

CLIMATE FINANCIAL RISK FORUM GUIDE 2020  
**INNOVATION CHAPTER**

June 2020



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This chapter represents the output from the cross-industry Innovation Working Group of the Climate Financial Risk Forum. This document sets out recommendations for how financial institutions and other stakeholders can start to deliver a step change in aligning private sector financial flows with climate goals, drawing on examples of good industry practices.

This CFRF guide has been written by industry, for industry. The recommendations in this guide do not constitute financial or other professional advice and should not be relied upon as such. The PRA and FCA have convened and facilitated CFRF discussions but do not accept liability for the views expressed in this guide which do not necessarily represent the view of the regulators and in any case do not constitute regulatory guidance.

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# 1 Introduction

## Purpose

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Meeting the internationally agreed Paris Agreement climate goals involves reducing net greenhouse gas emissions to zero within the next 20 to 30 years. This requires a *transformation* in the global economy and in the underpinning financial system. This transformation will create both risks and opportunities in institutional and retail financial services. Innovation is recognised as a critical element in bringing forward new financial products, services, policies and approaches to deliver and support the changes required to meet climate goals.

In order to address this challenge, a cross-industry Innovation Working Group was set up under the auspices of the Climate Financial Risk Forum. This working group included members from banks, insurers, asset managers and industry groups to *develop actionable recommendations with a focus on UK and international markets, including market practice and regulatory change*.

This chapter comprises a set of recommendations for how financial institutions and regulators can start to deliver a step change in aligning private sector financial flows with climate goals, both for increasing resilience to physical climate change and to supporting the transition to net zero, drawing on examples of good industry practices. In examining approaches to a capital allocation framework, new technologies, financial instruments and practices, it is designed to complement chapters describing components of a risk framework including climate change-related financial disclosures, scenario analysis and risk management.

**“Creating and financing the assets required for climate transition creates huge opportunities as well as risks. The economy can only get this done if finance can play its part successfully.”**

**Nigel Wilson (Group CEO of Legal & General and CFRF Innovation Working Group Chair)**

## Scope

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The focus on innovation comprises approaches, methods and models that can leverage a step-change in institutional capital to reshape industries and other economic sectors to meet Paris Agreement mitigation and adaptation climate goals. This chapter therefore seeks to put climate-related innovation in the mainstream of the financial industry. Although there are important changes taking place with the adoption and integration of climate issues and ESG by investors

and providers of finance, there needs to be a step change to achieve the necessary scale of capital mobilisation in the coming years. Financial industry innovation must involve more than “innovation labs”, “garages” and fintech start-ups if “the financing of green” and “the greening of finance” are to become mainstream realities.

As a result, this chapter should be relevant for financial institutions of all sizes and types. Its recommendations reflect issues of commercial strategy, as much as the detailed operational guidance offered in other chapters. They focus on facilitating transformative financing in the institutional and retail financial sectors, rather than calling for additional public sources of funding.

The report deliberately avoids reiterating a “problem statement” on climate change; it takes as read the scientific and economic consensus that the transition to achieve a sustainable global warming trajectory well below 2C (and pursuing efforts to keep temperature increase to less than 1.5C).<sup>1</sup> Delivering the UK’s net-zero carbon goal by 2050 is likely to need investment of perhaps 1-2% of GDP by 2050.<sup>2</sup> A substantial proportion of this will need to be from the private sector.

## Current state of play

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Climate finance continues to be the central issue in how the global community proposes to follow through with implementation of the Paris Agreement.<sup>3</sup> Whilst there has been an uptick in public and private sector finance allocated to climate-related issues in recent years, this does not come close to meeting the “step-change” in financial flows needed to meet Paris Agreement goals. Figure 1 provides an overview of global climate finance flows in 2017/18. Notably, it shows the very limited expenditure on climate adaptation.

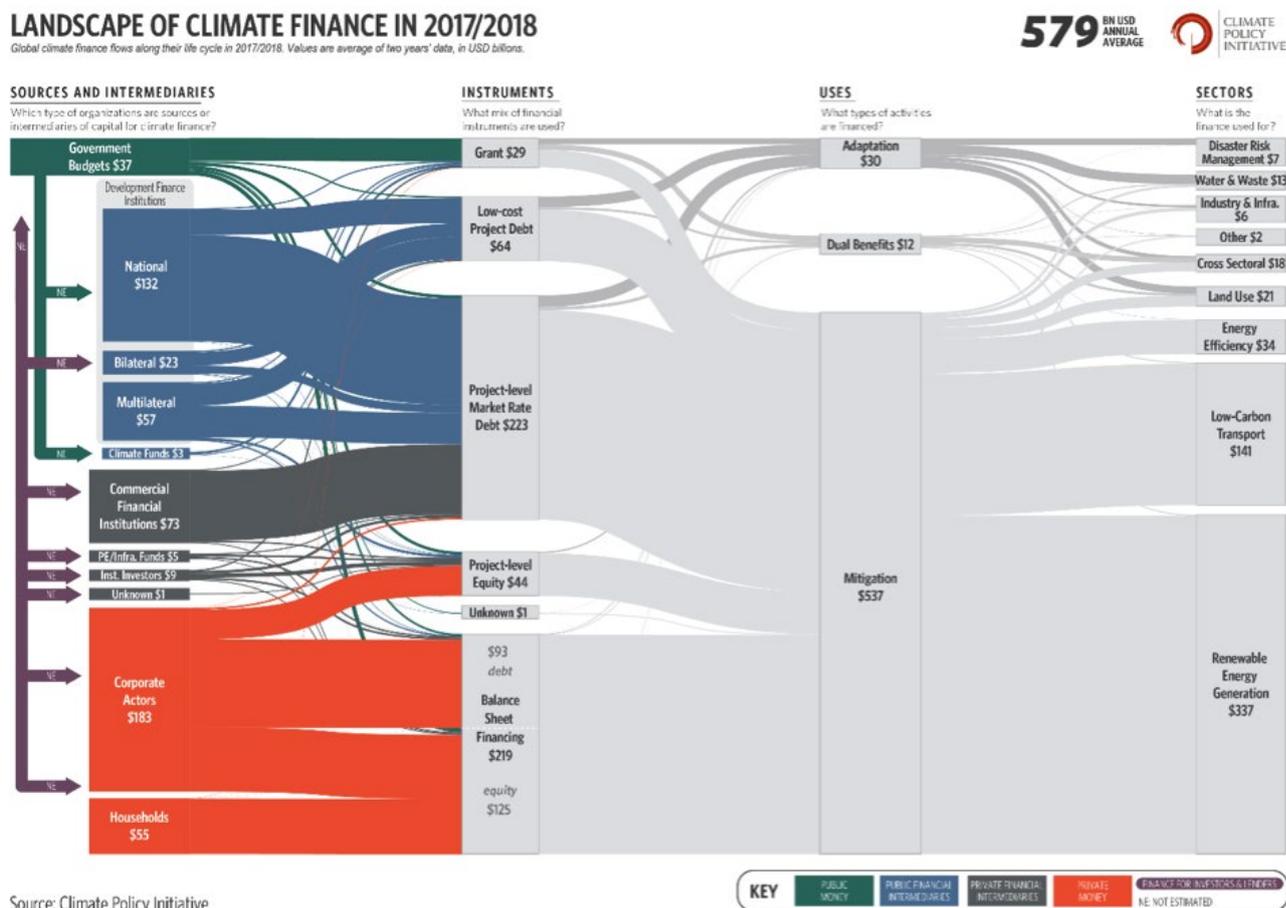
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1 For example: [www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Apr/IRENA\\_Global\\_Energy\\_Transformation\\_2018\\_summary\\_EN.pdf?la=en&hash=2335A542EF74D7171D8EC6F547C77395BDAFICEE](http://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Apr/IRENA_Global_Energy_Transformation_2018_summary_EN.pdf?la=en&hash=2335A542EF74D7171D8EC6F547C77395BDAFICEE)

2 Net Zero: The UK’s contribution to stopping global warming. Committee on Climate Change, 2019

3 Global Landscape of Climate Finance, 2019. Climate Policy Initiative, November 2019.

Figure 1: Global climate finance flows in 2017 and 2018. From Climate Policy Initiative, 2019.



