

# GREENING CHINA'S FINANCIAL SYSTEM

## CHAPTER 11:

# ALIGNMENT OF INVESTMENT STRATEGIES WITH CLIMATE SCENARIOS: PERSPECTIVES FOR FINANCIAL INSTITUTIONS

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# EXECUTIVE SUMMARY

## 2° Investing Concept

**2° Investing can be defined as investing strategies and policy frameworks leading to a financial portfolio that is in line with investment roadmaps based on +2° C climate goals.** At the heart of the 2° Investing concept is the capital reallocation and mobilization challenge. This involves closing the long-term financing gap, increasing the exposure to climate-friendly assets and reducing the exposure to high-carbon assets. This concept and the associated investment strategies apply for all types of financial institutions, including institutional investors and banks.

**Financial institutions today are unable to measure their exposure to climate change. There are equally no approaches to inform on the alignment of their investment strategies with national or international environmental goals.** By extension, there is no way to translate the 2° Investing concept into practice. Financial institutions seeking to contribute to environmental goals lack the tools. Mainstream financial institutions worried about their exposure to the long-term risks associated with the transition to a “green economy” are unable to measure and manage these risks. Policy-makers in turn seeking to develop policy incentives for the finance sector lack the right metrics to develop targeted incentives that will actually be guaranteed to be in line with their environmental policy goals.

## Relevance for the Financial System

**From a financial institution perspective, the 2° Investing concept has key implications for climate performance. Green finance objectives will have a significant impact at all stages of the investment chain—for investees as well as for banks and asset owners.** In terms of deal flow, for example, a European study identified cumulated financing needs related to climate change of EUR 350 billion in technology development and EUR 1.65 trillion in technology procurement (Barclays & Accenture, 2011). While there are no similarly rigorous estimates for portfolios, the “green share” in inventors’ financial portfolios will likely need to increase to 5–10 per cent.

**Economic changes associated with green finance will also need new risk management strategies.** Changes in economic models are likely to affect the valuation of physical assets and, by extension, the valuation of financial assets—whether equity, bonds or alternatives such as real estate, commodities and project finance. A model of the changes in the risk-return profile of various assets in a 2° C scenario shows long-term portfolio risk of over 10 per cent for financial portfolios (Mercer, 2010).

## Measuring and Managing the Climate Performance and Risk of Financial Portfolios: International Practices

**Currently, there are three types of approaches to measure the climate performance of financial institutions. None of the three approaches is currently able to comprehensively inform on the alignment of investment strategies with climate goals. While there are some individual examples, there is no comprehensive application of these frameworks in regulatory and policy frameworks.**

*Socially responsible investment frameworks* use environmental, social and governance (ESG) metrics to influence capital allocation decisions. These metrics, however, are not directly focused on climate change considerations and do not operate as impact measurements. As a result, they cannot inform in a meaningful way on the alignment of investment strategies with 2° C climate goals. The French government is currently exploring developing a Socially Responsible Investment (SRI) label dedicated to the energy transition.

*Financed emissions methodologies* are metrics that attempt to measure the carbon footprint of the financing and investing activities of a financial institution. Shortcomings include their limited overall coverage and the fact that they only inform on high-carbon investments. Financed emissions are accounted by about 40 fund managers and institutional investors. To date, however, it seems that this reporting does not inform investment decisions.

*Green/brown ratios* focus on defining what are “green” assets and “brown” assets in order to target a share of each of them in investment. At this stage, there is still no standard for defining “green” and “brown.” In terms of application, non-governmental organization initiatives and some funds have divested from brown sectors. Another application is in the area of financial market equity and fixed income indices that start to exclude brown assets or focus on green. In terms of policy, the Central Bank of Fiji mandated in 2012 that all commercial banks in Fiji allocate at least 2 per cent of their deposits and similar liabilities to the renewable energy sector.

***While risk assessment frameworks are becoming increasingly sophisticated at the asset level, risk metrics for banks and investors are still limited, preventing a more comprehensive integration of these metrics in investment practices and regulation.*** For risk assessment at the asset level, the first investor tools have been developed, notably the Bloomberg Carbon Risk Valuation Tool, although it is unclear whether this has affected investment decisions to date. In terms of risk at the portfolio and bank levels, there is no standard methodology, although there have been some ad hoc initiatives. The initiatives that have tried to measure carbon risks generally have found little materiality.

**Climate performance and risk metrics can be integrated into the analysis of a number of “sister” studies as part of the project on Greening the Chinese Financial Sector.** This includes the regulation of the insurance sector, macroprudential regulation, monetary policy and developing green debt markets.

## Trends and Next Steps

The next couple of years are likely to see a significant evolution of climate performance and risk frameworks. Whereas current risk metrics are limited, initiatives by a range of actors are likely to lead to significant improvements in risk frameworks in the next years. Climate performance metrics are also continuously being developed, both in terms of improving existing frameworks and pursuing alternative “science-based” approaches to measuring climate performance.

There is an increasing call for investors and banks to align their activity with climate goals and target-setting in this area. French Foreign Minister Laurent Fabius called for asset owners to allocate 10 per cent of their portfolios to climate-friendly investments. Building on CPI reports findings and the International Energy Agency roadmaps, U.S.-based organization CERES recommended institutional investors to set a goal of 5 per cent of their portfolios allocated to clean energy, compared to an estimated exposure of 1–2 per cent today depending on definitions.

Better climate performance and risk metrics are likely to support an increasing mobilization of financial regulatory and policy tools to drive capital towards financing the transition to a low-carbon economy. In this context, there will be an increased focus on transparency around disclosure and reporting, but with a sufficient level of sophistication in terms of metrics to provide for targeted incentives. These can relate to monetary policy instruments, financial regulation, public incentives, and accounting and disclosure.

## Implications for China

Climate performance and risk metrics can play a significant role in the Chinese financial sector reform process in the coming years, particularly for the Green Credit Guidelines, regulation of asset management and macroprudential risk frameworks. It can also help inform Conference of the Parties (COP) negotiations in 2015.

- *Implications for Green Credit Guidelines:* Climate performance accounting frameworks can be the next step to creating quantitative targets as part of the Green Credit Guidelines and improving the current reporting.
- *Implications for COP negotiations:* The Chinese negotiators can use target-setting frameworks to articulate a position about involving the finance sector (both public and private) as a key stakeholder in the climate change negotiations process.
- *Implications for growth of asset management:* The expected growth of asset management in China will likely be associated with significant regulatory reform. Climate performance metrics and risk frameworks can be integrated into this reform process.
- *Implications for risk to Chinese financial system:* Risk metrics can help to inform Chinese regulators on financial sector risks related to the transition to a low-carbon economy.

## 1.1 THE 2° INVESTING CONCEPT

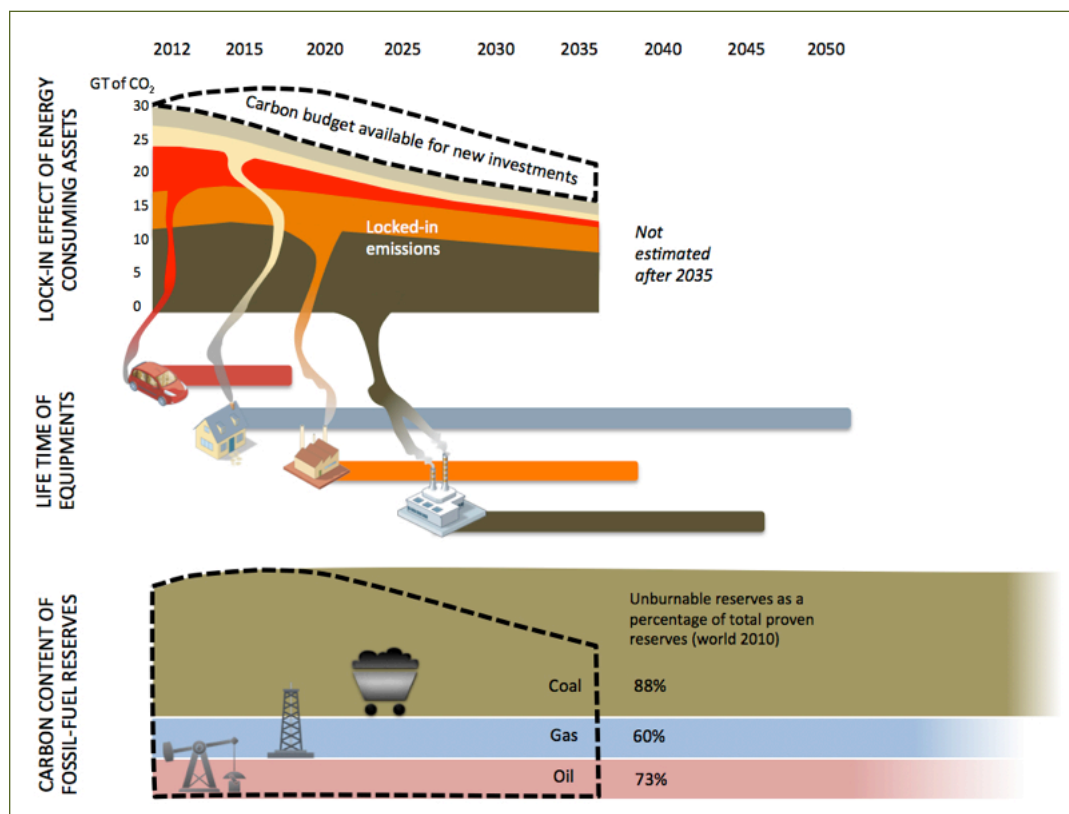
The long-term and climate-friendly investment needs associated with the transition to a low-carbon economy have given rise to the idea of 2° Investing. 2° Investing can be defined as investing strategies and policy frameworks leading to a financial portfolio that is in line with investment roadmaps based on goals to stay below 2° C of climate change.

**The capital reallocation and mobilization challenge.** At the heart of the 2° Investing concept is the capital reallocation and mobilization challenge related to building a 2° C world:

- *Long-term capital mobilization:* The Organisation for Economic Co-operation and Development (OECD) (2011), the World Economic Forum (2011, 2012) and the Group of Thirty (2013) stress the increasing gap between future long-term investment needs in the real economy and the share of long-term assets on asset-owners' balance sheets. According to Dobbs et al. (2010), the global economy may face a potential gap of USD 12.3 trillion equity financing in 2020. Closing the long-term financing gap will be key for mobilizing climate-friendly capital.
- *Reallocation capital to climate-friendly investments:* In terms of climate change, it is estimated that clean energy investments will require an additional annual investment of about \$1 trillion by 2050 (International Energy Agency [IEA], 2014). Financing these investments will require an increased role by both banks (Credit Suisse & WFM, 2011; Barclays & Accenture, 2011) and institutional investors (Nelson & Pierpont, 2013). Political credence to this role has been lent by French Foreign Minister Laurent Fabius (host of COP 21), who has called for asset owners to allocate 10 per cent of their portfolio to climate-friendly investment (le Figaro, 2014).
- *Reducing high-carbon capital expenditures:* Achieving climate goals will require a gradual and relative decrease for capital expenditures in certain in high-carbon sectors (e.g., oil exploration and production) and a reallocation within low-carbon sectors to low-carbon technologies (i.e., low-carbon vehicles in the automotive sector, renewables in the power sector) (IEA, 2014). A part of foreseeable capital expenditures in high-carbon sectors should therefore be avoided, or will lead to the creation of stranded assets (Carbon Tracker Initiative & Grantham Research Institute, 2014). In order not to exceed the "carbon budget" associated with +2°C climate goals, a significant part of fossil fuel reserves should not be exploited (Meinshausen et al., 2009). All the same, the IEA estimates that, without further action, by 2017 the greenhouse gas (GHG) emissions locked-in energy-related infrastructure will exceed the allowed 2° carbon budget (Figure 1) (IEA, 2012a).

