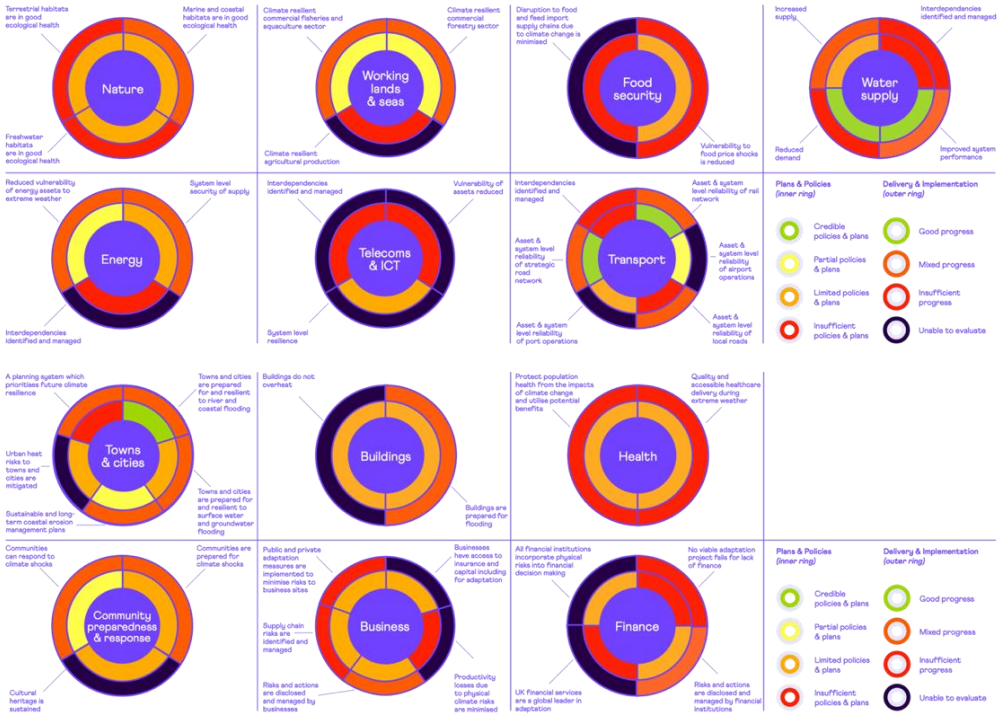


Figure 2: State of progress of UK adaptation. Source: CCC 2023

Action is required across all real economy sectors. The benefits outweigh the costs from both a societal and business perspective.

Evidence suggests that many businesses recognise the risks but also need to do more. For example, data collected in the 2022 S&P Global Corporate Sustainability Assessment, shows that just one in five companies across sectors has a plan to adapt to the physical impacts of climate change[17]. A study by the insurance broker Gallagher of more than 1,500 UK businesses found that two-thirds believed a 2ºC warming would have a significant impact on their businesses, yet more than half of all business leaders (53%) had not taken steps to mitigate against the risks, with a third failing to include climate change on their risk registers[18].

[17] S&P 2023. Adaptation planning is the next step for companies to prepare for climate risk. https://www.spglobal.com/esg/insights/adaptation-planning-is-the-next-step-for-companies-to-prepare-for-climate-risk
[18] Gallagher (April 2023) Half of UK businesses already impacted by climate change. https://www.ajg.com/uk/news-and-insights/2023/april/half-of-uk-businesses-already-impacted-by-climate-change/

All sectors of the economy will need to adapt and doing so will require some form of financing. The CCRA3 clearly demonstrates that action is required across all sectors, asset-types and actors, covering agriculture, nature, health, supply chains, transport, energy, telecoms, SMEs, water, buildings and distribution networks. This decade alone, annual investment needs in adaptation are estimated to be between £5 – 10 billion across both the public and private sector (Fig 3)[19]. The role of the public and private sector and amounts of finance needed from each will be different, as will the needs, barriers, market failures. Understanding these factors is an essential first step is designing effective policy to mobilise finance. Figure 5 provides a simple illustrative summary of adaptation interventions for a country like the UK, based on the 2nd National Adaptation Programme and CCRA3, that identifies key characteristics relevant to adaptation financing, including ownership and the nature of the financing need. The following conclusions emerge:

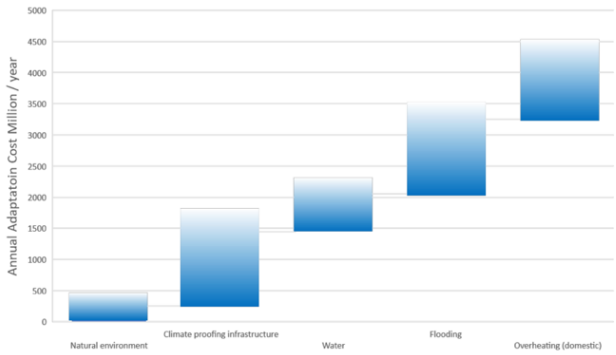


Figure 3: Indicative costs of adaptation for a selection of major CCRA3 risks. Watkiss et al. 2023

Both public and private investment in adaptation must scale-up

Greater public investment at both local, municipal and national levels in adaptation is essential to strengthen the resilience of the UK's critical national systems. Many priority areas for adaptation in the UK are public goods and will continue to be entirely or majorly publicly funded (Fig 4): public infrastructure (schools, telecoms, hospitals, roads), public services, early warning systems, local authority housing, environmental protection and tackling international risks and security. Mobilising private capital into such sectors to help spread costs over time, or structure risks is possible and can be direct (Box 1) or indirect through de-risking of investments, spending to crowd in finance, the issuance of gilts or use of PPPs, however ***unavoidably substantially more public investment will be needed***. Over one billion pounds of the Green Gilt Issuance in 2021–22 already financed adaptation in the UK[20]. Selecting appropriate modalities of mobilising private investment must strike a careful balance between social outcomes, resilience and securing sufficient returns to attract investors[21].

[19] Watkiss et al. (2023) The Costs of Adaptation, and the Economic Costs and Benefits of Adaptation in the UK. https://www.theccc.org.uk/wp-content/uploads/2023/01/The-Costs-of-Adaptation-and-the-Economic-Costs-and-Benefits-of-Adaptation-in-the-UK-Paul-Watkiss.pdf
[20] UK Green Financing Allocation Report. https://www.dmo.gov.uk/media/yxtnpt5l/pr260922.pdf
[21] Noting the challenges, e.g. Financial Times (29th March 2023) UK government looks at nationalising Thames Water as crisis deepens. https://www.ft.com/content/deaf19d6-8da1-4241-a1e6-2635535de88e

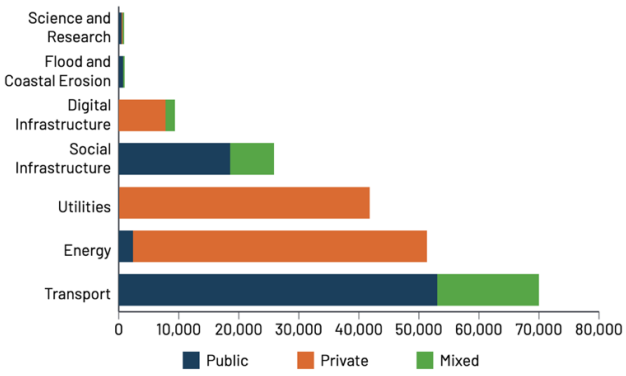


Figure 4: Funding Mix of Planned Investment in the Pipeline from 2021/22 to 2024/25 by Sector (£'m). Utilities here are e.g. water and waste water. Source: Infrastructure and Projects Authority 2021.

Readying the nation's schools, hospitals, infrastructure and nature environment to climate change are priority areas for public investment. While there is progress, and important initiatives, such as the Greater London Authority's Climate Resilient School programme[22] and *Climate Ready Clyde* in Glasgow City Region[23], public investment needs to scale up. For example, flooding in England in summer of 2007 resulted in widespread school closures that amounted to 400,000 lost pupil school days, at an estimated economic cost of £12m[24]. Over 2019 – 2020, there were 3,600 instances of overheating above 26ºC reported in NHS Trust buildings in England, causing concern about patient and staff safety and productivity[25]. More than ninety percent of schools in London report overheating as an issue. Health risks of overheating in buildings was identified by the CCRA3 as a priority risk, and this requires urgent public investment in schools, hospitals and local authority housing. The Climate Ready Clyde Adaptation Strategy and Action Plan alone identified an annual adaptation financing gap of £184 million per year for Glasgow City Region.

Some of the most costly adaptation investments from Figure 5, such as upgrading the UK's flood defences and sea walls to cope with sea level rise and increased flood intensity are likely to rest mainly with central government. In 2020, following major floods, then Chancellor Rishi Sunak set out plans to spend £5.2bn on flood defences between 2021 and 2027, supporting 2,000 new flood and coastal defence schemes by 2027. According to the Office of National Statistics, expenditure on flood and coastal erosion risk management (FCERM) to protect homes in England increased from £777 million in 2018 to £1.063 billion in 2021, current prices, of which 90% comes from central government[26]. These types of large-scale adaptation-specific projects tend to be those with higher upfront costs (Figure 5).

[22] GLA Climate Resilient Schools programme, https://www.london.gov.uk/programmes-strategies/environment-and-climate-change/climate-change/climate-adaptation/climate-resilient-schools
[23] 16 flagship actions laid out by Climate Ready Clyde (2021) Glasgow City Region Climate Adaptation Strategy and Action Plan 2020–2030: Choosing to flourish in our future climate http://climatereadyclyde.org.uk/adaptation-strategy-and-action-plan/. See Fankhauser et al. 2022 for additional case studies.
[24] https://www.arup.com/projects/climate-change-guidance-for-london-schools-and-early-years-settings
[25] Brooks K, Landeg O, Kovats S, et al. 2023 Heatwaves, hospitals and health system resilience in England: a qualitative assessment of frontline perspectives from the hot summer of 2019 BMJ Open 2023;13:e068298. doi: 10.1136/bmjopen-2022-068298 and references therein.
[26] Office of National Statistics: Investment in flood defences, UK: May 2023 https://www.ons.gov.uk/economy/economicoutputandproductivity/output/articles/investmentinflooddefencesuk/may2023#:~:text=Central%20government%20is%20the%20largest,billion%20in%202021%2C%20current%20prices & https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/221094/pb13896-flood-coatal-resilience-policy.pdf

	Actor/Sector	Type of Adaptation Investment	Characteristics of Adaptation Investment						CCRA 3 Priority Risk?
			Not adaptation specific (or negligible marginal cost)	Adaptation Specific, Likely low regrets	Integrate into new investments (low marginal cost)	Adapting/ retrofitting existing (low marginal cost)	Adapting/ retrofitting existing (medium to high marginal cost)	Potential new adaptation specific financing need with medium-to high cost	
Public Sector	Central Government	**National Public infrastructure (schools, hospitals, roads etc)**			**X**	**X**	**X**		**Heat and human health**
		Public services	X						
		National emergency services	X						
		Information services (e.g. early warning systems)	X						
		National capacity building initiatives		X					
		R&D investments		X					
		Climate-related defences, e.g. sea walls and flood protection			X	X	X	X	
		Environmental and nature protection schemes		X	X	X	X		
		UK Foreign Policy, Trade, Security and Development Assistance	X	X					
	Municipal and Local Government	**Locally financed public infrastructure and services**			**X**	**X**	**X**		
		Local authority housing			**X**	**X**	**X**		**Heat and human health**
		Support to vulnerable households and SMEs to help them to adapt		X				X	
		Local emergency services	X						
		Local capacity building and information services		X					
Public Private	Public Bank	**Public lending/blended finance (schools, energy, nature-based)**			**X**	**X**			
	Critical infrastructure systems and services	**Transport, water, energy, telecommunications (regulated sectors, costs may be passed onto consumers)**			**X**	**X**	**X**	**X**	**Failure of power system**
	Financial protection systems	PPPs like Flood Re	X	X				X	
		Private insurance (costs passed onto consumers)	X						
Private	Food, agriculture, fisheries, forestry	**Farmers (small scale to large commercial)**		**X**	**X**	**X**			**Crops, livestock, trees, soil health, carbon stores**
		Fisheries		X					
		Commercial farmers		X	X	X			
		Food production, processing and distribution		X					
		Retail		X					
	Business & Industry	**Retrofitting business premises and ensuring business continuity**		**X**	**X**	**X**	**X**		**Human health**
		Nationally critical supply chains		**X**		**X**			**Supply chains, overseas**
	Households	**Retrofitting private homes**		**X**	**X**	**X**	**X**		**Heat and human health**
	Land owners	**Land owners and private natural capital initiatives (e.g. PES)**		**X**	**X**	**X**			**Habitats, Carbon Stores**

Figure 5: Analysis of the characteristics of common adaptation interventions in the UK (in bold are types of investment directly linked with priority risks from CCRA3)

Box 1: Case study – Thames Tideway Green Bond Issuance

The Tideway project is a 25 kilometre sewer tunnel expected to be completed in 2025. The tunnel is designed to intercept overflows of raw sewage that discharge directly into the River Thames each year as London relies on a 150-year-old sewer system built for a population less than half its current size. The tunnel is expected to capture approximately 95 per cent of the overflow volume that currently enters the river in a typical year and reduce the number of individual overflow events at any controlled combined sewer overflow from over 50 down to four or fewer. As well as the key benefit of increased water quality, the tunnel also provides protection for users of the tidal Thames and infrastructure which will improve the resilience of the sewer network to climate change and population growth.

Tideway aims to deliver a wider legacy for London to boost the river economy, increase jobs, improve safety standards and drive down carbon emissions. A Legacy Plan detailed 54 commitments mapped to the Sustainable Development Goals at target level, with annual reporting including both positive and negative impacts. An evaluation of the social impact of the changes brought about by the Legacy programme was published in 2023.

The delivery model is underpinned by arrangements with different stakeholders that were key to make Tideway's risk profile similar to that of an established UK regulated water company. Tideway is a regulated utility company with inflation-linked revenue collected from Thames Water's wastewater customers. The company benefits from a bespoke regulatory regime until 2030 in many respects similar to the existing regulatory framework for the water sector and with additional, bespoke regulatory protections during construction to reflect specific considerations. During construction, the company also benefits from a support package provided by the UK Government covering certain exceptional risks. This delivery model with a supportive regulatory and contractual framework and stable revenue profile enabled the company to attract competitive private investment of £1.3 billion equity and £3 billion of third party debt. The company is privately owned by UK and European infrastructure investors and insurance companies representing over 3 million UK pension holders.

Tideway aligned its financing with the company's mission and has issued £2 billion of sustainable debt so far including 18 green bonds. Tideway became the largest corporate issuer of Green Bonds in sterling with £450 million of issuance in November 2017, doubling the size of the UK corporate green bond market. Tideway was a natural candidate to accelerate this scaling-up of the UK sustainable debt markets.

Source: Tideway https://tideway.london/ c/o Ines Faden, Tideway Group Treasurer 2018-2022

Scaling up the required investment in critical infrastructure systems will require action by both government and the private sector. The National Framework for Water Resources outlines that if no action is taken, between 2025 and 2050 around 3,435 million extra litres of water per day will be needed for public water supply, of which around half is related to increasing resilience to drought and tackling the impacts of climate change (and the remainder population growth and changes to water abstraction)[27]. Estimates from the National Infrastructure Commission suggest that investment of the order of £0.7bn per year will be needed to build resilience to a 1-in-500 year drought event accounting for both future climate change and population growth. ***The 2022 report of the Joint Committee on the National Security Strategy noted that critical energy and transport infrastructure – both important to the UK's transition to a net zero economy – is vulnerable to cascading physical risks from climate change.*** There is much to be done. Addressing these will require public policy to help reduce consumer demand and establish the right enabling regulatory environment to secure investment. Private investment has delivered major benefits for UK infrastructure. The Government supports this through established tools such as the UK Guarantees Scheme, Contract for Difference and the Regulated Asset Base model[28]. Over the past decade alone, over £200 billion has been invested in the water and energy sectors[29].

The challenges of mobilising finance for adaptation need attention, however to provide perspective, the annual costs of adaptation for infrastructure are a small portion of total UK infrastructure investment. An urgent priority therefore is to integrate climate resilience within 'business as usual' infrastructure investment. The UK's first National Infrastructure Strategy in 2020, laid out a £100 billion public investment commitment over the next three years, including projects from broadband to road networks[30]. The Infrastructure and Projects Authority (IPA) estimates that ***total infrastructure investment over the next 10 years, including private investment, will be nearly £650 billion[31] (Fig 6) – that is, 35 times larger than the adaptation costs estimated in CCRA3 for climate-proofing infrastructure***. Pension funds and insurers, for example, will be able to invest between £150 billion and £190 billion in infrastructure over the next ten years[32]. It is vital to ensure these investments in the UK's future critical systems are Climate Ready and this will require good policy, screening processes for climate risks in projects, as well as effective regimes for regulation and disclosure of adaptation plans, monitoring and evaluation.

[27] Meeting our future water needs: a national framework for water resources. Environment Agency 2020 https://www.gov.uk/government/publications/meeting-our-future-water-needs-a-national-framework-for-water-resources
[28] Infrastructure and Projects Authority (2021) Analysis of the National Infrastructure and Construction Pipeline. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1016759/Analysis_of_the_National_Infrastructure_and_Construction_Pipeline_2021.pdf
[29] *National Infrastructure Strategy 2020*
[30] *https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938539/NIS_Report_Web_Accessible.pdf*
[31] *IPA 2021 Analysis of the National Infrastructure and Construction Pipeline 2021. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1016759/Analysis_of_the_National_Infrastructure_and_Construction_Pipeline_2021.pdf*
[32] The Power of Pensions', Legal & General, June 2020

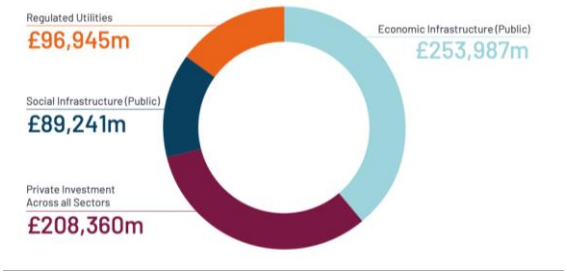


Figure 6: Estimated public and private investment in infrastructure from 2021/22 to 2030/31. IPA 2021

Private investment will need to play a considerable role in building a Climate Ready UK for businesses and households. Adaptation of UK nature and agriculture, households, corporates and SMEs will require private sector finance and many these investments are low regret – i.e. they deliver benefits today. Indeed, ***most of those risks identified as high priority in CCRA3 relate to asset types that are privately owned or operated in the UK, including supply chains, water use, agriculture and human health issues due to overheating in private homes and businesses*** *(Fig 2)*. Households, SMEs, farmers, retailers, corporates and private utilities providers will therefore have a key role to play in adaptation. The government needs to create the enabling environment for enhanced action and investment in adaptation and climate-resilient growth across these sectors, scales and stakeholders. The 2023 Climate Change Committee report suggested that based on available evidence it is plausible that investment needs for housing retrofits alone could be on the order of order of £1 billion per year this decade. However, ***importantly, in many cases of adaptation by households and businesses, the marginal (extra) costs are relatively small.*** New financing solutions will be beneficial to support farmers and commercial food, fisheries and agriculture, as well as SMEs and corporates (Figure 7). This can be ***significant opportunity for financial institutions to innovate in the support they provide to their clients.*** There are good examples of financial institutions stepping up to provide novel solutions to their clients to support them to adapt to climate impacts, including sustainability-linked bonds for investing in resilient buildings (Box 2) and water efficiency, including the BBVA Water Footprint Loan[33], as well as variable repayment loans to address income variability for smallholders[34]. Regulation can also play a role in ensuring financial innovations secure real resilience impact. Many banks are already providing green mortgages and loans for energy efficiency improvements (e.g. Rabobank Netherlands, Rabo Green Depo, a two year deposit account to finance energy-saving measures and interest-free energy savings loans for lower income households) and are beginning to actively explore how similar concepts could be applied to adaptation at household level, for example, products for water retention, green roofs or greening gardens[35]. In Delft, Bouwfonds, a subsidiary of Rabobank, develops buildings that take more account of extreme weather conditions than in conventional and existing buildings[36].

[33] BBVA Water Footprint Loan: https://www.bbvacib.com/insights/news/bbva-and-iren-sign-the-first-water-footprint-loan-in-italy/
[34] Adelphi (2019) Bottom-up Innovation for Adaptation Financing: https://adelphi.de/en/publications/bottom-up-innovation-for-adaptation-financing
[35] With thanks to Bouke de Vries at Rabobank for information on Rabobank activities. For more information on these activities and others by Rabobank see https://media.rabobank.com/m/4a9e775d00db23e7/original/Our-Impact-in-2022.pdf
[36] PoortMeesters development: https://www.bpdeurope.com/our-work/the-netherlands/poortmeesters-delft/

Box 2: Driving Climate Resilience in Real Estate with Sustainability-Linked Finance

Link REIT, a leading real estate investment trust in Hong Kong[37], has emerged as a major player in the sustainability-linked loan (SLL) market and has delivered several innovations in SLLs for adaptation. From 2020 to 2022, they issued seven SLLs amounting to USD 12.5 billion, with a syndicated group of banks, linking it to climate-focused performance indicators for enhancing both mitigation and resilience of retail and office properties in China's Greater Bay Area (Table 2).

