

# Adaptation and Resilience: Future-proof against the impacts of climate change

UK expertise and services:  
giving you the confidence  
to face the future







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# What is Clean Growth and its relationship to Adaptation and Resilience?

# What is Clean Growth?

## Clean Growth: A definition

An ambitious blueprint for Britain's low carbon future, Clean Growth encompasses the government's ambitions to promote sustainable economic growth through trade and investment, which includes managing the long-term impacts of climate change through adaptation and resilience.

It explains how countries, regions and businesses around the world, can benefit from low carbon opportunities, while meeting national and international commitments to tackle climate change through using UK expertise, services and products.

Clean Growth is at the heart of the UK government's export strategy and, as the world goes green, the ambition is to be at the forefront of the global clean revolution, exporting the UK's green technologies.

The Department for International Trade is supporting UK businesses to co-operate with international partners to transform good intentions of adaptation and resilience into practical and commercially viable solutions.





# Adaptation and Resilience defined

UK exports are supporting countries to adapt and build resilience to the impacts of climate change.

There is no one-size fits all solution to the impacts of climate change.

Even if we stopped emissions rising today, the world would still need to deal with significant impacts caused by climate change. Deploying solutions to adapt and build resilience to climate disruptions is crucial as we see these worsen.

Within this guide, we set out the UK's capabilities and success stories through a range of adaptation and resilience solutions. These vary from setting up early warning systems for extreme weather conditions, building sustainable flood defences and managing farming systems through changing environments.

A large part of the UK's offer is building resilience in economies and physical and resource vulnerabilities to manage the growing climate risks. These include:

- improved land management;
- recovering degraded agricultural land; and
- improving the design and construction of buildings.

Successful adaptation and resilience requires interconnected solutions to effectively adapt to short-term weather events and longer-term climate impacts.

For the purpose of this guide, we are using the United Nations Framework Convention on Climate Change (UNFCCC) definition on adaptation and resilience.

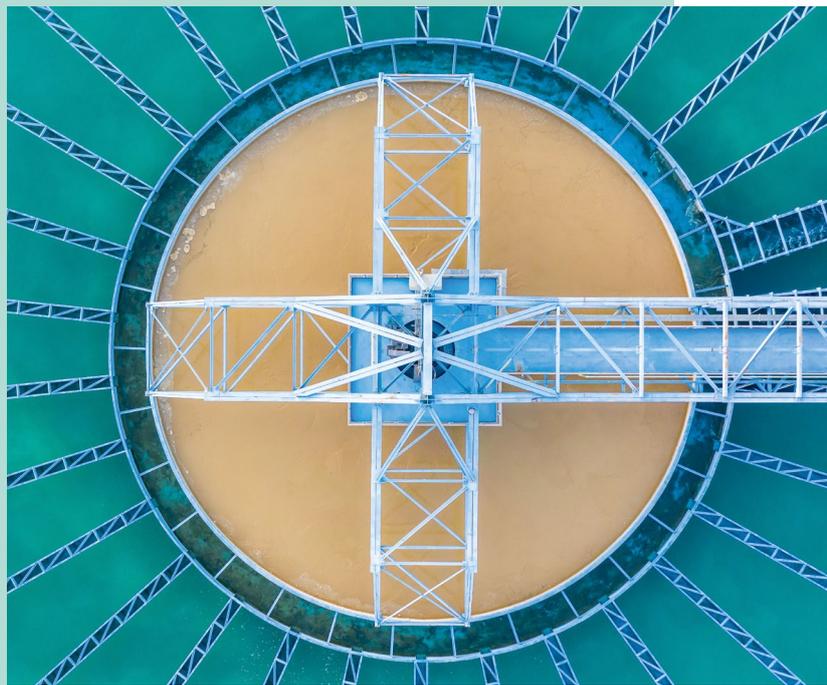


## Adaptation and Resilience: The UNFCCC definition

Adaptation refers to adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts.

It refers to changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change.

In simple terms, countries and communities need to develop adaptation solutions and implement actions to respond to the impacts of climate change that are already happening, as well as prepare for future impacts.



