Financing low-carbon growth and innovation in the UK Industrial Strategy

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About the author and acknowledgements

Sini Matikainen is a policy analyst at the Grantham Research Institute.
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Executive summary

The creation of the Department for Business, Energy and Industrial Strategy (BEIS) has brought climate change, energy and industrial strategy under one roof. In so doing, this has created the institutional opportunity to integrate the UK government's Clean Growth Plan and Industrial Strategy, which is necessary both to meet the UK's emission reduction targets and to create positive feedback loops that would increase policy effectiveness. Finance is a key consideration for both the Clean Growth Plan and the Industrial Strategy.

Drawing from a roundtable discussion sponsored by the Economic and Social Research Council attended by representatives from the government, private financial sector, and research community on mobilising green finance for the UK Industrial Strategy, held in London in March 2017, this policy brief suggests a number of measures that now need to be taken by government to harness the country's strengths in sustainable finance to deliver clean and resilient growth.

The low-carbon transition cuts across the Industrial Strategy but requires more funding and alignment with other government strategies

The success of the Industrial Strategy will hinge on its ability to attract sufficient capital at reasonable cost. In the energy sector alone, achieving the National Grid 'Gone Green' scenario for 2030 would require a 60–70% increase above 2012 levels of investment, or about £12 billion per annum in total (Blyth et al. 2015).

> **Implication:** Funding the Industrial Strategy will require mobilising large amounts of private sector funding for infrastructure and emerging technologies; in order for this infrastructure to be low-carbon, climate-resilient and future-proofed, it will need to be aligned with the government's carbon plans and 25-year environment strategy.

The UK's Industrial Strategy represents an opportunity to deliver low-carbon growth and innovation by aligning strategic objectives and government policy. The importance of accelerating the low-carbon transition cuts across many of the Industrial Strategy's 10 pillars, most obviously 'Affordable energy and clean growth' but also in the growth of emerging technologies, supporting innovation, long-term future-proofed infrastructure, entrepreneurship and regionally-balanced development.

> **Implication:** Aligning policy would allow for synergies: for example combining research and development (R&D) in smart grid technologies along with support for renewables would help achieve gains in energy security, lower costs, lower emissions, and encourage innovation.

Clear and forward-looking policy will be needed to encourage long-term investment. Though the UK has a strong long-term climate policy framework, expressed through the carbon budgets,

unanticipated policy reversals have created uncertainty for investors: there is a dearth of planned renewable energy projects in the National Infrastructure and Construction Pipeline, equivalent to a 95% drop in investment in 2020/2021 compared with 2017/2018 (Benton 2016).

> **Implication:** In order for investors to make long-term investment decisions, they need clarity and stability on the future direction of key policies for the low-carbon transition, in particular in energy production, transport and energy efficiency.

Government and public sector support may be necessary to help crowd in private sector investment. This is the case even though private finance will make up a significant part of investment. Although there is interest and capital available, investors remain uncertain about the risk-return profiles of available projects, particularly in emerging technologies. The lack of clarity regarding the future role of the Green Investment Bank (GIB) and the UK's relationship with the European Investment Bank (EIB) adds additional uncertainty.

> **Implication:** For large infrastructure projects and emerging technologies, public sector support in de-risking projects and providing funding can play a role in providing primary financing and crowding in private sector investment.

Mobilising capital markets and institutional investors will also be key to scaling up finance for the low-carbon transition. For more developed technologies and smaller-scale projects, debt and equity markets can provide a channel for additional private sector funding. As a global financial hub, London could use its financing expertise to underpin the goals of the Industrial Strategy, though investors may currently lack the information to incorporate climate risk into decision-making, or lack financial instruments to invest in.

> **Implication:** To mobilise capital markets, investors could benefit from additional information about investment risks and opportunities in high- and low-carbon assets, and greater availability of sustainable financial products like green bonds.