This growth in green finance also fails to capture the far-reaching and disruptive nature of unmitigated climate change, which challenges basic assumptions of the financial industry about future asset values. Climate change will drive fundamental changes to products and markets to which the financial sector will have to respond, leaving potential stranded assets in multiple sectors.<sup>4</sup> Successfully engaging with climate change as a market opportunity involves understanding the nature of the technologies and social practices that will replace existing systems. For example, energy production will be transformed into a much more capital-intensive system, with high upfront capital costs for renewable infrastructure but low operating costs. This naturally moves the energy system into the domain of long-term, responsible financial institutions, though with consequent impact on the need to find other sources of higher risk/return to create portfolio diversification.

4 For example:

- Stranded volumes: existing fossil fuel reserves that will be left unexploited as a result of climate policy.
- Stranded capital: capital investment in carbon-intensive infrastructure which is not recovered over the operating lifetime of the asset because of reduced demand or reduced prices resulting from climate policy.
- Stranded value: a reduction in the future revenue generated by an asset or asset owner assessed at a given point in time because of reduced demand or reduced prices resulting from climate policy.

This transformation will be played out against the backdrop of the existing financial system where there are over \$10 trillion in assets with negative nominal yields (i.e. delivering a negative return), despite the need for £trillions to be invested in new low/zero carbon infrastructure and assets. There is therefore a clear need for new, investable assets which can be part of addressing climate change.

The UK has been one of the leading nations involved in and supporting the growth of green finance internationally. The UK Government recently published its Green Finance Strategy<sup>5</sup> with a goal to align private sector financial flows with clean, environmentally sustainable and resilient growth; and to strengthen the competitiveness of the UK financial services sector. The UK supports the newly formed Green Finance Institute<sup>6</sup>, which provides a forum for public and private sector collaboration in green finance to identify and unlock barriers to deploy capital at pace and scale in the real economy. London, together with New York, is one of the two most international centres of finance in the world and therefore the UK can play a critical role in catalysing changes in global capital markets, including for example the application of climate-related financing approaches, alongside development banks, in Emerging Markets.

The Climate Financial Risk Forum seeks to support the creation of a financial system – and associated regulatory policy - that is fit for purpose in a zero-carbon world.

## Structure

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The chapter is organised into three main sections. The first focuses on possible approaches to match the sources of finance and pools of capital against potentially investable assets and technologies, to identify and enable pathways for investment. The second focuses on the role of data innovation to improve the quality and availability of information that facilitates the effective allocation of capital. This section considers issues that could improve the reporting discussed in the Disclosures, Scenario Analysis and Risk Management chapters. The third section outlines practical measures that can be taken by financial institutions to address this mobilisation of finance to tackle climate targets.

## Inputs, consultation and approval

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The Innovation Working Group met three times in June, September and November 2019. This chapter draws on its members' experience, networks and knowledge, coupled with feedback from an industry engagement day and targeted advice from external sources (e.g. UK BEIS). The chapter was written by the Working Group's secretarial team and approved by the Chair, after consultation with Working Group members.

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5 Green Finance Strategy: Transforming Finance for a Greener Future. UK Government (BEIS), 2019. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/820284/190716\\_BEIS\\_Green\\_Finance\\_Strategy\\_Accessible\\_Final.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/820284/190716_BEIS_Green_Finance_Strategy_Accessible_Final.pdf)

6 Green Finance Institute: [www.greenfinanceinstitute.co.uk](http://www.greenfinanceinstitute.co.uk)

## 2 Pools of capital and channels for delivery

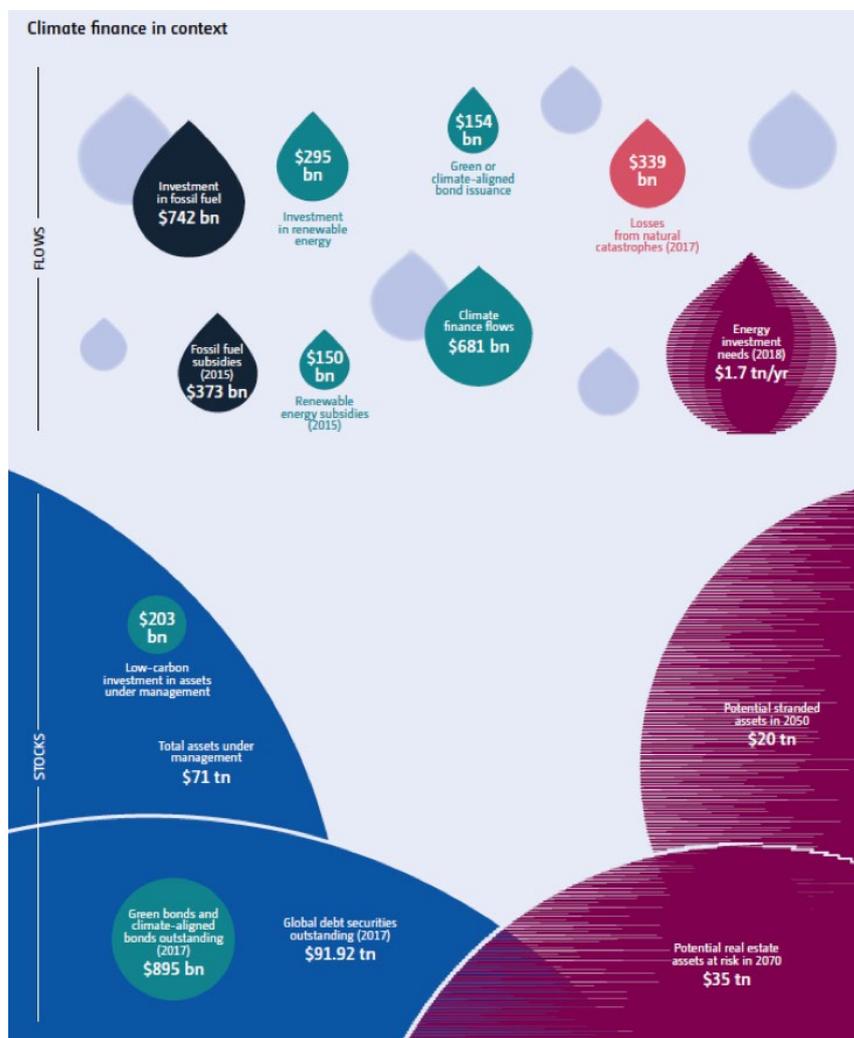
### Overview

Mobilising finance is critical to realising international and national climate goals. This requires *both* a rapid transition from investing in “brown” to “green” assets, in a way that maintains financial stability, *and* investment in new markets for climate resilient, zero carbon services and infrastructure.

This section illustrates current pools of capital (stocks), potential stranded assets and channels for delivery (flows) to new markets for resilient, zero carbon infrastructure.