For banks and asset-owners, this reallocation challenge implies a shift from brown to green in both the flows of financing delivered and the allocation of their assets.

FIGURE 1: EMISSIONS LOCKED-IN ENERGY INFRASTRUCTURE AND FOSSIL FUEL RESERVES



Source: 2° Investing Initiative data: IEA (2009, 2010, 2011); Carbon Tracker (2011, 2013).

**Organization of this paper.** This report is organized as follows. Section 1 introduces the concept of 2° investing and details the framework that quantifies the capital reallocation and mobilization challenge. Section 2 highlights the implications for capital expenditure decisions by investees (companies, governments, and households) and investment decisions by investors (institutional investors, banks). Section 3 reviews the international practices in terms of measuring and managing the climate performance and risk related to these scenarios by financial institutions. This discussion will focus on the issue of target setting for financial institutions vis-à-vis climate goals and associated risk management. It will also briefly discuss the implications for the other papers being produced in the context of this report. Section 4 will discuss the expected future trends and debates on the 2° Investing concept. Section 5 will conclude by briefly sketching out the implications for China.

## 1.2 2°C ROADMAPS AND INVESTMENT SCENARIOS

**From climate scenarios to energy-technology roadmaps.** The current framework to define investment needs for the 2° C economy is based on a translation of climate scenarios into *energy-technology roadmaps*.<sup>1</sup> The most prominent global scenarios are those of the IEA,<sup>2</sup> although alternative global scenarios have also been developed by environmental non-governmental organizations (NGOs) and research organizations such as Greenpeace (2012), WWF & Ecofys (2011) and World Energy Council (2013). These usually distinguish themselves by challenging the prominent role that carbon capture and storage (CCS) and nuclear power

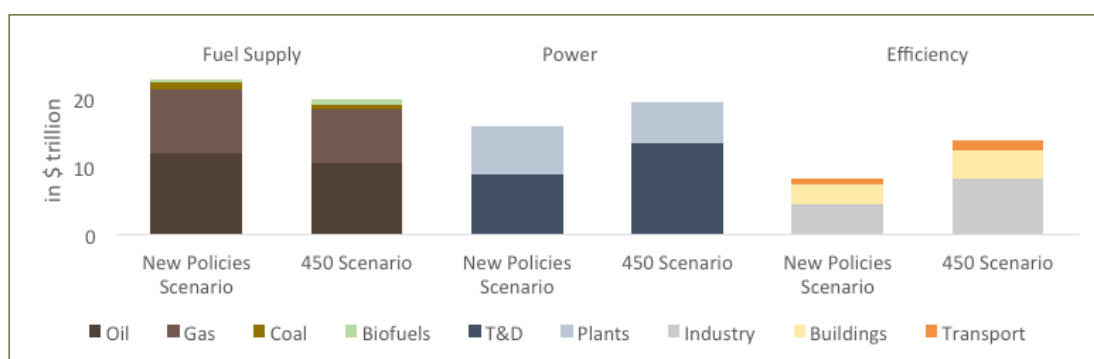
<sup>1</sup> Climate scenarios are usually modelled on carbon budgets and develop different trajectories in terms of the future energy infrastructure (and in some scenarios, other high-carbon sectors) to meet the climate objectives. Most of the scenarios described in this paper rely on the Potsdam Institute RC3PD emission trajectories that give a 50 per cent chance to limit global warming to +2°C.

<sup>2</sup> The IEA has developed two scenarios in line with 2° C climate goals, the 450 scenario for the World Energy Outlook, covering 2014–2035 and the 2DS for the Energy Technology Perspectives, covering 2014–2050.

play in the IEA scenarios, and putting emphasis the relative contribution of shifts in transportation patterns. Specific scenarios are also developed at the country level.<sup>3</sup>

**From energy roadmaps to investment needs.** Energy roadmaps are increasingly being turned into investment roadmaps. The three most prominent organizations currently developing investment roadmaps at the global level are the IEA (2014) and the World Energy Council (2013) for energy investment needs, the OECD (2012) for infrastructure investment more broadly, and the Frankfurt School with Bloomberg New Energy Finance (2014) (limited to low-carbon energy investment). Figure 2 shows the investment roadmap for the IEA. The Bloomberg New Energy Finance scenario, which focuses on clean energy investment needs, estimates annual investment needs of USD 1 trillion by 2030, under a 2°C scenario. Given current levels of around USD 356 billion to USD 363 billion of climate finance, these investment scenarios demonstrate a significant gap (CPI, 2013b).

FIGURE 2: WORLD CUMULATIVE INVESTMENT IN ENERGY SUPPLY AND EFFICIENCY BY SCENARIO 2014–2035



Source: IEA (2014)

**Gaps in the analysis.** There are currently a number of challenges with regard to turning energy scenarios and associated investment roadmaps into meaningful benchmarks for financial institutions. The following briefly summarizes some of the major challenges.

- **R&D expenditure:** Investments in R&D to date are largely underdeveloped in energy investment roadmaps.<sup>4</sup> Taking the cement sector as an example, the IEA projects 63 per cent of emissions associated with production will be captured through carbon storage by 2050. This still leaves roughly one third of emissions that need to be reduced through other means, even in an optimistic CCS scenario. Research and development (R&D) will be a key bridge in this regard, in particular expenditures on R&D for low-carbon alternatives to cement (i.e., reproducing at industrial scale the chemical process of coral reefs or egg shells) (Lafarge Group, 2004).

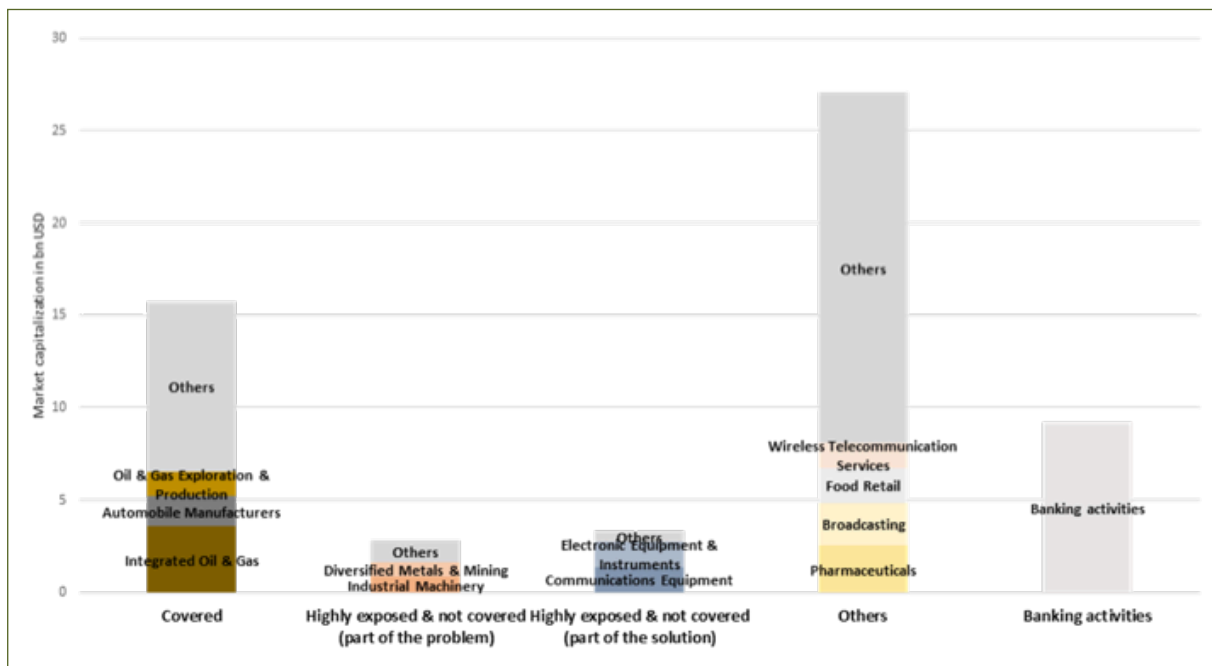
<sup>3</sup> For example, the Energy Research Center of the Netherlands (ECN) established several scenarios to discuss the different routes towards a “clean” Dutch economy (reducing carbon emission in 2050 compared to 1990 with 80 per cent). The “Gone Green” scenario produced by the UK National Grid simulates the transition pathway of UK’s energy system with the same emission target by 2050. The National Energy Board of Canada started the project Canada’s Energy Technology Future in 1998 and has constantly revised it in every two years. The aim is to provoke strategic thoughts about the range of possible futures in energy technologies and systems, and improve the government’s long-term planning capabilities. There are also several scenarios built around China. The prominent examples are the Bloomberg New Energy Finance’s 2014 paper, *The Future of China’s Power Sector*, which estimates China’s energy mix under different scenarios in 2030; CITI’s *Peak Coal in China*, which focuses on China’s coal consumption by 2030; and scenarios produced jointly by the Lawrence Berkeley National Laboratory and the China Energy Group, which analyze the role of energy-efficiency policies in transitioning China to a lower emission trajectory and meeting its intensity reduction goals. For references, see World Energy Council (2013), ECN & PBL (2011), National Grid (2014), Natural Resources Canada (2000), Bloomberg New Energy Finance (2013), Citi Research (2013), Ernest Orlando Lawrence Berkeley National Laboratory & China Energy Group (2011).

<sup>4</sup> The IEA Energy Technology Perspectives scenario does cover R&D expenditures for each technology, but beyond carbon capture and storage, the scenario only relies on best available technologies. The needs and perspectives regarding the introduction of breakthrough technologies in high-carbon sectors are not discussed.



- *Missing sectors and time frames:* Energy investment roadmaps usually miss significant sectors relevant from a climate change perspective, such as agriculture and land use.<sup>5</sup> In addition, most sectors only provide guidance until 2050. The IEA scenarios only provide limited coverage of the market capitalization of a sample of major stock indices (Figures 3 and 4).
- *Types of capital:* Most investment roadmaps do not distinguish between different types of capital. For instance, translating the energy roadmap for transport into implications for debt financing requires distinguishing development capital in aircraft manufacturing and low-carbon jet fuel, procurement capital for airlines and investment in airports infrastructure.
- *Uncertainties:* A challenge of investment roadmaps is the high degree of uncertainty associated with issues such as the changes in capital costs. For example, lower investment levels in 2012 were largely a function of lower prices in solar photovoltaic (PV) systems (Bloomberg New Energy Finance, 2014).
- *Target for whom:* Energy investment roadmaps are generally built for the energy sector and thus need to be “translated” for financial institutions (Section 2.2).

FIGURE 3: MARKET CAPITALIZATION BY MAJOR SECTORS



Source: Authors, Datastream Data (2013)

<sup>5</sup> In the IEA scenarios, 22.76 per cent of emission reductions rely on changes in land use, while the related actions and implications are not described in the roadmaps.