Recommendations for the UK government

1. **To encourage long-term investment, the Industrial Strategy needs to be supported by a trusted framework of climate policy fundamentals,** in particular energy efficiency, transport beyond 2020, carbon capture and storage, and mature low-carbon energy generation.
2. **To maintain investment from the private sector in low-carbon infrastructure and strategic sectors, the government must develop a contingency plan to safeguard the role the EIB and GIB have played** in providing direct financing and credit enhancement, and scale up investment to the level necessary for the low-carbon transition.
3. **To connect the UK capital markets with the Industrial Strategy, the government should encourage wider disclosure of climate-related risks and support additional issuance of bonds** for renewable energy and other low-carbon projects.
4. **The government should consider developing an overall strategy for green finance, to be overseen by BEIS or Her Majesty's Treasury.**

1. Introduction: the need for – and barriers to – investment

Climate-resilient growth and innovation in the transition to a low-carbon economy already cut across each of the pillars of the UK government's Industrial Strategy, and creating a clear and consistent focus on it could offer strategic advantages (see Table 1). Furthermore, in order to fulfil its obligations under the Climate Change Act, the government is required to detail its plan to meet the fifth carbon budget. The Clean Growth Plan is expected in summer 2017, and the government is also expected to release a 25-year environment plan in 2017.

The creation of BEIS enables the integration of the Clean Growth Plan and the Industrial Strategy

The Clean Growth Plan and the Industrial Strategy need to be integrated, both to meet the UK government's emission reduction targets and to create positive feedback loops that would increase policy effectiveness. For example, investing in smart grids and batteries helps the UK develop a comparative advantage in emerging technology, but combining R&D expenditure with energy saving and renewable energy policies could also help stimulate domestic demand, keep costs low for consumers and create a stable and secure domestic energy supply, while also helping to deploy renewables and meet emission reduction targets. The creation of the Department for Business, Energy and Industrial Strategy has provided the institutional opportunity to do this, by bringing climate change, energy and industrial strategy under one roof. A policy brief published in parallel to this one, *UK export opportunities in the low-carbon economy*, recommends that this kind of integrated approach allows UK firms to develop expertise for the low-carbon economy, and exploit 'home market effects' that enable them to become competitive in the global marketplace (Carvalho and Fankhauser 2017).

Low-carbon investment needs to be scaled up and market failures corrected

The transition to a low-carbon economy will require significant funding: for a transition path consistent with limiting global warming to 2°C, the latest International Energy Agency (IEA) estimates put the energy sector investment costs alone at US$3.5 trillion per year globally until 2050, or about double the current level of investment (OECD/IEA and IRENA 2017). In the UK, Blyth et al. (2015) estimate that to meet the National Grid's 'Gone Green' strategy would

require a 60–70% increase in energy investment compared with 2012 levels. Scaling up sustainable finance is not only a necessity but also an opportunity for stimulating growth and safeguarding financial stability, as noted by Bank of England governor Mark Carney in a 2016 speech (Carney 2016).

While there is capital available and investor interest in low-carbon investment, there are market failures that need to be corrected. Some are related to the underlying investments, where the negative externalities associated with high-carbon activities (air pollution, climate change) and the positive externalities of low-carbon technology (for example, how wider deployment of renewables allows for economies of scale and faster learning effects) are not priced in (Unruh 2000). As a result, new technologies face disadvantages in displacing high-carbon incumbents.

As explained in **Section 2**, a well-designed policy framework can help address these externalities by increasing the cost for high-carbon technologies (for example, with a carbon price) or by supporting new technologies (for example, with stable and predictable price support for renewables). Other market failures are related to the financial sector itself, where investors may be discouraged by higher risk (real or perceived) associated with low-carbon investment, a lack of adequate analytical capability, insufficient information, or a maturity mismatch between their investment horizon and the time horizon for the project (G20 Green Finance Study Group 2016).

Government intervention and coordination in infrastructure and other key sectors can help by de-risking projects through taking a cornerstone investment stake or credit enhancement, or by providing expertise: **Section 3** explores how the European Investment Bank (EIB) and Green Investment Bank (GIB) have both played this de-risking role in the past. To mobilise capital markets, the government can help address a lack of information through the promotion of green bonds standards and disclosure requirements, as detailed in **Section 4**.