### Global financial stocks and flows

**Figure 2: Source – UNFCCC 2018 Biennial Assessment and Overview of Climate Finance Flows**



Climate change and the rapid move to a zero-carbon society creates:

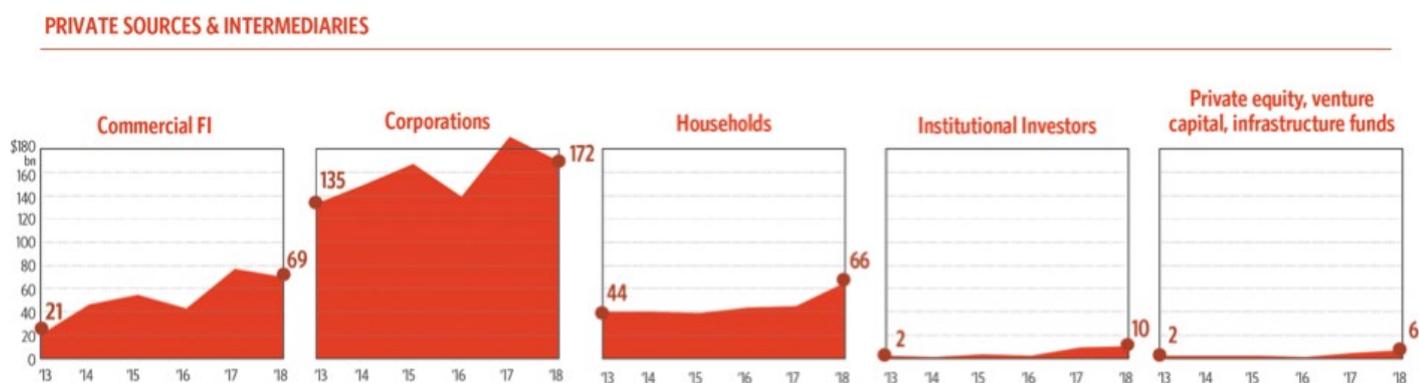
- Physical Risk – material impact on real assets, including housing, commercial property, land and infrastructure that business finances and insures
- Transition Risk - impact on companies and assets in existing portfolios which are not aligned with the global move to Paris Agreement climate goals
- Transformation Opportunity – active choices to invest in new resilient, zero carbon solutions (infrastructure, assets, services)

Recent data on financial stocks and flows (figures 1,2, 3) shows sizeable investment in renewable energy and green/climate-aligned outcomes, but still a fraction of what is required for the climate transition and a fraction of what is required to manage climate-related financial risks associated with potential stranded assets (including corporate securities, real assets and even sovereign debt) in the coming years.

Many pools of capital are projected to grow: global institutional ‘Assets under Management’ is forecast to grow from \$74 trillion today to \$101 trillion by 2023, so there is opportunity to deploy a higher proportion of new flow to climate-mitigating assets – provided appropriate assets can be accurately identified and the appropriate policy nudges and regulatory interventions delivered.

Making best use of growing pools of capital will require a step-change. At present, there are investments totalling perhaps \$1 trillion per year less than we need in climate finance (though this remains an estimate). Public finance contributes about 44% of current climate finance. Private climate finance accounted for ~\$323 billion in 2018, the bulk from corporations (\$172 billion). Banks accounted for \$69 billion funds but loaned nearly ten times this to fossil fuel projects. Institutional investors, including stock market and private equity, account for \$16 billion, 2.3% of total climate finance in 2018 (though this does not include investments in companies that themselves invest in climate solutions) and substantially less than investments by households (\$66 billion).

**Figure 3: Private sources of climate finance, Climate Policy Initiative, 2018.**



Source: Climate Policy Initiative

## Pools of capital

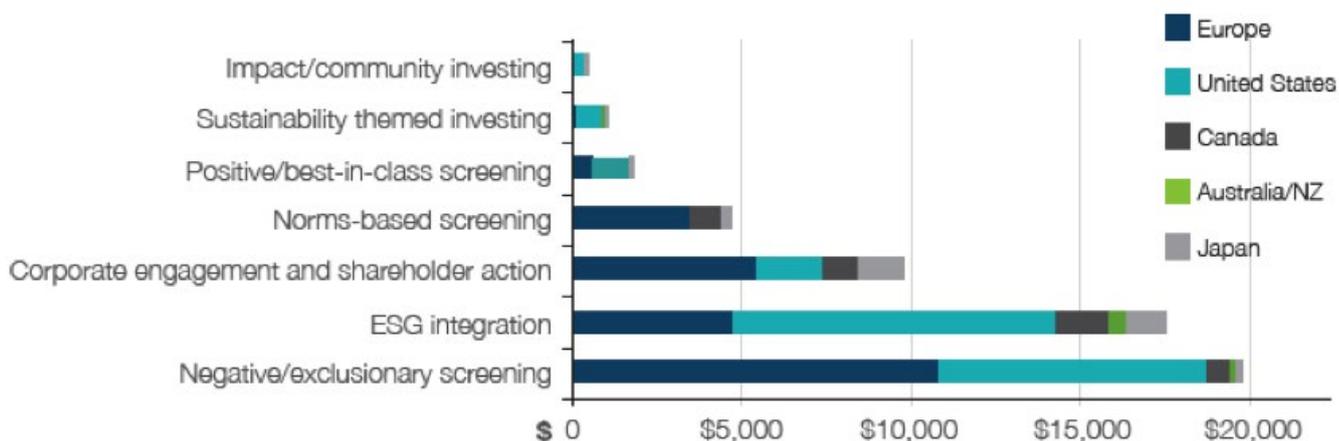
Pools of private sector capital that can be aligned with climate solutions include:

- Capital markets (debt and equity)
- Corporate/commercial lending by credit institutions
- Project Finance
- Retail lending by credit institutions, including mortgages
- Retail deposits
- Bank Lending (mortgages)
- Defined Benefit Pensions
- Defined Contribution Pensions

Alignment of these pools of capital with climate solutions needs action by the whole financial industry, including advisors, investment consultants, rating agencies and professional service providers, as well as asset owners and managers, insurers and regulators.

Globally, sustainable investing (which considers environmental, social and governance [ESG] factors in portfolio selection and management) reached over \$30 trillion at the start of 2018, a 34% increase since 2016 according to figures from the Global Sustainable Investment Alliance. Responsible investment now commands a sizeable share of professionally managed assets in each of the five main markets, ranging (in 2018) from 18% in Japan to 63% in Australia and New Zealand. Europe had the largest sustainable investing assets by volume, with over \$14 trillion (51%), followed by United States (39%) and Japan (7%).

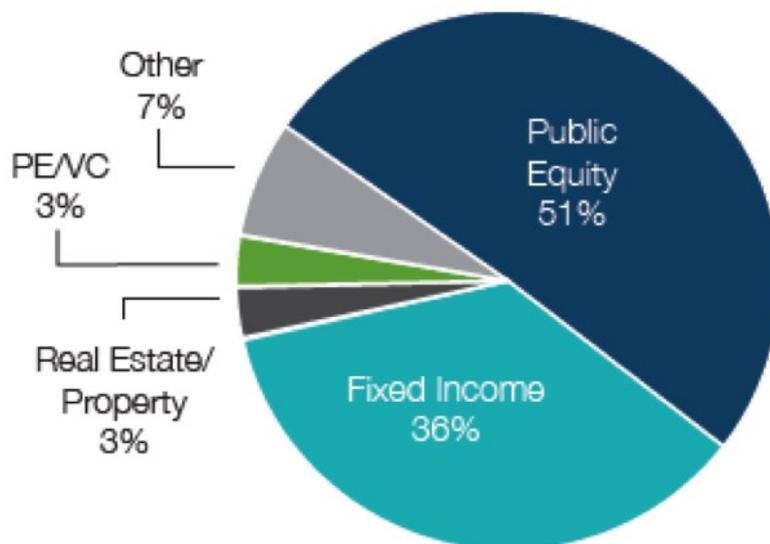
### ***Sustainable investing by volume, strategy and region in 2018<sup>7</sup> (GSIR, 2018)***



Note: Asset values are expressed in billions of US dollars.

