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EXPLORING METRICS TO MEASURE THE CLIMATE PROGRESS OF BANKS



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Authors:

Chris Weber

2 Degrees Investing Initiative, United Nations Environment Programme Finance Initiative, World Resources Institute

Jakob Thoma and Stan Dupre

2 Degrees Investing Initiative

Remco Fischer

United Nations Environment Programme Finance Initiative

Cynthia Cummis and Shilpa Patel

World Resources Institute

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EXECUTIVE SUMMARY

Highlights

- This paper informs the ongoing debate about how public- and private-sector banks should assess and report on their contribution to the transition toward a low-carbon economy.
- The research assesses the metrics that can be used to assess a bank's contribution to the climate solution or problem. We categorize the existing metrics into greenhouse gas (GHG) accounting, green or brown, and sector-specific metrics; compare these metrics; and make recommendations for choosing metrics by asset class.
- Different metrics are appropriate for different asset classes and/or activities, so banks may wish to report using a variety of metrics to cover all their relevant asset classes and activities.
- Banks should consider the criteria of completeness, context, fair share, and transparency when evaluating and choosing metrics to assess climate progress.
- Banks should report on activities related to climate problems in addition to climate solutions to enable full understanding of their contribution to the low-carbon transition,
- In spite of evolving climate progress assessment practices, banks should still measure and disclose metrics on climate progress and tracking performance. Meaningful and practical metrics are currently available for numerous asset classes, and banks can improve their approach over time as more useful metrics become available.

Introduction

Banks are paying increasing attention to climate change for two main reasons: interest in understanding and managing their contribution to both the low-carbon economy transition risk and international climate policy goals. In the lead-up to the United Nations climate change conference (COP 21) in Paris in 2015, many of the world's largest public-sector and commercial banks made commitments related to climate change mitigation and adaptation. They included statements of climate policy support and commitments to either decrease the financing of "climate problems" (e.g., coal mines) or, more often, increase the financing of "climate solutions" (e.g., renewable energy). At the same time, the Paris Agreement and initiatives such as the Financial Stability Board (FSB) Task Force on Climate-Related Disclosure have increased attention to the potential financial risk associated with climate problems (known as carbon asset risk, transition risk, or simply carbon risk) and the potential opportunity associated with contributing to climate policy goals through financing climate solutions.

Transition risk and climate policy goals lead to two parallel objectives for financial institutions, with potentially overlapping management strategies. Risk and/or opportunity management is seen as a *business objective*, while contributing to climate policy goals—for example, by supporting the transition to the low-carbon economy—is seen as a broader *societal objective*. The latter management strategy is defined in this paper as *climate progress*.

About this Report

This publication is part of a series by the Portfolio Carbon Initiative (PCI). It aims to inform the ongoing debate about how public- and private-sector banks should assess and report on the climate progress of their portfolios. It builds on a multistakeholder process that, in 2013, began to standardize the accounting of Scope 3 “financed emissions” (see Annex A). During that process, some financial institutions questioned the meaningfulness and practicality of the financed emissions metric. To respond to these concerns, PCI partner organizations agreed to perform a broader assessment of the various metrics available to help financial institutions report on their impacts on climate change and their contributions (both negative and positive) to the transition toward a low-carbon economy. This paper follows a 2015 sister publication for investors: *Climate Strategies and Metrics: Exploring Options for Institutional Investors*. Both these papers are based on a broad PCI review of the metrics that financial institutions are using to publicly report on climate progress.

This paper categorizes the relevant metrics for assessing the climate progress of banks, provides a comparison of these metrics, and provides recommendations for choosing metrics by asset class. The paper does not include guidance on how to collect data and calculate results using the various metrics discussed. The development of new metrics was also not in scope of this paper, but it does identify limitations of available metrics and areas for needed further research. Further, this paper does not address the objective to manage climate asset risk, although some strategies and metrics to address these two objectives are overlapping. The topic of carbon asset risk was covered in another PCI paper: Carbon Asset Risk Discussion Framework, published in August 2015.

The primary audiences for this paper are commercial banks and government-associated banks such as development finance institutions (DFIs). These banks may be of all sizes and located in all regions. Other intended audiences are governments, nongovernmental organizations (NGOs), and academics interested in understanding how they can advance banks’ efforts to improve their climate progress.

This paper was prepared by the following PCI partner organizations: 2 Degree Investing Initiative (2dii), the United Nations Environment Programme Finance Initiative (UNEP-FI), and World Resources Institute (WRI). Representatives from banks and other stakeholders provided feedback on a draft of the paper. See Annex B for a list of reviewers.

The most useful approach to assess the climate progress of a bank will vary, depending on the type of bank and the range of services it provides. In addition, the importance of climate progress considerations varies depending on the bank’s mandate, the regulatory and political environment it operates in, and the level of pressure from external stakeholders to take action on climate. In general, commercial and cooperative banks have as their main business objectives delivering value to their customers and shareholders, whereas public-sector banks may also be subject to public policy objectives and mandates. Thus, for commercial banks, the specific business driver for pursuing climate progress (as opposed to risk management) may be less clear. For such institutions, managing climate progress may be more related to reputational management and stakeholder engagement through traditional corporate social responsibility activities such as disclosure and reporting. However, an emerging driver for many banks is the business opportunity represented by rapidly growing sectors that are contributing to the energy transition, such as sustainable transportation and renewable energy.

A discussion of bank climate progress must begin with an understanding of the exact roles that banks play in the broader economy. Such services can largely be classified into four categories:

- **Retail banking:** banking services targeted at individual consumers rather than companies or other clients, including consumer lending (credit and debit cards, automotive loans) and mortgage finance, as well as savings products, deposits, and custodian functions.
- **Corporate banking:** a class of services similar to retail banking but targeted at corporate clients, including corporate loans and other credit products (e.g., lines of credit, letters of credit), financing for projects, equipment leasing, and commercial real estate activities.

- **Investment banking:** services performed by banks but relating to investment markets and traded securities, including underwriting, securitization, and advisory and merger and acquisition (M&A) services.
- **Investment and asset management services:** the management of investment portfolios for individual or institutional clients, including wealth management and institutional brokerage.

Scoping considerations: This report suggests the following asset classes as a reasonable scope for commercial banks to consider when measuring their climate progress:

- financing for projects;
- corporate lending to climate-related sectors;
- securities underwriting in these sectors;
- mortgages and auto loans; and
- asset management services.

Because banks are diverse, proper scoping of an accounting and reporting exercise is key to ensuring clear and meaningful reporting. On the one hand, the financing provided by public banks, particularly development banks, is generally fairly uniform. Many public banks invest primarily in development projects and local financial institutions rather than performing the diversity of intermediation services provided by universal banks. The situation is more varied in commercial banks, with different institutions taking part in different activities and with different levels of emphasis. This diversity makes measuring climate progress more challenging at the group level (i.e., across all business activities) for such banks. That said, measurement and reporting at an asset-class level can be practical and can be meaningfully compared across institutions using common metrics.

Within the recommended scope, banks should assess all the activities that are relevant to their business. However, several additional considerations are important. First, the different roles banks play in the economy can have different effects on climate problems and solutions. Further, depending on the type of financing, banks may not know exactly which activities are being financed (e.g., the concept of “use of proceeds” in the GHG Protocol Scope 3

Standard and Green Bond Principles). Disclosures are likely to be more meaningful when the use of financing is known. Finally, practicality of accounting considerations (e.g., double counting) and the question of what stakeholders desire from bank climate progress disclosure are also important.

Reviewing Existing Metrics

Using the recommended scope of relevant banking activities, this report reviews the existing landscape of climate progress metrics for banks and assesses the relative merits of these different metrics. The first step was a review of existing reporting by 35 large banks (14 development banks and 21 commercial banks, chosen using a combination of global size rankings and process participation). This review found three main categories of metrics currently being disclosed by intermediaries (Figure ES-1):

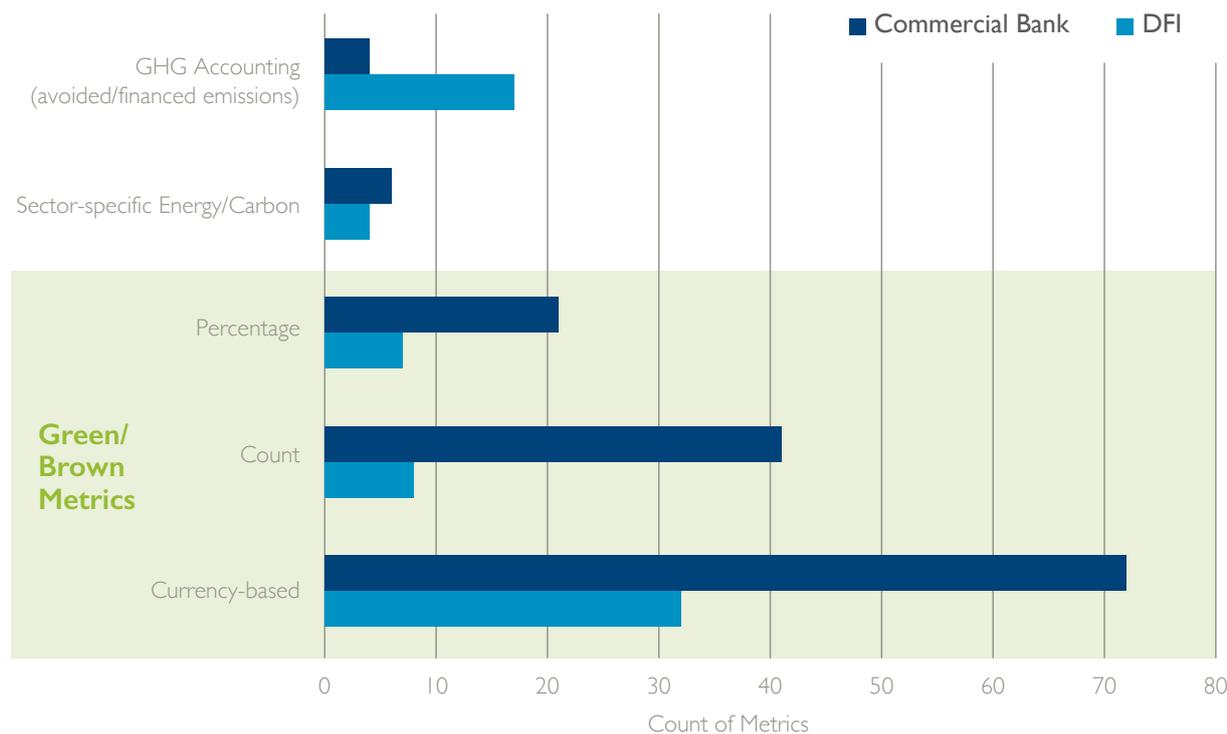
- GHG accounting approaches, which include project accounting and financed emissions.
- Other sector-specific energy and carbon metrics.
- Exposure-based green or brown metrics such as counts, percentages, and currency values, which measure the relative share of “green” or “brown” activities within a portfolio.

These three types of metrics are described further in Table ES-1.

GHG accounting approaches: Two types of GHG accounting approaches are relevant to financial institutions: project GHG accounting and “financed emissions” estimations. Corporate GHG accounting—for example, the GHG Protocol Corporate Standard—is less relevant because it covers only financial institutions’ operations and not their investment and financing activities.

Project-level GHG accounting uses methods set forth by the GHG Protocol Project Protocol, Clean Development Mechanism, or other methodologies (UNEP-FI et al. 2015; GHG Protocol Project Protocol 2005). The method accounts for the net GHG emissions or reductions from a baseline scenario based on project-level GHG accounting. Within the financial sector, this method is currently being used most actively by multilateral development banks to assess the avoided emissions associated with

Figure ES-1 | Number and Type of Metrics Currently in Use by Public and Commercial Banks



Source: WRI and UNEP-FI 2015.

financed projects.

The concept of financed emissions has been in active development in both banking and investing circles since at least 2005 (2dii 2013). Financed emissions can be defined as the portfolio-level aggregation of GHG emissions associated with a portfolio’s underlying entities or projects. The GHG Protocol Corporate Value Chain (Scope 3) Standard provides requirements and guidance to account for such emissions from selected asset classes, notably for equity investments, debt investments with a known use of proceeds, and project finance. The key distinction between project-level accounting and financed emissions-based approaches is that financed emissions approaches allocate the GHG emissions of investees proportionally to different investors or financiers based on their financial stake in the project or investee. For example, if a project emits 1,000 tons of carbon dioxide (CO₂)/yr. and is owned equally by two banks, the financed emissions allocated to each bank are 500 tons of CO₂/yr., whereas the project emissions are 1,000 tons CO₂/yr.

Financed emissions, when aggregated to the portfolio level, can show a broad picture of the portfolio’s exposure to underlying investee emissions. This is because one metric can be applied and aggregated across an

entire portfolio and used for various asset classes. The calculation of financed emissions does have several unresolved questions, including how to allocate emissions from an investee to the investor for different asset classes; a lack of clarity on whether to account for annual or lifetime emissions of an investee; lack of consistency on accounting across scope 1, 2, and 3 emissions of investees; and double counting of emissions across banks and within a bank. Additionally, due to data availability issues for underlying investees, emissions for some investees or counterparties may need to be estimated using techniques that can produce a high level of uncertainty at investee level. The Scope 3 Standard offers guidance on many of these issues, recommending reporting on proportional GHG emissions from investees due to activities in the reporting year.

Green or brown exposure metrics. Compared to other approaches, the use of green or brown metrics in existing bank disclosures is quite high (Figure ES-1), particularly among commercial banks. The majority of disclosed metrics tend to be measured either in terms of financial exposure (e.g., \$, €), counts of projects or activities identified as either “green” or “brown,” or as ratios (most often green: total or, more rarely, brown: total). If they are to be useful, such metrics must gain widely accepted agreement on what constitutes “green” and “brown.”

Table ES-1 | Climate Progress Metrics

CATEGORIES OF METRICS	SPECIFIC TYPES OF METRICS	DESCRIPTION
Greenhouse Gas Accounting	Corporate accounting	Corporate-level tracking of annual GHG emissions related to a company's operations
	Project accounting	Estimating net GHG emissions or emission reductions from projects relative to a baseline scenario
	Financed emissions	(Generally) portfolio level aggregation of GHG emissions associated with a portfolio's underlying entities or projects, allocated proportionally, based on financial stake in the underlying entity or project
Green/Brown Metrics	Exposure-based	Metrics that measure climate progress of a project, activity, or asset class in terms of exposure in financial terms such as \$ invested in green energy, counts such as number of energy star buildings in a real estate portfolio, or percentages such as % car loans to hybrids. Metrics could also be ratios such as \$ invested in hybrids or total \$ invested in cars
Sector-Specific Energy and Carbon Metrics	Physical unit-based (e.g., kWh, ft ² , km, etc.)	Metrics that are specific to a sector and expressed in absolute units (e.g., kWh generated) or intensity units (kWh/ft ²). Metrics can also be expressed in ratios such as kWh from green energy or total kWh generated from power generation

Source: Authors.

