A report to Government by the Green Finance Taskforce

ACCELERATING GREEN FINANCE

MARCH 2018

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Preface

How we manage the world's natural environment is one of the most pressing issues of our time, associated with climate stress, pollution and a prodigious need for clean energy. Until recently, however, this has tended to be seen in terms of cost rather than investment and return, of risk management rather than forward-looking risk mitigation.

In particular, the global challenge of raising the trillions needed to meet the two degrees or less scenario agreed in Paris 2015, are as great as the consequences appear grave if we don't. The sheer scale of capital required dictates that this cannot be driven through either public or private sectors working alone – we need an international alignment of interests, incentives and policies. That is why we set up the London Green Finance Initiative in 2016, to bring these groups together and see where the UK's great financial acumen could make its contribution.

All finance concerns intermediation between savers and borrowers – and pricing and managing risk accordingly. This should ensure that capital is allocated efficiently and productivity is duly maximised. When it comes to green finance, it is clear that this process is at an early stage of development and shows huge potential for growth. However, the risks implied in climate science modelling are not yet being transposed fully into financial models. Climate-related risk is understood to exist by all financial actors but it is not yet priced into long term financial thinking. Short time horizons in investment decision-making, information asymmetries, misaligned incentives, financial mis-education and perhaps most crucially, a lack of available data, co-conspire to under-allocate capital. It is this value chain that must be untangled.

This is key if we are to unlock the private capital needed because by doing so, we can make green finance much more widely available, throughout society. We can make a green investment the same as any other – where there is a need for capital from issuers there will be an opportunity for investors. It is this that the UK Green Finance Taskforce has been addressing and which I have been honoured to chair.

Looking across every aspect of financial services, from data and disclosure in our TCFD work, through to the national capital raising plan, to incentives for green real estate, to the case for a UK sovereign green bond, we have suggested a set of proposals that, when implemented, will represent a comprehensive and holistic package of measures that can meet our capital needs to move to an economy based on low carbon energy.

Parts of this report focus on specific sectors such as energy efficiency for buildings, where there is great potential for decarbonisation and green investment. We recognise that there are far more opportunities for financial markets to support a low carbon and resilient transition for those sectors which are the backbone of the economy, such as transport, retail, utilities and industrial processes. We would welcome further thoughts from Government on specific challenges and opportunities.

The Taskforce has two further aims at its core. The first is to further London as the leading world centre for green finance and to ensure our existing capabilities continue to evolve to grasp this commercial opportunity. The second is more important still, and it is to deliver against the Clean Growth Strategy to enable UK plc to benefit from the profound opportunity to green our economy.

This publication is the beginning, not the end of this work. The Green Finance Initiative will, as well as continuing its detailed work programme, set up a new implementation committee, charged with tracking progress on Taskforce recommendations, conducting further research where it is needed and continuing to champion this agenda amongst financiers and consumers alike. Thank you to the many contributors who have helped to make this report come about.

I believe that the green finance agenda can reap huge economic benefits for the UK as well as helping to meet our own obligations to protect the environment.

Sir Roger Gifford
SEB UK Senior Banker
Chair, Green Finance Initiative
Chair, Green Finance Taskforce appointed by HM Government

Foreword

The financial system is one of the jewels in the crown of the UK economy, and has a vital role to play in the transition to a low carbon economy.

We are the first government ever to clearly state our commitment to leaving the natural environment in a better state than we found it. We are determined to achieve our global and domestic climate change commitments, including reducing emissions and avoidable waste. To deliver our ambitions, we have to ensure that we have the right kind of finance to support the changes we need to make.

The transition to a low carbon economy is a major opportunity for the UK. Over the last two decades, we have led the world in demonstrating that cutting our emissions does not mean sacrificing the standards of living for hard-working families. Since 1990, we have reduced our emissions by more than 40%, while our economy has grown by two thirds – the best performance in the G7.

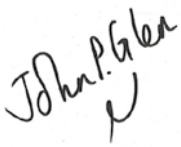
As we set out in the Clean Growth Strategy, our world-leading financial system is key to that transition. It is home to unrivalled experience, expertise and innovation. We could not meet our carbon budgets, or indeed the targets of the Paris Agreement, without private sector investment in low carbon technology and infrastructure.

Capital will need to be channelled towards sustainable projects, and environmental risk to be factored into financial decision-making. In short, a low carbon economy cannot be achieved by Government alone.

The UK is home to the world's most developed and international financial centre, and whilst the UK has played a key role in the development of the green finance sector, we recognise there is more to do domestically to achieve our ambitions of global leadership for this sector. This is why we established the Green Finance Taskforce – composed of leading experts in academia, finance and civil society – to encourage capital to move towards greener and cleaner sectors in the UK, and to ensure we continue to lead the world in green finance.

The challenges of the transition to a low carbon economy are great, but the opportunities are greater. We are grateful to the Green Finance Taskforce members and Chairman, and the huge range of contributors from across the finance sector, for their work in producing this report. We look forward to working together with industry to create a greener world for the people and businesses of Britain, now and in the future.

The Rt Hon Claire Perry MP
Minister of State for
Energy and Clean Growth



John Glen MP
Economic Secretary
to the Treasury

Executive summary

The global low carbon transition will redefine the UK economy. From the largest infrastructure projects to the fabric of our homes, that transition creates a huge opportunity for the UK to lead the world in cutting emissions while driving growth – building on our world-leading performance to date.

The UK Government's Industrial Strategy recognises Clean Growth as one of the 'Grand Challenges' for the UK economy. This creates an enormous opportunity to maximise the advantages for UK industry from the global shift to clean growth through to the development, manufacture and use of low carbon technologies, systems and services that cost less than high carbon alternatives.

Meeting that ambition will require unprecedented levels of investment. Green finance – i.e. investment in environmental technology, infrastructure and services – is therefore central to the future of the UK and global economy. The UK's status as host to a world-leading financial services centre means that the UK has direct access to the investment our economy needs, and the chance to seize the economic opportunities that it offers.

In recognition of that opportunity, the Government established the Green Finance Taskforce – an alliance of individuals and organisations tasked with providing recommendations for delivery of the public and private investment we need to meet our carbon budgets and related environmental and resilience goals, and maximise the UK's share of the global green finance market.

The Green Finance Taskforce has met that objective by working with over 140 organisations to deliver a series of recommendations on how the Government and the private sector can work together to maximise the UK's role in mobilising the green finance the UK and global economy will need. The Taskforce will now work closely with the Government and other players to support consideration and implementation of these recommendations and secure the benefits of clean growth.

The Report's Recommendations

Theme 1.
Relaunch UK green finance activities through a new unified brand

1. The Government and the City of London should establish a new Green Finance Institute brand under which strengthened Green Finance Initiative capacity is established.
2. This new Institute should set up a Green Fintech Hub.
3. The Government and the new Institute should deliver a joint diplomatic strategy on green finance.

Theme 2.
Improve climate risk management with advanced data and analytics

4. Private sector, academia and the Government should establish a Centre for Climate Analytics.

Theme 3.
Implement the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD)

5. Companies and investors should use the TCFD framework to develop their financial, corporate governance and stewardship disclosures, and Government should conduct a review of disclosure in 2020 to monitor and encourage market adoption amongst both issuers and users.
6. Relevant financial regulators should integrate the TCFD recommendations throughout the existing UK corporate governance and reporting framework.
7. The Government and relevant financial regulators must clarify in their guidelines that disclosing material environmental risks, including physical and transition climate-related risks, is already mandatory under existing law and practice.

Theme 4.
Drive demand and supply for green lending products

8. The Government should extend 2035 EPC targets from residential properties to commercial properties by the end of 2018, and introduce a requirement for operational energy ratings from 2020.
9. The Government should introduce Green Building Passports for residential and commercial properties by 2020.
10. The Government should complete research to understand the opportunities and costs of using a range of fiscal measures to boost demand for energy efficient retrofits in 2018, and pilot fiscal measures alongside mortgage products from 2019.
11. The Government should provide short-term incentives to pump prime the green consumer loans and green mortgage markets.
12. UK lenders should work towards promoting awareness and mainstreaming a consideration of 'green' factors into all their mortgage lending decisions.

Theme 5.
Boost investment into innovative clean technologies

13. The Government should set up a Green Investment Accelerator for early stage technology grant funding.
14. The Government should establish a dedicated public-private green venture capital fund.
15. Increase commercial opportunities for UK businesses through public procurement opportunities

Theme 6.
Clarify investor roles and responsibilities

16. Relevant regulators should ensure fiduciary duty clearly states the importance of ESG issues.
17. The Government should require that the Statement of Investment Principles include statements on the extent to which social, ethical and environmental issues (including climate change) are considered.
18. Government should clarify that trustees should engage with their beneficiaries to understand their beneficiaries preferences and can make investment decisions that are based on these preferences.
19. The Government should clarify that investment consultants should have sufficient expertise and competency on ESG issues.
20. Investment advisors should ask clients about their sustainability preferences, and investment funds marketed directly to individuals should clearly state the environmental and social impacts of the fund.
21. The Government and professional bodies should develop competencies across a wider group of societal stakeholders through education tools.
22. The Financial Conduct Authority should require that corresponding requirements are put in place for contract-based schemes

Theme 7.
Issue a Sovereign Green Bond

23. The Government to issue a Sovereign Green Bond. This should be of the order of the French sovereign green bond, which was €9.697 billion, and be considered as one of the measures of a comprehensive UK Green Capital Raising Plan.

Theme 8.
Build a green and resilient infrastructure pipeline

24. The Government should publish a National Capital Raising Plan explicitly designed to align UK infrastructure planning with the delivery of the Clean Growth Strategy and the 25 Year Environment Plan.

Theme 9.
Foster inclusive prosperity by supporting local actors

25. The Government should set up a Local Development Finance fund
26. Boost demand from public bodies and their pension providers for diverse place-based low carbon investments.
27. The Government should set up Clean Growth Regeneration Zones.
28. Awareness raising of green finance opportunities among local authorities.

Theme 10.
Integrate resilience into the green finance agenda

29. The Government should establish a national resilience unit to coordinate and champion climate resilience and ensure Government investment is 'future proofed' to climate change.
30. The Government should publish an action plan to develop the resilience market.

1.
Introduction

The opportunity for UK green finance

There has never been a more urgent need for investment to reduce emissions; adapt to be resilient to the effects of climate change; and seize the opportunities and manage the risks of the low carbon transition.

The signing of the **Paris Agreement on Climate Change** in December 2015 marked a milestone for the global economy. Combined with the 2015 **Sustainable Development Goals** it demonstrates the worldwide commitment to achieving a low carbon future – and signals a universal shift towards a less carbon intensive and more climate-resilient economy. The UK played a key role in delivering both these agreements.

Article 2 of the Paris Agreement[1] requires an alignment of financial flows with a 1.5/2°C trajectory and implies a fundamental reorganisation of both the financial system and the economy it serves. The Sustainable Development Goals - which set out specific goals to be achieved in the next 15 years to end poverty, protect the planet and ensure prosperity for all - also imply a significant rethink of the UK's current economic development model.[2]

The 2014 New Climate Economy Report estimates that some **US$90 trillion** will be needed between 2015 and 2030 to achieve global sustainable development and climate objectives.[3] This will require a significant increase in global investment, and **momentum is building**.

Over US$3.3 trillion of private climate finance[4] has been mobilised to date;[5] the global green bond market in 2017 reached US$155.4 billion new issuance in the year, compared to US$81.6 billion in 2016 **(Chart 1)**;[6] global sustainably managed assets under management have increased by 25% from 2014 to 2016;[7] and annual global investment in clean energy has grown seven-fold from US$47 billion in 2004 to US$335.5 billion in 2017.[8]

Many developing economies, particularly China, India and in Latin America, are growing quickly and will account for a greater proportion of global Gross Domestic Product (GDP) and trade flows in the future. It is in these same developing economies where demand for green finance expertise is greatest – generating significant trade opportunities.[9] In China alone it is estimated the transition to an 'ecological civilisation' will require annual green investment of between US$474 billion and US$633 billion in the period 2015-2020, at least 85% of which needs to come from the private sector.[10]

1 The United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement (2015) http://unfccc.int/paris_agreement/items/9485.php

2 UN Sustainable Development Goals (2015) http://www.un.org/sustainabledevelopment/sustainable-development-goals/#

3 The Global Commission on the Economy and Climate (2014) The New Climate Economy Report: Better Growth Better Climate https://newclimateeconomy.report/2016/wp-content/uploads/sites/2/2014/08/NCE-Global-Report_web.pdf

4 UNFCCC (2016) Biennial Assessment and Overview of Climate Finance Flows; defines climate finance as "finance that aims at reducing emissions, and enhancing sinks of greenhouse gases and aims at reducing vulnerability of, and maintaining and increasing the resilience of, human and ecological systems to negative climate change impacts" and references Paris Agreement (2015) Article 2.1(c) "making financial flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development".

5 Cumulative investment 2004 to 2017: Bloomberg New Energy Finance (2018) Clean Energy Investment Trends, 2017 https://about.bnef.com/clean-energy-investment/#toc-download

6 Climate Bonds Initiative (2017) Green Bond Highlights 2017 https://www.climatebonds.net/files/reports/cbi-green-bonds-highlights-2017.pdf

7 Global Sustainable Investment Alliance (2016) Global Sustainable Investment Review http://www.gsi-alliance.org/wp-content/uploads/2017/03/GSIR_Review2016.F.pdf

8 Bloomberg New Energy Finance (2018) Clean Energy Investment Trends, 2017 https://about.bnef.com/clean-energy-investment/#toc-download

9 Green Finance Initiative (2017) 15 Steps to Green Finance http://greenfinanceinitiative.org/fifteen-steps-to-green-finance/

10 UNEP Finance Inquiry (2017) Establishing China's Green Financial System: Progress Report 2017 http://unepinquiry.org/publication/establishing-chinas-green-financial-system-progress-report/

London is already a world leading hub for green finance – backed by deep and liquid capital markets and a strong reputation for innovation. As the market grows, the City's institutions have a great chance to be the first choice for structuring and arranging green infrastructure finance and issuing green bonds across the globe. In tandem, opportunities for UK-based investors to invest in the global green economy should also be promoted. Whilst some see there being competition between financial centres for green finance, global coordination and cooperation is critical. Indeed it is the global nature and outlook of London's capital market interactions, as well as the deep expertise in green finance and sustainable investment that positions it so well to help drive and catalyse the green economy to the benefit of societies and financial centres around the world. **This means that enhancing London's global offer in green finance will have a global impact** as well as help the UK meet its very significant domestic investment obligations.

The UK's 2008 Climate Change Act, the first such piece of legislation ever passed globally, includes a legally-binding target to reduce UK carbon emissions by at least 80% compared to 1990 levels by 2050.[11] To meet this, the Government is required to set out its plan to meet an interim greenhouse gas reduction target of 57% by 2032. This was published as the **Clean Growth Strategy** in October 2017.

11 UK Climate Change Act (2008) Chapter 27, Part 1, Article 1.1: "It is the duty of the Secretary of State to ensure that the new UK carbon account for the year 2050 is at least 80% lower than the 1990 baseline"

CHART 1.
Green bond annual issuance ($billion)

Source: Climate Bonds Initiative *Climate Bonds Initiative estimated value for 2017

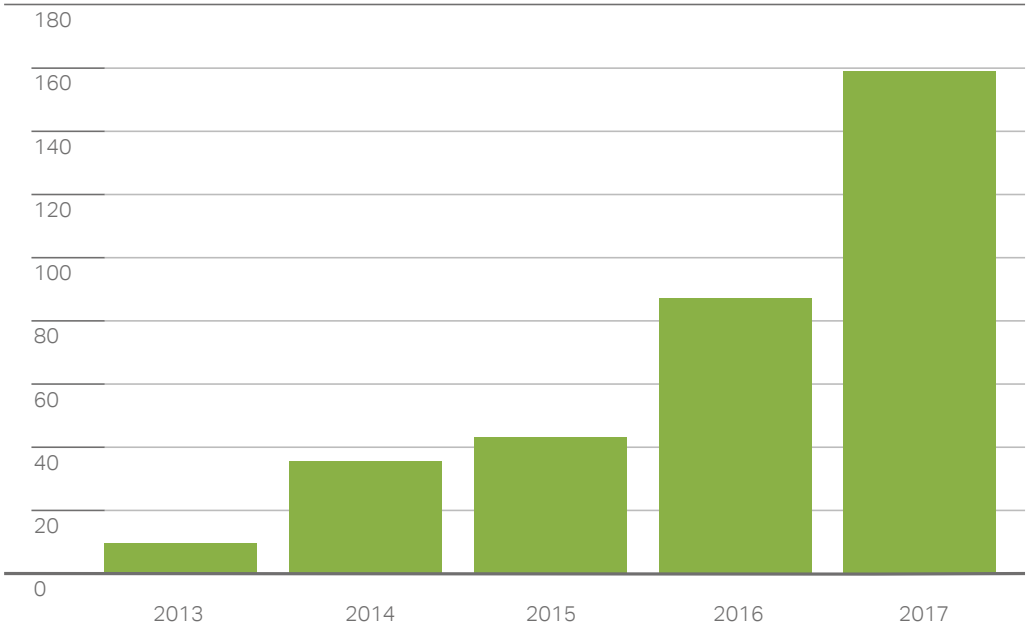


FIGURE 1.
Clean growth and green finance

Clean Growth Sectors	Ambition set out in Clean Growth Strategy	How green finance can help deliver
Innovation	Investing over £2.5bn in low carbon innovation	Increasing venture investment to support the commercialisation of innovative clean technologies **Theme 5**
Business and Industry	Improve business energy efficiency by at least 20%	Developing new green lending products that can facilitate widespread and affordable energy efficiency improvements **Theme 4**
Homes	Aspiration for as many homes to be EPC Band C by 2035	
Power	Phasing out unabated coal by 2025	Mobilising increased investment in large and small-scale power **Themes 6, 7** and **8**
Transport	End the sale of new conventional petrol and diesel cars and vans by 2040	Driving investment and finance that can reduce the cost of low emission vehicles both for manufacturers and consumers **Themes 4** and **5**
Natural Resources	Deliver better environmental outcomes	Ensuring the financial sector is resilient to climate change, and that investors consider environmental factors **Themes 3** and **10**
Public Sector	Voluntary public sector target of 30% reduction in carbon emissions by 2021	Maximising the carbon reduction impact of public spending, through targeted investment and flexible procurement **Theme 9**

FIGURE 2.
Five foundations of the Industrial Strategy and green finance

Five Foundations	Green Finance Recommendations
Ideas The world's most innovative economy	**Theme 2:** Access to climate data can boost financial innovation such as fintech **Theme 5:** Channel venture capital into cleantech
People Good jobs and greater earning power for all	**Theme 8:** Boost competency on climate risks and opportunities in the finance industry
Infrastructure A major upgrade to the UK's infrastructure	**Themes 7, 8, 9** and **10:** Channel investment into low-carbon, climate-resilient infrastructure
Business environment The best place to start and grow a business	**Themes 3:** Upgrade financial regulation so that sustainability is at the heart of investment
Places Prosperous communities across the UK	**Theme 9:** Ensuring our approach to green finance is inclusive and place-based

The Clean Growth Strategy sets out a bold vision not just to deliver reduced greenhouse gas emissions, but also cleaner air, lower energy bills for households and businesses, an enhanced natural environment, good jobs and industrial opportunity.[12] Of the sectors covered transport, homes, business and industry represent 62% of carbon emissions in the UK.[13] The Clean Growth Strategy's projections speak for themselves – the Government estimates that to meet our targets by 2030, businesses and industry should be more energy efficient by at least 20%; by 2032, six to nine million homes will require new insulation; and by 2050 almost every car and van in the UK will need to be zero emissions (**Figure 1**).[14]

The Clean Growth Strategy rightly recognises that private sector investment is central to delivering this ambition. As a result, green finance is highlighted as a priority area, with £180 billion already in the pipeline for clean electricity and supporting infrastructure. The Strategy goes further to outline a number of policies and proposals to develop expertise and seize opportunities from new green finance solutions. This includes working with the British Standards Institution (BSI) to develop green and sustainable financial management standards and work with mortgage lenders to develop green mortgage products.[15]

In addition, the Government published in January 2018 its **25-Year Environment Plan** on environmental quality, protection, and enhancement.[16] The Plan sets out a combination of strategies, targets, mechanisms and commitments in order to meet its broad goals of improving the environment, namely: clean air and clean plentiful water; thriving plants and wildlife; sustainable resource use; reducing the risk of harm from environmental hazards; and conservation and enhancement of the natural environment. It also states that the Government will "take all possible action to mitigate climate change, while adapting to reduce its impact" and deliver a 'green' Brexit that puts environmental policy at the heart of domestic and international priorities.

Finally, the **Industrial Strategy** will be a key driver and policy framework for future UK industrial and economic growth. The Industrial Strategy recognises that the shift to clean growth is one of the most foreseeable and significant global economic trends and is set to transform many sectors over the coming decades.[17] For this reason, the Industrial Strategy announced a Clean Growth Grand Challenge: to maximise the advantages for UK industry from the global shift to clean growth – through leading the world in the development, manufacture and use of low carbon technologies, systems and services that cost less than the high carbon alternatives. Again, green finance will be central to delivering this (**Figure 2**). Investment by Governments, businesses and households will play a critical role in accelerating clean growth in many sectors, facilitated by the financial sector. The Industrial Strategy recognised this in its commitment under the Clean Growth Grand Challenge to 'make the UK the global standard-setter for finance that supports clean growth'.

12 Department for Business, Energy and Industrial Strategy (2017) Clean Growth Strategy https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/651916/BEIS_The_Clean_Growth_online_12.10.17.pdf

13 Ibid.

14 Ibid.

15 Ibid.

16 Department for Environment, Food and Rural Affairs (2018) 25 Year Environment Plan https://www.gov.uk/government/publications/25-year-environment-plan

17 Department for Business, Energy and Industrial Strategy (2017) Industrial Strategy https://www.gov.uk/government/organisations/department-for-business-energy-and-industrial-strategy

Active measures to promote green finance can help manage the uncertainty around delivery of the UK's domestic policy agendas, support the international transition to a low carbon economy, and help deliver a successful Brexit process – all while securing significant economic benefit for the UK

This would build upon **a groundswell in support from financial institutions for 'greening' finance** – catalysed by work led by the Bank of England. The establishment of the G20 Green Finance Study Group in late 2015, co-chaired by the UK and China, and later establishment of the Financial Stability Board Task Force on Climate-related Financial Disclosures (TCFD) has significantly advanced detailed thinking on both why and how the financial system should be 'greened'. Over 238 companies, with a combined capitalisation of US$6.3 trillion, including 150 financial institutions representing US$81.7 trillion, publicly support the TCFD's recommendations.[18]

Challenges to expanding green finance

Globally the green finance sector is growing, but not fast enough.[19] The green bond market for 2017 reached US$155.5 billion,[20] roughly 2% of the US$6.7 trillion of bonds issued in the same year.[21] Comparatively, US$87 billion was lent by the world's 37 top banks for fossil fuel extraction in 2016, with US$437 billion invested by the oil and gas industry.[22] This financing gap is seen by many in financial services as a challenge but also as an opportunity.

The Committee on Climate Change (CCC) has estimated the total investment needed to meet the UK's fifth carbon budget at approximately £22 billion per year (1% of GDP),[23] with public investment of £2.2 billion (0.1% of GDP) needed annually alongside a much larger private investment programme (**Figure 3**).[24]

18 Taskforce on Climate-related Financial Disclosures (2017) Mike Bloomberg and FSB Chair Mark Carney Announce Growing Support for the TCFD on the Two-Year Anniversary of the Paris Agreement https://www.fsb-tcfd.org/wp-content/uploads/2017/12/TCFD-Press-Release-One-Planet-Summit-12-Dec-2017_FINAL.pdf

19 Rainforest Action Network, Oil Change International (June 2017) Banking on Climate Change https://d3n8a8pro7vhmx.cloudfront.net/rainforestactionnetwork/pages/17788/attachments/original/1504737269/RAN_Banking_On_Climate_Change_2017_final.pdf?1504737269

20 Climate Bonds Initiative (2018) Green Bond Highlights 2017 https://www.climatebonds.net/files/reports/cbi-green-bonds-highlights-2017.pdf

21 Thomson Reuters (2018) Debt Capital Markets Review: Full Year 2017 https://www.thomsonreuters.co.jp/content/dam/openweb/documents/pdf/japan/market-review/2017/dcm-4q-2017-e.pdf

22 Reuters (2017) New Oil Projects to Double in 2017, WoodMac says https://www.reuters.com/article/oil-production-spending/new-oil-projects-to-double-in-2017-woodmac-says-idUSL5N1F03US

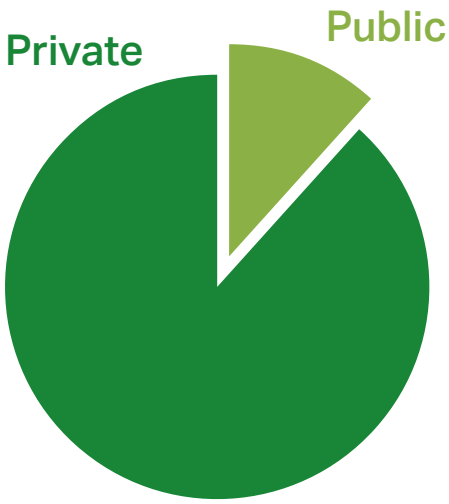
23 World Bank national accounts data (accessed March 2018) UK Gross Domestic Product 2015 https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2016&locations=GB&start=2008&view=chart

24 Committee on Climate Change (March 2017) The infrastructure needs of a low-carbon economy prepared for climate change https://www.theccc.org.uk/publication/briefing-note-the-infrastructure-needs-of-a-low-carbon-economy-prepared-for-climate-change/

FIGURE 3.

£22bn Annual Investment

Investment needed to meet the fifth carbon target



Source: Committee on Climate Change 2015 *The infrastructure needs of a low carbon economy prepared for climate change.*

For upgrades to the UK's infrastructure, the Infrastructure and Projects Authority (IPA) has for the first time brought together a spending plan with private investment setting out more than £500 billion of total planned investment in our economic and social infrastructure up to 2021.[25] In the longer term, the UK energy and transport sectors are forecast by the IPA to need £255 billion and £134 billion of investment respectively over the next 15 years. Of this, approximately 90% will need to come from private sources.[26] There is a significant opportunity to build in upgrades to this infrastructure to ensure it is resilient to a changing climate.

Since the establishment of the UK Green Finance Initiative in 2016 much has developed. Increasingly **other countries are taking a lead** – both in shaping the global policy agenda and on developing and marketing new green finance products.