### Discover how Clean Growth can help achieve Adaptation and Resilience

To find out more about how UK expertise, products and services can benefit your country, region, city or organisation and assist in achieving your adaptation and resilience targets, visit

<https://great.gov.uk/international/content/trade/how-we-help-you-buy/>

# How our understanding and experience of Adaptation and Resilience can help you



## 02

The UK government helps international governments, regions, and organisations connect to the UK's world-leading adaptation and resilience capabilities.

The world-class skills and services on offer can:

- Improve the functioning of markets and reduce the price volatility of vital goods.
- Boost economic resilience through industrial diversification and higher income growth.
- Spread uptake of goods, services and technologies which help bolster resilience to climate change.

# Adaptation and

# Resilience and Clean Growth

The increasing significance placed on adaptation and resilience globally was particularly evident in the build up to COP26 and was championed by the UK's Presidency. At COP26 the UK announced that 88 countries were now covered by Adaptation Communications or National Adaptation Plans, with 38 published in the previous year.<sup>1</sup>

The UNEP Adaptation Gap Report 2021 estimated \$140 billion to \$300 billion investment into adaptation is needed annually by 2030.<sup>2</sup> The Glasgow Climate Pact, agreed at COP26, urges developed countries to address this gap through scaling-up climate finance, and specifically to double finance for adaptation by 2025.

The Global Commission on Adaptation estimates that by 2050 if nothing is done to prepare for climate change, it could:

- Lower global agriculture yields by up to 30%.
- Cause water shortages at least one month a year for up to 5 billion people.

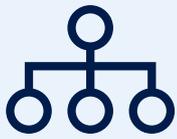
- Displace hundreds of millions of people who live in coastal cities, with an annual cost to coastal urban areas of more than \$1 trillion.

The cost of unmitigated climate change on human life is irrefutable. In addition, there is also strong economic imperative to invest in adaptation and resilience.

The commission found that the return on investment in strengthening climate resilience is very high. Their research found that investing \$1.8 trillion globally in five areas from 2020 to 2030 could generate \$7.1 trillion in total net benefits.

The UK is responding by facilitating these commercial opportunities to deliver clean growth and ensure global prosperity.

# UK capabilities and expertise in climate resilience are world leading



## **Governance:**

Legal and regulatory advisory on climate change legislation and transparent climate-related disclosure.



## **Engineering:**

A global leader in the transition towards net zero and climate resilient design in energy, water, and transport sectors. Technical advisory at early stages of investment design and appraisal to ensure delivery of sustainable projects.



## **Use of Data:**

Strong research councils and bodies such as the Met Office and UK Space Agency, support digital transformation in areas including insurance, finance, and infrastructure.



## **Innovation and Technology:**

A science superpower with business partnerships develop technological innovations for solution-based approaches.



## **Financing capability:**

London is a global centre for international financial services with leading finance bodies such as UK Export Finance (UKEF), UK International Climate Finance (UK ICF) and involvement of leading banks, such as Standard Chartered.



## **Insurance:**

One of the longest standing (re)insurance markets with leading catastrophe modelling and climate risk analytics capabilities.



## **Professional and Business Services:**

The UK is the second largest exporter of services in the world, and home to the Big 4 management consultancy firms. It is also the second largest legal centre in the world, with five of the world's top 15 law firms.

Find out more about how working with UK businesses can help to achieve Adaptation and Resilience goals, and the benefits they can bring to communities, organisations and governments, visit:

<https://great.gov.uk/international/content/trade/how-we-help-you-buy/>

# Physical Adaptation and Resilience



03

## Adapting human settlements and systems to climatic shifts – a global issue

Societies have been adapting to different environments throughout history. However, climate change is driving unprecedented shifts (in temperature, precipitation, storm frequency, flooding and other factors) that previous experience has not prepared us for.

From the impacts of Hurricane Katrina on the Gulf Coast of the United States to the increasing frequency of flooding in South Asia, it is clear disasters and extreme weather events are devastating lives and communities.

Climate change is expected to increase of the frequency of these events over the coming decades, intensifying loss and damage to human settlements and systems and will be exacerbated by growing populations and urbanisation.

These events demonstrate the urgent need to invest in the world-class technologies and infrastructure to minimise the impacts of climate change on communities around the world, and the high costs of failing to do so.