Today, such metrics are commonly used to report on a portfolio's exposure to green technologies, notably renewable energy and green-labeled assets (e.g., Leadership in Energy and Environmental Design [LEED] buildings). Reporting on the "brown" portions of portfolios is more limited.

Sector-specific energy or emissions metrics. A third type of metric, less used currently, involves reporting sector-specific energy and/or emissions metrics in either absolute terms (e.g., kilowatt hours [kWh] saved by projects, megawatts [MW] installed) or ratio terms (e.g., CO₂/kWh of power clients). Such metrics are potentially highly meaningful, since a key performance indicator (KPI) can be derived for each sector or technology in the most relevant terms. Based on the institutions reviewed for this paper, a striking split was observed between commercial banks, who reported primarily "green" metrics and DFIs, who reported both "brown" and "green" energy and GHG metrics.

Comparing Existing Metrics

Table ES-2 summarizes the pros and cons of the different metrics in terms of bank reporting on climate progress. Each type of metric may be appropriate for different types of banking assets and transactions. In general,

financial assets with known use of proceeds (e.g., financing for projects, green bonds, and project bonds) represent the most practical and meaningful uses of financed emissions and/or project-level GHG accounting, as the underlying activity to be accounted for is clear. Reporting the results of such accounting in either absolute (i.e., project GHG accounting) or proportional (i.e., financed emissions) terms can be relevant. Either way, it is particularly important to disclose whether the metric represents *total* (e.g., project-level) or *proportional* (e.g., financed) emissions.

The main advantage of GHG accounting approaches is that a single metric can be used to encompass an entire portfolio rather than just segments of the portfolio.

This applies at the asset class level; multi-asset portfolios are more difficult. Therefore, taking a broad financed emissions approach can also be useful for banks that are primarily interested in getting a broad picture of their overall exposure to GHG emissions and have a tolerance for using non-investee-specific, averaged data. The GHG Protocol Corporate Value Chain (Scope 3) Standard's requirements for accounting for emissions from investments are consistent with these findings.

On the other hand, green:brown ratios can

track both “green” and “brown” exposures with relative practicality. They can apply to investment banking services (e.g., advisory, underwriting) as well as on-balance sheet assets, and can provide sector- and asset-specific nuance when designed correctly. Their credibility and meaningfulness as disclosure metrics, however, depend on three critical needs:

- contextualization (both between “green” and “brown” categories, relative to overall portfolio levels, and relative to economy-wide averages);
- the use of clearly defined taxonomies of what constitutes “green” and “brown”; and
- the need for complete reporting covering both “brown” and “green.”

Conclusions

There is likely no universal approach to how to best measure the climate progress of banks, but general considerations can guide the way. The broad stakeholder engagement that contributed to this report suggests that some agreement can be found on a set of decision criteria that should guide banks in their climate-progress reporting. Such criteria can be summarized as follows:

- **Completeness:** Reporting should include all material parts of the bank’s business, notably including all parts of the bank financing climate-relevant activities and the financing of both climate “problems” (e.g., coal-fired power plants) and “solutions” (e.g., renewable energy). Current reporting practices often focus much more, sometimes exclusively, on “green” activities with little disclosure of high-carbon financing as specifically desired by many stakeholders.
- **Context:** Where possible, metrics should be compared to values outside the bank’s portfolio, such as ratios in the regional economy and required financing to meet global policy goals.
- **Fair share:** When banking activities occur in syndicates, reporting should be based on “fair share” of the activity, for both climate problems (banks shouldn’t be saddled with lifetime emissions of a coal plant if they were only part of an underwriting syndicate) and solutions. (Don’t claim \$10 million of “green”

if you represent 20 percent of a \$10 million syndicated loan.)

- **Transparency:** Information should be provided on the key assumptions and methodologies used to assess climate progress so the reader knows how to use the information and its limitations.

The emergence of regional dialogues is an important recent trend in bank climate progress tracking. There are several reasons why a regional approach makes sense. First, some types of stakeholders (e.g., responsible investor groups) can be regionally based and may be interested in different types of disclosed metrics, including the relative focus on climate-related risks vs. climate progress. Further, financial regulation can vary by market, driving differences in confidentiality requirements and peer group practices. Finally, given different resource endowments, development levels, and existing energy systems in different countries, relatively green practices in one location may not necessarily be generalized to other markets.

Benchmarks and roadmaps are urgently needed to address one of the main weaknesses of all existing metrics, which is their inability to contextualize “how much is enough.” In other words, how little “brown” or much “green” must a bank’s portfolio have to ensure that it is doing its part for the achievement of global climate policy goals? Such benchmarking is currently possible in certain asset classes (e.g., listed equity and corporate bonds based on the EU-funded Sustainable Energy Investment Metrics project) for certain sectors. There is a need for science-based targets and benchmarks that show, by asset class and transaction type, how “green” or “brown” different portfolios can be while still meeting the needs of the global energy transition. Research is under way by various organizations to create such benchmarks and road maps for financing the transition. Tools are already available for many asset classes, including listed equity, corporate bonds, and real estate.

Recommendations

- Different metrics are appropriate for different asset classes, or activities, or both, so banks may want to report using a variety of metrics to cover all their relevant asset classes and activities.

Table ES-2 | Pros and Cons of Different Climate Performance Metrics

	DESCRIPTION & EXAMPLES	APPLICATION	PROS	CONS
GHG Accounting Approaches	Cross-sector portfolio-level assessment of investees' exposure to GHG emissions such as financed emissions (a bank's scope 3 emissions)	<ul style="list-style-type: none"> Connecting the dots between portfolios and GHG emissions in the real economy Project finance screens (e.g., lifetime GHG emissions > 50 Mton) Public communication & reporting, particularly for assets with known use of proceeds 	<ul style="list-style-type: none"> Broad information on carbon emissions of sectors and portfolios Directly measures contribution of each transaction (if proportional, i.e., for financed emissions) Metric works across sectors and asset classes, thus enabling portfolio-level reporting 	<ul style="list-style-type: none"> Emissions data availability Inability to track "green" activities directly (except through avoided emissions accounting) Lack of accounting standard and agreement on some measurement issues Data availability and confidentiality issues outside listed companies and projects Difficult to apply to off-balance sheet services
Sector-Specific Energy/Carbon Metrics	Sector-specific physical unit metrics expressed in absolute units (e.g., kWh generated) or intensity units (kWh/ft ²)	<ul style="list-style-type: none"> Measuring sector-level climate performance Comparing portfolio performance to economy-wide averages 	<ul style="list-style-type: none"> Sector- and asset-specific indicators can provide nuance and context Benchmarks possible for transition (e.g., 2°C scenarios) 	<ul style="list-style-type: none"> Only applicable for a number of key sectors No obvious way to aggregate data across sectors or assets and/or transactions
Green / Brown Metrics	Taxonomies distinguishing between activities and technologies that are climate solutions ("green") and climate problems ("brown")	<ul style="list-style-type: none"> Tracking both "green" and "brown" financing in the context of portfolios Tracking and reporting for any transaction or asset type, including services 	<ul style="list-style-type: none"> Ability to track both "green" and "brown" Exposure metrics easy to track Applicable to off-balance sheet services and on-balance sheet assets 	<ul style="list-style-type: none"> Controversial technologies and taxonomies (e.g., are natural gas, nuclear, CCS, biofuels "green" or "brown"?) Lack of standard taxonomy

Source: Authors.

- To fully understand a bank's contribution to the low-carbon transition, there needs to be more comprehensive reporting on activities related to climate problems in addition to climate solutions. Banks should not be reporting on their contribution to climate solutions without also reporting on their contribution to the climate problem.
- Banks should consider the criteria of completeness, context, fair share, and transparency when evaluating and choosing metrics to assess climate progress.
- GHG accounting approaches, including project emissions and financed emissions, are the most useful for asset classes when the use of proceeds is known. Financed emissions may also be useful to provide a high-level picture of a bank's exposure to emissions.
- A green or brown metric is recommended when a bank wants to understand both its significance of exposure to climate solutions and problems in relation to each other.
- The current discussions on the climate progress of banking exhibit strong regionality. Therefore, the best selection of accounting and reporting metrics may vary regionally. Peer comparisons and stakeholder outreach can be important aspects for performance tracking.
- Most importantly, in spite of evolving climate-friendliness assessment practices, banks should not wait to begin measuring and disclosing metrics on climate progress and tracking performance. Meaningful and practical metrics are currently available for numerous asset classes, and banks can improve their approach over time as more useful metrics become available.

INTRODUCTION & CONTEXT

SUMMARY OF MAJOR POINTS

- Climate change and the transition to a low-carbon economy are increasingly prominent issues for banks, which provide much of the external financing needed for the transition (either directly or indirectly through securities underwriting).
- Banks can have two primary objectives for estimating their contribution to climate change and the low-carbon transition: carbon risk and opportunity (a business objective) and climate progress (broader societal considerations). The appropriate metrics to track, use, and potentially report on each objective are likely different.
- Public banks and commercial banks differ in the primary reasoning for assessing climate progress, with many public banks having an explicit or implicit climate mandate, while commercial banks may be driven more by commercial and possibly reputational issues. Both may pursue long-term business opportunities in the transition to the low-carbon economy.

1.1 Background

Climate change is an increasingly prominent issue for banks. In the lead-up to the United Nations Framework Convention on Climate Change (UNFCCC) Conference of Parties (COP 21) in Paris, many of the world's largest public-sector¹ and commercial banks made commitments related to climate change mitigation and adaptation, including statements of climate policy support as well as commitments to either decrease the financing of “climate problems” (e.g., coal mines) or increase the financing of “climate solutions” (e.g., renewable energy). As just one example, a set of 23 public and commercial banks signed a set of five voluntary principles to “mainstream climate action” within their institutions in December 2015 and included risk management and climate progress tracking objectives.² At the same time, increasingly ambitious climate mitigation policies, including a reaffirmation of the global goal to limit warming to well below 2°C (and to strive for 1.5°C), have further solidified the potential financial risk associated with climate problems (alternatively referred to as carbon asset risk, transition risk, or simply carbon risk) and the potential upside or opportunity associated with financing climate solutions. These two concepts can be referred to as *climate progress* and *carbon asset risk*, respectively (2dii et al. 2015), and are further explained below.

Purpose

The purpose of this report is to inform the ongoing debate about how banks (public and private) should assess and report their contributions, both positive and negative, on climate change. The report represents the outcome of a multistakeholder process that is summarized in more detail in Annex A, originally called the Financed Emissions Initiative (FEI) and later renamed the Portfolio Carbon Initiative (PCI). Importantly, this report represents the third sister report in a series through the PCI, with the first two reports focused on metrics and strategies for institutional investors (2dii et al. 2015) and managing carbon asset risk (UNEP-FI and WRI 2015), henceforth referred to as Investor Report and Carbon Risk Report, respectively, or sister reports, collectively. Throughout this

BOX I. DISTINGUISHING BETWEEN THE REPORTING OF BANKS' CLIMATE PROGRESS AND BANKS' GREEN FINANCING

Climate progress and *green financing* are frequently used interchangeably, but even if they are linked and do overlap, they have important differences.

The concept of green financing, as currently applied in the reporting practices of banks, focuses on the *transaction level* and typically encompasses all transactions that enable financial flows toward assets (companies and/or projects) that qualify as being of a low-carbon nature (for the sake of this exercise, the concept of “green” and sustainable development is reduced to the concept of low-carbon development). The financing of such assets can undoubtedly be considered supportive of, or conducive to, a low-carbon economy, yet there are generally two major shortcomings in banks' reporting on green financing:

- First, these reports are *incomplete* because they are selective and provide transparency on green

financing without doing so on all the other financing, including the potentially “brown” financing provided. This means that they fall short of enabling a full reflection of the bank's overall financing as it pertains to GHG emissions and decarbonization pathways and therefore fail to comply with the important *Completeness* principle of sound reporting.

- Second, applicability of the concept of green financing is limited to sectors where technological and/or infrastructural taxonomies of green versus brown technologies are themselves meaningful or feasible. This includes the important electricity generation sector (albeit with certain caveats) but excludes other sectors (or subsectors) that are significant in terms of GHG emissions and low-carbon development, such as airlines, cement, and car companies.

The concept of climate progress of banks can address these two shortcomings by going beyond the transaction level and covering the bank's entire portfolio, including full sector exposure and the entire balance sheet (also including, at least in principle, the bank's off-balance sheet operations). Climate progress can go beyond measures of the volume of green financing provided and look at the entire portfolio to gauge the financial institution's degree of alignment with a low-carbon economic transition across all relevant sectors. As such, it would comply with the *completeness* requirement of sound disclosure and allow for a full and fair assessment of a bank's climate-related behavior and impact. This report proposes a wider range of sector-tailored metric families, including green/brown metrics, GHG emissions and intensity metrics, and others that can be used for this purpose.

report, these reports will be cited heavily, and certain topics will be covered in less detail here due to their expanded coverage in the sister reports.

As described in greater detail in Annex A, the PCI stakeholder process did not produce enough agreement on critical issues to produce a common standard reporting framework for bank climate progress (but it may be a first step in working toward this goal in the future). Likewise, this report does not attempt to present any single best way to measure and report on bank climate progress. In fact, given the issues discussed in chapters 2 and 3, it may not be possible to define any single best approach given the immense variability among different types of banks, banking activities, and individual institutions. Instead, the report reviews the available metrics and approaches for measuring the climate progress of banks, assessing each with respect to three main criteria:

Practicality: How easy is it to get underlying data? How complete are such data? Are there regulatory constraints?

Meaningfulness: Does the metric communicate the real-world effects of the financing decision? Can it be used for internal decision-making? Is it comparable across banks with different business models? Does it measure both “brown” and “green”?

Applicability: Which metrics are applicable to which asset class, or transaction type, or both?