Table 1. Connecting the UK's Industrial Strategy to low-carbon growth and sustainable finance

Source: Author

Industrial Strategy pillars	Low-carbon growth and innovation	Connection to sustainable finance
1. Investing in science, research and innovation	Direct R&D funding and support for renewable energy, battery storage, smart grids	Building a pipeline of innovative companies and assets to finance
2. Developing skills	Promoting low-carbon goods and services	Retaining and cultivating expertise in sustainable finance and financial services
3. Upgrading infrastructure	Flood defences and climate-resilient infrastructure in renewable energy, transport, and energy efficiency	Mobilising direct investment and secondary markets for low-carbon, future-proofed infrastructure through policy stability, credit enhancement, issuance of infrastructure bonds, and/or promoting green bond standards
4. Supporting businesses to start and grow	Scaling up innovation in low-carbon small and medium-sized enterprises (SMEs)	Channelling finance to support SMEs including through financial technology (fintech), the Green Investment Bank, British Business Bank, or tax incentives for R&D funding
5. Improving procurement	Reviewing and increasing reporting of environmental considerations in procurement guidelines	Incorporating sustainability factors in the procurement of financial services, if required
6. Encouraging trade and inward investment	Identifying areas of comparative advantage in low-carbon goods and services	Attracting finance from foreign direct and institutional investment in low-carbon goods and services
7. Delivering affordable energy and clean growth	Renewable energy and low-carbon innovation	Providing policy stability, forward guidance on pricing, and direct funding or credit enhancement for renewable energy
8. Cultivating world-leading sectors	Identifying areas of comparative advantage in low-carbon goods and services, including manufacturing and other sectors that target regional development	Using the UK's role as a financial hub to maintain and extend expertise in sustainable finance
9. Driving growth across the whole country	Identifying sectoral and regional effects resulting from the low-carbon transition	Developing finance mechanisms focused on local needs (e.g. municipal bonds, crowd-funding) for climate-resilient regional development
10. Creating the right institutions to bring together sectors and places	Research institutions, aligning government policy	Strong institutions and policies to encourage long-term investment in sustainable growth and innovation

2. Climate policy fundamentals to encourage long-term investment

In order to feel confident about making long-term investments, investors seek forward-looking policy that is coherent, consistent and credible (Corfee-Morlot et al. 2012; Hamilton 2009; OECD/IEA/NEA/ITF 2015). Policy reversal, as has happened in the past, undermines investor confidence and dampens investment (see for example Barradale 2010; Fabrizio 2013; Meyer and Koefoed 2003).

The UK government's five-year carbon budgets provide forward-looking clarity but key policy gaps remain

The Committee on Climate Change (2016) has highlighted the following areas in particular as requiring increased government effort:

- Energy efficiency in buildings
- Post-2020 transport policy: promoting low-emission vehicles and the creation of infrastructure for electric vehicle charging
- Carbon capture and storage
- Mature low-carbon energy generation (e.g. onshore wind)

Reversals of policy on carbon capture and storage and zero-carbon homes in particular have led investors and project developers to question the government's commitment to low-carbon policies (Clark 2012; House of Commons Energy and Climate Change Committee 2016; Oldfield 2015). While the UK has previously featured in the top 10, Ernst and Young has recently put the country at fourteenth place out of 40 in terms of attractiveness to renewable energy investors – an all-time low (EY 2016). Analysis of the National Infrastructure and Construction Pipeline shows a dearth of planned renewable projects in the next few years, equivalent to a 95% drop in investment in 2020–21 compared with 2017–18 (Benton 2016).

The Levy Control Framework lacks transparency and its future is unclear

The key instrument of long-term guidance, besides the carbon budgets, is the Levy Control Framework (LCF), which sets an annual cap on the total charge passed on to consumers related to three key renewable energy policies: the Renewables Obligation, Feed-in Tariffs, and Contracts for Differences.

While the LCF had the benefit of indicating forward-looking policy, it has also been criticised for the lack of transparency around key underlying assumptions, such as future wholesale electricity prices (Lockwood 2016). The ambiguity is heightened by the fact that the future of the LCF is still unclear, with the Treasury's spring budget of 2017 indicating that a replacement policy is being sought.