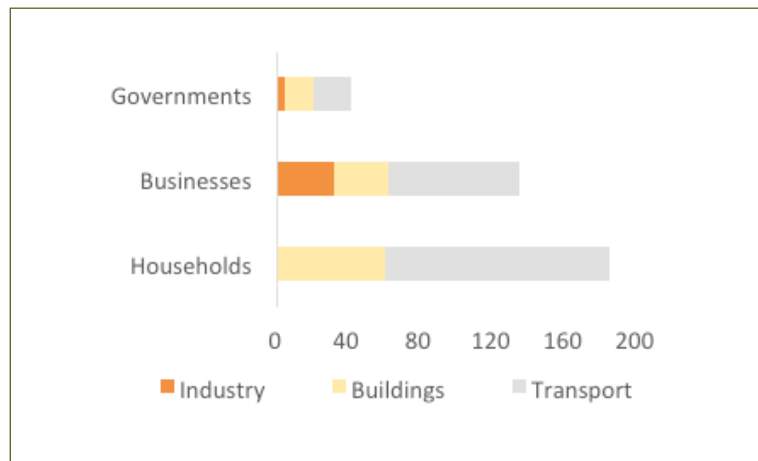
# 2

## RELEVANCE FOR THE FINANCIAL SYSTEM

### 2.1. IMPLICATIONS FOR INVESTEES

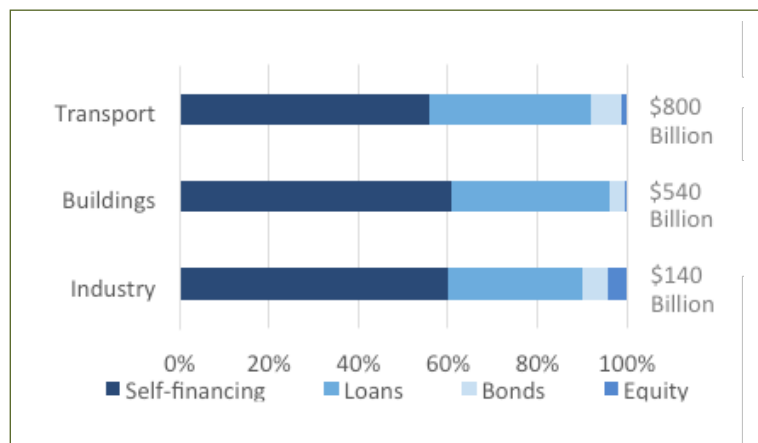
**Financing capital expenditure.** Energy investment roadmaps operate in the first instance as guidance on capital expenditure decisions by companies, households and states. Indeed, in this context the implications of the scenarios (insofar as they cover the relevant sector) are much more straightforward than for financial institutions, as will be discussed in the subsequent section. To understand the implications for companies, households and states, the key piece of information for determining the investment needs is an analysis of the ownership (Figure 5) and financing structure (Figure 6). The most common source is, by far, self-financing from savings or revenues or, in the case of governments, from tax revenue. This type of analysis clearly maps the implications of energy investment roadmaps for the key actors.

FIGURE 5: AVERAGE ANNUAL INVESTMENT IN ENERGY EFFICIENCY IN THE NEW POLICIES SCENARIO BY OWNERSHIP CATEGORY AND SECTOR, 2014–2035



Source: IEA (2012)

FIGURE 6: ESTIMATED INVESTMENT IN ENERGY EFFICIENCY BY SECTOR AND FINANCING SOURCE IN THE NEW POLICIES SCENARIO, 2014–2020



Source: IEA (2012)

**Impairment risks.** Given the conclusions on locked-in emissions and capital reallocation, energy investment scenarios also imply significant potential for the impairment of fixed assets. Carbon-related impairments occur when the future free cash flows derived from an asset are corrected downwards due to the occurrence of unexpected changes in the regulatory and market environment. The risks range from below-expectation returns to premature closure. On paper, the concept applies to any long-term high-carbon asset that can face competition from low-carbon technologies, including infrastructure (power plants, fossil fuel reserves, cement and steel plants, airports and highways), product development programs (automotive, aircrafts, power technologies), and real estate and fertilizer-dependent croplands. However, to date, the attempts to precisely define and quantify the related risks have been limited to a few sectors, including power,<sup>6</sup> oil,<sup>7</sup> residential housing<sup>8</sup> and croplands.<sup>9</sup>

**Missed opportunities.** The flipside of issues related to impairment risks are missed opportunities in climate-friendly investments. The IEA (2014) provides a current example for this: German utilities for example have largely failed to respond to the significant increase in renewable energy capacity and generation with their own fuel mix adjustments. While there is a range of reasons as to why German utilities have suffered in the past years (Smith School of Enterprise and the Environment, 2014), part of the equation is having missed the opportunity to capitalize on the growth of renewables as part of the German *Energiewende*.

## 2.2 IMPLICATIONS FOR BANKS AND ASSET OWNERS

### 2.2.1 ROADMAPS FOR THE FINANCE SECTOR

Attempts to “translate” energy-climate investment roadmaps into targets or constraints for financial institutions have been very limited to date. A significant reason for this analytical gap is the technical challenge associated with this “translation” exercise. The following maps some of the core issues in this regard, in particular analyzing the implications of energy investment roadmaps on deal flows, asset allocation and broader investment strategies.

### 2.2.2 IMPACT ON DEAL FLOWS

Understanding the implications of investment roadmaps for financing activities involves making assumptions regarding the evolution of ownership, the structure of financing and the relative role of bond markets and bank lending, for different technologies. In 2011, Barclays and Accenture developed a scenario for Europe dealing with the financing of a sample of technologies in power production, road transport and building efficiency until 2020. The scenario is based on the analysis and extrapolation of past transactions on these technologies. The authors have identified cumulated financing needs for EUR 350 billion in technology development and EUR 1.65 trillion in technology procurement (Figures 7 & 8). Equity issuance plays a key role in financing development, while retained earnings, loans and bonds are the primary sources of financing for procurement. To deliver, the finance sector is expected to develop green seed capital, venture capital and private equity funds to finance innovation, mobilize equity and bonds underwriting businesses to provide expansion and procurement capital, and develop the capacity to originate loans for small-scale projects. Building on Barclays and Accenture findings, Credit Suisse and WWF (2011) estimated a few months later that the related business opportunities for banks amount to between USD 25 billion and USD 30 billion in 2020. To date, such a roadmap as not been designed for other regions.

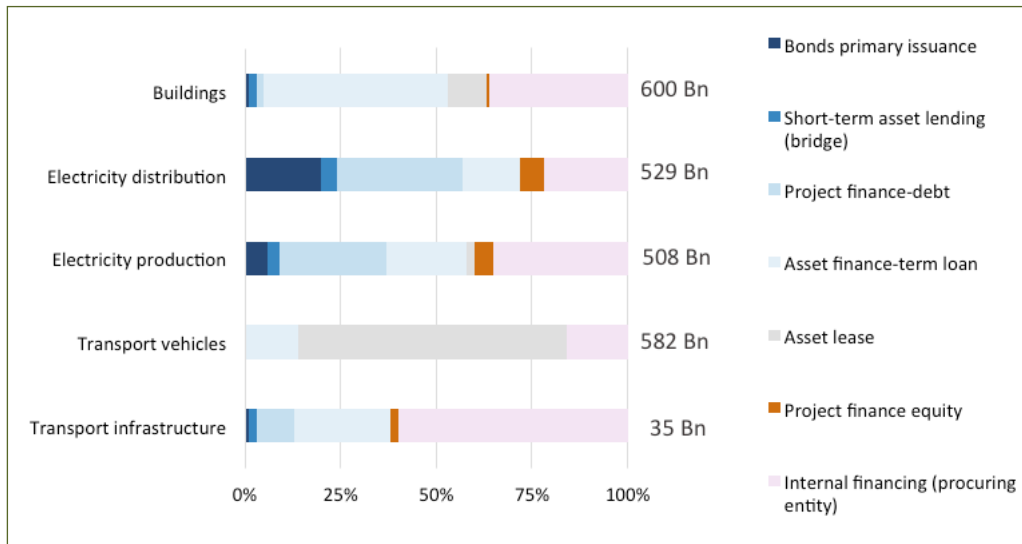
<sup>6</sup> The European power sector actually experimented with EUR 30 billion of impairments on fossil fuel-fired plants from 2011 to 2013, due to a combination of competition from renewables, constraints on carbon emissions and flat demand partly due to energy efficiency (Perrin, 2013). The consequence for equity investors has been significant: at their peak in 2008, the top 20 European energy utilities were worth roughly EUR 1 trillion. In October 2013, they were worth less than half that (The Economist, 2013).

<sup>7</sup> Analysis by the U.K.-based Carbon Tracker Initiative (2012) suggests that an estimated USD 1.1 trillion of capital expenditure earmarked needs a break-even market price of USD 95 out to 2025, a price significantly above projections in a low-carbon scenario.

<sup>8</sup> In France, the SHIFT Project has explored the relationship between the risk of default on mortgages and the energy-profile of residential real estate (energy efficiency and dependency on individual transportation). They concluded that a doubling in the price of energy would significantly increase the default rate of low-income, energy-intensive homeowners, and called for the integration of energy risks in social homeownership programs.

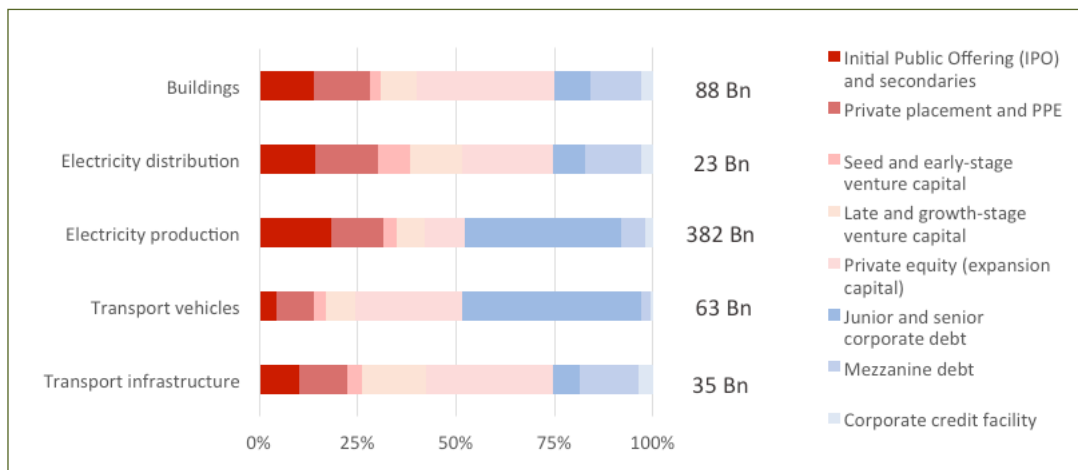
<sup>9</sup> The Oxford University Smith School of Enterprise and the Environment (2013) Stranded Assets Research program has mapped impairment risks for the agricultural sector and ranked the exposure of various types of assets to these risks.