The report is structured around a set of key questions:

- *What are the business drivers for banks to consider the effects of their activities on climate change? (Chapter 1)*
- *What roles do banks play in financing the economy, and how can these different roles affect climate change? (Chapter 2)*

- *What are the metrics that can help inform and track the climate progress of banking activities, and what are their strengths and weaknesses? (Chapter 3)*
- *Given the available approaches and metrics and their strengths and weaknesses, what principles can be applied today; and how can actions best be reported? What does the future hold? (Chapter 4)*

1.2 Defining the Business Objective

Financial institutions can have at least two distinct climate-related objectives.³

As discussed in previous reports, these objectives likely have different, but potentially overlapping, management strategies. These include the following:

- **The carbon asset risk or climate opportunity objective stems from a business objective**, suggesting that the transition to a low-carbon economy may create financial risk and/or investment opportunities for financial institutions. These risks and opportunities are driven by changes in climate policies, the associated economic value chain, changes in the relative economics and viability of different technologies, and public- and private-sector investment decisions. In December 2015, nearly 200 countries adopted the Paris Agreement, the first-ever universal climate agreement that seeks to “strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.” This gives a clear long-term signal that investment decisions should be taken in the context of this long-term decarbonization signal (zero net emissions in the later part of this century). However, despite recently increasing ambition in climate policy arising from the 2015 Paris Agreement, the near-term materiality of this risk for investors is still unclear, and this near-term view drives most financial decision-making despite the clear long-term risks of climate change.⁴ Short-term risk will depend on portfolio composition, the expected time frame of these risks, portfolio diversification effects, and underlying assumptions about public policy and technological progress to drive large-scale decarbonization. As discussed in the Carbon Risk Report, the materiality of carbon asset risk may be lower for short-term lending portfolios than equity portfolios due both to their position in the capital stack and the often shorter-term nature of lending relationships (UNEP-FI and WRI 2015).
- **The climate progress objective stems from a broader societal objective**, suggesting that some banks may seek to contribute to GHG emissions reductions and the transition to a low-carbon economy in response to internal or external pressures that go beyond risk management. These could include the bank’s mission, its external mandate, corporate social responsibility considerations, and reputational concerns. Importantly, climate-friendly financing strategies will not necessarily lead to GHG emissions reduction impacts in the real economy (chapter 2). Thus, this report distinguishes between a bank’s *climate progress*, its *intended* contribution to the transition in the real economy, and *climate impact*, the *actual* contribution to climate mitigation in the real economy, and focuses on the former as the most feasible proxy for the latter.

These two topics (carbon asset risk and climate progress) are often discussed interchangeably, and some metrics (e.g., green or brown metrics) may at least partially be used to measure and manage both of them. In reality, though, they are quite distinct issues that in most cases will require different measurement and management strategies. This is because the climate progress of an investee or a portfolio of financial holdings is a necessary but insufficient criterion for assessing risk exposure, which is a function of climate progress as well as many other characteristics like market positioning, geography, pricing power, and future plans of the investee and asset class and tenor of the financial instrument (2dii 2015; UNEP-FI and WRI 2015).

This report focuses on the measurement and reporting of climate progress rather than carbon asset risk. This distinction is by design and due to two primary reasons: first, because metrics and management techniques are distinct in each, and second, because several reviews of carbon asset risk have recently been published (UNEP-FI and WRI 2015; CDC Climat Recherche 2015; Bank of England 2015).

Table 1 | Typology of Major Types of Banks

	COMMERCIAL BANKS	COOPERATIVE BANKS	PUBLIC BANKS
Owners	Institutional investors/individual shareholders	Depositors/members	Municipalities, states
Major Bank Types	Investment banks, retail banks	Cooperative banks, credit unions	Savings banks, national and regional public banks, development banks, export-import banks
Main Customers	Corporate and institutional clients, small and medium-size enterprises (SMEs), households	SMEs, households, and projects	
Geographic Scope	National and international	Regional for cooperatives and savings banks + national and international for development and export-import banks	
Business Objective	Revenue, profit, shareholder value, customer value	Customer value	Customer value and policy objectives

Source: Authors, based on Deutsche Bank 2013.

Nonetheless, it is not always easy to distinguish fully between these related but distinct objectives. For instance, many public banks perform climate progress type calculations as part of an environmental and social risk management process. Similarly, many commercial banks engage with interested stakeholders (e.g., civil society, investors, regulators) on both climate progress and carbon asset risk issues simultaneously. The report focuses on the assessment of climate progress while addressing risk-related issues where they are relevant and directly connected. It should also be noted that climate progress is often equated with green financing, but this report argues that they are fundamentally different (see Box 1).

1.3 Typology of Banks

The relative importance of climate progress considerations, as well as the specific performance objectives of a bank, will vary depending on the type of bank and its mandate—particularly whether the bank is partially or wholly publicly owned. Table 1 shows a basic typology of major types of banks, including commercial, cooperative, and public banks. Although all banks will have as their main business objectives delivering value to their customers and shareholders, public banks may also be subject to public policy objectives and mandates.

1.3.1 Public Banks

Some public and development banks and international financial institutions (IFIs) have climate mitigation or adaptation explicitly in their mandates, and others include climate-related criteria as part of an implicit mandate or policy objective adopted by governance bodies (NCI et al. 2015). Here are some examples:

In France, the Banque Publique d’Investissement (Public Investment Bank), created in 2012, has a specific mandate to finance the “ecological transition” (Art. 1). While not a bank *per se*, the French Pension Fund (Fonds de Réserve pour les Retraites, FRR) “report[s] on the way the general guidelines of the Fund’s investment policy took into account social, environmental and ethical considerations.”

The German Kreditanstalt für Wiederaufbau (KfW) Group has a mandate focused more broadly on environmental protection and, for distinct business areas on development, export finance or support of small and medium enterprises (SMEs), respectively (KfW 2013, Art. 2.1).

The United Kingdom created a national Green Investment Bank (GIB) in 2012 with a specific climate and environmental mandate. From 2015, the GIB will also invest internationally.

BOX 2. INTERNATIONAL FINANCIAL INSTITUTION (IFI) GHG ACCOUNTING HARMONIZATION PROCESS

In 2012 a group of 13 IFIs came together to formalize their collaboration and harmonize their approaches to project-level accounting for estimating GHG emissions reduced or avoided and to establish minimum standards for climate-related accounting and reporting. Carbon accounting issues had begun to be discussed much earlier around IFI consultations on the Equator Principles and environmental and social risk management practices. Because the framework applies only to finance for projects, project-type GHG accounting is performed whereby the emissions associated with the project are measured relative to a baseline scenario that generally reflects either no action or the prevailing market conditions in the country or region. In late 2015, the group released sector-specific guidance for the accounting of GHG emissions reduced or avoided in three sectors: transportation, energy efficiency, and renewable electricity (IFI 2015). The IFI process is revealing: It took several years to standardize such accounting and reporting even for a relatively homogeneous and “public-interest-driven” constituency. Several interim steps were involved, including agreement on a common set of definitions for climate relevance or friendliness and methodologies for calculation, particularly with regard to the baseline. As IFIs come under increasing scrutiny for their climate relevance, advancements in extra-financial disclosure as well as standardization of this disclosure, will likely evolve from the current focus on “green” to a more comprehensive view of the portfolio that includes “brown” activities. The harmonization is also likely to extend to commercial IFIs and rating agencies, as investors demand more transparency and disclosure.

Climate assessment often takes place as part of the larger environmental, social, and governance (ESG) risk assessment, which is itself part of a variable decision-making process specific to the bank in question. As an example, while the World Bank’s guiding principle is to alleviate poverty, it also has stated goals to increase access to sustainable energy, leading to a balance between cost effectiveness and climate protection in project assessment and development (NCI et al. 2015). In responding to such mandates, IFIs have built up a rich history of accounting for the GHG emissions associated with specific financing

decisions. Since 2005, IFIs have been individually devising approaches to report on the climate progress of their investments and account for the climate benefits of certain types of financing decisions, with attempts to standardize these approaches bearing fruit in 2012 (Box 2).

1.3.2 Commercial Banks

“Brown” Financing

Banks have a rich history of stakeholder engagement on environmental and climate-related issues. Often, such engagement has focused on quantifying the financing of climate problems (“brown” technologies), for reasons related to both environmental risk management and broader societal responsibility. Some initiatives specific to the finance sector have occurred for “brown” financing, notably the Equator Principles on financing for projects launched in 2003,⁵ which require participating banks to adhere to common environmental and social performance management measures, including public reporting on projects that generate more than 100,000 tons CO₂e/yr. in emissions.

However, given that most commercial banks are publicly listed companies themselves, a significant amount of engagement on “brown” financing assessment and reporting has occurred through broader environmental performance and disclosure initiatives that are not specific to the finance industry. These include the Carbon Disclosure Project (CDP), the Global Reporting Initiative (GRI), and national GHG emissions registries in some countries. Particularly important to this broad history was the development of the concept of “financed emissions”—emissions attributed to a specific financial position in a GHG-emitting project or company, or aggregated to portfolio level. The history of such accounting has been documented previously (2dii 2013) and is summarized in Box 3 and illustrated in Figure 1.

“Green” Financing

In addition to stakeholder demands for disclosure on financing of “brown” technologies, many commercial banks have made public commitments with respect to their financing of climate solutions (“green” technologies). Such commitments are becoming widespread, as illustrated in Box 4. This is a rapidly evolving area of bank activity, and the examples below, although far from exhaustive, show some of the characteristics of such commitments.

BOX 3. FINANCED EMISSIONS AND GHG PROTOCOL SCOPE 3 HISTORY

In the past 10 years, about 20 different calculation methodologies have been developed to assess GHG emissions related to investments. Most approaches rely on the application of standardized greenhouse gas accounting methodologies (based on the GHG Protocol), specifically applied to carbon-intensive projects (power plants, oil and gas projects, etc.). The application at portfolio level is more recent and originates from four parallel trends:

- Reaction to nongovernmental organization (NGO) pressure. In the mid-2000s, environmental NGOs, such as World Wildlife Fund and Platform, developed assessment methodologies to calculate projects' footprints as part of their campaign against "dirty" projects. Some banks responded by implementing their own assessment framework based on the a 'bottom-up' approach. The consultancy *Profundo* extended this approach in 2007 to various types of financing based on publicly available data in order to rank banks on the basis of their level of involvement in the "financing of climate change." NGOs, such as Friends of the Earth, Rainforest Action Network, and Greenpeace and its international network BankTrack, have also commissioned studies. More recently, the Carbon Tracker Initiative

developed a similar bottom-up approach focused on the ownership of fossil-fuel reserves.

- Innovation from equity managers. At the same time, two equity managers (Henderson Global Investor and Pictet AM) commissioned *Trucost* and *Inrate* to estimate the carbon footprint of equity funds for research and marketing purposes. At the time, the Carbon Disclosure Project (CDP) was still in its infancy. Given the lack of standardized reporting and its aim to include supply chain emissions, the CDP developed top-down approaches, mostly based on input-output macroeconomic models. Over the years CDP data have been used by other equity managers (to develop "green" funds), by index providers (e.g., NYSE-Euronext), and consultants publishing fund rankings. More recently, in 2010 and 2013, respectively, new players—namely, South Pole Carbon and Bank of America Merrill Lynch—used mathematical models to extrapolate the carbon emissions reported by listed companies to estimate a broader spectrum footprint. Such data are now available in several mainstream financial databases (2dii et al. 2015. "Climate Strategies and Metrics: Exploring Options for Institutional Investors).

- Adoption of the Scope 3 Standard. Financed emissions were included as a category (Category 15) of Scope 3 emissions in the GHG Protocol Scope 3 Standard in 2011. Coverage is largely limited to debt with known use of proceeds (namely, project finance and similar loans) and significant equity investments, although optional reporting can be made for generic debt instruments and small equity investments. A desire to provide more detailed guidance on the Scope 3 category led to the launch of the Financed Emissions Initiative, which later became the Portfolio Carbon Initiative.
- Investor commitments in the lead-up to COP 21. In the lead-up to the critical UN climate negotiations in Paris in 2015, two investor climate pledges were announced: United Nations Principles for Responsible Investment's (UNPRI) Montreal Pledge focuses on mobilizing investors to measure and disclose the carbon footprint of their portfolios, and the Portfolio Decarbonization Coalition (PDC), led by CDP and UNEP-FI, focuses on decarbonizing portfolios.

Source: Adapted from 2dii (2013).

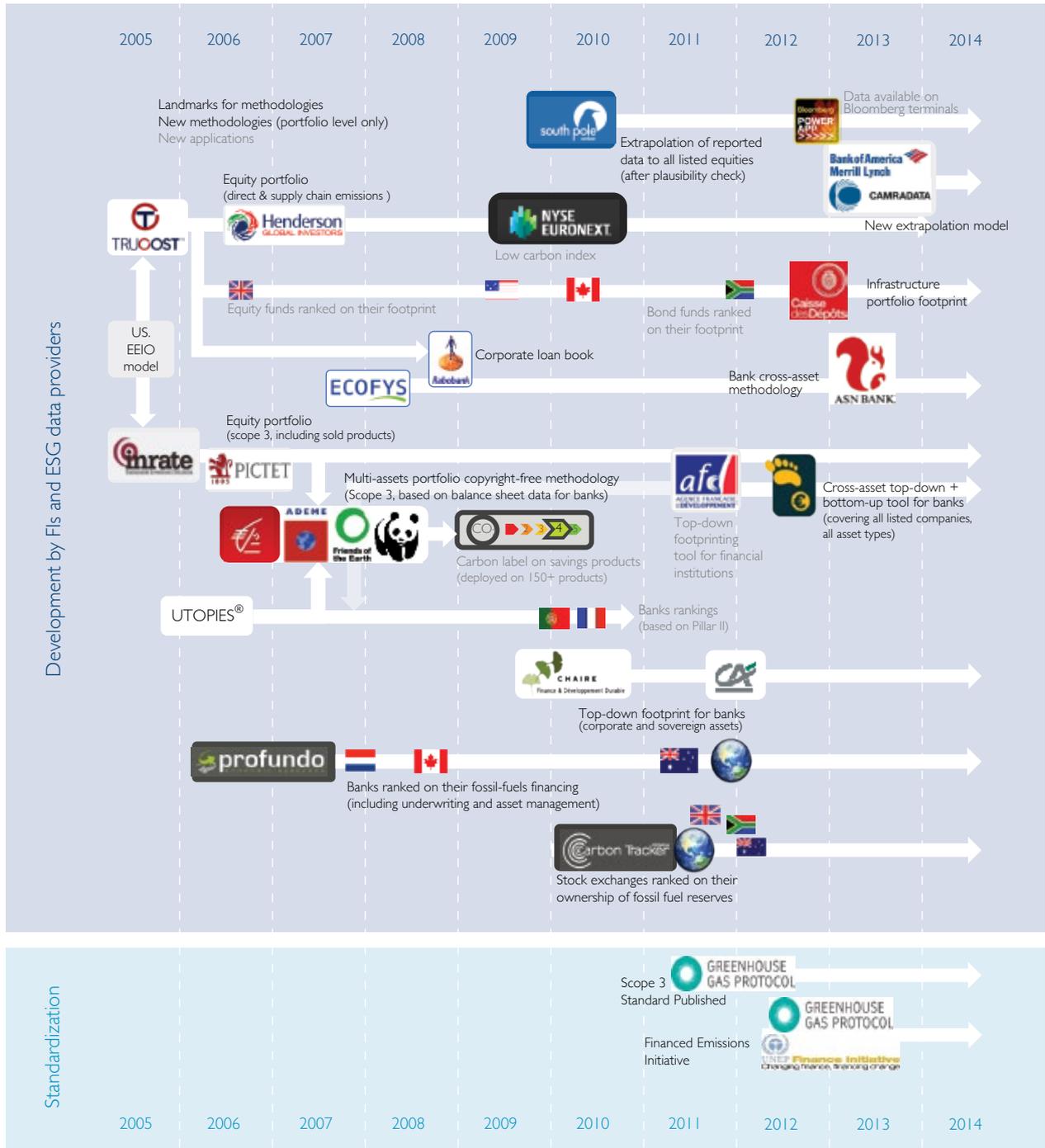
1.3.3 Differences between Banks and Investors

The Portfolio Carbon Initiative reviewed climate metrics and strategies for institutional investors in the parallel Investor Report (2dii et al. 2015). The study discussed how climate progress strategies (see Figure 2) for institutional investors consist of

- investment activities (portfolio construction and engagement);

- positioning and signaling (whether and how an investor publicizes its strategic activities); and
- a series of performance metrics that can track progress toward improving portfolio climate progress (including GHG accounting, green or brown metrics, and qualitative ESG or climate scores).