Link REIT's strategy aims to protect their own investments from climate change, but also contribute more widely to societal adaptation through collaborations with policymakers and public financiers. In this way Link REIT harmonises its climate adaptation strategies with the requirements of capital providers and regional policies. Specifically, the SLLs are connected to resilience by using the Key Performance Indicator (KPI) of green building certification (Table 2)[38] and is directly tethered to Link's Environmental, Social and Governance (ESG) strategies and related targets, including the corporate adaptation strategy, which includes specific KPIs on adaptation and engagement (Table 2).

Table 2. Link REIT' sustainability-linked financing framework overview

Instruments	7 SLLs	Total issuance	12.5 billion USD
Market of issuance	Hong Kong	Date	2020-2022
Stakeholders	Syndicated group of banks: Bank of China, DBS Bank, Industrial and Commercial Bank of China, Oversea-Chinese Banking Corporation, Bank of America, Bank of Communications, CMB Wing Lung Bank and HSBC. Sustainability Advisor: HSBC Verifiers: HKQAA, S&P Global and Science Based Targets Initiative (SBTi)		
Financial structure	Credit facility that incorporates interest rate reductions linked to predetermined sustainability performance targets, which will allow Link to enjoy savings in borrowing. costs as it achieves these targets through its portfolio in Hong Kong and Mainland China.		
KPIs of SLF	**KPI 1. Engaging contractors: Green building certification coverage across the portfolio (%) – 100% by 2026** KPI 2. Tenant engagement: Percentage of green lease adoption in Hong Kong and Mainland China by 2027 – 50%. KPI 3. GHG emissions reduction: 25% reduction in carbon emissions intensity (Scope 1 & 2) across our portfolio by 2025/2026 (compared to 2018/2019 baseline). Net Zero carbon emissions (Scope 1 & 2) by 2035. Set SBTi approved net zero carbon emissions targets (Scope 1, 2 & 3) by 2024/2025. 100% renewable energy adoption across our portfolio by 2035		
KPIs of corporate adaptation strategy	KPI 1: Conduct climate risk assessments across our portfolio and develop corresponding climate resilience strategies. • Number of climate risk assessments conducted annually. • Percentage of portfolio assets assessed for climate risk. • Number of climate resilience strategies developed. • Percentage of portfolio assets covered by climate resilience strategies. KPI 2: Engage with investors and regional-level policymakers to develop comprehensive climate resilience strategies. • Number of investor engagements focused on climate resilience. • Number of regional-level policymakers engaged in climate resilience discussions. • Number of comprehensive climate resilience strategies developed in collaboration with investors and policymakers. • Number of partnerships established with investors and policymakers for climate resilience initiatives.		

[37] Data derived from: https://www.factset.com/
[38] GRESB Resilience Guide. https://www.gresb.com/wp-content/uploads/resources-2020-resilience-module-reference-guide.pdf

Sources: Environmental Finance (2023), Bloomberg (2023), Link REIT (2022).

Link REIT has already taken steps to tackle adaptation, including piloting tools and geospatial analytics to identify vulnerable assets and taking mitigation actions. For example, Table 3 presents three specific coastal threat scenarios used by Link REIT to assess the risks from storm surges and rising sea levels to their real estate assets in the GBA region. Link REIT then engages with investors and policymakers to develop partnerships and comprehensive climate resilience strategies. This example demonstrates how capital can be aligned with adaptation strategies through specific KPIs. In future, KPIs could be derived based upon vulnerabilities to storm surges and sea level rise and used to monitor the resilience of their portfolio in high-risk coastal areas.

Table 3. Link REIT's Three Low-regret Coastal Threat Scenarios for Modelling. Source: REIT (2022)

Storm Tide Scenario	Acute Risk	Timeline	Chronic Risk	Timeline
5m	Hit today by T-10 storm tides and overtopping waves	Present	• Medium to long term permanent submersion due to sea level rise with tides that "cannot be ruled out" as per 2021 IPCC-AR6's warnings. • • A storm like T-10 Mangkhut could become an annual event by 2050	Medium to long Term: 2050–2100
6m	Direct hit today by an "Unlucky Mangkhut" * – a T-10 Super Typhoon arriving at high tide bringing storm tides of 5+m			
8m	Hit by an "Unlucky Mangkhut" that coincides with sea level rise by 2050	Medium term: 2050	Longer term permanent submersion due to sea level rise with tides that "cannot be ruled out" as per 2021 IPCC-AR6's warnings.	Long term: 2100–2150

Source: José Reséndiz, Nicola Ranger and Olivier Mahul, based on forthcoming paper.

The benefits of investing early in adaptation today far outweigh the costs from both a societal and business perspective.

The Climate Change Risk Assessment's own analysis of adaptation costs and benefits concluded that the benefit-cost ratios typically range from 2:1 to 10:1 for the priority risks identified in CCRA3, and some are even higher. That is, for every £1 invested in adaptation could result in £2 to £10 in net economic benefits[39] (Fig). This result is consistent with similar studies, for example, by the World Bank[40], the OECD[41] and the European Environment Agency[42] and the Global Commission on Adaptation[43] and takes into account only the economic benefits of the intervention, rather than the full social co-benefits. Many of these investments bring immediate benefits, for example water efficiency, heatwave planning, information and training, and investing in reducing vulnerability of critical infrastructure today.

It is also clear that delaying investments in adaptation will increase the costs, particularly in areas like infrastructure where delay could commit (lock-in) large future impacts. For example, infrastructure built today will operate under a very different climate over its lifetime. If this is not accounted for in the design now, revenues will be lower, operating costs higher and assets depreciate far more quickly[44]. The same is true for buildings, homes and land-use change[45]. Conversely, there are many actions that can be taken now with very low cost, and approaches to reducing the upfront costs of adaptation will avoiding lock-in[46].

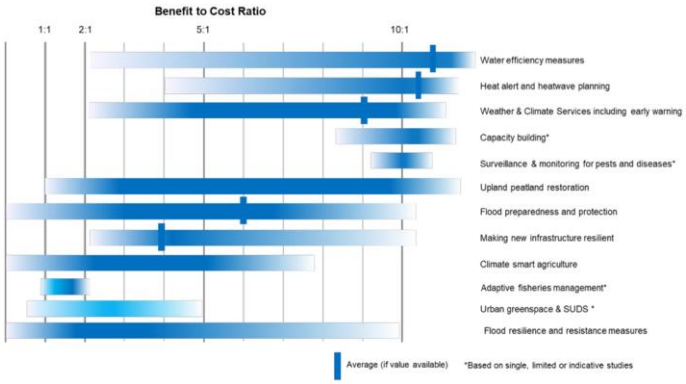


Figure 7: Figure shows the indicative benefit to cost ratios (BCR) and ranges for a number of adaptation measures. It is based on the evidence review undertaken in the CCRA3 Valuation study. Vertical bars show where an average BCR is available, either from multiple studies or reviews. It is stressed that BCRs of adaptation measures are highly site- and context-specific and there is future uncertainty about the scale of climate change: actual BCRs will depend on these factors. Watkiss and Brown (2021)

[39] *Paul Watkiss Associates (2021) Monetary Valuation of Risks and Opportunities in CCRA3. https://www.ukclimaterisk.org/wp-content/uploads/2021/06/Monetary-Valuation-of-Risks-and-Opportunities-in-CCRA3.pdf*
[40] *Hallegatte et al. 2019 Lifelines*
[41] *OECD 2015 Overview of costs and benefits of adaptation at the national and regional scale. https://doi.org/10.1787/9789264234611-6-en*
[42] *European Environment Agency 2023. Assessing the costs and benefits of climate change adaptation. https://www.eea.europa.eu/publications/assesing-the-costs-and-benefits-of*
[43] *Global Commission on Adaptation (2019) Adapt Now: A Global Call for Leadership on Climate Resilience:*
[44] *Coalition for Climate-Resilient Investment (2021) Physical Climate Risk Assessment Methodology: https://resilientinvestment.org/pcram/*
[45] *Fankhauser et al. 2013 An Independent National Adaptation Programme for England. https://www.lse.ac.uk/granthaminstitute/publication/an-independent-national-adaptation-programme-for-england/*
[46] *Ranger et al. 2010: Adaptation in the UK: a decision making process. https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2014/03/PB-Ranger-adaptation-UK.pdf*

Box 3: Adaptation sectors can outperform the market: initial analysis by Impax Asset Management

Adapting to a changing climate is going to require a massive investment— far more than we, as a society, have committed to date. Investment opportunities across adaptation and adaptation sub-sectors are still being developed and the investment case of positive returns is still emerging. A new analysis by Impax Asset Management indicates that investing in adaptation can achieve positive return, in addition to reducing risks and future costs.

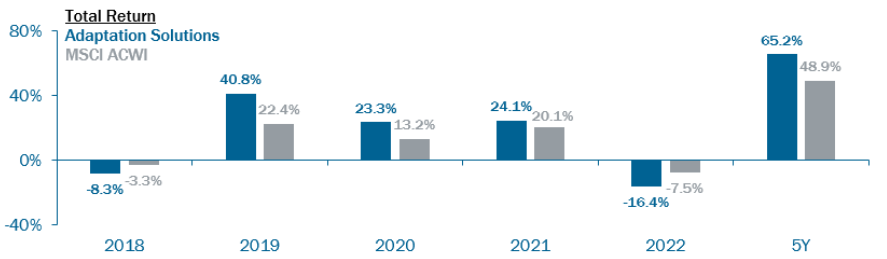
Firstly, it is important to define *what is adaptation* from an investor perspective. Using a similar approach that applied to UK government spending in Fankhauser et al. (2023), Impax has developed a climate taxonomy which defines *'adaptation solutions'* as sectors and activities which are:

I. Directly reducing the immediate physical impacts of climate change, including for example, improving energy systems resilience, water supply resilience, resilient buildings and sustainable agriculture

II. Providing new business models and/or solutions arising from climate change, such as the need for healthcare solutions to address increased spread of vector-borne diseases, the need for improved data for business continuity solutions, as well as environmental products and services to forecast and mitigate financial losses caused by extreme weather events.

The table below shows the total return figures for both of the adaptation solutions categories mentioned above and compares these with an analogous total return for the mitigation solutions in the Impax climate taxonomy and a proxy for the market (the MSCI ACWI index). The absolute total returns from adaptation solutions (light green highlighted row) were positive on a historical 5-year basis, and negative in two of the past 5 calendar years. It is worth noting that both mitigation and adaptation solutions had positive returns over the past five years and that past performance does not predict future returns.

Absolute Total Return	2018	2019	2020	2021	2022	5Y
Climate Portfolio	**-5.8%**	**31.6%**	**31.8%**	**18.0%**	**-15.0%**	**63.9%**
Adaptation Solutions	-8.3%	40.8%	23.3%	24.1%	-16.4%	65.2%
Mitigation Solutions	-5.3%	31.1%	35.9%	17.2%	-15.7%	66.8%
MSCI ACWI	**-3.3%**	**22.4%**	**13.2%**	**20.1%**	**-7.5%**	**48.9%**
Relative Total Return	**2018**	**2019**	**2020**	**2021**	**2022**	**5Y**
Climate Portfolio	**-2.6%**	**9.2%**	**18.6%**	**-2.1%**	**-7.5%**	**14.9%**
Adaptation Solutions	-5.0%	18.4%	10.0%	4.0%	-8.9%	16.3%
Mitigation Solutions	-2.0%	8.7%	22.6%	-2.9%	-8.1%	17.9%



These **initial results showed that the total return from a broad definition of adaptation solutions was 16.3% higher than for the MSCI ACWI over the period (dark green highlighted), only slightly less than mitigation (17.9%).** The figures suggest the adaptation solutions had both a high upside

market capture (stronger returns when markets are up) and a high downside market capture (lower return when markets are down) over the past five years.

Figures refer to the past five years and past performance is not a reliable indicator of future results. It is also worth noting that three of the five years included in this analysis were very unusual years, from a financial perspective, due to the pandemic and the war in Ukraine. These initial results are promising with positive returns against the market over the last 5 years from investment in adaptation sectors. Larger data sets are needed across the industry to further test this analysis and the factors that underly any outperformance of adaptation investment. It will also be important to test this result over longer timescales as well, and any out-performance over not only five, but ten years. From this initial analysis investments in assets aligned with climate resilient development have outperformed the market over a five-year period. Of course, it is important to ensure these individual assets' adaptation plans are based on the assessment of physical climate risks and appropriately disclosed, in line with the Task Force on Climate-related Financial Disclosures guidance for all assets.

Methodology Notes: Bloomberg, 31/12/2017 – 30/12/2022. Data shown in GBP and based on bottom-up (aggregate of daily contributed return) total return figures for the relevant sectors of the Impax Climate composite portfolio, and the MSCI All Country World Index (net). Since 1999, Impax Asset Management has developed and applied taxonomies to identify investment opportunities in the transition to a more sustainable economy. The analysis set out above is based on the categories in the Climate Taxonomy used in developing the actively managed Impax Climate composite portfolio. This taxonomy is split into three thematic sectors; "Adaptation Primary Solutions", "Adaptation Secondary Solutions" and "Mitigation Solutions", the former two sectors representing about 25% of the composite over the period observed. "Adaptation Solutions" in the tables above refers to an aggregate of the "Adaptation Primary Solutions" and "Adaptation Secondary Solutions" thematic sectors of taxonomy. Securities are not equally weighted across the portfolio.

Source: Impax Asset Management

Resilience is a commercial imperative for all businesses today and adaptation is a major investment opportunity, domestically and internationally.

From a business perspective, the commercial case for investing in adaptation becoming clearer and this is supported by increasing requirements around disclosures and adaptation reporting. There is nothing new about adaptation as an asset class and managing risks is a requirement for any asset owner or manager. Framed as an asset class, adaptation is resilient infrastructure, sustainable agriculture, data and information services, insurance, water, healthcare and real-estate. For example, infrastructure is becoming an increasingly important asset class, with returns of 14.6 percent per annum over the past 10 years based on the EDHECinfra index and, based on data from Refinitiv, less volatility over the long-term[47]. ***New analysis by Impax Asset Management, found that adaptation sectors as an asset-***

[47] Refinitiv Investment Insights, February 2021 Does infrastructure as an asset class yield long-term returns? https://www.refinitiv.com/perspectives/market-insights/does-infrastructure-as-an-asset-class-yield-long-term-returns

class had a total return cumulatively 16.3% higher than for the MSCI ACWI over a five year period, and only slightly less than mitigation (17.9%). This suggests that an overly simplified narrative that adaptation does not yield private sector returns is *false*. It shows that in discussing the financial barriers it is critical to differentiate between *new large-scale adaptation projects* (such as more costly retrofits to existing public infrastructure, which can have higher upfront costs) and provision of adaptation goods and services or where adaptation is integrated within new builds or existing activities (where 'extra' costs are null or minimal). The analysis by Impax Asset Management demonstrates that an investment portfolio aligned with climate resilient development can bring returns, albeit it is critical to ensure that risks are appropriately measured, managed and disclosed.

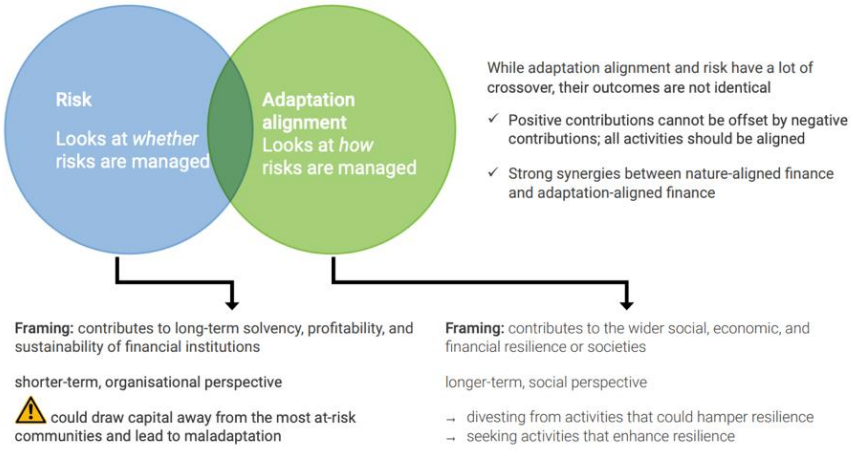


Figure 8: Graphic summarising the differences between risk management and adaptation alignment for financial institutions from Mullan and Ranger (2021). Source: UNEP FI (2022)

There is growing investor demand for projects with positive outcomes for adaptation and resilience[48]. From a business or investor perspective, aligning finance with climate resilience means more than just managing risks. Mullan and Ranger (2022) proposed an operational framework for financial institutions to ***align finance and investment with climate resilient development*** (Figure 8), that includes physical climate risk management as a foundation, but builds upon this to consider the alignment of a portfolio or asset with broader national priorities for adaptation, identifying adaptation opportunities and ensuring do no significant harm. This is consistent with the approach taken by the EU taxonomy, and learns from analogous frameworks of the World Bank and European Bank for Reconstruction and Development as well as Climate Bonds Initiative, and should also be reflected in core standards and regulations around private investment. UNEP FI (2022) further built upon the framework by Ranger and Mullan and proposed potential indicators for monitoring and reporting (Figure 10). ***Preliminary analysis***

[48] See for example. IIGCC (2022) Working toward a climate resilience investment framework. https://www.iigcc.org/download/working-towards-a-climate-resilience-investment-framework-2/?wpdmdl=6394&refresh=649d13eac57b31688015850

suggests that over 60% of FTSE 350 companies (GBP1.6 trillion) are in activities with potentially a non-negligible influence on UK and global climate resilience (Box 4).

Preliminary evidence suggests that, globally, finance and investment may not be aligned with societal resilience goals. Finance flows, both public and private, have significant impacts on climate resilience not just in the UK but globally. Where and how financial institutions lend or invest can steer the development of economies and influence resilience at local, national and global scales. The scale of these flows is many orders of magnitude larger than adaptation finance. These influences can be positive, neutral or negative depending on how climate-related risks are accounted for in decisions. For example, total infrastructure investment globally stands at around USD 2.7 trillion each year[49]; almost 60 times larger than all earmarked climate finance for adaptation. These investments will shape the structure and resilience of our economies for decades; yet, in many parts of the world, buildings and infrastructure are still not built to minimum standards[50], potentially undermining local climate resilience. Financial flows related to global agriculture – which can have major impacts on resilience locally and globally through its relationships with land-use change, ecosystems, pollutants, water resources, rural income levels, commodity prices and trade - are even larger at over USD 5 trillion[51]. We have little way of knowing right now to what extent these financial flows support or are in opposition to adaptation needs globally and in the UK. Whilst some governments are beginning to track finance and investment flows for adaptation (e.g. France), there is currently no standard framework to identify or track how they are positively or negatively impacting resilience outcomes, so we have limited information from which to assess the issue and act.

There is clear evidence that physical climate risks are not fully priced into financial markets and are underestimated by financial institutions. According to the TCFD, as of 2022, only around 20% of asset managers and 35% of asset owners are reporting on their physical climate risks. The 2023 reports of the Climate Financial Risk Forum (CFRF), a public-private collaboration forum convened by the Bank of England (PRA and FCA), highlighted the technical challenges in estimating physical climate risks and also identified adaptation plans as a key missing data point that limited efforts to manage the financial risks of climate change in the UK and identify solutions for clients[52]. The fact that physical risks are underpriced in markets means that the economic incentives for investment in adaptation are too weak and not commensurate with the risks. Yet at least one survey indicates that financial professionals, regulators and economists see climate physical risk as the top risk over the next 30 years, and most of those surveyed believe that markets are underestimating those risks now.[53] For government, it also means there is very little information on the alignment of private finance with adaptation goals and the state of preparedness of firms in the UK to climate change.

[49] Mirabile et al. 2017
[50] GCA, 2020
[51] https://blogs.worldbank.org/voices/do-costs-global-food-system-outweigh-its-monetary-value
[52] Climate Financial Risk Forum. See Session 3 guidance materials of the Scenario Analysis working group. https://www.bankofengland.co.uk/climate-change/climate-financial-risk-forum
[53] Egemen Eren, Floortje Merten and Niek Verhoeven (2022) "Pricing of climate risks in financial markets: a summary of the literature," Bank for International Settlements BIS Papers No. 130, December 2022. Pricing of climate risks in financial markets: a summary of the literature (bis.org)

Measuring private sector, whole economy alignment to climate resilience goals, acting upon this and disclosing that information where appropriate, could yield significant benefits for society as well as FIs:

- Enabling investors and lenders to assess the position of companies and portfolios in relation to adaptation and resilience goals at global, national and local levels.
- Increasing FI ability to effectively allocate capital in ways that support resilience and adaptation goals (scope 3 resilience, see figure 9 and Box 4), as well as manage their own risks and opportunities (scope 1 and 2).
- Derive value (reputational, commercial positioning, cost of capital) through increasing alignment.
- Incentives for physical risk management across the private sector, including risk-based pricing.
- Along with the efforts to resolve wider barriers to adaptation, the measurement and disclosure of climate resilience alignment could, as such, drive more financing into climate resilience aligned activities and away from activities that undermine resilience and lead to maladaptation.