7 Diagrams from 2018 Global Sustainable Investment Review, sourced from Global Sustainable Investment Alliance: [www.gsi-alliance.org](http://www.gsi-alliance.org)

**Sustainable investments across different asset classes in global markets (GSIR, 2018).** “Other” in this diagram includes hedge funds, infrastructure, cash and commodities.



### What are the critical financing needs?

In 2017, the Committee on Climate Change commissioned Ricardo<sup>8</sup> to assess the economic opportunity of a global transition to a low carbon economy. This work suggested that the global market for low carbon goods and services is expanding much faster than the overall economy, with the global market for low-carbon financial services growing at annual average rates in excess of 10% through to 2030.

Globally, international and emerging markets require major (\$trillion) interventions to reduce the release of greenhouse gas emissions and to adapt to the physical impacts of climate change. This means major programmes to transform the energy systems of countries from fossil fuel-based to renewable energy based, improve the efficiency and ‘circularity’ of energy and material use in buildings and transport systems, and increase the capacity of carbon ‘sinks’ in land and reforestation. Adaptation needs are also coming sharply into focus, as the impacts of climate change are more evident.<sup>9</sup>

Below, we focus on capital needs in the UK, which provide a good exemplar for other developed countries, but financial institutions based in the UK service many other economies, especially larger, faster-growing more carbon-intensive economies around the world. These will need different approaches which need to be aligned to the country’s own NDRCs.

The UK’s Committee on Climate Change “Net Zero” report in 2019 noted that delivering net zero emissions in the UK will involve increased investments, typically offset by reduced operating costs. Power sector *annual* investment rises to around £20 billion. Investment in buildings will be £15-20 billion higher in 2050 than it would have been without decarbonisation (depending on mix of technologies deployed). Overall, extra investment is required across the economy

8 UK business opportunities of moving to a low carbon economy. Ricardo (2017). At [www.theccc.org.uk](http://www.theccc.org.uk)

9 See for example, work of the Green Climate Fund ([www.greenclimate.fund/themes](http://www.greenclimate.fund/themes))

of an annual cost of perhaps 1-2% of GDP by 2050 (with substantial co-benefits, however, to human health and wellbeing). Given the uncertainty about overall costs, the transitional impacts and distributional costs and benefits are crucial.

Key decision points on capital intensive UK infrastructure in the coming years include:

- Improving commercial and residential buildings to be fit for purpose in a zero-carbon world<sup>10</sup>;
- Developing the electricity grid to cope with local renewable generation and massive increase in demand (from electric vehicles and increased electric heating from heat pumps);
- Change over to electric-powered surface transport over the next 15 years;
- Developing new infrastructure, such as Carbon Capture and Storage solutions, for industry, and hydrogen grids, to replace natural gas.

The Committee on Climate Change also note the economic opportunity to the UK by building leading positions in key industries (e.g. low carbon services; zero carbon electricity generation (such as offshore wind, energy storage, matching local supply/demand); zero emission vehicles and associated infrastructure; energy efficient products and services), and the massive opportunities around upgrading the built environment.

At the same time, there is unmet or unexplored demand from retail investors, and an increasing focus on the financial system from climate campaigners, for example through the 'Make My Money Matter' campaign.<sup>11</sup> This will increasingly change the context for retail firms' license to operate.

The UK Financial sector is a global leader in many segments. Given the global nature of the climate challenge, there are significant opportunities for global innovation in which UK financial institutions can play a leadership role. These include: global and Emerging Market project finance; the development of "Blended Finance" propositions incorporating development banks and elements of international aid but also commercial financing aspects; financing approaches to support oil and gas decommissioning and fintech applications with global relevance.

**"We need an asset allocation framework as much as a risk framework"**

**Nigel Wilson (Group CEO of Legal & General and CFRF Innovation Working Group Chair)**

<sup>10</sup> See, for example: *The Net Zero Litmus Test: Making energy efficiency a public and private infrastructure investment priority*. Energy Efficiency Infrastructure Group (EEIG), October 2019.

<sup>11</sup> <https://makemymoneymatter.co.uk/>

## Current initiatives and issues

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Current initiatives and issues include:

- **Need for new financial instruments:** The UK Green Finance Institute is instigating a group – CEEB<sup>12</sup> – to develop financial instruments to unlock finance needed to retrofit housing in UK, which is one of the big financing challenges in the UK. The Climate Financial Risk Forum will need to collaborate effectively with CEEB in future, for example to expand the green mortgage market and other product for retrofitting which require both additional producer “push” and retail customer “pull”.
- **Using pension capital:** The changes introduced by UK Department of Work and Pensions requiring trustees to set out how they are considering financially material ESG and climate risks in their statement of investment principles (SIPs) is a potentially powerful catalyst, but recent analysis by UKSIF<sup>13</sup> showed the majority of UK pension schemes are not yet meeting these requirements. Some leading asset owners globally, including some UK pension funds, have taken a leadership position to capture climate risk and opportunity and are re-allocating investments accordingly, and implementing powerful engagement and stewardship strategies. More action has been taken so far by DB (defined benefit) schemes but there has been some leadership from DC (defined contribution) pension funds too. However, the majority of funds, both DC and DB, are not yet taking demonstrable action and today only a minority of DC schemes integrate climate risk into their default funds.
- **Regulatory constraints:** Defined Contribution pensions provide more retail choice for investing in climate solutions. But they are constrained by regulation from investing meaningful amounts in illiquid assets, such as infrastructure and private investment opportunities, which is where climate capital needs to be deployed.
- **Leveraging existing transitions:** There has been some concern about a potential reduction in scheme governance with the move from DB to DC pensions, the transition from defined benefit to defined contribution pensions could create new opportunities for asset managers, especially if combined with greater end-investor engagement. Further bought-out defined benefit pensions (c£150bn or more, growing at £40bn annually) may provide more investment manager discretion for real assets, subject to Solvency 2.

## Recommendations and/or guidance for financial institutions

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A key issue for the market is to balance the growing focus on climate-related financial risk management frameworks with an equal emphasis on capital allocation plans, which recognises the investment opportunities and

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12 [www.greenfinanceinstitute.co.uk/news/press-release-green-finance-institute-establishes-coalition-for-the-energy-efficiency-of-buildings](http://www.greenfinanceinstitute.co.uk/news/press-release-green-finance-institute-establishes-coalition-for-the-energy-efficiency-of-buildings)

13 UK Sustainable Investment and Finance Association: Changing Course – How pensions are approaching climate change and ESG issues following recent reforms (February 2020) <https://uksif.org/wp-content/uploads/2020/02/UKSIF-SIP-Review-Jan-20201.pdf>

requirements for tackling climate change. This would align optimally the climate-related economic and social priorities for the financial sector.