In many respects this is a welcome global recognition of the challenges and opportunities of the global transition. But it also creates a risk that the UK falls behind, as the pace of innovation, investment and policy changes accelerates globally. The UK is a world leader in the structuring, underwriting and the listing of international green bonds. However, there is much more to do in terms of domestic (including pound sterling) green bond issuance. Among G7 countries, France has issued the most, with US$33.7 billion labelled green bonds tracked by Climate Bonds Initiative

25 Infrastructure Projects Authority (2016) UK Infrastructure Investment to Reach Record High https://www.gov.uk/government/news/uk-infrastructure-investment-to-reach-record-high

26 The Infrastructure Projects Authority (IPA) 2030 projections of £255bn for energy and £134bn for transport include non "green" infrastructure, but do not capture the incremental spending needed for energy efficiency, a replacement of the residential heating network and the move to electric cars. The last official forecast by Department for Energy and Climate Change in 2014 forecast £45-60bn residential energy efficiency investment and another £18bn for businesses. The IPA highlights energy as the sector which needs 90% of capital from private sector.

since 2009, including a noticeable US$13 billion for 2017. It is followed by the United States and Germany with US$15.3 billion and US$13.6 billion respectively[27]. The UK did not make the top 10 nations for green bond issuance in 2017[28]. Only two sterling denominated green bonds were listed on the London Stock Exchange between 2012 and 2016. Several domestic green bonds were issued in 2017, including by Anglian Water, SSE, Barclays and Thames Tideway.[29]

Figures show similar trends for green lending. Japanese entities are the most dynamic in terms of identified green lending, representing a table share of 16.7% for 250 deals over the period 2012-2017.[30] With US$17.2 billion and US$17.0 billion respectively, France and Germany are leading the green lending market in Europe.[31]

The recently published, inaugural Global Green Financial Centres Index from Z/Yen[32], ranks London as number one, but respondents felt that the UK was in danger of falling behind unless further action is taken. For example, France, having established the 'Finance for Tomorrow' forum, introduced the first mandatory climate change-related reporting laws for institutional investors in 2015 and established a sovereign green bond programme in 2017, so far raising €9.697 billion[33], is recognised as a leader in green finance. China was also the first country in the world with clearly stated Government policy support to create an all-encompassing green financial system and has established five green finance pilot zones across the country.[34]

Last but not least, The European Union is pursuing a leadership strategy on green and sustainable finance. In March 2018 the EU published its Action Plan on Sustainable Finance, setting out a strategy for a financial system that supports the EU's climate and sustainable development agenda. The Action Plan lists a number of important initiatives based on the recently published recommendations of the High-Level Expert Group (HLEG) on Sustainable Finance and includes reforms that are relevant to the UK's own ambitions on clean growth.

The UK has deep regulatory and market experience in many of these areas, including on fiduciary duty, corporate reporting and mobilising capital for clean infrastructure and can move ahead with domestic reforms.[35] In other areas, UK interests would be best served via alignment with EU reforms that are designed to provide standards to serve global capital markets, such as the proposed taxonomy of sustainable industry activities and financial product standards. Aligning with these EU reforms would best serve the interests of increasing international investment in clean growth in the UK, , while building on its leadership as a financial centre to achieve global alignment on green policies and standards beyond the EU (through dialogue with China, India and other important players).

27 I4CE, PwC, Climate-KIC (2017) Benchmarking the greenness of financial services [Provisional version] https://www.i4ce.org/wp-core/wp-content/uploads/2017/12/Climate-KIC-I4CE-PwC-benchmak-greenness-financial-centres.Provisional-Version.pdf

28 Climate Bonds Initiative (2018) Great Britain Issuance 2017 https://www.climatebonds.net/2018/01/2017-gb-issuance-usd1555bn-new-record-all-2017-numbers-count-our-green-bond-highlights

29 London Stock Exchange Group (2016) Green Bonds on the London Stock Exchange http://www.londonstockexchange.com/specialist-issuers/green-bonds/greenbondspresentation.pdf

30 I4CE, PwC, Climate-KIC (2017) Benchmarking the greenness of financial services [Provisional version] https://www.i4ce.org/wp-core/wp-content/uploads/2017/12/Climate-KIC-I4CE-PwC-benchmak-greenness-financial-centres.Provisional-Version.pdf: In this report, green lending was defined as loans provided by banks to finance renewable energy and energy efficiency.

31 I4CE, PwC, Climate-KIC (2017) Benchmarking the greenness of financial services [Provisional version] https://www.i4ce.org/wp-core/wp-content/uploads/2017/12/Climate-KIC-I4CE-PwC-benchmak-greenness-financial-centres.Provisional-Version.pdf

32 China Development Institute and Z/Yen (2017) Global Financial Centres Index 22 http://www.longfinance.net/images/GFCI22_Report.pdf

33 Environmental Finance (2017) Second tap takes France's sovereign green bond to almost €10bn. https://www.environmental-finance.com/content/news/second-tap-takes-frances-sovereign-green-bond-to-almost-10bn.html

34 UNEP and The International Institute of Green Finance, Central University of Finance and Economics (2017) Establishing China's Green Financial System: Progress Report 2017 https://wedocs.unep.org/bitstream/handle/20.500.11822/22285/China_Green_Finance_ProgressRep_ES_EN.pdf?sequence=1&isAllowed=y

35 European Commission (2018) Sustainable finance: Commission's Action Plan for a greener and cleaner economy http://europa.eu/rapid/press-release_IP-18-1404_en.htm

Opportunities for the Government and financial services to work together

Making the UK and the City of London a global hub for green finance can bring substantial benefits to the UK.[36] But being best in class globally on green finance needs to start at home. The time is right for the Government to take a more activist approach to working with the private sector to help realise expanded leadership and business opportunities for the UK.

Over the course of six months the Green Finance Taskforce has identified a range of opportunities to achieve this, which are grouped under 10 themes as follows:

1. **Relaunch UK green finance activities through a new unified brand**
2. **Improve climate risk management with advanced data and analytics**
3. **Implement the recommendations of the Task Force on Climate-related Financial Disclosures**
4. **Drive demand and supply for green lending products**
5. **Boost investment into innovative clean technologies**
6. **Clarify investor roles and responsibilities**
7. **Issue a sovereign green bond**
8. **Build a green and resilient infrastructure pipeline**
9. **Foster inclusive prosperity by supporting local actors**
10. **Integrate resilience into the green finance agenda**

Several of the recommendations are institutional in nature. This reflects the nature and scale of the challenge and opportunities faced by the UK, in common with other countries globally, and which require public -private cooperation on an unprecedented scale. By **creating institutional capacity, an enduring space for collaboration can be created to: develop new metrics, standards and tools; unlock new financial solutions; and ensure the UK can position itself as the visible global leader with go-to expertise**.

These thematic recommendations are drawn from a longer list of over 100, developed by the Green Finance Taskforce in consultation with leading experts in the area over a period of six months. Each Green Finance Taskforce member was selected based on relevant expertise on green finance and contributions to the agenda to date. In total, 300 people have contributed to this work, representing over 140 organisations. More details on how the Green Finance Taskforce was set up and run are included in Annex 1.

The Green Finance Taskforce believes that implementing these recommendations will bring substantial benefits to the UK through **unlocking inward investment, promoting diverse trade opportunities for the financial services sector and building on UK leadership on climate change and London's existing reputation as a leading global financial centre.**[37]

36 Green Finance Initiative (2017) 15 Steps to Green Finance http://greenfinanceinitiative.org/fifteen-steps-to-green-finance/

37 According the Global Financial Centres Index, in 2016 London was ranked the leading financial centre – ahead of New York, Hong Kong, Singapore and Tokyo: China Development Institute and Z/Yen (2016) The Global Financial Centres Index 20 http://www.longfinance.net/images/gfci/20/GFCI20_26Sep2016.pdf

2.
Key recommendations

Theme 1. Relaunch UK green finance activities through a new unified brand

The size of the opportunity

Raising the capital needed to combat climate change is a global challenge, and an unparalleled opportunity for any financial centre that retains global ambitions. As noted above, more than US$90 trillion of investment is required by 2050 to deliver a 'two degrees or less' scenario as agreed at the UN Climate Change Conference in Paris in 2015. Repositioning conventional market infrastructure, regulation and private sector business models to capture this growth will be essential if London's leading position as a global financial services hub is to be retained.

Building on UK strengths

The City of London has already benefited from a growth in green finance activity. In 2017, 27 green bonds were listed in London, raising US$10.09 billion, compared to 14 green bonds which raised US$5.65 billion in 2016. In total, there are **64 green bonds** listed in London that have raised over **US$20.67 billion in aggregate terms across seven currencies**.[38] Thirteen renewable infrastructure funds with an aggregated value of over US$7 billion are listed on London Stock Exchange, in addition to 23 exchange traded funds (ETFs) tracking sustainability indexes. London Stock Exchange Group's green indexes offered through FTSE Russell have significantly outperformed their benchmark over a five-year period. Examples include: FTSE Balanced Climate Factor Index (+5%), and FTSE Divest.

The renewables market – a subsection of the low carbon infrastructure market – is already estimated to be worth US$290 billion,[39] with global trade in a selection of low-carbon goods and services projected to increase from around £150 billion in 2015 to £1–£1.8 trillion in 2030, and to £2.8–£5.1 trillion in 2050.[40] Key export markets will include India, Kenya, Mexico and Brazil.[41]

But while global green bond growth has been strong, it still only represents a fraction of the global bond market. Green bonds and new products, such as transition and social bonds, offer new opportunities for issuers and investors to show their commitment to the transition to a low carbon economy. Further, climate risks and opportunities need to be applied and integrated across all asset classes including equities and bonds more broadly outside of "green" defined securities. London to capture its share of that growth in green financial and professional services, is a necessary condition of its future success as a global centre.

London has considerable strengths in conventional finance, all of which have relevance for green finance. The latter is after all, a specific kind of intermediation between buyers and sellers, investors and savers, which need financial services to raise investment and generate returns.

38 Lovisolo, S., London Stock Exchange Group (2018) UK-Italy Financial Dialogue http://www.minambiente.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/Lovisolo_UK_Italy_Green_Finance_25022018.pdf

39 Renewable UK (2017) Report reveals massive range of UK wind, wave and tidal energy industries' exports http://www.renewableuk.com/news/341845/Report-reveals-massive-range-of-UK-wind-wave-and-tidal-energy-industries-exports.htm

40 Carvalho, M., Fankhauser S. (2017) UK Export Opportunities in the low-carbon economy http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2017/04/Carvalho-and-Fankhauser-2017.pdf

41 International Trade Administration (2016) 2016 Top Markets Report: Renewable Energy https://www.trade.gov/topmarkets/pdf/Renewable_Energy_Top_Markets_Report.pdf

Depth and scale – London has a full-service offer in financial and professional services with world leading asset management, insurance, banking and professional services. For example, the UK's insurance market is the largest in Europe, and fourth largest in the world[42].

Deep and Liquid Capital Markets – The UK is home to what is on several measures the world's deepest and most internationally-oriented capital market, providing access to financing and investment opportunities for many overseas companies, banks and investors. Its expertise and connectivity positions London well to influence the development of green and sustainable finance globally.

Global Regulatory Leadership – The UK has provided strong regulatory leadership through the G20 Green Finance Study Group, co-chaired with China, and Bank of England Governor Mark Carney's role as FSB Chairman leading to the creation of the Task Force on Climate-related Financial Disclosures. Further, the UK launched its market leading Corporate Governance Code in 1992 and its much "exported" Stewardship code in 2010[43]. In 2013, through amendments to the Companies Act 2006, the UK introduced legislation mandating carbon reporting for all UK listed companies, thus pre-empting the EU Non-Financial Reporting Directive.

Global Reach – The UK has soft-power assets it can leverage to boost capital flow through its extensive trading roots in Asia and across the Commonwealth, making the most of the Corporation of London, the Foreign and Commonwealth Office and the Department for International Trade global networks.

Academic and Civil Society Excellence – The UK has five of the world's top 25 universities[44]. Oxford, Cambridge and London School of Economics all have globally recognised, interdisciplinary research centres in this field. Institutions such as the Met Office Hadley Centre and the Natural Environment Research Centre are global leaders in climate science and are leading contributors to the Intergovernmental Panel on Climate Change process. London is a notable centre of civil society expertise in green and climate finance issues, hosting, among others, E3G, Climate Bonds Initiative, UN PRI, Carbon Tracker Initiative, Carbon Disclosure Project (CDP), Climate Disclosure Standards Board (CDSB), Client Earth and ShareAction.

Challenges to overcome

London has a credible leading offer in expertise in:

- integration of green and sustainability into investment strategies;
- green advisory services;
- financing climate mitigation, promoting the UK as a centre of excellence for structuring and arranging finance for green infrastructure and investing in the global green economy; and
- financing climate adaptation, including promoting the development and uptake of insurance products to increase climate resilience globally.[45]

Lack of consistent and comparable data is a barrier to realising more green finance opportunities in the UK and globally. It can prevent investors from managing risks as well as seizing opportunities that climate change presents.

Information is the life-blood of financial markets and there is a vast data disclosure and benchmarking exercise now underway to enable more accurate asset pricing. It is for this reason

42 Association of British Insurers (2018) UK Insurance and Long-term Savings: State of the Market https://www.abi.org.uk/globalassets/files/publications/public/data/abi_bro4467_state_of_market_v10.pdf

43 Financial Reporting Council (2018) Origins of the UK Stewardship Council https://www.frc.org.uk/investors/uk-stewardship-code/origins-of-the-uk-stewardship-code

44 Financial Times Global MBA Ranking (2018) http://rankings.ft.com/businessschoolrankings/global-mba-ranking-2018

45 Green Finance Initiative (2017) 15 Steps to Green Finance. E3G http://greenfinanceinitiative.org/fifteen-steps-to-green-finance/

that **the TCFD project must be implemented globally; otherwise market failures will continue, with exposure to climate change risk and opportunity continually mispriced and capital misallocated as a result**.

While the market for green bonds remains relatively sophisticated, this is not true for loans and asset-backed securities and there is little in the way of commons standards in green corporate lending, real estate or securitisation, either domestically or internationally.

International competition

As noted earlier, London is the leading green finance centre currently, there is growing competition from other financial centres aiming to gain market share in green finance (see Box 1). However seeing green finance as a purely competitive issue, is too narrow as the transition to a green economy has huge global cross dependencies. London's success in supporting this area will be beneficial for the global economy and for other financial centres. Other financial centres are aligning their capital markets offer, with national capital raising activity, as well as green finance regulation. In particular, France has created a strong brand in Finance for Tomorrow established in June 2017 as an initiative of Paris Europlace. This provided a platform to showcase both the sovereign green bond and the Paris green bond, as well as prominent environmental legislation such as Article 173, which among other things, mandates carbon reporting from a wide range of investors including asset managers, insurance companies and pension funds. This package, combined with visible political support at the highest level, makes for a compelling offer. In comparison, the UK needs to develop close, formal cooperation between central Government Departments and their international networks (via the Foreign Office, Department for International Trade, HM Treasury and others), academic institutions and the private sector. **Given the UK's prominent role in the UN, World Bank, IMF, G7 and G20 on this agenda, this should not become a missed**

BOX 1.

OTHER FINANCIAL CENTRES ARE SHOWING LEADERSHIP ON GREEN FINANCE

- France: strong brand through Finance for Tomorrow; leading environmental legislation such as the Energy Transition Law, which includes the well-known Article 173
- Singapore Roadmap on Green Finance – from the Singapore Institute of International Affairs on the request of the Monetary Authority of Singapore
- ASEAN Green Finance Opportunities – a collaboration with the region's largest bank, DBS, the first quantification of the green finance opportunities across the region
- China Green Finance Progress Report – a collaboration with the Central University for Finance and Economics in Beijing, the first published review of progress in China on green finance set against the State Council's 35 recommendations on green finance adopted in August 2016
- A number of national financial system 'roadmaps' or action plans have been introduced, e.g. in Argentina, China, Italy, Singapore and South Africa
- EU HLEG report recommends using full institutional force of EU to promote sustainable finance internationally.
- World Bank Roadmap on Sustainable Finance – the results of a major collaboration with the United Nations Environment Programme Finance Initiative

Recommendations

RECOMMENDATION 1

Government and the City of London should **establish a new Green Finance Institute brand under which strengthened and rebranded Green Finance Initiative capacity is established.**

London is the world's leading financial centre and indeed has conditions that are hard to replicate, notably a full-service financial and professional services offer and deep capital markets. However, in the field of green finance, the UK is not yet making the most of existing assets and leveraging its full set of expertise. Moreover, it lacks a strong, internationally-recognised brand under which green finance expertise can be promoted and exported. To address this, the Green Finance Taskforce **proposes that a new Green Finance Institute brand under which strengthened and rebranded Green Finance Initiative capacity is established.**

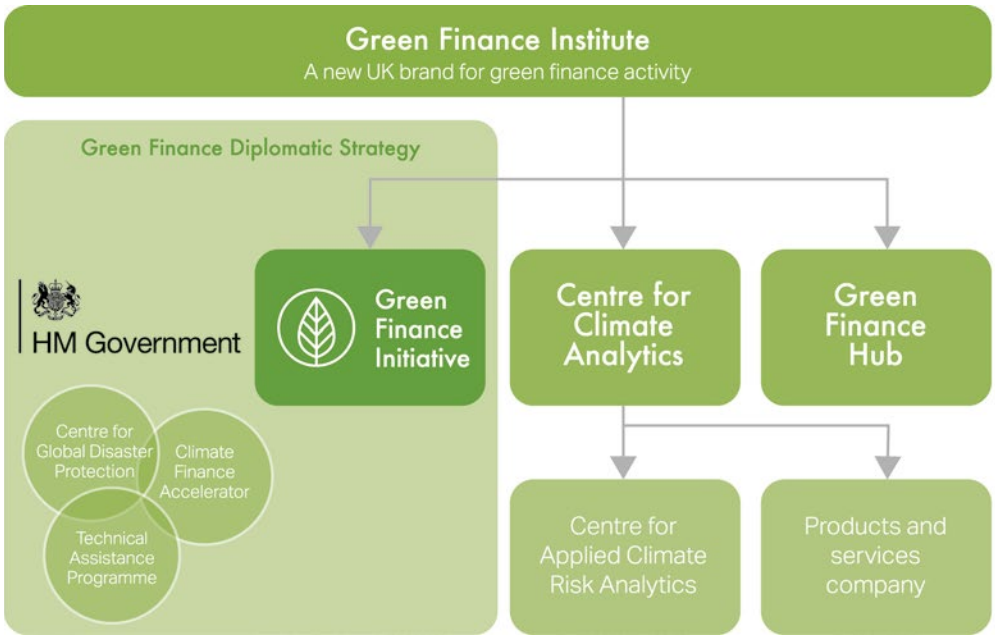
Operating as a compelling new brand the Institute would bring together the UK's existing capabilities, create new business opportunities and communicate to the wider market what London's offer is in green finance and insurance.

Building on the strengths of the Green Finance Initiative, it would represent a best in class public-private collaboration. From inception it would deliver a smart, public-private diplomatic strategy, leveraging commercial activity here, the UK's civic network, and its diplomatic network, to deliver real commercial opportunities in green finance. As such it would facilitate and capture emerging opportunities in green finance in the UK and globally.

It would achieve this through:

- Having an umbrella brand for all green finance activity with a clear communications strategy;
- assisting with mapping and promoting green and climate-resilient investment opportunities in the UK (see **Themes 8** and **10** on Building a Green and Resilient Infrastructure Pipeline and Integrating Resilience into the Green Finance Agenda);
- providing advice to UK Government and other sub-sovereign issuers of green bonds on management and use of proceeds – contributing to the design and management of the UK Government Green Bond Framework (see **Theme 7**);
- engaging the financial sector to help deliver the British Standards Institution's work on green and sustainable management standards;
- providing green finance training modules for embassy posts;
- being a centre for core scientific input for different forms of environmental project;
- deepening existing key strategic partnerships (i.e. China and Brazil) and creating new ones (i.e. India, Nigeria and Mexico) and ensure these are effectively resourced with clear deliverables;
- working with the Centre for Climate Analytics to promote world class investor and issuer-orientated research (see **Theme 2** on Improve climate risk management with advanced data and analytics);
- improving policy communication and regulatory onboarding for investors in the UK;
- promoting the UK's green infrastructure specialism, i.e. supporting China's Belt and Road projects;
- providing a central repository for green finance project knowledge and learning, standardised documentation, information about sources of Government funding for green infrastructure projects; and
- function as the forum for ongoing discussion and collaboration between Government and private sector to provide governance structure and accountability for the implementation of the Green Finance Taskforce recommendations. See **Figure 4**.

FIGURE 4.
Institutional arrangements for the proposed Green Finance Institute
How green finance activities could fit under a single brand



The Institute could be, in the first instance housed at the Corporation of London. **Seed funding from Government of the order of £2 million** would need to be supplemented with private sector subscriptions and matched funding from the Corporation of London is suggested. **Match funding from the private sector sources will be key to get to and sustain scale and is key to aligning interests**.

Sourcing funding from multiple pots would afford the Institute maximum flexibility to pursue commercial opportunities. The **Climate Finance Accelerator** and **Centre for Climate Analytics** would be separate institutions funded by separate means and would have their own governance structures and mandates, under one UK Green Finance brand.

RECOMMENDATION 2

This new Institute should **set up a Green Fintech Hub**

An early project for the Green Finance Institute would be to set up a Green Fintech Hub (GFH). The GFH would build on and support UK leadership in finance, space, fintech, and sustainability. Secondly, compared to alternatives such as company reporting, digital technology solutions can be significantly lower cost routes to amass such data at scale across the financial sector. Finally, digital technology can enable the democratisation of green finance, empowering the investing public with the information to redirect their own capital.

A Green Fintech Hub would **serve as the national centre for businesses, data and solution providers and researchers** to coordinate and collaborate to develop commercially viable green fintech solutions, with direct access to Government where necessary to unlock market development. Such a Hub would directly address two of the four Grand Challenges identified in the Government's Industrial Strategy, namely growing the Artificial Intelligence and data-driven economy and Clean Growth.

The GFH would focus on three areas: market development; standardisation; and application development. Details of each of these are below (and see **Figure 5**).

1. Market development

- Provide platforms and computing power to support big data analysis and machine learning applications relevant to green fintech;
- support the creation of algorithms and processes to match datasets, particularly in terms of linking asset-level data with ownership information;
- provide access to/aggregate data beyond remote sensing that can unlock green finance innovation, e.g. existing asset-linked data;
- use the Government's convening power to crowd in/leverage the best sources of data capture/processing/access for a specific challenge;
- interface with regulators to remove barriers to deployment; and
- promote growth of green fintech market in the UK, crowding in investors and start-up companies in this space, with the aim of being the global leader in green fintech.

2. Standardisation

- Establish the rules, principles, and technologies required to create a global database of asset ownership based on observational data;
- develop approaches using novel datasets and methodologies to tag all publicly traded securities with a 'shade of green';
- develop methodologies to measure environmental risks and impacts currently and in the future;
- develop a global monitoring, reporting and verification (MRV) system for remotely measuring the point source of emissions of individual facilities and land use change globally;
- define or develop data definition standards; and
- develop open-source methodologies.

3. Application development

- Develop distributed databases and blockchain technology that can support the creation and development of asset-level databases and information sharing between public and private sectors;

FIGURE 5.
Fintech hub design

- pioneer applications of green fintech for policymakers and regulators in the UK and internationally; and
- Provide process expertise to remove frictions, e.g. intellectual property ownership.

Such a Hub should offer a collaboration space – leveraging existing relevant facilities if possible – and access to a virtual network of all other relevant science, technology, innovation and business clusters. A core team could structure a series of business-led innovation processes.

The Hub will increase the likelihood that the UK secures a position as a truly global leader on green fintech. Existing market experience across use cases such as environmental risk management by investors, financing of sustainable commodity production and trade in global supply chains and financing of energy efficiency improvements in the built environment all indicate that there are clear opportunities for growth.

RECOMMENDATION 3

Government and the new Institute should deliver a joint diplomatic strategy on green finance

The UK Government is recognised for its leadership in commercial diplomacy and is uniquely placed to make a global contribution in carrying the best practices recommended in the Green Finance Taskforce Report into the global environment, through international platforms such as the UN, G7 and G20, and via the independent regulators in global standard setting bodies such as International Organization of Securities Commissions (IOSCO), International Accounting Standards Board (IASB) and International Association of Insurance Supervisors (IAIS) to step up and set basic global minimum standards on sustainable finance in all major markets.

Central Government Departments, and the new Green Finance Institute, should develop a green finance diplomatic strategy. The recommendations of the report could be promoted bilaterally (e.g. through economic and financial dialogues) and multilaterally (e.g. through the G20 UK/China study group on green finance). Moreover, the UK should ensure it puts forward a consistent narrative – from both the Government and private sector – at international events. This could be an opportunity to showcase concrete progress and public-private collaboration.

This approach could also encourage international collaboration on sustainable finance to harmonise practices (e.g. building on the BSI's work to establish an ISO standard on responsible investment) and bring together countries to collaborate in reforming global financial policy to promote sustainability. This could potentially contribute to supporting a proposed UN Resolution on Sustainable Finance, which would establish new norms and practices for finance in achieving the UN Sustainable Development Goals (SDGs)[46].

Achieving impact

The Global Green Finance Institute would position London as a global standard setter through both thought leadership in green finance and the science behind it, as well as the hub to facilitate access to commercial expertise, capital and insurance. The aim of the Institute would be to ultimately result in increased market share for London in green finance, for example through greater issuance and underwriting of green bonds, green assets under management and securitisation of green loans.

Increasing end investor demand and demonstrating UK leadership globally will potentially also:

- Create additional commercial opportunities for the City of London to meet additional demand for responsible investment, thereby helping to continue to position London ahead of other global financial centres, such as New York and Singapore;
- support more long-term investment and processes in capital markets and providing business leaders with the opportunity to invest in long-term areas such as R&D, workforce training and skills, which increase productivity;
- provide opportunities for the UK to export its high standards abroad – whether on embedding environmental, social and governance (ESG) practices into investment decisions, clarifying fiduciary duty, the BSI standards on green finance management or recalibrating long-term risk into prudential requirements. This will help to ensure that the UK is a rule setter rather than a rule taker globally;
- provide positive global leadership on this issue and show strong UK international engagement and negotiation on a proactive agenda, with expertise embedded along its diplomatic channels, supported by an engaged private sector;
- showcase sustainability as a British asset and a strong brand and play it to its maximum effect – this will help give a key competitive advantage, a hallmark for quality, integrity and reliability;
- support the UK's status as a great trading nation, open to the world through the exchange of ideas and innovation at the global level on sustainable finance;
- support its positioning as a country with global reach, global partnerships and a global outlook; and
- join up the UK's domestic, international and public and private sector agendas on green finance via the Green Finance Institute and the green finance diplomacy strategy.

46 https://sustainabledevelopment.un.org/

Theme 2. Improve climate risk management with advanced data and analytics

The size of the opportunity

Risk management practice is commonplace across business, and the terminology of risk and resilience is familiar to the finance community. Fund managers, insurers and capital markets actors readily account for risks and uncertainty in markets and ensure that portfolios can be resilient to external shocks or stresses. However, it has long been recognised that environmental externalities, such as climate risk, are poorly incorporated into financial and business risk management practices, valuations and decision making.