Figure 1 | Short History of Financed Emissions



Source: Authors.

BOX 4. GREEN FINANCING COMMITMENTS

The examples in this box show the variability of green financing commitments made public over the last decade by an illustrative sample of private financial institutions. Generally, most of these commitments take the form of a total monetary value (e.g., \$X billion over Y years) of financing across a variety of banking activities, including lending, investment management, bond issuance, advisory services, and more general financing. Such commitments can take place within a climate-specific context or as part of a broader “green” or socially responsible context, as seen by the types of sectors and activities covered in the table below. It is not always possible to ascertain from public

statements how the accounting of such commitments is performed, including such issues as how to add together different transaction types, how multiple counting for syndicate financing is treated, etc.

Importantly, such commitments are underpinned by a variety of different motivations related to environmental risk management, broader societal responsibility, and the mobilization of investors. These quotes are taken from press releases for the selected initiatives, respectively, in the table below:

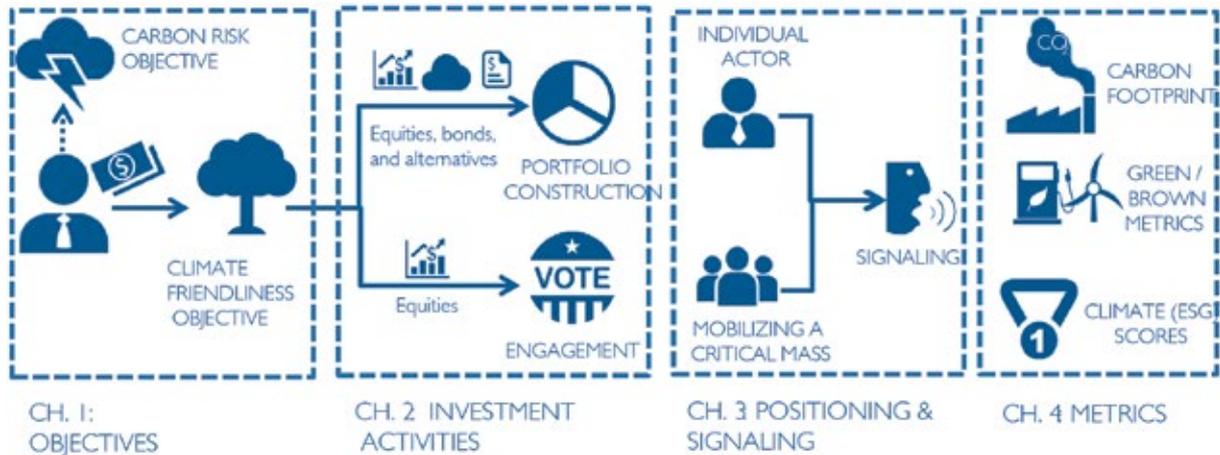
- “We understand some of our stakeholders view our financing of

fossil fuel industries as a material risk and in direct conflict with our stated position on the need to reduce greenhouse gas emissions.”

- “[D]evelop innovative and scalable solutions that attract new investors and additional capital to clean energy and low-carbon infrastructure opportunities.”
- “[H]elp deploy capital to scale up clean energy technologies” and “[P]lay a catalytic role and facilitate financial innovations in clean energy.”

	ASSETS/TRANSACTIONS COVERED	SECTORS/ACTIVITIES COVERED
ANZ Climate Change Statement (Revised 2015)	<ul style="list-style-type: none"> • Lending • Investment services • Advisory • Other markets transactions 	<ul style="list-style-type: none"> • Energy efficiency in industry • Low emissions transport • Green buildings • Reforestation • Renewable energy and battery storage • Emerging technologies (such as carbon capture and storage) • Climate change adaptation
Bank of America Environmental Business Initiative (Updated 2015)	<ul style="list-style-type: none"> • Lending • Investment services • Capital raising/bonds • Advisory • Developing financing solutions 	<ul style="list-style-type: none"> • Energy efficiency • Renewable energy and transportation • Water conservation • Land use • Waste
Goldman Sachs Environmental Policy Framework (Revised 2015)	<ul style="list-style-type: none"> • Underwriting/financing • Coinvestment 	<ul style="list-style-type: none"> • Renewables (solar, wind, sustainable hydro, biomass, geothermal, advanced biofuels) • Energy efficiency • Advanced materials, energy storage, • LED lighting • Electric vehicles • Renewable energy transmission

Figure 2 | Summary Figure of PCI Institutional Investors Report Describing Climate Strategies and Metrics for Investors



Source: 2dii et al. 2015.

This framework has several parallels with considerations of climate metrics for banks. Notably, as discussed above, many banks (particularly commercial banks) are driven by some of the same objectives as investors with respect to tracking climate progress, including minimizing financial risk associated with climate change and contributing to the transition to a low-carbon economy for reasons such as mandates and reputational management. Further, as discussed in the following section, many of the same metrics for tracking climate progress currently used by investors are available to banks as well.

However, there are also several critical differences between banks and investors with respect to tracking climate progress. These include the following examples:

- Intermediaries act as both asset owners (i.e., financial assets on a balance sheet) as well as service providers to asset owners and other economic actors through securitization, mergers and acquisitions and advisory services, underwriting, and asset management services.
- Most private intermediaries are themselves listed companies with both financial and nonfinancial (e.g., Global Reporting Initiative, CDP, Dow Jones Sustainability Index) report-

ing obligations that have not historically applied to institutional investors (with the exception of insurance companies), although institutional investors are increasingly under such pressures.⁶

- Reputational risk may be more significant for commercial banks, *as compared to investors*, due to consumer choice (i.e., in some markets individuals may not be able to choose their pension fund but can choose their bank).
- Banks generally have a larger presence of non-listed companies and SMEs than their equivalent in investment portfolios (e.g., equity and corporate bonds). This has two practical consequences that are discussed further in the next chapter:
 - Data and confidentiality challenges may be significantly greater for commercial banks than for institutional investors because financial and environmental data of counterparties may be private and of varying quality or not subject to regulatory reporting.
 - Comparative benchmarks (e.g., equity indexes) are more widely available for investor asset classes than for commercial lending portfolios.

THE ROLE OF BANKS IN THE ECONOMY AND THE IMPLICATIONS FOR ASSESSING CLIMATE PROGRESS

SUMMARY OF MAJOR POINTS

- Banks play a variety of roles in providing finance to the real economy, including direct lending to consumers, businesses, and governments; asset management for institutional and individual clients; and securities underwriting.
- Through these different roles, banks affect the financing of climate problems and solutions in several ways: direct lending that contributes to climate problems and solutions at the consumer (mortgages, auto loans), business, and government levels; investment products and practices; and the underwriting of financial securities with underlying “green” and “brown” assets.
- Different types of banks have different business models. Given the differences between bank types, transaction and asset class types, and the variability across banks, a one-size-fits-all approach to measuring bank climate progress is unlikely to lead to comparability. Instead, a tailored approach following common principles, methodologies, and a menu of different metrics specific to different types of banking activities is more likely to be meaningful.
- Since most large banks affect the real economy through numerous types of financial instruments and activities, tracking and reporting of climate progress across all banking activities is not necessarily relevant. This report focuses on the highest priority areas from the standpoint of both stakeholder concern and impact: financing for projects, commercial lending and securities underwriting for “green” and “brown” technologies, mortgages and auto loans, and wealth management.

2.1 How Do Banks Finance the Economy?

Banks have differing business lines and play many different roles in financial intermediation (matching lenders to borrowers) in the economy. This creates many challenges in measuring the climate progress of banks. Banks may classify their activities differently or have different organizational groupings for them, but in general, the main categories of intermediation can be summarized as follows:

- **Retail banking:** banking services targeted to individual consumers rather than companies or other (institutional) clients. With regard to tracking climate progress, relevant services in this category include consumer lending (credit and debit cards, automotive loans, white goods) and mortgage finance. Some “green” savings products are also emerging.
- **Corporate banking:** services targeted to corporate clients, such as corporate loans and other credit products (e.g., lines of credit, letters of credit), financing for projects, equipment leasing, and commercial real estate activities. The corporate banking category can also be thought to include interbank lending, which is not included in the scope of this report.
- **Investment banking:** services performed by banks relating to investment markets and traded securities. Services relevant to climate progress include

- underwriting debt and equity securities for corporate and government clients (equities and corporate, sovereign, and municipal bonds);
- securitization of pooled mortgage-backed securities (MBS) and other asset-backed securities (ABS); and
- advisory and merger and acquisition (M&A) services.

- **Investment and asset management services:** the management of investment portfolios for individual or institutional clients, including wealth management and institutional brokerage.

In short, banks provide intermediation by raising funds through retail and wholesale deposits, by issuing equity and debt in the bank itself, by fees associated with investment banking activities, and by using these funds to finance loans and provide other credit to individuals, companies and projects, and governments. As a part of this intermediation, the bank holds a certain portion of its financial assets on its balance sheet (notably loans), with other assets held for third parties (assets under management, AUM) or as off-balance sheet activities (e.g., financial derivatives and other financial commitments such as letters of credit), which are beyond the scope of this report.

Not all banks take part in all the activities described above, and the relative share of each varies considerably across different banks. Banks are categorized above based on the majority of the bank’s activities. For instance, a bank that primarily performs retail banking services is often referred to as a retail bank, while one that focuses on investment activities is called an investment bank. In some countries, it is common to refer to a bank that performs both commercial and investment banking activities as a universal bank.

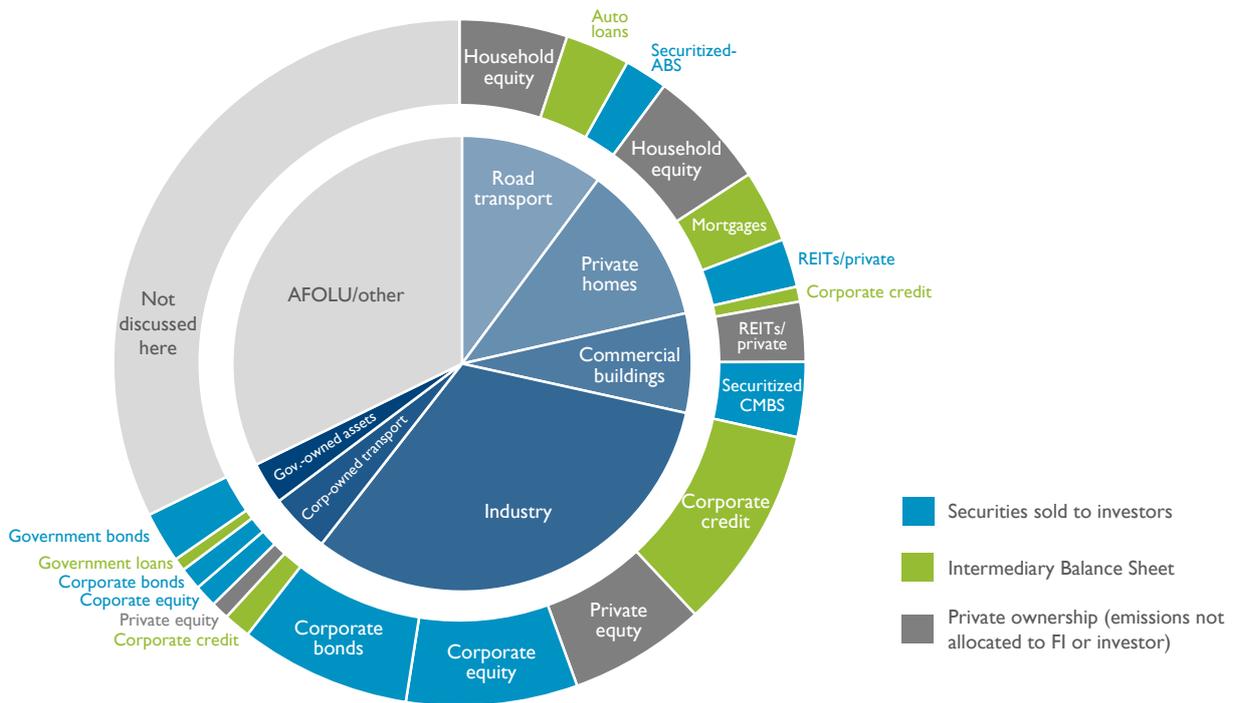
The financing provided by public banks, particularly development banks, is generally more uniform, given that many invest primarily in development projects rather than performing the diversity of intermediation services provided by universal banks (NCI et al. 2015; CPI 2015).

2.2. How Do These Roles Affect Climate Problems and Solutions?

As seen above, banks play different roles in financing economic activity, with varying effects on contributing to climate problems and solutions. Determining which of these roles is most important for funding climate problems and solutions is challenging, and the answer likely varies considerably between banks. For example, retail and corporate banking activities lend money directly to households and companies, which may produce GHG emissions or reduce them, depending on how the funds provided are used, while investment products and investment banking activities can help shift the larger pools of investor assets toward climate solutions or contribute to climate problems, depending on how they are directed. Figure 3 provides a schematic illustration of how the banking roles discussed above relate to the largest areas of climate impact; i.e., highest GHG emissions. The center pie of the diagram shows the shares of global GHG emissions by economic sector, while the outer circle depicts financial ownership and the three types of roles banks play in financing—loans and mortgages held on balance sheets (green), securities sold to investors (blue), and retail investors or private ownership (dark gray). A large portion of global emissions is due to agriculture, land use, land use change, and forestry (AFOLU). However, AFOLU are considered beyond the scope of this paper due to the fundamentally different nature of economic activity, GHG emissions, and climate-friendly behavior relative to energy and fossil fuels.