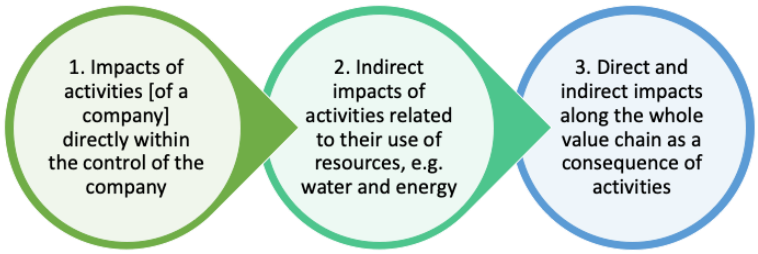


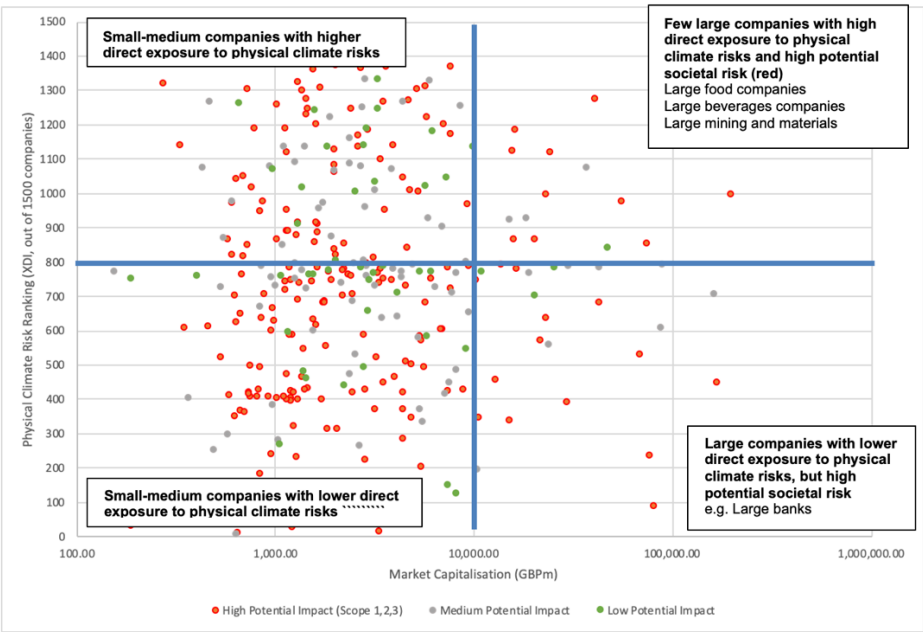
Figure 9: Proposed 'scopes' of risk exposure and resilience impact of an asset or portfolio from a business and investor perspective including whole value chain resilience impacts, analogous to greenhouse gas emissions scopes.

Box 4: Measuring the alignment of FTSE350 companies with climate resilient development

Taking the FTSE350 index companies as an example, preliminary research suggests that almost 45% of those companies - GBP1.5 trillion in market capitalization – are in sectors that have potential to have a direct impact on wider societal resilience, such as agriculture, food and beverages (the latter through its water footprint), construction, real-estate, chemicals and insurance (figure below). Most of these companies have a global footprint, so the potential impact is large. A challenge is that there is no one metric or framework currently to measure and compare the resilience impact of such firms; which makes measuring the alignment of finance more difficult. Ranger and Mullan (2022) outline a series of simple frameworks, including a conceptual approach for measuring societal resilience impacts equivalent to 'scope 1' and 'scope 2' equivalent to emissions, that is *activities that generate societal impacts that are directly (1) or indirectly (2) within the control of the company and its use of resources, such as energy and water* (Fig 9). As such, looking at the societal resilience implications across the whole value chain is defined as the *'scope 3'* and would now include *'financed resilience impacts'* from

banks and investors. Including 'scope 3' would mean that **over 60% of FTSE 350 companies (GBP1.6 trillion) are in activities with potentially a non-negligible influence on global resilience.** Scaling up from the 350 firms to more than 40,000 (USD 80 trillion) listed companies globally, the potential for impact and the potential opportunities through climate resilience aligned finance are massive.

Several FTSE 350 companies fall within the quadrant with large size (market capitalization), high direct physical climate risk and high potential societal impact (figure below). All are large food, beverages, or natural resources companies. Such firms could be defined as having a high potential *'systemic importance for societal resilience*' (SISR). Such a metric, if quantified and comparable across companies, would be useful as a tool to inform investors and governments as part of a climate disclosure framework. International companies can have a large impact on societal resilience outcomes globally both directly and indirectly: directly, through their supply chains (e.g. agriculture, natural resources) and indirectly (employment, trade, macroeconomic conditions). If such firms committed to align activities with climate resilience goals, this could have a meaningful positive impact on societal resilience and adaptation both in the UK and internationally.



Source: Ranger and Mullan (2022)

Several institutions are now exploring the development of approaches to align finance and investment with climate resilience. In 2023, the UN Environment Programme Finance Initiative (UNEP FI) established a working group to advance the development and implementation of frameworks with banks through the Principles of Responsible Banking; the outcomes of this collaboration are due in late 2023. Developing approaches have also been integrated within the considerations of the Transition Plan Taskforce workstream on Adaptation Plans. This complements work by the Institutional Investors Group on Climate Change (IIGCC) with investors[54], and new work as part of the Climate Financial Risk Forum Working Group on

[54] IIGCC Adaptation and Resilience Project Group, https://www.iigcc.org/resource/adaptation-and-resilience-project-group/

Adaptation, co-chaired by the Green Finance Institute and Impax Asset Management. Such frameworks, developed by industry, provide an opportunity for governments work more closely with financial institutions to mobilise investment.

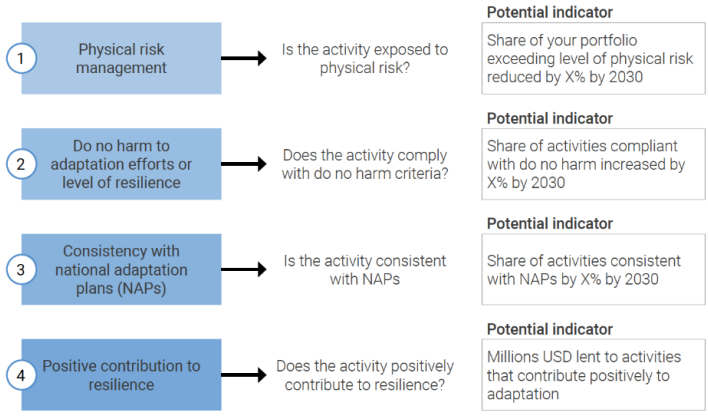


Figure 10: Approach to achieving positive adaptation alignment (Mullan and Ranger, 2021) with potential indicators (UNEP FI 2022). Source: UNEP FI (2022).

Climate Ready, net zero and nature goals are interdependent and interlinked. Reflecting this across all government policies is essential and a win-win.

Opportunities can be captured through taking an integrated approach to mitigation, adaptation and nature in both policy and investment. Today, government (and private sector) policies largely treat mitigation, adaptation and nature in isolation and the added costs and missed opportunities and risks of this are becoming evident. For example, in 2022, carbon released by US forests burnt in wildfires wiped out most of the buffer in the Californian carbon offset trading system; an example of a nature-based mitigation solution that did not account for physical climate risks and which, itself, could have created a major market disruption[55]. A further example is for critical infrastructure. The Joint Committee on the National Security Strategy noted the lack of resilience of the UK's critical energy and transport infrastructure. Further major investments in restructuring our energy and transport infrastructure to decarbonise could require costly retrofits or fail to perform over their lifetimes if the government does not integrate adaptation now. Investing in green buildings without considering adaptation similarly misses opportunities and risks retaining their value; if designed well, energy efficiency investments such as insulation can help mitigate risks of extreme heat and protect people as well as reduce cooling needs; action is needed now to integrate adaptation into all policies.

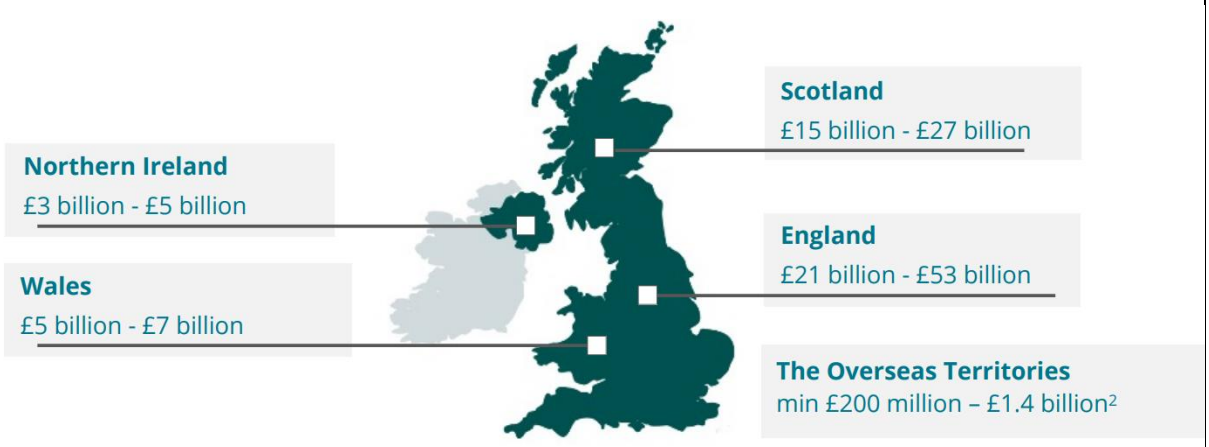
Policies and spending that reflect interlinkages between adaptation and nature recovery bring significant win-wins. Nature-based solutions such as urban green spaces and green buildings can be a key adaptation measure for heat and air pollution risks in cities as well as

[55] https://www.ft.com/content/d54d5526-6f56-4c01-8207-7fa7e532fa09

enhancing biodiversity, and nature-based solutions can also enhance flood management and soil quality[56]. It is of course important to assess and manage any trade-offs, which further emphasises the need to take such an integrated approach to policy and investment.

Box 5: Finance for nature: GFI Hive and Local Investment in Natural Capital (LINC) programme

An estimated £44 billion to £97 billion in additional financing is needed to achieve the UK's key nature goals by 2030. The Green Finance Institute's (GFI) *Finance Gap for UK Nature* report outlines the gap between required spending and committed spending associated with the delivery of nature-related outcomes across England, Wales, Scotland, Northern Ireland and the UK's Overseas Territories over the next 10, 20 and 30 years. The largest gap regionally lies within England (£21 - £53 billion over 10 years). Having identified the scale of investment needed, and where it is needed, the GFI's Nature Programme (*GFI Hive)* is now focused on unlocking barriers to the mobilisation of private finance into nature-positive projects and businesses right across the UK. The GFI Hive identifies barriers and co-designs solutions to private sector investment in nature working with the finance sector, government, business and environmental stakeholders; and acts as a knowledge sharing hub for private investment and finance for nature and nature-based solutions.



The 2023 Green Finance Strategy (GFS2023) set out how the government will encourage green finance for nature-based solutions such as tree planting and peatland restoration and support farmers to access new private sector revenue streams whilst protecting our natural environment. The government has set a target to raise at least £500 million in private finance to support nature's recovery every year by 2027 in England, rising to more than £1 billion per year by 2030. Investing in nature recovery is an important part of building the resilience of the UK to climate change as well as protecting biodiversity. Several policy measures to mobilise finance for nature were announced in March 2023, linked to the GFS2023, and included the Local Investment in Natural Capital (LINC) programme.

In March 2023, Cornwall Council was one of four local authorities across the country to receive funding through the Department for Environment, Food & Rural Affairs' Local Investment in Natural Capital (LINC) programme, alongside Northumberland, Cumberland, and Westmoreland & Furness, West Midlands Combined Authority, and York and North Yorkshire. This two-year programme will be

[56] https://www.naturebasedsolutionsinitiative.org/news/science-paper-harnessing-the-potential-of-nature-based-solutions-for-mitigating-and-adapting-to-climate-change/

delivered in partnership with the Environment Agency to test ways to attract investment into local priorities for nature and climate such as creating and restoring habitats, capturing carbon and improving access to nature. Initial funding will be used to develop a local investment approach, analysing project proposals, offering support to partners, farmers and landowners in developing viable proposals and coordinating support to get nature recovery projects 'investment ready'.

Sources: Green Finance Institute, gov.uk and Cornwall Council[57]

PART 2: A CLIMATE READY ECONOMY & FINANCIAL SECTOR

Mobilising finance for adaptation is as much (or more) about good policy as it is about finance. Policy is needed now to address market failures and set the right enabling environment for finance to flow, in the same way it has done for net zero. It is time for learn from the mitigation playbook.

Mobilising finance for adaptation is as much (or more) about good policy as it is finance. A central argument of this report, contrary to some other work on this topic, is that finance is not a barrier to adaptation but an enabler to be unleashed through good policy. Adaptation action and investment is not happening at scale today because the policy and regulatory environment is not in place to enable it to do so. As suggested in the previous section, there is evidence that ***finance and investment may not be aligned with resilience goals today*** and this could be pushing the UK economy in the wrong direction, hence policy intervention is justified.

As with climate mitigation, key market failures need to be addressed both on the demand side and the supply side. This includes for example, unlocking the demand side: households, SMEs and corporates often assume adaptation is the role of Government, and lack information and clarity on risk ownership and these (plus others[58]) create barriers to adaptation that can be seen in the lack of climate readiness today. As illustrated by Figure 5, only in a few cases is finance amongst the main barriers, for example costs of retrofitting homes and infrastructure. This points to the need for adaptation policy design to assess the barriers to action and take an integrated approach to addressing the market failures, keeping societal resilience as a central goal. This will also allow government to more strategically deploy public finance where this can be most effective to catalyse adaptation.

[57] https://www.greenfinanceinstitute.co.uk/gfihive/about-us/ and https://www.gov.uk/government/news/green-finance-boost-for-nature-in-uk

[58] Others include standard issues of risk perception for extreme weather events for example, or upfront costs of retrofitting homes versus long-run benefits, issues in the pricing of insurance that mean it fails to reflect risk and adaptation

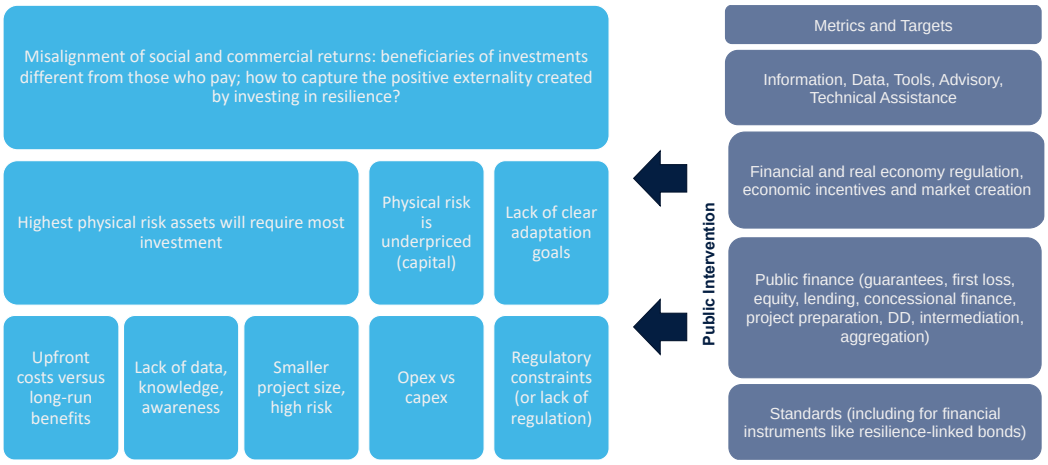


Figure 11: Summary of common barriers to action on adaptation. Noting barriers differ significant between different types of adaptation, asset classes and actors.

To mobilise action and finance for adaptation requires coherent action from government, employing the full policy and public finance toolbox. Mobilising finance requires action by government well beyond just financial regulatory levers; which alone arguably will be ineffective in catalysing the transformative action needed and indeed could lead to perverse outcomes that could undermine societal resilience, through for example incentivising financial institutions to withdraw finance from vulnerable communities or to prioritise short-term commercial returns related to adaptation over the required long-term investments in societal resilience. The balance between different fiscal, economic, monetary and policy levers is essential to balance efficiency, capital mobilising and social outcomes, as well as to ensure that safeguards are employed.

This report proposes a simple two-part operational diagnostic framework to visualise the interconnections between different policies and public interventions in steering finance towards a desired national goal of a UK that is resilient and adapted to climate change. Figures 12 and 13 visualise, in simple terms, how different areas of government policy and spending can work together to help catalyse action by financial institutions and the real-economy toward the goal of building a climate resilient economy. This includes, for example: fiscal, economic and monetary policies to provide public goods like data, blended finance and capability building, and create incentives for adaptation; alongside economic and environmental regulation to hard-code in resilience and environmental protection in critical areas; financial and corporate regulation to encourage physical risk management and ensure sufficient information is disclosed by corporates to guide investment into areas aligned with climate resilience. What is evident from Figures 12 and 13, is that several of the key government levers are missing from what is observed in practice. Action is happening in some areas, for example the work by the Bank of England to encourage risk management, but not in others, for example, provision of public goods, adoption of market frameworks and integrating resilience into real-economy regulatory bodies. An incoherent approach can lead to inaction, but also asymmetric and misaligned action across the economy that can add to costs and create risks. This is further discussed in the subsequent sections and specific recommendations made. We propose that government develop and adopt such operational diagnostic tools in their design of policy.

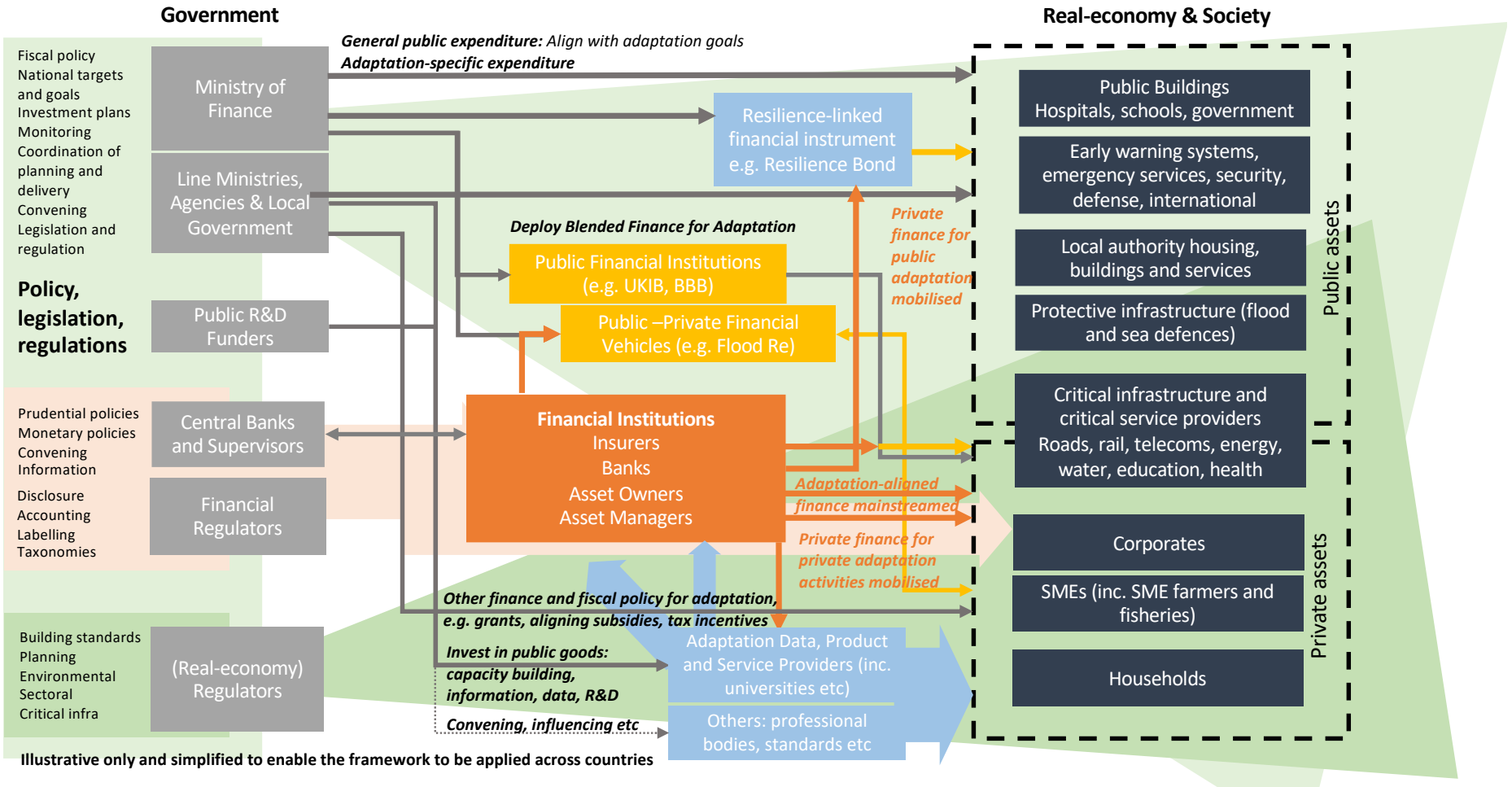


Figure 12: Illustration of the main channels through which government policy can support the mobilisation of finance and investment for adaptation in the UK, demonstrating the diverse levers that can be deployed across economic and environmental regulation, fiscal policies including public spending, financial and monetary policy, and provision of public goods. Where one or more is missing where policies are misaligned, this can reduce the potential for action.