For capital allocation plans to be effective, innovation is required across the value chain. Issues to be addressed include:

- Improved ‘upstream’ partnerships/collaboration between financiers and infrastructure design, to ensure only infrastructure in alignment with Paris Agreement goals is financed
- Means of standardising and aggregating investment opportunities, linked to data availability, criteria and quality
- The key role of rating agencies, insurers and auditors in enabling capital allocation
- The importance of individual skills and capabilities across industry in understanding the climate transition, particularly in investment consultants, advisors and analysts
- The role of government in both setting clear policy signals and frameworks (e.g. clear dates for phasing out internal combustion engines)
- The role of government in underwriting (e.g. akin to Export Credit Guarantees) or taking first loss risk or credit support (e.g. Thames Tideway financing) on investment programmes to crowd in private finance while ensuring there is a suitable risk/reward profile for private capital
- The need to regulate/authorise investment vehicles to increase capital flows from retail customers (to match risk appetite). This includes improving the way retail customers are educated and consulted about the impact of their investments to make it easier for them to understand
- The need to develop new investment products/services to unlock capital into the emerging zero carbon economy (such as those being developed by the Green Finance Institute)
- An awareness of time-horizons for actions, between those that be addressed in the near term (by a regulatory ‘tweak’), and those that require whole industry buy-in and extensive groundwork

In addition to addressing these intervention points through the financial value chain, more general issues include:

- **Establish a decarbonisation innovation forum.** The challenge of mobilising capital at speed to meet the decarbonisation targets requires a concentrated collaborative effort between policymakers and the private sector. The CFRF Innovation Working Group has been a useful basis for initial discussions, but we need a mechanism that will continue to support this collaboration, ideally one with a broadened membership to capture perspectives from more points along the investment lifecycle. By way of example from other jurisdictions, the AMF (French regulator) has recently established its Climate and Sustainable Finance Commission with a 3-year term and constituents from beyond regulated firms.
- **“Just Transition” Financing;** as well as supporting high carbon industries to transition there is also a need to support communities and labour forces to transition too. Communities in oil and gas, mining and steel communities could be the focus of an effort to attract new clean green industry investments and jobs with packages to support re-training and development. In financial services, there is a need to develop (re)training

strategies for the some 1.1. million financial professionals<sup>14</sup> in the UK, to ensure all financial professionals are aware of UK legislated targets and are taking steps to build climate into their operational decisions.

- **Further research into consumer engagement:** Consumer appetite will be an important driver (e.g. as pension beneficiaries, owners of homes requiring retrofitting/new homes). Policymakers' experience in other retail policy areas has demonstrated that inertia can be a challenge even where there are clear material benefits to the consumer. Further research (for instance, from regulators or the GFI) on consumer motivations will allow policymakers and financial services to more effectively consider ways to stimulate demand and can build on existing initiatives, such as UKSIF's "Good Money Week" and "Make My Money Matter".
- The need for a scheme to **recognise and share innovation in green investment** to socialise new ideas and evidence of efficacy more rapidly through the industry.
- Three key issues impinge on financial regulation:
  - Do markets understand and value assets correctly?
  - Are suitable climate-adapted assets and product structures available?
  - Is advice to client of the risk of borrowing / investing correct (within regulations)?

This leads to Working Group recommendations that naturally fall into two categories.

- i. Recommendations on supply-side of finance (industry + regulators)
  1. **Board statements:** Acknowledging the material transformation required **it is prudent for the Boards of regulated financial institutions to publish a climate-related financial risk appetite AND capital allocation statement**, which clarifies their intended approach to climate change and publicly records climate-related business targets. This will clarify expectations for management and improve transparency for investors, regulators and the general public. This is similar to France's Article 173, and links to TCFD recommendations, but focused on capital allocation as much as climate/ESG risk management.
  2. **Kick-start market with green gilts:** Approach HMT and PRA to address the creation of a credible UK Green Bond market – at scale – through (a) *issuance of Green Gilts* and (b) *more favourable regulatory capital treatment*, through Solvency 2 or its post-Brexit successor arrangements. The issuance of Gilts is a key kick-start to the market which should be prioritised over the next 12 months, noting also work by GFI in this area, and the link to recommendation 9 on transition bonds and skills training for just transition.
  3. **Regulatory levers:** *Implement the LENDERS<sup>15</sup> Project recommendations* to include actual energy costs in loan to income ratio.

The LENDERS (Levering Economics for New Drivers to Energy Reduction & Sustainability) project proposes to better reflect actual household energy

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14 <https://researchbriefings.parliament.uk/ResearchBriefing/Summary/SN06193>  
15 [www.ukgbc.org/ukgbc-work/lenders-core-report](http://www.ukgbc.org/ukgbc-work/lenders-core-report)

costs – one of the largest unavoidable outgoings every mortgage borrower incurs - into mortgage applications, in which case lenders may be able to justify higher lending to low energy cost properties and make energy performance a fundamental part of mortgage lending, and ensure that this changes the cost of capital for “green” homes.

4. **Green Loan Principles** (from Loan Market Association): propose to standardise the current voluntary approaches into a regulatory framework.

The aim is to create a high-level framework of market standards and guidelines, providing a consistent methodology for use across the green loan market, whilst allowing the loan product to retain its flexibility, and preserving the integrity of the green loan market while it develops.

5. **Review capital relief treatment of long-dated green assets**, to attract more bank funds (regulatory capital relief) and insurance investment (Solvency 2). This would have the effect of promoting lending and investment into areas of need but the potential risks of misaligning capital to credit risk will need to be managed, along with other risks that affect insurance investment and underwriting.

6. **Build public financial institutions** that are seeking to “crowd-in” private investment to their climate investments: for example, a National Infrastructure Bank or Fund (noting Scotland’s recent launch of their Scottish National Investment Bank, and the experience of the former Green Investment Bank).

- ii. Recommendations on demand-side of finance

7. **New investment vehicles**: Building on recommendation 6, we need to enable public and private finance to come together, for example through blended finance listed green infrastructure funds that enable deployment of assets into developing and emerging markets, but provide diversified portfolios where public finance provides a risk buffer to crowd in institutional finance at scale. In the UK, there is a role for expanding the Business Growth Fund, the biggest provider of equity growth capital for business using a pan-industry fund supported by four banks. In addition, building on London’s leading role as an insurance and reinsurance centre, the development of a market for climate-related insurance-linked securities (ILS) – securitised reinsurance transactions including, but not limited to catastrophe bonds – should be promoted. London Stock Exchange’s International Securities Market (ISM) is ready to list these instruments, in line with the Risk Transformation Regulation 2017, which established a regulatory framework for ILS issuers to be domiciled in the UK. Green Asset-Backed Securities (ABS) or Mortgage-backed Securities (MBS) can also play an important role in freeing up capital that bank can reinvest in additional green mortgages and loans (this would link into recommendations 4 and 5 above).

8. **Building local partnerships** between finance institutions, local authorities and other public sector bodies (e.g. NHS Trusts, Network Rail) with businesses in zero carbon supply chains to support development of investable, zero carbon projects, building on clear national policy frameworks for net zero ambitions. Cities and city regions, from Edinburgh and Glasgow

to Manchester, Leeds and the West Midlands, are seeking “net zero” carbon emissions by or close to 2030. They are seeking to channel large scale finance into infrastructure developments (transport, buildings) to support their needs. A study on the potential role of Local Authorities in housing retrofit (c.f. US States’ PACE initiatives) would help inform this debate.