These risks are present and exhibiting changing frequency and severity, including:

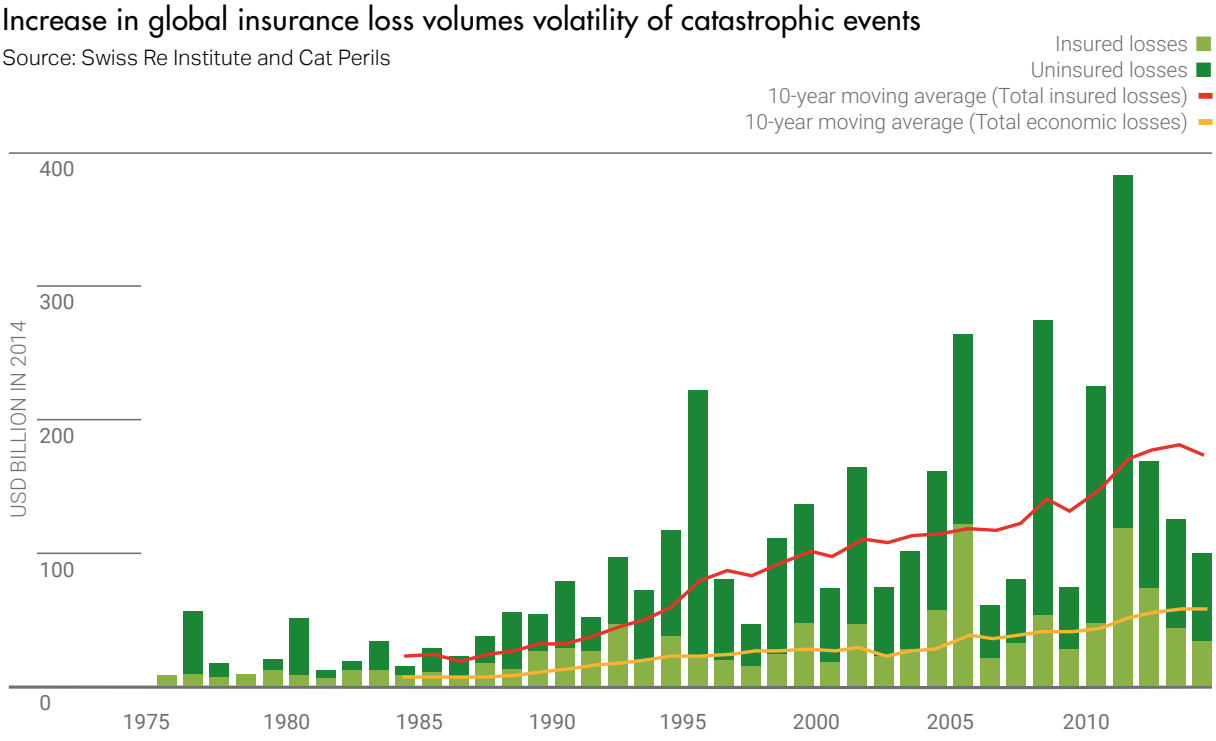
- Increased or decreased rainfall (leading to flood or drought);
- higher temperatures (leading to heat waves);
- sea level rise (leading to coastal erosion or coastal flooding); and
- increased windstorm intensity (leading to greater damage and loss).

In addition, emerging and relating to these issues are risks relating to growth of populations and exposed assets, especially in more hazardous locations (see **Chart 2**).

While responding to climate change has traditionally been seen as the realm of Government policy, there is growing recognition that the financial system, including the insurance sector, has a contribution to make in managing climate change-related risks. There are significant opportunities for growth and development of 'climate smart' finance as society and the economy move to being both low carbon and more resilient to a changing climate.

The Task Force on Climate-related Financial Disclosures (TCFD) has provided a refreshed

CHART 2.
Increase in global insurance loss volumes volatility of catastrophic events
Source: Swiss Re Institute and Cat Perils



impetus in this area, with its dual focus on 'transition risks' and 'physical risks'.[47] Examples of other UK initiatives include ClimateWise, an insurance industry-led global initiative that supports the industry to better communicate about and respond to climate change-related risks[48]; and recent Government and industry missions, particularly with China where in December 2017 the UK committed to jointly explore development and feasibility of insurance products such as catastrophe bonds.[49]

Due to its domestic role in the UK economy and its global role in the annual $160 billion natural disaster re/insurance market[50] the UK based re/insurance sector has significant capabilities in evaluating, disclosing and managing key aspects of physical climate related risks within a comprehensive and well adapted regulatory framework. The broader finance sector would benefit from the re/insurance market's knowledge on climate risk, especially as relates to infrastructure and supply chain impacts.[51] These established capabilities should be built upon and accelerated with practical and integrated climate risk analytics made available across the UK and abroad to promote sustained clean growth and resilient economies.

Globally, more than 30% of natural disaster losses are covered by insurance, although in most developing and emerging economies the proportion is less than 5%.[52] Closing this yawning protection gap, which will only be amplified by climate change impacts, is a growing focus of attention for international public policy makers. In 2016 G7 nations committed, through the InsuResilience programme, to increase current levels of climate risk insurance coverage by 400 million people. This became a shared G20 Commitment in 2017. In response to these demands and the wider UN 2030 Sustainable Development Agenda, the industry together with the World Bank and United Nations have formed the Insurance Development Forum to support delivery of these targets and of the UN Sustainable Development Goals, Sendai Framework for Disaster Risk Reduction, and Paris Agreement on Climate Change.

Actions to support these priorities will consolidate UK leadership and promote UK science, engineering and insurance services in ways that helps countries and businesses be better prepared to manage the impacts of a changing climate.

Building on UK strengths

The UK is home to world class expertise in climate and environmental science, engineering, computation and actuarial professions. This includes expertise in the insurance and reinsurance sectors, including catastrophe risk modelling firms, specialist credit ratings and accounting teams and financial regulators and research teams. In 2015 the Prudential Regulation Authority assessed the impact of climate change on the insurance sector and found that firms are reasonably well-equipped

47 Task Force on Climate-related Financial Disclosures (2017) Recommendations of the Taskforce on Climate-related Financial Disclosures https://www.fsb-tcfd.org/wp-content/uploads/2017/06/FINAL-TCFD-Report-062817.pdf

48 ClimateWise, a membership organisation which supports the insurance industry to better communicate disclose and respond to the risks and opportunities associated with the climate-risk protection gap https://www.cisl.cam.ac.uk/business-action/sustainable-finance/climatewise

49 UK-China Economic and Finance Dialogue (2017) 9th UK-China Economic and Finance Dialogue Policy Outcomes https://www.gov.uk/government/publications/uk-china-9th-economic-and-financial-dialogue-policy-outcomes

50 Global non-life reinsurance premiums in 2016 totalled about US$160 billion: Swiss Re (2017) Reinsurance non-life http://reports.swissre.com/2016/financial-report/financial-year/market-environment/reinsurance-non-life.html#

51 ClimateWise (2016) Investing for Resilience https://www.cisl.cam.ac.uk/publications/sustainable-finance-publications/investing-for-resilience

52 Holzheu, T., & Turner, G., (2018) The Natural Catastrophe Protection Gap: Measurement, Root Causes and Ways of Addressing Underinsurance for Extreme Events. The Geneva Papers, Vol. 43, Issue 1, pp. 37–71 .https://link.springer.com/content/pdf/10.1057%2Fs41288-017-0075-y.pdf

to manage the current level of physical risks[53], although in future – if climate change is not limited to safe limits – this will change.

In addition, through bodies such as the Committee on Climate Change, the Environment Agency and Flood Re, the UK is a global leader in delivering institutional solutions to clearly apportion risks between the public and private sectors. For example, the UK is one of the few countries globally where flood risk insurance is available.

As the climate continues to change and affect nations, the importance and value of this expertise in helping Governments and businesses across the globe understand and manage climate risks will grow.

The UK's insurance and reinsurance sectors are well placed to meet this demand through domestic innovation and exporting its services abroad, developing and promoting new climate resilience insurance products. This capability has been given opportunity to expand via the recent passage of legislation enabling Insurance Linked Securities (ILS) - financial instruments sold to investors whose value is affected by an insured loss event, including catastrophe bonds and other forms of risk-linked securitisation – to be issued in the UK.[52]

At the same time the Department for International Development (DfID) has launched the Centre for Global Disaster Protection.[55] This Centre builds upon its decade long engagement with insurance mechanisms, such as the Caribbean Catastrophe Risk and Insurance Facility, which provide direct insurance protection to approximately a dozen countries with technical assistance also a priority.

The UK's ILS regime is due to come into force in 2018, creating a new market in the UK for ILS deals. ILS, also known as catastrophe bonds, enable insurers to transfer large and complex risks, such as catastrophic risks arising from natural disasters, to capital markets rather than through reinsurers. Capital backing ILS stands at around $90 billion globally. Research by EY estimates that this market could grow to a value of $224 billion by 2021 – 28% of reinsurance capital as a whole.

Leveraging both advice in modelling and understanding climate change impacts and expertise to design and sell innovative new products would build the UK's reputation as a centre of excellence on climate resilience and insurance as well as promote new trading opportunities globally.

International competition

EIT Climate-KIC has supported a number of European initiatives:

- The Financial Markets and Accounting Initiative[56] supports corporate disclosure of climate risk by developing metrics, standards and instruments. This in turn can advance financial decision-making, benchmarking of performance and developing new investment and financial instruments; and
- The Climate Risk Information Initiative has developed an online market for climate risk data and models. This has also received Horizon 2020 funding until 2020.This is linked to Oasis Hub[57] which provides a range of free environmental risk data, tools and services for commercial users.

53 Bank of England Prudential Regulation Authority (2015) The Impact of Climate Change on the UK Insurance Sector https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/publication/impact-of-climate-change-on-the-uk-insurance-sector.pdf?la=en&hash=EF9FE0FF9AEC940A2BA722324902FFBA49A5A29A

54 HM Treasury (2017) Business set to benefit from new Insurance Linked Securities rules https://www.gov.uk/government/news/business-set-to-benefit-from-new-insurance-linked-securities-rules

55 Artemis (2017) London Centre for Global Disaster Protection announced at G20 by PM May http://www.artemis.bm/blog/2017/07/10/london-centre-for-global-disaster-protection-announced-at-g20-by-pm-may/

56 Climate-KIC (2018) Decision metrics and finance: Our Initiatives http://www.climate-kic.org/areas-of-focus/decision-metrics-finance/our-initiatives/

57 EIT Climate-KIC (2018) Oasis Hub https://oasishub.co/

The InsuResilience Global Partnership for Climate and Disaster Risk Finance and Insurance Solutions was launched at COP23 in 2017. This initiative involves the G20 nations, civil society, private sector, academia and international organisations to enable countries to carry out more timely and reliable post-disaster responses, and to enable them to better prepare for climate and disaster risk through the use of risk finance and insurance.

Challenges to overcome

Many corporates and Governments are only at the beginning of understanding how to assess, measure and manage climate risk. As a consequence, there is still a significant knowledge gap about the potential size and scale of climate risk and a lack of demand for adequate insurance protection. Significant market failures are created by the challenges of translating science and data and applying it productively in corporate contexts.

This is in part because of the need for greater engagement between climate impacts experts and risk data users (businesses) to understand and communicate the links between climate impact pathways and corporate decision-making. This may require quantifiable objectives (cf. minimum liquidity and capital ratio requirements as set by the Basel III framework) or other mechanisms to facilitate engagement with climate risk data.

An institutional solution is required to overcome these existing barriers because active and close integration is needed to develop workable solutions between: science, social science and engineering agencies; financial professionals and institutions; and innovative technology companies and start-ups.

By drawing together such skills and expertise - which are held in the public, academic and private sectors - the UK's expertise in data, analytics, research and innovation can be channelled into providing high utility public-private facilities that can translate climate into corporate risk and in doing so enable the City of London to generate and provide advanced green financial products and services to manage that risk.

Recommendations

RECOMMENDATION 4

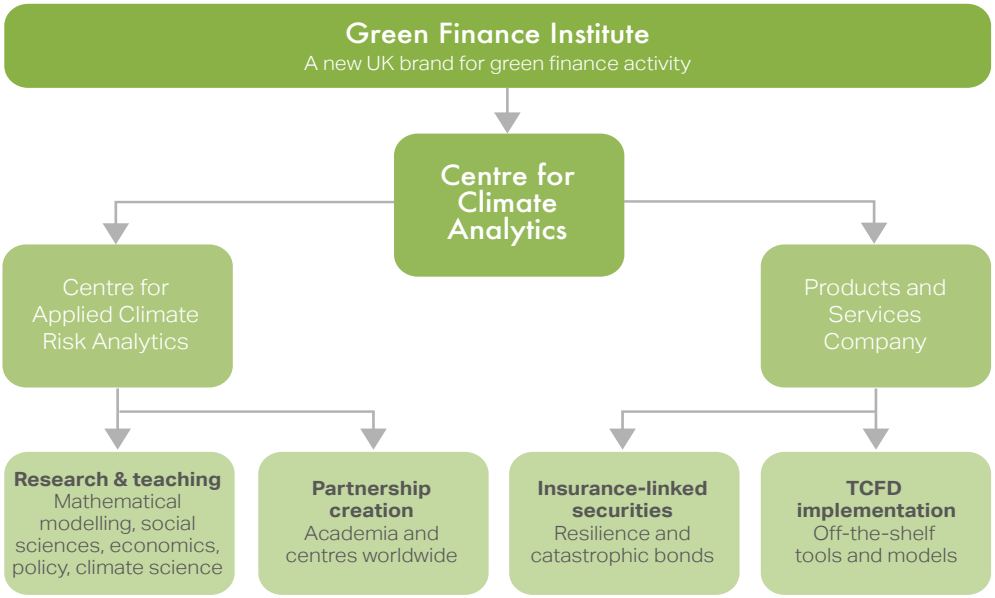
Private sector, academia and Government should establish a Centre for Climate Analytics

Building on the methodologies and metrics employed by the insurance and reinsurance sectors and their regulators and wider stakeholders (including catastrophe risk modelling and annual average loss) the UK Government should help create an industry led, user-focused and UK-based centre to work at the interface of academic and industry innovation. The role of this centre would not be to undertake climate science analysis, but rather to develop tools and metrics to integrate climate and weather data and outputs into wider risk modelling frameworks that can be used within mainstream financial systems.

The key functions proposed for a 'hub and spoke' Centre for Climate Analytics described as "the Centre" – established under the overall brand of the Green Finance Institute (**see Figure 6**) are:

- Support the widespread and open source understanding of current UK and overseas climate risks and the resilience of assets and populations to those risks;
- generate expanded methods to enable a wider range of financial services actors (including investment and asset management) to apply these in their own risk evaluations and decision-making;
- develop and incorporate tractable methods and tools to enable the assessment of future risks concerning evolving patterns of climate, exposed assets and populations and their vulnerabilities;
- understand domestic and institutional consumers attitudes and responses to risk and resilience; and

FIGURE 6.
Institutional arrangements
Structure for the Centre for Climate Analytics



- provide a magnet for: technology and fintech companies; innovators; and the venture capital community to engage in this insurance ecosystem.

The Centre should be structured in a way that explicitly addresses the market barriers to date and be set up to produce both applied research and allied products and services. The current market failure to develop climate risk assessment applications includes increasing data and processing costs, limited applied technical expertise, and silo-working in differing commercial spaces that potentially 'reinvents the wheel' and does not benefit from scaled up and validated approaches. A step-change of analytics development is required which builds on mature insurance industry tools to innovate climate-conditioned methodologies, datasets and products that support broader financial and public sector needs. The Centre would effectively provide a pre-competitive space generating open source and thus more easily validated and communicated products. Significant competitive advantage would subsequently be extracted by extent and effectiveness of individual company deployment of such easily examined, widely accepted and de facto standard products.

To support the Centre's mission, two linked but separate entities are needed that can actively facilitate the partnerships that can translate climate change research into risk quantification tools and new insurance products.
The first is an applied research department, which could be embedded within a UK University, called here the Centre for Applied Climate Risk Analytics.

Core functions would include research, teaching and partnership creation as follows.

Research and teaching would cover all aspects of natural hazard risk, vulnerability, exposure, improved mathematical modelling techniques and associated topics such as humanitarian and economic impacts of disasters and broader policy issues and objectives. The Centre will need to establish links with existing centres of expertise in these topics across UK academic institutions. The key supporting disciplines for the applied climate risk research entity are: mathematics and statistics; computation and software development; engineering; economics, accounting and finance; law and public policy. Climate and environmental science, per se, would be a relatively small proportion of the Centre's expertise and would facilitate collaboration, integration and

interpretation of data, modelling and expertise from other institutions.

Partnership creation along with collaborations with industry and other relevant academic groups in UK, Europe and internationally will be key to scaling up resources and impact. Collaboration on climate and environmental science will be an important component of the Centre's work. Datasets could be developed with input from: Energy Performance Certificates and digital passports for buildings; the UK Space Agency on remote sensing and satellite imagery; Met Office on climate data; and the Environment Agency on flood risk. Success will require outreach to these specialist centres, and universities with relevant research capacity such as Bristol, Bath, Exeter, and Cardiff Universities. This will require dedicated resources.

Early projects: The Centre could undertake would be evidence-based, risk-driven and deliver tangible applications of climate related risk-sharing mechanisms.

Sustainable infrastructure: Working with the National Infrastructure Assessment sub working group described in **Theme 8**, develop and socialise a clear definition and means to evaluate the climate resilience of investments, including UK and overseas property and infrastructure, by applying insurance style climate risk metrics and methodologies. This should be promoted as part of the Green Finance Institute's diplomacy strategy, as set out in **Theme 1**.

The second is the creation of a Products and Services Company limited by guarantee. Located closely to core user markets to service both domestic and international clients, this company would focus on turning research into products, where the combined effort and transparency of their composition would assist in conceptual robustness, interoperability and widespread market acceptance. Core functions would include:

- The production and support of industry-standard models and datasets, including ones centred on **TCFD implementation.** An early task should be to develop practical methods, standards and applications of physical climate risk stress-testing to fulfil the requirements of the TCFD for corporates and wider financial and public sector organisations to assess their current and future UK and overseas exposures. They should be free and publicly available. Working through the Hub, the insurance sector should take a lead in developing and implementing stress-tests for future climate risk scenarios, looking ahead 20, 50 and 100 years for underwriting and investment management planning.
- Development of new insurance **underwriting products and innovations to de-risk green investments** and technologies to enable greater investment in sustainable development such as clean energy and or resilient infrastructure, lowering the cost of capital for such investments.

Set up and implementation: The estimated cost to set up the Centre is in the order of £15-£20 million per year with approximately one third dedicated to the applied research centre and the rest to the Products and Services Company. Funding could be initially seeded through an industry-led application to the Industrial Strategy Challenge Fund in addition to core funding provided by the Natural Environment Research Council.

Post-TCFD, the potential demand for such services should be increased to an at-scale offer. On that basis it is suggested public funding, with match funding from the private sector, is used during the first five years of existence to get the Centre up and running – amounting to total funding of £75-£100 million. After that, given the expected significant and growing demand for such products and services, there is the potential for the Products and Services Company to become self-financing. Once established, the applied research arm could operate as a mainstream academic department funded via the usual channels but also set up – through its partnership arm – to source funding from other domestic and international public and private sector sources.

Achieving impact

Setting up the Centre would enable insurance-related approaches to be emulated in the wider realms of public and private sector finance with the UK developing the leading metrics, standards and implementation systems for use by domestic and international facing financial institutions. Related insurance products would be created and sold, making the UK a global leader in this market. Prudential regulators should then consider amending frameworks to allow protections to be proportionately recognised on balance sheets as a contingent form of green finance (regulatory capital) against these contingent climate risks to encourage protection and increase demand.

The establishment of the Centre would also help promote UK leadership in climate risk and insurance to close the insurance protection gap, further boosting trade opportunities. Climate-related re/insurance protection underpins a major proportion the UK re/insurance premium income and yet global coverage rates remain low. Strategies to increase financial security and resilience and close the protection gap, will become a growing focus of attention and demand and the UK should maintain and extend its role in this growing global market.

BOX 2.

DEEP DIVE: HOW THE CENTRE COULD UNLOCK INNOVATION IN THE INSURANCE SECTOR IN MANAGING CLIMATE RISK AND BOOSTING GREEN UNDERWRITING

- Mainstreaming industry sector support and related public sector R&D and innovation alignment with the newly announced **Centre for Global Disaster Protection** to increase insurance for climate and natural disaster risk in developing and emerging countries.
- Establishing a research and innovation programme for **Insurance Linked Securities and Capital Markets** integrating industry, public sector and academic communities with a particular focus on application of recent UK legislation. This could include the development of climate resilience bonds for sovereign, public sector or corporate entities and expand the role of these instruments in development finance.
- Establishing a domestic and international research and innovation programme with industry, academic and public sector on **Insurance Systems** and **Public Policy in UK and other Countries** to support the application and integration of UK experience, expertise and industry capacity in the development of systems for climate and wider risk sharing and resilience in the UK and overseas markets. Part of this focus should be on driving innovation in the range and quality of green related insurance protections for UK consumers and public and private sector institutions.
- Embedding insurance and resilience related areas of science, industry and regulatory expertise as a sustained focus within diplomatic and trade development strategies including international processes.

Theme 3: Implement the recommendations of the Task Force on Climate Related Financial Disclosures (TCFD)

The size of the opportunity

Capital markets require high quality and timely data to function efficiently through the climate-related energy transition. Companies and investors will need better information to make informed decisions about the impact of climate risks on their business operations and future capital investments. The recommendations from the private-sector led Task Force on Climate Related Financial Disclosures (TCFD) provides an internationally agreed framework through which exposure to climate risk can be assessed, reduced and managed.

The UK Government has already formally endorsed the work of the TCFD.[58] This section presents proposals for clarifying how the recommendations should be implemented in the UK.

Many businesses and investors are increasingly vocal about the need to urgently transition to a low carbon economy to deliver sustainable economic growth and business competitiveness. Several changes to the regulation, supervision and oversight of financial markets and financial markets and institutions, as suggested in this chapter, would expand the UK green finance sector, helping promote financial stability, market efficiency and consumer protection.

Building on UK strengths

The UK is renowned as the world's largest financial centre and an attractive place to do business with a trade surplus of US$77 billion in 2016, more than the combined surpluses of the next two leading countries (US and Switzerland).[59] It is a valuable asset, contributing 11% of Government tax receipts to March 2017.[60] The depth of innovation, products and capital including on green finance and investment, combined with legal expertise and capabilities in emerging markets are unmatched. Ensuring the UK has the best and most reliable information on climate-related risks and opportunities will be fundamental to its continued success and its ability to act as the leading green financial centre.

Leadership in the availability of climate-related and sustainability-related information for financial decision-making, in large part enabled by effective disclosure and reporting frameworks, is a critical competitive advantage for the UK. Disclosure and transparency help to encourage trust in capital markets. This is important for London's international reputation and its attractiveness to issuers on the London Stock Exchange. The Bank of England has led the discussion globally on financial stability risks flowing from climate change and has a position of authority on development of the sustainability aspects of the financial stability regime globally. The UK has a base of existing regulations and guidance on sustainability issues that can be clarified to properly include climate related disclosure obligations.[61]

58 BEIS and HM Treasury (2017) UK Government launches plan to accelerate growth of green finance https://www.gov.uk/government/news/uk-government-launches-plan-to-accelerate-growth-of-green-finance

59 TheCityUK (2017) Key facts about the UK as an International Financial Centre 2017 https://www.thecityuk.com/assets/2017/Reports-PDF/Key-facts-about-the-UK-as-an-International-financial-centre-2017.pdf

60 City of London Corporation (2017) Total tax contribution of UK Financial Services 10th edition https://www.cityoflondon.gov.uk/business/economic-research-and-information/research-publications/Documents/research-2017/total-tax-report-2017.pdf

61 Principles for Responsible Investment and Baker McKenzie (2017) Relevance of recommendations of the Task Force on Climate-related Disclosures in particular jurisdictions https://f.datasrvr.com/fr1/717/47909/TCFD_Baker_McKenzie_PRI_full_report_2017.pdf

The time is right for the UK to move further on climate related disclosures and stay ahead of the curve. The competitive landscape is changing rapidly. As noted earlier a growing number of financial centres, together with proactive policymakers, have started to challenge London.

Challenges to overcome

Existing UK legislation provides the foundation for implementing the TCFD. Yet, it also includes several gaps such as: the absence of forward looking analysis; inadequate consideration of transition risks;[62] and only partial enforcement of existing requirements.[63] Realising the opportunities that global market leadership on green finance provides will require a response to these gaps and the following market barriers.

Information failures

Despite wide acceptance in business and finance of the need to reduce emissions, information failures limit common understanding of the financial risks and opportunities and hamper decision making. For example, assumptions about the severity and implications of climate risk vary. There is also limited forward looking climate related financial information disclosed by companies. Unless there is a clear signal that widespread, high quality disclosure is required, the value of the reporting of a minority of companies and investors will be undermined, creating a disincentive for the market to develop.

Financial stability risks

The Bank of England has argued that climate change and policies to mitigate it could affect the ability of central banks and regulators to meet monetary and financial stability objectives. The speed at which re-pricing occurs due to physical and transition risks of climate change is uncertain but could be important for financial stability as well as the soundness and safety of financial firms. Delayed implementation of widespread reporting requirements on material emerging issues allows financial system risk to build. [A, B]

Trust in capital markets

Expectations of capital markets on sustainability challenges are increasing. Disclosure and transparency helps to encourage trust in capital markets. In addition, companies (and directors) may face legal liability exposure by failing to assess and manage environmental risk in accordance with their duties or failing to report risks. Without credible comparability of climate related disclosures, which are most reliably based on a level playing field of disclosure requirements, it is difficult for financial system users and beneficiaries to trust the information they receive.

Productivity

Businesses in the UK face risks to future productivity and efficiency gains, without better information. The implementation of climate and sustainability practices at the organisation-level can therefore help UK companies become more competitive. Without a clear signal from government that climate transition and disclosure of relevant information is a substantial issue for all emissions intensive, energy dependent and related service industries, there is a real risk of delayed consideration of the implications by industry.