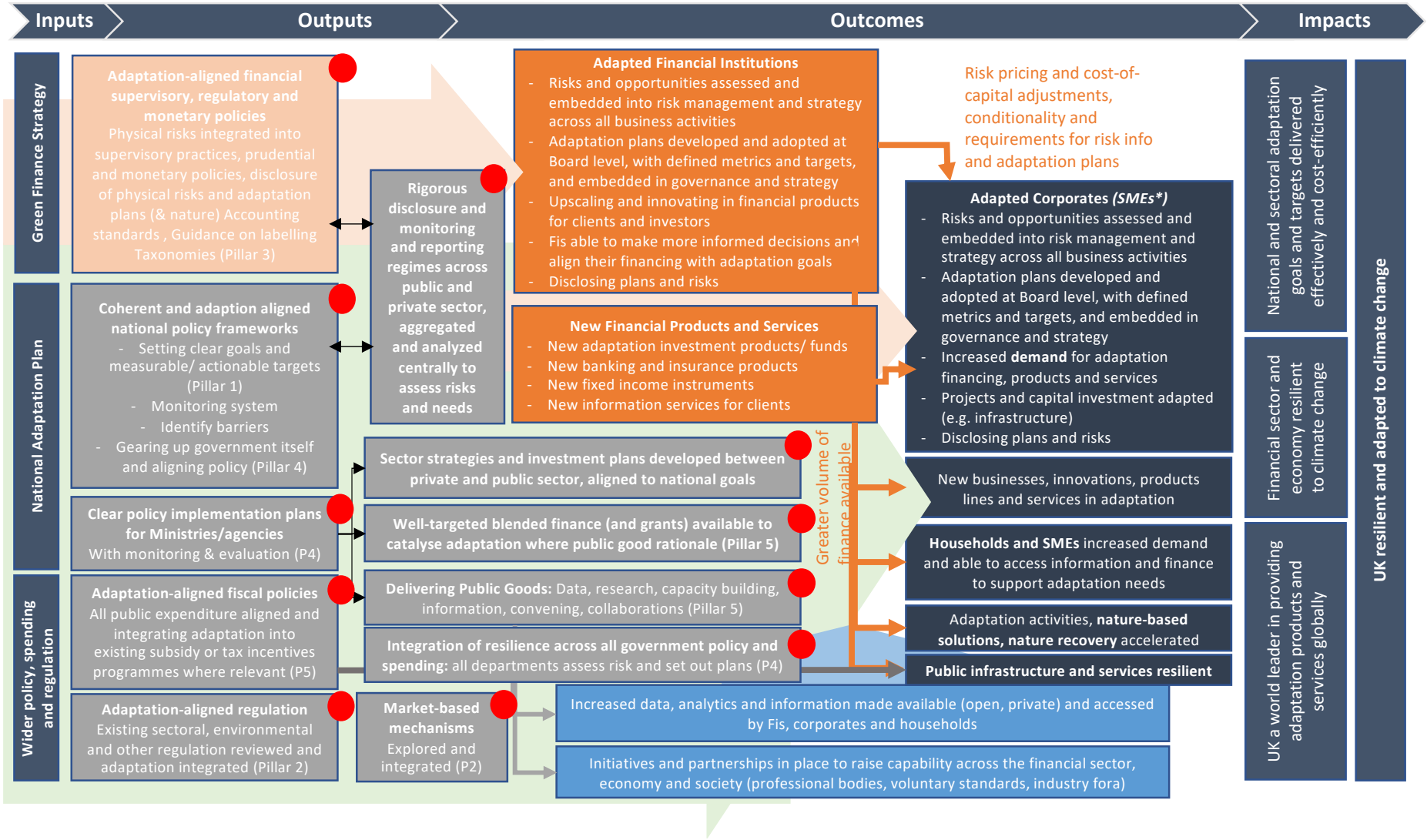


Figure 13: Theory of change for mobilising finance and investment toward a Climate Ready UK. Red/amber circles indicate where there are gaps in UK government action based on analysis of the 2023 Green Finance Strategy, the 2023 Progress Report of the Climate Change Committee, the 2nd National Adaptation Programme report and other relevant policy documents. Pillars (or 'P') refer to pillars proposed in this report.

The UK's 2023 Green Finance Strategy (GFS2023) made clear the intention of the government to take action to prepare for the physical impacts of the changing climate, seek to align financial flows with a climate resilient economy and increase investment in adaptation (Box 6). The NAP3 (England) and adaptation programmes for Scotland, Wales and Northern Ireland provide an opportunity to complement this ambition with concrete actions and an urgency consistent with the scale of the risks to the UK**.**

Box 6: Adaptation commitments of the 2023 Green Finance Strategy

- Build a launchpad for private and public collaboration over next 5 years to overcome barriers to investment in adaptation and assist in the creation of new markets. Announce approach alongside adaptation finance deliverables and action plan by end 2024.
- In its second phase of work, the TPT will consider in more detail how nature's recovery, climate adaptation and social impacts can be incorporated into transition plans.
- Work with industry partners to improve, and make more efficient for business, the approach to climate resilience assessment and disclosure through the development of adaptation metrics and guidance. This will facilitate a more structured, quantitative and consistent approach to the assessment and management of physical climate risks.
- Ensure that the government's future climate-related disclosure guidance includes sufficient information and detail on physical climate risk to support organisations in disclosing and mitigating this risk.
- Champion the development of adaptation metrics within the IFRS Sustainability Disclosure Standards.
- Scope what support businesses and the finance sector needs, for example guidance, training, facilitating collaboration and standardising data sets, and anticipate developing partnerships with the private sector on delivery. Announce our approach alongside our adaptation finance deliverables and action plan by the end of 2024.
- With the CCC, scoping research requirements in adaptation investment needs. This will improve the evidence base, and findings will be published in the fourth Climate Change Risk Assessment (CCRA4), due for publication in 2027.
- Deliver two research projects to explore how to monetise the benefits of adaptation to repay private investment (both related to flood)

All of the actions outlined in the 2023 Green Finance Strategy are welcome and needed. Yet, five conclusions are clear from an analysis of this strategy (Annex 1) in comparison to parallel commitments made on nature and net zero and the diagnostic framework of this report:

1. commitments on adaptation are substantially weaker than for nature and net zero;
2. the strategy included more on international action rather than domestic;
3. lack of concrete actions, milestones and plans;
4. no financial commitments
5. lack of urgency; delivery dates in the range of end of 2024 to 2027

The 3rd National Adaptation Programme and other UK adaptation programmes can go further, delivering 'easy wins' with demonstrable impact at minimal cost, including scaling up investments in public goods, such as data and research, providing a clear vision and committing to establish a dedicated task force in 2023 to take forward the actions proposed in the Strategy. Other policy announcements planned, such as the potential updates to the Adaptation Reporting Power, provide similarly important moments.

The UK Government needs to set a clear, ambitious vision and plans for adaptation, equivalent to net zero and nature recovery goals.

Pillar 1: Setting a clear, ambitious vision and strategy for adaptation, equivalent to net zero and nature recovery

To set the direction of the real economy and financial institutions and provide the necessary certainty and clarity to mobilise action, two recommendations are made to the UK Government:

⇒ **Recommendation 1: Commit to make the country resilient to climate change by 2030 and outline specific and costed goals and delivery plans for each sector by 2025, and envisaged public/private sector roles.** Unlike for nature and net zero, the 2023 Green Finance Strategy gave no targets or goals for adaptation. Setting clear and measurable goals, and the actions to deliver them, is an essential first step in mobilising action and investment. Such goals provide the private sector with a clear direction of change and enable them to align their plans and investment with this direction. Without this, private institutions lack the clarity and certainty required to make new investments in capital, research and product design. The Netherlands provides an example of a country with clear goals and legal framework[59]. As part of the NAP3, the government must set out its vision for a well-adapted England, commit to make the country resilient to climate change by 2030 (not 2050 as in previous policies). This ambition would be consistent with the UK's call at COP26[60].

⇒ **Recommendation 2: Commit to mobilise £1bn per year of private finance into UK adaptation by 2030.** The UK 2023 Green Finance Strategy reaffirmed the 2021 CSR Spending Review goal to mobilise more than £1 billion per year of private finance into nature's recovery in England by 2030. A similar goal could be set for adaptation. Setting a goal creates an important signal to the private sector and motivates concrete actions and commitments both on the side of government and the private sector to deliver it. The CCC (2023) suggested that across all climate risks facing the UK, the necessary additional investment in climate resilience required this decade could be in excess of £10 billion per year this decade. We recommend that as part of the National Adaptation

[59] https://climate-adapt.eea.europa.eu/en/countries-regions/countries/netherlands
[60] https://www.gov.uk/government/news/uk-calls-for-world-to-be-climate-resilient-by-2030-as-cop26-delivers-billions-for-most-vulnerable

Programme and the next CSR, the UK set an initial goal to mobilise £1 billion per year of private finance into adaptation, to match the commitment to nature recovery, and put in place methodologies to measure and report progress against this goal over time.

Government should lead in defining resilience targets for each sector and outlining clear plans to accelerate action and investment and align regulatory frameworks. To do this, government should work closely with corporates and the financial sector to outline targets and investment plans, power-up markets, unlock barriers and mobilise investment.

Pillar 2: Accelerating sectoral action and investment

To mobilise finance and action, the private sector needs a clear roadmap and targets for adaptation at sector level, and clarity on expectations of the private sector and the government. As part of the NAP3, and building upon the 2023 GFS commitment to develop a *'launchpad for private and public collaboration',* the government should work closely with the private sector and civil society to define such roadmaps, and associated investment plans, aligned with national adaptation goal. This process can also identify priority needs from government and regulators to help mobilise action and investment.

⇒ **Recommendation 3: Establish public-private task forces by the end of 2023 to define adaptation roadmaps for sectors and clear investment plans aligned with national goals. To enable timely action, the government should respond with clear commitments to adaptation finance by 2025**. Progress has been mixed across sectors, with areas like water already having clear targets and plans[61] and progress in specific areas, such as resilience of the power grid to flood[62]. To fill the gaps, we recommend that the government immediately establishes dedicated task forces by the end of 2023 to define sectoral adaptation roadmaps and clear, concrete investment plans, co-led by senior officials and senior private sector representatives. This can follow the approach taken by the Net Zero Council established this year. Plans should specify targets and outline sector-specific delivery plans and associated costs, and the envisaged role of the private sector in financing them and the needs from the public sector. This should include a 'top 10' investments for each sector to guide banks and investors to provide a national pipeline of investment. Specifically, each task force would deliver: (i) the roadmap for adaptation with clear milestones, costs and measurable targets against which progress can be monitored over time by independent or public bodies; (ii) a clear investment plan for the sector; (iii) recommendations priorities for public policy and expenditure to catalyse action and investment, including via blended finance or spending on public goods, and assess appropriate modalities

[61] For water policy vision, see https://www.gov.uk/government/publications/meeting-our-future-water-needs-a-national-framework-for-water-resources and https://www.gov.uk/government/publications/plan-for-water-our-integrated-plan-for-delivering-clean-and-plentiful-water/plan-for-water-our-integrated-plan-for-delivering-clean-and-plentiful-water
[62] For example, ETR138 https://www.ena-eng.org/ena-docs/D0C3XTRACT/ENA_ET_138_-_Annex_Extract_180902050351.pdf

for these public investments. **The taskforces should deliver outputs by the end of 2024 and the government respond with clear commitments for finance and policy in response by 2025.** This is much faster than the pace suggested by the GFS2023, but it is justified by the urgency.

A common challenge for adaptation is that while the benefits are significant they can fall disproportionately across those who pay (e.g. the private sector) and those who benefit (e.g. the public). Without a clear policy and regulatory framework to align public and private interests, private entities will underinvest in adaptation. For example, making a rail network climate resilient has significant benefits for the public but these public benefits are difficult to fully internalise by rail operators without the right regulatory approach. A related issue is that costs are incurred now but benefits accrue over time so; that is, people in the future benefit most, but people in the present pay most . There are also uncertainties around the degree of climate change and socio-economic change. [63]. These issues are common across many areas of environmental and critical infrastructure policy and there are established policy, market-based instruments and regulatory tools to address them, as well as established private financing models, such as Regulated Asset Bases (RABs) in the water and energy sectors. Innovation in the area for adaptation is lagging behind net zero and nature. Government should learn from these other areas and commission research in 2023 on the opportunities for mobilising adaptation finance, including reviewing how existing modalities such as the RABs can more explicitly incorporate adaptation and resilience goals.

Adaptation should draw on the mitigation playbook. Market-based mechanisms are largely unexplored for adaptation. For example, market-based mechanisms such as contracts for difference and renewables obligations have demonstrable success in driving progress on the deployment of renewables and so net zero goals. In nature recovery, market-based mechanisms such as payments for ecosystem services and biodiversity credits allow private actors to monetise the benefits of investing in nature recovery. For adaptation, there is a very market failure to be resolved; the huge positive resilience ‘spill overs’ from investing in resilience today and in the future for society are difficult to capture and monetise, leading to a common underinvestment by the private sector. Potential solutions could include, ‘resilience net gain’ credits for activities, adaptation tax credits or the extension of codes and standards such as the ISO standards on adaptation planning. The government commission work to explore the potential of analogous market-based mechanisms for adaptation.

⇒ **Recommendation 4: Commit to develop an Adaptation Markets Framework.** The Nature Markets Framework, published in March 2023, lays out an important framework to scaling up private investment in nature recovery and sustainable farming, including a set of core principles, rules, and new arrangements for a British Standards Institution, as well as next steps to clarify and develop institutional and regulatory roles and market infrastructure needed to ensure good market governance. The framework represents

[63] And are sometimes associated with uncertainties. Many frameworks exist to deal with such uncertainties in decision making, including the UK Green Book methodologies, or those applied in CCRA3.

a commitment from the Government to support the development and operation of nature markets, and to build market policy on robust and enduring principles, and builds upon earlier policies and pilots in nature markets, including six existing markets. Markets for adaptation are far behind those for nature and net zero but there are opportunities to learn from successful progress in those areas. It is recommended that the government consider commissioning the Green Finance Institute (GFI) to lead a study on what an adaptation markets framework could look like, with an initial focus on a small number of relevant sectors. Ensuring the integration of climate resilience within the modalities of the Nature Markets Framework (and net zero frameworks) is also important.

Regulation has been successful in driving investment into areas aligned with UK resilience. In 2021/2, the Environment Agency and the National Infrastructure Commission highlighted the need to update current regulation to meet the challenges of climate change and mobilise investment in a climate resilient economy. Fully incorporating climate resilience across all existing regulatory bodies is essential, in particular for water, energy, telecoms, transport, the natural environment and land.

Regulation has played a vital role in driving private investments in hard (and soft) infrastructure that deliver critical services to people and the economy and ensures standards are met, including on safety, service provision, risk and environmental protection. Major new investment is needed to make the UK's core systems Climate Ready. Resilience standards need to be designed and implemented where there are gaps. The NAP3, alongside the devolved adaptation programmes, provides an opportunity to progress this.

For the case of infrastructure (water, energy, telecoms), in April 2023, the National Infrastructure Commission and Climate Change Committee jointly wrote to government urging ministers to take steps to improve the resilience of key infrastructure services to the effects of climate change (Box). As stressed by Sir John Armitt, Chair of the National Infrastructure Commission (NIC) in 2019 "*Good infrastructure needs effective regulation. The services we receive from water, energy and telecoms companies, and the bills we pay, depend on it. Regulators set targets for providers, determine new investments they should make and protect consumers' interests… Updating our system of regulation is overdue and necessary".*

Research by the NIC in 2019[64] concluded that the UK's model of regulation for energy, water and telecoms has generated significant investment over the past decades, but it is increasingly facing new challenges that it was not designed to address… "***the UK's model of regulation for energy, water and telecoms must be updated to meet the coming challenges of achieving net zero, adapting to changing weather patterns, and increasing digitalisation"***. It recommends that government should introduce legislation ensuring that, where they are currently missing, Ofwat, Ofgem and Ofcom have duties to require them to

[64] National Infrastructure Commission 2019 Strategic Investment and Public Confidence. https://nic.org.uk/app/uploads/NIC-Strategic-Investment-Public-Confidence-October-2019.pdf

seek to ensure their decisions promote the resilience of infrastructure systems. To deliver resilient infrastructure, a framework is required that values resilience properly and drives adaptation "*before it is too late*"[65]. Climate resilience similarly needs to be integrated within wider infrastructure planning, investments and public-private partnerships, for example rail and road infrastructure through relevant government departments. There are existing data, tools and approaches that can be leveraged to support this integration (for example, box 8) but there is also a role for increased government investment in this area, as discussed later.

Box 7: Joint Letter by Baroness Brown of Cambridge, Chair Adaptation Committee of the Climate Change Committee and Sir John Armitt, Chair National Infrastructure Commission[66], in April 2023: five recommended steps

- Translate the present high-level objectives into delivery plans, with clear goals and measurable outcomes for resilience.
- Align policymaking for resilient infrastructure with regulatory cycles
- Give essential duties to Regulators that presently do not have them
- Strengthen resilience coordination between infrastructure systems to head-off cascading impacts
- Embed net zero and climate adaptation in infrastructure planning

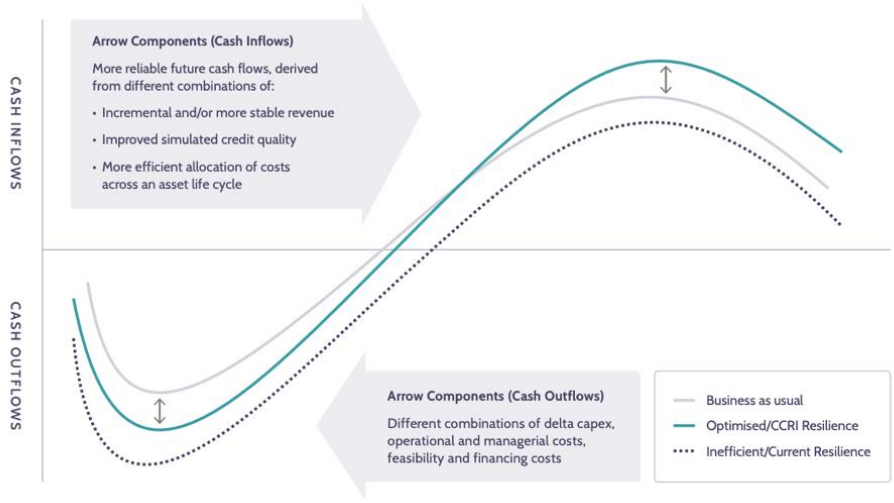
The Environment Agency is the main environmental regulator in England and plays a critical role in adapting the country to climate change and protecting natural capital, including through its mandate related to water, land, air and flooding, drought, sea level rise and coastal erosion. Its 2021 report concluded that environmental regulation in the UK is not yet ready for a changing climate[67]. Tackling the climate emergency is central to the work of the Environment Agency[68] and several policies and activities are already in place[69],[70], including working with government, businesses and communities. The EA's stated Climate Ambition is to create a net zero nation that is also resilient to climate change. This is addressed through the regulation of key industrial sectors, and by administrating the UK Emissions Trading Scheme. Climate change makes it harder to achieve the EA's goals and current regulation is not yet ready for a changing climate. The Environment Agency is encouraging regulated industries to integrate climate mitigation and adaptation thinking into their manufacturing process, supporting adaptation at a site level. In addition to this, environmental and financial regulators committed in the 2023 Green Finance Strategy to strengthening how they work together on sustainable finance. The EA will support the delivery

[65] National Infrastructure Commission 2020 Anticipate, react, recover: resilient infrastructure systems. https://nic.org.uk/app/uploads/Anticipate-React-Recover-28-May-2020.pdf
[66] https://nic.org.uk/news/nic-and-ccc-call-for-urgent-action-to-protect-infrastructure-from-climate-risks/
[67] Environment Agency (2021). Living better with a changing climate: report to Ministers under the Climate Change Act. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1025955/environment-agency-climate-change-adaptation-report.pdf
[68] Our Climate Ambition – creating a net zero nation resilient to climate change (publishing.service.gov.uk)
[69] Environment Agency – National Flood and Coastal Erosion Risk Management Strategy for England (publishing.service.gov.uk)
[70] Our Integrated Plan for Delivering Clean and Plentiful Water (publishing.service.gov.uk)

of adaptation finance, in line with the Green Finance Strategy commitments. This includes the development of two financing mechanisms, the first to capture resilience benefits in insurance premiums and the second will focus Coastal Loss Innovative Funding and Financing. In addition to this, the recently launched Local investment in natural capital programme will pilot support to local governments to develop integrated plans for investment in mitigation, adaptation and nature (LINC). It is essential that the NAP3 provides the EA with the financial resources needed to deliver the agreed ambition on climate adaptation.