It is estimated that failing to develop climate-resilience against flooding from rising sea levels could result in asset losses of up to \$14 trillion annually by 2100.

Adapting our cities to be more water-resilient will allow populations to cope with climate-driven disruptions, thereby maintaining essential services, and protecting the environment both now and in the future.

Resilience has always been recognised as a priority for UK government, and the industry has responded by delivering best-in-class solutions, regulation and innovative approaches.



**The UK can support the creation of resilient and positive change by leveraging its core strengths in:**

- flood risk management;
- water management;
- digital planning and monitoring systems;
- digital maritime;
- clean mining;
- built environment/infrastructure; and
- agricultural technology.

# UK capabilities

## Flood risk management

The UK has a strong background in flood risk assessment, adaptation and control. There is particular expertise in understanding the risks of disaster situations, climate and weather on the risk of flooding, and then turning these risk assessments into operational tools to manage these risks.

We have designed defences for some of the world's largest cities – including:



the Thames Tideway in London;



stormwater management in New York;



the drainage masterplan for Shanghai;



water management for Cairo: and



a smarter flood response system in Bangkok.

The UK has also developed a large range of products to reduce flood risks at an individual property scale and flood warning systems to alert those at risk.

# Digital planning

Assessing potential climate impacts through integrated and inclusive planning can significantly increase the adaptive capacity of both urban and rural settlements.

With digital technology, the impacts of climate change and natural disasters on assets can be modelled, allowing potential disruptions to be pre-empted and managed accordingly.

Building Information Modelling (BIM), can enable adaptability as demand patterns change – and support the re-purposing or re-use of components. It is envisaged that digital twins of assets will play a critical role in managing responses to climate events, reducing the risk of asset failures and associated utilities outage.



# Excellence in Satellite Applications

The UK published its first [National Space Strategy](#) in September 2021. This strategy sets out the UK government's ambitions for the UK in space, bringing together civil and defence policy for the first time.

An extract of the National Space Strategy is captured below:



## Goal 5: Use space to deliver for UK citizens and the world.

We will use space to tackle global challenges, including climate change and biodiversity loss... We will support businesses to develop the new technologies and infrastructure to deliver these services through better government procurement, with clearer requirements, a more joined up approach to civil and defence needs, and easier routes for firms to offer their expertise.

We will also use space to help deliver the UN Sustainable Development Goals, putting the UK at the forefront of meeting the needs of our planet and its people.

UK government will work with British companies, researchers, innovators, and our partners and allies across the world to transform the UK's space sector and achieve these goals.



The Strategy's 10-point plan emphasises the role of space in adaptation and resilience. It commits the UK to staying at the forefront of Earth observation technology, to gain a clear understanding of how climate change is impacting the Earth and guide crucial decision-making and investments.

It is the UK government's ambition to be a science and technology superpower that delivers space-enabled leadership in combatting climate change and biodiversity loss. **The UK Space Agency's space for sustainable development initiative – the [International Partnership Programme](#)** – demonstrates the utilisation of UK expertise in satellite technology and data services to help tackle global challenges.



Achieving adaptation and resilience goals with UK expertise and products.

# Disaster Risk Management (DRM)

The UK has expertise in a variety of satellite technologies which can support adaptation and resilience initiatives in a wide range of DRM scenarios.

Examples include:

**Flood risk management and response** which provides flood risk mapping and insurance, both supported and verified by satellite data.

**Satellite-enabled communications** allow responders to communicate and cooperate when systems are damaged, such as in the event of a natural disaster.

## Digital Maritime

The UK has a distinguished reputation in maritime with a strong history of being at the cutting edge of maritime science.

Approximately 95% of all UK imports and exports by volume are moved by sea and virtually all data entering and leaving the UK travels by subsea cable.

Global maritime trade volumes are expected to treble by 2050 and the Organisation for Economic Co-operation and Development (OECD) estimates the value add generated globally by ocean-based industries could double from £1.1 trillion in 2010 to £2.3 trillion in 2030. Climate related impacts on the maritime sector might include rising sea levels affecting ports, and adverse weather events causing loss or delay.

Technology, including enhanced data, can help mitigate these effects by predicting weather events more accurately and by improving shipping operations through greater connectivity and data gathering.