FIGURE 7: CUMULATIVE PROCUREMENT CAPITAL (2011–2020) NEEDS IN EU-25 BY SOURCES OF FINANCING



Source: Barclays and Accenture (2011)

FIGURE 8: CUMULATIVE DEVELOPMENT CAPITAL (2011–2020) NEEDS IN EU-25 BY SOURCES OF FINANCING



Source: Barclays and Accenture (2011)

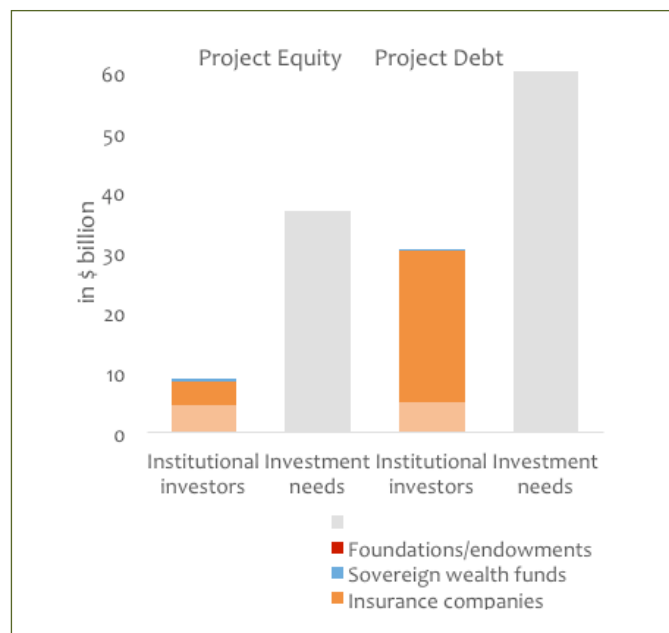
### 2.2.3 IMPACT ON ASSET ALLOCATION

The evolution of the allocation of the stock of assets owned is a second step in the translation of investment roadmaps into implications for financial institutions. New financial assets will ultimately be accounted on the balance sheet of banks (loan books), institutional investors (portfolios) and households (savings and rights on pension funds). For these asset owners, the transition to a low-carbon economy will therefore have an impact on the allocation of their portfolio by technology and sector.<sup>10</sup> Beyond the creation of new assets, the allocation of financial assets will be influenced by several other factors, including the evolution of asset prices and the average maturity of credit for each technology and sector on the asset side of their balance sheet, as well as changes in the structure of their liability and regulatory constraints. This leads to a very complex equation. Very few organizations have attempted to model these changes:

<sup>10</sup> One major obstacle in the “translation process” relates to the inability of existing sector and business segment classifications (including GICS, ICB, Bloomberg for listed equities, Barclays and Merrill Lynch for bonds, and SIC and NACE for credit) to properly reflect the exposure to different energy technologies. Indeed, most sector categories aggregate brown and green technologies. The 1,000 categories in the U.S. statistics sector classification provides a good example of this obstacle: a specific category exists for tortilla manufacturing, but renewable, coal-fired, gas-fired and nuclear power plants are all accounted in the same category.

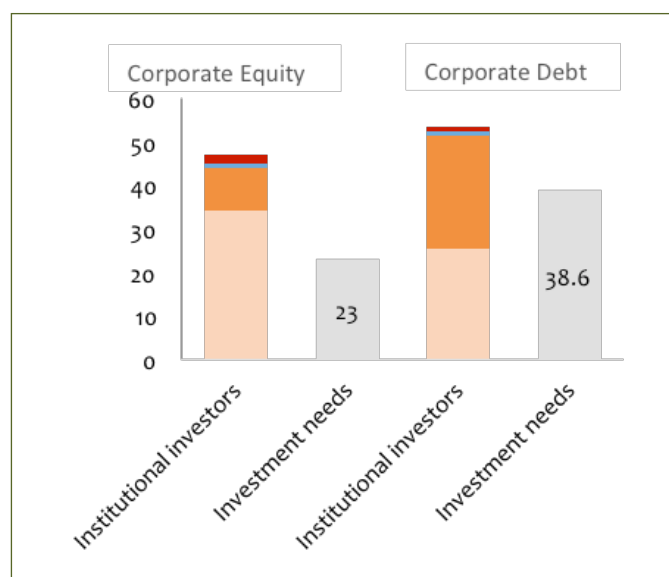
- In 2013, CPI estimated the ability of institutional investors to increase their exposure to renewable energy assets in order to “absorb” the expected flow of new assets. They concluded that these investors have a limited ability to adjust their direct exposure to renewable energy infrastructure investments, but can cover the needs thanks to their indirect exposure via equity and corporate bonds portfolios (Figures 9 & 10).
- A few years before, in 2010, Mercer tried another approach: they modelled changes in the risk-return profile of various assets in 2°C scenarios, and then calculated the implications for asset allocation (Figure 11 & Section 3.2). They concluded that to bet on one scenario or another has tremendous implications for portfolio allocation.

FIGURE 9: POTENTIAL ANNUAL INVESTMENT VERSUS OECD PROJECT INVESTMENT NEEDS



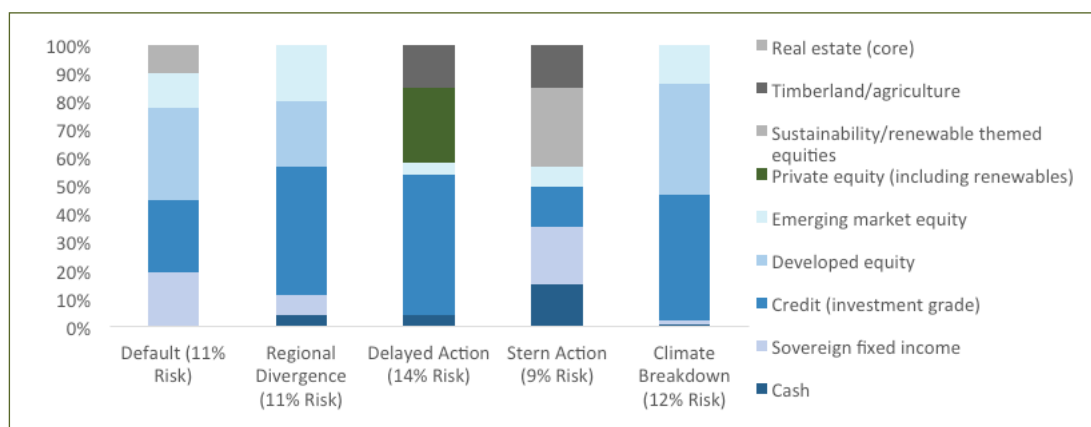
Source: Buchner, Hervé-Minucci et al. (2013)

FIGURE 10: CORPORATE INVESTMENT NEEDS



Source: Buchner, Hervé-Minucci et al. (2013)

FIGURE 11: EXAMPLE OF PORTFOLIO MIX ACROSS THE SCENARIOS: 7 PER CENT RETURN TARGET



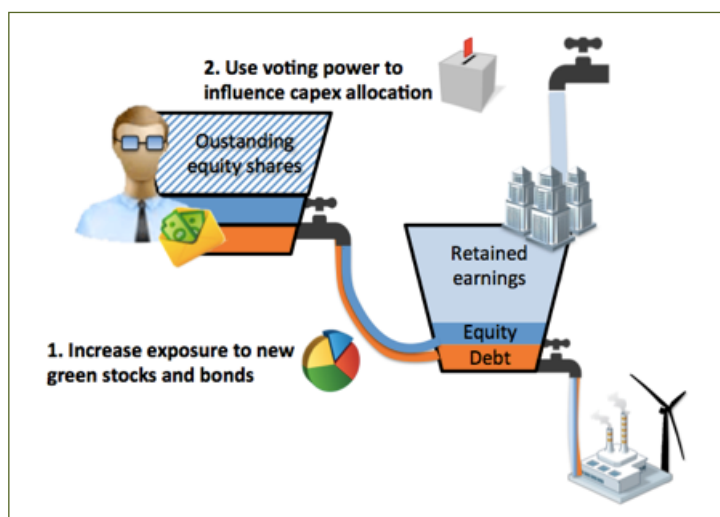
Source: Mercer (2010)

## 2.2.4 IMPLICATIONS FOR ASSET OWNERS' INVESTMENT STRATEGIES

For financial institutions, the pathways and methodologies used for aligning their portfolios are obviously very different, depending on how they understand their role and mandate. However, whatever the approach, asset owners can act at three stages.

**Shareholder engagement.** Financial institutions frequently act as prominent shareholders or key debtors. In this way, they affect capital expenditure decisions through two avenues: (i) by increasing exposure to newly-issued “green” stocks and bonds, financing green projects, and (ii) by using their voting power or influence as shareholders to influence capital expenditure decisions (Figure 12).

FIGURE 12: PATHWAYS FOR SHAREHOLDERS



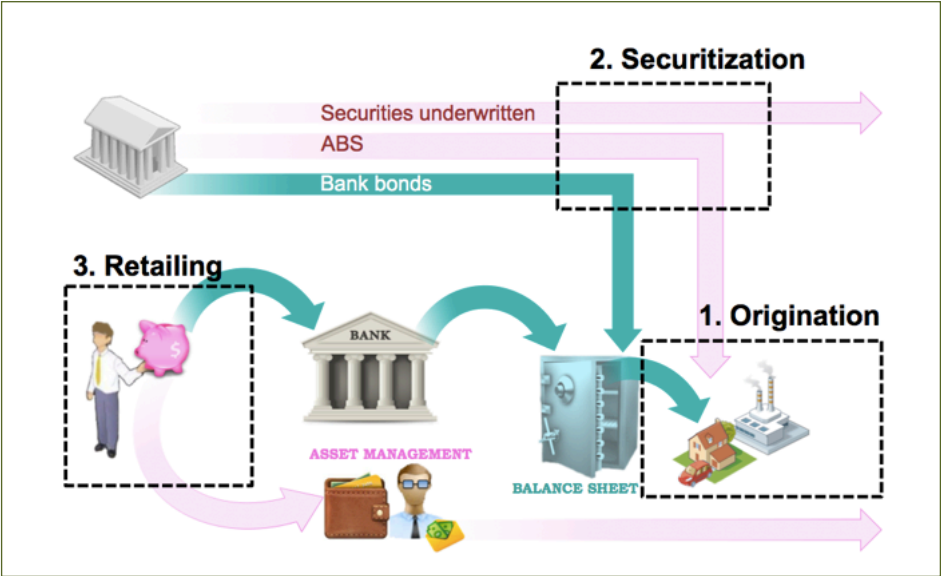
Source: Authors

This lever allows them to not only affect the allocation of the investment they finance, but also the investments financed by retained earnings. This pathway is key where a technology shift is required within the industry and retained earnings play a key role, like the power and the energy sectors.<sup>11</sup> So far, the involvement of shareholders in decisions on capital expenditure (capex) plans has been very limited. On the one hand, shareholder engagement still needs to be boosted (Section 3.4). On the other hand, there is a broader challenge in terms of transparency, as companies often do not report the breakdown of capital expenditure by energy technology in relevant sectors.

<sup>11</sup> In the OECD power sector, for example, 74 per cent of capital expenditure in 2012 was financed through “internal sources” (i.e., retained earnings). Source: 2<sup>o</sup> Investing Initiative.

**Channelling power.** Banks can use their ability to channel capital flows in order to increase investment in certain assets and limit investments in other assets (Figure 13). For banks with a climate mitigation mandate, the objective is to increase (or reduce) the demand for green and brown assets, thus influencing the cost and availability of capital for investees, and hopefully influence their ability to invest. The overall allocation is primarily determined by the risk-return profile of investment opportunities in the real economy (i.e., the “demand” for capital), but the financial sector also has an ability to influence choices. This is especially the case for the design and distribution of investment products, particularly given that in many countries, products are sold to rather than purchased by retail clients (Autorité des Marchés Financiers, 2013). In this context, fiscal incentives can play an important role (Section 3.4).

FIGURE 13: BANKS’ POINTS OF ACTIONS FOR CHANNELLING CAPITAL



Source: 2° Investing Initiative (2014b)

**Reallocation of outstanding assets.** Institutional investors, asset managers and banks can directly influence the cost and availability of capital for green and brown investees with climate mitigation targets in mind or simply manage their risk exposure to future climate policies. This lever is very much related to the channelling power, but applies to the management of stocks rather than flows. For policy-makers and the public, it is easier to focus on this dimension since most financial institutions publicly report on the outstanding assets owned or under management, rather than flows channelled by different activities. Financial institutions can adopt different positioning vis-à-vis climate scenarios:

- *Passive strategies* take the view that changes in public policies will lead to changes in demand for capital in the real economy, the role of financial institutions being to respond to this demand while maintaining business-as-usual investment frameworks. This is the dominant positioning within the finance sector to date.
- An *active strategy* implies updating the way a financial institution prices financial risk and opportunities related to the energy transition. This approach seems dominant among U.S. and U.K. organizations.
- A *proactive approach* assumes that proactive changes in asset allocation and investment strategies in the finance sector might support the reallocation of investment in the real economy. This approach is relevant where governments seek to embed economic goals in public financial institutions’ mandates, as well as financial regulation and incentives.