Box 8: Physical Climate Risk Assessment Methodology (PCRAM)

After outlining its climate resilience approach in September 2022[71], the IIGCC announced in March 2023 that infrastructure would be the first asset class to be covered under its new framework. The methodology builds upon the PCRAM tool originally developed by the Coalition for Climate Resilient Investment (CCRI) with Mott McDonald[72]. The methodology aims to properly quantify physical climate risks and the benefits of resilience so that they can be integrated into infrastructure investment decisions. It showed that by comprehensively integrating resilience measures and physical climate risks into infrastructure project cashflow models; the increase in initial investment for resilience is less than anticipated, and the benefits in future cashflows are substantial. PCRAM provides one tool to integrate physical climate risk into project and asset valuation, and outline measures to mitigate climate-related valuation risk. This can be married with open data sources (e.g. Box 14).



Source: IIGCC 2023[73] and CCRI & Mott McDonald 2022

⇒ **Recommendation 5: Explicitly incorporate climate resilience within the mandate and priorities of all regulatory frameworks and bodies.** Regulators set targets that drive and determine new investments made by the private (and public) sector in areas of critical national importance, such as water, energy and telcoms,

[71] *https://www.iigcc.org/resource/working-towards-a-climate-resilience-investment-framework/*
[72] *CCRI and Mott McDonald THE PHYSICAL CLIMATE RISK ASSESSMENT METHODOLOGY (PCRAM) Guidelines for Integrating Physical Climate Risks in Infrastructure Investment Appraisal. https://storage.googleapis.com/wp-static/wp_ccri/c7dee50a-ccri-pcram-final-1p.pdf*
[73] *https://www.iigcc.org/news/net-zero-resilient-infrastructure-net-zero-climate-resilient-investing-begins-physical-world/*

and protect consumers' interests. Regulators should implement the five steps outlined in the April 2023 letter to Ministers of the NIC and CCC. In addition, establish a cross-regulator group to share data and metrics on action, ensure alignment across sectors, address interconnectedness of systems, and identify gaps.

Protecting and recovering the UK's natural capital is essential to reduce vulnerability to climate change and provides important opportunities for climate adaptation, as well as – as made clear by the Dasgupta Review - being critical to our economy, food, health, water, air quality and wellbeing. Nature-based solutions, and nature protection and recovery more widely, are an important part of adaptation. For example, urban green spaces and green buildings can be a key adaptation to heat and flooding risks in cities, as well as enhancing biodiversity and acting as natural carbon stores. Protecting natural capital is also important for water quality. In 2020, the value of the natural capital services that the government currently quantifies were estimated to be worth at least £1.8 trillion.

The UK defines Critical National Infrastructure (CNIs) as those critical elements of infrastructure (namely assets, facilities, systems, networks or processes and the essential workers that operate and facilitate them), the loss or compromise of which could result in: (a) major detrimental impact on the availability, integrity or delivery of essential services - including those services whose integrity, if compromised, could result in significant loss of life or casualties - taking into account significant economic or social impacts; and/or (b) significant impact on national security, national defence, or the functioning of the state. This definition is consistent with UK natural capital. CNIs are subject to addition support and regulatory requirements to protect their functioning. The UK to-date has 13 CNIs, including energy, finance, food, health and water. As part of readying the UK regulatory environment for the challenges ahead, natural capital should be the 14th CNI.

⇒ **Recommendation 6: Introduce natural capital as the 14th critical infrastructure sector.** Given the critical importance of the UK's natural assets to the availability and integrity of several critical services in the UK (as per the definition of CNIs), national capital should be added as the 14th critical infrastructure sector.

Government and financial regulators are taking positive steps to align finance with a climate resilient economy but more can be done to manage risks and catalyse adaptation investment

Pillar 3: Setting the right enabling environment to align finance with adaptation

The UK has already taken several important actions to mainstream physical climate risk management into the financial sector, including as part of the Bank of England's setting of supervisory expectations for banks and insurers on the management of climate-related financial risks and delivery of the 2021 bottom-up scenario exercise (CBES), the roll out of

mandatory TCFD-aligned climate disclosures for corporates and financial firms and work by the Transition Plan Taskforce to develop guidance for adaptation (and nature recovery) plans.

Yet, as described, there is clear evidence that physical climate risks are not fully priced into financial markets and are underestimated by financial institutions. There is appetite from the financial sector to do more. Further action is also required from firms given the evidence that, for example, only one in five companies has a plan in place to adapt to the physical risks of climate change. An urgent priority is to set clearer expectations and guidance around the reporting of physical climate risks and adaptation plans, as well as bring together financial institutions, the best science, government and regulators to generate improved data and standards to fully incorporate physical risks.

⇒ **Recommendation 7: Government and financial regulators to build upon TCFD and ensure that the TPT standards set expectations for the assessment and disclosure of physical climate risks and adaptation plans across the economy.** TCFD-aligned disclosures are already mandatory for large companies and financial institutions in the UK and the TCFD guidance includes physical climate-related risks and opportunities. Setting clearer expectations around the reporting of physical climate risks and adaptation plans, and providing clear guidance and data to support this, would significantly enhance the UK's preparedness for climate change and help unlock opportunities for investment. In agreement with the GFS2023, a more structured, quantitative and consistent approach to the assessment and management of physical climate risks is needed, but further, achieving this requires support from the government. The government and regulators should invest in and work with relevant institutions and the scientific community to develop and provide such guidance, data and frameworks, leveraging existing bodies such as the CFRF, Green Finance Institute and the UK Centre for Greening Finance and Investment, as well as professional and industry bodies. As such frameworks come into action, it will be important to ensure consistency with the Adaptation Reporting Power in the UK.

The Bank of England's 2021 took important steps toward strengthening capability on physical climate risk management for the financial sector through the Climate Biennial Scenario (CBES) exercise, however it concluded that there is more to do[74]. This stemmed from a paucity of information from the scientific community about physical risks of climate change, and a lack of data from counterparties on risks and adaptation plans. The Climate Financial Risk Forum and the UK Centre for Greening Finance and Investment in 2023 consulted with the market and the scientific community on the gaps and provided a set of recommendations for how to close the gaps in data and methodologies[75].

⇒ **Recommendation 8: The Bank of England and the Financial Conduct Authority should work with the Climate Financial Risk Forum (CFRF) and the academic community to strengthen financial risk management for physical climate risks,**

[74] https://www.bankofengland.co.uk/stress-testing/2022/results-of-the-2021-climate-biennial-exploratory-scenario
[75] https://www.cgfi.ac.uk/physical-risk/learning-from-the-climate-biennial-exploratory-scenario-cbes-exercise/

including through improved data, scenarios and guidance. The CFRF should look to generate a suite of scenarios to guide financial institutions to more fully represent physical climate risks within their in-house stress testing and scenario analysis exercises, and consider how nature risks could be interlinked. CFRF should also identify priority data gaps from counterparties and the scientific community, and take actions to fill these with appropriate partners.

Adaptation is already (at least partially or implicitly) integrated within many existing sustainability disclosure standards and taxonomies, but the government, regulators and standard setters and financial sector can work together to build capability of firms in this area and ensure appropriate integration within UK frameworks. The GFS committed to champion the development of adaptation metrics within the IFRS Sustainability Disclosure Standards; action can be accelerated through greater support to build capability.

⇒ **Recommendation 9: HM Treasury (HMT) should commit to ensure financial regulatory frameworks, including the UK Green Taxonomy, are aligned with a climate resilient economy, and in 2023, implement a task force to examine explicit integration of adaptation and nature across existing disclosure and accounting frameworks, with commitment for HMT to review and set roadmap for implementation by end of 2024.** The taskforce should consistent of relevant experts and representatives from across the public sector, regulators and private sector, co-chaired by senior officials from government and financial institutions. The taskforce should consider what data and capability need to be built to begin to operationalize these frameworks and mobilise finance for adaptation. Adaptation should be fully integrated within the UK Green Taxonomy, drawing upon the work of the GTAG, the LNAS and the TPT. The government and financial sector should support the roll out of TPT transition plans as being fully net zero, resilient and nature positive plans, with proportionality of expectations for different asset types, and support for associated guidance and capability building. In agreement with the GFS2023, this taskforce should deliver recommendations by early 2024, such that government can set a roadmap for implementation by end of 2024. This would set a clear direction of travel for the financial sector and corporates.

Box 9: Targets and metrics for adaptation

Recent research completed by the University of Oxford and the UK Centre for Greening Finance and Investment with the UNEP FI Principles of Responsible Banking identified more than 300 existing adaptation-related targets and metrics within existing disclosure standards, taxonomies and frameworks across 30 different bodies, from TCFD, to the Global Reporting Initiative, SASB, ISSB, Carbon Disclosure Project, IRIS, the EU taxonomy and many more. These metrics covered a wide variety of adaptation sectors, water, infrastructure, nature, agriculture, and included process, output, outcome and impact-based metrics, providing a strong basis upon which to build a standard. UNEP FI and Oxford are now working with banks to develop a series of feasible indices and pilot their application to assess risks and align finance with adaptation and resilience goals.

The full database of indices can be accessed here: https://www.cgfi.ac.uk/adaptation-and-resilience-metrics/

Source: Bernhofen and Ranger (2023) ALIGNING FINANCE WITH ADAPTATION AND RESILIENCE GOALS. Targets and Metrics for Financial Institutions.

The government. regulators and financial sector should work together to identify and unlock barriers to adaptation investment. This includes, for example, unnecessary regulatory barriers that can hold back investments with longer-term returns, as well as work around data, developing investible pipelines, design of financial products and solutions and disclosures. The UK can learn from experiences of other countries in this areas, for example the collaboration between government and the financial sector in the Netherlands (Box 10).

⇒ **Recommendation 10: Through the new Adaptation Working Group of the CFRF, financial institutions should work with government to identify barriers to investment in adaptation and opportunities to overcome barriers and investment in adaptation**, and identify actions that can be taken by government, the Bank of England, financial institutions or other stakeholders to catalyse greater investment in adaptation in the UK, including the role of adaptation plans.

Box 10: DeNederlandscheBank - Working Group on Climate Adaptation

In the Netherlands, the business community, financial sector and the government are working together to consider how to adapt the economy to climate change and how to mobilise the extensive investments in infrastructure, economic sectors and the physical design of the Netherlands that will be required to manage the risks. In June 2022, a new Working Group on Climate Adaptation was established to investigate how best to contribute through investment and finance to adapting the Netherlands economy to climate change. The working group looks at scenarios, methods and data needed by the financial sector to assess the physical impact of climate change on the economy and will identify finance and insurance solutions. The group aims to identify sector-wide opportunities for public-private adaptation finance and indicate how current bottlenecks can be overcome. It will initially

launch several studies. For example, it will quantify the consequences of climate change, calculating the costs of possible scenarios for climate-proofing the Netherlands in the long run. The working group will also be investigating options for financing. It wants to explore innovative public-private forms of financing and their added value compared to existing market financing, based in part on the toolbox on financing climate adaptation[76] developed by the Ministry of the Interior and Kingdom Relations. The working group is expected to report on its findings by the end of 2023. It also seeks to explore joint activities and aims to reach out to Dutch central and local authorities to explore collaboration opportunities.

Banks, insurers, real estate investors and the government join forces in this working group. Members include: ABN AMRO, Achmea, Altera Vastgoed, a.s.r., Athora, Bouwinvest, Deloitte, ING, Ministry of the Interior and Kingdom Relations, Ministry of Infrastructure and Water Management, Ministry of Agriculture, Nature and Food Quality, Nationale Hypotheek Garantie, NN, NWB Bank, Pension fund Rail & OV, Philips Pension fund, Rabobank, Staf Deltacommissaris, Stimuleringsfonds Volkshuisvesting (SVn), Univé, Dutch Association of Insurers. The working group is chaired by Gijs Kloek from Achmea. The Working Group builds upon several partnerships already set up by industry organisations on physical climate-related risks and climate proofing investments[77].

Source: DeNederlandscheBank[78] with thanks to Bourke de Vries at Rabobank for the information

PART 3: A CLIMATE READY GOVERNMENT

Government needs to further gear itself up to tackle the challenges of climate change over the coming decades, including integrating adaptation as a priority across all policies, regulatory bodies and spending

Pillar 4: Gearing up government to drive adaptation and align policy with adaptation goals

To mobilise action across the economy, the government itself needs to further gear itself up to tackle the challenges of climate change over the coming decades, including integrating adaptation as a priority across all relevant policies, regulatory bodies and spending in line with the government's initial 25 Year Environment Plan. This should be a core priority of NAP3. In line with progress in other regions, for example across Europe, this should be supported by a detailed Adaptation Investment Plan. The UK should also consider how the machinery of government could be geared up to deliver this, as well as ensure better

[76] https://infographics.rvo.nl/klimaatadaptatie/
[77] Their current activities are also described in the illustrated document Nederland klimaatbestendiger maken: Welke rol spelen financiële instellingen? (Climate-proofing the Netherlands: What role do financial institutions play?, produced by Samen Klimaatbestendig (Climate-proofing Together). https://klimaatadaptatienederland.nl/en
[78] https://www.dnb.nl/en/green-economy/sustainable-finance-platform/working-group-on-climate-adaptation/

integration across the triple challenges of climate change adaptation, net zero emissions and nature protection and recovery.

⇒ **Recommendation 11: Establish a National Office for Climate Readiness.** Coordinating adaptation across government and more than sixty individual risks with complex interdependencies is a massive undertaking and is a task that requires a strong, dedicated team and senior-level leadership in government. The location of this team within government is also important to get right. A new National Office of Climate Readiness hosted within the Cabinet Office could, for example, ensure strong coordination across government, better integration with the National Resilience Framework[79] and a more coherent approach, including integration across net zero, nature and adaptation. However, there are also arguments for other arrangements. What is certain is that the government needs to invest more in building its capability.

The 25 Year Environment Plan for England (initially set out in 2018[80]) recognised that, in order to achieve our 25-year goals, we need to adapt to climate change and ensure that all policies, programmes and investment decisions take into account the possible extent of climate change this century. The UK Green Book and its supplementary guidance on Accounting for the Effects of Climate Change sets out clearly the rationale and approach for accounting for the impact of climate change in the development, appraisal and evaluation of all UK government policies, programmes and projects[81]. Under the Climate Change Act, the National Adaptation Programme should set out how the risks identified in the CCRA will be addressed for England, with similar programmes in place in the devolved administrations. In addition to the commitment of the initial Environment Plan, the Cabinet Office also has a commitment to ensure departments have an Adaptation Plan under its Greening Government Commitments (2021 – 2025)[82] and the recent 2023 Green Finance Strategy committed both to the alignment of financial flows with the Paris Agreement and by 2025 to set plans to implement TCFD in central government annual reports and accounts. ***These are strong and important commitments that, if implemented well, lay a firm basis for gearing up government to address the challenges of climate change***.

Research suggests that around (only) one-fifth of UK fiscal expenditure during the COVID-19 recovery phase potentially positively contributed to UK adaptation and resilience goals[83]. This was lower than some other G20 countries. This is the conclusion of a new study that develops an adaptation taxonomy and applies this to fiscal expenditure across 88 countries. Areas that were assessed to directly contribute to UK adaptation were, for example, investments in large-scale infrastructure for climate resilience (£6.1 billion), disaster

[79] UK Government Resilience Framework, December 2022, https://www.gov.uk/government/publications/the-uk-government-resilience-framework/the-uk-government-resilience-framework-html. The National Resilience Framework includes three pillars of (i) understanding risk, (ii) risk prevention and (iii) whole of society approach
[80] This has since been replaced with the Environment Improvement Plan, which does not include this commitment.
[81] Accounting for the Effects of Climate Change: Supplementary Green Book Guidance. November 2020. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/934339/Accounting_for_the_Effects_Of_Climate_Change_-_Supplementary_Green_Book_.._.pdf
[82] https://www.gov.uk/government/publications/greening-government-commitments-2021-to-2025/greening-government-commitments-2021-to-2025#f-adapting-to-climate-change
[83] Fankhauser et al. 2023 based upon Sadler at al. https://www.smithschool.ox.ac.uk/sites/default/files/2023-01/Case-studies-in-adaptation-finance.pdf

preparedness (£5.1 billion), green retrofitting programmes (£4.2 billion), resilient new housing (£1.2 billion) and natural infrastructure and green spaces (£1 billion). The important question is was UK expenditure on adaptation proportionate and appropriate. Without specific adaptation targets, it is difficult to assess this. However, it is notable that the spend related to direct adaptation was far lower than that for mitigation. In addition, while it is impossible to fully assess policy impact from analyses based on policy documents, the study finds that up to £155 billion (73%) of recovery spending could potentially have contributed negatively to UK vulnerability to climate change or wider national resilience. Government, with advice from the Climate Change Committee, should conduct an audit of how climate adaptation is being accounted for in government policies, investments and programmes.

⇒ **Recommendation 12: Mainstream consideration of climate change risk into spending and policy decisions by government, using the Green Book to screen policy and programme decisions and implement the recommendations from the Coalition of Finance Ministers for Climate Action, including the use of Green Budgeting techniques.** The UK Green Book and its supplementary guidance on Accounting for the Effects of Climate Change makes clear the rationale and approach for accounting for the impact of climate change in the development, appraisal and evaluation of all UK government policies, programmes and projects[84] and government has in the past made strong commitments to ensure that all policies, programmes and investment decisions take climate change into account and public expenditure is aligned with a climate resilient economy. The Cabinet Office and HM Treasury should review how UK government departments, along with Combined Authorities and Local Government are meetings these commitments, 'powering up' the Green Book and supporting departments to integrate climate resilience. This information should be disclosed as part of the TCFD-aligned disclosures committed to. The Cabinet Office commitment to ensure departments have an Adaptation Plan under its Greening Government Commitments (2021 – 2025) could further be extended to explicitly include all public assets, procurement and programmes under the department[85]. The National Adaptation Programme is an opportunity to lay out plans to monitor and evaluate the progress in England against the commitments of the 25 Year Environment Plan on Adaptation and assess and disclose information on the impact of all government policies and expenditures on climate resilience and adaptation.

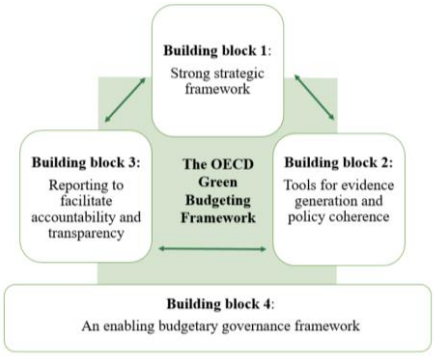
Box 11: Using green budgeting and investment planning to mobilise resource for adaptation

A coalition of over 80 finance ministries (including the UK) have committed to using the domestic budgeting powers to further drive climate action (Coalition of Finance Ministers for Climate Action, 2023). This approach, commonly known as green budgeting, involves the use of the tools and

[84] Accounting for the Effects of Climate Change: Supplementary Green Book Guidance. November 2020. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/934339/Accounting_for_the_Effects_Of_Climate_Change_-_Supplementary_Green_Book_.._.pdf

[85] https://www.gov.uk/government/publications/greening-government-commitments-2021-to-2025/greening-government-commitments-2021-to-2025#f-adapting-to-climate-change

systems of budgetary policymaking and public financial management to inform, assess and deliver green objectives[86]. The approach consists of four key building blocks.



Whilst green budgeting is an umbrella term, in reality there many different tools and approaches, each with strengths and weaknesses[87]. Such approaches are powerful because as well as financing adaptation, they also support the financial and economic goals of macroeconomic stability, growth and responsible management of the public finances. Proper management of climate risks can helping avoid economic and budgetary shocks and rising cost of capital from increasing climate impacts. Second, it can drive significant growth and development opportunities, through cost savings, new jobs and attracting new capital and talent. Third, investing in resilience will create economic, social and environmental benefits, especially for the most vulnerable members of society, reducing demands on the public safety net.