62 The Financial Conduct Authority's risk outlook, for example, does include physical climate-related risk but not transition risks. House of Commons Environmental Audit Committee (2018) Green Finance Inquiry, oral evidence, 20 February http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/environmental-audit-committee/green-finance/oral/78606.html

63 ClientEarth has reported several UK quoted companies to the Financial Reporting Council that are not meeting the disclosure requirements set out under the 2006 Companies Act. ClientEarth (2016) ClientEarth triggers review of companies' climate disclosures https://www.clientearth.org/clientearth-triggers-review-companies-climate-disclosures/

A Financial regulators acknowledge that climate change presents a systemic risk to the financial system. An Aviva-sponsored Economist Intelligence Unit report estimated that up to US$43 trillion of assets could be lost by 2100 as a result of severe climate change. The Economist Intelligence Unit (2015) The Cost of Inaction: recognising the value at risk from climate change https://www.eiuperspectives.economist.com/sites/default/files/The%20cost%20of%20inaction_0.pdf

B Bank of England (2017, Q2) Quarterly Bulletin: The Bank of England's Response to Climate Change https://www.bankofengland.co.uk/quarterly-bulletin/2017/q2/the-banks-response-to-climate-change

Recommendations

RECOMMENDATION 5

Companies and investors should use the TCFD framework to develop their financial, corporate governance and stewardship disclosures on a comply or explain basis. There must be a comprehensive effort by the Government and relevant regulators to support successful adoption, implementation, and enforcement of the TCFD recommendations, such as through public rankings, off-the-shelf tools and scenarios, and publicly available datasets. The Government should conduct a review of disclosure in 2020 to monitor and encourage market adoption amongst both issuers and users. If adoption is deemed insufficient, Government should give consideration to what further measures are required to encourage take up.

RECOMMENDATION 6

Relevant financial regulators should integrate the TCFD recommendations **throughout the existing UK corporate governance and stewardship reporting framework**. The Government and financial regulators should create and publish guidelines by Summer 2019 and appropriately reference these guidelines in the corpus of relevant UK rules, codes and guidance by 2020.[64] The guidelines would clarify certain TCFD recommendations to make them more readily implementable, for example in relation to physical climate scenario analysis and the disclosure of assumptions.

To ensure that the TCFD recommendations are properly integrated into the UK corporate governance and reporting framework, the guidelines would need to be appropriately referenced in the corpus of relevant rules, codes and guidance such as the FCA Handbook (including listing rules and prospectus rules), corporate governance code and stewardship code. Guidelines should include each of the four key areas of the TCFD recommendations: governance, strategy, risk management, and metrics and targets.[65]

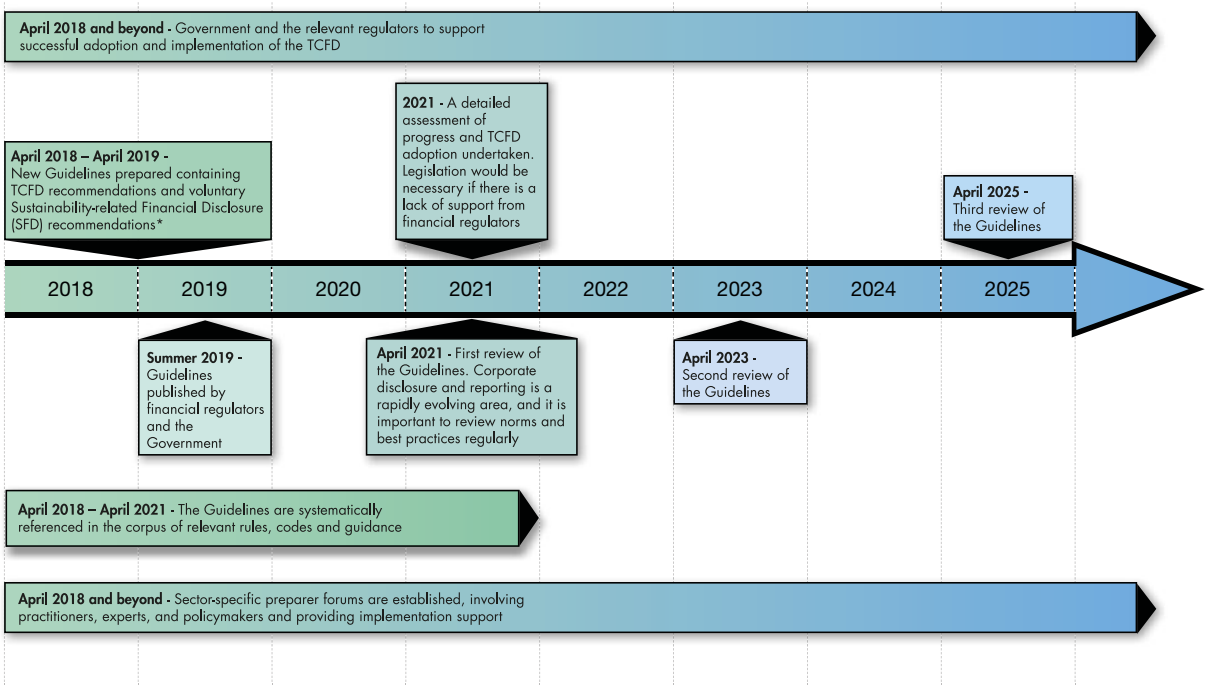
The guidelines should define which corporate preparers are covered by disclosure requirements. This will be in large part determined by the scope of existing rules and codes. This should be based on existing plans for updates and revisions but expedited if and where necessary. Financial regulators would need to assess the suitability of the existing rules, codes and guidance for the disclosures envisaged by the guidelines. Where the existing rules, codes and guidance are not suitable, then publishing separate or new guidance to assimilate the guidelines should be considered where it is within a regulator's powers to do so, and where any procedural formalities are complied with.

The Green Finance Initiative should be formally tasked by the Government and financial regulators to implement an inclusive process involving key private sector stakeholders to help generate the guidelines. This could significantly reduce the burden on the Government and financial regulators associated with preparing new guidance in a short period of time.

64 Key to this process will be for relevant regulators to identify the most effective mode by which the guidelines can be accommodated within its regulatory remit. In the event that a regulator determines the guidelines cannot be accommodated within its remit, then the mandate should be amended accordingly.

65 This is to ensure that guidance is provided on aspects of the TCFD that can support clean growth, for example, the disclosure of revenues from products and services that provide green solutions. Companies require clear guidance on revenue sub-segments to report on their disclosures. For example see Chapter 7 of the LSEG ESG Reporting Guidance https://www.lseg.com/sites/default/files/content/images/Green_Finance/ESG/2018/February/LSEG_ESG_report_January_2018.pdf

FIGURE 7.
Proposed Task Force on Climate-related Financial Disclosures implementation timeline



The guidelines should:

- Define which preparers are covered by disclosure requirements;
- ensure that information is disclosed on a consistent and transparent basis. The guidelines should make clear that assumptions used for calculations, estimates or projections should also be disclosed by preparers;
- ensure that preparers provide scenario-based disclosures of how their business strategies and financial planning may be affected by climate-related risks and opportunities and the associated time horizons considered;
- ensure that prepares are aware of the requirement and are supported in the reporting of revenues from green business areas; and
- take account of how different jurisdictions are responding to new disclosure needs.

In addition to the need for companies and investors to prepare and use the climate related disclosures, there are several steps that the private sector can take. These include providing knowledge development and training for preparers to ensure sufficient organisational competence in relation to environmental risk, impact and opportunity.

To support adoption and implementation Government and regulators should leverage the Green Finance Initiative and Centre for Climate Analytics to make available matched datasets from the Land Registry, Environment Agency, Ministry of Housing, Communities and Local Government, BEIS and other relevant public bodies, such as the Met Office, to support banks accurately measuring the exposure of loans, particularly mortgages, to changing physical climate-related risks. The assessment that could be created with these datasets should then inform future supervisory work. This work should help develop benchmarks, public rankings and off-the-shelf tools to encourage preparers to disclose. An independent body should also conduct regular reviews of TCFD disclosure practices in 2019/20 to inform future policy making.

The Green Finance Initiative should also convene sector-specific preparer forums to support guideline adoption and implementation. These forums would involve practitioners, experts and policymakers and would provide implementation support to preparers across a sector.

Recommendations

RECOMMENDATION 7

Government and relevant financial regulators must clarify in their guidelines that disclosing material environmental risks, including physical and transition climate-related risks, is already mandatory under existing law and practice. The guidelines should also clarify that the TCFD recommendations, given that they reflect key international norms for disclosing material climate-related risks, enable preparers to fulfil their legal obligations and duties.

These recommendations would embed the TCFD recommendations for disclosing climate-related risk in all relevant UK corporate governance and reporting frameworks. With the requisite support from financial regulators this can be achieved without additional legislation. However, at an appropriate moment, revisions to relevant legislation should further integrate the TCFD recommendations into the corporate governance and reporting framework.

This would also provide an opportunity to: harmonise requirements across different entities (where existing rules, codes and guidance take different approaches); and make provisions for further accountability in relation to the information (e.g. specify location, make provision for shareholder approval similar to the directors' remuneration report).

Legislation would however be necessary if financial regulators do not provide their support within the timeframes envisaged in this report (see **Figure 7 for implementation timeline).**

Achieving impact

As a result of the measures outlined above being implemented, the UK would become the first jurisdiction globally to fully implement the TCFD. This would in turn enable investors in the UK to differentiate between companies and assets that are aligned (or misaligned) with the implementation of the Paris Agreement and the UK's Clean Growth Strategy. This would have the effect of ensuring that companies that implement sustainability practices have a lower cost of capital, higher productivity and better stock market performance.[66] Organisational level improvements in performance and resilience due to the adoption of sustainability practices by corporates will have macro-economic benefits, including helping to improve the productivity of the UK economy as whole and putting UK industries at the leading edge of a global economic transformation.

66 G L Clark Feiner, A., Viehs, M. (2014) 'From the Stockholder to the Stakeholder: How Sustainability Can Drive Financial Outperformance' (Smith School of Enterprise and the Environment, University of Oxford)

Theme 4: Drive demand and supply for green lending products

The size of the opportunity

Buildings are at the heart of the UK's decarbonisation and climate adaptation challenge. The UK's residential, commercial and public buildings account for 30% of total greenhouse gas (GHG) emissions, comprising two thirds of power sector emissions and 19% of direct CO_2 emissions.[67] In addition, the housing stock is some of the oldest and least energy efficient in Europe[68] – which is why boosting energy efficient renovation is a priority for the Government. As well as contributing to meeting the UK's carbon targets, energy efficiency improvements save money on energy bills and have wider benefits for health, reduced supply side energy costs, and improved productivity.

Progress so far has focused on domestic properties. The Clean Growth Strategy set out several policies aimed at improving their energy efficiency, including: an extension of the Energy Company Obligation to 2028; and a commitment to look at energy performance standards across the private rented sector with the aim of all private rented homes being upgraded to Energy Performance Certificate (EPC) Band C by 2030. The ambition is for as many homes as possible, where practical, cost-effective and affordable, to reach EPC band C by 2035.

The Clean Growth Strategy also included a commitment to help business improve their productivity and competitiveness. The Government's ambition is to enable business and industry to improve energy efficiency, reducing energy use by at least 20% by 2030. This would deliver £6 billion of bill savings (approximately 20% of total business and industry bill)[69] through building regulations, rented sector regulation, voluntary standards and simplification of reporting requirements and other new policy options.

International competition

Unlocking investment to improve energy efficiency in buildings is a major challenge faced by governments globally[70] – and therefore a significant opportunity for the Government to show global leadership. Significant additional investment in energy efficiency will be needed to deliver the 20% ambition for business and industry. In the residential sector, it requires an average annual investment in energy performance upgrades of £5.2 billion to 2035.[71]

Many models are being tested globally already. For example, Germany's development bank KfW Bankengruppe (KfW) unlocks €7 of private investment for each €1 the KfW's programme costs the public purse by combining subsidised loans and capital subsidy for energy efficient renovation.[72] However, Germany is still some way off its goal to see 2% of its housing stock (800,000 homes) per year undergoing major renovation from 2020.[73] In comparison, the UK Government is aiming for up to 1.1 million homes renovated to a good standard per year[74] – around 4% of the total housing stock.

67 CCC (2017) Meeting Carbon Budgets: Closing the policy gap https://www.theccc.org.uk/wp-content/uploads/2017/06/2017-Report-to-Parliament-Meeting-Carbon-Budgets-Closing-the-policy-gap.pdf

68 ACE (2015) Cold Man of Europe – 2015 http://www.ukace.org/wp-content/uploads/2015/10/ACE-and-EBR-briefing-2015-10-Cold-man-of-Europe-update.pdf

69 BEIS (2017) Clean Growth Strategy https://www.gov.uk/Government/uploads/system/uploads/attachment_data/file/651916/BEIS_The_Clean_Growth_online_12.10.17.pdf

70 E3G (2017) What is holding back energy efficiency financing in G20 countries? https://www.e3g.org/library/what-is-holding-back-energy-efficiency-financing-in-g20-countries

71 Frontier Economics (2017) Affordable Warmth, Clean Growth http://www.frontier-economics.com/publication/affordable-warmth-clean-growth/

72 Climate Policy Initiative (2013) The landscape of climate finance in Germany: a case study on the residential sector https://www.eceee.org/library/conference_proceedings/eceee_Summer_Studies/2013/5b-cutting-the-energy-use-of-buildings-policy-and-programmes/the-landscape-of-climate-finance-in-germany-a-case-study-on-the-residential-sector/2013/5B-393-13_Novikova

73 Currently at 1.5%. See ZEBRA2020 (2018) Energy efficiency trends in buildings: Equivalent major renovation rate http://www.zebra-monitoring.enerdata.eu/overall-building-activities/equivalent-major-renovation-rate.html#equivalent-major-renovation-rate.html

74 BEIS (2017) Clean Growth Strategy https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/651916/BEIS_The_Clean_Growth_online_12.10.17.pdf

Meeting this opportunity will require mobilising different types of investment. Promoting a green mortgages and loans market for renovation is one obvious means to boost investment in this area and has been done successfully already in the Netherlands, where mortgage lending rules allow households to borrow up to €25,000 extra to purchase or refurbish to a net zero energy home.[75] In the USA, state-owned mortgage providers Federal National Mortgage Association and Federal Home Loan Mortgage Corporation (commonly known as Fannie Mae and Freddie Mac) offer lower interest mortgages for more energy efficient properties and low interest loans to help fund improvements.[74]

Consumer savings and small-scale investments are also an important source of capital, although the suite of savings products available to the average retail investor is limited. Financial advisors – for those who can afford them – are not generally familiar with the issues, nor are specialist products available. Despite growing evidence that funds geared towards sustainability can actually perform better,[77] advisors continue to focus on financial returns and conventional diversified portfolios (with often important exposures to fossil fuels), without asking for their clients' preferences.

With the Government and the finance sector working together, **there is now a serious opportunity for the UK to become a global leader in the products, services and logistics required to modernise buildings at a national scale.**

Building on UK strengths

The UK has several assets it can build on to develop a thriving market for green mortgages and loans. First, the UK has **a robust database to work with**: EPCs are publicly available for all domestic and commercial buildings available to buy or rent.

The **supply chain for energy efficiency products is well established** within the UK, although highly dependent on policy to drive demand for products. Since 2012, the rate of home insulation has decreased by 90%,[78] in part as a consequence of changes to policies and reductions in public investment. Nonetheless, the energy efficiency sector as a whole is the largest within the low-carbon and renewable economy, employing over 141,500 people and an annual turnover of over £20.7 billion in 2016.[79] The insulation and retrofit subsector is also one of only three parts of the low carbon economy where the UK is a net exporter.[80]

75 Energiesprong http://energiesprong.eu/country/the-netherlands/

76 Better Buildings Partnership (2017) Beyond Risk Management: How sustainability is driving innovation in commercial real estate finance http://www.betterbuildingspartnership.co.uk/sites/default/files/media/attachment/BBP_BeyondRiskManagement_Insight_Final.pdf

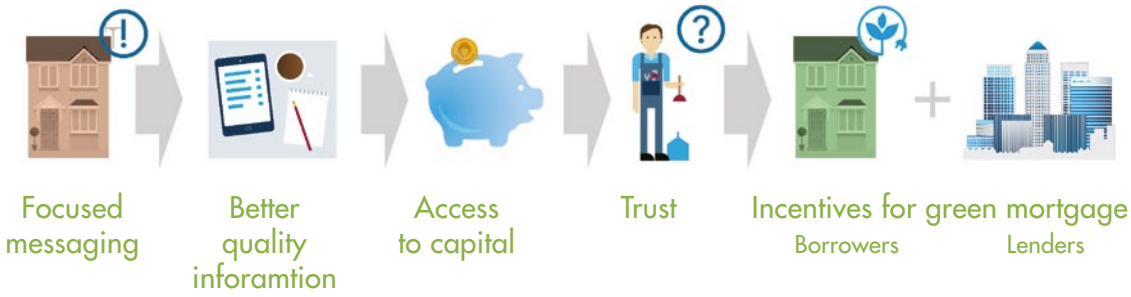
77 Global Impact Investing Network (2017) Evidence on the Financial Performance of Impact Investments https://thegiin.org/assets/2017_GIIN_FinancialPerformanceImpactInvestments_Web.pdf

78 The Committee on Climate Change CCC (2017) An independent assessment of the UK's Clean Growth Strategy: From ambition to action https://www.theccc.org.uk/publication/independent-assessment-uks-clean-growth-strategy-ambition-action/

79 Office for National Statistics (2018) UK Environmental Accounts: Low Carbon and Renewable Energy Economy Survey: 2016 final estimates https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/finalestimates/2016

80 Carvalho, M., Fankhauser S. (2017) UK Export Opportunities in the low-carbon economy http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2017/04/Carvalho-and-Fankhauser-2017.pdf 2017

FIGURE 8.
Overcoming barriers to boost the green mortgages market



Finally, the longer-term track record has shown strong progress. Gas and electricity demand in homes peaked in 2004, and has fallen steadily to 2016 – by 21% and 13% respectively – mostly as a result of energy efficiency improvements.[81] Overall energy demand was 19% lower than in 2004 – despite there being more homes, rising indoor temperatures, more appliances and more lighting per home.[82] For commercial energy users, total energy use has been broadly flat since 2000,[83] despite significant economic growth over that time period. It is clear that energy efficiency measures not only deliver enhanced productivity and affordability but also security of supply, falling gas imports and improved balance of trade.

Challenges to overcome

Existing policies will not be sufficient to unlock the investment needed to deliver the goals set out in the Clean Growth Strategy. The scale of the challenge calls for innovative ways to use the tax system along with regulatory signals to scale up market opportunities in a carrot and stick fashion.

It is well established that scaling up investment in energy efficiency in the household and commercial sectors is a significant challenge because of a range of institutional, market, economic and financial barriers.[84]

As noted in the Government's *Call for Evidence on Building a Market for Energy Efficiency*,[85] "there is no single 'silver bullet' policy for improving energy efficiency." Providing easier access to finance is important, but – as the call for evidence acknowledged – will not in itself drive demand for insulation and more efficient heating systems.

From 1 April 2018 the Minimum Energy Efficiency Standard (MEES) will make it – subject to certain exceptions – unlawful to let buildings, or renew existing leases, in England and Wales that do not achieve a minimum EPC rating of E. This may create some latent demand for energy efficient mortgages within a pool of 280,000 affected rental homes and over 100,000 business premises[86] but is unlikely to be enough to get to the scale and depth needed to meet Government policy objectives. More actions are needed.

81 BEIS (2017) Energy Consumption in the UK data tables https://www.gov.uk/government/statistics/energy-consumption-in-the-uk

82 Ibid.

83 BEIS (2018) Energy and Emission Projections 2017 https://www.gov.uk/government/collections/energy-and-emissions-projections

84 Energy Efficiency Financial Institutions Group (2015) Energy efficiency – the first fuel for the EU economy: How to drive new finance for energy efficiency systems https://ec.europa.eu/energy/sites/ener/files/documents/Final%20Report%20EEFIG%20v%209.1%2024022015%20clean%20FINAL%20sent.pdf

85 https://www.gov.uk/government/consultations/building-a-market-for-energy-efficiency-call-for-evidence

86 BEIS (2017) Domestic private rented sector minimum level of energy efficiency https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/669198/PRS_Minimum_Standards_Consultation_2017.pdf

In addition, the challenges related to resilience discussed in Theme 10 mean that the UK cannot consider upgrading our buildings stock simply in terms of efficiency. Resilience to more extreme weather must also be considered.

Multiple interventions to both generate consumer demand and incentivise retail banks to develop and promote green lending for energy efficient homes and commercial properties are needed and set out here. They focus on **messaging, better quality information, access to capital, trust that the work done will deliver the energy savings predicted and incentives for both borrowers and lenders to act (see Figure 8).**

Recommendations

Implementing the following package of proposals set will **boost demand for energy efficiency measures** but also produce new business opportunities for UK industry.

RECOMMENDATION 8

Government should **extend 2035 EPC targets from residential properties to commercial properties by the end of 2018 and introduce requirements for operational energy ratings from 2020.**

The Clean Growth Strategy sets out an ambition for all homes to reach a minimum Energy Performance Certificate C by 2035, whereas the ambition for business and industry is to improve energy efficiency by 20% by 2030. It is recommended that a trajectory and **minimum energy standard for commercial properties of EPC B by 2035** be adopted. The higher target reflects the proactive response from commercial property owners to the EPC E Minimum Energy Efficiency Standard already in place for rented properties. The certainty provided by a defined long-term EPC target should underpin energy improvement plans and the supporting investment decisions and encourage early compliance.

Tighter energy performance regulations for rented commercial properties should be introduced that build on the existing Minimum Energy Efficiency Standards (MEES) set to come into effect during 2018.

In addition, it is recommended that **mandatory operational energy ratings and an appropriate public reporting mechanism** are introduced to drive improved ongoing energy efficiencies in commercial buildings.

Mandatory operational energy ratings can help ensure that future energy performance standards are informed by actual energy performance and ensure that investments are underpinned by measurable energy savings. The introduction of mandatory operational ratings will initially require the development of an agreed metric, possibly building on the Display Energy Certificate methodology and the Bigger, Better Data project, as proposed by the UK Green Building Council, to reduce compliance burdens. Ensuring that operational ratings become a requirement and are made available through a central platform will help owners, banks and asset managers assess their real estate portfolios' regulatory risk better and enable better lending and investment decisions.

RECOMMENDATION 9

Government should introduce Green Building Passports for residential and commercial properties by 2020.

A digital passport providing detailed guidance on the actions required – and already undertaken – to improve the building, based on building fabric and operational data helping building owners and occupiers make decisions to improve the buildings.

The passport would be transferable across building owners and help maintain sight of a long-term decarbonisation goal for the building. These would not replace EPCs but rather enhance them, creating an opportunity to capture EPC data digitally and augment it with other data over time.

Digital passports can form a basis for customised retrofit roadmaps that provide a guide to homeowners and certified installers on renovation options. These roadmaps could also outline the renovation standards, in terms of improved and assured energy performance, to be achieved (in line with the Each Home Counts review)[87], incentives and finance offerings as well as costs and payback periods against each possible energy efficiency measure. This information passport could also be used to record projects and capture energy efficiency data of buildings.

Similar to current EPC data, the passport data should be openly available for both commercial and residential properties, although commercial data should be curated to manage the disclosure of information to specific stakeholders. The digital passport provides a platform to incorporate other data in due course, such as flood-resilience or well-being, as demonstrated by the International WELL Building Institute which launched a WELL Building Standard in 2014 to support health and wellness in buildings. The standard includes elements such as indoor air quality, water filtration, lighting quality and comfort.

Introduction of digital passports could follow the example of the German State of Baden-Württemberg, which launched an EPC-compliant passport that is initially being backed by state subsidies.[88] ING Bank in the Netherlands also developed an app as an engagement tool to help their borrowers identify energy improvement measures that will provide both a financial return and improved environmental performance[89] driving down energy usage and driving up cash flow and asset valuation. In Switzerland, renovated or newly constructed buildings that achieve the 'Minergie' energy and comfort high performance label can benefit from preferential mortgage terms offered by 30 Swiss banks.[90] This means that we know what good looks like and our banks have a prototype to learn from and improve upon.

RECOMMENDATION 10

Government should complete research in 2018 to understand the opportunities and costs of using a range of fiscal measures to boost demand for energy efficient retrofits in 2018, and pilot fiscal measures alongside mortgage products from 2019.

Research should be undertaken to understand the cost and benefit of using a sliding 'bonus-malus' Stamp Duty scale, designed to be fiscally neutral and linked to energy performance[91] to drive demand for energy efficient renovation. Research should also determine how a pilot scheme could be set up to assess the efficacy and fiscal impact of such an approach in driving demand, while creating an environment in which green mortgage products can be tested. This should be explored for both domestic and commercial properties.

The scoping work for a Stamp Duty incentive pilot should take account of the following and report within the next six months:

- Focus on simplest possible design for policy makers and for purchasers to understand;
- Differentiate between the owner-occupier and buy-to-let markets;
- Take earlier research and modelling into account;

87 http://www.eachhomecounts.com/

88 Ministerium fur Umwelt, Klima und Energiewirtschaft Baden-Wurttemberg (2018) Sanierungsfahrplan-BW https://um.baden-wuerttemberg.de/de/energie/informieren-beraten-foerdern/sanierungsfahrplan-bw/

89 Better Buildings Partnership (2017) Beyond Risk Management: How sustainability is driving innovation in commercial real estate finance http://www.betterbuildingspartnership.co.uk/beyond-risk-management-how-sustainability-driving-innovation-commercial-real-estate-finance

90 See Minergie coverage (2017) Bauen und renovieren mit einer Öko-Hypothek https://www.minergie.ch/media/170830_kgeld_print.pdf

91 As has been proposed, among others, by UK Green Building Council (2013) Retrofit Incentives Task Group Report https://www.ukgbc.org/wp-content/uploads/2017/09/13070520Retrofit20Incentives20Task20Group20-20Report20FINAL_1.pdf

- Reflect on the two limited Stamp Duty incentive experiences (Zero Carbon Homes exemption and Green Deal Home Improvement Fund) in the UK to date;
- Uncover and take into account the (limited) experiences from property sales tax incentives available in other countries;
- Consider the *presence* of the signal on the purchasing choice as much as the size of the signal (e.g. the effects of a relatively small Stamp Duty variation linked to energy performance that is less than that needed to make the rational economics of energy efficient renovation stack up);
- Consider its interactions with existing and proposed policy levers, such as ECO and Clean Growth Strategy ambitions; and
- Ensure we consider how design could drive retrofit beyond the minimum (e.g. C) aimed for, to EPC B or beyond.

RECOMMENDATION 11

Government should provide short-term incentives to pump prime the green consumer loans and green mortgage markets

The Government should seek to support competitively priced consumer loans and mortgages by lenders to finance and reward green retrofit. This support is intended to be for a short period only as a pump-prime mechanism to drive consumer demand and establish competitive markets. It would allow a wide range of lenders to pilot different green mortgage and loan products and develop an evidence base on loan performance and establish consumer demand, which should mean that lenders could then continue to offer these products without Government support in the medium term.

This approach should acknowledge the full retrofit pathway, with home improvements financed through savings or loans and a green mortgage defined such that it is positioned as an incentive for homeowners to retrofit their homes to qualify for better mortgage terms (lower interest rate and/or higher loan to value) based on EPC or equivalent targets.