When designing the replacement scheme, the government should take into account the criticisms raised about the current framework. There is a need for:

- Forward-looking clarity on spending forecasts
- A plan for how to address projected overspend
- Comprehensive coverage of consumer-funded policies (including the Capacity Market and the Energy Companies Obligation)
- The difference between gross and net costs for consumers to be considered (Committee on Climate Change 2015; Energy and Climate Change Committee 2016)

These points are particularly important for investors in UK renewable energy, who will be watching market conditions and public policy closely for an indication of future market support and the direction of wholesale electricity prices (Blyth et al. 2015).

3. Mobilising investment for strategic sectors and infrastructure priorities

Investment in renewable energy, sustainable infrastructure and emerging technologies has been constrained not only by policy uncertainty but also by the risk-return profile of the projects. For technologies at an early stage of development, government support can help provide funding where the returns from the project are too uncertain to entice adequate levels of private sector investment. This is acknowledged in the Industrial Strategy, particularly in relation to research, development and innovation in smart grids and battery technology, which will be vital for scaling up the use of renewable energy. In addition to directly providing funding and setting up research institutions, the government could also encourage additional private sector investment in R&D, for example through tax incentives.

In the case of sustainable infrastructure, the returns can be too low for private actors, but the risk can be too high for institutional investors such as pension funds because of a high upfront cost and the perception of higher risk associated with newer technologies and platforms (The New Climate Economy 2016). Bank lending – which makes up a considerable portion of infrastructure investment, along with infrastructure funds and institutional investors (via either a direct equity stake or a fund) – has also been dampened after the 2008 financial crisis due to higher risk aversion related to general economic uncertainty, the need to repair balance sheets, and new regulatory requirements (Blyth et al. 2015). Crowding in private sector investment will be key because it makes up a significant part of UK infrastructure funding (see Figure 1 below).

Public sector intervention can help address financing gaps

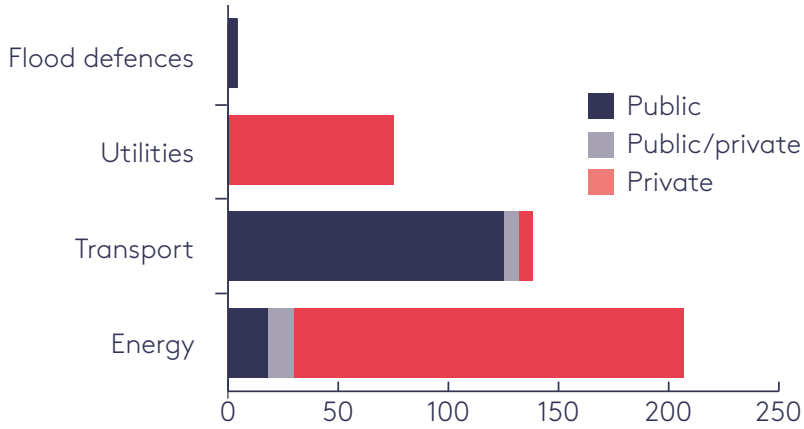
The public sector can intervene by offering direct co-funding – which can help fund the riskier parts of projects, like R&D and construction – and by reducing the risk for private investors through tools like credit enhancement and expert support. The government should consider how the roles that EU funding, the European Investment Bank (EIB) and Green Investment Bank (GIB) have been playing may change in the future, and how to safeguard, supplement, or – depending on the outcomes of privatisation and the Brexit negotiations – possibly replace their financial support in key projects.

The EIB plays a role in de-risking infrastructure projects to crowd in private funding

Guarantees can help reduce the cost of capital and encourage private sector investment by de-risking projects, through either making a direct investment, credit enhancement, or providing expertise during the funding process, particularly for new technologies and large deals where there is a perception of higher risk and less liquidity.

Figure 1. Pipeline of UK infrastructure investment from 2016–17 (£bn)

Source: Infrastructure and Projects Authority (2016)



The EIB has supported has supported renewable energy in the UK, both through direct funding and credit guarantees, but, depending on how the UK's exit negotiations with the EU proceed, this may not continue (Giles 2016). While the EIB is seen as less important for financing mature technologies, it plays a role in reducing risk and might become more important in times of uncertainty when financing becomes more constrained (Hamilton 2017). The EU's European Fund for Strategic Investment (EFSI) has also mobilised a significant amount of funding for smart meters and offshore wind (European Commission 2016).