As illustrated in Figure 3, the largest shares of global emissions outside of AFOLU are generated by industry, buildings (both commercial and residential), and road transportation (notably personal automobiles but also on-road freight). These major emissions sources are linked to both banking balance sheets (through corporate, project, mortgage, and auto-loan books) and to investment banking services through the securities backing these entities (corporate equity and bonds, mortgage backed securities, ABS). The same logic can be used for “green” finance—these types of transactions and assets are most important for avoiding emissions through financing “green” rather than “brown” activities—to the extent that the financing structures of

Figure 3 | Schematic of Global GHG Emissions and Financial Intermediary Roles in Their Financial Structure (External Financing Only)



Note: Data on financing shares are illustrative only and do not reflect actual ratios.
 Source: Authors, GHG breakdown based on IPCC 2013.

“green” and “brown” activities are similar.⁷ Thus, at its simplest expression and within a strictly emissions-related accounting framework, the categories of banking transactions and assets that are most related to climate progress and are logically the most important ones for banks to account and report on are corporate credit (including financing for projects), mortgages and auto loans to consumers, and underwriting of securities associated with these entities.

However, several additional issues complicate this simplistic accounting exercise.

Climate progress vs. impact. An important consideration is the extent to which different financial assets and transactions actually have an impact in the real economy, an issue closely tied to the concept of additionality. Additionality is when an individual financing decision changes what would have occurred compared to business as usual. Some banks have begun to move toward

the logic of positive impact or catalytic finance, stressing that innovative financing mechanisms, in particular for “green” technologies, will be needed to meet international climate goals. However, such considerations are largely outside the scope of this report. Additional work on bank climate progress should further develop these assessment approaches.

Use of proceeds. As discussed in the GHG Protocol Scope 3 Standard, whether or not the use of proceeds is known in a financing relationship is crucial to determining its associated emissions and thus potential impact on climate. For both risk and responsibility reasons, it is more reasonable to expect disclosure on transactions where the counterparty’s use of proceeds is known (financing for projects, project bonds, equipment leasing, etc.) rather than for general financing, which is fungible and can be used by consumers, governments, and companies in any desired way.

Double counting between off–balance sheet transactions and on–balance sheet holdings. Another issue relates to the double counting of emissions between the investment bank’s underwriting or advising on corporate securities and the investors who own the actual securities. Whether or not to include investment banking activities—in particular underwriting—within a climate progress framework for banks was the subject of significant discussion in the PCI and FEI processes (see Annex A). Table 2 displays some of the major discussion points for and against the inclusion of such off–balance sheet items in a financed emissions framework. The FEI process concluded that underwriting was not appropriate for financed emissions accounting due to a perceived issue with double counting (i.e., that emissions should be allocated only to capital providers and not also to service providers); but in a more general climate progress framework, there is no reason to exclude it as investment banks can be seen as an important part of the financing chain that enables the

financing of climate problems and solutions. Further, many banks already report on such activities.

What do stakeholders want? The final important question is which aspects of banking represent the highest demands for disclosure by stakeholders? Given that the primary business objective for tracking climate progress for commercial banks is stakeholder (including investor) engagement and reputational risk (chapter 1), this, in fact, may be the most important driver for action. Historically, stakeholders have been most interested in disclosure on high-carbon lending and underwriting activities and sectors such as fossil fuel production and power generation, for both risk and responsibility reasons.⁸ This contrasts with the financing of mortgages and auto loans, which, despite being responsible for relatively large portions of global emissions (Figure 3), have seen relatively little stakeholder attention. As will be discussed further in Chapter 4, there may also be regional variability in the disclosures that stakeholders are most interested in.

Table 2 | Pros and Cons Surrounding the Use of Off–Balance Sheet Items Identified in the FEI/PCI Process

PROS	CONS
Services such as underwriting are essential to company activities so they “enable” the company’s emissions	They are off–balance sheet activities, so they should be accounted for by the holders of the assets instead
Underwriting (IPO) is the point of maximum information in the market and therefore potentially the point of most influence	In most cases, like for underwriting, the service company is not directly exposed to a financial risk
Financial services can represent a large portion of an FI’s revenue stream and where one is earning money one is responsible	There is no clear way to allocate a proportion of the company’s emissions to the financial service provider
The guidance should be as comprehensive as possible—all of an FI’s activities should be covered	If service providers have to account for the emissions from the companies to which they provide the service, then this logic should also be applied to other service providers that are equally essential to the transaction; e.g., lawyers, consultants, etc.
GHG emissions reporting on underwriting can improve transparency in general	

Source: 2dii 2013.

2.3 Implications for Measuring the Climate Progress of Banks

The previous two sections can be summarized as follows:

- Banks finance the economy through a variety of roles, including direct lending to consumers, businesses, and governments; asset management for institutional and individual clients; and securities underwriting.
- Through these different roles, banks affect the financing of climate problems and solutions in several ways: through direct lending to problems and solutions, through investment products and practices, and through the underwriting of equity and bonds with underlying “green” and “brown” assets or activities.
- Banks are not a monolithic group. Even among large universal banks, there is great variability in the different shares of business between retail, corporate, and investment banking and other financial services.
- Given the complexity of banks, climate progress tracking will likely be limited for practical reasons, and stakeholder interest, use of proceeds, and impact are important considerations.

There are two major implications of these points for the assessment and management of the climate progress of banks. The first is a question of whether performance metrics should be tracked at the bank level or at the business line (asset class) level. The second is a question of scope: Given limited resources, what are the most important aspects of a bank’s activities to be assessed?

2.3.1 Bank Level or Asset Class Level

Given the considerable differences in banking activities and among different banks, performance metrics tracked at bank group level (i.e., highest corporate structure combining all business lines) would seem to have several weaknesses, notably the difficulty of using a single unit of measurement for a heterogeneous group of banking activities. It can be argued that a single unit, such as emissions or currency, increases the communications value of the metric, as the public and stakeholders alike are familiar with such units (perhaps less so with emissions). Yet the communications value is limited for two reasons:

first, because it may be difficult to understand how to combine loans, transactions, and assets under management together in a meaningful manner; and second, because such metrics will be strongly correlated to the overall size of the bank.⁹

An alternative approach would accept that different banking activities are “apples and oranges” and develop a suite of metrics most applicable to each type of activity or business. Such an approach can more easily target specific aspects of climate progress (i.e., measure both “green” and “brown” activities) and allow for more nuance between risk and climate progress objectives, different sectors (e.g., fossil fuel production vs. renewable technology development), and different types of banking activities. The drawback to this approach is that a suite of metrics is potentially harder to communicate in aggregate; it may also make it more difficult to compare different institutions in aggregate. Furthermore, given the strong correlation of group-level metrics with bank size, such comparisons may have limited meaning to begin with.

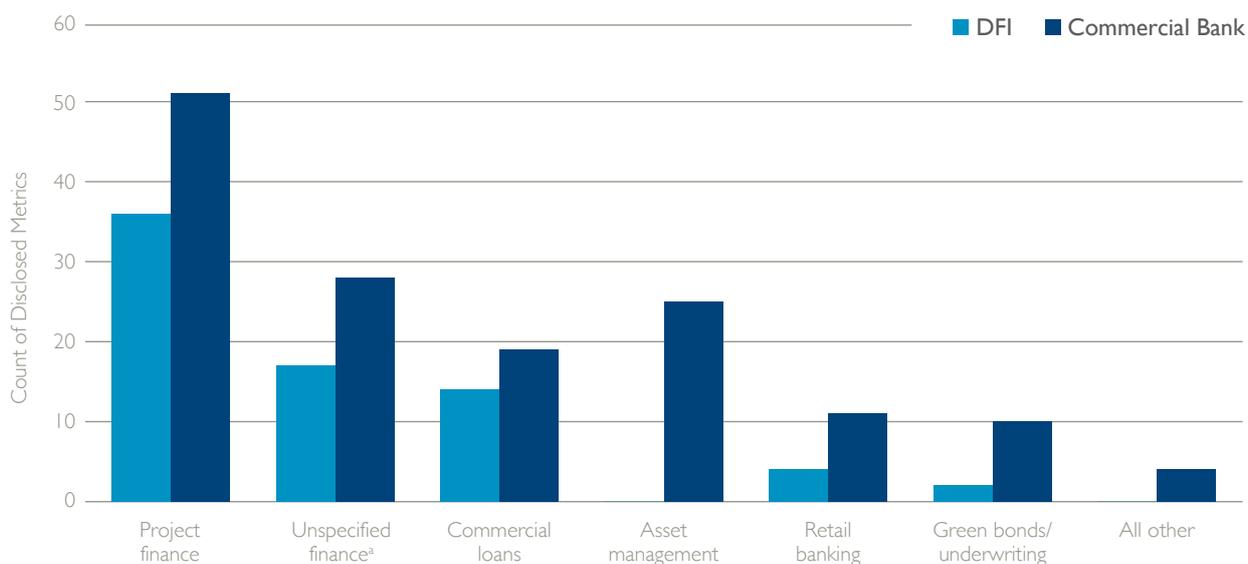
Given these strengths and weaknesses, most stakeholders in the FEI and PCI processes thought that a single approach was unlikely to succeed and agreed with the approach taken in this report, which is to develop a suite of metrics across different banking activities.

2.3.2 What Is Reasonably to Be Included?

Given the complexity of measuring bank climate progress, it is necessary for practical reasons to focus performance tracking where it can have the most impact and where it is feasible and important to stakeholders. As discussed above, a strict emissions allocation exercise would focus efforts on corporate credit (including financing for projects), mortgages and auto loans to consumers, and underwriting of securities associated with these entities. Stakeholder interest and use of proceeds could additionally narrow the potential scope of assessment to financing with a known use of proceeds or financing in only high- or low-carbon activities and sectors.

Interestingly, these same types of assets and activities are the most disclosed in recent financial and nonfinancial reports (Figure 4). This highlights both their informational value as well as the practicality of assessing and reporting on such metrics, which will be discussed more fully in the following chapter.

Figure 4 | Count of Recently Disclosed Quantitative Climate-Relevant Metrics in Reviewed Private and Development Finance Institutions (DFI) Reports



Note: a. Unspecified finance relates to any tracked metric where the specific transaction or asset type was not clear from reporting.

Source: WRI and UNEP-FI 2014.

In light of the considerations and tradeoffs discussed above, this report focuses on the metrics shown in Table 3.

Table 3 | Scope of Report

INCLUDED	EXCLUDED
Financing for projects	Personal loans and credit cards
Corporate lending	Guarantees
Securities underwriting (corporate bonds, equities, and project bonds)	Derivatives
Mortgages and auto loans	Insurance products
	Underwriting of government bonds (exc. project bonds)
	Money market

Source: Authors.

REVIEW OF EXISTING CLIMATE PROGRESS METRICS

SUMMARY OF MAJOR POINTS

- Two primary types of metrics are used for tracking the climate progress of banks: GHG accounting, including financed emissions, and a variety of green or brown metrics tracking exposure to climate problems and/or solutions. A third lesser-used class of metrics are sector-specific energy and GHG-related metrics.
- An effective performance tracking metric should be **practical** to use with existing or easily acquired data, as well as **meaningful** for the bank's business goal (whether business opportunity planning, reputational risk management, or a broader societal goal).
- Perspectives on both the practicality and meaningfulness of GHG accounting approaches, particularly financed emissions, differ among stakeholders, but several points of agreement have emerged over the past several years of intense discussion.
 - **Practicality:** The effort needed to assess portfolio or group-level Scope 3 GHG/financed emissions is largely a function of the desired level of precision. The effort to track such emissions from the bottom up for each client or relationship may exceed the perceived value of the metric for most banks. Top-down approximation methods exist, but many banks question the value of such estimations. An important counterexample is financing for carbon-intensive projects when there is known use of proceeds.
 - **Meaningfulness:** Proportionally allocated financed emissions measure the responsibility of a bank for the emissions of its underlying clients and are of limited relevance to carbon asset risk or business opportunity planning (since the metric does not track "green" easily, except through the calculation of project accounting from a baseline). If the business case is primarily providing transparency on exposure to GHG emissions and reputational risk management, disclosure may be valuable and most meaningful when focused on high-carbon sectors crucial to the energy transition.
- Compared to GHG accounting approaches, the use of green/brown metrics in existing bank disclosures is quite high particularly among commercial banks, showing a perceived practicality and perhaps meaningfulness among banks. Such metrics have several advantages, tracking both "green" and "brown" exposures with relative practicality, applying to investment banking services (e.g., advisory, underwriting), as well as on-balance sheet assets, and providing sector- and asset-specific nuance when designed correctly. However, to be meaningful, such metrics must be reported completely (i.e., covering both "green" and "brown"), must provide context where possible, and must use clearly defined taxonomies of what constitutes "green" and "brown."
- A third type of metric, less used currently, involves reporting sector-specific energy or emissions metrics in either absolute (e.g., kWh saved by projects, MW installed) or ratio terms (e.g., CO₂/kWh of power clients). Such metrics are potentially highly meaningful, since a KPI can be derived for each sector or technology in the most relevant terms and can be compared to science-based road maps for decarbonization. However, such metrics are likely the least practical at scale since they have the highest data needs.

3.1 Overview

For each asset or transaction type, this chapter compares three types of metrics for assessing the climate progress of banks along dimensions of practicality and meaningfulness. As discussed in the PCI Investors Report, as well as other recent investor reviews (2dii et al. 2015; Kepler Cheuvreux 2015), a first useful classification distinction is between the principal types of metrics that are currently in use by major banks and investors, which are as follows:

- **GHG accounting**, including financed emissions accounting, represent an assessment of investees' GHG emissions, which can be proportionally allocated to investors and lenders via their financial stake in the investees (financed emissions).
- **Green/brown metrics** are a class of indicators that distinguish which activities and technologies are climate solutions or climate problems.
- **ESG scores** are qualitative indicators provided by specialized ESG analysts based on quantitative and qualitative climate indicators, including carbon and green/brown exposure metrics.

This paper focuses on GHG accounting (primarily the financed emissions approach) and green/brown metrics, as they are less well-established in current practice. The climate component of ESG scores are used largely in risk management (as opposed to climate progress accounting) and are covered in other reports, including the Investor Report (2dii et al. 2015). We also distinguish a third class of metrics: sector-specific energy and GHG metrics that build from GHG accounting principles but create sector-specific performance indicators at investee or portfolio level.