**Earth observation** provides accurate information on the location of buildings and infrastructure and how they relate to different hazards, such as flooding, fire, landslides, and volcanic activity. This mapping technology provides planners and responders with improved geospatial information which supports smarter decision-making before and after disaster events.

As UK business represents 20% of the entire global offering in ship operations, and a management technology sector, worth £4 billion,<sup>3</sup> the UK can make a positive and transformative impact on industry resilience and supply chain traceability.

The UK Hydrographic Office is a major source of nautical mapping, and its products are used in around 80% of all ships.<sup>4</sup>

The world-class UK space sector has the potential to grow the provision of earth observation, satellite communications, position navigation and timing (PNT) and maritime autonomy. Lloyd's Register, the UK's classification society, has also been innovating rapidly at the [Satellite Applications Catapult](#) with remote vessel inspection products.

# Mining and flooding, and excavation instability

Across the globe it is becoming increasingly important to understand and address the impact of climate change on water, specifically its effect on groundwater. Climate change can affect the soil infiltration, surface percolation, and the volume of water in these groundwater systems. It is therefore essential that mining companies manage the efficiency of water use or reuse and understand the constraints on the abstraction or discharge of water to and from the natural environment.

In summary, physical challenges that may arise if mine water is not effectively managed, include:

**Flooding and excavation instability:** As a direct consequence of the effect of climate change on rainfall intensity and river flows, heavy rainfall can result in an ingress of groundwater or uncontrolled surface runoff into mines, consequently resulting in flooding, the destabilisation of pit walls, and ultimately mine collapse.

**Water pollution:** The flooding of mine operations, leaching and tailings facilities can also result in the water pollution of groundwater and fresh water sources. This may occur from the large-scale land disturbance associated with mining. Many discharges from deep mines can be treated as point sources, but the quality of water is due to reactions occurring across a large area that may cover tens of square kilometres.

A way in which we can mitigate these risks is through exporting our domestic expertise in clean mining practices, and by improving ways of treating sources of mine water pollution and increasing the stability of mine infrastructure. To prevent water entering mines, ongoing systems of boreholes and pump stations should also be installed to ensure the continuous dewatering of mining operations.



# Translating environmental and social consultancy into practical solutions



The UK is home to a variety of companies that have world-class capabilities in assessing the social and environmental impacts of natural resources management and climate-related events through stakeholder analysis. These assessments can inform strategies that create long-term economic prosperity while protecting biodiversity, ecosystems, and the environment. This expertise extends to the remit of mining and flooding, as well as excavation instability.

- Many of the world's largest engineering, design and construction companies are located in the UK, for example the British Geological Survey, who have expertise in groundwater management. From here, they design and develop mining projects and related infrastructure across the world.
- Over 50 UK universities and technology institutions are active in world-leading research and development programmes including evolutionary mineral processing technology that dramatically reduces mining waste products and environmental impact.
- The University of Exeter is leading a pioneering new research centre, designed to revolutionise how crucial metals are extracted, used and reused in clean and digital technologies across the UK. The Centre will bring together experts from the Universities of Exeter, Birmingham, Manchester, Leicester and the British Geological Survey, as well as 40 partner companies and organisations.

# Success Story: Peru reconstruction



In 2017, the climate pattern of El Niño had a devastating impact on communities in Peru, as heavy rain caused coastal flooding and erosion, causing hundreds of thousands of people to lose their homes, public service facilities and farmland.

Following severe damage to critical infrastructure, Peru selected the UK as a delivery partner to support its goal of reconstructing and restoring vital infrastructure and creating long-lasting social-economic benefits for communities across the country.

The programme's UK delivery team (Arup, Gleeds and Mace) provides project management capability and technical assistance working side-by-side with the Reconstruction Authority supporting a £1.7 billion programme of flood prevention, healthcare and education infrastructure works.

This partnership will support the delivery of schools for over 47,000 children and enable healthcare for a population of over 1.5 million citizens. This partnership will also plant 56 million seedlings to support a nature-based solution for flood prevention works and the sequestration of carbon. The programme is trail-blazing, implementing the world's largest integrated early warning system.<sup>5</sup>

Together, UK companies are supporting Peru with technical assistance to rebuild climate-resilient and sustainable social infrastructure across the country to recover from the most devastating effects of climate change.