9. **Enable new Transition Bonds:** The green bond market is becoming more established but there is also a need to support businesses in raising finance to transition away from more carbon intensive activities and processes. There needs to be robust measures of transition to ensure genuine alignment and based on clear strategies and financing to deliver the changes required. London could become a global centre for transition finance. This also allows lenders to reduce exposure to potentially stranded assets and reallocate to investments that enable and deliver transition. *New transition bonds could support companies genuinely seeking to transition in alignment with climate goals. The need for appropriate data on company assets and that companies are following credible science-based targets is critical to make this work.*
10. **Valuation of assets:** Need to see high physical climate risk / stranded asset risk built into valuations. Mandated stress testing for financial institutions could promote this.
11. Build market demand with consumers by defaulting Workplace Defined Contribution **pensions to funds with a clear capital allocation plan for climate solutions as a minimum.** Consumer demand for housing retrofit would be encouraged by greater emphasis on climate and resale values of property, including potential tax “nudges”.
12. Financing the green economy; there needs to be a variety of interventions to facilitate and catalyse investments and capital allocation into green solution industries. This also interlinks into the EU Taxonomy and London Stock Exchange Group’s Green Revenues and **“Green Economy Mark”**. Companies should be encouraged to disclose their revenues associated with green products and services. Mechanisms such as Green Economy Mark can highlight these companies and investments in them could be encouraged with is also measures such as reduction in stamp duties.
13. **Build better engagement between carbon intensive sectors around the world and financial institutions around financing needs for transition.** For example, building on the work of the UN-convened Net Zero Asset Owners Alliance.<sup>16</sup>

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16 [www.unepfi.org/net-zero-alliance](http://www.unepfi.org/net-zero-alliance)

## 3 Data Innovation

### Overview

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The wealth of available data must be made usable to help the financial industry address climate and environmental risks and to radically improve its investments in, and planning and management of, resilient, zero carbon infrastructure. While there is a vast supply of capital, the lack of effective dataflow is leading to misallocation of resources, missed opportunities, and is creating substantial climate-related financial risks on global balance sheets. Data infrastructure is as important as the physical infrastructure in meeting climate goals but is seriously neglected. The creation and curation of this data in itself creates “Green Fintech” opportunities for innovation.

Capital might be abundant: our ability to deploy it intelligently is not. We are holding back financial sector innovation, as relevant data is often not available or easily discoverable; is not clearly licenced for use; and is not in formats that people or machines can easily manipulate. To compound this, the models used to create climate data are sometimes opaque, with respect to estimation of missing data and the underlying assumptions applied in these models.

### Defining the data infrastructure for climate-ready investment

As a matter of priority, the public and private sector must now define the data infrastructure for climate-ready investment and act upon it, enabling the interoperability of data at scale. Addressing climate change requires new thinking across finance, policy, and physical and data infrastructures. There is also a need for clear data governance and transparency on methodologies and assumptions that must underpin climate risk models and analytics.

### Physical vs data infrastructure

It is easy to see physical infrastructure: energy, water, transport, buildings and agriculture. Our financial systems are also largely transparent: including investors, insurers, asset owners and managers and banks. Policy is shaped by known governance structures at city, region, national and international levels. Our scientific institutions have huge resources and knowledge to share. It is less clear what data infrastructure might be required to fully bring these areas together in a coherent manner: how can we create product and service innovation that properly quantifies and codifies climate-related financial risk and opportunity, and makes it actionable by markets?

Areas of focus for greater data interoperability include:

- Asset-level data (location and ownership information of facilities and assets enabling effective cross linking with group entities and financial details,)
- Geospatial data (administrative, land usage, elevation)
- Environmental data (in which assets exist)

- Climate data (its links to risk and hazards)
- Policy, regulatory and legal environment (global, national, regional, local)

Increasing access will have direct benefit to

- *Financial markets*: Insurance; Financing; Pensions
- *Asset owners and managers*: Large portfolios; those impacted by climate change; contributors to climate change
- *Public sector*: Policy; Regulation; Green growth & infrastructure
- *Science*: Baseline data; Scenarios, insight & models; Predictive analysis

## **Building on the principles of Open Banking and Open Finance**

Open Banking is a regulated standard that addresses the sharing of sensitive data across the banking sector. The thinking behind Open Banking can be applied to climate-related innovation. It addresses:

- Rights
- Liability models
- Dispute resolution and redress
- Consent
- Security
- Legal frameworks
- Usability
- Logistics
- Technology architecture
- Operating principles

Open Banking was created by convening teams to develop common principles and good practice for sector-wide data sharing.

Open Banking has created an open and safe marketplace for innovation. The standard was (and is) developed openly—as a result, it has helped to catalyse initiatives around the world. Similar initiatives now exist across Australia, Bahrain, Europe, Hong Kong, India, Japan, Mexico, Malaysia, New Zealand, Rwanda, Singapore and the USA.

FCA's team on Open Finance is, concurrently, exploring how the role of Open Banking might be built upon to include Investments, Pensions, Savings, Consumer Credit, Mortgages and General Insurance.

We recommend building on this approach to help companies and regulators design and develop new financial products and services, with a shared set of principles and practices that are aligned with regulatory good practice.

## **Moving beyond reporting**

Data has greatest utility when used in operational decision-making. Investors need greater certainty around the climate-related financial risk-return of their portfolios, both in financial and environmental term. Such an approach to data will lay the foundations for actionable insight that will meet the business, market and policy needs of the coming decade. Suitable data must, therefore, be made available at relevant points in the process, in a meaningful form, to shape actions.

Providing opaque, estimated data based on undisclosed assumptions and models which may be several years out of date and with high error rates is not fit for purpose, as sophisticated climate risk data is required at scale.

Instead investors, procurers and asset-owners need to effect change through influence or even require the provision of relevant information on a continuous basis as part of their conditions. This information can be aggregated to include asset, geospatial, environmental, climate, policy and science to provide climate-related financial risk informed insights. There is a potential role for credit rating agencies to extend coverage from financial analysis to climate topics in support of, for example, green bond issues and investors.

Standards (building on Open Banking and Open Finance) that address foundational 'data plumbing' will enable financial businesses to innovate and the UK and its regions to plan policies and regulation to help protect citizens, their environment and economy, and accelerate the adoption of artificial intelligence (and related) technologies.

The underpinning issues of data availability and quality raised here are closely related to and should be read in conjunction with the practical approaches laid out in **the Scenario Analysis chapter of the CFRF guide**. Different scenarios (from emission pathways, the socioeconomic context, the climate policy landscape and technology evolution) need to link much more directly to data to drive effective actions.

## Current issues and initiatives

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- There is extensive focus on the *negatives of climate-related financial risk*, such as carbon intensity of energy and physical climate risks for capital allocation. However, there is equivalent need for clearer data on the solution side of climate, being able to measure and allocate to these emerging markets in the economy.
- Much of the transition to a low carbon economy is not being driven by pure-play green companies but companies across a wide range of industries who are changing their business mix; for example, Siemens and ABB now generate approx. 40% revenue from these areas.
- Most companies do not currently provide detailed enough *segmented reporting in their financial statements* to break out the revenues associated with green products and services.
- Many large investors are trying to allocate more capital to green but due to data reporting limitations from issuers they struggle to do so effectively. This also becomes a climate-related financial risk issue as portfolio risk attribution technology is based around traditional industries and currently cannot capture these *hidden but growing* new industries.
- TCFD covers this topic at high level with a disclosure point on *low carbon products*. The EU Taxonomy could be used as a possible starting point, though only covers a small percent of the total market. The opportunity for UK regulators/policy makers is to set clear guidance for issuers on green revenue reporting building on TCFD and the EU Taxonomy. This should be clear guidance, not mandatory requirements, and the definitions of green

activities - although drawing from the EU work - will need to be dynamic, pragmatic and evolve over time.

- *Product development and asset allocation*: a number of asset owners are looking to substantially grow investment allocations to green industries but lack the data and the products that enable this. This is changing as a variety of data and index providers develop new capabilities and as fund managers create new fund products. However, there are also challenges. One issue is that whilst companies have been increasing their disclosure of carbon data, they are often not breaking down revenue segments to show their revenues from green products. This means its hard for investors to identify their level of activity in green economy sectors and hence less able to direct capital towards them.
- *Green loans*: work is underway in the Green Finance Institute, amongst others, on incentivization to take out green loans. However, data needs to be strong enough to evidence the purpose.