3.1.1 Recent Reviews of Climate Metrics for Banks

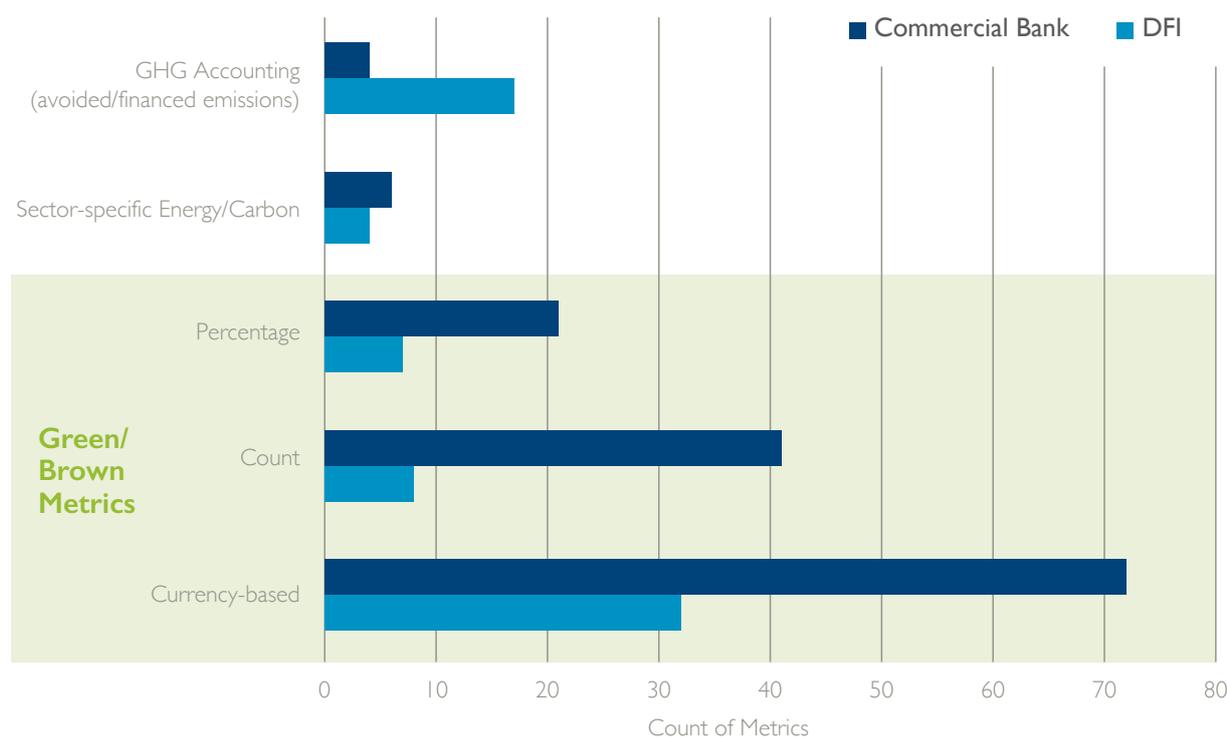
This paper uses, among other sources, two recent reviews of climate progress metrics for banks, one conducted in 2015 as part of a report to the G7 on climate criteria for development banks (NCI et al. 2015) and the other conducted as part of the PCI process, focused on a sampling of large universal banks and development banks (referred to as *Landscape Review of Alternative Climate Metrics*, September 2014).

The landscape review of how development banks integrate climate progress in investment criteria shows a variety of climate progress management techniques in place. This review found that the following three main types of sector-specific climate criteria are commonly used for assessing climate finance activities:

- Qualitative criteria (e.g., financing coal plants only in countries with strong mitigation goals)
- Positive and negative lists (green/brown taxonomies; e.g., financing renewables but not coal plants)
- Other quantitative benchmark criteria (e.g., only financing power plants below a certain level of CO₂ emitted per kWh of electricity generated)

The landscape review looked at climate progress metrics disclosure for 14 development banks and 21 commercial banks (mostly large universal banks). The sample was chosen using a combination of global size rankings and process participation. This review found three main types of metrics currently being disclosed by intermediaries, as shown in Figure 5: GHG accounting approaches, including project accounting and financed or avoided GHG emissions; green/brown exposure based metrics such as counts, percentages, and currency values; and other sector-specific energy and carbon metrics. The following sections review the current use of such metrics and discuss their practicality and meaningfulness for conveying the climate progress of a portfolio.

Figure 5 | Count of Metrics in PCI Landscape Review by Major Type (GHG Accounting, Sector-Specific Energy and Carbon Metrics, and Exposure-Based Indicators)



Source: WRI and UNEP-FI 2014.

Table 4 | Categories of Climate Progress Metrics

CATEGORIES OF METRICS	SPECIFIC TYPES OF METRICS	DESCRIPTION
Greenhouse Gas Accounting	Corporate accounting	Corporate-level tracking of annual GHG emissions related to a company's operations
	Project accounting	Estimating net GHG emissions or emission reductions from projects relative to a baseline scenario
	Financed emissions	(Generally) portfolio level aggregation of GHG emissions associated with a portfolio's underlying entities or projects, allocated proportionally, based on financial stake in the underlying entity or project
Green/Brown Metrics	Exposure-based	Metrics that measure climate progress of a project, activity, or asset class in terms of exposure in financial terms such as \$ invested in green energy, counts such as number of energy star buildings in a real estate portfolio, or percentages such as % car loans to hybrids. Metrics could also be ratios such as \$ invested in hybrids or total \$ invested in cars
Sector-Specific Energy and Carbon Metrics	Physical unit-based (e.g., kWh, ft ² , km, etc.)	Metrics that are specific to a sector and expressed in absolute units (e.g., kWh generated) or intensity units (kWh/ft ²). Metrics can also be expressed in ratios such as kWh from green energy or total kWh from power generation

Source: Authors.

3.2 GHG Accounting Approaches

As discussed in chapter 1, and reviewed in detail in 2dii (2013), the concept of financed emissions, which can be defined as “the allocation of an underlying entity’s, activity’s, or portfolio’s emissions to the parties holding a financial stake,” has been in active development in both banking and investing circles since at least 2005. The concept gained considerable traction in the lead-up to the UNFCCC COP 21 in November 2015, including several large-scale pledges by investors to calculate and disclose their portfolio carbon footprint, notably the PRI Montreal Pledge and the UNEP-FI/CDP Portfolio Decarbonization Coalition.

The concept of financed emissions starts from an underlying accounting of the GHG emissions associated with a financial institution’s investee entities (i.e., the projects, companies, individuals, etc., to which it lends or invests its capital). This concept notably differs from traditional corporate GHG accounting as applied to a financial institution, which would only cover the institution’s operational GHG emissions (e.g., associated with its buildings, IT systems, etc.). This type of accounting is outside the scope of this report. Project-level GHG accounting is included in this section as an important subtype of GHG accounting, as many banks account for and report on their project finance activities. Both the financed

emissions approach (portfolio-level accounting) and project-based accounting use emissions metrics to track responsibility for GHG emissions, but they have some conceptual differences, most notably their sector or activity specificity and use of proceeds information (See Table 5.)

The general pros and cons of GHG accounting for financial portfolios were reviewed for investor asset classes in the PCI Investor Report. The main advantage of a cross-sector, portfolio-level GHG accounting approach is to show a broad picture of the portfolio’s exposure to underlying investee emissions. However, the approach was found to have several unresolved issues related to allocation rules across asset classes, time boundaries, reporting scopes, and double counting. Additionally, due to incomplete data for underlying investees, emissions for some investees or counterparties need to be estimated, increasing the uncertainty of the metric (2dii 2013; Kepler Chevreux 2015). Accounting for off-balance sheet transactions is also made more difficult by unclear allocation rules between the service provider (e.g., underwriter) and investee. The Investor Report provides more details on these and other issues related to financed emissions, specifically related to the investor asset classes most commonly used today (listed equity and corporate bonds). These unresolved issues could likely be overcome by a bank interested in developing an approach, but there is currently no harmonized standard on

Table 5 | Differences between Financed Emissions and Project-level GHG Accounting

	DESCRIPTION	SECTOR/ ACTIVITY COVERAGE	USE OF PROCEEDS	INTENDED PURPOSE
Financed Emissions	portfolio-level aggregation of GHG emissions associated with a portfolio’s underlying entities or projects	Cross-sector and cross-asset class approach	Not necessary	Portfolio (multisector and/or multi asset class) understanding of responsibility for GHG emissions
Project GHG Accounting	net emissions or reductions resulting from a project compared to a baseline scenario	Generally sector- and asset/transaction-specific	Necessary	Understanding of the GHG emissions impact of financing a project, relative to an assumed baseline
Corporate GHG Accounting Applied to Banks	Emissions associated with a bank’s operations (Scope 1 and Scope 2)	N/A	N/A	Tracking operational sustainability for banks

Source: Authors.

financed emissions to apply.

Development banks and commercial banks that implement the Equator Principles use project GHG accounting approaches to measure the GHG emissions associated with a specific financed activity. A detailed review of such methods is outside the scope of this work, but current practices in the investor community are available in Annex 3 of the Investor Report, and a summary of GHG accounting metrics found in the landscape review can be found in Table 4. Generally, compared with cross-sector financed emissions accounting, there is less uncertainty associated with activity data and financing structure in project-specific accounting, since it is only performed in the context of a specific project (e.g., for financing for projects). However, greater uncertainty may be introduced through the need for an assumed baseline scenario reflecting the outcome in the absence of the project (see GHG Protocol Project Protocol). This approach also faces issues of appropriate boundaries, assessment period, and attribution of impacts. Development banks have developed numerous methodologies that address these issues in certain sectors (IFI 2015).

Due to the inherent variability in types of business lines and types of banks (see chapter 2), it is useful to review the practicality and meaningfulness of GHG accounting, specifically the financed emissions and project accounting approaches, within the reduced scope of this paper (see Table 6), including a summary of its current limited usage in banks (see Table 7).

3.2.1 Practicality of Financed Emissions for Banks

Figure 7 illustrates how the overall practicality of assessing the financed emissions of a portfolio varies across types of banking activities. In general, financed emissions of an individual investee (project, company, etc.) can be defined through the GHG emissions profile (numerator) and capital structure (denominator, used to allocate to different lenders/investors). Thus, at the portfolio level, the practicality of financed emissions for different asset classes depends on three dimensions:

- Availability of investee GHG data (numerator)
- Availability of investee capital structure (denominator)
- Number of financial institution's relationships by asset class (count of number of relationships in a portfolio)

For example, through the due diligence process typically undertaken in financing for projects, an intermediary will have a high level of access to the emissions of the project and sufficient information about its role in the project's financing. In addition, the total number of project finance activities per year will be low for most banks. Thus, estimating financed emissions for financing of project transactions is likely very feasible for most intermediaries. The same goes for lending to publicly listed companies, where oftentimes both emissions and capital structure data are publicly available. The opposite, however, is true for SME loans, auto loans, and mortgages, where capital structure data (i.e., loan-to-value ratios) are private, and portfolios consist of a large number of small transactions.

Of course, some of these data issues can be overcome, notably by the use of sector-average emissions or capital structure data, and some banks are taking this approach in their financed emissions assessment (see chapter 4). However, many financial institutions consulted in the Financed Emissions Initiative believe that the large-scale use of such average data would result in disclosures that are meaningless due to little differentiation in bank inventories. To make this point clear, if all banks were to estimate their mortgage book financed emissions using similar average emissions factors, the results would simply reflect a linear relationship of the overall mortgage book size (more mortgages -> more GHG emissions), a trivial answer. There would similarly be a limited ability to track progress over time without client-specific data. Because of these limitations, the current use of GHG accounting is mostly limited to financing for projects (see Table 7).

Table 6 | Summary of Elements and Overall Practicality of Financed Emissions for Relevant Asset Classes and Transactions

ASSET CLASS/ TRANSACTION	DATA ACCESS: EMISSIONS	DATA ACCESS: CAPITAL	CONFIDEN- TIALITY: CAPITAL	NUMBER OF RELATION- SHIPS	OVERALL PRACTICAL- ITY OF FE
Project Finance	High	High	Private	Low	High
Lending to Listed Companies	High	High	Public	Medium	High
SME/Private Company Lending	Low	Medium	Private	High	Low
Mortgages/Auto Loans	Medium	Medium	Private	High	Low
Advisory and Underwriting	N/A ^a	Variable	Variable	Variable	N/A*

Note: a. Emissions for advisory and underwriting are listed as N/A due to ownership logic taken in FEI/PCI—emissions are allocated only to capital providers rather than service providers.

Source: Authors.

Table 7 | Examples of GHG Accounting Metrics

ASSET CLASS/ TRANSACTION	SECTOR	GHG ACCOUNTING APPROACHES OBSERVED IN LANDSCAPE REVIEW
Corporate Finance (Lending, Lease Finance, Securities Underwriting)	Oil & gas & coal	
	Power	
	Cross-sector	<ul style="list-style-type: none"> ■ Total GHG associated with lending portfolio
Financing for Projects	Cross-sector	<ul style="list-style-type: none"> ■ Total financed emissions associated with financing for projects portfolio ■ Net GHG emissions or reductions associated with individual projects or portfolio ■ Gross GHG emissions associated with construction and operations of transport projects
Retail Banking	Auto loans	<ul style="list-style-type: none"> ■ Net GHG emissions reduced or avoided associated with financed green cars
	Mortgages	
Asset Mgmt. and Investment Products	Cross-sector	<ul style="list-style-type: none"> ■ GHG accounting of portfolio/funds, comparison to index

Source: WRI and UNEP-FI 2014.

3.2.2 Meaningfulness of Financed Emissions

Substantial differences in opinion arose around the meaningfulness of financed emissions estimation during the PCI and financed emissions processes. (See Annex A for a full description.) Thus, it is difficult to present a consensus view on this point in this paper. Nevertheless, most stakeholders in the process, which include banks, investors, data providers, consultants, and NGOs, agreed on the following points:

- **Direct measure of contribution or responsibility.** Because the financed emissions approach allocates the emissions associated with a financing activity to different financial actors, a direct and interpretable relationship exists with an institution’s responsibility for emissions or contribution to emissions reductions. This proportional allocation (GHG Protocol Scope 3 Standard) is uncommon for green/brown metrics.
- **Aggregation of investments allowed across portfolio.** Because it uses a unit that can apply to any sector, financed emissions enables a single aggregated score within a multisector or multiasset portfolio.
- **Difficulty of capturing “green.”** The usual measure of a carbon footprint at portfolio level does not capture investments in “green” activities well because low GHG emissions sectors and activities include both “green” and “gray” (climate neutral activities).¹⁰
- **Uncertainty and precision for disclosure.** Uncertainty and precision are important considerations for corporate disclosures, and many banks are not comfortable releasing information to the public that is based on modeled, as opposed to investee/counterparty-specific, information.
- **Services vs. on-balance sheet assets.** Financed emissions for on-balance sheet items (i.e., emissions allocated to shareholders and lenders, under an “ownership of emissions” logic) are more meaningful than for services (asset management, underwriting; i.e., “enabling emissions to occur” logic). At the bank level, it is difficult to interpret financed emissions numbers in aggregate given the substantial conceptual difference among different types of banking transactions, service, and assets.