## 2.3. KEY DRIVERS AND BARRIERS

This section will briefly highlight the main finance sector drivers and barriers to aligning investment strategies with the roadmaps outlined in the previous sections.

### 2.3.1 DRIVERS

**Reputation:** Reputational costs are usually a function of public pressure. Examples include the campaign of the Rainforest Action Network (2014) against Bank of America Merrill Lynch and the U.K. campaign by Platform and the World Development Movement (2014) against the Royal Bank of Scotland (RBS). In both cases, the respective banks responded, largely by attempting to reduce their financed emissions (see Section 3). In China, Green Watershed and several partner NGOs have begun to publish coal finance rankings. The examples show that, while public pressure can have an impact, this pressure is usually limited to targeting specific financial institutions and high-carbon financing, without addressing broader climate goal alignment.

**Fiduciary duty.** Another driver relates to the concept of fiduciary duty, which includes the “prudent investor rules.” It has been argued that investors exposed to high-carbon “toxic” assets face significant carbon risks and that their over-exposure can constitute a violation of their fiduciary duty.<sup>12</sup> Going forward, this concept may gain new traction with a broader interpretation of fiduciary duty and a more forward-looking standard of what constitutes optimal diversification in the setting of the energy transition (2° Investing Initiative, 2013b). To date, however, the impact of this narrative is limited.

**Public finance.** In many countries, public finance is the largest source of climate-friendly capital and a significant lever for mobilizing private capital (Buchner, Falconer et al., 2013), with a leverage factor ranging from two to 25 times, according to the Inter-American Development Bank (Smallridge et al., 2013). Although their role has been important, they do not comprehensively address the key barriers in the finance system to 2° C Investing, as outlined below.

### 2.3.2 KEY BARRIERS

**Climate and carbon risk management frameworks.** Climate and carbon risk frameworks are ill-equipped to integrate long-term risks as a result of short-term risk horizons, backward-looking risk analysis and doubts regarding 2°C climate goals. To highlight one example, short-term risk horizons create a disconnect between climate policy and climate risks and the risks considered by financial analysts or equity fund managers with relatively short average holding periods (Figure 14). In addition to these challenges, accounting may be the biggest barrier at the current stage: the risks are complex and multi-dimensional. They are likely to require an asset-per-asset analysis and the related data collection and research infrastructure is not yet sufficiently developed (see Section 3.2).

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<sup>12</sup> This narrative has, for instance, been developed by the Carbon Tracker Initiative and AI Gore.



FIGURE 14: TIME HORIZON DISCREPANCIES IN THE INVESTMENT CHAIN FOR EQUITY FUNDS



Source: Authors

**Target-setting and reallocation:** A main barrier for target-setting by policy-makers and strategic capital mobilization/reallocation strategies by financial institutions is the underlying accounting frameworks. Current metrics are largely unable to inform on the exposure of a financial institution to economic transition scenario. They are not integrated at a strategic level nor are they used to help develop mainstream financial products (i.e., benchmark indices, portfolio optimization tools) for investors.

**Public policy incentives:** Current financial policy and regulatory frameworks largely ignore climate goals, with a few notable exceptions. The Green Credit Guidelines in China are a first step in this regard (see Section 5) (2° Investing Initiative, 2013c). In some cases, such as Basel III, regulation may even increase incentives for short-term investing at the expense of long-term, climate-friendly finance. As a result, policy does not address finance sector barriers, with mainstream climate policies ill equipped to respond.

Section 3 will explore the international practices in response to the key barriers.

# MEASURING AND MANAGING CLIMATE PERFORMANCE AND RISK OF FINANCIAL PORTFOLIOS: INTERNATIONAL PRACTICES

In the context of the capital reallocation and mobilization challenge, a number of initiatives have developed to help financial institutions measure and manage the climate performance and risk of their financial portfolios. In light of the growing momentum around the global climate negotiations in 2015 in Paris, these initiatives have likewise seen tremendous growth in recent months. They have focused on strengthening the methodologies underlying the measurement of climate performance and risk, and their application in regulatory frameworks and investment tools. This section will review the leading international practices to measure climate performance and risk and briefly discuss their application. Section 3.3 will then briefly discuss how the methodologies reviewed here fit into the broader context of the studies produced as sister studies to this report.

## 3.1. CURRENT STATE OF TARGET-SETTING FRAMEWORKS

One of the two approaches to integrate climate considerations into an investment decision is to set targets related to the contribution of a financial portfolio to financing the energy-technology transition. At the base of these targets are methodologies, necessary to measure the alignment with the targets or objectives that have been articulated. Table 1 summarizes the relevant methodologies.

TABLE 1: METHODOLOGIES FOR TARGET SETTING

Methodology	Approach	Shortcomings
1. ESG/Socially Responsible Investment scoring and screening	Evaluation of assets and portfolio based on environmental criteria	Based on investment process, rather than actual impact on capital expenditures, not focused on climate change issues per se
2. Carbon footprint of investment portfolios	Measuring financed emissions of financial activity	Lack of forward-looking analysis on emissions, does not inform on green assets
3. Green/brown ratios	Measures the exposure to green and brown assets	Lack of wide agreement on a robust definition of “green” (and “brown”)

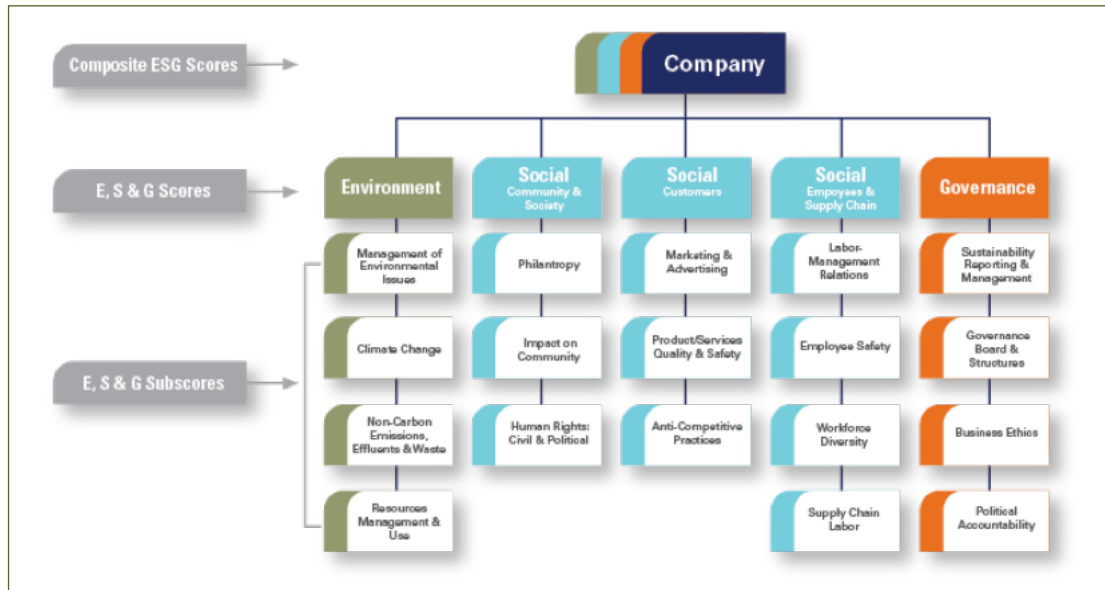
### 3.1.1 SOCIALLY RESPONSIBLE INVESTMENT (SRI) FRAMEWORK

**Approach.** SRI funds use ESG metrics to influence capital allocation decisions. These are usually based on management processes and “scoring” systems, with a limited role for quantitative metrics and a “best-in-class” approach that focuses on the highest ESG performers, even in industries, such as fossil fuels, where there may be over-arching concerns.<sup>13</sup> There is a range of ESG metrics providers. Given the more process-based approach of these metrics, they are generally easier to implement methodologically.

One example of ESG metrics is the ESG Research Methodology from MSCI ESG Research, one of the leading ESG data and research providers worldwide. MSCI ESG Research uses data from company filings, media, governments third-party data providers and NGOs. Each company is assigned to one of more than 80 industry groups, each of which has a unique set of ESG rating data and weightings. The research model generates numerous sub-scores for the company across each data category applicable to the industry group (Figure 15). The model aggregates the sub-scores to generate separate ESG scores for the company, which are ultimately expressed as a single composite ESG score. A company’s ESG score is mapped to a 9-point letter scale, with ratings from AAA (highest) to C (lowest) (MSCI, 2014).

<sup>13</sup> This has received some criticism, notably by Novethic Research (2013).

FIGURE 15: OVERVIEW OF MSCI ESG FRAMEWORK



Source: (MSCI, 2014)

**Shortcomings.** As a result, from a climate change perspective (MSCI, 2014), there are a number of shortcomings to SRI frameworks. First, they are not directly focused on climate change considerations, but take a broader approach. Second, they do not operate as impact measurements. As a result, they cannot inform in a meaningful way on the alignment of investment strategies with 2°C climate goals.

**Application.** Nevertheless, there have been some initiatives to use SRI frameworks to label funds. The French government is currently exploring the development of an SRI label dedicated to the energy transition. The idea is to reach a critical mass of labelled funds in order to stimulate the reallocation of capital (a target). At the European level, the Packaged Retail Investment Products (PRIIPS) Directive addresses the need for a label (article 8, paragraph 5) to signal socially and environmentally friendly investments in key information documents. The regulatory text, however, fails to produce satisfactory ESG information for retail investors on the basis that (article 34) “at this point there are no certain criteria or a formal procedure to objectively verify the target of these investments as being socially or environmentally friendly” (European Commission, 2014). The question will therefore be tackled during the review of the directive in 2018 if satisfactory quantitative metrics exist by then.

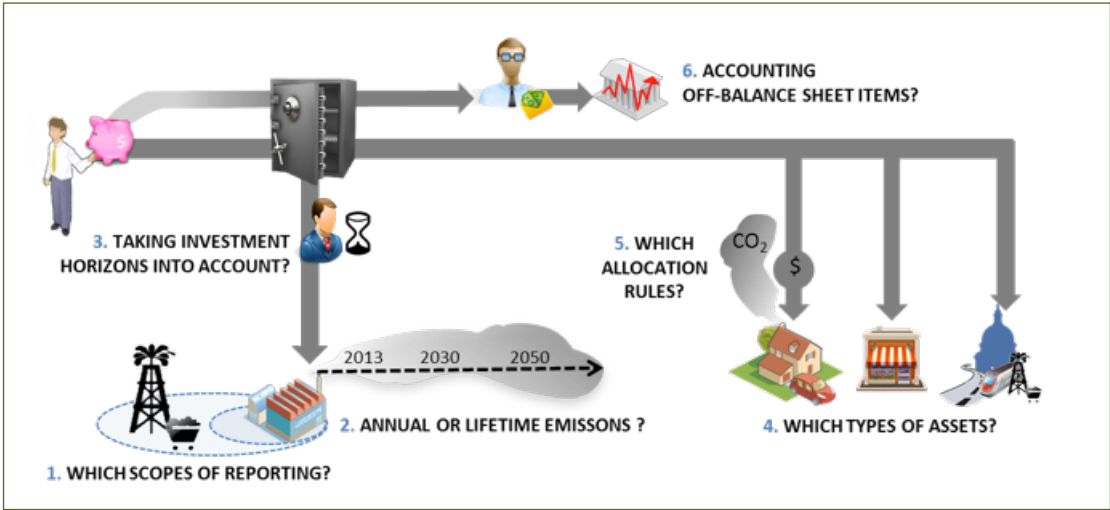
### 3.1.2 FINANCED EMISSIONS METHODOLOGY

**Approach.** Financed emission (FE) methodologies are metrics that attempt to measure the “carbon footprint” of the financing and investing activities of a financial institution. There are about a dozen different FE methodologies that have been developed to date (2° Investing Initiative, 2013a). Targets related to FE methodologies can either be relative (i.e., to last year’s footprint, peers or an index) or absolute (i.e., to a carbon budget). The methodologies differ on a number of issues related to key accounting questions (Figure 16) and responses to data gaps. There are currently several standardization initiatives under way in this field, including the United Nations Environment Programme’s Finance Initiative (UNEP-FI) GHG Protocol guidance on financed emissions, and the Association Bilan Carbone, sponsored by the French Environmental and Energy Agency.