A future lack of EIB support may also affect other priority areas in funding small and medium-sized enterprises (SMEs) and regional growth, which the EIB has made a point of investing in (EIB 2016a) and which are both pillars of the UK Industrial Strategy. For example, funding for Welsh infrastructure could be affected if the UK stops working with the EIB, both because of a lack of funds and because the funds may be directed to other geographical areas in the UK (Mor and Ward 2017).

Several options exist to replace the EIB's support

In the event that EIB and EU funding does not continue, the GIB, the British Business Bank, UK Guarantees Scheme and National Infrastructure Fund could potentially make up some of the difference.

The Green Investment Bank

The GIB, a UK-government backed fund that provides investment in energy efficiency, waste and bioenergy, offshore wind, and onshore renewables, is in the process of being privatised. The GIB could help take on some of the EIB's role in supporting private investment – a role it has already played in the past (OECD 2016a) – though it would require significantly scaling up its operations and safeguarding its mission after privatisation.

So far, the GIB has directly invested £2.8 billion, which has mobilised a further £8 billion in private capital, and its Offshore Wind Fund has made it the largest renewable energy fund in the UK (Infrastructure and Projects Authority 2016). The GIB has also put some focus on SMEs, for example via loans to support energy efficiency (Green Investment Bank 2014). Still, its contribution to renewable projects has been much smaller than the EIB's: in the fiscal year ending in 2016, the GIB committed £700 million in financing (Green Investment Bank 2016a), whereas the EIB committed £1.2 billion in renewable energy investment in the UK in 2016 (Willis 2017).

These figures imply that the GIB would need to more than double its annual outlay to maintain the same level of investment if the UK loses EIB funding – even more if other types of infrastructure, such as water, are taken into account. Keeping in mind that the current level of investment is insufficient to meet long-term decarbonisation targets (Blyth

et al. 2015), this means that the GIB would need to significantly scale up if it is both to replace EIB funding and to help address the investment gap.

The EIB and GIB are important not just for funding, but also for expertise. Some investors, for example smaller pension funds, may lack the necessary in-house expertise to feel confident making investments in renewable energy (Della Croce et al. 2011), and the involvement of the GIB has allowed other investors to feel more confident in investing because of the vetting process the project has gone through (Green Investment Bank 2016b).

Following its privatisation, the GIB will need to maintain a strong balance sheet and safeguard its mission to support the transition to a low-carbon economy in order to avoid losing credibility. One potential advantage to privatisation would be if the GIB were to obtain a banking licence, allowing it to leverage its capital to increase lending. One option could be for the government to retain a key stake in the GIB while pursuing an initial public offering (IPO), thus safeguarding the mission while still taking it off the public balance sheet (House of Commons Debate 2017).