The Government should undertake analysis to decide how best to offer this support. Two possible (not mutually exclusive) solutions for doing so are set out below:

Time-limited guarantees

The Government could offer partial guarantees to support the development of green mortgage products such as lower interest loans for more efficient homes or additional borrowing capacity for homeowners buying more efficient homes based on calculations of greater affordability due to lower energy costs. This should be a time limited programme, so as to maximise value for money for Government and additionality should be designed to support the development of a range of pilot products. This could be for example a **green mortgage challenge fund.**

A fund could be launched that would be open to lenders looking to develop green mortgage and loan products. Funds would be awarded to lenders based on the anticipated benefit in terms of energy savings or number of homes improved, which should be set out in bids. Lenders could use the funding to offer a range of incentives to homeowners, such as cashback in return for making improvements or, a lower-to-zero interest loan to help finance improvements. Government and lenders should work together to ensure that a portfolio of different incentives is deployed and learned from through the fund.

RECOMMENDATION 12

UK lenders should work towards promoting awareness and mainstreaming a consideration of green factors into all their mortgage lending decisions.

Mortgage lenders should identify and include EPC ratings on mortgage statements as part of a voluntary initiative to raise awareness of EPC ratings. Building on **recommendation 9**, awareness could also be raised through disclosure of relevant portfolio level EPC or digital passport data.

This could help kick off a process of green tagging. Knowing whether and how securities and loans, including mortgages, are financing 'green', 'brown' or 'neutral' activities in the real economy and tagging them accordingly is a key stepping stone to enabling banks and investors to better identify the extent of their exposure to green (but also non-green) investments and facilitate the process of shifting capital to be aligned with sustainable growth. Identification and appropriate labelling or 'tagging' of green securities and loans is key to understanding progress in meeting national obligations under the Paris Agreement to align financial flows with 1.5/2°C; the potential for systemic risks to the financial system from climate change; and measuring the advancement of greening the UK's financial sector. Such an exercise would also help institutional investors avoid some of the risks associated with 'brown' investments, including potential asset-stranding resulting from transition risk.

Tagging is also a fundamental pre-requisite to enable the Government to incentivise green activities. Equally, given it is a substantial undertaking, financial institutions will need encouragement to tag all securities and loans. Doing so will help normalise climate change risk and opportunity becoming a key part of everyday business. It will also unlock opportunities to aggregate and securitise asset-backed green bonds, as Barclays has done and help secure lower cost financing for more efficient properties (depending on how the bonds price).

Demand for green mortgages can be further driven by training for sales staff following the launch of green mortgages to encourage their take up. This would build on the experience of banks such as ING in the Netherlands, which have driven energy efficiency improvements among their commercial real estate customers through a combination of voluntary targets including a sectoral covenant with the Dutch Government. In return the Dutch Government pump-primed the market through subsidising lowered interest rates[92] – discounted interest rates for more efficient buildings and internal training and green mortgage sales targets for frontline mortgage salespeople.

Achieving impact

Department of Energy and Climate Change research in 2013 found that across England, higher EPC ratings in the residential sector correlated with an average increase in property value of 14%. This research was the first of its kind in the UK, and the report acknowledged that this correlation was not known to amount to causality. However, a later review of similar studies in 15 EU countries found that all but one identified a positive correlation between higher energy performance ratings and higher property prices – over a wide range of climates and geographical scales (cities, regions and countries).[93] In this context, it will be especially important to include impacts on property value in evaluations of pilots of fiscal incentives and new ways of financing energy efficiency as proposed.

A causal link between higher-performing buildings and their value is better established, for commercial

92 TU Delft (2011) Waking a Sleeping Giant: Policy Tools to Improve the Energy Performance of the Existing Housing Stock in the Netherlands https://repository.tudelft.nl/islandora/object/uuid:c1f0c794-f094-4d4d-a2ed-29aa53e62718/datastream/OBJ

93 Ballarat Consulting (2017) What will you pay for an "A"? – a review of the impact of building energy efficiency labelling on building value https://www.eceee.org/library/conference_proceedings/eceee_Summer_Studies/2017/6-buildings-policies-directives-and-programmes/what-will-you-pay-for-an-8220a8221-8211-a-review-of-the-impact-of-building-energy-efficiency-labelling-on-building-value/2017/6-033-17_Brocklehurst.pdf/

buildings.[94] For example, ING concluded that over the period 2015-2016, green buildings in the Netherlands commanded 9-11% higher value than brown buildings.[95] Academic research in the US has shown lower default rates from commercial properties with Energy Star ratings.[96]

As a result, implementation of these recommendation is likely to lead to building value increasingly linked to energy performance, which creates ongoing incentives to invest.
This will boost the demand for green loans in the household and commercial sector, which in turn boosts the supply of asset backed green bonds, lowering cost of capital for green loans, and lowering emissions from the building stock.

BOX 3.

UK GREEN START-UP CASE STUDY: YASA MOTORS

- Spun out from Oxford University in 2009
- Invention of novel axial-flux motor technology
- World-leading power and torque density
- Significant grant support, including £1.5 million from the Regional Growth Fund
- Raised £35 million of equity capital from the private sector across six funding rounds
- Secured a wide portfolio of world-class electric and hybrid automotive customers including Nissan, Jaguar Land-Rover, Williams
- New 100,000-unit factory in Oxford opened by BEIS Secretary of State Greg Clark in February 2018

94 Hermes Investment Management and Better Buildings Partnership (2017) Hermes Rolls out Programme that Improves Energy Efficiency and Comfort Levels www.betterbuildingspartnership.co.uk/hermes-rolls-out-programme-improves-efficiency-and-comfort-levels

95 ING (2018) How to save money and energy in buildings https://www.ing.com/Newsroom/All-news/How-to-save-money-and-energy-in-buildings.htm

96 An, X and Pivo, G (2015) Default Risk of Securitized Commercial Mortgages: Do Sustainability Property Features Matter? www.reri.org/research/files/2014funded_An-and-Pivo.pdf

Theme 5. Boost investment into innovative clean technologies

The size of the opportunity

Technological innovation has a key role to play in delivering the UK's Clean Growth Strategy and the Industrial Strategy's Clean Growth Grand Challenge. Venture funding is an important source of finance for clean technology companies. However, the longer development timescales needed for clean energy hardware commercialisation require a patient capital approach. This presents a challenge for private sector institutions, which typically need a shorter-term return on capital. The deployment of public finance in the early stages of start-up companies can crowd-in venture capital by reducing the quantity of expensive initial funding needed from the private sector. This would support business innovation to deliver the Clean Growth and Industrial Strategies.

In addition, public entities, working in partnership with the private sector, can help scale and accelerate the speed at which energy innovation is commercialised. This section sets out delivery options to maximise the impact of funding that the Government has already announced.

Building on UK strengths

High growth, innovative companies are disproportionately important for economic growth and improving productivity in the UK. The OECD ranks the UK as one of the best places to start and grow businesses thanks to a supportive business environment, competitive tax rates and innovative finance support schemes such as the Enterprise Investment Scheme. The UK is also a global leader in science and hosts four of the top 10 universities in the world, which generate world-class talent and ideas for new technology.

Demonstrating the Government's ambition to support clean growth, the Clean Growth Strategy sets out how over £2.5 billion will be invested by Government to support low carbon innovation. This includes the £246 million Faraday Challenge that supports companies to rapidly commercialise new battery technologies; as well as £20 million to support a new clean technology early stage investment fund. Ensuring that this £2.5 billion spending is deployed efficiently and leverages maximum private sector investment should be a high priority.

International competition

Global investment in cleantech has doubled since 2013, while cleantech investment in the UK has declined,[97] meaning that the UK is falling behind its international competitors. The Patient Capital Review highlighted issues with the distribution of R&D business investment. For example, 45% of R&D investment by business was by less established firms in the US, compared to only 15% in the UK.[98] In addition, total UK R&D investment has plateaued at 1.7% of GDP compared to 2.8% and 2.9% in Germany and the USA respectively.[99] The Government's target to increase R&D investment to 2.4% of GDP by 2027 is welcome. [100] It is important to ensure that this investment is converted into business value in an efficient manner.

Public programmes supporting early-stage cleantech in other countries have proved successful in stimulating increased private sector investment. A good example is ARPA-E ("Advanced Research Projects Agency-Energy"), a US Government agency tasked with promoting and funding research and development of advanced energy technologies. The agency receives US$200-300 million of federal funding annually from the US Department of Energy.

97 Cleantech Group i3 platform https://www.cleantech.com/i3/

98 HM Treasury (2017) Financing Growth in innovative times: consultation https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/642456/financing_growth_in_innovative_firms_consultation_web.pdf

99 Ibid.

100 HM Government (2017) Record boost to R&D and new transport fund to help build economy fit for the future https://www.gov.uk/government/news/record-boost-to-rd-and-new-transport-fund-to-help-build-economy-fit-for-the-future

CHART 3.
Decline in cleantech investment to 2017

Since its inception in 2009, ARPA-E projects have led to 56 new start-ups, which have raised between them US$1.8 billion of private sector venture funding. ARPA-E's focus is on high-risk, high-reward research that might not otherwise be pursued because of a relatively high risk of failure. Backing genuinely disruptive R&D aligns well with the type of highly-scalable technologies that green venture capitalists are looking to back.

Challenges to overcome

Despite the overall growth of the green finance sector globally and increasing deployment of low carbon technologies, equity finance transactions for cleantech companies have been falling in the UK.

Chart 3 shows annual deal totals for cleantech in the UK: the total value and number of deals has halved over the last four years. This contrasts with the overall venture industry trend, where investment increased by more than 50% in the UK between 2014 and 2016.[101]
A paucity of funders willing to take early stage risk in cleantech means many pioneering low-carbon technology start-ups struggle to attract the capital required to scale to commercialisation.

There are several factors weighing on the sector and holding back its ability to grow.

A major concern is that there is less appetite to invest in start-ups with longer timescales to commercial development. In many instances this is unavoidable because cleantech start-ups require longer timescales, and in many cases more capital, to scale to commercialisation than digital technology companies. The first-investment-to-exit journey for a hardware start-up can be more than 10 years. This long timescale means that the early equity investment rounds are unsuitable for closed-end financially motivated funds of a typically 10-year duration that are common in the UK. By contrast, the growth in green venture capital (VC)

101 British Private Equity and Venture Capital Association (2016) BVCA Private Equity and Venture Capital Report on Investment Activity 2016 https://www.bvca.co.uk/Portals/0/Documents/Research/Industry%20Activity/BVCA-RIA-2016.pdf?ver=2017-07-13-111054-127&timestamp=1499940663502

seen in Europe has primarily come from corporate venture capital (CVC), which is driven by the longer-term strategic motivations of its backers.

The knowledge spill-over market failure can also reduce commercial competitiveness. [102] Start-ups with new skills, knowledge and technology that can deliver the returns necessary to justify venture equity investment suffer from competition from fast followers who benefit from spill-over knowledge generated by the pioneers. Due to the longer timeframes for cleantech development, the vulnerability to knowledge spill-over is greater, thereby increasing risk and reducing appetite for investment.

The start-stop nature of Government grant funding for early stage R&D can increase the risk of the technology incubation stage and lengthen the prototype development process.

Even when companies mature, the absence of a liquid secondary market disincentivises VCs looking to move their capital into the next opportunity. Private equity or institutional investors have different time horizons to venture capital, and this makes it more difficult for VCs to exit their investments. This is compounded by the need for patient capital in physical technology investments, which in turn lengthens and complicates the buy-out due diligence process.

Looking to the future, once the UK leaves the EU and no longer has access to the European Investment Fund (EIF), there may be a substantial gap in limited partner (LP) funding. Historically, the EIF has been a cornerstone investor in UK VC funds, investing £500m across the UK of which £100m has been in cleantech. Ensuring sufficient sources of funding to replace that available via the EIF is of paramount to the health of the venture ecosystem in the UK.

While there is a strong case for Government funding support, it must be delivered in a way that offers clarity and reassurance throughout the process.

Recommendations

Given the headwinds detailed above, the private sector response alone is unlikely to be sufficient for the UK to achieve 'world-class' status as a centre for cleantech venture capital. A lack of funders willing to take early stage risk has knock-on effects for later-stage VC and growth capital investors. The lack of seed and Series A funding leads to high failure rates for early stage businesses and therefore a smaller pipeline of later stage deals.

The Government should act through three linked recommendations focused on different stages of the value chain.

RECOMMENDATION 13

Government should **set up a Green Investment Accelerator (GIA) for early stage technology grant funding.**

Building on the success of the Innovate UK Investment Accelerator pilot in health, life sciences and infrastructure systems,[103] the Government should fund a comparable mechanism to focus on early stage cleantech. The GIA would be a multi-year, multi-call scheme to provide fast track grants of up to £150,000[104] for early-stage companies receiving at least £100,000 of new VC funding from pre-qualified institutions with a green VC track record.

BEIS should select a number of experienced private sector investors to be investor partners in

102 As defined in European Commission (2014) Framework for State aid for research and development and innovation https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.C_.2014.198.01.0001.01.ENG

103 Innovate UK (2017) Funding competition: investment accelerator pilot https://www.gov.uk/government/publications/funding-competition-investment-accelerator-pilot

104 This is below the State aid de minimus and which can be reviewed once the relationship between the UK and the EU is finalised post-Brexit

the Green Investment Accelerator. In order to be most impactful and develop a thriving ecosystem with coordinating Government and investor support, the GIA scheme needs a multi-year commitment, with regular calls for applications announced well in advance. This would be a welcome change from the current situation where Energy Entrepreneurs Fund support — welcome as it is — is announced at short notice. This could be complemented by public funding bodies such as Research Councils UK including clean growth objectives in their programme criteria.

RECOMMENDATION 14

Government should establish a dedicated public-private green venture capital fund.

Government should set up a VC fund to leverage the £20 million announced in the Clean Growth Strategy to raise capital from the private sector and deploy up to £100 million of new capital. The green VC fund will focus on backing early-stage SMEs under five years old with revenues less than £1 million (including pre-revenue companies). It will encourage more capital into the early-stage market and support more and larger deals. Government action should be by one of **two alternative delivery options** for the Fund.

Co-Investment Fund (CIF): An equity fund matching up to 50% of deal-by-deal investments in start-ups by the private sector on a co-investment basis. The CIF would select a number of experienced private sector institutions to be accredited partners, who would bring co-investment opportunities to the CIF to assess. Management of the CIF could either be performed within BEIS' Energy Innovation team or out-sourced to, for example, the British Business Bank (BBB).[105] Keeping the transaction and portfolio management function for the public funds in-house avoids the need for the Fund to pay management fees to its private-sector partners.

General Partner/Limited Partner Partnership Fund: Delivery of the fund would be through one or several General Partner (GP) fund managers selected through competitive public procurement. Selection would consider the investment track record and domain knowledge of the manager as well as its ability to attract additional private sector capital to leverage the public funds. Once selected, the state funds would be committed to the GP as a Limited Partner (LP) position on a conditional basis. The GP would then need to secure matching private sector funding of at least the same amount to complete the fund and draw down the public capital. The GP would take on origination, diligence, transaction and portfolio management authority, and charge the fund a management fee (typically 2% of fund capital) for these services. The Government and other LPs would receive regular updates on investments and fund performance but are typically not able to influence investment decisions.

Looking more widely the BBB is sector-agnostic but has had a capital injection of £2. 5billion following the Patient Capital Review in 2017. Consideration should be given to how they can play a bigger role in supporting delivery of the Clean Growth Strategy.

RECOMMENDATION 15

Increase commercial opportunities for UK businesses through the use of public procurement processes.

In addition to supporting early stage technology investing, the Government should consider how other sources of public finance from public entities and Government procurement could help support delivery of the Clean Growth and Industrial Strategies through investment in products or services from British-owned businesses. The investment prospects

105 The BBB provides finance to UK small businesses at all stages of their development has developed regional, venture capital and growth loan programmes.

of early stage companies are hugely enhanced where they have credible lead customers or even better a sound order book. This should include public procurement.

Annually, Government agencies spend tens of billions of pounds on private sector goods and services. This presents a significant opportunity for innovative private sector companies to scale up through supplying services to the public sector. The public sector is unique in its number of large energy-using sites close to one another and, through the Cabinet Office, has access to central purchasing support. The public sector could use its own sites as a pathfinder to demonstrate benefits, develop methods and disseminate them to the private sector to build innovative clean products and services. The Green Finance Taskforce recommends encouraging public sector procurement to lead the market in clean alternatives using mechanisms such as the Small Business Research Initiative (SBRI) and using climate impact as a factor in procurement decisions. The public sector should also take a strategic approach to public sector energy purchasing by considering the opportunity presented by site clusters to demonstrate lower-cost, clean energy services that can ultimately be scaled to provide business models to deliver services to the wider economy. Finally, the Green Finance Taskforce recommends establishing a **green procurement credit facility** for local authorities. This would aim to increase the percentage of renewable energy and other green goods and services that local Government, the NHS or other Government agencies purchase.

Achieving impact

Adopting these recommendations is expected to make a material and measurable impact on green VC finance in the UK. The **Green Investment Accelerator** and **public-private fund** will have a direct impact on the quantity of funding going into early-stage deals, leveraging at least 100% of the public funds with private capital. The indirect effect will be to increase the quantity and quality of later stage deal-flow, leading to additional private-sector investment in these stages by corporates and conventional VC funds. In addition to increasing the supply of capital, the recommendations will also support venture-backed businesses in securing lead customers for their products from the public-sector estate. Commercial adoption of disruptive technology is often initially slow, but by encouraging UK public entities to align their activities with the Government's Clean Growth Strategy, public procurement can be used to add value to cleantech start-ups by accelerating their commercial development. These increases to funding and customer pull will help grow a thriving low-carbon innovation ecosystem in the UK. There is great demand for novel clean technology globally, and successful entrepreneurial companies will present a significant export opportunity. Technology start-ups typically create high value jobs and if able to grow at the rate expected by venture backers, will deliver strong productivity grown to the economy. Such an integrated package of support, working in partnership with the private-sector venture capital community, would present the UK as a world leader in efficient and effective innovative clean technology policy.

Theme 6. Clarify investor roles and responsibilities

The size of the opportunity

Clarification of fiduciary duties, investor competence, good fund governance on environmental, social and governance (ESG) issues and processes that take proper account of the financial risks and opportunities that they pose, are essential to enable the UK financial system to respond in a timely way to climate risk and clean growth opportunities. Fiduciary duties are foundational for the UK investment industry. The way they are framed, viewed and understood helps set the assumptions for appropriate investment behaviour.[106]

The Government has a clear opportunity to build on recent developments aligned with this aim. For example, in a letter to the Parliamentary Environmental Audit Committee,[107] the Minister for Pensions and Financial Inclusion at the Department for Work and Pensions (DWP) has confirmed his current intention to launch a consultation in June 2018 to bring forward legislation to clarify trustees' fiduciary duties in relation to their consideration of ESG factors, including climate change. In addition, recent mandates awarded by UK Local Government pension funds have targeted clean investment strategies, demonstrating that informed investors are willing to act on clean investments, especially when schemes are required to specify a policy in relation to ESG risks.[108]

Addressing the recommendations below will foster the investor competence and fund governance required to promote UK green finance.

Building on UK strengths

Progressive UK investors have for years led the debate on the need to factor ESG issues into fiduciary obligations and have taken steps to do so.

The Law Commission has stated unambiguously: "There is no impediment to trustees taking account of environmental, social or governance factors where they are, or may be, financially material"[109] that sought to address past misperceptions that fiduciary duty may act as a barrier to the integration of ESG issues including climate change adaptation and mitigation in the UK and abroad. Further clarification through the recommendations below would serve to address this need.

It is for this reason the UK debate is well developed, and the opportunity noted above, to clarify trustees' fiduciary duties in relation to ESG issues including climate change, is a major UK strength.[110]

International competition

The European Commission has set a clear direction for requiring consideration of ESG issues

106 PRI and UNEP Finance Initiative (2015) Fiduciary duty in the 21st century http://www.unepfi.org/fileadmin/documents/fiduciary_duty_21st_century.pdf

107 Minister for Pensions, Guy Opperman MP (15 February 2018) Letter to Mary Creagh MP, Chair, House of Commons Environmental Audit Committee: "Given that there is a broad scientific and public policy consensus that climate change is [a financially material] risk, then trustees already have a duty to take account of it" http://www.parliament.uk/documents/commons-committees/environmental-audit/180215-Guy-Opperman-to-Chair-Green-Finance.pdf

108 Including: Brunel Pension Partnership (2018) An overview for fund managers https://www.brunelpensionpartnership.org/news/2017/12/brunels-engagement-presentation-to-fund-managers; and LGPS Central Limited as featured in EU Commission Tenders Electronic Daily http://ted.europa.eu/TED/notice/udl?uri=TED:NOTICE:94012-2018:TEXT:EN:HTML&src=0 noting the relevant regulation: Local Government Pension Scheme (Management and Investment of Funds) Regulations 2016 – SI 2016/946

109 Law Commission (2014) Fiduciary Duty of Investment Intermediaries https://www.lawcom.gov.uk/project/fiduciary-duties-of-investment-intermediaries/

110 Department for Digital, Culture, Media and Sport (2017) Pension fund and social investment: interim response https://www.gov.uk/government/publications/pension-funds-and-social-investment-interim-response

as part of an investor's fiduciary duty[111] as an action area within the European Commission's Sustainable Finance Action Plan. To maintain the UK's leadership on green finance, the UK should address fiduciary duties and the capacities of investors as a matter of priority to drive behaviour in the investment chain towards UK green finance.

Challenges to overcome

The Department for Work and Pensions has noted that some pension fund trustees have misconceptions about their fiduciary duty as regards the consideration and incorporation of ESG issues including climate change, and pay insufficient attention to these issues.[112] Industry research shows that, similarly, there are misconceptions among investment professionals about the relevance of ESG issues to investment decisions, and that they are often not considered in a systematic way as part of their fiduciary duties.[113]

A clear and common understanding of fiduciary duties is foundational for the UK investment industry. The core aspects of fiduciary duty are the duties of prudence and loyalty, which require fiduciaries to act in the best interests of beneficiaries. Fiduciary duty relates to duties:

- owed to beneficiaries, for example, a pension fund trustee to its scheme members; and
- that investment managers owe throughout the investment chain and to the end investor.

Additional barriers to investor competence and good governance on ESG issues include:

- Gaps in the expertise of trustees on ESG issues, makes it more difficult to clearly include these factors in investment principles and strategies;
- investment consultants that do not fully incorporate ESG issues into the services provided to investors. Given their disproportionate influence in the UK pension market, this acts as a barrier to pension funds incorporating ESG issues into investment strategy;[114] and
- short term investment horizons, investment mandates which do not include ESG issues and performance management benchmarks which do not include ESG issues.[115]

Recommendations

To improve capacity and performance in the investment sector on ESG issues including climate change, the Government should clarify fiduciary duties and implement several supporting recommendations on investment processes and disclosures, in particular in **revising investment regulations.**

RECOMMENDATION 16

Regulations on fiduciary duty should clearly **incorporate ESG issues.**

The Investment Regulations should be revised to clarify that ESG issues should be taken into account[116] where they are financially material

111 In civil law, referred to as "investor duties"

112 Minister for Pensions, Guy Opperman MP (15 February 2018) Letter to Mary Creagh MP, Chair, House of Commons Environmental Audit Committee: "Given that there is a broad scientific and public policy consensus that climate change is [a financially material] risk, then trustees already have a duty to take account of it" http://www.parliament.uk/documents/commons-committees/environmental-audit/180215-Guy-Opperman-to-Chair-Green-Finance.pdf

113 Financial Conduct Authority (2016) Asset Management Market Study: Interim Report: "In a recent sample of 34 Investment Association members, half reported that they managed at least some proportion of assets according to ESG considerations and, where they did, approximately one fifth of total assets were subject to ESG requirements." https://www.fca.org.uk/publication/market-studies/ms15-2-2-interim-report.pdf

114 Principles for Responsible Investment (2017) Working towards a sustainable financial system: Investment Consultants Review https://www.unpri.org/download_report/45165

115 Principles for Responsible Investment (2016) Sustainable Financial System: Nine key priorities to address https://www.unpri.org/download_report/23144

116 Taking ESG issues into account includes their integration into investment decision making and including ESG requirements in mandates to service providers. Good practice includes ESG integration, engagement with investee companies, considered use of shareholder rights and public-policy engagement in beneficiaries' best interests.

over the time horizon that is consistent with fiduciary duties that are owed to the beneficiary.[117]

RECOMMENDATION 17

Government should require that the Statement of Investment Principles[118] include statements on the extent to which social, ethical and environmental issues (including climate change) are considered, or why the trustees have determined that such considerations are not material or relevant factors to consider.[119] Asset owners should be required to report on how they take into account ESG issues in their Statement of Investment Principles and investment strategy.[120] Implementation of the revised Investment Regulations and Statement of Investment Principles by pension funds (recommendations 16 and 17) should be overseen by The Pensions Regulator.

RECOMMENDATION 18

The FCA should require that corresponding requirements are put in place for contract-based schemes,[121] noting that: contract-based pension providers also have a fiduciary duty to their members; the DWP and FCA should seek to align to prevent regulatory arbitrage; and given that under automatic enrolment, pension scheme members have no choice as to whether they are enrolled into a trust or contract based scheme. The FCA should explore options to better clarify the need for asset managers to have a sound understanding of the interests and broad range of preferences of their clients, including those relating to ESG factors, and that they provide clear information to their clients about the potential benefits and risks of incorporating such preferences, including the effect on the prospective return of the investment strategy.[122]

RECOMMENDATION 19

Government should clarify that trustees should engage with their beneficiaries to understand their beneficiaries' preferences and can make investment decisions that are based on these preferences[123], provided there is no risk of significant financial detriment to the fund. The Government should provide guidance to define 'significant financial detriment' and demonstrate how they establish their understanding of beneficiary preferences.

RECOMMENDATION 20

Government should clarify that investment consultants should have sufficient expertise and competency on ESG issues.

Recognising the critical role of investment consultants in advising pension trustees, including the regulated obligation for scheme trustees to seek investment advice, the Government should[124] clarify that investment consultants should have sufficient expertise and competency on ESG issues, including climate change, and should include ESG issues as a standing issue when advice is given, including advice on portfolio strategy, asset allocation and manager selection.

117 Particularly for pension beneficiaries and insurance policy holders

118 In order to strengthen trustee board competence on climate

119 The Occupational Pension Scheme (Investment) Regulations 2005 sections 2(3)(a)(vi) currently states that SIPs must cover "the extent (if at all) to which social, environmental or ethical considerations are taken into account in the selection, retention and realisation of investments." Such an update to the SIPs will require strengthening trustee board competence on climate issues for trustees to comply with trustee knowledge and understanding requirements in sections 247-249 of the Pensions Act 2004, particularly with regards the Statement of Investment Principles.

120 Also referred to as policies and beliefs

121 Including for example, terms of references for Independent Governance Committees (IGCs). See UK roadmap: PRI and UNEP Finance Initiative (2015) Fiduciary duty in the 21st century http://www.unepfi.org/fileadmin/documents/fiduciary_duty_21st_century.pdf

122 Institutional clients of asset managers should consider their members and beneficiaries' preferences in their discussions, to ensure that information flows throughout the investment chain.