One example for these methodologies is that of South Pole Carbon. The methodology uses data for annual Scope 1 and Scope 2 emissions of the investees (see endnote 15) and parts of Scope 3 emissions based on Carbon Disclosure Project (CDP) data. In addition, it provides qualitative data related to climate-related key

performance indicators. The methodology can at least in part adjust for double counting. For equities, the model covers 50,000 equities based on reported and modelled data. The model thus uses a mix of reported data and estimated data based on regression models and extrapolation. The results can be accessed on yoursri.com and Bloomberg Screener.

FIGURE 15: OVERVIEW OF KEY METHODOLOGICAL QUESTIONS FOR FE METHODOLOGIES



Source: 2° Investing Initiative (2012a)

**Shortcomings.** FE methodologies currently exhibit a number of shortcomings. First, many of the methodologies do not account for supply-chain and product-use emissions.<sup>14</sup> They also generally do not cover all asset classes. More importantly from a climate perspective, however, FE methodologies only inform on high-carbon investments. A portfolio with low financed emissions does not inform on that portfolios’ contribution to financing a 2°C scenario.<sup>15</sup> They also seem ill suited to inform on risk exposure, given that all types of emissions are treated equally.

**Applications.** As part of the Montreal Pledge, over 40 investors have agreed to do their carbon footprint using financed emissions (as of May 2015). To date, however, it seems that this reporting is largely driven by green marketing and does not inform investment decisions in a meaningful way.<sup>16</sup> While the French government is currently exploring making this reporting mandatory, supported by some asset managers and owners,<sup>17</sup> financial institutions and standardization organizations such as the UNEP-FI GHG-Protocol initiative are increasingly exploring alternatives due to a mix of technical challenges and reservations by banks.

3.1.3 DEFINING GREEN/BROWN RATIOS

**Approach.** An alternative approach to financed emissions and ESG scoring focuses on defining what are green assets and what are brown assets in order to target a share of each of them in investment portfolios. Interestingly, the French public financial institution Caisse des Dépôts et Consignations (CDC), which was a pioneer on ESG assessment in the 2000s and road-tested FE assessments in 2011, is now developing an approach based on green and brown exposure. The main challenge in this regard is defining “green” and “brown” categories (Solactive, 2014). In terms of green assets, the OECD (2013) has identified a number of different approaches. The conclusions highlight the sizeable common intersection of the various definitions

<sup>14</sup> Greenhouse gas emissions are categorized into three groups or “scopes” by the most widely used international accounting tool, the Greenhouse Gas (GHG) Protocol. While scopes 1 and 2 cover direct emissions sources (e.g., fuel used in company vehicles and purchased electricity), scope 3 emissions cover all indirect emissions due to the activities of an organization. These include emissions from both suppliers and consumers.  
<sup>15</sup> Low levels of financed emissions could, for example, simply mean that the portfolio has significant investments in low-carbon sectors that are not related to climate change and energy infrastructure (e.g., finance sector, pharmaceuticals, etc.).  
<sup>16</sup> For example, in 2014 the Nordic fund Nordea assessed the carbon footprint of its fund, but the analysis showed that its lower carbon intensity was due to higher weighting to information technology and healthcare sectors and a lower weighting to energy and materials, rather than a concrete better exposure to “climate solutions” in those fields (Marriage, 2014).  
<sup>17</sup> For example, the French public pension fund ERAFP communicated its GHG footprint in 2014 and is advocating for public financial institutions to do so (RAFP, 2014).

in terms of some sectors (e.g., renewable energy), commodities (e.g., carbon energy credits), services (e.g., waste management) and technologies (e.g., to enhance energy efficiency). Equally, a number of divergences remain (e.g., questions around including nuclear power, changing consensus around biofuels and ambiguity for sectors such as agriculture). The most prominent organization in the context of defining green investments for financial institutions is the Climate Bonds Initiative (CBI). CBI is currently working to create a “Climate Bond Taxonomy” based on an inductive approach of scanning sectors and technologies one by one based on their contribution to a 2° C world (Climate Bonds, 2014).

**Shortcomings.** At this stage, there is still no standard for defining “green” and “brown.” For example, practitioners define the “greenness” of bonds in very different ways (e.g., for corporate climate bonds, they are mostly self-labelled). No robust method or even conceptual framework exists today to define and measure this dimension in a meaningful way. An example of a remaining challenge is the real estate sector, where energy-efficiency investments in buildings may be “greener” than the status quo, but still not in line with 2°C energy-efficiency targets.

**Application.** In the United States, a growing divestment movement has been urging educational and religious institutions, city and state governments, and other institutions that serve the public good to divest from fossil fuels. To date, the “Go Fossil Free” movement has received commitments from 11 colleges and universities, almost 30 cities, and dozens of foundations and religious institutions (Go Fossil Free, 2014). In March 2014, Norwegian Funds started considering a divestment strategy and the Norwegian Pension Fund Storebrand has already divested from 10 fossil fuels firms (Clark, 2014). These initiatives have largely relied on a rough definition of “brown” as fossil fuel assets (e.g., coal, gas and oil).

Another application of this approach is in the area of financial market equity and fixed income indices. Here, thematic indices are developed based on the exclusion of brown assets or focused on green assets. In terms of fixed income indices, Solactive currently offers the only Green Bond Index (Solactive, 2014), although Barclays and MSCI have publicly announced the launch of such an index in July 2014. In terms of equity indices, there are a number of green indices (i.e., RENIXX World, ALTEXGlobal, S&P Global Clean Energy Index, etc.). In terms of policy, there is one notable, albeit peripheral from a global finance perspective, example that stands out. The Central Bank of Fiji mandated in 2012 that all commercial banks in Fiji allocate at least 2 per cent of their deposits and similar liabilities to the renewable energy sector (Reserve Bank of Fiji, 2012).

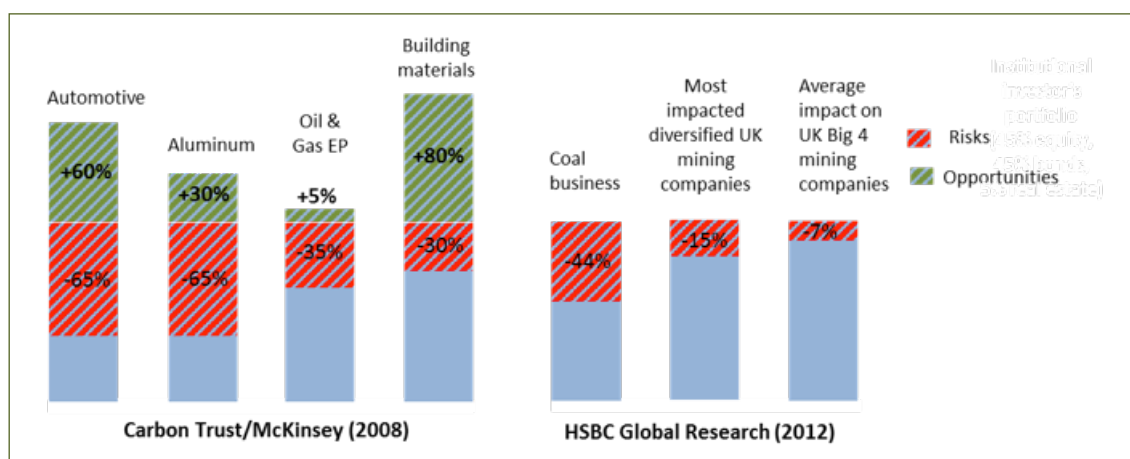
## 3.2. THE CURRENT STATE OF CLIMATE AND CARBON RISK MANAGEMENT

Asset impairment is set to become a growing challenge for households, governments and companies, and by extension, financial institutions (Section 2). While to date issues around carbon risk do not seem material to the majority of financial institutions, risks may become more prominent moving forward. This section will review carbon risk management at asset, investor portfolio and bank portfolio levels.

### 3.2.1 RISK ASSESSMENT AT ASSET LEVEL

**Approach.** Risk assessment at the asset level usually relies on scenario analysis to understand the exposure of high-carbon industries to carbon risks, specifically adjusting discounted cash flow (DCF) calculations to account for higher prices on direct or induced carbon dioxide emissions. These approaches have been piloted by brokerage houses and researchers on climate-sensitive industries. According to several studies, the impact of a 2°C scenario on companies’ valuations can reach up to 35 per cent for oil companies, 44 per cent for pure players in coal mining and 65 per cent for car manufacturers and aluminum producers (Figure 17) (Carbon Trust & McKinsey, 2008; HSBC, 2012).

FIGURE 17: MARKET VALUE AT RISK IN A 2° C WORLD FOR SELECTED STOCKS



Source: 2° Investing Initiative (2012a)

**Shortcomings.** While an analysis at the company level in terms of data availability is somewhat more straightforward, the exercise is complicated when assessing carbon risk at the industry level. Within industries, the ultimate materiality of carbon risks may not be evenly distributed, as many high-carbon assets are at very distinct positions on the cost curve.<sup>18</sup> Moreover, from a financial institution, given short-term time horizons, many of the risks at asset level may not be material from a financial institution perspective.

**Application.** The approach is now starting to be translated into investor tools. In 2013, Bloomberg launched a beta version of a Carbon Risk Valuation Tool based on the approach described above, allowing equity managers to test the impact of low-oil-price and high-carbon-price scenarios on fossil fuel and power equities. It is unclear whether the tool has affected investment decisions to date. In terms of regulation, the U.S. Securities and Exchange Commission (2014) issued an interpretive guidance on climate disclosure in February 2010, including climate and carbon risks. To date, however, the guidance has had little impact on carbon and climate risk exposure by listed companies (Coburn & Cook, 2014).