UK Guarantees Scheme and National Productivity Investment Fund

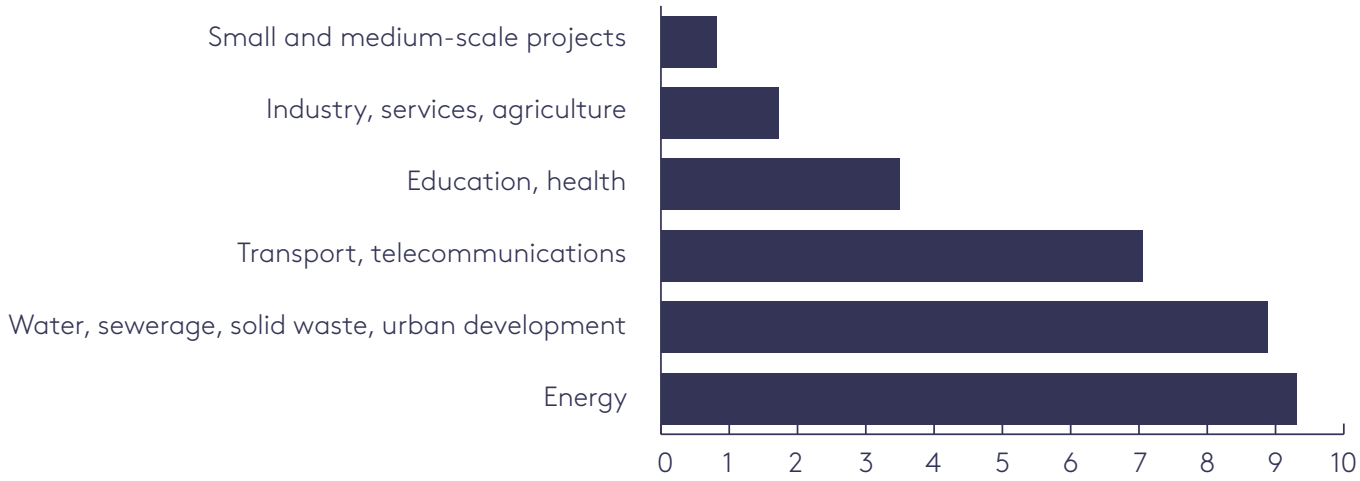
Other options to replace the EIB's role could be further use of the UK Guarantees Scheme (UKGS) and the new National Productivity Investment Fund (NPIF).

The UKGS aims to boost project finance by offering government guarantees on nationally significant infrastructure projects (Blyth et al. 2015). In addition to issuing guarantees for nine projects worth £4 billion in total, the Infrastructure and Projects Authority reported that another 24 projects worth £32 billion closed thanks to the advice and support of the scheme, as the involvement of the UKGS reassured investors enough to crowd in funding without needing to actually provide a guarantee (Infrastructure and Projects Authority 2016). The BBA (the UK banking sector's trade association) has suggested that more tailored tools to cover parts of project risk (e.g. construction or refinancing) would be helpful for proven renewables such as onshore wind, while a guarantee for the entire project would be more appropriate for riskier technologies or larger projects (BBA 2015).

The £23 billion earmarked for the NPIF could also help contribute to filling the green investment gap, with some of it already allocated to transport and R&D.

Figure 2. Total EIB lending to the UK from 2012 to 2016 (£bn)

Source: EIB (2016b)



4. Harnessing financial markets

The support of public sector agencies via direct project financing and credit enhancement is important for large infrastructure projects and new technologies, while financial markets can help scale up corporate financing and bank lending for more proven technologies like onshore wind and solar, and smaller-scale projects such as loans to increase energy efficiency.

There are barriers to incorporating climate considerations into capital markets, due to a lack of information (either about the risks associated with high-carbon assets or appropriate labelling of low-carbon assets), cognitive biases (for example, herd behaviour and optimism bias that could downplay investment risks), and a tendency towards short-term thinking (Carney 2015; Silver 2017; Thomä and Chenet 2017; Weber 2017).

Standardisation and labelling can help increase information and transparency to encourage additional issuance and demand for climate-resilient products, and a greater degree of financial disclosure could help encourage longer-term thinking about climate risks and opportunities. For smaller community-based schemes, there is also a potential role for crowd-funding, which has already provided the financing for more than 120 UK energy projects (Green Finance Initiative 2016; Castilla-Rubio et al. 2016). London's position as a global financial hub offers an opportunity to use this expertise both to finance the Industrial Strategy and to develop and retain a competitive advantage in an emerging field.

Bond markets could be better utilised for low-carbon investment but obstacles exist

Green bonds currently make up a small fraction of the overall bond universe: Climate Bonds Initiative estimates that, as of 2016, only about US$700 billion of the overall $90 trillion global bond market is 'climate aligned' (Climate Bonds Initiative 2016), although the OECD (2016b) predicts that such bonds could make a significant contribution to financing for low-carbon investment, particularly in the 2020s.

The UK is a locus for issuance of green bonds – for example, both India's and China's first green bonds were issued on the London Stock Exchange (Green Finance Initiative 2016) – but it risks falling behind in domestic bond issuance. Between 2015 and 2016, the UK stayed at the same level while the United States and China increased their market share in climate-aligned bond issuance, and there were no new labelled green bonds issued for domestic projects in the UK in 2016 (Climate Bonds Initiative 2015, 2016, 2017). To scale up the domestic green bond market, potential avenues include providing guidelines on and definitions of green bonds and loans, considering credit enhancement of some bonds, or issuing public sector green bonds.