- **Focus on high-carbon and low-carbon sectors.** If the main business case for tracking climate progress is disclosure/reputational risk, GHG accounting should focus on the high-carbon sectors most crucial to and most potentially at risk in the energy transition, as well as their low-carbon competitors.

3.3 Green/Brown Metrics

As discussed above, green/brown metrics are taxonomy-based approaches to classify financed activities into climate problems (“brown” technologies) and climate solutions (“green” technologies). We now turn to their practicality and meaningfulness.

3.3.1 Practicality of Green/Brown Metrics

As evidenced by the overall level of disclosure found in the landscape review (Figure 6), exposure-based green/brown metrics are considerably more commonly reported than energy- and emissions-based metrics, particularly outside of financing for projects. Figure 6 shows the total count of metrics disclosed by banks, including DFIs, representing metrics reported in exposure and proportion/ratio of exposure units (\$, €, etc.). Table 8 also reviews the main metrics encountered in the review.

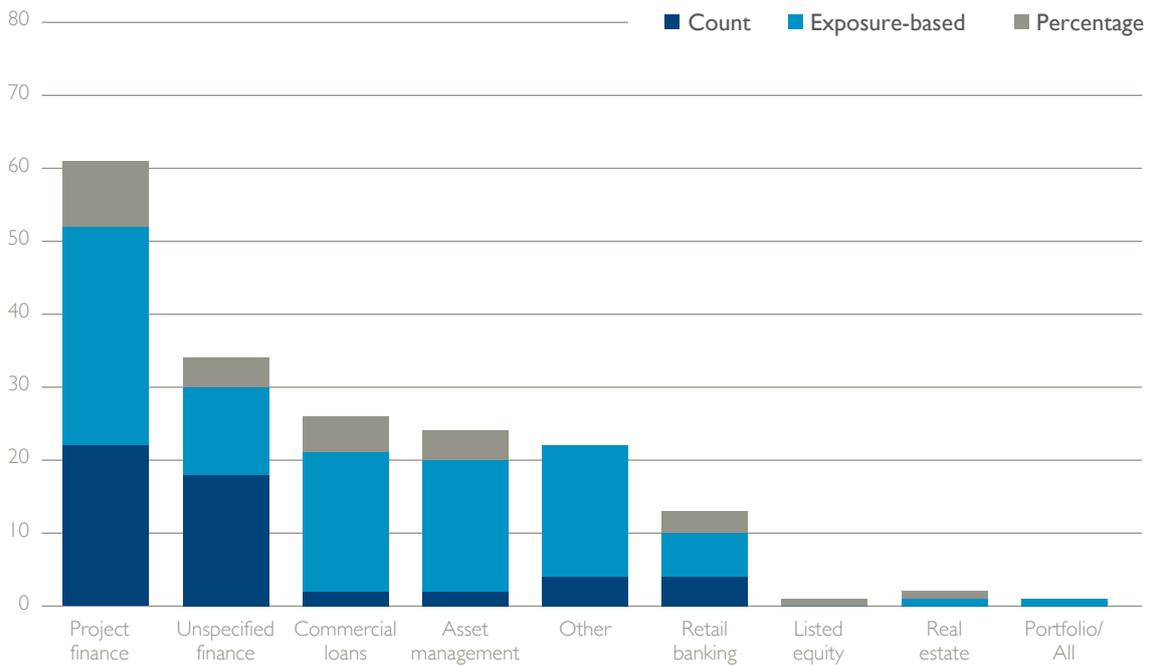


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WRI differs from the other authors in its recommendations on the use of financed emissions. Since financed emissions is the only metric that represents a bank portfolio’s overall contribution to climate change, WRI recommends that this metric be reported, as a minimum, by all banks to provide transparency to stakeholders. Green/brown metrics and sector-specific metrics are also useful to understand a bank’s contribution to climate progress and should be used following the recommendations in this paper.

While there is not yet a widely accepted method to measure financed emissions, there are existing calculation approaches developed by Ecofys, TruCost, South Pole, and others, although these existing approaches are generally proprietary. The GHG Protocol Scope 3 Standard also provides useful guidance on accounting for financed emissions (pp. 51–54). Banks should use an existing approach, or develop and adopt their own method until a standardized approach is available.

Figure 6 | Counts of Currently Disclosed Metrics by Sample of Banks by Asset Class/
Transaction Type and Metric Unit



Source: Authors.

This review suggests that the practicality of exposure-based green/brown metrics may be considerably higher than for GHG accounting or other emissions-based metrics. This is not surprising, since tracking such metrics generally requires only two types of information about the portfolio in question: *financial data* on the projects, loan book, etc. (tracked as part of the core business of banking), and a *taxonomy* of which of the activities, sectors, etc., are considered “green” or “brown.” This seemingly compares well with emissions- and energy-based metrics, which require financial and nonfinancial data (e.g., emissions intensity, fuel consumption, electric capacity, etc.)

As discussed in the Investor Report, several ESG data providers are beginning to offer segmentation indicators for green/brown metrics at company and project levels. Such indicators operate at different levels, such as project or activity, facility, and company or issuer (see Table 9), and the level of specificity offered can vary considerably within climate-relevant categories. Commonly used classification systems such as the Global Industry Classification Standard (GICS) or the Industrial Classification Benchmark (ICB) operate at the company level, such that each individual company can only be considered “green” or “brown” using a single indicator. Similarly, broad industrial classification systems used by national

statistics offices or financial data providers are used to classify industrial activity at the facility level, assigning a code to each facility based on the activities pursued there. On the other hand, some ESG-specific systems now provide segmented “green share” data that identify “green” and “brown” activities at the business line level, allowing users to assess diversified companies on the basis of the percentage of their revenues derived from “green” or “brown” activities.

The practicality of tracking portfolio climate progress by these different systems varies, according to data availability by asset class, transaction type, or sector. Banks generally have access to at least investor classification codes or the standard industrial classification codes of most corporate clients, allowing a simple categorization relatively quickly based on the sector of each client. However, given their level of aggregation, broad investor classification schemes like GICS and ICB can identify sector-level exposures such as total lending to the utility or mining sectors but cannot easily be used to classify “green” or “brown” activities in these sectors. Broader industrial classification systems like the International Standard Industrial Classification (ISIC), the North American Industry Classification System (NAICS), Nomenclature of Economic Activities (NACE), Australian and New Zealand Standard Industrial Classification (ANZSIC),

Table 8 | Examples of Exposure-based Green/Brown Metrics for Banking Asset Classes/Transactions

ASSET CLASS/ TRANSACTION	SECTOR	GREEN/BROWN EXPOSURE INDICATORS	
		BROWN	GREEN
Corporate Finance (Lending, Lease Finance, Securities Underwriting)	Oil & gas & coal	<ul style="list-style-type: none"> ■ Share of high-cost capital expenditure ■ Total exposure to high-carbon sectors (e.g., energy) ■ Count of loans to energy sector 	<ul style="list-style-type: none"> ■ Share of revenues in carbon capture and storage ■ Share of renewables in R&D and capital expenditure
	Power	<ul style="list-style-type: none"> ■ Share of high-carbon lending in electricity generation portfolio ■ Total value of loans to power sector 	<ul style="list-style-type: none"> ■ Share of renewables in elec. generation, installed capacity, and capital expenditure ■ Total value financed to renewables companies
	Cross-sector	<ul style="list-style-type: none"> ■ Share of oil & gas in sales/revenue ■ Share of coal in revenues 	<ul style="list-style-type: none"> ■ Share of “green” (e.g., low-carbon economy) in sales ■ Total value lent to “green” activities ■ Total value of “green” bonds issued/underwritten ■ Total value underwritten for low-carbon clients
Financing for Projects	Cross-sector	<ul style="list-style-type: none"> ■ Share of projects by Equator Principles category ■ Value of projects screened by Equator Principles ■ Count of projects by sector (oil & gas, mining, energy) ■ Share of structured finance projects (count) by technology (wind, oil, solar, gas, biomass) ■ Share of financing for projects value by sector ■ Count of projects screened for ESG risks 	<ul style="list-style-type: none"> ■ Share of projects financed meeting “green” categorization (CBI, etc.) ■ Number of renewables projects, loans, transactions ■ Total value of climate finance ■ Total value of renewables/“green” projects ■ Share of structured finance projects (count) by technology (wind, oil, solar, gas, biomass)
Retail Banking	Auto loans		<ul style="list-style-type: none"> ■ % of car loans to hybrids, electric vehicles ■ Count of “green” vehicles financed
	Mortgages		<ul style="list-style-type: none"> ■ % of mortgage financing to energy-efficient homes ■ Value lent to energy-efficiency home retrofits ■ Number of energy-efficiency projects financed in homes
Asset Mgmt. and Investment Products	Cross-sector	<ul style="list-style-type: none"> ■ Number of ESG-rated issuers ■ Value of assets under management screened or invested according to ESG criteria ■ Percentage of AUM screened 	<ul style="list-style-type: none"> ■ Number of Socially Responsible Investment (SRI) funds ■ Total value of SRI/ESG assets under management

Source: WRI and UNEP-FI 2014.

Table 9 | Green/Brown Taxonomies and Sector Classification Schemes Used for Classifying Green and Brown Activities

	CLASSIFICATION	MAIN FEATURES	LEVEL	APPLICABLE TRANSACTIONS/ ASSETS	OVERALL PRACTICALITY
ESG-Specific Classifications	CBI (Climate Bonds Initiative)	Classification developed for “green” bonds involving a taxonomy of “green” compatible assets and investments.	Project/activity	Financing for projects, “green” bonds	Medium for applicable assets or transactions
	MSCI	“Green” classification applicable to listed equity, corporate bonds, and sovereign bonds	Project/activity, aggregated to company	Corporate lending, underwriting	High (with subscription), limited to listed companies
	FTSE	Exposure of listed companies to 60 energy transition activity segments.	Project/activity; aggregated to company	Corporate lending, underwriting	
Standard Industrial Classification Schemes	BICS (Bloomberg), SASB SICS	Broader industrial classification system, used to segment companies by activity	Project/activity; aggregated to company	Corporate lending, underwriting	Medium; requires corporate segmentation
	Eurostat/ NACE, ISIC, NAICS, ANZSIC, etc.	National industrial classification systems linked to national statistics. Used by financial and ESG data providers to segment companies into activities	Facility; aggregated to company	Corporate lending, underwriting	High
Investor Classifications	ICB, GICS, TRBC, Bloomberg, SASB	Sector classification system including green and brown sectors	Company/ security	Corporate lending, underwriting	High but limited to listed companies

Source: 2dii 2015b.

etc., can have varying levels of detail available for different climate-relevant sectors. The level of detail in these schemes is typically higher than for investor classification schemes, and some financial data providers use them to segment companies’ revenues into different categories.

The most comprehensive solution for segmenting activities into “green” and “brown” are classification systems and standards specific to the ESG space, such as those developed by the Climate Bonds Standard and commercial “green” taxonomies from providers like MSC, Financial

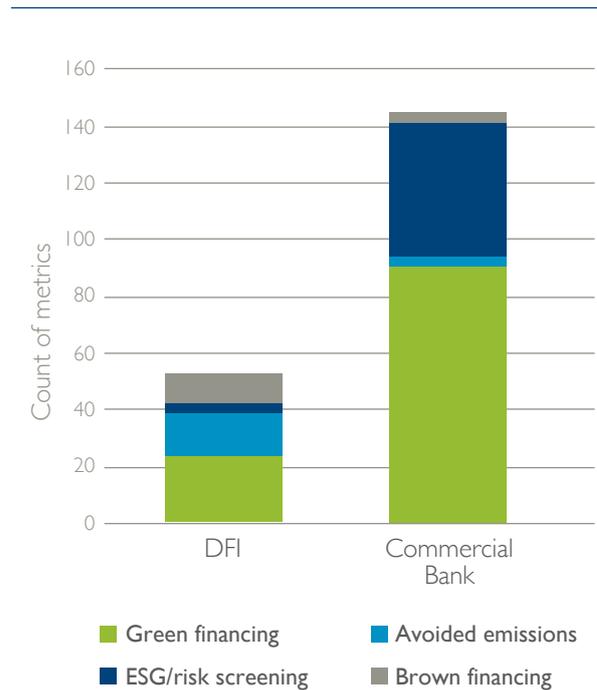
Times Stock Exchange (FTSE), and others. Such schemes are most useful for classifying transactions with a known use of proceeds (financing for projects, “green” bonds underwriting, etc.) or, when aggregated to company level, for estimating the green/brown activity fractions of corporate lending and corporate bond and equity underwriting. However, the use of such classifications may require more effort than applying a simpler classification scheme, such as ISIC, and will be limited to specific types of transactions or assets (e.g., known use of proceeds) or types of counterparties (e.g., listed companies).

3.3.2 Meaningfulness of Green/Brown Metrics

As was the case for GHG accounting, the meaningfulness of different green/brown metrics is variable and dependent on the specific metrics, sectors, and assets or transactions in question. There were differences of opinion among the different stakeholders in the FEI and PCI processes with regard to the usefulness and credibility of such metrics for measuring the climate progress of portfolios. Some of the high-level conclusions reached are summarized below:

- A one-sided story.** Both stakeholder perceptions and the results of the landscape review show a relatively one-sided story on banking climate progress disclosures, with a significantly greater number of metrics disclosed on “green” than on “brown” financing, particularly among commercial banks (Figure 7). Many civil society stakeholders pointed out this discrepancy and argued strongly for further disclosure on “brown” financing.
- The need for context.** Stakeholders expressed a desire for *context* for both “green” and “brown” performance metrics. Simple metrics tracking counts of projects, counterparties, etc., or exposures to either “green” or “brown” activities without some context, such as reference to total portfolio values, lack meaning. Instead, more meaningful metrics can be constructed by tracking either the ratio of “green” to “brown” (or vice versa) or the proportion of “green” or “brown” financing in the overall portfolio. Context can also be provided through a comparison of the portfolio climate progress with parallel values in the real economy, such as economy-wide averages (see chapter 4), or to relevant security indexes.
- Credible taxonomies.** In general, metrics used for stakeholder disclosures will be more meaningful when they use “green” or “brown” taxonomies that are external to the bank (see 6), as some stakeholders are skeptical of taxonomies generated by the bank itself. However, there is a need for balance here: while the use of standard industrial classification systems may represent the most credible green/brown classification taxonomy for disclosures, internal business planning may be better served by more FI-specific taxonomies.