### Case Study: Engagement Tools

Over the last two years there has been a range of positive developments on collaborative investor engagement with companies on climate change with most led by UK-based organisations:

- *Climate Action 100+* is an investor initiative to ensure the world's largest corporate greenhouse gas emitters take necessary action on climate change, including the 100 'systemically important emitters' accounting for two-thirds of annual global industrial emissions.
- The *Transition Pathway Initiative* was set up by two UK pension funds; Church of England and the Environment Agency aims to provide a common and transparent framework to assess corporate climate strategies and performance to use as a basis for collaborative engagement. It now has global investors backing it with over \$18tn in assets. The three partners behind it are all London based; the London School of Economics, the UNPRI and FTSE Russell.
- *InfluenceMap*, working with *EIT Climate-KIC*, is building a platform to list investments through a climate change lens by applying the TCFD metrics, which will rate investments in terms of meeting the Paris Agreement. Other firms look at matchmaking (Neural Alpha) and at entire supply chains. These are examples that can be scaled with better data.
- *Carbon Tracker Initiative* carries out in-depth analysis of the impact of the energy transition on capital markets and the potential investment in high-cost, carbon-intensive fuels. For example, it notes where current oil and gas company plans do not fit with a low carbon future.
- 2 Degrees Investing Initiative promote the integration of climate risks in investment strategies and financial regulations.

## Recommendations and/or guidance regarding data innovation

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The financial industry and regulators need to build on the Open Banking Standard and Open Finance approaches and thinking to build the foundational “data plumbing” to enable the financial industry to allocate capital commensurate with the climate-related financial risk of stranding assets AND the opportunities in the new markets for zero carbon, climate resilient infrastructure and service solutions.

Financial institutions should break out revenue associated with green products and services, to give tracking products the opportunity to weight those companies with a higher proportion of green sales, and so allow capital to be allocated preferentially to these companies.

The definitions of what is genuinely ‘sustainable’ or ‘green’ have up until recently only been clarified by industry-based methodologies such as from the Climate Bonds Initiative and the Green Revenues Classification System by FTSE Russell. Now there are regulatory efforts that build on these. The most advanced is the EU Taxonomy<sup>17</sup> and other markets such as China, Japan and Canada are considering developing their own potentially inter-related systems. Canada is seeking to define transition activities rather than what is green. There may be an opportunity for UK regulators and policy makers to play a role helping to form global consensus on taxonomies. This is already becoming a focus for regulation (e.g. the EU Sustainable Finance Action Plan will apply the taxonomy in a range of ways to both corporate reporting and to funds sold in Europe) and is already gaining traction. This will involve developing standards-based marketplaces for environmental and financial data and reducing transactional friction in shared data. Mark Carney’s COP26 priorities include engagement on taxonomies under the ‘Return’ agenda.

### Case Study: Asset Level Data

Asset-level data is information about the physical and non-physical assets tied to company ownership information. This foundational ‘building block’ data about which real-world assets are owned by companies can provide accurate and reliable data to inform sustainable investment choices made by the global financial system. As industry, regulators, governments and consumers increasingly move toward investing in a net-zero economy asset-level data will become a critical aspect of mainstream financial decision-making among investors of all sizes.

The asset-level data initiative is a new non-commercial research-based initiative aiming to make asset-level data more accurate, comparable, and accessible for financial decision-makers. EIT Climate-KIC partners from the University of Oxford Smith School, CDP and the 2 degrees investing initiative are collecting, verifying, and distributing asset-level data on all companies in key sectors

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17 [https://ec.europa.eu/info/publications/sustainable-finance-teg-taxonomy\\_en](https://ec.europa.eu/info/publications/sustainable-finance-teg-taxonomy_en)

globally, regardless of whether they disclose this information publicly or not.

This information would enable the assessment of asset, company, asset manager, asset owner, and system-wide exposure to a wide range of environmental factors in a granular and comparable way. Such datasets will enable new value-added analysis, from academics and civil society through to consultants and service providers. In the absence of perfect reporting by companies ADI is critically important for integrating the environment into decision-making across the financial system.

Publishing these data provides an important basis upon which financial innovation can take place – accurately informed by real-world asset ownership information.

More information at: <https://assetleveldata.org/>

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## 4 What should financial institutions do to mainstream innovation to mobilise capital for climate solutions?

This chapter has outlined key strategic issues and initiatives in the financial sector for mobilising capital to meet climate needs. All financial institutions can and need to play a role. This section outlines examples of practical actions that all financial institutions can do, now.

### Staff knowledge and training

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There are some 1.1 million financial professionals in the UK.

Helping your staff – senior and junior - understand national legislated climate targets, the transformation required in economic sectors from housing and transport to food supply systems, the scale of the financing required, and the emerging models of financial innovation for unlocking mobilisation of capital at scale, are key building blocks to operationalise financial innovation.

***Action: partnering with trade associations and training organisations to develop and run training and skills courses for your staff on the operational implications of the climate transition***

### Staff incentives

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Businesses are now starting to incentivise senior staff in novel ways, for example, by encouraging a reduction in air-miles or company vehicles, to reflect company commitments to reduce their direct impact on the climate.

***Action: Examine and reduce company incentive structures which misalign senior staff activity with wider corporate intent on the climate transition***

### Corporate impacts on climate

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Organisations throughout the financial sector are increasingly committing to challenging corporate targets for reducing their corporate impacts on climate, for example through purchasing renewable energy. Often, this is supported by engagement with groups such as the Climate Group, the CDP's RE100 initiative, and the Dow Jones Sustainability Index, amongst others. Separately, there is a

strong push to use platforms and frameworks for disclosure and target-setting, such as the CDP and Science-Based Targets initiative.

As renewable energy becomes cost-competitive – and indeed the market-leader in many markets – organisations are moving beyond committing to renewable energy purchases to committing to reducing emissions from scope 1, 2 and 3 carbon emissions.

***Action: Review and revise and then deliver corporate commitments to climate impact in line with leading cities and regions around the world – i.e. net zero by the 2030s - or with leading corporates in sectors in which institutions are invested. In other words, be at the forefront of the change.***

**EXAMPLES of company activities:** For most financial institutions, exposure to investments or customers is the biggest source of climate-related financial risks or impacts. Understanding how rapid climate action or climate impacts and risks in different countries and markets will impact on investors and customers is key.

Companies, such as Schrodgers, are now tracking both the speed and scale of climate action in different markets and the financial risks posed by the climate transition. The former captures a range of measures of actions taken to tackle climate change in different markets. This latter climate-related financial risk assessment combines a range of issues such as:

- Carbon Value at Risk which looks at the impact of \$100/t carbon prices on companies' cashflows, combining analysis of the impacts of (i) higher direct costs (scope 1 & 2), (ii) higher supply chain costs (using input-output modelling), (iii) the impact on prices in each market as prices are passed through to customers and (iv) the impact of higher prices on volumes.
- Physical risk which measures “what would it cost a company to insure against damage caused by climate change for the remaining life of its assets” using analysis of the geographical location of assets with a top down view of climate-related financial risks in each area, today and with projections into the future.
- Growth impacts looks at “how would growth in each industry change in a 2-degree transition relative to the current trajectory and what is the present value of that increase/ decrease in growth at the industry level” and then attributes that growth impact to individual companies
- Fossil fuels looks at the impact on companies' valuations of being unable to exploit the reserves they have developed, looking at (i) their cost positions, (ii) the carbon intensity of their reserves and (iii) their reserve lives

The Scenario Analysis chapter contains more details of such scenario planning, but underpinning this is effective ‘data plumbing’ or data infrastructure to enable the financial industry to allocate capital commensurate with climate opportunities for net-zero, resilient solutions and with climate-related financial risk (e.g. stranded assets).