### 3.2.2 RISK ASSESSMENT AT THE PORTFOLIO LEVEL

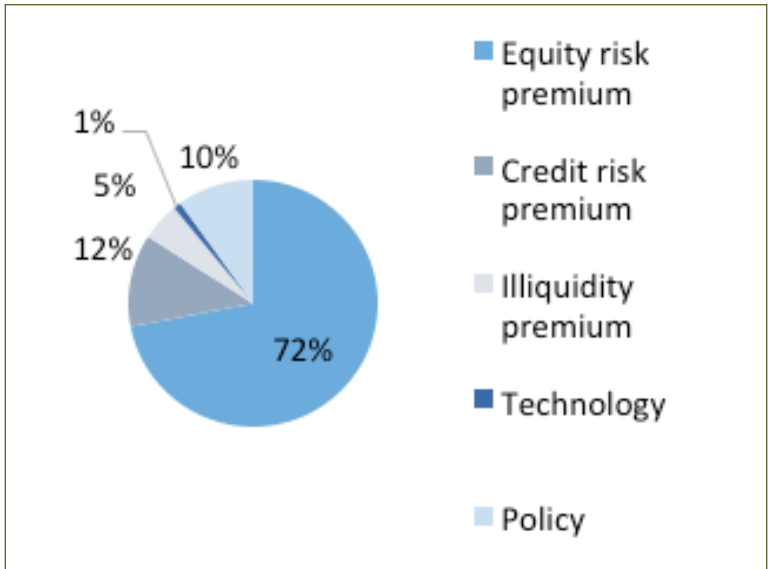
**Approach.** The work of Mercer (2010), the French national pension reserve fund (FRR, 2009) and Green European Foundation (Weyzig, Kuepper, van Gelder, & van Tilburg, 2014) provide the sole examples of a risk assessment framework at the portfolio level published to date. Mercer assessed the potential impact of climate policies and change on various parameters including GDP, investment flows, cost of mitigation and adaptation, etc. They then modelled the impact on the risk-return profile of each asset class (equities, sovereign fixed income, equity, corporate bonds, cash) and some specific sub-categories (renewable equities, agriculture, etc.) to come up with an optimal allocation strategy for each scenario. Mercer concluded that climate policy risks account for about 10 per cent of total risk exposure of an average portfolio (Figure 18). In 2008 the FRR project launched a similar project targeting the definition of investment strategy, with a wider perspective (environment: climate, fossil resources, biodiversity and water). The report for that project (self-labeled as preliminary) proposed to investigate several ways to integrate environmental issues in strategic allocation, on the basis of four (climate) scenarios (FRR, 2009). For each, risk/return ratios are built for different asset classes and discussed in terms of geographic and sectorial impacts.

**Shortcomings.** Beyond methodological limitations, one shortcoming of this approach lies in the fact that most institutional investors have investment horizons shorter than the expected time frame for the materialization of the policy and physical climate risks (See Section 2.3). Consequently, the climate risks are material on paper, but do not necessarily lead to major changes in asset allocation given the current short-term focus of investment frameworks.

<sup>18</sup> The Carbon Tracker Initiative is pursuing a research project to address this question in more detail.

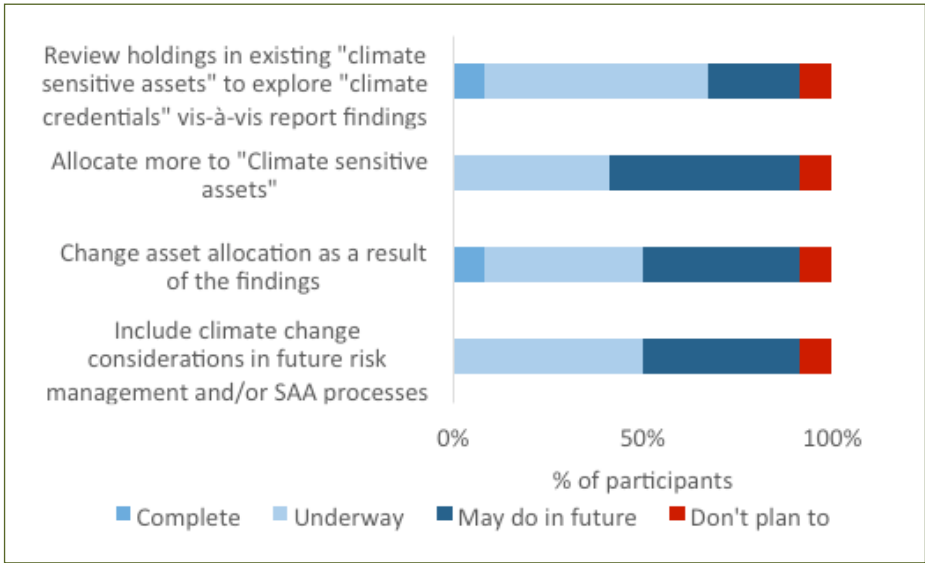
**Application.** One year after release, Mercer (2012) surveyed the 14 institutions that commissioned the research. Among the conclusions, half of the participants decided to include climate change considerations in future risk management and/or strategic asset allocation processes, while 40 per cent were still undecided, and one entity had no plans to make any changes (Figure 19). Participants in the project made the most significant change related to their engagement strategy, showing that asset allocation and investment decision is not always the most powerful tool for investors to address climate change. To our knowledge, the time-horizon issue stated earlier was also the reason for which the FRR did not follow up on its first exercise of integrating environment and climate change in its allocation strategy. It is likely that climate-change-related risks are perceived as immaterial given the time horizon of investment decisions and mandates, and thus not integrated by decision-makers. In the case of FRR, this may explain the decision to end the work on these methodologies.

FIGURE 18: CONTRIBUTION TO RISK FOR REPRESENTATIVE PORTFOLIO MIX IN “DEFAULT CASE”



Source: Mercer (2010)

FIGURE 19: CHANGES FOLLOWING MERCER RISK ANALYSIS AMONG ROAD-TESTERS



Source: Mercer (2012)

### 3.2.3 RISK ASSESSMENT FOR BANKS

**Approach.** Similar to risk assessments for portfolios, carbon and climate risk assessments for banks have been limited. The Green European Foundation (GEF) published the only major study on this topic in 2014. The results showed a limited impact, specifically a 0.4 per cent loss of total assets in the European banking sector and 2.5 per cent for the European pension fund sector. Interestingly, there was a significant European variation among institutional investors, with losses of slightly more than 7 per cent for the Universities Superannuation in the United Kingdom. Beyond this report, UBS has launched an internal review to stress test climate and carbon risks for the bank (the review is ongoing). The stress test will largely focus on climate risks to the institution, but also address carbon risks. There is no public material on the methodological approach of this review.

**Shortcomings.** In terms of the GEF study, the analysis was limited to carbon risks related to fossil fuels and did not take other sectors (e.g., power, transportation, etc.) into account. Moreover, as the study identified, given, again, short-term time horizons, these risks were not material at a significant level for financial institutions. For investors, the report concludes that the calculated losses are comparable to regular developments in overall equity markets over a one-month period.

**Application.** Beyond UBS, there is no known application by a financial institution or policy-maker. However, in the wave of the GHG Protocol and UNEP-FI's work stream on carbon asset risks, one can reasonably expect new road tests in the next few years.

## 3.3. IMPLICATIONS FOR PARALLEL RESEARCH STREAMS

This paper, written for the IISD by the 2° Investing Initiative, is part of a broader focus on greening China's financial system. There are a number of connections between this report and its sister studies, including:

*Regulation of the insurance sector:* Carbon (and climate) risk considerations are likely to be a key part of future insurance regulations. This paper focuses particularly on issues surrounding environmentally related risks and opportunities. The ability for insurers to measure these risks at the asset and portfolio levels are likely to be a key prerequisite for effective regulation and effective implementation by insurance companies (Section 3.2).

*Macprudential regulation:* This research stream addresses the potential financial system risk associated with the impairment of carbon-intensive assets. Here, too, key connections to this report appear with regard to measuring asset impairment risk.

*Monetary policy:* This research stream focuses on the international experience of central banks and regulators that have built environmental and social policy goals into their mandate. Incentives for "climate-friendly" portfolios and target-setting will rely on relevant methodologies.

*Developing debt markets:* This research focuses on policies to support the development of debt markets that encourage lending for environmentally sustainable activities, with particular reference to green bonds. Climate bonds are covered in this paper as one of the ways to support the reallocation of capital from brown to green assets, with a specific focus on defining "green" assets.



In the coming years, a number of key developments can be expected in terms of the methodologies used to measure climate performance and risk, their application and the broader framework.

#### 4.1 EVOLUTION OF CLIMATE PERFORMANCE AND RISKS FRAMEWORKS

The next couple of years are likely to see a significant evolution of climate performance and risk frameworks. In terms of risk assessment:

- The buzz created by the Carbon Tracker Initiative has sparked a form of competition in research on “stranded assets,” involving other NGOs like CERES, universities like Oxford Smith School Stranded Assets program, and sell-side research like Kepler-Cheuvreux and HSBC. U.S. and European foundations are currently planning multi-million multi-year grants on these topics in order to develop the conceptual framework, quantify risks in new sectors and engage with the finance sector.
- The GHG Protocol, UNEP-FI and JP MorganChase will release a draft guidance document on “carbon asset risk” assessment in September 2014. This initiative is expected to lead to further developments and road testing in 2015 and 2016. A dozen of major financial institutions are actively involved in the working groups.<sup>19</sup>
- Mercer is planning to update their risk-based methodological framework in 2014 and 2015 in collaboration with a group of investors and extend the analysis to sector considerations.

There are also developments in terms of climate performance:

- World Resources Institute, Carbon Disclosure Project, and WWF are developing a guidance document to be published by the end of 2014 to help companies set science-based, credible GHG emission reduction targets.
- As outlined above, a number of initiatives are under way to help standardize FE accounting, including internationally by the UNEP-FI GHG-Protocol and in France by the Agence de l’Environnement et de la Maîtrise de l’Energie (ADEME).
- From 2015 to 2017, a consortium of 12 organizations (universities, equity research firms, index providers, etc.) led by the 2° Investing Initiative, in collaboration with a group of investors, banks and governmental organizations, will fine tune and extend the translation of investment needs into financing and allocation targets.<sup>20</sup> The project plan is to develop a methodology to measure the alignment of financial assets and financial portfolios with climate and associated investment scenarios, to address associated data needs, and build financial products (i.e., indices, portfolio optimization tools) based on the methodology.

#### 4.2 VOLUNTARY COMMITMENTS AND TARGET-SETTING

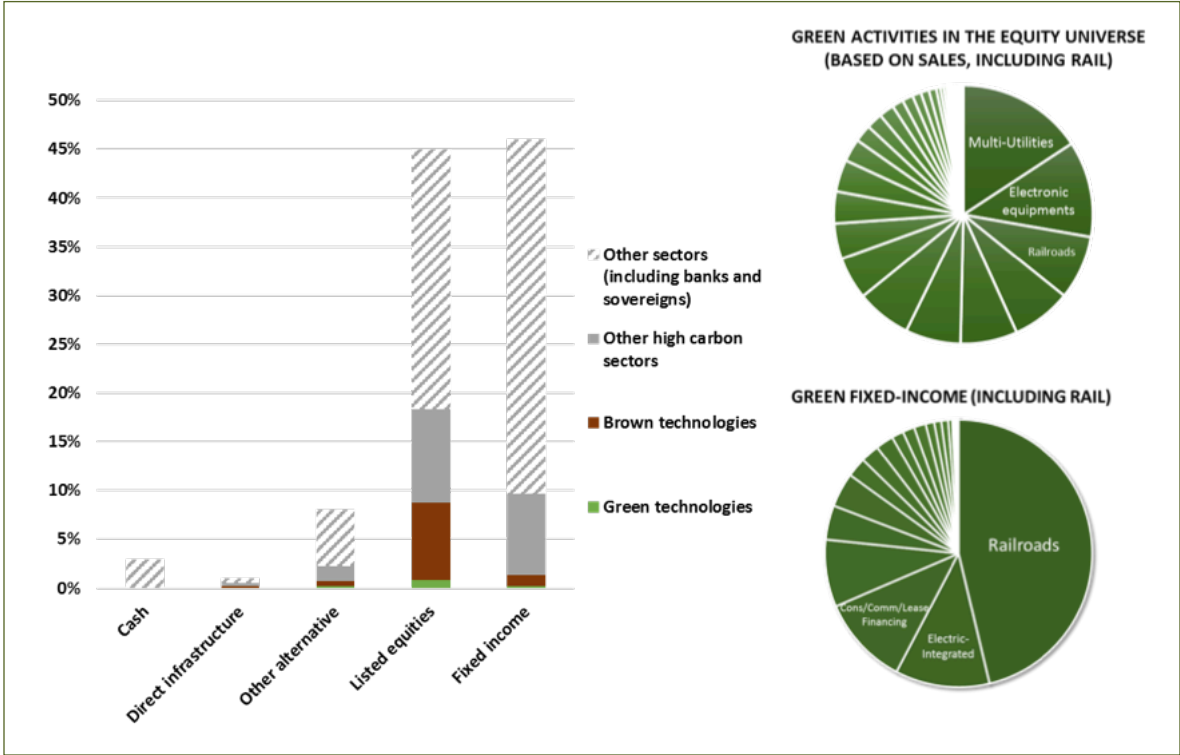
There are increasing calls for investors and banks to align their activities with climate goals. Building on CPI reports findings and the IEA roadmaps, the U.S.-based organization CERES presented a 2014 report at the United Nations headquarters that recommended institutional investors set a goal of 5 per cent of their portfolios allocated to clean energy (Fulton & Capalino, 2014), compared to an estimated exposure of

<sup>19</sup> Participants include, for instance, Bank of America, JP MorganChase, UBS, Citi, Wells Fargo, Deutsche Bank, Unicredit, BNP Paribas, Societe Generale, State Street, Calvert, Prudential, Allianz.