123 Beneficiary preferences may or may not be distinct from their financial interests.

124 In lieu of regulatory oversight of consultants, this is a recommendation that the government would be required to implement.

RECOMMENDATION 21

Investment advisors should ask clients about their sustainability preferences, and investment funds marketed directly to individuals should clearly state the ESG impacts of the fund

Market surveys regularly report that social and environmental objectives are an important factor for a majority of retail investors[125] and the EU Markets in Financial Instruments Directive (MiFID II) requires advisors to offer products that are suitable to meet their customers' needs. However, advisors rarely ask their clients about their investment preferences. Correcting this failure would connect individual citizens more closely with the sustainability agenda, as well as help stimulate the flow of capital towards green projects. Investment advice more broadly is currently the subject of an ongoing review by the FCA, but the Green Finance Taskforce understands that issues surrounding sustainability have not yet been considered.

This Green Finance Taskforce notes that the EU high level expert group on sustainable finance recommended that the European Securities and Markets Authority (ESMA) 'require investment advisors to ask about, and then respond to, retail investors' preferences regarding the sustainable impact of their investments, as a routine component of financial advice'.[126] **This Green Finance Taskforce further notes that the European Commission Action Plan on Sustainable Finance proposes that** subject to the outcome of its impact assessment, the Commission will amend the MiFID II and Insurance Distribution Directive delegated acts in the second quarter of 2018 to ensure: that sustainability preferences are taken into account in suitability assessments; and that it will invite ESMA to include provisions on sustainability preferences in its guidelines on the suitability assessment to be updated by the end of 2018. **Technical guidance would be needed on the nature of the questions asked, but these should be kept simple. Importantly, the questions should not be framed in terms of a financial trade-off, particularly where there is evidence from multiple studies to indicate that sustainable investments can achieve higher returns than approaches that do not incorporate sustainability criteria**.[127]

The FCA should issue similar clarifying guidance for the UK directly. It is an opportunity for the FCA to move quickly and assume a leadership role internationally on sustainability issues.

Furthermore, all investment funds marketed directly to individuals should **have clear and simple disclosures about the environmental and social impacts of those funds**. In the UK, many retail investors are likely to invest money in products bought directly, without private financial advice. Such retail investors will have limited appetite to wade through pages of disclosure documents, much less the ability to analyse them.[128]

The FCA should consider working with industry to develop simple labelling schemes that would both inform and better protect retail investors by providing clear, simple indicators for the non-financial impact of investment funds. This would facilitate better-informed decision-making by

125 Natixis Global Asset Management (2017) 2017 ESG Report; A survey of 7100 respondents in 22 countries found that social and environmental objectives are an important factor for around 70% of retail investors. https://www.im.natixis.com/us/press-release/esg-may-be-catalyst-to-solving-the-savings-crisis-

126 EU High-Level Expert Group on Sustainable Finance (2018) Final report of the high-level expert group on sustainable finance, page 28 https://ec.europa.eu/info/sites/info/files/180131-sustainable-finance-final-report_en.pdf

127 Global Impact Investing Network (2017) Evidence on the Financial Performance of Impact Investments https://thegiin.org/assets/2017_GIIN_FinancialPerformanceImpactInvestments_Web.pdf; 'The Value of Responsible Investment – Investment Leaders Group', University of Cambridge Institute for Sustainability Leadership, 2014'; G. Friede, T. Busch and A. Bassen et al (2015) ESG and Financial Performance: Aggregated Evidence from More than 2000 Empirical Studies, Journal of Sustainable Finance and Investment

128 See action on implementing Climate Related Financial Disclosure (TCFD) recommendations.

investors who have a preference to improve the environmental and social impact of their capital. Existing Government-agreed targets such as the Sustainable Development Goals, and the Clean Growth Strategy at a UK level, should provide the benchmark against which impacts are assessed. Practical approaches that recognise current data limitations are already under development by industry and academic leaders,[129] but any approach would need FCA endorsement to encourage take-up at scale. If market-driven, such a scheme could be voluntary."

RECOMMENDATION 22

Government and professional bodies should develop **competencies across a wider group of societal stakeholders through education tools.**

Education for investors and professional training

Shifting finance onto a sustainable footing to boost green finance opportunities will require all actors in the system to improve their engagement, understanding and competency in the issues. For example, pension funds and asset managers, including insurance companies, should be expected to apply the clarified duties in their investment practices. Additional education and training is required to support their implementation. Professional and industry bodies, including the Chartered Financial Analysts (CFA) and the Institute and Faculty of Actuaries (IFoA) should be engaged by investors to develop how ESG issues are incorporated within their professional designations.

Similarly, educational programmes for issuers but also importantly individual savers should be developed to raise awareness of green capital markets and to create greater demand for sustainable financial services, respectively.

Education for issuers and banks

An education and capacity building programmed for issuers and banks should cover the development of skills around:

- Identification of green projects and assets already present in a company capex plans;
- key areas for green data collections and reporting and the project/asset level;
- ESG disclosure capabilities at the entity level
- impact reporting;
- understanding of ESG credit and sustainability equity ratings; and
- development of the ability to tap into all the available insurance and credit enhancement facilities already provided by the Government.

This capacity building effort should be convened by the Government with delivery contributions made by leading industry players.

Education for individual savers

The Government should also deliver rapid improvements in literacy in sustainable finance and educate citizens about how their investments shape the world they live in today and retire into. The Government should work with industry, educational and consumer groups, via the Green Finance Institute, to design and deliver an ambitious financial literacy programme delivered in secondary, tertiary and continuing education. Financial capability qualifications are currently available for 14-19 year olds and are offered in approximately 700 schools nationally.[130]

Government should encourage more schools to adopt these qualifications, encourage education at a younger age, and ensure that sufficient emphasis is placed on sustainability issues. These measures will help boost both the supply of, and demand for green finance. A scheme that focuses on financial literacy could be funded through releasing a portion of the UK's dormant assets accruing from the institutional investor sector.

129 Example: Investment Leaders Group, Cambridge Institute for Sustainability Leadership (2016) In Search of Impact: Measuring the Full Value of Capital https://www.cisl.cam.ac.uk/publications/publication-pdfs/impact-report.pdf

130 The London Institute of Banking and Finance (2018) Financial Capability Qualifications https://www.libf.ac.uk/study/financial-capability/qualifications

This demand can be further enhanced through the work of the World Benchmarking Alliance to create league tables ranking companies on their sustainability performance. The league tables will be made freely available, as a public good. They will incentivise corporates to improve their sustainability performance and help educate people about how their money is invested, and how they can exert their influence to stimulate demand through the investment chain. The Government (DfID) has funded the establishment of the WBA and a long-term commitment is now required.

Achieving impact

This process will drive impact by: incentivising corporates to improve their sustainability performance; creating a race to the top; educating people about how their money is invested; how this impacts the world around them; and how they can use their investments to exert influence on companies to stimulate demand through the investment chain.

Theme 7. Issue a Sovereign Green Bond

The size of the opportunity

The development of a world-class UK Sovereign Green Bond Framework under which a single sovereign green bond (structured in tranches, one of which for the retail markets) or a rolling programme of sovereign green bonds could be issued to help secure the investment needed to achieve the UK's clean growth and innovation goals while also signalling a consolidation of UK leadership in green finance.

The strongest argument posed to date for UK Sovereign Green Bond issuance or programmatic issuances is that it sends a signal that the Government is serious about green finance. To back up that signal, the funds secured must themselves be used for serious intent. Without such additionality, there is a danger that a Sovereign bond simply substitutes for potentially cheaper Gilt issuance, making it poor value for money after green accreditation costs and simultaneously vulnerable to accusations of 'green washing'.

The key to achieving a meaningful impact relative to sovereign green bonds already issued elsewhere, is to make it clear that the proceeds amount to additional sources of capital, invested in new green projects that might otherwise not have been funded. Indeed, one possible use would be to raise sufficient funding to support the full gamut of activities set out in this report, and which would otherwise require existing public resources for implementation.

The UK Sovereign Green Bond Framework should be designed to reflect the targets and priorities set by the Clean Growth Strategy and the 25-Year Environment Plan and channel low-cost, patient capital towards selected qualifying green projects that will be identified over the course of the bond framework's life. The green assets accumulated would also create opportunities for them to be securitised and sold on to investors – enabling proceeds to be recycled into other green assets.

Issuing a series of UK Sovereign Green bonds could therefore be a cornerstone activity to deliver the Green Resilient Infrastructure Pipeline proposed in **Theme 8**, with public funds used to crowd in private capital where risk is too high or funding streams to repay high public value investment are lacking.

Building on UK strengths

The UK's Clean Growth Strategy and the 25 Year Environmental Plan set a clear direction of travel for how the economy needs to reduce GHGs and adapt to a changing climate. It is proposed that a UK Sovereign Green Bond Framework build on this. As such the Framework need to reflect the targets and priorities set by the Clean Growth Strategy and the 25 Year Environment Plan and focus on raising and channelling attractively priced, patient capital towards selected qualifying green projects. Through the use and management of proceeds, the project selection process and the quality of the associated impact reporting[131], the UK will have the opportunity to demonstrate excellence and transparency in applying standards and tools so far tested on a more limited scale domestically.

International competition

International competition in sovereign green bond issuance is significant – more specifically financial centres' ability to use bond issuance to position themselves as green capital markets hubs. The recently published, inaugural Global Green Financial Centres Index from

131 These are the four components of the International Capital Market Association (2017) Green Bond Principles (2017) https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/GreenBondsBrochure-JUNE2017.pdf

Z/Yen,[132] ranks London as number one but cites Luxembourg, currently ranked second, as home to half of the world's green bond listings and Paris, currently ranked five, as a significant likely mover in future rankings.

France has issued a sovereign green bond programme, raising €9.697 billion, which went to fund a variety of eligible activities and projects, including energy efficient buildings, transport, smart grids, farming, adaption and the circular economy although there were disagreements about whether any of this activity was additional. Within the EU, Belgium and Poland have both issued sovereign green bonds. Globally, Nigeria has issued in Africa, Indonesia issued the first Green Sovereign Sukuk in February 2018 and Fiji has indicated its intention to list its sovereign green bond in London, highlighting the climate issues faced by island states.

UK Sovereign green issuance will be a game changer in this landscape by:

- Directly raising and deploying additional capital to support new key climate projects and ensuring the capital is deployed to fund areas where it will create significant additionality in terms of impact;
- sending a powerful signalling effect to investors and issuers that positions London as green finance hub;
- stimulating further development of the sterling green bond market, which lags behind the green markets in RMB, € and US$
- energising wider popular participation in the green finance agenda (if a retail bond is chosen);
- hardwiring climate change mitigation and adaptation into the national assets and liabilities improving the UK long-term creditworthiness profile[133]; and
- signalling that the UK will remain, post-Brexit, a high environmental standards economy.

Impacts of the UK Sovereign Green Bonds in the public sector

Through the development of public sector skills and procedures in the design and management of a Green Bond Framework, the UK Sovereign Green Bond could:

- Stimulate municipal and more broadly local Government green bond issuance (including public utilities), especially in the face of reduced borrowing available from the EIB, which has been an important source of municipal green funding to date[134];
- revitalise the role of the UK Municipal Bonds Agency, with a focus on green bond issuances; and
- pave the way for retail green bond issuance from the National Savings and Investments, which would further popularise the retail green savings.

Impacts on the private sector

The UK corporate market in green bond issuance is also markedly smaller than in other countries. Of the over US$20 billion equivalent raised through green bonds on London Stock Exchange [since 2012], only US$3.4 billion funded UK businesses[135]. A UK Sovereign Green Bond would help catalyse this market, opening up more investment opportunities for UK investors. In the private sector, a UK Sovereign Green Bond would:

132 China Development Institute and Z/Yen (2017) Global Financial Centres Index 22 http://www.longfinance.net/images/GFCI22_Report.pdf

133 As credit rating agencies increasingly incorporate ESG considerations into their rating methodologies, this will stand the UK in good stead

134 See also: Investment Association (2016) Investors Encourage the Development of UK Municipal Bond Market https://www.theinvestmentassociation.org/assets/components/ima_filesecurity/secure.php?f=Investors_Support_the_Development_of_Municipal_Bonds_Market.pdf

135 London Stock Exchange, data from March 2018

- Catalyse further issuance of corporate green bonds, drawing on the established credentials of UK underwriters, more pricing information for investors and a burgeoning narrative that London has the capabilities, market infrastructure and investor base to issue green bonds;
- mobilise the retail market, through the exposure to the retail tranche of the bond. Retail involvement could also lead to greater demand for pension scheme solutions that incorporate ESG considerations. Building on growing private investor demand, the Government might later consider removing any fiscal asymmetries, for example through the introduction of green ISAs (Individual Savings Accounts) and green SEIS (Seed Enterprise Investment Scheme);
- build on initiatives aimed at developing taxonomies (such as the forthcoming Green Lending Principles of the Loan Market Association (LMA) and the EU sustainable taxonomy announced as part of the EU Action Plan on Sustainable Finance), green tagging and warehousing of loan portfolios could lead to the structuring of green covered bonds and green asset backed securities; and
- promote the uptake of green bond wrappers for SMEs or to aggregate green projects in sectors where there is a shortage of green project at scale, to allow smaller corporate issuers or sectors that are not typically green to access the capital markets.

In summary, **a UK Sovereign Green Bond would directly drive investment into clean growth**, consolidate UK leadership by adding major issuance to our existing underwriting strengths and maximise opportunities for UK businesses by creating opportunities for corporate issuance. In addition, the green assets developed under this framework could later be securitised and sold on to investors – enabling proceeds to be recycled into further new green assets.

Challenges to overcome

The principal barriers to implementing this recommendation identified so far are around the use and management of proceeds and the cost of funding and reporting.

Suitable mechanisms must be designed to track the use of proceeds of sovereign green bonds and manage the funds in alignment with the Green Bonds Principles within the context of the National Loans Act 1968.

The other key aspect in issuing such a bond is the cost of funding. However, it is worth noting that in the cases of France, Belgium and Poland, their sovereign green bonds, priced close to or inside their conventional bond curves, and on the secondary market, the bonds traded closer to or inside the curve, having been heavily oversubscribed. Corporate green bond issuances in London and elsewhere have experienced similar pricing. It is further evidence that the pool of specialist investors looking for green opportunities is growing.

Where price differences do exist it is also worth noting the findings of Sweden's Inquiry to Promote the Market for Green Bonds, which suggested that the costs associated with a green bond issuance were a worthwhile 'tuition fee' given that "In the long run, green bonds will account for a significant share of the bond market", as well as the fact that "the issue of a green bond would widen the base of future investors in Swedish Government bonds."

While the Debt Management Office is a market expert on raising money, thought should be given to the governance of the use of proceeds from funds raised. A Steering Committee of experts should be established consisting of the Committee on Climate Change, BEIS, Defra, HM Treasury along with civil society and the private sector represented by Green Finance Initiative.

Reporting on the impact of funds raised through the UK Sovereign Green Bond programme could build on the work already carried out by the Green Investment Bank (now GIG), and the issuance could provide the testbed for the work on green standards now being carried out by the British Standards Institution (BSI) and be supported by the expertise of the recommended Centre for Climate Analytics and of the Green Finance Initiative more broadly.

Recommendations

RECOMMENDATION 23

Government to issue a Sovereign Green Bond. This should be of the order of the French sovereign green bond programme, which has raised EUR9.697 billion and be considered as one of the measures of a comprehensive UK Green Capital Raising Plan.

It should be made clear that the money is additional, to finance new green investment that would not otherwise have happened.

HM Treasury would determine the overall policy framework within which debt issuance takes place, including the level of financing to be raised each year and the type of financial instruments for this to be raised through. The DMO would be the sole body charged with issuing sovereign bonds and would also be expected to be involved in any green sovereign bond issuance. However, this issuance would need to connect directly with the Clean Growth Strategy and 25 Year Environment Plan, when drawing up eligible projects and defining the use of proceeds and should require coordination with a number of Government departments and agencies as part of the UK Green National Capital Raising Plan.

Implementation steps include:

- HM Treasury to design a mechanism for the management of proceeds in line with the Green Bond Principles within the framework of the National Loans Act 1968;
- BEIS to appoint a Green Bond Framework Steering Committee drawing on the skills of expert bodies as set out above;
- A consortium of green bond external reviewers to be convened by the Government to assist with the certification of the Green Bond Framework; and
- DMO to work with Gilt-Edged Market Makers to ensure buy in and the best pricing conditions for the issuance are secured.

Achieving impact

The short-term impact would be ring-fenced finance to deploy to climate change mitigation and adaption-related investments. Ultimately, success would be judged against how much this gives way to a broader programme of issuance and underwriting of green bonds in London and how swiftly and cost-effectively public policy goals are met.

At sub-sovereign municipal, corporate and small- and medium-enterprise level, the UK lags in terms of issuance even if London is a competitive jurisdiction for underwriting. But if a sovereign issuance were to take place, it would likely enhance London's competitive position, allow it to remain on top of green financial sector globally, and allow it to grow market share in green bond listings.

Theme 8: Build a green and resilient infrastructure pipeline

The size of the opportunity

At the end of 2017, the Government committed to upgrading the UK's digital, energy, transport, housing, water and flood defence infrastructure, including through investment in the National Productivity Investment Fund, with annual central Government infrastructure investment rising each year from around £2 billion in 2016/17 to over £5 billion in 2020/21.[136]

This represents a step change in the amount of capital being deployed to infrastructure overall. Looking more specifically at green infrastructure, the Committee on Climate Change has estimated the annual cost of meeting the fifth carbon budget in 2030 at less than 1% of GDP,[137] equivalent to around £22 billion annually.[138] It will require the UK securing major investment not just to renew and decarbonise its infrastructure (which includes buildings as well as more traditional infrastructure such as rail and ICT), which is discussed in detail earlier in the report, but also ensure it is resilient to the impacts of a changing climate.

Against this backdrop, the UK is delivering less than a half of the green infrastructure projects required to meet its environmental targets.[139,140] Meanwhile, investor demand for investment opportunities linked to these targets is substantial and currently unmatched by the supply of viable projects.

Institutional investors, especially those with long-term liabilities, like insurers and pension funds, would like to increase allocations to infrastructure assets since they offer inflation-linked long-term returns. For defined benefit pension funds, increasing investment in infrastructure assets can help reduce deficits. Analysis by Macquarie suggests that for every £1 billion UK defined benefit pension funds allocate from corporate bonds to infrastructure debt, a reduction in pension fund deficits of £270 million could be achieved.[141] However, there are currently so few investable opportunities that any reallocation of institutional investor funds to green infrastructure is unlikely to reduce deficits until more opportunities are made available.[142] The availability of bankable opportunities can be due to a combination of factors including the complexity of technology or infrastructure, lack of long-term uncertainty around policy and the dual challenge (particularly in the case of small-scale, distributed and energy efficiency projects where transaction

136 HM Treasury (2016) Autumn Statement 2016 https://www.gov.uk/government/topical-events/autumn-statement-2016

137 Committee on Climate Change (2015) The Fifth Carbon Budget: The next step towards a low-carbon economy https://www.theccc.org.uk/wp-content/uploads/2015/11/Committee-on-Climate-Change-Fifth-Carbon-Budget-Report.pdf

138 Aldersgate Group (March 2018) Towards the New Normal: Increasing Investment in the UK's Green Infrastructure http://www.aldersgategroup.org.uk/events/towards-the-new-normal-how-to-increase-investment-in-the-uk-s-green-infrastructure; and World Bank national accounts data (accessed March 2018) UK Gross Domestic Product 2015 https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2016&locations=GB&start=2008&view=chart

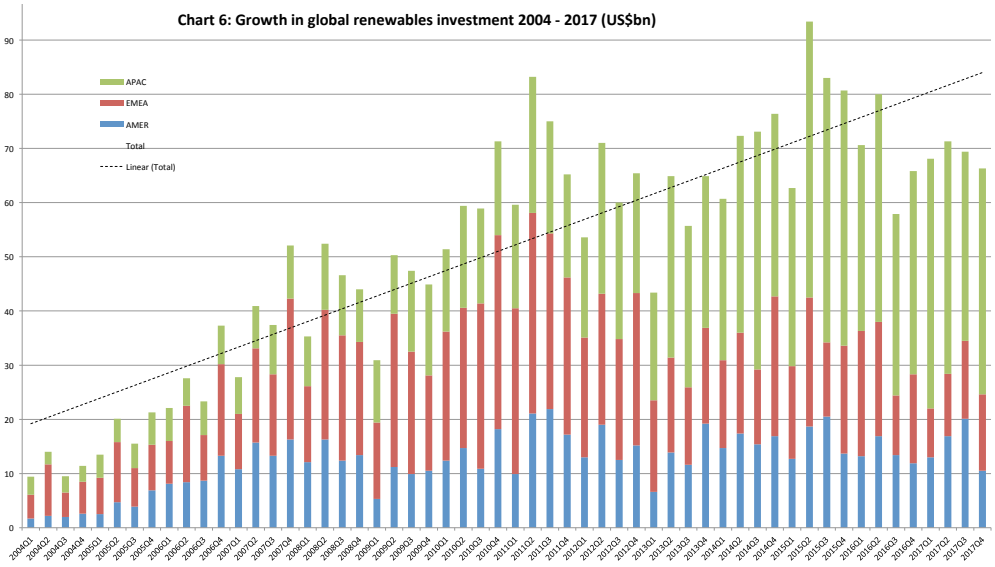
139 By 2020: 15% of UK's energy needs and 10% of its transport energy consumption has to come from renewable energy sources; reduce the amount of biodegradable municipal waste sent to landfill to 35% of 1995 levels; reduce carbon intensity of new cars and vans to 95 grams of carbon dioxide per kilometre (g/km) and 147 g/km respectively; by 2050, return aviation emissions to 2005 levels; and reduce water consumption to an average of 130 l/person/day by 2030 from 2008 the level of 150 l/person/day. Vivid economics (2011) The Economics of the Green Investment Bank http://www.vivideconomics.com/publications/the-economics-of-the-green-investment-bank

140 In terms of reducing GHG emissions the UK is on track to outperform on the second (2013 to 2017) and third (2018-2022) carbon budget, however, "*gaps to meeting the fourth and fifth carbon budgets remain*". Committee on Climate Change (2018) An independent assessment of the UK's Clean Growth Strategy: From ambition to action https://www.theccc.org.uk/publication/independent-assessment-uks-clean-growth-strategy-ambition-action/

141 Macquarie (2016) Appraisal of private debt opportunities: A holistic approach for UK pension funds http://static.macquarie.com/dafiles/Internet/mgl/global/shared/sf/pdf/MIDIS_White_Paper_Appraisal_of_Private_Debt_Opportunities.pdf?v=2

142 Intelligence on European Pensions and Institutional Investment (2016) Infrastructure Debt: a niche strategy https://www.ipe.com/reports/special-reports/liability-driven-investment/infrastructure-debt-a-niche-strategy/10013539.fullarticle

CHART 4.
Growth in global renewables investment 2004-2017 (US$bn)
Source: Bloomberg New Energy Finance



cost are high as a proportion of overall deal size and complex technology).

While investment in UK clean energy infrastructure has grown in recent years towards the levels required to meet policy targets (**Chart 4**), **UK investors consistently cite a lack of UK-based green infrastructure investment opportunities as a major barrier to deploying more capital to these assets**.

To deliver on the clean development objectives in the Clean Growth Strategy, Industrial Strategy and 25-Year Environment Plan and enhance the UK's reputation as a market with reliable clean and green infrastructure investment opportunities, the Government should develop detailed forward plans for developing clean infrastructure, contribute to a better-informed market about available investment opportunities, and help make the risk/reward profiles of clean investment opportunities more financially attractive to private investors. In doing so, the Government can tap into growing investor appetite and increase private investment in clean growth opportunities across the UK.

Building on UK strengths

The UK benefits from a largely stable regulatory policy framework and impressive growth potential in green infrastructure.[143]

Across the UK sub-national infrastructure initiatives are emerging. For example, a number of UK city authorities have plans such as the Leeds Hydrogen City Gate project. Run by Northern Gas Networks with the support of Leeds City Council, the project is piloting converting the gas grid from natural gas (methane) to zero-carbon hydrogen.[144] Looking at a regional level, the North Energy Taskforce set out a vision for the north of England as a leading low carbon energy region in the UK worth £15 billion per annum and employing over 100,000 people by 2050.[145]

143 CMS (2016) Infrastructure Index: Bridging the gap https://cms.law/en/GBR/Publication/Infrastructure-index-bridging-the-gap

144 H21 Leeds City Gate (2016) https://www.northerngasnetworks.co.uk/wp-content/uploads/2017/04/H21-Executive-Summary-Interactive-PDF-July-2016-V2.pdf

145 IPPR (2017) A Northern Energy Strategy https://www.ippr.org/publications/northern-energy-strategy

These plans can both lead to increased supply of clean infrastructure assets for investment[146] and provide examples that can be used in other local authority and regional areas.

At an institutional level the UK benefits from well-developed capacity to support infrastructure planning and delivery. The **National Infrastructure Commission provides independent strategy thinking, analysis and advice to address the UK's long-term infrastructure needs. The Infrastructure Projects Authority (IPA) is the Government's centre of expertise on infrastructure and major projects.** It works to create the right environment for successful delivery through: supporting and de-risking the most complex and high-risk projects; developing the skills and capability of the people who deliver projects; and overseeing the project life-cycle from policy, initiation and financing to independent assurance. It has available to it tools that can enable and crowd in private investment opportunities in the form of its £40 billion UK Guarantee Scheme and the National Productivity Investment Fund.[147] The IPA also has experience in establishing co-investment vehicles in clean economy and related enabling sectors such as ICT sectors, for example through the Digital Infrastructure Investment Fund.[148]

Challenges to overcome

Despite the UK strengths, the proportion of green infrastructure projects emerging from the IPA is only one sixth of the whole pipeline, and only one eighth of the total spend on infrastructure at £85 billion[149]. A significant barrier is around infrastructure development choices. Infrastructure can last many decades and the UK has a GHG reduction target of at least 80% by 2050. Thus, climate screens urgently need to be applied to the emergent project pipeline to ensure assets do not become stranded in the coming decades by tightening climate policies and that they are built and sited to be resilient to a changing climate.

Looking more specifically, investors and project developers have cited:

- Insufficient policy detail in the Clean Growth Strategy and 25 Year Plan including a lack of clear economic incentives for infrastructure operators to develop a pipeline of clean assets for private investment;
- fears of policy uncertainty affecting returns due to the chilling effect of 2015 solar feed-in tariff adjustments, scrappage of the zero carbon homes targets;
- insufficiently attractive risk-return profiles on some next generation clean infrastructure investments;
- dual challenge of high transactions costs and complexity of technology or infrastructure; and
- a lack of clarity on what assets and activities should be considered green.

In addition to this, UK-based pension fund allocations to the green infrastructure opportunities that do exist – notably renewables infrastructure - is currently well below those of from other countries, notably Australia and Canada.[150] Similarly, investment by insurers remains below par.