Another example is Citi Bank using the Poseidon Principles as a framework for assessing and disclosing the climate alignment of ship finance portfolios.

**Principle 1 Assessment**

requires assessment of portfolio climate alignment and defines methodology for calculation.

**Principle 2 Accountability**

establishes the reliance on International Maritime Organization (IMO) standards and Recognized Organizations for the provision of identical, unbiased information across Signatories.

**Principle 3 Enforcement**

requires the inclusion of a covenant clause in new business activities that ensures access to high-quality data being produced under IMO Data Collection System (DCS).

**Principle 4 Transparency**

stipulates how the results of portfolio climate alignment are disclosed publicly.

## **Understanding and supporting early stage innovation**

Many large listed companies are now transforming business models to focus on green industries. It can be more difficult for investors to directly deploy capital into “real economy” climate solutions but this is evolving. Available routes include through green bonds where the use of proceeds is directed to green projects, venture capital funds, to scale new ideas and solutions, IPOs of green companies and through private asset investment, to scale infrastructure such as wind and solar farms.

Financial institutions are now developing a closer interest in the emergence of new solutions – through supporting networks of business accelerators and scaling growth-stage entrepreneurs – but also recognising the opportunity for supporting companies that develop products and services with a sustained social or environmental impact.

### **Case Study: Barclays Social Innovation Facility**

To support external entrepreneurs, in 2016, Barclays co-founded *Unreasonable Impact* with the Unreasonable Group. *Unreasonable Impact* is the world's first international network of accelerators dedicated to scaling growth-stage entrepreneurs whose ventures have the potential to employ thousands worldwide while solving some of our most pressing societal and environmental challenges. Run in the Americas, UK and Europe and Asia Pacific, this partnership is exploring the leading edges of technology for the benefit of society at large and connecting entrepreneurs to a global community of world-class mentors and industry specialists, including experts from across Barclays. To

date, the more than 100 ventures that comprise the global cohort operate in more than 180 countries, have had a positive impact on 200 million people, supported 30,000 net new jobs since joining Unreasonable Impact and have reduced greenhouse gas emissions by 55 million tonnes.

For more information, please visit  
<http://www.unreasonableimpact.com/>

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***Action: Review and operationalise your company's knowledge of emerging solutions, particularly those beyond pure technology plays which tackle the major social behaviour issues that impact climate (retrofitting homes; commuter choices for getting to work; leisure time; etc.).***

## 5 Final Recommendations

This section summarises the recommendations made through this chapter.

### For Regulators

- **Implement the LENDERS Project recommendations** to include actual energy costs in loan to income ratio (so as to change cost of capital for green homes).
- **Review capital relief treatment of long-dated green assets**, to attract more bank funds (regulatory capital relief) - noting risks of misaligning capital levels with credit risk
- **Valuation of assets:** Need to see high physical climate-related financial risk/stranded asset risk built into valuations, building on better dataflow/data infrastructure.
- **Ensure that pension funds are following the new requirements from DWP** on ensuring that they are setting out in their SIPs how they are accounting for material ESG themes such as climate and monitor what actions they are taking as a result.
- Identify routes to ensure that the **default options within DC schemes are adequately integrating climate risk into investment strategies and allocations**. Ensure that this is applied across both active and passive portfolios and that trustees are aware of climate innovations in the products available to them.
- **Address regulation limiting pension funds' abilities to invest in illiquid assets** (as plays a key role in mobilising capital into zero carbon infrastructure)
- **Incentivise and catalyse financial institutions (including asset owners) to disclose against TCFD** including articulating publicly how they are allocating to green investments,
- **Green Loan Principles** (from Loan Market Association): propose to standardise into regulatory framework, as currently voluntary.
- Build on the EU Taxonomy through **encouraging green revenue reporting of UK incorporated companies** and associated exposure requirements for funds.
- Coordinate internationally with emerging taxonomy frameworks including the EU, China and Canada to ensure a global consistency.
- **Make the UK a home for green industries** through encouraging investments in corporate issuers with the “green economy mark” through fiscal measures and other routes to creating a supportive regulatory and listing framework for these companies.
- **Role of stewardship** – encourage broad scale adoption of CA100+ and TPI including through the major investment industry associations; PLSA and the IA.

### For industry collaboration

- **Build public financial institutions** that are seeking to “crowd-in” private investment to their investments.
- **Develop new investment vehicles** which can, for example, blend capital funds for emerging/development market green infrastructure, and in the UK

build on the Business Growth Fund, the biggest provider of growth capital for business using pan-industry fund supported by four banks.

- **Build local partnerships between finance institutions, local authorities and businesses in zero carbon supply chains** to support development of investable, zero carbon projects, building on clear national policy frameworks for net zero ambitions, for example around city transformations.
- **Establish a decarbonisation innovation forum.**
- **Develop a neutral space for necessary dataflow on sustainable finance** (e.g. retail consumer appetite across multiple product areas for green products) to help frame recommendations for how to stimulate consumer demand.
- **Build on the Open Banking and Open Finance approaches** and thinking to build the foundational “data plumbing” to enable financial industry to allocate capital commensurate with the climate-related financial risk of stranded assets and the opportunities in the new zero carbon, climate resilient infrastructure.
- **Support an industry-neutral scheme (e.g. GFI) to recognise innovation** in the green investment space (for sharing knowledge rather than awards per se).
- **Build better engagement between carbon intensive sectors around the world and financial institutions around financing needs for transition.** For example, building on the work of the UN-convened Net Zero Asset Owners Alliance.<sup>18</sup>

### For Treasury

- Kick-start the **creation of a credible UK Green Bond and Transition Bond market including through issuance of Green Gilts.**
- **Create blended finance risk capital**, working through DFID/BEIS, to open up a whole new market to scale institutional investment into emerging and developing country green infrastructure investments.

### For Regulated Financial Institutions

- **Publish a climate-related financial risk appetite AND capital allocation statement** which clarifies their intended approach to climate change and publicly records climate-related business targets.
- Create a **supportive market environment for both green bonds and transition bonds in the UK** to encourage and catalyse these markets and to encourage London listings of these instruments.
- **Develop a pipeline of climate-related insurance-linked securities (ILS)** – securitised reinsurance transactions including, but not limited to catastrophe bonds – to manage the transfer of climate-related physical risks, thus reducing the cost for the financial system of climate-related physical risks, build resilience and expand the insurability of climate-related risks.
- **Develop a pipeline of green Asset-Backed / Mortgage-backed Securities (ABS/MBS)**, which can play an important role in freeing up capital that bank can reinvest in additional green mortgages and loans.

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18 [www.unepfi.org/net-zero-alliance](http://www.unepfi.org/net-zero-alliance)

# Annex 1: References

Links to resources/reports which may be helpful in identifying data gaps/demand etc:

- [Alliance for Corporate Transparency report “State of corporate sustainability disclosure under the EU Non-financial Reporting Directive](#)
- [CDP report “Major Risk or Rosy Opportunity: Are companies ready for climate change?”](#)
- [Climate Disclosure Standards Board TCFD implementation guide and TCFD knowledge hub](#)
- [European Commission “Guidelines on reporting climate-related information”](#)
- [EU Technical Expert Group \(TEG\) on Sustainable Finance “Report on Climate-related Disclosures”](#)
- [EY “Climate Risk Disclosure Barometer”](#)
- [Spatial Finance Initiative various publications](#)
- [Transition Pathway Initiative “State of Transition Report 2019” and “State of Transition Report 2020”](#)
- [World Business Council for Sustainable Development report “Climate-related financial disclosure by oil and gas companies: implementing the TCFD recommendations”](#)