Box 1. What are green bonds?

While there is no universally accepted definition of 'green' bonds, they are generally understood to be bonds where the proceeds are used to fund environmental or climate-related projects.

The International Capital Markets Association's Green Bond Principles (2016) includes projects where the proceeds are used to fund:

- Renewable energy
- Energy efficiency
- Pollution prevention and control
- Sustainable resource management
- Biodiversity conservation
- Clean transport
- Sustainable water management
- Climate change adaptation
- Eco-efficient products

Defining, formalising and scaling up green bonds: opportunities and obstacles

The green bond market currently relies on voluntary labelling initiatives, and formalising them could help reassure investors by providing a 'term sheet' of internationally recognised standardised terms and conditions (Carney 2016). The Chinese and Indian governments have already taken the step of issuing green bond guidelines to promote growth and transparency in their own markets (The New Climate Economy 2016). Investors have, however, raised concerns about China's green bond standards (Tu 2016) – which, for example, allow for 'clean coal' – which highlights the importance of creating guidelines that meet international standards in order to attract foreign investment.

The public sector could also provide definitional frameworks for identifying green loans in bank portfolios, which could give additional information and transparency about the credit risk and potentially pave the way for future securitisation (Kidney et al. 2017; Robins and Sweatman 2016). By bundling together smaller projects – for example household installation of solar panels – securitisation could give banks access to additional financing via bond markets and take the loans off the balance sheet, freeing up capital for additional lending (Green Finance Initiative 2016; OECD 2016b). However, this would have to be undertaken carefully and with due consideration of the risks that have previously materialised with securitisation, making sure that the underlying loans and their credit risks are transparent.

Another potential obstacle for scaling up bonds in renewable energy and emerging technologies is their credit rating, which may impact the willingness of institutional investors to invest in them, both due to risk and because of regulatory capital requirements (e.g. the Solvency II directive, which introduced a new, harmonised EU-wide insurance regulatory regime, has higher capital weights for non-investment grade bonds). The EIB's Project Bond Credit Enhancement Facility has been designed to address this, aiming to increase credit quality by helping to guarantee subordinated debt in infrastructure projects, either through a loan or a contingent credit line (European Investment Bank 2012; Rossi and Stepic 2015).

The UK government and public sector agencies could also consider issuing their own green bonds, which could raise funding for infrastructure projects and key sectors while sending another signal of the government's commitment to the low-carbon transition. Last year, Poland became the first country to issue a sovereign green bond and nine countries are expected to follow suit in 2017 (Hirtenstein 2017). The US has also witnessed strong growth in the municipal 'climate-aligned' bond market (Climate Bonds Initiative 2016)

and local councils in the UK might be able to increase their issuance with the new Municipal Bond Agency (Plimmer 2016).

Mainstreaming climate disclosure would have multiple benefits...

Disclosure could help address asymmetries in, and lack of, information. On the investment side, a forward look at risks and opportunities encourages investors to make longer-term, climate-resilient investment decisions (Depoers et al. 2016), and market participants have called for further regulatory guidance and work on operationalising the recommendations of the Task Force on Climate-related Financial Disclosures (Green Finance Initiative 2016). On the side of the firms, sustainability reporting helps create new norms that become self-reinforcing and encourage long-term decision-making (Eccles et al. 2014). Improving the disclosure of risk could also facilitate the incorporation of environmental risk into credit ratings, which the governor of the Bank of England has called for (Carney 2016).

...but the guidelines need refining

Recent research suggests that disclosure in and of itself does not necessarily correlate with emissions reductions, and that the design of reporting is important for effectiveness (Doda et al. 2016).

In the UK, disclosure of climate risks – both transitional and physical – could be applied both more generally (expanding the reach of climate disclosure) and uniformly (standardising the disclosures). Listed companies in the UK are already required to disclose environmental, social and governance (ESG) considerations under the UK Companies Act, and non-listed companies above 500 employees will also be required to make disclosures in 2017 for the first time under the EU Non-Financial Reporting Directive. France has gone further by strengthening the disclosure requirements for listed companies and expanding the reach of reporting by also requiring disclosure from institutional investors (PRI 2016).