<sup>20</sup> The consortium includes the 2° Investing Initiative, WWF, CDP, Climate Bonds Initiatives, Kepler Markets, University of Zurich, SMASH, and the Frankfurt School of Finance. It has been endorsed by a number of public and private financial institutions, the French and German government ministries, as well as several non-governmental organizations and academic institutions. The project is still at the fundraising stage with the European Commission and other international funders.

1 per cent to 2 per cent today, depending on definitions (Figure 20).<sup>21</sup> It should be noted that these figures are primarily back-of-the-envelope estimates made for public communication rather than the result of academic research meeting science standards. However, these recommendations seem to get traction from climate policy-makers and even lead to an “inflation” in the ambition of targets: in July 2014, Laurent Fabius, French Minister of Foreign Affairs in charge of organizing COP 21, suggested to “set the objective of 10% of standard investment portfolios allocated to green assets in 2020 instead of 1% today” (Le Figaro, 2014). In this context, there is likely to be a significant debate around COP 21 for mobilizing financial institutions as partners for financing the transition to a 2° C world.

FIGURE 20: CURRENT EXPOSURE OF A REPRESENTATIVE INSTITUTIONAL INVESTOR’S PORTFOLIO TO GREEN AND BROWN ASSETS



Source: Estimates 2° Investing Initiative, based on MSCI ESG Research data (2014)<sup>22</sup>

### 4.3 POTENTIAL IMPLICATIONS FOR FINANCIAL PUBLIC POLICIES

The trend is increasingly pointing in the direction of mobilizing financial policies and regulatory framework as tools to drive capital towards financing the transition to a low-carbon economy. In this context, there will be an increased focus both on transparency around disclosure and reporting, and on having a sufficient level of sophistication in terms of metrics to provide for targeted incentives. Table 2 provides an overview of existing financial policy tools that can potentially embed climate mitigation targets or carbon risk assessment. A specific example is the current EU proposal for revising the Directive on Institutions for Occupational Retirement Provision (IORP). Article 29 of this proposal requires climate stress testing for these institutions. However, without the associated stress-testing frameworks, this article will likely face significant barriers to implementation.

<sup>21</sup> There are significant limitations to this assumption, including questions around how to measure the “green” exposure associated with investments in sovereign bonds and investments in financials where the footprint is unclear.

<sup>22</sup> Assumptions and categories: The list of green innovators from MSCI ESG Research is used to apply the thematic revenue (per cent of green exposure of a company) to estimate the part of green activities in major indexes. In this case, CAC 40, Stoxx 600, S&P 500, Dax 30, FTSE 100, MSCI World and MSCI ACWI are represented without any duplicate. From the five categories used for environmental innovators, only green building, alternative energy and clean technology are kept, while sustainable water and pollution prevention are ignored. The sector classification used is GICS level 4 (Sub-Industry), being matched with ISIC and NAICS. The railroad sector is considered as 100 per cent green, whatever the thematic revenue from MSCI is. Brown technologies are mainly oil and gas and coal companies, while other high-carbon sectors are highly exposed to energy-efficiency challenges.

TABLE 2: POTENTIAL POLICY INSTRUMENTS FOR INTEGRATING GREEN FINANCE CONSIDERATIONS

TYPE	INSTRUMENT	EXAMPLE
Monetary Policy Instruments	A carbon-linked monetary instrument	“Create carbon assets that can serve as legal reserves with central banks”
	Collateral frameworks	“Improve the liquidity of ‘green’ assets through preferential treatment in collateral frameworks”
Financial Regulation	Stress testing	“Integrate carbon risks into stress-testing frameworks”
	Capital reserve requirements	“Expand the scope of portfolio matching by insurers in the context of capital reserve directives”
	Lending guidelines	“Establish guidelines for integrating environmental considerations and risks into investment processes”
	Lending mandates	“Establish lending restrictions for ‘high-damage’ sectors”
	Mortgage markets	“Provide incentives for climate-friendly home ownership in the framework of mortgage origination”
	Carbon markets	“Design carbon markets under a regulatory auspice that guarantees transparency”
	Benchmarks	“Mandate ‘diversification assessments’ of mainstream indices and strengthen associated reporting”
	Credit rating regulation	“Strengthen the rules regarding carbon risk reporting”
Public Incentives	Tax incentives	“Provide tax incentives for savings’ interest and pension fund benefits that invest in low-carbon assets”
	Public banks	“Leverage public banks to increase private investment in ‘green’ assets”
Accounting & Disclosure	Developing new metrics	“Invest in developing and adopting more sophisticated carbon metrics reflecting both climate-friendliness and carbon risk concerns”
	Rules governing Key Information Documents (KIDs)	“Integrate climate-friendliness and carbon risk indicators in KIDs”

Source: 2° Investing Initiative (2013c)

## IMPLICATIONS IN THE CHINESE CONTEXT

The paper has focused on one type of environmental reporting—that related to climate change. The focus in this regard allows for a detailed description of the conceptual framework, the current state of the art in terms of methodologies and their application, and the remaining challenges and expected developments. Despite the chosen focus, it is important to highlight that the analysis can be extended to all types of environmental accounting and methodologies. This chapter will review the potential implications of the analysis for the Chinese policy context.

### 5.1 IMPLICATIONS FOR THE IMPLEMENTATION OF THE GREEN CREDIT GUIDELINES

The current assessment framework with regard to the Green Credit Guidelines and the Enterprise Environmental Credit Evaluation is aligned with international practices. At the same time, the assessment framework faces a number of challenges. First, the framework provides room for improvement with regard to providing quantitative indicators. Second, the framework does not inform quantitatively on the alignment of the banking sector with the environmental policy goals of the Chinese government. Third, a number of avenues remain to be explored in terms of integrating these indicators into policy frameworks.

To allow Chinese policy-makers to measure the alignment of the Chinese banking sector activities with environmental policy goals and create associated policy incentives, we recommend the development of new metrics that allow the Chinese government to measure the alignment of banks' loan books and investors' portfolios with the 5-year plans.<sup>23</sup> The objective of the indicator is to measure the alignment of a bank's financial activities with the Chinese environmental policy goals. In particular, the focus could be on the investments in the “two highs and one over” and strategic sectors and whether they diverge from the policy path. The research project can be linked to existing international research projects, notably in Europe,<sup>24</sup> or operate independently. The objective of the research project should be a turnkey indicator for policy-makers, regulators, bank officials and investors.

Associated with the indicator are improvements in reporting and disclosure. Corporate reporting guidelines should be updated to facilitate adoption of the new indicator. Similarly, the Chinese government can use the indicator to report on the progress of the Chinese finance sector in aligning with policy goals.

Beyond changes in reporting frameworks, the indicator can also be associated with direct incentives related to adoption, which can be road tested at the provincial level. These incentives can be related to the adjustment of interest rate regulations for green savings accounts (defined on the basis of these metrics), fiscal incentives for “best performers” on the part of financial institutions and the adjustment of the Enterprise Environmental Credit Evaluation ratings system based on the loan book indicator to facilitate credit intermediation to better performers. Beyond policy incentives for commercial finance sector institutions, a direct policy application of this proposal could relate to the mandatory adoption by the Chinese policy banks. First, this would ensure the alignment of its activities with policy goals and, second, it could act as a “road test” for the adoption by the Chinese commercial state-owned banks.

<sup>23</sup> Given that the current Five-Year Plan is set to expire in 2015, this policy proposal is based on the expectation that a 13th Five-Year Plan will be developed for the time frame 2016–2020. Hypothetically, the assessment framework does not rely on five-year policy plans, but can also operate with market-developed “transition roadmaps.” In the case of climate change, the role model in this regard is the *IEA World Energy Investment Outlook*, which maps the energy-technology and investment roadmap for 2035 and 2050.

<sup>24</sup> In Europe, a consortium led by the 2° Investing Initiative is planning a research project set to begin in November 2014 that will develop a European assessment framework to allow companies and financial institutions to measure the alignment of their portfolios with climate goals.

## 5.2 FINANCIAL RISKS RELATED TO GREEN FINANCE

China's path towards a sustainable growth model will be associated with a transformation of the economic model. As outlined in the sister papers to the 2<sup>o</sup> Investing Initiative report (see, for example, *The Risks and Opportunities of Stranded Assets*), a significant challenge will relate to ensuring a smooth and low-cost transition. This relates in particular to the potential cost of so-called stranded assets. Stranded assets are defined as “assets that have suffered from unanticipated or premature write-downs, devaluations, or conversion to liabilities” (Smith School of Enterprise and the Environment, 2015). In the Chinese context, these are particularly likely to appear in the “two highs and one over” industries (industries with high energy consumption and high pollution or overcapacity). Better risk metrics proposed above can help to manage these risks and provide policy guidance on reducing these risks for the relevant agencies represented in the National Energy Commission, notably the Ministry of Land and Resources, the Ministry of Housing and Urban-Rural Development, and the Ministry of Environment Protection.

## 5.3 DEVELOPMENT OF THE ASSET MANAGEMENT INDUSTRY

In the context of the Chinese push to grow the asset management industry, a key step will be avoiding the “legacy” costs incurred by the European and American asset management industry that relies on high-carbon financial products. A key component of these legacy costs are benchmark equity and bond indices, notably cap-weighted equity indices, that act as sector allocation guidelines, despite their misalignment with market diversification and low-carbon transition roadmaps.<sup>25</sup> The developing industry also constitutes a window of opportunity to develop environmentally friendly alternatives that are, unlike their European and American counterparts, both connected to policy goals and enjoy public sector incentives.

In the context of the development of the asset management industry, there is an opportunity to mandate one of the major Chinese stock exchanges (e.g., Shanghai Stock Exchange) to develop an investable equity index series, which overall, and based on its constituents, is aligned with the Chinese environmental policy goals. In the context of the momentum around COP 21, Europe has seen a number of such climate-related indices developed in recent months. Particularly with a view towards COP 21, China can contribute to putting the Chinese asset management industry on a similar decarbonization trajectory through providing policy-related indices as investment tools. Here too, indices can be associated with relevant disclosure requirements by the exchanges, both for climate-related and non-climate-related indices, and potential policy incentives for the adoption of these indices.

<sup>25</sup> In 2012 the share of the oil and gas sector in the total capital expenditure of major cap-weighted indices (S&P500, FTSE100, MSCI World, Stoxx600) was between 30 and 45 per cent of total capital expenditure, relative to an estimated 10 per cent share of all global listed equities (2<sup>o</sup> Investing Initiative, 2014a).

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