146 H21 Leeds City Gate (2016) https://www.northerngasnetworks.co.uk/wp-content/uploads/2017/04/H21-Executive-Summary-Interactive-PDF-July-2016-V2.pdf

147 Example: Department for Energy and Climate Change (2013) Drax and White Rose CCS Project: project was facilitated by UK guarantee on part of the debt https://www.gov.uk/government/news/drax

148 HM Treasury and Infrastructure Projects Authority (2017) Billion pound connectivity boost to make buffering a think of the past https://www.gov.uk/government/news/billion-pound-connectivity-boost-to-make-buffering-a-thing-of-the-past

149 Green infrastructure projects include renewable energy, electricity infrastructure, flood mitigation measures: Infrastructure Projects Authority (2017) National Infrastructure and Construction Pipeline 2017 https://www.gov.uk/government/publications/national-infrastructure-and-construction-pipeline-2017

150 City of London Green Finance Initiative (2017) The renewable energy infrastructure investment opportunity for UK pension funds http://greenfinanceinitiative.org/wp-content/uploads/2017/11/Final-Report-14.11.2017.pdf

International context

The challenge of connecting **sufficient capital to sustainable infrastructure projects is one faced by Governments across the globe**. In recognition of this, the European Commission along with the European Investment Bank (EIB) has undertaken a more activist approach to promoting such investment through the establishment of the European Fund for Strategic Investment and the European Investment Advisory Hub, which provides targeted support to identify, prepare and develop investment projects across the EU. More recently the EU has boosted this capacity, adding a new hub – URBIS – to promote city level investment and the High Level Expert Group on Sustainable Finance has called for the establishment of a new dedicated institution (Sustainable Infrastructure Europe) to accelerate the establishment of high quality infrastructure projects that deliver the EU's objectives including under the Paris Agreement.[151]

As the UK prepares to withdraw from the EU, the UK will consider its access to the EIB – a major investor in UK infrastructure and world leader on sustainability standards in particular - and the largest public infrastructure lender globally. Currently 90% of EIB investment is directed to EU Member States and there have been reports the EIB has begun scaling back investment in the UK ahead of its exit from the EU.[152] The EIB Group invested €31 billion in the UK from 2012-2016, of which 30% was in the energy sector.[153] Active solutions must now be sought to manage the potential impact on infrastructure development as the UK considers its future relationship with the EU.

151 EU High-Level Expert Group on Sustainable Finance (2018) Financing a sustainable European economy https://ec.europa.eu/info/sites/info/files/180131-sustainable-finance-final-report_en.pdf

152 The Architects' Journal (2017) European Investment Bank freezes public building loans due to Brexit https://www.architectsjournal.co.uk/news/european-investment-bank-freezes-public-building-loans-due-to-brexit/10022730.article

153 European Investment Bank (2017) The European Investment Bank in the United Kingdom: what we do http://www.eib.org/projects/regions/european-union/united-kingdom/index.htm

Recommendations

RECOMMENDATION 24

Government should publish a National Capital Raising Plan explicitly designed to align UK infrastructure planning with the delivery of the Clean Growth Strategy and the 25 Year Environment Plan.

As part of its 2018 National Infrastructure Assessment, the National Infrastructure Commission should set up an expertise hub with subgroups focused on providing advice to the Commission on what infrastructure including mapping required range of assets in geographical regions and how much capital is needed to deliver a national capital raising plan aligned with delivery of the Clean Growth Strategy and the 25 Year Environment Plan. This hub should report to the Commission by the end of 2018 and its recommendations included in the final National Infrastructure Assessment Report.

Five subgroups could be set up with the following focuses.

- **Establishing more granular pipeline over the next five, 10 and 15 years**. This would set out clean infrastructure and regional development priorities, including details on the priority locations and types of green infrastructure required. There should be a focus on large and small-scale distributed energy/energy efficiency projects. For large projects advice should be provided on splitting the value chain for complex projects such as carbon capture and storage and hydrogen and heat networks to provide for interventions appropriate to distinct risks and investment requirements at each stage of the value chain. For smaller projects advice should be provided on the aggregation of smaller projects through a dedicated Government-led programme. Where possible clear guidance on investment needs should be given including the type (debt/equity) and level (quantity) of private capital needed to complement public finance and allow infrastructure developments to proceed along with guidance on the likely

characteristics of the required capital (in terms of tenor and risk return profiles).

- **Increasing a regional role for green infrastructure development**. In concert with the recommendations set out in the **Theme 9** on bolstering prosperity that is green and inclusive, this should link local authority environmental improvement plans to national and local infrastructure requirements. Providing parties with visibility of complementary investment requirements and timelines will enhance coordination and pooling of resources, realising economies through efficiency and synergy.

- **Advising on the role of standards in delivering low carbon and resilient green infrastructure**. Delivering a resilient UK economy will rely on higher building and infrastructure standards to reduce carbon emissions and promote resilience to flood risk. A progressive and predictable regulatory framework will offer building owners and investors the necessary visibility to plan for a major, multi-decade investment programme. This work should be linked to the recommendations in **Theme 2** on managing climate risk analytics, **Theme 4** on green mortgages and lending and **Theme 10** on resilience.

- **Setting out the role Government and other public bodies can play in supporting low carbon and energy efficiency investment through procurement policy** and purchasing power to favour businesses and premises that are resource-efficient and create a platform for encouraging investment into innovative projects such as vehicle electrification. This should be undertaken in concert with the recommendations set out in **Theme 5** expanding investment in innovative clean technologies.

- **Identifying opportunities for regulated authorities to allow service charges reviews** on the basis of capital expenditure designed to increase the resource and energy efficiency, reduce the emissions footprint or increase the resilience of infrastructure assets.

Membership of the expertise hub should include private sector representatives spanning the breadth of infrastructure investment activity and encompassing equity investors from across the project lifecycle, bank and non-bank finance, non-traditional finance, project developers and sponsors. Public sector interests should be represented by: IPA; key Government departments including BEIS, DEFRA, MHCLG; statutory national environmental regulators; local authorities including city regions with relevant experience and interests; and other civil society and academic experts. This activity should be convened and coordinated by the Green Finance Institute.

Achieving impact

A more active partnership between the public and private sector is needed to turn public policy aspiration into investment outcomes. mirroring what is happening across Europe, China and Latin America. Through the approaches outlined above a series of high impact opportunities could emerge to unlock private sector investment into the UK economy including:

- Mobilising a wider range of private sector investors to invest in green infrastructure. In particular this may assist smaller institutional investors such as smaller pension funds to invest in new asset classes;
- increasing investor confidence and spurring private long-term investment, including entering into long-term Power Purchase Agreements (PPAs). This will provide project developers with revenue certainty required to construct and operate renewables infrastructure, for example, at scale;
- through the standardisation of documents for certain types of small-scale or distributed energy projects scaling up

levels of investment by the private sector. Standardisation of documentation could be particularly useful on aggregated small-scale projects such as electric vehicle charging station projects;

- stimulating private investment in innovative technologies that can be used to meet Government strategies through a commitment by Government to use procurement policies focussing on low carbon and energy efficient investment;
- for buildings, a clear stimulus for private developers and landlords to enter sustained programmes of investment in the energy performance of their stock of property. Leadership through public procurement would provide a demonstration effect, help to upskill the supply chain and could act as a precursor to a further tightening of Minimum Energy Efficiency Standard (MEES) Regulations in the future; and
- enabling the UK to become a global leader in the deployment of high value innovative technologies such as carbon capture and storage and could export this expertise elsewhere.

Theme 9: Foster inclusive prosperity by supporting local actors

The size of the opportunity

Local authorities are well placed to drive emission reductions through their unique position of managing policy on land, buildings, water, waste and transport.[154] They can embed low carbon measures in strategic plans across areas such as health and social care, transport, and housing. Partnerships across public, private and community sector organisations can unlock powerful integrated local energy solutions. Local leadership is therefore critical in rising to the clean growth Grand Challenge across the UK.

The UK's Industrial Strategy foresees a key role for local actors in delivery. It sets out a national framework which is driven by Local Industrial Strategies, strengthening the leadership of Local Enterprise Partnerships and Mayoral Combined Authorities. Both the Industrial Strategy and Clean Growth Strategy stress the importance of clean growth as central plank in the development of these Local Industrial Strategies. Future investment in local clean growth will: reduce carbon and bring high value local jobs; improve productivity and air quality; drive UK innovation; and deliver wider wellbeing.

Building on UK strengths

Local leaders already recognise the importance and the opportunity in clean growth and are putting local carbon targets and strategies in place. Local leaders are also at the forefront of managing challenges relating to resilience, notably flood risk. Local initiatives and action abound: 35 UK cities are signed up to the Global Covenant of Mayors, which commits cities to developing climate resilient initiatives and independently assessed strategies and carbon targets for 2020, 2030 and 2050[155]; 80 UK places have also signed up to the UK100 commitment to being 100% clean energy by 2050. Other city-led examples are set out in **Box 4**.

International competition

Greater action is needed to unlock the full potential of place-led investment across UK regions and cities. This is especially the case as the UK prepares to exit the European Union and lose access to technical assistance facilities provided by the EIB. This includes: the ELENA scheme, [156] which provides grants for technical assistance focused on the implementation of energy efficiency, distributed renewable energy and urban transport projects and programmes; and the URBIS facility - a new dedicated urban investment advisory platform set up to provide advisory support to urban authorities to facilitate, accelerate and unlock urban investment projects, programmes and platforms.

Challenges to overcome

Currently the ambition to have all cities and region contributing to the low carbon transition is stymied by a lack of capacity and capability to turn public policy ambition into investment. As noted in the UK100 report: "Access to development finance for local projects is an issue, and the disparity between private finance and local authorities in their attitudes towards risk continues to be a barrier. However, the development of the global infrastructure finance market has created a large

154 Committee on Climate Change (2012) How Local Authorities Can Reduce Emissions and Manage Climate Risk https://www.theccc.org.uk/publication/how-local-authorities-can-reduce-emissions-and-manage-climate-risks/ International Energy Agency (2009) Cities, Towns & Renewable Energy http://www.iea.org/publications/freepublications/publication/cities2009.pdf

155 Global Covenant of Mayors (2017) The Global Covenant of Mayors announces 3 new initiatives and partnerships to support local climate action at One Planet summit https://www.oneplanetsummit.fr/IMG/pdf/4-global_covenant_of_mayors-press_release-en.pdf and http://www.iclei.org/fileadmin/user_upload/ICLEI_WS/Documents/Press_release/One_Planet_Charter_Press_Release.pdf

156 European Investment Bank (2018) ELENA – supporting investments in energy efficiency and sustainable transport http://www.eib.org/products/advising/elena/index.htm

pool of investors with a strong desire to invest in clean energy projects which can generate an appropriate return for the risks involved. Without clear direction in terms of policy and regulation, the market on its own won't deliver. Business needs strong signals and active leadership from Government, locally and nationally."[157]

The key issues to address are therefore capacity, capability and commercialisation.

Capacity: There are no statutory obligations on local authorities to deliver on energy, low carbon or resilience, though Defra's 25 Year Environment Plan has provided new impetus to act. This means that for many councils, for whom resources to fulfil existing statutory duties are tight, making staff and funding available to promote clean energy or resilience investment is difficult, even if there is a strong business case to act.

Where clean energy investment schemes are taken forward, they are usually small, ad hoc projects based on resources available in a single year. These projects tend not to be embedded in or effectively linked into wider local strategies, of the sort the Local Industrial Strategies envisage, meaning opportunities to develop integrated low carbon solutions, with higher value financial and social returns, are missed.

Where funding is available (for example from EU programmes, national Government or commercial investors) to support integrated project development over a longer time it is often not allocated because there is no one to bid for the money or to develop the schemes. So, projects are never brought forward for investment.

Capability: Energy and low carbon projects cover a very broad range of potential schemes. They can be of significant size, upwards of £250-300 million to build an efficient scale energy from waste

157 UK100 (2017) Financing the transition: harnessing UK cities' ambition for clean energy http://www.uk100.org/wp-content/uploads/2017/09/UK100_Report_SEP04_Final.pdf

BOX 4.

CITIES IN ACTION

- Towns such as **Grimsby** are committed to meeting UK Carbon Budget levels locally while bigger cities are looking to go further faster with **Liverpool City** region aiming for a 2040 target for example.
- **Bristol**, **London** and **Manchester** are among UK cities which have successfully applied for ELENA funding from the European Investment Bank. This funding for resources has a minimum 20:1 investment ratio. Bristol secured over £50 million investment in low carbon energy for a £2.5 million grant.
- **Greater Manchester** has a publicly agreed low carbon strategy with a steering group mixing local authority, other public sector, private sector and third sector organisations. This integrates buildings, transport, waste, energy and some elements of health in a broad place-based approach to decarbonisation.
- **Bristol** and **Nottingham** have supported local supply companies, with many others looking to white label supply companies to develop local tariffs and savings. **Gateshead** and many others have developed a commercial energy opportunity through a Combined Heat and Power development.
- **Cambridgeshire Council** and **Nottingham City Council** have developed energy teams from the incomes generated through energy projects developed and funded by the local authority. These both provide funds for key frontline services as well.

plant, or an investment programme to retrofit hundreds or thousands of homes amounting from £100,000 to £5 million. Delivering such projects requires specialist technical, commercial, legal, procurement and other skills. These will not be available in-house in every local authority – and nor should they be. But there is a need to develop and share expertise through building up a supply chain across to support local authorities and develop in house capacity.

Some of this work has already started - through the Government's £7 million Local Energy Programme in England. The programme has supported the development of local strategies, tools and guidance and capacity support via five regional energy hubs. However, given the scale of the opportunity, there is scope for further action to expand capability at a local level.

Commercialisation: As discussed above, many local actors are under-resourced. Many can access funding for feasibility studies, but then lack the development capital needed to turn these into investible proposals. Where proposals do come forward, they often lack consistency in specifications. This non-comparability pushes up transaction costs. This lack of established and agreed protocol and practise, which would enable quick and low cost due diligence, means long development time lines and high costs for investors. This is a key barrier to address.

There can also be complex and lengthy procurements, even for small value schemes. An arduous bidding process against fixed criteria means high transaction costs for bidders and of course, there is no guarantee of success. Frameworks, into which multiple bidders can gain access to deliver a range of projects, reduce costs and open opportunity. There are also more flexible framework approaches available, for example dynamic purchasing systems, which allow delivery bodies to register with minimal costs up front and then bid against a range of projects, as they come forward. These approaches are in evidence, but more typically are not seen at local levels.

Recommendations

The following recommendations are designed as a package to open opportunities to boost place-based green finance.

RECOMMENDATION 25

Government should set up a Local Development Finance fund

This should be a fund of £100 million that would award capital grants to applicants seeking to create new forms of public-private consortia and organisations to bridge the "development gap" and unlock the estimated £30 billion[158] of potential clean growth infrastructure projects estimated by the UK100 initiative. These projects have been identified by local authorities, but they lack the development capital and capacity to finance and build.

This capital would differ from that available the Public Works Loan Board (PWLB) because the money is fully at risk and not invested against an asset. Any money repaid would come from the realisation of value from a successful move to the next stage of the development cycle (at an indeterminate point in the future). Such event-driven repayment terms are beyond the normal scope of PWLB terms.

The capital would be awarded to those organisations that can demonstrate potential to create scalable approaches, allowing the development capital to be recycled as much as possible. This would avoid development grants being treated as a 'sunk cost', and instead, leverage the value created by such interventions to fund future development capital.

Organisations would also need to demonstrate potential for bringing projects to completion within an accelerated time frame relative. This would

158 Green Investment Bank (2015) Smarter, greener cities: Ten Ways to modernise and improve UK urban infrastructure http://greeninvestmentgroup.com/media/44748/gib-smarter-greener-cities-report-final.pdf

build on the opportunities being unlocked via Industrial Strategy Challenge Funds and unlock match funding for the forthcoming UK Shared Prosperity Fund, to drive the clean growth agenda. The development capital needed is not huge, so individual awards of £250,000-£500,000 would allow a meaningful trial of competing models of development. The leverage and repayment aspect of the fund mean this would operate as a rolling pot, continuing to support projects over time without ongoing new monies. However, any unsuccessful investments risk reducing the core total fund value over time. This much needed learning would create efficiencies of scale and accelerated roll-out of the successful models.

The private sector, working in collaboration with community and public-sector bodies has the capital and capacity to develop the £30 billion of projects currently stuck in the 'valley of death' between initial feasibility and becoming investment ready, successfully developed projects.

Government would enable the creation of new forms of public private partnership which would ensure the benefits of clean growth infrastructure investment are felt by local communities and economies across the UK. These models could include charitable trusts, Community Interest Companies, and local authority owned companies (such as Swindon & Public Power Solutions). This fund would complement the dedicated public-private green venture capital fund' proposed in recommended in **Theme 5** Expanding investment in innovative clean technologies.

RECOMMENDATION 26

Boost demand from public bodies and their pension providers for diverse place-based low carbon investments.

Local authorities control significant investment capital in pension funds and treasury reserves that are not currently invested in line with long term environmental or social benefits of members or local citizens. Narrow interpretations of fiduciary duty are often cited as the reason for making investments that produce unintended consequences of increased climate risk and therefore reduced real benefits for members and local citizens. In addition, trustees and managers lack confidence and expertise in low carbon investment strategies.

Local Government pension schemes should build on growing collaboration under the Local Government Pension Scheme (LGPS) pooling, for example between the Local Pensions Partnership and Northern Pool in the GLIL infrastructure fund. This will help share knowledge and experience, supporting the achievement of infrastructure allocation targets, currently up to 10% of assets, which presently far exceed actual investment.

Demand for more diverse place-based low carbon investment opportunities could be further boosted if LGPS is to implement the recommendations of the TCFD to disclose their climate-related risks and opportunities, on a comply or explain basis. This will create a space for trustees and managers to examine their decision-making criteria for investments and ensure they have the right level of training and capacity to understand and take into account the climate impacts and opportunities of those decisions. This, in turn creates opportunities for an alternative 'activist' approach to securing low carbon investment opportunities to emerge.[159] In due course, requiring public sector investments to be held to the TCFD recommendations would protect public investment against climate impacts and further build on UK expertise in low carbon financing. Such a move would require investment in education and training of local authority pension fund trustees, manager and treasury officials on the risks and opportunities of investments in a low carbon future.

159 City of London Green Finance Initiative (2017) The renewable energy infrastructure investment opportunity for UK pension funds http://greenfinanceinitiative.org/wp-content/uploads/2017/11/Final-Report-14.11.2017.pdf

RECOMMENDATION 27

Government should **set up Clean Growth Regeneration Zones**

Government should work with industry and financial institutions to identify clean growth regeneration zones across the UK that can be transformed by anchor investments in direct generation of green power to new industrial assets. This would: build on the Local Energy Programme already in place; encourage further clustering of critical expertise and resource; provide the long-term investment strategy needed to create stable signals to the market; and support integrated investment portfolios to maximise local value.

It would build on the model of development being pioneered by companies such as GFG Alliance in Scotland and the North-west of England to rebuild local industrial capacity based around anchor investments in local clean growth infrastructure such as local energy generation. Such projects could require innovation in the scope and terms of corporate power purchase agreements but can potentially deliver a model of clean energy development that does not require Government subsidy to realise.

The aim would be to engage local communities, legacy local skills, local educational institutions and local investors to support such redevelopment and focus on the regeneration of quality on the back of leadership in clean growth transition.

Local authorities within and adjacent to the zone would be encouraged to bring forward investments in infrastructure to support the regeneration and extend the benefits into the local supply chain as well as mobilising local pension fund investments alongside individual and corporate investments.

Beyond the work carried out under the Adaptation Reporting Power (ARP), the Government should also require public agencies and regulators to find ways to deliver and incentivise investments in climate resilience and mitigation in the local region.

RECOMMENDATION 28

Awareness raising of green finance opportunities among Local Authorities

Many Local Authorities remain unaware of the range of finance available to support low carbon energy programmes. To overcome this barrier, a series of regional workshops could be run for senior decision makers on 'Financing the transition' bringing together local and national funders and specialist low carbon energy investors. This could be run by the Green Finance Initiative in conjunction with the Local Government Association.

Awareness should also be raised of the fact that renewables are falling in cost and becoming cost-competitive with traditional forms of generation. Local Government has the potential to access these cost benefits by becoming buyers of electricity from privately funded renewable projects using power purchase agreements (PPAs) and so supporting investment by providing price stability for contracted output. This can be done in a manner to ensure low costs to the public sector by holding competitive auctions to supply renewable electricity to the public estate, including local Government offices, universities, schools and hospitals.

These events could be run over the summer with a national conference held in October 2018 to coincide with Green Great Britain Week.

Achieving impact

The shift to more, decentralised, local clean and resilient infrastructure in the UK presents large investment opportunities. Taking activist measures to unlock investment at the local level will help boost opportunities for place-based investment but also create leadership opportunities for the UK globally as cities and regions everywhere seek solutions to play a more active role in delivering the transition to sustainable economies.

Theme 10. Integrate resilience into the green finance agenda

The size of the opportunity

Infrastructure assets and services are already vulnerable to a range of weather-related hazards such as flooding, drought, heatwaves and snow and ice.

Ensuring the UK is resilient to the effects of a changing climate would create significant new green finance opportunities that would enable the UK to lead the world in how to employ innovative means of direct public institutional and regulatory capacity and public and private and financial resources to build resilient infrastructure, supply chains and economies.

There is a significant opportunity now for the UK to amend how it plans, delivers and manages its infrastructure to be resilient to a changing climate and avoid economic losses later down the line.

On a national scale, the costs of flooding can be significant and the resilience of buildings – and housing especially – has been a high-profile economic and social concern. Improving the resilience of infrastructure and buildings is therefore a 'no regrets option' — schemes that generate direct or indirect benefits that are large enough to offset the costs of implementing the options. This is essential to preserving a productive and socially functional economy. Doing so would **promote the UK as a global leader on how the deliver a resilient economy while boosting green finance opportunities.**

Recent weather events in the UK illustrate the scale of the risks and costs if further action is not taken. The summer 2007 floods alone were associated with 43,000 flood-related residential insurance claims.[160] Over the last 10 years, an average of 19,000 homes have made flood-related insurance claims each year.[161] Two million people lost power in the 2013/14 floods, and power outages disrupted trade through Gatwick airport and three major ports. Floods in December 2015 directly affected 17,000 properties, leading to £1.3 billion of damage.[162] The number of assets in high flood risk areas will increase by at least 50% in 2050.[163]

Solving the resilience challenge requires the public and private sectors to share the risk, as well as a step change in the amount of capital being deployed to infrastructure.

While the response to climate change has traditionally been seen as the responsibility of Government policy, there is growing recognition of the role of the financial system. There are huge opportunities for growth and development as society and the economy move to being both low carbon and more resilient to a changing climate. The TCFD has provided a refreshed impetus in this area, with its dual focus on 'transition risks' and 'physical risks'.

As noted earlier, the Government has already committed to upgrading the UK's digital, energy, transport, housing, water and flood defence infrastructure, including through investment in the National Productivity Investment Fund, with annual central Government infrastructure investment rising each year from around £2 billion in 2016/17 to more than £5 billion in 2020/21.[164]

160 Flood Re (2016) The first Flood Re transition plan: Transitioning to an affordable market for household flood insurance http://www.floodre.co.uk/wp-content/uploads/Flood-Re-Transition-Plan-Feb-2016-FINAL..pdf

161 Ibid.

162 Defra, (2016) The Property Flood Resilience Action Plan: an action plan to enable better uptake of resilience measures for properties at high risk of flooding https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/551615/flood-resilience-bonfield-action-plan-2016.pdf

163 Ibid.

164 HM Treasury (2016) Autumn Statement 2016 https://www.gov.uk/government/topical-events/autumn-statement-2016

Building on UK strengths

The UK has a great track record on mitigation and a leadership role globally. A stronger alignment between mitigation and resilience would unlock further opportunities for green investment.

The UK insurance sector is a great asset, being the largest in Europe and fourth largest in the world. Flood Re is a 'world-first' flood re-insurance scheme that enables insurers to offer affordable premiums and lower excesses to homes at risk of flooding across the UK. Since its launch in April 2016 Flood Re has significantly improved the availability and affordability of flood insurance, with more than 142,000 policies ceded to it within the first 18 months.[165] Flood Re is planned to cease by 2039 and enable a transition by then to an affordable risk reflective market for household flood insurance. To enable this transition the scheme is investigating how it could incentivise the uptake of resilience improvements for properties at high flood risk.

As noted earlier in the report, the UK is also regarded as a global leader in driving greater public understanding of the risks and impacts of climate change. This leadership is built off the expertise in climate science held in the Met Office and other academic centres around the UK.

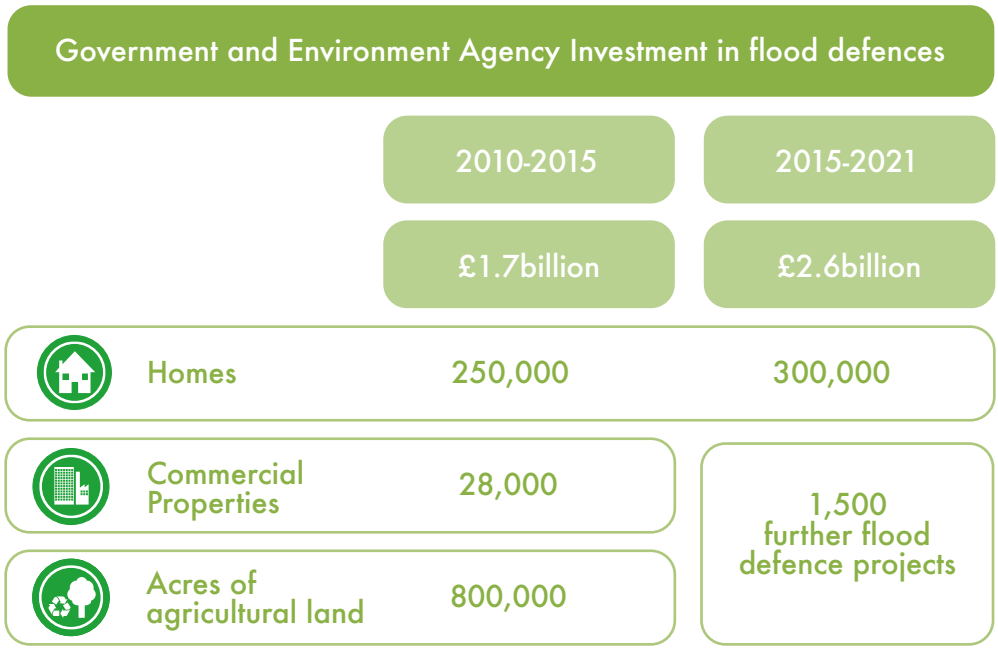
Other public institutional capacity created over the past decades has also had an important role to play. The Committee on Climate Change, which was established by the Climate Change Act (2008) – the first in the world - is explicitly tasked with advising the Government and devolved administrations on emissions targets and reporting to Parliament on progress made in reducing greenhouse gas emissions and preparing for climate change. The latter takes the forms of a National Adaptation Programme that must be published every five years to address climate impacts identified in the preceding national Climate Change Risk Assessment. The next National Adaptation Programme is expected to be published later in 2018. The Climate Change Act also includes provision for adaptation reporting, which is aimed at infrastructure operators and public bodies, asking them to report to Government on how current and long-term climate risks are being addressed.
The Environment Agency, a non-departmental public body, is at the forefront of mitigating and responding to some of the most significant impacts, with a lead role on flood and coastal risk management and on water resources. This experience, coupled with its role as a category one responder under the Civil Contingencies Act (at the core of the response to most emergencies), means it is leading the way on embedding thinking about climate impacts into its decision making and investment planning, in collaboration with other partners at home and overseas. The Environment Agency's future flood and coastal erosion strategy due in 2019 will seek to attract more non-public sector investment to support communities if and when flooding does occur (**see Figure 9 for current arrangements regarding investment**).