Listed firms in the UK are disclosing environmental considerations, but there are considerable company-level differences in what they report and how this is integrated into principal risks and key performance indicators (CDSB 2016). This suggests that guidelines could be further refined to encourage more uniform and useful disclosure, for example by making them more detailed (ibid 2016).

The recommendations of the Financial Stability Board's Task Force on Climate-related Financial Disclosures could provide some guidance. In particular, disclosing the assumptions underlying the company's forward-looking scenarios could offer valuable information for investors (Zenghelis and Stern 2016), though other elements of its proposed framework are still under discussion (see, for example, 2ii [2017] on possible limitations of using CO_2 emissions/$ of assets under management [AUM] as a key performance metric).

While London has been leading the way in some aspects as a green finance hub – including leading in carbon markets, integrating ESG considerations into institutional investment, and current discussions around climate and carbon risk such as the Green Finance Initiative – it is facing increasing competition from other financial centres. London spearheaded the movement towards socially responsible investment, but as of 2016, two of the top three banks for sustainability investment research are French (Extel Surveys 2016; Robins 2016).

Promoting the UK as a sustainable finance hub has the benefit not only of scaling up and greening capital markets, but also of developing and retaining expertise in low-carbon financial services, for example in legal, accountancy and audit services where the UK already has a strong advantage and which form a key part of the UK's economy (Green Finance Initiative 2016; McDaniels and Robins 2016). Connecting the City of London's expertise more directly with the sustainable finance needs of UK industry would provide greater depth as global competition in this arena continues to grow.

5. Conclusion

The UK's Industrial Strategy offers the opportunity to harness the country's strengths in sustainable finance to deliver clean and resilient growth. Mobilising sufficient capital will be an important component of its success.

To accomplish this, three things will be important:

- Clear and forward-looking policy fundamentals
- Help in delivering primary financing in infrastructure and strategic sectors by de-risking projects
- Mobilisation of capital markets for corporate financing and better-established technologies

Policy recommendations

Recommendation 1:
To encourage long-term investment, the Industrial Strategy needs to be supported by a trusted framework of climate policy fundamentals, laid out in the upcoming Clean Growth Plan.

In particular these should cover heat in buildings, transport beyond 2020, carbon capture and storage, and mature low-carbon generation.

Recommendation 2:
To maintain investment from the private sector in low-carbon infrastructure projects and strategic sectors, the government must develop a contingency plan to safeguard the role the EIB and GIB have played in providing direct financing and credit enhancement, and scale up investment to the level necessary for the low-carbon transition.

This could be achieved, for example, through an expanded GIB, the use of the UKGS, or a new entity fulfilling a similar role in directly funding projects and offering credit guarantees.

Recommendation 3: To connect the UK capital markets with the Industrial Strategy, the government should encourage wider disclosure of climate-related risks and support additional issuance of bonds for renewable energy and other low-carbon projects.

Specific efforts could be made to develop a domestic green bond market through labelling and guidance and to increase the scope and usefulness of disclosure requirements for climate-related risks.

Recommendation 4: The UK government should consider developing an overall strategy for green finance.

Mobilising appropriate levels of finance to meet the needs of the Industrial Strategy and the carbon budgets will require policy coordination across multiple departments. Taking a high-level view would help to identify gaps where strategic coordination is required. This strategy could be overseen by BEIS or Her Majesty's Treasury.

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Funding the UK government's Industrial Strategy will require mobilising large amounts of private sector funding for infrastructure and emerging technologies. To be future-proof, that infrastructure and technological development must be aligned with the government's strategy for a low-carbon transition.

This policy brief outlines how the public sector can crowd in private finance to support the Industrial Strategy through clear and forward-looking climate policy, targeted support of sustainable infrastructure and clean technologies, and the mobilisation of capital markets.

Such a strategic alignment of public policy could help meet the objectives of the Industrial Strategy and the carbon budgets at least cost, while also fostering long-term growth and innovation.

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