Green budgeting approaches are also applicable to regional and local levels[88], and are increasingly being applied in support of climate action. London, New York, Oslo, have committed to implementing climate budgets, whilst Glasgow has piloted the use of budget tagging – linking budgetary proposals to the environmental objectives of the EU Taxonomy. Westminster City Council is also implementing such processes. As well as mainstreaming climate action through the budget processes, there has also been an increasing focus on producing dedicated Mitigation and Adaptation Financing Plans or Investment Plans at National, Regional and City level. These documents translate the high-level goals and actions of strategies into bankable projects, as well as setting out envisaged sources of finance and instruments, as well as the roles of the public and private sector. In doing so, they can better quantify and sequence public investment needs, highlight investment opportunities to the private sector, and help the private sector play a better role in financing adaptation goals.

Climate Investment Planning is not just useful at the national level, but can also be applied at the local and regional government level. In Europe, the Pathways2Resilience project is developing a standardized adaptation planning process for regional and local government, including resources to support the development of bankable adaptation projects, of climate-proofed projects, and of regional Adaptation investment Plans, as well as improving the enabling conditions for investment in regions, all with the aim of closing the adaptation finance gap.

Source: Kit England

[86] OECD (2022) https://www.oecd.org/environment/green-budgeting/OECD-Green-Budgeting-Framework-Highlights.pdf
[87] Pengwern Associates (2022) Green Budgeting for Glasgow City Council
[88] OECD (2022b) Aligning Regional and Local Budgets with Green Objectives: Subnational Green Budgeting Practices and Guidelines

⇒ **Recommendation 13: Strengthen local planning and local government planning regimes for adaptation and resilience by 2030. Reintroduce a statutory duty to adapt to climate change for the public sector in England.** Supporting local and devolved government in England should also be a key priority for the NAP3, including through a statutory duty for public bodies to adapt to climate change (as has worked well in Scotland), strengthening capacity and empowering local authorities to define sector-based adaptation targets and financing arrangements, and collaborate with others. This should involve learning from place-based examples such as Climate Ready Clyde, which are underpinned by common understanding of risk interdependency and common vision for adaptation. Box 12 gives an example of the success of public sector reporting in driving action in Scotland. Local government plays an important role in adaptation planning at a local level, with an in-depth knowledge of the needs and opportunities and interdependencies between different forms of risk.

Box 12: Public sector reporting for Adaptation in Scotland.

Under the Climate Change (Scotland) Act 2009, public bodies in Scotland are required to report annually on compliance with their climate change duties, which includes adaptation to climate change. Each public body discloses climate change risks, arrangements to manage them such as adaptation strategies, actions underway, future plans and monitoring and evaluation, as well as their contribution to delivering the national climate change adaptation Programme. Each report is listed centrally on the Sustainable Scotland Network website, and the Adaptation Scotland programme provides capacity building and support to the public sector for compliance and progress

The requirement to disclose necessitates the allocation of core resources from public bodies for reporting, and the potential for scrutiny helps drive progress. Similar to the private sector, public sector reporting and disclosure helps build the case for investment by demonstrating current and envisioned actions, ensuring public scrutiny, and identifies needs and barriers. In doing so, it helps provide a sense of the envisioned roles of the public and private sector, though it could potentially be extended further to cover current and future financing needs and provide a clearer role.

Source: Kit England

It is also vital to integrate physical climate risks within the government's own financial risk management engine. COVID-19 demonstrated that the government holds significant implicit contingent liability on its balance sheet related to exogenous shocks such as climate change and this can lead to considerable fiscal impacts. When crises happen, government often acts as an insurer of last resort, supporting homes and businesses to recover, as well as rebuilding public infrastructure. The 2021 Fiscal Risks Report[89] was the first to attempt to quantify the risks of unmitigated climate change (Fig 14). It concluded that

[89] OBR 2021 Fiscal Risks Report https://obr.uk/docs/dlm_uploads/Fiscal_risks_report_July_2021.pdf

"unmitigated climate change would ultimately have catastrophic economic and fiscal consequences, but even meeting Paris goals implies some further warming". Similar work has been undertaken in the US, where the OMB is quantifying fiscal risks of climate change to Government departments and programmes[90]. HM Treasury in 2021 recognised these challenges and its role as an 'insurer of last resort': *"the costs incurred when risks materialise directly affect the government's ability to spend on essential services and support. Managing these liabilities well is therefore essential for the long-term sustainability of the public finances".* It recommended strengthened approaches to quantify and manage these as part of the UK's contingent liability framework, to establish risk sharing agreements and frameworks between the public and private sector, and also to explore where it may be appropriate to expand the scope of current risk pooling arrangements to manage risks more effectively, such as Flood Re and Pool Re. ***Defining risk ownership and setting appropriate risk sharing mechanisms with the private sector can be an important way to encourage investment in adaptation***. Assessing physical risks is challenging[91] and methods can be strengthened through collaboration with research institutions to more systematically and comprehensively incorporate physical climate related risks into the UK's fiscal risk assessments.

⇒ **Recommendation 14: Integrate adaptation and nature into the UK's national fiscal risk management frameworks and set out plans for how these can be managed that protect national resilience and incentivise action across the economy.** HM Treasury and OBR should invest in improved models and action these recommendations for climate change adaptation.

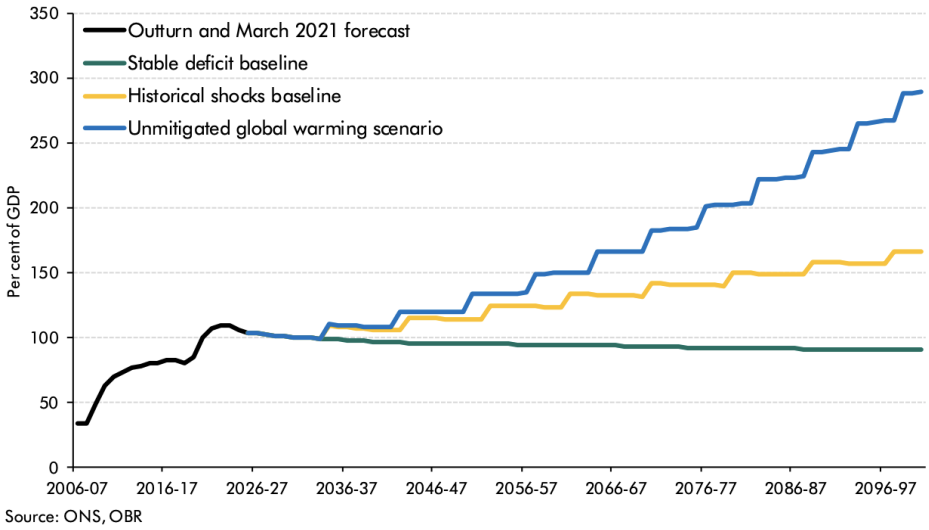


Figure 14: Public sector net debt: illustrated unmitigated global warming scenario. Chart 3.6 from 2021 OBR Fiscal Risks Report.

[90] OMB 2023 The Importance of Measuring the Fiscal and Economic Costs of Climate Change https://www.whitehouse.gov/omb/briefing-room/2023/03/14/the-importance-of-measuring-the-fiscal-and-economic-costs-of-climate-change/

[91] See, for example, A Third Wave in the Economics of Climate Change. J. Doyne Farmer, Cameron Hepburn, Penny Meal, and Alexander Teytelboym. Environ Resource Econ (2015) 62:329–357. https://www.cameronhepburn.com/app/uploads/2016/02/Third-wave.pdf

⇒ **Recommendation 15: Commission work to examine public-private risk pooling architecture of the UK and how this can evolve to support insurability and adaptation.** Measuring and proactively managing these risks is not just efficient for the taxpayer but can create more risk sharing with the private sector. An example is flood risk in the UK, where Flood Re helps to maintain the insurability of homes. As part of NAP3, the government should take actions to explore how pooling mechanisms like Flood Re can be scaled-up and applied more widely. There is an opportunity to expand work of the Green Finance Institute and Association of British Insurers (ABI) to examine public-private risk pooling architecture of the UK and how this can evolve to support insurability and adaptation. This includes exploring how existing pooling mechanisms, such as Flood Re and Pool Re can be scaled up.

Knowledge is power. The UK government should build its capability to monitor physical climate financial risks and corporate plans to shape national strategies. Good policy requires good data. To design policies and spending most efficiently, the government needs to understand the risks, where action is happening and where the bottlenecks are. The Climate Change committee can provide advice on this and support the synthesis of data. As a starting point, as part of its 2025 Progress Report, the CCC could assess the preparedness of the private sector for climate change and the alignment of public and private financial flows based on disclosures.

⇒ **Recommendation 16: As part of its 2025 Progress Report to Parliament, the CCC should assess and report on the preparedness of the corporate and financial sector for climate change and the alignment of financial flows with UK adaptation goals.** Corporate disclosures relevant to adaptation should be routinely assessed as a key input to the UK climate change risk assessment progress, and the CCC monitor and report on the alignment of private (and public) plans and finance with adaptation as part of its 2025 Progress Report.

Power up public finance to catalyse private adaptation, including through increased investment in public goods and blended finance.

Pillar 5: Power up public finance to support adaptation

The UK's public financial institutions, like the UK Infrastructure Bank, can be more fully mobilised to serve UK adaptation goals. Today, while the UK Infrastructure Bank does have a mandate to help tackle change, unlike on net zero, adaptation is not recognised within UKIBs priorities (beyond water). Adaptation is not mentioned in the UKIBs strategic plan[92] though is recognised as a lending risk through incorporation in the UKIBs Environmental, Social,

[92] UKIB Strategic Plan 2021. https://www.ukib.org.uk/strategic-plan

Resilience and Governance (ESRG) framework for assessing and reporting on the impacts of projects[93]. Other institutions, like the European Investment Bank (EIB) and the European Bank for Reconstruction and Development, provide good models for how this could work, offering a mix of technical assistance and targeted concessional financing, as well as screening all investments for the risks of climate change. Indeed, the EIB has previously supported Newcastle City Council; providing a £100,000 grant for technical assistance for a climate risk and vulnerability assessment linked to an EIB loan[94]. ***Lessons can be drawn from other public banks across Europe on adaptation, such as the European Investment Bank and the European Bank for Reconstruction and Development (EBRD)***, which have clear strategies and investment commitments on adaptation, strategies for assessing risks, and facilities for providing technical assistance to clients. Lessons from the EIB are captured in Box 13 and the EBRD approach, which is also world leading in its technical assistance and financing, is documented online[95]. The UKIB, for example, is already mandated to lend to local authorities and its concessional rates could be a vehicle to support local resilient infrastructure and housing, whilst further reducing risks to lending.

⇒ **Recommendation 17: Amend the mandates of the UK Infrastructure Bank Act and British Business Bank to put economic prosperity, net zero and adaptation as on equal footing, including through targeted concessional finance. Grants instruments and guarantees should allow for capacity building and blended finance options, similar to the UK Export Credit Agency.** As part of NAP3, the UK Infrastructure Bank (UKIB) and other public financial institutions should be mandated to support adaptation as a priority on equal footing with net zero and other goals and provide technical assistance alongside financial. The adaptation roadmaps identified in recommendation #3, should include consideration of the role of the UK Infrastructure Bank, UK Export Credit Agency, Salix and the British Business Bank (BBB), by 2025. For UKIB and BBB in particular, these plans should outline roles in providing technical assistance on adaptation through their investment portfolio, following the examples of the European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD). As part of the Comprehensive Spending Review (CSR), the government should consider UKIB as a vehicle for providing concessional support to resilient infrastructure in the UK where required. As part of the next cycle of the UK Adaptation Reporting Power, the UKIB and BBB should report on their plans to align their activities and investments with national adaptation goals and the findings of the Climate Change Risk Assessment (CCRA).

[93] Readiness for storms ahead? Critical national infrastructure in an age of climate change: Government response to the Committee's First Report https://committees.parliament.uk/publications/34189/documents/188122/default/
[94] https://www.eib.org/en/press/all/2016-036-gbp-100m-investment-in-newcastle-university-campus-development.
[95] The EBRD Climate Adaptation Action Plan 2023-25 https://www.ebrd.com/climate-adaptation-action-plan.pdf

Box 13: Lessons from the European Investment Bank

In 2021, the European Investment Bank launched its Climate Adaptation Plan that aims to strengthen investment and technical support to protect projects from the impact of more extreme weather and increase climate resilience of existing and new infrastructure. The EIB will significantly increase adaptation financing to support the European Union Adaptation Strategy for smarter, more systemic and faster adaptation, both across Europe and globally.

The EU Adaptation Strategy reframes adaptation as an investment, rather than a cost, and emphasizes the need to accelerate financing for adaptation. It also refers to the need to invest in a way that has most impact, addresses the vulnerability of most sectors of the economy and provides benefits to those that have the least ability to adapt. In order to support this goal, by 2025, the EIB will: **grow the share of EIB climate action for adaptation to 15% of EIB's overall climate financing (around €4.5bn annually); ensure high impact and measure the results of adaptation finance through a series of new dedicated indicators**

Over the 2012-2019 period, the average share of adaptation within overall EIB climate action financing has been 4-5%. This has increased significantly in 2020 to reach 10%, reflecting stronger EIB internal capacity and operational processes to screen projects for physical climate risk. A 15% target locks in this progress in 2020 and extrapolates this out to 2025.

Key investment areas identified in the strategy include:

- Water scarcity and flooding
- Protecting energy and transport sectors
- Urban and regional development
- Food systems, forests and ecosystems
- Health, education and public research
- Innovation
- Disaster risk management
- Promoting gender responsive adaptation financing

The EIB will launch the **Climate Adaptation Investment Advisory platform (ADAPT)** to provide technical and financial advice to clients in the EU. The objective of ADAPT is to provide advisory services that have the potential to strengthen climate resilience of cities, infrastructure networks such as transport and energy, coastal areas and river basins, farming practice and other vulnerable activities. ADAPT will consist of a dedicated investment advisory facility to cover the full project cycle. Advisory services will include upstream planning, identification, preparation, development, and implementation of adaptation projects as well as capacity building and awareness raising

In order to promote smart adaptation, the EIB continuously updates its processes and tools to make the most use of scientific advances and a growing market for climate services for the benefit of the Bank and its clients. The EIB has developed tools to manage physical climate risks at project and portfolio level. At project level, the EIB introduced the Climate Risk Assessment System (CRA) – a tool to systematically screen investments for climate risk in direct lending operations and where needed, develop appropriate adaptation plans. The CRA system is the cornerstone for delivering on the EIB's Climate Bank Roadmap commitment of alignment to the goals of the Paris Agreement and

the MDB framework on Paris Alignment.24 It also supports the Bank's alignment to the EU Taxonomy as described in the Delegated Act adopted in April 2021

Source: EIB Adaptation Strategy 2021
https://www.eib.org/attachments/publications/the_eib_cllimate_adaptation_plan_en.pdf

There is a clear economic and social rationale for government to invest in public goods for adaptation, including information, data and capability building. Part of the UK's leadership in adaptation globally has come its continued investment in important public goods, including major programmes and institutions such as the Met Office (Box 14) and its UK Climate Projections to generate open data to inform adaptation[96], the UK Climate Impacts Programme that provided guidance and capability building to businesses and local authorities[97], data infrastructure such as DAFNI[98] and research programmes such as the UK Climate Resilience Programme[99], as well as the Climate Change Risk Assessment itself. The UK has a very well-established and internationally recognised expert base on climate risk, adaptation economics and climate science. There is more to do. Research by the University of Oxford demonstrated the challenges caused by the paucity of decision-relevant climate projections for the UK for the financial sector[100], whilst European collaboration through Horizon 2020, has yielded much policy-relevant research and innovation. Government support for adaptation services for businesses, local government and the third sector ceased in 2016, and the Government has yet to complete its association to Horizon Europe. At the present time, there is no government guidance being given to organisations on planning for climate change from a single source. While there remains good provision of information about future climate risk and climate projections, there is no information coming from government on how to prepare for all short-term threats (beyond extreme weather warnings) or how to embed adaptation into decision making, for example. Public investment in science and capacity building programmes bring win-wins in terms of UK leadership, adaptation and capability.

> **Recommendation 18: Re-establish an adaptation support programme (£3 – 5 million per year), including capacity building and foundational investment in R&D.** The UK government should re-establish a national adaptation support programme, with investment of at least £3-5 million per year and including capability building and foundational R&D, to provide businesses and investors (as well as local government and the third sector) the guidance and tools to help them integrate climate risks, identify adaptation opportunities and ensure that actions that are needed urgently are being undertaken[101]. At the same time, Government and the professional bodies

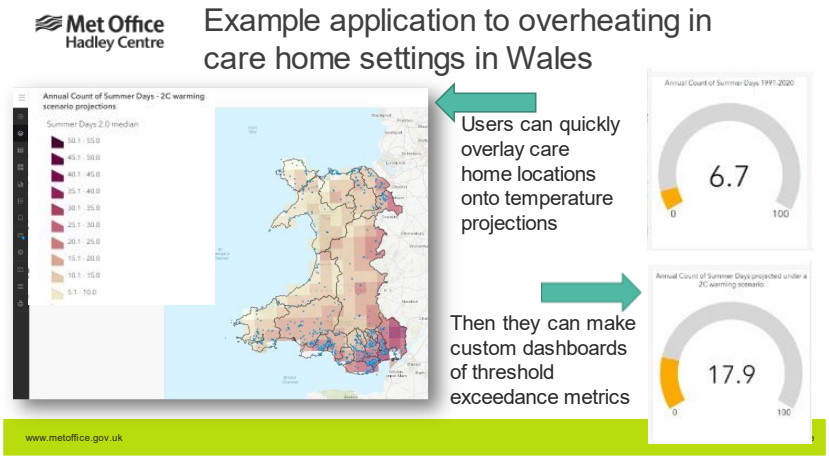
[96] UK Climate Projections Programme: https://www.metoffice.gov.uk/research/approach/collaboration/ukcp
[97] UK Climate Impacts Programme: https://www.ukcip.org.uk/
[98] Data and Analytics Facility for National Infrastructure: https://www.dafni.ac.uk/
[99] UK Climate Resilience Research Programme: https://www.ukclimateresilience.org/
[100] https://www.cgfi.ac.uk/physical-risk/learning-from-the-climate-biennial-exploratory-scenario-cbes-exercise/
[101] This should be linked with the reassociation to Horizon Europe and the EU's Adaptation Mission

should support training, including supporting the incorporation of adaptation and nature within the Sustainable Finance Education Charter.

Box 14: The Met Office – Supporting a Climate Ready UK

Met Office is the National Meteorological Service for the UK, providing critical weather services and world leading climate science to help decision makers act in a timely manner to reduce the impacts of people make better decisions to stay safe and thrive. The Met Office is currently working with DEFRA to ensure the latest climate science research is being applied into the NAP3.The Met Office facilitates and delivers a range of climate services to help businesses, government and individuals make informed decisions on timescales ranging from the next hours, to seasonal to decades or more ahead. Some of these climate services are focused on providing data for decision making directly, whereas some are more indirect, through providing data upon which other climate service providers can build their own added value products and services. Other Met Office climate services focus more on engagement or consultancy, such as a Climate Knowledge Integration service that co-develops expert interpretation of climate science with policy makers, or climate consultancy for industry sectors including electricity, water and transport. The Met Office also provides international climate services, which include helping nations build the skills and infrastructure required to make and use climate information to improve their resilience.

To give one example, the UK Climate Projection 18 (UKCP18[102]) is a climate analysis tool forming part of the Met Office climate programme. It uses cutting edge climate science to provide update observations and climate change projections out to 2100 in the UK and globally. This valuable information has been tailored to help various public and private sector agencies to increase resilience in their work, from energy sectors to water to agriculture to civil contingency sectors.



A second example of a Met Office data service is an open climate data portal built using geospatial technology from Esri UK, making it easier for businesses, Government and other organisations to combine open climate data with their own data to reveal the future impact of extreme conditions on their operations, including heatwaves, floods or droughts. This was released as a beta version in 2022 and fully launched as a free service in June 2023 after co-development with users. The Figure

[102] https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/about/project-news

below is a demonstration of combining future temperature information from the UKCP18 climate projections with the location of care homes in Wales using the open climate data portal.

Other examples from users during the testing phase, include: a government department in Scotland looking at extreme rainfall events to evidence base land management decision-making; a national nature-based charity who is using it for horizon scanning locations for further focus; and a council in Wales using it to build awareness of their own stakeholders. A carbon accounting business highlighted how the new service can save them large amounts of time.