This focus now needs to be expanded to support broader resilience in line with recent commitments made in the Government's 25 Year Environment Plan to ensure "all policies, programmes and investment decisions take into account the possible extent of climate change this century". Attention to drought, flood and coastal risk tends to be focused in the immediate aftermath of major events and reduce significantly thereafter. This Green Finance Taskforce is asking Government and industry to lead a paradigm shift so that resilience is central to new infrastructure projects and buildings are consistently "built back better".

Looking ahead, in 2019, Defra will update the national flood and coastal erosion risk management strategy, looking to strengthen joint delivery across organisations. It will look at current partnership arrangements ahead of a review of funding needs beyond 2021, seeking

165 Flood Re (2017) Annual Report and Financial Statements (2017) http://www.floodre.co.uk/wp-content/uploads/FloodRe-Annual-Report-AW-WEBSITE.pdf

FIGURE 9.
Governance arrangements for flood and coastal risk management in England
Source: Environment Agency



to attract more non-public sector investment, and make sure all relevant agencies are able to respond quickly and effectively to support communities if and when flooding does occur.

International competition

The UK can learn from other countries facing similar climate risks. The Netherlands is a world leader in developing flood-resilience strategies. Its Delta Programme[166] lays out the strategy to manage the country's vulnerability to water. This strategy supports adaptation and mitigation by bringing together municipalities, NGOs, businesses and experts, while the national Government is responsible for the system with respect to climate adaptation and resilience.[167] This type of devolved approach can enable the delivery of modern and resilient infrastructure systems by taking advantage of the opportunities for convergence and careful integration of infrastructure systems at the local level of consumer markets, supply chains, physical systems and planning choices.[168]

Challenges to overcome

Although the importance of resilience is clear, there are often market failures or missing markets for resilience measures which can make them harder to fund.

For example, resilience infrastructure such as flood risk management is a public good and suffers from a 'free-rider' problem where people have come to rely on tax-funded flood risk management by Government. This relationship, coupled with low public awareness, has negatively impacted the

166 Dutch Government (2018) Delta Programme https://www.government.nl/topics/delta-programme

167 PBL Netherlands Environmental Assessment Agency (2015) Adaptation to climate change in the Netherlands www.pbl.nl/sites/default/files/cms/publicaties/PBL-2015-Adaptation-to-climage-change-1632.pdf

168 Nick Mabey and Taylor Dimsdale, E3G (2016) Faster, Smarter, Safer, Cleaner: Making Britain's Infrastructure Systems fit for the future https://www.e3g.org/library/making-britains-infrastructure-systems-fit-for-the-future

demand for resilience measures.[169] This is an issue for households but also for businesses.

Recommendations

RECOMMENDATION 29

Government should establish a national resilience unit to coordinate and champion climate resilience and ensure Government investment is 'future proofed' to climate change

There is a need for greater coordination among public agencies – and a real opportunity for greater leadership from the heart of Government to deliver investment that supports resilience and boosting the UK's resilience. Currently responsibility for climate resilience is spread across multiple Government departments and agencies, with accountability resting with different policy owners. These include Defra, BEIS, the Environment Agency, the National Infrastructure Commission, the Adaptation Sub Committee and the Cabinet Office through the sector resilience plans and the national risk register.

Better coordination and collaboration will ensure that decisions are consistent and proportionate to the likely level of climate risk and that interdependencies between risk owners are understood and acted upon. To achieve this a new national resilience unit could be established, and coordinate with Cabinet Office to provide stronger cross-Governmental leadership and building the links more closely with the Civil Contingencies Secretariat. **This in turn would provide clarity to the private sector of responsibilities and market opportunities for innovation around resilience. In delivering this recommendation, Government should decide where such a unit would best sit in Government so that it has maximum leverage across Departments, delivery agencies, and private and public sector investments.'**

The national resilience unit should:

- Coordinate and align existing public bodies to ensure proper ownership and coverage of climate risk;
- commission work to inform what level of possible climate change should be assumed for different planning purposes;
- require departments and their agencies to integrate resilience planning into all their policies, programmes and investment decisions;
- provide guidance to enable businesses to make resilient investment decisions
- work with the finance and investment community to promote greater understanding, integration and disclosure of climate risk and resilience; and
- assess the overall resilience performance of UK infrastructure, ensuring resilience is built in from the design and investment phase.

It should also look beyond flood risk and infrastructure to consider the wider range of issues identified by the 2017 statutory report by the Committee on Climate Change to Parliament including risks to the natural environment, including to soils and biodiversity, and risks to human health and wellbeing from higher temperatures.

The national resilience unit will help deliver on the aspirations of the 25 Year Environment Plan to set standards for new build homes that will reduce demands for water, energy and material resources, while improving flood resilience. Resilient buildings and infrastructure will more readily adapt to a changing climate and reduce the risk of harm to people, the environment and the economy from natural hazards including flooding, drought and coastal erosion. The

169 The need to incentivise adoption of flood resilience measures is not new. A number of schemes have attempted to influence household decisions in this area, such as the Household Flood Resilience Grant Scheme and the Communities and Business Recovery Scheme. However, despite significant recent and historic action in this area, households have not always shown willingness to take up measures to protect their homes.

national resilience unit should also embed consideration of the use of natural processes to boost resilience and achieve multiple benefits.[170]

RECOMMENDATION 30

Government should publish an action plan to develop the resilience market

The market for resilience products and services is under-developed, with few incentives for end users, be they businesses, public bodies or homeowners. As noted in **Theme 8** on building a green and resilient infrastructure pipeline, a dedicated National Infrastructure Assessment working subgroup could focus specifically on the role of standards in incentivising greater up-take of products and services relating to 'green retrofitting' of homes and commercial properties. This would be a key means to improving resilience.

The Government's move to sponsor the Property Flood Resilience Action Plan, the outputs of the Bonfield report on building resilience, is a step forward in encouraging property owners to become more resilient. This brings together the public and private sector to address some of the key issues and encourage innovation through collaboration.

Part of the work of the group and key output for 2018 will be the development of a Code of Practice. This will be a set of standards for the preparation, response and recovery of flooded properties. By adopting this code, and therefore a consistent set of standards we will start to see resilience being considered normal practice across retrofit and new build.

This will be achieved through:

- Promoting research and development – and working with the new Centre for Climate Risk Analytics;
- attracting innovation and start-ups in the field of resilience products and services; and
- developing resilience standards for new homes, and coordinating with the National Infrastructure Assessment working sub-group on standards.

The action plan should include a focus on how generate new research, development and deployment opportunities for businesses, in line with the aims set out in the Clean Growth and Industrial Strategy commitment to aiming for resilience as a general principle of the UK's infrastructure systems and the wider environments within which they operate.

This in turn would reinforce the UK's commitment to moving towards a more circular economy as well as raising productivity by using resources more efficiently, increasing resilience by contributing to a healthier environment, and supporting long-term growth by regenerating our natural capital.

Increased private sector investment into protecting and enhancing natural capital will also be crucial to improving our resilience. Further consideration should be given to how public-private investments in natural assets can enhance the ability of the natural environment to contribute to UK resilience. To this end, the 25 Year Environment Plan commits to exploring the potential for a blended natural environment impact fund.

170 Environment Agency (2017) Natural flood management – part of the nation's flood resilience https://www.gov.uk/government/news/natural-flood-management-part-of-the-nations-flood-resilience

Achieving impact

Climate change is expected to increase the risks from extreme weather such as flooding, heat and drought in the UK.[171] According to the Committee on Climate Change, 10-35% of infrastructure disruptions in the UK are already caused by extreme weather events.[172] Under current climate trends the "500 year" heatwave in 2003, which buckled railway tracks and caused drought restrictions, will likely happen every other year by 2050.[173] Resilience is an imperative not a 'nice to have' benefit. Overall, the package would boost help boost the pipeline of resilience and green infrastructure opportunities promote a market for resilience products and services and deliver clear economic benefit in the form of avoided losses.

171 Met Office, commissioned by Ofwat (2010) Changes in the Frequency of Extreme Rainfall Events for Selected Towns and Cities https://www.ofwat.gov.uk/wp-content/uploads/2015/11/rpt_com_met_rainfall.pdf

172 Committee on Climate Change (2015) Reducing emissions and preparing for climate change: 2015 progress report to Parliament https://www.theccc.org.uk/publication/reducing-emissions-and-preparing-for-climate-change-2015-progress-report-to-parliament/

173 Met Office (2015) The Heatwave of 2003 https://www.metoffice.gov.uk/learning/learn-about-the-weather/weather-phenomena/case-studies/heatwave

3.

More ambitious reforms for the future

The Green Finance Taskforce included senior leaders from the finance sector who worked to design high impact reforms on green finance. Many of the reforms recommended by the Green Finance Taskforce involved clear actions for Government, regulators and industry that could be implemented in a timely and relevant way. These recommendations constitute the earlier part of this report.

In addition, the Green Finance Taskforce identified potential reforms that require further development or for which the exact nature of implementation will in part be determined by ongoing negotiations over the trading relationship between the UK and EU after Brexit. Taskforce members do not believe that the recommendations that follow in this section are less important than those that precede it, but recognise that either additional work or greater clarity on the UK's future relationship with the EU are needed before they can be resolved.

1.
Provide further incentives for sterling issuers of green securities

2.
Go beyond TCFD with Sustainability-related Disclosures

3.
Increase allocations into illiquid asset classes to facilitate long term investments

4.
Addressing barriers to sustainable investment

5.
Consider how the prudential regime for banks and insurers might better reflect the different financial risks associated with 'green' and 'brown' assets

1. Provide further incentives for sterling issuers of green securities

Currently State Aid rules preclude the Government's ability to provide such incentives. However, Brexit potentially opens up new opportunities which could be explored depending on the nature of the final deal between the UK and the EU.

While there has been healthy growth of the green bond market in the last few years, the level of sterling issuance remains very low. No green bonds were issued in sterling in 2016. Besides issuing a sovereign green bond or bonds, the Green Finance Taskforce recommends that the Government takes further steps to encourage UK issuers. Several options are set out here.

Option one - remove tax barriers

Issuers should be incentivised to issue in green format by the removal of any tax or other barriers Other incentives such as fast-track listing should be actively considered, especially for maiden issuances.

There are several types of tax incentives policy makers can put in place to support green bond issuance. The incentives can be provided either to the investor or to the issuer:

- Tax credit bonds: bond investors receive tax credits instead of interest payments, so issuers do not have to pay interest on their green bond issuances. An example of this in the area of clean energy is the US federal Government's Clean Renewable Energy Bonds (CREBs) and Qualified Energy Conservation Bonds (QECBs) programme. The programme allows for the issuance of taxable bonds by municipalities for the purposes of clean energy and energy conservation, where 70% of the coupon from the municipal is provided by a tax credit or subsidy to the bond holder from the federal Government;
- direct subsidy bonds: bond issuers receive cash rebates from the Government to subsidize their net interest payments. This structure is also used by the US federal Government Clean Renewable Energy Bonds (CREBs) and Qualified Energy Conservation Bonds (QECBs) programme; and
- tax-exempt bonds: bond investors do not have to pay income tax on interest from the green bonds they hold (so issuer can get lower interest rate). This type of tax incentive is typically applied to municipal bonds in the US market. In the green bond space specifically, an example to highlight is tax-exempt bond issuance for financing of wind projects in Brazil.

Option two - grants for first time issuers

Grants for the verification process of green bonds, which are already being offered in other fixed income markets such as Singapore should be introduced for smaller issuers. In 2017, the Monetary Authority of Singapore announced a new grant scheme, allowing qualifying issuers to offset 100% of the expenses attributable to getting an external review for green bonds, with a cap of US$100,000 per transaction.

Some of these suggestions will be subject to State Aid rules currently. Depending on the nature of the UK's future trading relationship with the EU, these barriers could be removed enabling their implementation.

2. Go beyond TCFD with Sustainability-related Disclosures

As a long-term target, and based on suitable internal capacity being made available, the UK could consider establishing **a new and voluntary UK Sustainability-related Disclosures framework**, introducing additional elements that were beyond the scope of TCFD process. This could build on the work of the Green Finance Initiative's Working Group on Data, Disclosure, and Risk. The Sustainability-related Disclosures framework could include: a new framework for measuring and reporting on impacts related to climate change, the environment and the Sustainable Development Goals (SDGs); clarifying reporting processes and standards for disclosing green revenues, asset-level data and committed emissions; and setting out requirements for knowledge and training, among other things.

With the requisite support from financial regulators, this can be achieved without additional legislation. The GFI, together with relevant regulators and Government departments, can begin an inclusive process involving key private sector stakeholders, to generate guidelines on sustainable disclosure. This could significantly reduce the burden on financial regulators and the UK Government associated with preparing new guidance in a short period of time. Similar to guidelines on TCFD, these should also be reviewed after two years. Once the TCFD framework is well established, Sustainability-related Disclosures recommendations should also be properly integrated into the UK corporate governance and reporting framework.

Sustainability-related Disclosures should include **disclosure of green revenues**. There are information asymmetries in the market on green corporate activities and investment opportunities. Increasing allocations of corporate capital to green assets will be encouraged by clearer information in the market on green revenues.

Green revenue streams could be easily identified if the UK and the EU develop green taxonomies. Building on this, companies should be encouraged to consider which commercial services or products they offer provide environmental solutions, in their disclosures. They should set out the rationale and evidence of why specific products have an environmental utility. This kind of disclosure could clarify for investors whether there is a financial advantage of investing in 'green' rather than 'business-as-usual' streams.

174 An example of this may be directly held real estate or infrastructure assets which require lock-in periods. These are projects with long time horizons, varying market value and any investments that cannot be bought or sold as quickly or easily between investors, or priced as accurately at any given time, as liquid assets.

175 For example, the Law Commission study on social impact investing, Treasury patient capital review, social impact investing taskforce.

176 The Pensions Regulator Guidance: "Most members will not have a need for immediate liquidity of their investments, and it may not always be beneficial for dealing to be carried out daily. You should think about the level of liquidity that your members need, e.g. in relation to likely transfers from the fund, and in that context, consider the liquidity constraints on certain fund structures. You should seek to balance the liquidity of assets against the investment objectives. Holding too high a proportion of liquid assets may impact the level of investment return, and limit opportunity for diversifying your portfolio of assets." http://www.thepensionsregulator.gov.uk/trustees/investment-management-in-your-dc-scheme.aspx

3.
Increase allocations into illiquid asset classes to facilitate long term investments

The perceived norm for defined contribution funds is to invest in assets which can be liquidated daily. This presents a barrier to investment in illiquid asset classes that may otherwise contribute to the objectives of UK green finance and the Clean Growth Strategy. Daily pricing is used to allow investors to transfer in and out of funds at any time, using up-to-date valuations for those assets. Because illiquid assets cannot always be accurately valued at any given time, defined contribution schemes in the UK (and their members) are generally not able to invest in illiquid assets.[171]

This issue has been noted by various industry and Government reviews[172] and in November 2017, the Government established an investor working group to investigate barriers, including liquidity constraints, which prevent defined contribution schemes investing in patient capital.

To address this barrier TPR and the FCA should clarify and better promote existing guidance for defined contribution pension assets which states that daily dealing is not required under regulation, and which encourages better balancing of liquidity and member investment objectives.[173] This would help to remove perceived barriers to making allocations to illiquid investments in the default option that limits pension fund investment practice.

Further, the FCA should issue guidance on the necessary minimum standards of practice in relation to pricing fund assets to fairly value investment pots on entry to and exit from a fund. The guidance should clarify areas of reasonable flexibility that pension funds can apply to enable them to invest in illiquid assets, but still have fair asset prices reflected in fund valuation. This may include guidance on how and when funds should be priced i.e. offering an exact versus estimated fund price and identifying critical times when an exact fund price is needed (on entry and exit).

4. Addressing barriers to sustainable investment

Industry, Government, and the UK prudential regulators, the PRA and where appropriate the FCA, should work to identify any unnecessary regulatory and practical barriers that prevent or delay sustainable investments with a view to removing them to effectively manage the transition to a more sustainable financial system with reduced long-term risk.

Where this is consistent with the Regulators' statutory objectives and within their power under regulatory regimes including Solvency II, the Regulators' approach should combine:

- Applying discretion to review capital treatment of sustainable infrastructure investment and, where necessary, to facilitate faster investment decisions; and
- Where existing supervisory practice or regulation prevents, delays or makes such investments inaccessible to UK institutions, working with those institutions and Government to amend the supervisory practice or regulation.

5. Consider how the prudential regime for banks and insurers might better reflect the different financial risks associated with 'green' and 'brown' assets

In line with the recommendations of the EU's High Level Expert Group on Sustainable Finance, the Green Finance Initiative should be tasked by Government to convene a cross-sector working group made up of representatives of financial institutions, regulators and civil society and academic experts to investigate the extent to which there is evidence that supports a financial risk differential between 'green' and 'brown' assets. In the light of that evidence, the PRA should consider how this might be reflected in the prudential framework. Given the need for such assets to be correctly and consistently identified, this work should also include staying close to international initiatives relating to the development of a green taxonomy and considering how this could be best applied in a UK context.

4.
Next steps

In September 2017, the Green Finance Taskforce was given six months to come up with a set of proposals to inform and advance policy development on green finance in the UK.

The Taskforce was asked to address the following aims: to help deliver the investment needed to meet the UK's Industrial Strategy and Clean Growth Strategy; to further consolidate the UK's leadership in financing international clean investment; and to maximise the opportunities for UK businesses in this rapidly growing area. The Green Finance Taskforce also expanded its focus to examine opportunities to support investment towards the Government's 25-Year Environment Plan, following its publication in January 2018.

Up to 10 ambitious and practical policy recommendations were requested. As this report sets out, rapidly expanding green finance in the UK will require multiple market, economic and institutional reforms. The recommendations have been captured under 10 themes, with further stretch recommendations to be considered. The Green Finance Taskforce has also suggested a set of research tasks to strengthen the analytical underpinning to the recommendations made, set out in Annex 2.

Most of the recommendations put forward provide actions that can be delivered in a relatively short timescale of one to two years. They have been agreed as part of an ongoing iterative process between Green Finance Taskforce Members. Emerging findings were presented in meetings with Ministers to incorporate early feedback prior to drafting the final report.

As such this report represents the first stage of an ongoing cooperation between the private sector, the UK Government and academia that could usefully be extended to include other civil society experts. The Green Finance Taskforce looks forward to further discussion on the implementation of these recommendations.

Annex

Annex 1.

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Disclaimer

1: The role of observers has been to provide technical assistance and support for the members and does not necessarily constitute an endorsement for the recommendations.

2: The Taskforce report includes recommendations from actors working in different parts of the financial system and whilst every attempt has been made to develop workable recommendations using different perspectives, further work to resolve the practical implementation of the recommendations will be needed in the next phase.

Green Finance Taskforce terms of reference

Objectives
The intention was to inform and advance policy development on green finance, contributing to setting direction of travel for long-term policy development.

As a result, the Government established the Green Finance Taskforce in September 2017 to: help deliver the investment needed to meet the UK's Industrial Strategy and Clean Growth Strategy; further consolidate the UK's leadership in financing international clean investment; and maximise the opportunities to be had for UK businesses in this rapidly growing area.

The Taskforce was asked to present Government with a report that includes up to 10 ambitious and practical policy recommendations within six months on how Government can best support the finance sector in achieving the above objectives.

The key underlying questions for the Taskforce were asked to consider were as follows:

1. What is the investment that will be required in each sector?
2. What are the barriers preventing this investment?
3. What is the role of private financial markets in accelerating this investment?
4. How can Government support the acceleration of this investment?
5. How can Government enable better risk management?
6. How can Government support the development of particular products, for example green mortgages for owner occupiers and the buy-to-let market?
7. What is needed to strengthen the UK's international leadership position and ensure it captures greatest share of global opportunity to finance Clean Growth?

Handling

Any recommendation from this Green Finance Taskforce are to be considered and implemented at the Government's discretion.

Process

The Green Finance Taskforce was set up through sub workstreams encompassing the full suite of financing options as set out in the table below. The Taskforce were initially asked to refine and agree draft recommendations, and then gathered input from a wide range of industry peers in support of these objectives.

The Green Finance Taskforce met with Ministers prior to final drafting to present early findings and incorporate early feedback where relevant.

TASKFORCE WORKSTREAMS	Venture Capital	Retail Finance	Project & Commercial Finance	Capital Markets	Institutional Investment	Insurance
CROSS-CUTTING ISSUES	- **Taskforce on Climate-related Financial Disclosures' implementation**: enabling financial flows through data and disclosure - **Place agenda**: connecting small-scale, local projects to sources of finance - **International agenda**: cementing the UK's global leadership in green finance - **Resilience**: ensuring UK is resilient to the effects of a changing climate* * this theme was introduced part way through the process to connect the discussions relating to resilience that were occurring across multiple sub workstreams.					

The Green Finance Taskforce was working to very short timelines. However, consultations were held across workstream as they developed, with different approaches used by different workstreams ranging from questionnaires to roundtables and bilateral meetings. In all more than 300 stakeholders were consulted during this time period ranging from asset managers, consultants and investment banks, to civil society organisations, trade associations and local councils.

Annex 2

Research proposals

During the development of this report, several areas of high value research were identified by members. These are set out below. In all cases, the driver was a sense that benefit would be derived, in terms of build the case as well as establishing the cost and benefit of policy action.

The additional research areas include: a focus on providing certainty around funding, options and costs of fiscal incentives to both supply and demand of green infrastructure; how data can be more informative and be used to drive the change; and using limited public resources to crowd in private finance. Each of these areas are associated with a chapter within the report.

CHAPTER	SECTION	RESEARCH PROJECT	FOCUS
CHAPTER 2	**Theme 1: Relaunch UK green finance activities under a new unified brand**	Green Fintech Hub	**i.** The GFI Working Group on Data, Disclosure and Risk being charged with formulating the following for the Green Finance Hub: 1) a business plan, 2) a detailed business case for HMG to provide co-funding, and 3) finding some co-funding from financial institutions and others. The questions that would be bottomed out in process would include: What exactly does it do and how? Where does the funding come from? What does its governance look like, and where is it best positioned institutionally to deliver (is it City of London Corporation, a new non-profit, or based elsewhere in the longer term)?
CHAPTER 2	**Theme 4: Drive demand and supply for green lending products**	Literature review of digital passport and utilising new and existing data	**i.** A literature review should be commissioned concerning: the establishment of a Digital Passport for buildings; data collection related to energy efficiency and consumption; and potential for a digital passport to assist in decarbonising the UK's commercial and residential building stock. This would provide guidance on how to utilise the data that is already available. There are practical elements to this recommendations that need to be explored, including: mapping out existing data resources/stakeholder, understanding legal constraints of sharing collected data and technology needs for data collection (e.g. sensors, satellites), the latter should be constructed to be flexible and expandable. **ii.** What would the cost of a time or volume-limited help to buy, 100% grant or partial guarantee scheme be to support the pump priming of the green mortgage market to help homes and businesses to meet the C-rating EPC set out by the Clean Growth Strategy by 2035? **iii.** How would a bonus-malus stamp duty rating (higher energy efficiency performance attracts lower stamp duty) affect demand for retrofit improvements? What would the cost be to HM Treasury and could it be designed to be fiscally neutral? How could a trial be designed to assess efficacy and cost of such a scheme?

CHAPTER	SECTION	RESEARCH PROJECT	FOCUS
CHAPTER 2	**Theme 7: Issue a sovereign green bond**	Incentives needed to scale up the green capital market	**iv.** What are the best forms of incentives that Government should introduce to the capital market? What are the ideal amounts to be offered from government and issuer perspective? How would the incentives effect behaviours of issuer and investor behaviour? What be the risks of offering incentives?
CHAPTER 2	**Theme 8: Build a green and resilient infrastructure pipeline** **AND** **Theme 9: Foster inclusive prosperity by supporting local actors**	Public banking capacity	The UK is considering its access to the EIB which is a major investor in UK infrastructure in particular and the largest public infrastructure lender globally. Therefore, an impact assessment of the possible removal of EIB funding is necessary.
CHAPTER 2	**Theme 9: Foster inclusive prosperity by supporting local actors**	Reform of the Public Works Loans Board	**i.** The PWLB – a statutory body operating within the UK DMO – has been a source of borrowing for local authorities which is often used to finance local infrastructure projects. Through the PWLB, local authorities have access to very low-cost debt (60 basis points above gilts, which are at historically low levels). Most local infrastructure priorities are financed this way. However, the scale of the UK's green infrastructure requirements means private finance will have to be the main source of investment and opening local authorities to private finance should be addressed as a priority. Therefore, the government should research how to reform PWLB so it becomes a resource of high value public risk capital and not cheap public debt. Identifying the agencies and departments that need to be involved would be a good start. **ii.** The Government should assess what improvements could be made to the UK planning process, in order to make it easier to build community energy projects. **iii.** Research dynamics of equity crowdfunding market in the UK: deal stage, types of company, quanta of investment; consult the crowdfunding platforms on how they might respond to the proposed change; evaluate the impact of the proposed SEIS boundary change in terms of lost tax revenue; develop robust definition of "green" start-up to avoid misuse of the incentive.
CHAPTER 3	**Theme 1: Raising ambition further: additional recommendations**	The options/ cost of different fiscal incentives to promote green lending by banks	**i.** Effect of reducing Stamp Duty Reserve Tax and Capital Gains Tax on all green securities for five years on green product development. Assess cost of 5bps and 10bps for institutional investors and 50 and 100bps for retail investors (say 50bps). Consider the option of a declining level of support for 5-10 years. **ii.** What is the scope for adjusting the bank levy to promote the growth of green financial product development by banks? **iii.** How could green tagging and a green supporting factor be used to incentivise green financial product development by banks? What definitions and standards would be needed to identify assets for which a Green Supporting Factor could be considered. Is there a case for lower capital requirements for those assets? What would be the risks to making these changes (e.g. concentration risk)?

ACCELERATING GREEN FINANCE IN THE UK

A report to Government by the Green Finance Taskforce