**For the full story, see the [Adaptation and Resilience Success Story document](#).**

# Resource Adaptation and Resilience

The impacts of global food security, water scarcity and climate change are a major concern for the UN and governments across the world, and current predictions for population growth and global migration patterns are likely to increase the severity of the situation.

## How vulnerability could affect us



**Agriculture uses 70% of global freshwater use, competing with industrial and residential use, creating greater strain on water security.**



**The number of extreme weather events hitting multiple major breadbasket regions at the same time could triple by 2040.<sup>6</sup>**



**Increased incidences of flooding threaten to destroy and contaminate water sources and sanitation facilities.**



**Ensuring that everyone has access to sustainable water and sanitation services is a critical climate change mitigation strategy for the years ahead.**



## Food security

- Increasing global temperatures will alter what can be grown and where, while climatic shocks (heatwaves, cold snaps, droughts and floods), will significantly reduce crop yields and livestock production.
- Approximately one-half of the world's habitable land is used for agriculture. Food production systems have a massive impact on our planet. These impacts are set to increase with global food demand is set to increase 50%, including a 70% increase in protein demand by 2050 (OECD and FAO, 2018).
- Without Agri-Tech, these systems cannot meet the challenges of increasing demands for food and diverse diets from a rapidly growing population, a changing climate with more extreme weather conditions, competing access to water, land and energy resources, commitments to the clean growth agenda and net zero carbon target and protection of natural capital/nature.
- Trade in Agri-Tech is a critical element to tackling all these challenges, with innovation and technology at the centre of solutions for more sustainable and productive farming practices using less inputs and the contribution of agriculture to provide fuels, fibres and pharma products for the circular economy.
- It is particularly important that farmers, especially those living in climate vulnerable regions, continue to have access to the technology they will need to adapt to, and mitigate the impacts of climate change.



## Capability and Strengths

- The UK has one of the most highly regarded agricultural technology sectors in the world, having contributed to the Agricultural Revolution with many developments in technologies used globally.
- The UK has three of the top five global universities, 20% of the workforce in science, over 100 science parks, well established R&D sites for multinational companies such as Syngenta, Zoetis and Bayer, and the world's best and most complete data-sets relevant to agriculture.

## Precision agriculture

- Precision agriculture is the use of technologies to allow farmers and growers to make more informed decisions on cropped areas, animal husbandry and land management. The objective is to treat smaller areas of the field more specifically at every stage of crop growth, to maximise the output by measuring an increasing number of parameters that can affect yield.
- Effective application enables less inputs (water, fertiliser, energy) to give higher yields with less impact on the environment.
- UK strengths and opportunities in precision agriculture include positioning, remote sensing, automation and machine control, increased accuracy of application, data handling and transfer, wireless technology, and decision support systems.
- Precision agriculture also offers many business opportunities for other sectors, for example, space, telecoms, ICT, big data, chemicals and engineering.

## Case Study: Precision Agriculture, Telford, UK

The UK is very active in precision farming R&D and has a population of professional farmers ready to adopt effective innovations. The 'hands-free hectare' project developed in Telford was the world's first to plant, tend and harvest a crop using only autonomous vehicles and drones. The project has been extended in size and complexity to the 'hands-free farm', a 35-hectare site with several fields.

The Hands Free Hectare and follow-on project Hands Free Farm have been realised through a collaboration with funding from Innovate UK and industry partners Precision Decisions and Farmscan AG supporting innovations including the automation of agricultural machines, route planning software for seeding and harvest, communication & navigation, and remote safety systems.

For the full story, see the [Adaptation and Resilience Success Story](#) document.



# Water scarcity

Water is the primary medium through which we will feel the effects of climate change. Water availability is becoming less predictable in many places. In some regions, droughts are exacerbating water scarcity and, as a result, negatively impacting people's health and productivity.

Higher temperatures and more extreme, less predictable, weather conditions are projected to affect availability and distribution of rainfall, snowmelt, river flows and groundwater, and further deteriorate water quality. Low-income communities, who are already the most vulnerable to any threats to water supply are likely to be worst affected.<sup>7</sup>

Unexpected drought conditions can increase capital expenditure on infrastructure to transport water and increase the risk of conflict with local communities.