Source: Met Office (Jason Lowe and Nyree Pinder)

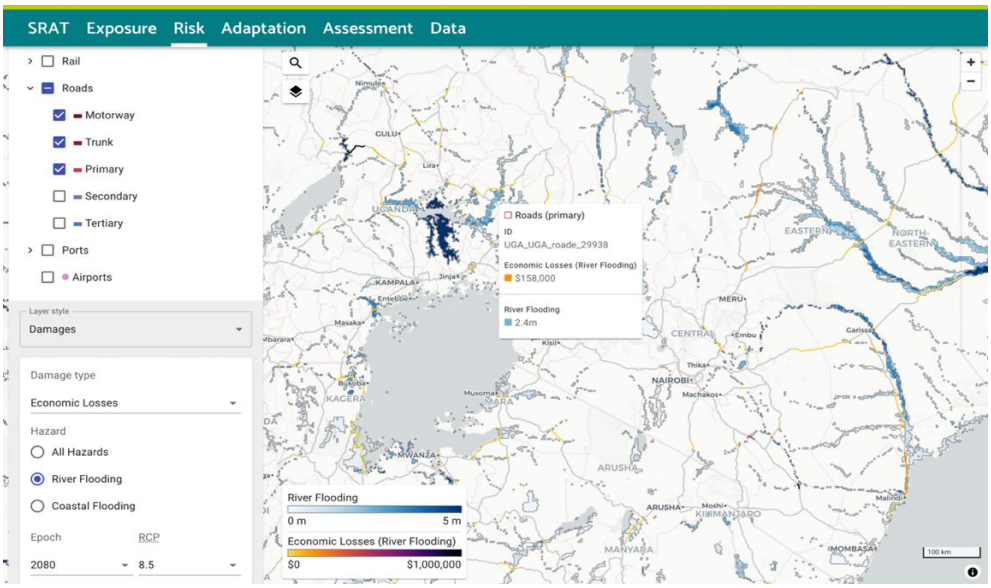
To mobilise finance for adaptation, increased investments in public goods should include targeted data and R&D to support greening finance and investment. There is a clear rationale for publicly available data to ensure a level playing field and common understanding of the risks[103]. Commercial providers of physical climate data will continue to play an important role and this is a major commercial opportunity for the UK. Yet, there are well-known issues around transparency and quality of data and the proprietary nature of these products creates inequalities in access to data and asymmetries of information across government, Fis, businesses and the public. The lack of transparency, accessibility and quality of information can lead to: firstly, mispricing of risks – including overpricing of risks to vulnerable groups that can mean they struggle to access finance and insurance; secondly, maladaptation across the economy, including the build-up of systemic financial risks through inadequate action; and thirdly, increased risks of greenwashing by financial institutions. ***Ensuring that financial institutions, government and the real-economy have access to the same basic reference data on risks and adaptation opportunities is essential to catalyse action, manage risks and avoid greenwashing.*** This must include investment in the underpinning data, science and modelling and close collaboration across regulators, financial institutions and experts as outlined through recent work in collaboration with the Climate Financial Risk Forum[104].

Box 15: Investing in Data as a Public Good: Global Resilience Index Initiative

The Global Resilience Index Initiative (GRII) is an example of a public-private-academic collaboration to provide open, globally-consistent data on climate risks and resilience to support financial institutions and governments to manage risks, align their finance with climate resilience and mobilise finance for adaptation. The GRII was established in 2021 by six founding partners to respond to this need, including the UK Centre for Greening Finance and Investment, and is convened by the Insurance Development Forum (IDF) with the UN and with Mark Carney as a

[103] https://www.cgfi.ac.uk/2022/11/grii-report-nov22/
[104] https://www.cgfi.ac.uk/wp-content/uploads/2023/03/CBES-Reports-Recommendations.pdf

patron. The Oxford University is the lead technical partner to GRII and led the development of G-SRAT open toolkit (Figure below) with funding support from several partners including the UK government. In June 2023, the University of Oxford, the Insurance Development Forum (IDF), UN Office for Disaster Risk Reduction (UNDRR) and the Global Earthquake Model (GEM) signed new agreements to advance the GRII and agreed to jointly establish a Global Resilience Hub, to upscale its work on engaging with governments and investors. The new Hub provides a unique opportunity to accelerate cooperation to help mobilise investment in adaptation.



Source: Global Resilience Index Initiative (http://globalresilienceindex.org/)

Advances in science and technologies mean that much improved data can be provided publicly at low cost. ***UK Research and Innovation is supporting such initiatives, for example, work on data, guidance and capability building as part of the UK Centre for Greening Finance and Investment (UKCGFI), including the Global Resilience Index Initiative*** (Box 15). UKRI is also supporting the growing ecosystem of commercial providers via UKCGFI Innovation Labs. Such initiatives show promise but require public support to scale.

⇒ **Recommendation 19: Increase investment in open data, guidance and tools to support financial institutions to upscale adaptation investments, including publication of foundational risk data by end of 2025**, building upon existing activities and UK institutions, including the UK Met Office (UKMO), UK universities and UKCGFI/GRII**.** The next set of UK adaptation programmes including NAP3 are an opportunity to lay out plans to do more to mobilise UK scientific strength and support public goods for adaptation. Government should consult through the CFRF and other groups to identify priority needs to mobilise finance for adaptation, and commit to public support to relevant initiatives to close the gaps by the end of 2025.

Sovereign financing, e.g. through resilience-linked gilts and bonds, can be a win-win opportunity to mobilise private capital into adaptation at local, municipal and national level. For example, ***£2.1bn of the Green Gilt Issuance in 2021–22 already supported UK adaptation goals***[105], including about £1bn into the Environment Agency Floods Programme and substantial support to UK international adaptation and nature recovery via the Green Climate Fund (GCF) and Global Environment Facility (GEF). The Netherland Green Bond programme has financed over €3.6bn of adaptation expenditures over 2021-22[106].

⇒ **Recommendation 20: Issue first dedicated UK adaptation bond in this government, supporting local, municipal and national adaptation projects.** The UK should issue the world's first dedicated adaptation bond for a G7 country and align the allocation with the priorities of the NAP3. The government should work with the GFI and other stakeholders to outline an adaptation bond framework aligned with the UK taxonomy as a way to help demonstrate best practice to private sector issuers and catalyse the market for such instruments, creating a key competitive advantage for the UK financial sector. The UK could also trial the first sovereign adaptation-linked bond, with defined key performance indicators, to further demonstrate leadership on innovative private financing and catalyse their increased use.

Ensure that fiscal, economic and environmental policies and regulations are working together coherently to achieve UK adaptation goals. Beyond regulation, the alignment of public and private interests can also be achieved through taxes (taxing activities that negatively impact societal resilience) or subsidies, including for example existing subsidy regimes to encourage farmers to invest in natural capital to reduce flood risk downstream or preserve biodiversity, and also grants and blended finance mechanisms.

⇒ **Recommendation 21: As a special topic report in 2024, CCC should independently review how UK regulation (financial, economic and environmental) and fiscal and economic policies can work together to better support adaptation in the UK.** CCC's Adaptation Committee advises on UK climate change risks and assesses progress towards tackling them[107]. As part of this mandate, the CCC should (a) assess progress of the government in meeting the commitments to integrate climate change risks across all government policies, spending and programmes and (b) review to what extent government fiscal, monetary and economic policies, as well as regulatory architecture, are working together toward building the resilience of the UK economy to climate change and unlock private sector investment in adaptation. This should be a priority for 2024, following the publication of NAP3, in time to inform CCRA4 and the 2025 Progress Report to Parliament for England.

[105] UK Green Financing Allocation Report (2022): HM Treasury and UK Debt Management Office https://www.dmo.gov.uk/media/yxtnpt5l/pr260922.pdf
[106] Dutch State Treasury Agency Green bond report 2022 https://english.dsta.nl/documents/publication/2023/05/26/green-bond-report-2022#:~:text=Download%20%22Green%20bond,26%2D05%2D2023
[107] https://www.theccc.org.uk/what-is-climate-change/a-legal-duty-to-act

PART 4: TOWARD A CLIMATE READY, NET ZERO, NATURE-POSITIVE FINANCIAL SECTOR: CAPTURING THE GLOBAL OPPORTUNITY

The UK financial sector has the appetite, expertise and capability to become the leading global hub for adaptation finance

Pillar 6: Toward a globally leading Climate Ready, Net Zero, Nature-Positive Financial Sector

The UK is well positioned to be globally leading financial hub in adaptation. The UK already has unique strengths relevant to adaptation finance, including through its world-leading insurance sector and strength in climate and environmental science and analytics. The London Market is the largest commercial insurance and reinsurance hub globally. With $121bn of gross written premiums in 2020, the London Market is considerably larger than other competing centres, such as the US and Singapore. And the London Market's capital is increasingly global in source: 89% of London Market premium is written by companies domiciled outside the UK. The financial strength of the London Market is also coupled by significant expertise in risk, resilience and analytics that can be deployed to support the financial system to align with climate goals and mobilise investment in adaptation globally. The UK is also a global leader in climate science and climate services, including through the Met Office and its research institutions and also commercial data providers and professional services businesses. This leadership in insurance and analytics, coupled with the wider strengths of the UK financial sector[108], including across international banking and borrowing, asset management, international debt issuance, financial services and foreign exchange trading mean the ***UK has unmatched potential to lead globally as a resilience, net zero, nature positive financial sector to the world***, as well as support domestic adaptation finance needs.

⇒ **Recommendation 22: Set ambition to make the UK the world's first Resilient, Nature Positive, Net Zero-aligned financial sector.** One of the central objectives of the 2023 UK Green Finance Strategy was to make the UK financial sector the world's first UK Net-Zero-aligned Financial Sector. This is essential for ensuring the UK meets its climate goals but is also a massive growth opportunity for the UK financial services sector. Supporting UK and international adaptation finance can similarly be a growth opportunity for the UK. Through the National Adaptation Programme, and those of the devolved administrations, the government should update and extend the vision set out in the 2023 Green Finance Strategy and set a clear ambition and actions toward making the UK the world centre for resilient, nature-positive and zero-aligned finance.

108 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1092788/State_of_the_sector_annual_review_of_UK_financial_services_2022.pdf

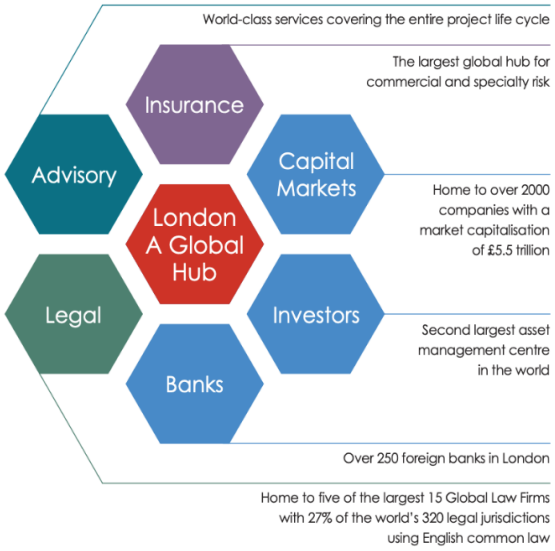


Figure 15: London as a Global Hub. Source: City of London Corporation 2019[109]

The UK can maintain its leadership position through strengthened National Adaptation Programmes and new partnerships across government, industry and academia, bringing substantial economic benefits to the UK. ***Over the coming decade, a massive increase in private and public investment in adaptation is expected: for example, if the world is to meet its goal to align finance with climate resilient development (Paris Article 2.1c) then the $2.7tn of global infrastructure investment each year and $5tn of agricultural investments will need to become adapted to climate change***. Similarly, COP26 urged developed nations to double their collective provision of adaptation finance, The total investment needs in infrastructure globally are expected to be around £3.8tn. Investments in adaptation across emerging and developing economies alone are estimated at $100bn - $300bn per year. And already, the EU has committed to deploy 25% of its total budget on climate for the next six years; US Department of Defence budget 2022 included $26 billion on resilience; and California and New York, $4.1 billion and $29 billion respectively on resilient infrastructure. The UK can play a central role in mobilising finance, including through ensuring well-regulated and conducive markets for international debt issuance aligned with sustainability and resilience goals, and also providing risk-based financial products, including insurance and guarantees to de-risk investments. The UK can lead in providing information and professional services to support new disclosure requirements and taxonomies around the world. Globally, each of the world's largest financial centres (outside of the USA) already require TCFD-aligned reporting and across 101 jurisdictions almost 4,000 corporates are supporting TCFD[110]. TCFD requires reporting of physical climate risks, yet this is weak today, with less than 30% of asset owners and asset managers reporting on their risks. Green and sustainable finance taxonomies are similarly proliferating and the majority integrate adaptation.

[109] City of London Corporation 2019: A Global Marketplace For Infrastructure Solutions. https://www.theglobalcity.uk/resources/london-infrastructure-solutions
[110] https://www.fsb-tcfd.org/support-tcfd/

These tends point to the huge need and commercial opportunity through providing the UK's world-leading science and analytics.

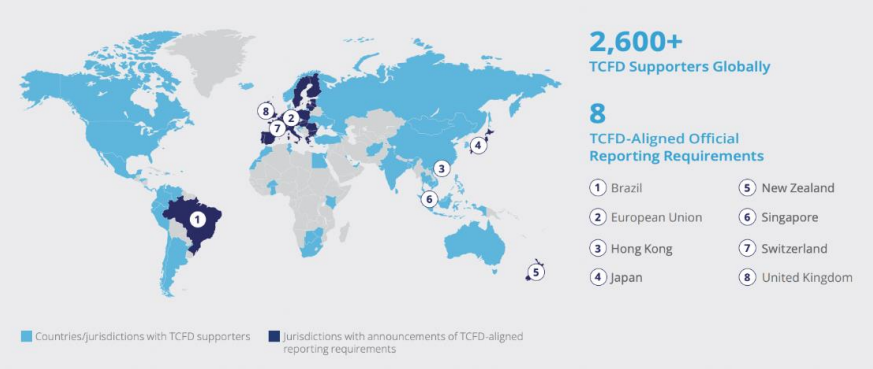


Figure 16: TCFD supporters globally. Source: TCFD Progress Report 2021

HM Treasury should work with the London Insurance Market, the Climate Financial Risk Forum, the FCA and PRA to put in place processes to ensure the continued competitiveness of the UK in the evolving risk and financing landscape. Regulators should work with financial institutions to identify where there may be unnecessary barriers to investment in adaptation internationally, including in emerging markets. The government should also ensure the global interoperability and conduciveness of the UK financial sector for adaptation finance, including interoperability of the UK taxonomy and standards and environment for new innovations in adaptation finance, as recommended by the guidance of the UK Green Technical Advisory Group[111].

⇒ **Recommendation 23: Government and financial institutions to work together to identify opportunities to strengthen the UK's market for international adaptation finance and services, including through the Climate Financial Risk Forum. This includes ensuring the global interoperability and conduciveness of a UK taxonomy and standards and environment for new innovations in adaptation finance**. The government should convene a taskforce to provide recommendations on specific actions by mid-2024, including building upon the Adaptation Working Group of the Climate Financial Risk Forum and the recommendations of the UK GTAG on international interoperability

⇒ **Recommendation 24: Invest in science and innovation as a public good in the UK to capture the growing demand for information and professional services globally on adaptation**, including building upon existing initiatives and programmes such as the UKCGFI, GRII (Box 15) and the UK Met Office Hadley Centre (Box 16). The next comprehensive spending review (CSR) is a key moment to commit to increase investment in domestic data, research and related infrastructure to ensure the UK's position as a leading centre of expertise on climate impacts and adaptation

[111] Green Technical Advisory Group (2023) Promoting the international interoperability of a UK Green Taxonomy. https://www.greenfinanceinstitute.co.uk/wp-content/uploads/2023/02/GFI-GTAG-INTERNATIONAL-INTEROPERABILITY-REPORT.pdf. Green Finance Institute.

globally, and foster new partnerships between businesses and research institutions to develop products and services.

Box 16 - UK Global Partnerships for weather and climate research to inform effective advice across all timescales.

The UK Met Office provides science expertise and technical assistance in partnership with funders and implementers of global programmes related to weather and climate information services. These include the FCDO, the European Commission, the World Bank, the Green Climate Fund and UN agencies such as the World Food Programme and UNOCHA. Met Office works with users to co-produce early warnings across all timescales informing decision making for preparedness, disaster risk management, climate mitigation and adaptation. UK government announced at COP26 the intention to scale up funding to FCDO for proven successful programmes such as the Weather and climate Information SERvices[112] (WISER) and Asia Regional Resilience to a Changing Climate[113] (ARRCC). Met Office manages these programmes and works with implementing partners to provide relevant technical expertise. WISER and ARRCC originated in East Africa and South Asia in 2015 and 2017 respectively and are now extending to Pan-Africa, the MENA region, Asia and the Pacific.

An example WISER project, HIGHWAY[114], worked with national weather agencies and communities in Uganda, Kenya and Tanzania to improve the accuracy of the forecasts, the co-generation of warnings with users, for improved action taken by the 5.4 million people who live along the shores and islands of Lake Victoria. The project demonstrated a 30% fall in weather related deaths between 2019 and 2020, increased forecast accuracy to 70% which benefitted the fishing communities who generate a $44million per year income.

The Met Office is also a key delivery partner on behalf of the UK's government Department for Science, Innovation and Technology (DSIT) Weather and Climate Science to Services Programme[115] (WCSSP), harnessing the weather and climate expertise of the UK and partner countries such as Brazil, China, India, South Africa and various countries in South East Asia, to help address the global impacts of weather and climate change. Since 2014 the programme has supported over 100 research projects[116] which have stimulated over £26 million of additional research funding, produced publications which have been cited 289 times in 146 policy documents across 17 countries. This work has advanced our knowledge of weather and climate science and created new improved services.

Met Office climate scientists co-author the World Meteorological Organisation's State of the Climate Reports[117] and the Intergovernmental Panel on Climate Change[118] reports.

Source: Met Office (Helen Bye and Nyree Pinder)

[112] https://www.metoffice.gov.uk/about-us/what/working-with-other-organisations/international/projects/wiser/highway
[113] https://www.metoffice.gov.uk/services/government/international-development/arrcc
[114] https://www.metoffice.gov.uk/about-us/what/working-with-other-organisations/international/projects/wiser/highway
[115] https://www.metoffice.gov.uk/research/approach/collaboration/newton#:~:text=What%20is%20the%20Weather%20and,Service%20Partnership%20(WCSSP)%20programme.
[116] https://www.metoffice.gov.uk/research/approach/collaboration/newton/insights/wcssp-research-insightshttps://www.metoffice.gov.uk/research/approach/collaboration/newton/insights/wcssp-research-insights
[117] https://public.wmo.int/en/our-mandate/climate/wmo-statement-state-of-global-climate
[118] https://www.ipcc.ch/reports/

The 2023 Green Finance Strategy laid out the UK's ambition to demonstrate leadership on aligning finance with climate goals. The UK can show global leadership on delivering the climate resilience development aspect of this goal. This aspect of the Paris agreement Article 2.1c is as essential as mitigation, but not operationalised. The UK should clearly advocate for aligning finance with climate-resilient development goals through international fora including the International Platform on Sustainable Finance, the G20 Sustainable Finance Working Group, the Network of Central Banks and Supervisors for Greening the Financial System (NGFS), the UN Framework Convention on Climate Change (UNFCCC) Conference of Parties and Coalition of Finance Ministers for Climate Action, through its influence and financing of multilateral agencies and international financial institutions, including the World Bank and the International Monetary Fund (IMF), and its bilateral development assistance. and the Coalition of Finance Ministers. The UK can take the opportunity to position itself clearly to be the go-to centre of expertise through increasing investment in public goods to support this goal, building upon existing UK-funded initiatives with leadership in this area.

⇒ **Recommendation 25: Advocate and lead on the implementation of Paris Article 2.1c globally on ensuring financial flows are consistent with climate resilient development**, including through engagements in international fora, with multilateral agencies and international financial institutions and through UK international development assistance, including the UK's International Climate Finance (ICF).