With cities worldwide expected to grow by an estimated 2 billion residents by 2050, there is an urgent need for urban water management that ensures consistent, adequate and high-quality water services for all in an increasingly complex and risky climate environment.

A study found that the economic losses of water insecurity could include:

- \$260 billion per year from inadequate water supply and sanitation,
- \$120 billion per year from urban property flood damages,
- \$94 billion per year of water insecurity related to food production.<sup>8</sup>





# UK capabilities

## Strengths of the UK Water Supply Chain

The UK delivers high quality, innovative products and services to high environmental and ethical standards. Examples of UK strengths include: digital modelling and analytical tools, such as BIM; technical and advisory services, such as for tunnelling; and supply and distribution of quality water.

## Products and services

The UK is home to some of the world's greatest research organisations, including those leading research on the impacts of climate change.

Our consultancy experts, companies like Arup and Mott MacDonald, work on projects across the world, providing integrated solutions to improve the management of water supply, wastewater and flooding, while our UK supply chain builds and produces some of the world's most advanced processes and equipment.

## UK capabilities

With world class science and highly skilled talent in many sub-sectors of Agri-Tech, the UK has a proven ability to develop and bring to market new products with commercial partners.

With the UK's food manufacturing and retail sectors introducing innovation to drive productivity increases, environmental improvements and meet consumer demand, the UK has a progressive farming and food supply chain.

Ranked by the World Bank Index as the easiest place to do business compared to any other major country in Europe, the UK has a competitive pricing and tax/tariff environment (especially for R&D/innovation) and stable reliable supply chains creating a dynamic business environment.

## Supporting agriculture through satellite-enabled technology

- Improving yields by providing data which supports more proactive, effective interventions.
- Making farmers more resilient to climatic impacts by providing better weather forecasts and intervention advice.
- Assisting in the provision of insurance by providing data for monitoring and verification.

## Mining and Water

The UK mining sector is home to a large variety of mining supply chain companies who export equipment and services globally. This includes companies that specialise in mine water systems, wastewater treatment, tailing facilities, mine lifecycle assessments, and many more services

These UK-based companies are at the forefront of driving the increase in Environmental, Social and Governance (ESG) standards of mining practices across the globe. This makes the UK mining sector a key component in the push for increasing adaptation and resilience services in global mine water management.

## Success Story: Intelligent dam safety monitoring

DAMSAT is an award-winning project funding through the UK Space Agency's International Partnership Programme (IPP) which uses space technology to track movement (instability) in mining dams; it also tracks pollution in water around mining areas.



For the full story, see the Adaptation and Resilience Success Story document.

# Economic Adaptation and Resilience

## Climate disruptions to economic growth – a global issue

The economic impacts of climate-related incidents and conditions are stretching budgets to their limits, especially in Small Island Developing States (SIDS) and Least Developed Countries (LDCs).

If no steps are taken to adapt to climate change and enhance resilience to its impacts, then the effect on global economic output will be considerable – causing a predicted reduction of up to 14% by 2050.

In monetary terms that would be a reduction of \$23 trillion in annual global economic output according to a report from Swiss Re.

In the aftermath of natural disasters, there is, rightly, an almost reflex response to protect and restore economic activities to their previous levels, but adopting a more proactive, more diversified Adaptation and Resilience approach to future climate disruptions and the risks they may bring can lead to higher income growth in the long-term.

This section examines the role that finance, and professional services can play in reducing and managing the risks of climate-related loss and damage from climate change.

With its world class engineering, insurance and finance industries, the UK brings forward integrated solutions that support future-proof infrastructure, that is easier to finance and resilient to the most damaging effects of climate change. Within economic adaptation and resilience and an interconnected approach to the solutions, we have multiple areas that will support both the UK and overseas, these include:

- Support from UK Export Finance supporting global mitigation and adaptation efforts.
- Climate risk and finance resilience through resilience solutions as a service with government and insurance expertise.
- UK capabilities through upskilling green and transition skills.
- Resilient supply chains.

# Climate Insurance and Finance Resilience – taking the UK’s expertise global

- **Building on existing culture and reputation:** The UK is home to innovative solutions and effective risk management strategies and products.
- **Integrated service offerings for financial institutions:** Managing interdependent climate risks requires expertise to be combined in new ways.
- **Highlighting the ‘protection gap’:** The Insurance Industry and the UK government has an important role in raising global awareness of the ‘protection gap’; the growing gulf between the scale of climate/disaster damage/ risk and the modest level of insurance cover available.
- **Resilience solutions as a service:** government and insurance sector expertise and data can be used to enable and encourage capital to flow toward creating green industry and infrastructure and building resilience.
- **UK expertise can be used to build understanding and develop solutions to reduce the protection gap. In turn, creating export opportunities.**



# Green Finance

Green Finance applies to both Foreign Direct Investments (FDI) into sectors and to the exporting of green financial services such as project finance, green bonds and venture capital, as well as integrating Environmental, Social and Governance (ESG) considerations into the financial system and disclosing such risks.

As the World's most internationally connected global financial hub, the UK is a leading player in green finance – the strength, maturity and international role of its financial sector is proven not just in volume (deals, capital, revenues) but also in international presence and initiative.

UK institutions are strengthened by a unique ecosystem that attracts capital, know-how and talent.

They also benefit from the political determination in the UK to tackle climate change and to transition the global economy and financial system, with the UK government's commitment to reinforce the UK's leadership in green finance.

The UK is home to considerable expertise, ideation, and action in Green Finance – a brief list of examples includes:



Asset managers developing several successful specialist funds.

- Investment banks highly involved in the green bond market.
- The world's largest specialty insurance market in London.
- UK leadership in the development and international adoption of Task Force on Climate-Related Financial Disclosures (TCFD) reporting.
- The unique London Stock Exchange Group (LSEG) Green Economy Mark, helping investors identify London-listed companies and funds whose revenues are mostly 'green'.
- The world's first Green Finance Education Charter.

The UK government launched its Green Finance Strategy (GFS) in July 2019, setting out specific proposals to strengthen the UK's lead and competitiveness in Green Finance.



**Green Finance is not a new financial product, but for the most part it is the application of existing financing tools to green/sustainability projects and companies, such as:**



## Green corporate finance

Also known as corporate finance or 'on-balance-sheet finance', this allows companies like utilities and developers to finance new green developments and construction projects using their own company funds and borrowings.



## Green project lending

Usually provided by banks, in which project debt and equity used to finance a specific green project are paid back from the cash flow generated by that project alone, also known as project finance or 'off-balance-sheet finance'.



## Public/private co-funding or 'blended financing'

Where national and multi-lateral development banks (for example, International Finance Corporation, Inter-American Development Bank, Deutsche Bank, Asian Development Bank, CDC Group) and/or export credit agencies (for example, UK Export Finance) can provide certain guarantees and credit-enhancements to reduce the risk to private sector investors and therefore reduce borrowing costs.



## Retail finance

Bank loans for individual consumers where the use of funds is for environmental purposes: green mortgages, car loans for electric vehicles, etc.



## Capital markets

By providing a market for tradable securities listed on global stock and bond exchanges, mainly green bonds and green equities, this allows businesses to raise long-term funds.



## Carbon credits

Effectively granting 'Permits to emit' various greenhouse gases within a constantly decreasing cap over time, and which are normally government mandated.



## Venture capital and private equity

Forms of finance for small and growing green businesses, in particular those developing innovative clean technologies, for example, hydrogen fuels, biofuels, graphene, carbon capture and storage, batteries and smart grids.



## Asset management

The management of large pools of funds from institutional investors, such as public and private pension funds, insurance companies etc., that falls into two main categories:

- **Large, global, and diversified** asset managers, where the challenge is to encourage them to develop Environmental, Social and Governance (ESG) investment products and strategies, which has increased enormously in recent years.
- **Smaller, specialised Green/ESG Funds** which manage diversified portfolios of green and sustainable development projects. The UK has many successful examples of these types of funds which increasingly operate globally.