ANNEX: ANALYSIS OF THE 2023 GREEN FINANCE STRATEGY

	Adaptation (explicit)	Linked Nature (adaptation not explicit but potential benefits for adaptation)	*Other commitments that *should* implicitly contribute to adaptation (but not explicitly mentioned)*
Domestic			
Targets	[NONE]	International: Commitment to the **Kunming-Montreal Global Biodiversity Framework** UK: **Legally binding target** to halt the decline in domestic species abundance in England by 2030, and then increase abundance by at least 10% to exceed 2022 levels by 2042. *"This target, together with other goals set out in our Environmental Improvement Plan published in Jan 2023, sets a clear direction that can help to make the UK a leader in private investment in natural capital"*	***Alignment of financial flows was captured in the long-term goals of the Paris Agreement***
Goals	[NONE]	2021: Government set a **goal to mobilise more than £1 billion per year of private finance into nature's recovery in England by 2030**, and at least £500 million of private finance per year by 2027. *"We expect to see this finance made up principally of investment in nature-based solutions for carbon sequestration, flood risk management and water quality, as well as compensating for biodiversity and nutrient impacts (e.g. through Biodiversity Net Gain and Marine Net Gain)"*	
Other commitments	"As we transition to net zero, we will also take action to prepare for the physical impacts of the changing climate, **seeking to align finance flows with a climate resilient economy and increase investment in adaptation"**	2021: Over 140 countries, representing 90% of the world's forests, signed the **Glasgow Leaders' Declaration on Forests and Land Use (GLD)** and committed to work collectively to halt and reverse forest loss and land degradation by 2030 while delivering sustainable development and promoting an inclusive rural transformation. Recognising the power and necessity of private finance in protecting forests and other ecosystems, GL Action 6 commits countries to facilitate the alignment of financial flows with international goals to reverse forest loss and degradation. We will work with UK financial institutions, starting with a series of Government-convened roundtables in 2023, to further tackle deforestation-linked finance. The UK government is **committed to supporting the development of markets for carbon and other ecosystem**	

		services in the UK, guiding, and stimulating demand while also ensuring that they build trust and confidence. **UK's Finance Nature Recovery initiative**	
Strategies/Plans	2023: We will set out a **five year strategy to build the UK's climate resilience in the third National Adaptation Programme (NAP3)**. **Build a launchpad for private and public collaboration over next 5 years to overcome barriers to investment in adaptation and assist in the creation/functioning of new markets.** Announce our approach alongside our adaptation finance deliverables and action plan by end 2024.	This Strategy sets out the measures we are putting in place to mobilise that investment, including through our **Nature Markets Framework**, published alongside GFS We will aim to **publish an investment roadmap by 2024** to support the nature-positive transition pathway for these sectors and will update them as policy develops. A number of sectors (such as agriculture, forestry, water, resources and waste) also have a critical role to play in delivering the goals set out in our Environmental Improvement Plan, in addition to the key contribution they will make to meeting our net zero target.	
Policy/Legislation	[NONE]	2021: We passed **the landmark Environment Act 2021**, putting environmental goals, such as reversing the decline in biodiversity, on a statutory footing. 2023: **Environmental Improvement Plan**, setting out how we will work with land managers, communities and businesses to deliver our environmental goals. 2023: **New Nature Markets Framework**. 2023: **Mandatory Biodiversity Net Gain**, which we legislated to introduce in Environment Act 2021, will establish a market for biodiversity units from Nov 2023. 149 Land managers who can create/enhance habitat on their land will be able to sell the units to developers needing to meet their obligations. 2023: committed to publish **Land Use Framework for England** in 2023, to inform how manage trade-offs between land uses as deliver ambitious climate and environmental goals, and provide clarity to the market The UK government has **set an expectation of a significant increase in the use of nature and catchment-based solutions** in the water sector, with companies and regulators working towards delivering these solutions as a matter of preference. As well as mandating **Biodiversity Net Gain** for developers and Nationally Significant Infrastructure Projects, we are aiming to make ***Sustainable Drainage Systems***	

		(SuDS) mandatory in new housing developments in 2024, subject to final decisions on scope, thresholds and process following consultation.	
Regulatory, Standards, Disclosures	2020: UK government was the first G7 country to commit to mandatory **TCFD reporting**, and published a roadmap towards mandatory climate-related disclosure. [+ physical risk] 2021: **Mainstreamed climate considerations into the work of the financial regulators** – the Financial Conduct Authority, Prudential Regulation Authority and Financial Policy Committee - when carrying out their duties [includes physical risk] 2022: **Climate disclosure requirements introduced for large companies/LLPs** (including Pensions schemes). 2022: BoE set **supervisory expectations** for banks and insurers on the management of climate-related financial risks as part of core supervisory processes. Delivered bottom-up scenario exercise (**CBES**) 2023: In its second phase of work, the **TPT** will consider in more detail how nature's recovery, climate adaptation and social impacts can be incorporated into transition plans. 2023: We will work with industry partners to **improve, and make more efficient for business, the approach to climate resilience assessment and disclosure through the development of adaptation metrics and guidance**. This will facilitate a more structured, quantitative and consistent approach to the assessment	2022: The UK signed up to a **commitment in the Global Biodiversity Framework** to ensure the largest companies regularly monitor and disclose their risks, dependencies and impacts on nature. First government to fund and fully support the creation and progress of the **Taskforce on Nature-related Financial Disclosures** (TNFD). The UK government will explore how best the final TNFD framework, due to be published in September 2023, should be incorporated into UK policy and legislative architecture, in line with Target 15 of the GBF. The TNFD provides the main method of operationalising Target 15 and the **UK government welcomes closer integration with the ISSB to build a global baseline on sustainability reporting.** 2023: We are working with the **Bank of England, the Green Finance Institute and other partners** to quantify more effectively the potential UK financial exposures from nature loss and degradation. 2023: Given the importance of agriculture for our nature and climate change goals we have created the **Land, Nature, and Adapted Systems Advisory Group (LNAS)** as a sub-group to the G T A G to advise on sustainable agriculture and fisheries. It will also consider the role of infrastructure, including nature-based infrastructure, in delivering a resilient economy. **Nature investment standards**	*2019: Co-funded the **British Standards Institution (BSI)** to design and roll out a programme of internationally relevant standards on Sustainable Finance.* *2021: Set up the **Climate Financial Risk Forum (CFRF)** with the FCA to build capacity and share best practice to help the financial sector address climate financial risks.* *2021:**Greening Finance: A Roadmap to Sustainable Investing** focussing on ensuring that the info. exists to enable every financial decision to factor in climate and environment. UK's disclosure framework aligned with TCFD.* *"CFD requirements central part of the SDR framework as well as the foundation for the IFRS Sustainability Disclosure Standards "* *2025: Plans to **implement TCFD in central government annual reports and accounts,** with a three-year phased implementation extending to 2025-26. UKEF and some public finance institutions are already reporting or committed to reporting in line with the TCFD.* *2023: Government is committed to implementing a usable and useful UK Green Taxonomy. 2023: Consult on the UK Green Taxonomy in 2023 and explore link to SDR.* *2023, the FRC will review the regulatory framework for effective **stewardship,** including the operation of the **UK Stewardship Code*** *"Environmental reporting requirements for businesses and the financial sector are becoming stronger, with the implementation of SECR and TCFD, the development of the I RS Sustainability Disclosure Standards and the TPT. These measures make it easier for*

	and management of physical climate risks. We will ensure that the government's future climate-related disclosure guidance includes sufficient information and detail on risk to support organisations in disclosing and mitigating this risk. 2023: **We will champion the development of adaptation metrics within the IFRS Sustainability Disclosure Standards.** 2023: We will scope what support businesses and the finance sector needs, for example guidance, training, facilitating collaboration and standardising data sets, and anticipate developing partnerships with the private sector on delivery. We will announce our approach alongside our **adaptation finance deliverables and action plan by the end of 2024.**		*investors to understand the climate risks associated with their investments and help direct finance towards **adaptatio**n."* ***DWP Stewardship Guidance on Fiduciary Duty*** *Assessing **IFRS Sustainability Disclosure Standard**s for use in UK* ***Solvency UK** – enabling infrastructure investment*
Public Financial Institutions and Financing Vehicles and Schemes	[NONE]	The UK government is **investing £30 million Big Nature Impact Fund (BNIF)**, a new blended finance impact fund managed by Federated Hermes and Finance Earth The **£50 million Woodland Carbon Guarantee** helps accelerate woodland planting and develop the domestic market for woodland carbon, by offering a price guarantee for verified carbon credits sold to the UK gov Our new **Environmental Land Management** schemes are being designed to dovetail with private investment. In particular, we are supporting the bespoke **Landscape Recovery projects** to secure private funding alongside public funds in innovative ways.	*Work with the Green Finance Institute and the finance sector to develop a forward-looking analysis **of blended finance models** and where they could be better deployed in the U K.* *UKIB published a Strategic Plan with five priority sectors: clean energy; digital; transport; **water; and, waste.*** *GFI Designing the **Green Finance Guarantee Facility** to overcome obstacles faced by financial institutions on the mitigation of real or perceived risk in emerging market climate infrastructure investments.*

		The UK government is providing four local authority areas with up to £1 million each to act as trailblazers in our **Local Investment in Natural Capital (LINC) Programme**	
Data and Analytics	[NONE]	**Natural Capital and Ecosystems Assessment (NCEA)** **TNFD Nature-related data catalyst** UKRI including **Nature Positive Future programme**	*UKRI support to **CGFI*** *Consultation on the regulation of **ESG** ratings providers under FCA.* ***Benchmarks and indices** play a role in the allocation of capital towards green and sustainable investment. The UK's regulatory regime for benchmarks already makes provision for ESG benchmarks*
Education, Skills and Research	With the CCC, **scoping research requirements in adaptation investment needs.** This will improve the evidence base, and findings will be published in the fourth Climate Change Risk Assessment (CCRA4), due for publication in 2027. One of the biggest barriers to adaptation finance is being able to monetise the benefits of adaptation ao repay private investment. Two projects seeking to address this barrier: a. **Monetising insurance benefits from flood resilience:** We will explore opportunities for new financing mechanisms for facilitating insurance markets to build flood resilience, where that will reduce overall costs. b. **Coastal Loss Innovative Funding and Financing**: exploring the development of financing mechanisms to support residents in properties impacted by sea level rise, either through incentives to relocate from high-risk areas or by providing financial protection.	The National Parks Partnership and National Association for Areas of Outstanding Natural Beauty to support capacity building of Protected Landscape bodies and increase pipelines of projects for private investment. Cover nearly 25% of land in England and are critical to attracting investment into natural capital, protecting habitats while enabling access for people. We are working with the **Ecosystems Knowledge Network** and Green Finance Institute (GFI) to publicise and share cases studies and learning from the **Natural Environment Investment Readiness Fund (NEIRF).** The £270 million committed to **agricultural and horticultural R&D** through the Farming Innovation Programme (FIP) to 2029, to enhance productivity, environmental sustainability and resilience in England's farming sectors Research focused on exploring options to **track private investment into nature** which we plan to publish shortly. We are looking at the feasibility of adopting some of the methods recommended. Supporting **86 innovative nature projects across England to explore ways of generating revenue from nature markets** and operate on repayable private sector investment, through the £10 million Natural Environment Investment Readiness Fund (NEIRF).	*The GFEC will be re-launched alongside this Strategy as the **Sustainable Finance Education Charter (SFEC).** This reflects the need for professional bodies and professionals to address wider issues of biodiversity loss and nature-based finance, transition planning, and ensuring an economically and socially inclusive transition in support of the UK's net zero objectives. [No adaptation mention]*

Devolved Administrations			
Goals		Scotland: Commitment to develop Scottish Government Interim Principles for Responsible Investment in Natural Capital	
Strategies/Plans		Wales: Contributing to the Global Biodiversity Framework by developing an action plan to deliver the 30x30 biodiversity target, including consideration of statutory biodiversity targets, ethical and transparent private investment in nature recovery.	*Scottish Taskforce on Green and Sustainable Financial Services* *Scottish Green Investment Portfolio* *Scottish Funding to Finance approach* *Scottish National Investment Bank*
Funding Commitment		Wales: Establishment of the Ministerial Portfolio for Climate Change in 2021, with an annual budget of over £2 billion to support Net Zero and tackle biodiversity loss in Wales.	
Public Financial Institutions and Financing Vehicles	Wales: Commitment of the Development Bank of Wales to support Net Zero and climate adaptation targets.	Scotland: Facility for Investment Ready Nature in Scotland (FIRNS), a £1.8 million investment readiness fund. Wales: Establishment of Sector and Regional Funds and Boards examples including Woodland Financing Group	
International			
Goals and Commitments	UK will double **International Climate Finance (ICF)** and as part of this triple our funding for adaptation from 500 million in 2019 to 1.5 billion in 2025	2022: The International Development Strategy set out our commitment to ensure our **bilateral ODA becomes 'nature positive',** aligning with the Kunming-Montreal Global Biodiversity Framework and the international goal to halt and reverse biodiversity loss by 2030.	2019: Committed to **align all new bilateral Official Development Assistance with the Paris Agreement,** to be delivered in 2023.
Regulatory, standards, disclosures (voluntary)	[NONE]	2021: Secured support for launch of the **Taskforce on Nature-related Financial Disclosures**, now an international market-led taskforce with over 900 members representing over $20 trillion AUM	*2021: UK G7 Presidency secured **mandatory climate disclosure*** ***commitments from members**.* *2023: The government will also take proactive steps to **encourage other jurisdictions to mandate transition plan requirements.** Encouraging consistency with the TPTs guidance. We will advocate for the importance of **international alignment** and best practice in transition planning- collaborating with our partners through key forums such as the G7, G20 Sustainable Finance Working Group and our leadership of the private finance*

			workstream at the Coalition of Finance Ministers for Climate Action. *Continue to support the efforts of **ISSB** on the international stage. Supporting the adoption of IFRS Sustainability Disclosures by other jurisdictions* *The government recognises that for the objectives of an international baseline to be met it is important that there is strong global take up of the standards, which we will support through our **international engagement and development assistance**.* *Continue to work with international partners to maximise **interoperability and harmonisation**, which will be critical in minimising reporting burden, facilitating cross-border financing and maintaining high levels of transparency and environmental integrity. In line with GTAG guidance, we will also **work with international partners to ensure that other efforts to develop national taxonomies are informed by the UK's principles and approach.*** ***Encouraging the development of a science-based global baseline** on taxonomies- considering the GTAG recommendations and strengthening our engagement in the International Platform for Sustainable Finance*
International Leadership and Policy/influencing	Work with MDBs and partner countries- to ensure MDBs fully **align their activities with the Paris Agreement** in accordance with their timebound commitments, and by 2025 at the latest. IMF: **Ensuring that climate and nature degradation risks are better reflected in**	Support **MDBs to align with the GBF** by implementing the MDB COP26 Joint Statement on Nature, including tracking and scaling up finance for nature. 2022: the UK – in collaboration with Ecuador, Gabon, and the Maldives – set out a political vision for bridging the global nature finance gap through the **10 Point Plan for Financing Biodiversity.** The Plan presents a clear pathway for bridging the global nature finance gap by defining the role of all	*Supporting the **Bridgetown Agenda*** *UK will champion, seeking greater recognition of **Article 2.1c** through the upcoming **Global Stocktake** and the **Sharm-el Sheikh Dialogue** agreed at COP27, and working towards a new global financial goal to replace the $100 billion goal, which better reflects the important role of **efforts to align the global***

	assessments of macroeconomic stability. Aligning the UK's development assistance and international finance levers with climate and nature goals, and using our voice in international financial institutions to encourage them to do the same. The UK has published principles for including CRDCs (Climate-Resilient Debt Clauses) in private sector loans and is **calling on more international financial institutions (IFIs) and the private sector to adopt them.** **U K-Fiji-led Taskforce on Access to Climate Finance** and its country pilots in Bangladesh, Fiji, Jamaica, Rwanda and Uganda	sources of finance, with a particular focus on how international public finance can support EMDEs to accelerate the transition to become nature positive. 2022: UK co-launched a **Joint Donor Statement on International Finance for Biodiversity and Nature**. This statement by 14 countries included a commitment to collectively increase international biodiversity finance and align relevant international development flows commensurate with the ambition of the GBF. This means mitigating nature-related risks and impacts; assessing risks across financial systems from biodiversity loss; supporting recipient countries' transitions to net zero, nature positive economies; and increasing finance aligned with the mission to halt and reverse biodiversity loss by 2030.	***financial system in meeting the needs of LMICs**. This will be coupled with efforts through key fora such as the G20 Sustainable Finance Working Group, to ensure build consensus and coherence around actions to build a globally aligned, interoperable financial system* ***BoE & regulators advanced international thinking on the relationship between climate risks and regulatory capital**,* *2022: Supporting the **Resilience and Sustainability Trust (RST).** We will continue to shape the RST to ensure it meets vulnerable countries' needs for increased fiscal space to deal with climate shocks. Advocating to increase financing for the poorest countries, and for increased access limits for Low Income Countries and greater resourcing of the **Poverty Reduction and Growth Trust.*** *The UK is calling for the Multilateral Development Banks (MDBs) to **unlock billions of dollars in new lending** by implementing the recommendations of the G20 Review of MDBs' Capital Adequacy Framework* *To achieve a globally aligned financial system, the UK Government will continue using its voice in international forums – including the G7, G20, Financial Stability Board (FSB), Coalition of Finance Ministers for Climate Action, U N Framework Convention on Climate Change and UN Convention on Biological Diversity – to advocate for broadening and deepening coverage of green finance policy frameworks. In particular, we will **call for greater global action on mandatory sustainability disclosures, transition planning requirements, data***

			availability and science-based green taxonomies.
Funding and related Commitments	UK investing £200 million in a new **African Development Bank Climate Action Window**. This seeks to attract private investment for adaptation projects in some of the countries most vulnerable to climate change. 2021: a new £120 million funding package for **Disaster Risk Financing**, helped establish the Global Shield Against Climate Risks, and set up the Centre for Disaster Protection 2023: Enabling **private investment in international climate adaptation** – financial support and building coalitions to address the barriers to private investment in adaptation and resilience.	ICF: ringfencing **£3 billion to protect and restore nature** The UK's **£100 million Biodiverse Landscapes Fund** (BLF) will have a strong focus on leveraging private capital to protect biodiversity and reduce poverty in six global biodiverse hotspots across three continents. Leverage private investment through over £40 million of investment in the **Eco Business Fund** and the **Land Degradation Neutrality Fund**, which are dedicated to raising public and private capital to support sustainable land use projects and improve biodiversity. The UK is working with the **Global Innovation Lab** for Climate Finance to scope new support for projects in Latin America, including a potential thematic window to identify innovative financing solutions for high-integrity forests. The UK's £500 million **Blue Planet Fund (BPF) supports** EMDEs to reduce poverty, protect and sustainably manage their marine resources and address human-generated threats. Programmes under the BPF include technical assistance to support blue bond development and funding for innovative financial tools that encourage private investment into marine nature-based solutions. The U K's **Biodiversity Challenge Funds** (the Darwin Initiative, Illegal Wildlife Trade Challenge Fund, and Darwin Plus) award grants to support the development and adoption of financial mechanisms to benefit biodiversity, people and the planet.	
Capacity Building	We will work with MDBs to **mainstream climate change within their technical assistance support**, including by supporting borrowers to integrate climate considerations in policy formulation to manage climate-related fiscal risks and strengthen enabling environments. The **NDC Partnership** is supported by a £23 million UK contribution.	The **Nature Positive Economy Programme** will be delivered in partnership with the U Development Programme's Biodiversity Finance Initiative (BioFin) and Financial Sector Deepening Africa. This supports governments, central banks, businesses, and financial institutions to integrate nature-related risks and opportunities into decision-making.	***UKPACT*** *uses country programmes, skill-shares, secondments and technical assistance to green financial systems.* ***Financial Sector Deepening Africa*** *works with policymakers, investors and issuers to green financial systems by advising on regulatory reform, mobilising green capital, supporting issuance of green bonds and catalysing green technologies.*

			*The **Bank of England** shares its expertise to enable central banks to implement effective public financial management, such as through running climate scenario analysis workshops with central banks from countries across Africa and Asia.*
Public Financial Institutions	2020: **British International Investment launched its Climate Change Strategy**, which set out three building blocks for its Paris alignment approach including supporting adaptation and resilience. **UK Export Finance** becoming the first bilateral Export Credit Agency to offer Climate Resilient Debt Clauses.		*We will also **champion high standards in working with international partners**. For instance, UKEF will continue to work with its international counterparts and customers to set stretching climate goals and boost clean growth and climate adaptation investments*
Research, Training, Capacity Building and Convening	BII is working with other DFIs through the **Adaptation and Resilience Investors Collaborative (ARIC)**, to improve understanding of investment in adaptation solutions and developing tools to support the mobilisation of private investment. The UK is supporting the **Coalition on Climate Resilient Investment** to develop tools to more efficiently and effectively price physical climate risk so that the cost of capital is not needlessly inflated. CCRI comprises over 120 members managing $25 trillion in assets.188 Its work includes piloting tools in **Jamaica t**o review critical infrastructure investment gaps, modelling climate risks to that infrastructure, and enabling the government and investors to identify investment priorities.		*Work with the Climate Policy Initiative (CPI) to map **mobilisation of finance flows through the UK to EMDEs**, including to map data gaps and how tracking/ reporting of international flows could be improved* ***Financial Services Deepening Africa** also worked with CPI to launch a Landscape of Climate Finance in Africa report at COP27.* *The Government will also **continue working to improve the supply, quality and comparability of climate and nature related financial data, globally.*** *Welcomes the work of the FSB **Climate Vulnerabilities Data Group** in addressing data gaps and maximising data flows between financial authorities. We will **focus future work on areas where investment is most lacking**, but data gaps remain, such as internal investment within countries and companies, and **towards adaptation**.* *Providing training through the **Centre for Central Banking Studies.***