## Insurance-related products

Insurers are on the front line of understanding economic damage and knock-on effects arising from climate change, providing traditional natural catastrophe insurance policies. They also provide ancillary services such as risk modelling, and newer solutions such as catastrophe and resilience bonds, all based on reduced premiums and coupons linked to reducing risk. Centred on Lloyds of London, the UK is the world's leader in this sector.



# Professional Business Services

## UK Professional and Business Services Clean Growth offer

The Professional and Business Services (PBS) sector is comprised of a broad range of subsectors including: Accountancy, Actuarial, Advertising, Architecture, Consultancy, Engineering, Law, Recruitment and Surveying.

As diverse as they are, these PBS subsectors have a crucial enabling role in supporting businesses of every size and in every location on their journey towards net zero, and in developing green solutions themselves.

With the PBS sector already a proven UK exports leader, providing a third of the UK's total services exports and globally second only to the US, Clean Growth represents a major opportunity for the sector to demonstrate its credentials and strengthen its international trade footprint.

Many of the services provided by PBS firms are not necessarily new, but PBS firms are evolving and expanding their services to meet the needs of Clean Growth. As a major investor in, and trainer of, its people, the PBS sector has the skills, capacity, and agility to innovate quickly and bring the best talent to bear to deliver projects across public and private sector domains. Often working to complement each other, many PBS services combine to enable projects to be delivered sustainably and successfully.



**Advice and support in standard setting and impact assessment for government and local leaders - available from government, management consultancies, specialist consultancies:**

- Establishment of Climate Change targets and market mechanisms to exploit clean growth opportunities and deliver carbon targets – so for example carbon markets, incentives for clean growth solutions.
- Leadership in the development and implementation of TCFD green finance standards across the financial services sector globally and locally, including finance, asset management.
- Adaptation of the financial and services sector in light of demographic changes and digital transformation.
- Managing geo-political risk.
- Workforce and resource planning in light of demographic changes – developing and retaining talent, succession planning, supporting an ageing population. Impact assessment of demographic changes on national, regional and local communities.
- Development of national, local and Business Specific Risk Assessments
- Development of national, regional and business specific climate change adaptation programmes.
- Infrastructure planning to adapt to climate change and demographic changes.



### **Provision of finance solutions and financial advice:**

- Raising Green finance - green bond and debt issuance and international project finance.
- Project and international finance to enable business and community digital and climate change adaptation.
- Asset and investment solutions for ageing population and provision of pensions.
- Fintech solutions to enable digital transformation and new products and services.

### **Insurance and risk mitigation**

- Insuretech solutions to monitor and support an ageing population.
- Insuretech enabled tailored insurance products to businesses and individuals recognising age, health and risk.
- Insurance to manage business risk through digital transformation and changes to where and how we work.
- Specialist insurance to mitigate against climate change catastrophe, infrastructure failure.
- Advice to create government-private sector pooled funds schemes to provide cover for risk considered too great for the commercial market.

### **Professional and Business Services**

- Management consultancy to provide advice on risk mitigation and adaptation.
- Specialist consultancy services on ESG.
- Outsourced service providers to help support demographic changes.
- Professional and project management services to enable adaptation projects.
- Strategy for development of resilient digital infrastructure.
- HR and workforce development services.

## Success Story: UKEF services



Through its Climate Change Strategy 2020-2024, UK Export Finance has committed to increasing its support for the clean growth, climate adaptation and resilience sectors, supporting global mitigation and adaptation efforts.

This commitment will involve the review and further development of its green products to ensure that UKEF can boost the export capacity of the UK's clean growth offering. It will also see UKEF continue to expand and upskill its staffing dedicated to clean growth transactions, both in the UK and overseas.

For the full story, visit [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1019141/UKEF\\_Climate\\_Change\\_Strategy\\_2021.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1019141/UKEF_Climate_Change_Strategy_2021.pdf)

# Endnotes

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### **Department for International Trade**

The UK's Department for International Trade (DIT) helps businesses export, drives inward and outward investment, negotiates market access and trade deals, and champions free trade.

We are an international economic department, witnesses to drive sustainable international growth

- ensuring the UK remains a leading destination for international investment
- opening markets, moulding the trade environment with new and existing partners which is free and fair
- using trade and investment to underpin the government's agenda for a Global Britain and its ambitions for prosperity, stability and security worldwide.

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