Figure 7 | Count of Identified Metrics in WRI and UNEP-FI Landscape Review



Source: WRI and UNEP-FI 2014.

3.4 Sector-Specific Energy or Carbon Metrics

The final type of observed metric is sector-specific energy and/or GHG metrics that use a performance indicator in physical units (examples in Table 10). Despite their relatively uncommon use, such metrics are generally seen as relatively meaningful and useful, notably because they can be more directly compared to realities in the economy like the global carbon budget, national energy mixes, etc. For instance, a portfolio averaged carbon intensity in the utilities sector (CO₂/kWh) can be compared to both the regional mix in the markets the bank operates as well as future scenarios of the energy transition to set science-based targets for this portion of the portfolio. Furthermore, units of exposure permit a more nuanced appreciation of climate impact: \$1 lent to a renewable power utility will not have the same impact as \$1 lent to a producer of smart-grid equipment.

The downside of such metrics, and likely why they are not currently used more, is that they require more effort from the bank, given the need for sector-specific nonfinancial (energy/carbon/technology) information for its clients, many of whom may not disclose such information. That said, forward-looking physical asset level production capacity data are available for many climate-relevant sectors, such as electric power, fossil fuels, automotive, and other sectors but can be costly (2dii 2017) and can be utilized to create such performance indicators and track portfolio alignment with climate scenarios (2dii 2015c). Further, for some types of transactions, banks may possess all the information required as part of the due diligence process or from the transaction itself. For instance, the specific make and model of automobile is available for auto loans, and fuel economy data are generally public. In general, though, the overall effort required to calculate such metrics is likely to be higher than just tracking exposure to sectors or activities.

3.5 Comparing the Different Types of Metrics

Table 11 summarizes the strengths and weaknesses of the reviewed types of metrics. In general, GHG accounting and specifically financed emissions face several perceived issues associated with both practicality and meaningfulness when the use of proceeds is not known. Thus, such accounting is best applied to financing for projects and related transactions with a known use of proceeds. In these cases, the metric can represent a feasible and credible tracking metric, particularly for exposure to “brown” activities. GHG accounting, however, is not usable for measuring “green” activities, except through the use of project accounting calculations such as avoided emissions estimations due to the inability to distinguish “green” and “gray” activities. Tracing performance over time through financed emissions is also challenging if using average data instead of investee-specific data, since such data will not track performance improvements

Table 10 | Examples of Exposure-based Green and/or Brown Metrics for Banking Asset Classes and Transactions

ASSET CLASS/ TRANSACTION	SECTOR	SECTOR-SPECIFIC RATIOS AND METRICS
Corporate Finance (Lending, Lease Finance, Securities Underwriting)	Oil & gas & coal	Portfolio average or distributed intensity by fuel type
	Power	<ul style="list-style-type: none"> ■ Portfolio average carbon intensity (e.g., CO₂/kWh) ■ Total renewable capacity (MW) associated with lending portfolio ■ Total renewable generation by portfolio (MWh)
	Cross-sector	<ul style="list-style-type: none"> ■ Steel: Breakdown of asset base by EAF/BOF production method ■ Shipping: Breakdown of asset base by ship efficiency rating
Financing for Projects	Cross-sector	<ul style="list-style-type: none"> ■ Total/lifetime energy savings (MWh) from energy efficiency projects ■ Steel: Breakdown of asset base by EAF/BOF production method ■ Shipping: Breakdown of asset base by ship efficiency rating
Retail Banking	Auto loans	Breakdown of auto loans by drivetrain/powertrain
	Mortgages	<ul style="list-style-type: none"> ■ Percentage of global real estate portfolio LEED certified ■ Energy intensity of real estate portfolio (kWh/m²)
Asset Mgmt. and Investment Products	Cross-sector	

Source: Authors, based on WRI and UNEP-FI 2014 and 2dii et al. 2015.

Table 11 | Pros and Cons of Different Climate Performance Metrics

	DESCRIPTION & EXAMPLES	APPLICATION	PROS	CONS
GHG Accounting Approaches	Cross-sector portfolio-level assessment of investees' exposure to GHG emissions such as financed emissions (a bank's scope 3 emissions)	<ul style="list-style-type: none"> ■ Connecting the dots between portfolios and GHG emissions in the real economy ■ Project finance screens (e.g., lifetime GHG emissions > 50 Mton) ■ Public communication & reporting, particularly for assets with known use of proceeds 	<ul style="list-style-type: none"> ■ Broad information on carbon emissions of sectors and portfolios ■ Directly measures contribution to each transaction (if proportional, i.e., for financed emissions) ■ Metric works across sectors and asset classes, thus enabling portfolio-level reporting 	<ul style="list-style-type: none"> ■ Emissions data availability ■ Inability to track "green" activities directly (except through avoided emissions accounting) ■ Lack of accounting standard and agreement on some measurement issues ■ Data availability and confidentiality issues outside listed companies and projects ■ Difficult to apply to off-balance sheet services
Sector-Specific Energy/Carbon Metrics	Sector-specific physical unit metrics expressed in absolute units (e.g., kWh generated) or intensity units (kWh/ft ²)	<ul style="list-style-type: none"> ■ Measuring sector-level climate performance ■ Comparing portfolio performance to economy-wide averages 	<ul style="list-style-type: none"> ■ Sector- and asset-specific indicators can provide nuance and context ■ Benchmarks possible for transition (e.g., 2°C scenarios) 	<ul style="list-style-type: none"> ■ Only applicable for a number of key sectors ■ No obvious way to aggregate data across sectors or assets and/or transactions
Green / Brown Metrics	Taxonomies distinguishing between activities and technologies that are climate solutions ("green") and climate problems ("brown")	<ul style="list-style-type: none"> ■ Tracking both "green" and "brown" financing in the context of portfolios ■ Tracking and reporting for any transaction or asset type, including services 	<ul style="list-style-type: none"> ■ Ability to track both "green" and "brown" ■ Exposure metrics easy to track ■ Applicable to off-balance sheet services and on-balance sheet assets 	<ul style="list-style-type: none"> ■ Controversial technologies and taxonomies (e.g., are natural gas, nuclear, CCS, biofuels "green" or "brown"?) ■ Lack of standard taxonomy

Source: Authors.

by client. Despite these weaknesses, some banks, especially those with a higher tolerance for the use of averaged data, may also find value in the use of financed emissions for other on-balance sheet assets like mortgages and auto loans and corporate lending. For such banks, financed emissions can be used to encompass an entire portfolio, rather than just segments of the portfolio, and in these cases the boundaries of such assessments should include Scope 1, 2, and 3 emissions of the assets in a portfolio so that the full GHG impact of the investee is captured.

Green/brown exposure metrics can track both "green" and "brown" exposures with relative practicality, can apply to services as well as on-balance sheet assets, and can provide sector- and asset-specific nuance when designed correctly. However, their credibility and meaningfulness as disclosure metrics depend on their contextualiza-

tion (between "green" and "brown" categories and relative to overall portfolio levels) and the use of clearly defined taxonomies of what constitutes "green" and "brown." The disadvantage of green/brown exposure metrics is the inability to roll up such metrics to bank level as an overall performance metric and the lack of availability of taxonomies for all sectors and assets.

Finally, sector-specific energy and carbon indicators can provide a highly nuanced performance metric for specific sectors. The key advantage of such indicators is the ability to benchmark a portfolio to broader economy-wide averages and to assess portfolio alignment by coupling with climate scenarios. The main drawback of these indicators, and likely the reason for their relatively small usage to date, is the availability of data and the expertise needed to estimate them.

COMMON PRINCIPLES AND REPORTING OPTIONS

KEY RECOMMENDATIONS

- There is likely no universal single approach for how all banks should measure and report climate progress due to different stakeholder perspectives and the large differences in bank business lines and types of intermediation. Also, different metrics are more appropriate for a specific asset class or activity, so banks may want to report using a variety of metrics.
- What stakeholders agree to can be summarized in the following series of common principles:
 - **Completeness:** Reporting should include all material parts of the bank's business, notably including all parts of the bank financing climate-relevant activities and the financing of both climate problems (e.g., coal-fired power plants) and solutions (e.g., renewable energy). Current reporting practices often focuses much more, sometimes exclusively, on "green" activities with little disclosure of high-carbon financing as specifically desired by many stakeholders.
 - **Context:** Where possible, metrics should be compared to values outside the bank's portfolio, such as ratios in the regional economy and required financing to meet global policy goals.
 - **Fair Share:** When banking activities occur in syndicates, reporting should be based on the bank's fair share of the activity for both climate problems (banks shouldn't be saddled with lifetime emissions of a coal plant if they were only part of an underwriting syndicate) and solutions (don't claim \$10 million of "green" if you represent 20 percent of a \$10 million syndicated loan).
 - **Transparency:** Information should be provided on the key assumptions and methodologies used to assess climate progress so the reader knows how to use the information and its limitations.
- The current discussions on climate progress of banking exhibit strong regionality, and it may not be possible to achieve one global standard today.
- For many types of banking activities, there is a lack of benchmarks available to determine whether a bank's overall financing is in line with the transition to the low-carbon economy. Road maps that show financing needs by region, technology, and transaction or asset type are needed to fill this gap and allow banks to benchmark their portfolios to their role in the transition. Such road maps are in development now.
- Most importantly, in spite of evolving climate progress assessment practices, banks should not wait to be measuring and disclosing metrics on climate progress and tracking performance. Meaningful metrics are currently available that are practical for numerous asset classes, and banks can improve their approach over time as more useful metrics become available.

4.1 Common Principles

The previous sections have discussed the various metrics currently available to track climate progress across the many types of climate-relevant assets and transactions of banks. As discussed, it is very difficult to provide a single standard approach to tracking climate progress at the bank level, for several reasons: First, the different metric types have their relative strengths and weaknesses, and perceptions vary considerably among banks. Second, there are large differences between banks' business activities, both across

industry segments and even within a similar segment, not to mention across regions. Thus, rather than deliver a single set of recommendations, we provide a set of common principles that can be tailored to different regional and industry contexts and that can form the basis for continued work on the subject.

Given the drivers, scope, and types of metrics identified in previous sections, we have identified four principles for tracking and reporting on climate disclosure, as shown with examples in Box 5.

BOX 5. GENERAL PRINCIPLES OF CLIMATE PROGRESS TRACKING FOR BANKS

Completeness: Reporting should include all material parts of the bank's business, notably including all parts of the bank that are financing climate-relevant activities and the financing of both climate problems (e.g., coal-fired power plants) and solutions (e.g., renewable energy). Current reporting practices often focus much more, sometimes exclusively, on "green" activities with little disclosure of high-carbon financing as specifically desired by many stakeholders.

Examples:

- Development banks should report on all financing for project finance and any major underwriting activity.
- Universal banks should assess their business lines to find any material sources of financing for either climate problems or solutions. Table 2 can serve as a guide of where to start.
- Wherever reporting occurs on renewable power financing, a parallel metric should be tracked for financing of coal-fired power plants or for overall power sector financing.
- When external stakeholders assess a bank's financing of the fossil fuel sector, they should also acknowledge the bank's financing of green technologies (BankTrack 2016).

Context: Where possible, metrics should be compared to values outside the bank's portfolio, such as ratios in the regional economy.

Examples:

- When reporting occurs on hybrid car loans, a ratio of hybrid car loans to total car loans is more meaningful than an aggregate value.
- A bank tracking the average carbon intensity of its utility lending portfolio can compare the value (X g CO₂e/kWh) to the regional grid mix (Y g CO₂e/kWh in the same geography).
- A bank tracking the percentage of green-certified commercial real estate loans can benchmark this ratio to the average ratio of green-certified buildings in the market.

Fair Share: When banking activities occur in syndicates, reporting should be based on the fair share of the activity for both climate problems and solutions.

Examples:

- A bank should not claim \$10 million of "green financing" if it only contributed 20 percent of a \$10 million syndicated loan.

- A bank should not be responsible for the entire lifetime emissions of a coal plant if the bank was only a minority part of an underwriting syndicate.

Transparency: Information should be provided on the key assumptions and methodology used so the reader knows how to use the information and its limitations.

Examples:

- If portfolio averages are used to calculate a performance metric (e.g., CO₂ intensity of a utility loan portfolio), information on how the average was calculated (weighted by exposure, weighted by exposure and company or project size) should be disclosed.
- Full details should be provided on included transaction types and assets for rolled up totals of "green" or "brown" financing (e.g., \$x million of green financing includes \$y million of loan exposure and \$z million of underwritten green bonds).
- Utilized taxonomies should be disclosed for "green" or "brown" categories.

4.2 The Importance of Regional Diversity

An important recent trend in bank climate progress tracking has been the emergence of regional dialogues on such tracking. There are several reasons why such a regional approach makes sense. First, some types of stakeholders (e.g., responsible investor groups) can be regional and may be interested in different types of disclosed metrics or relative focus between climate-related risks vs. climate progress. Second, financial regulation in different markets can be quite different, with resulting consequences on disclosure. Confidentiality and regulation mandates may inhibit certain types of disclosures in certain markets. (This point was made strongly in the financed emissions process; see Annex A.) Also, the structure of capital markets in different regions may be such that peer comparisons may be more meaningful on a regional rather than a global basis.

The Dutch approach: The Platform Carbon Accounting Financials (PCAF) was set up by 10 Dutch financial institutions—ABN AMRO, Actiam, APG, ASN Bank, FMO, MN Services, PGGM, SNS Bank, Stichting Pensioenfonds Metaal en Techniek, and Stichting Pensioenfonds van de Metalektro—to jointly develop methods to measure the climate impact of their investment and financing activities. The initiative recognizes that banks, insurance companies, pension funds, and other financial institutions contribute indirectly to carbon emissions and, therefore, climate change by financing greenhouse gas emitting activities. Conversely, by financing sustainable energy and energy-saving programs, they contribute to reducing carbon emissions, and they can leverage their position as shareholders and financiers by requiring companies to make their business operations more sustainable.

The PCAF represents a bottom-up initiative in which a group of different financial institutions have come together to devise a common framework for measuring their impact on climate, both positive and negative. To this end, the PCAF will develop tools for carbon footprint measurement based on Greenhouse Gas Protocol standards.

The tools and framework developed are expected to give PCAF participants more insight into the carbon impact of their banks' activities and help them manage this impact by, for example, offsetting the emissions caused by their carbon-intensive activities with those reduced by their financing of climate-friendly activities. Participants hope that better measurement of the climate footprint will enable them to formulate climate goals for their activities and contribute to a more sustainable future.

The Australian experience: In 2014, ahead of and during the Australian Annual General Meeting season, a group of institutional investors demanded from the banks in Australia that they start disclosing their climate, and in particular their GHG-emissions-related, risk exposures in a consistent way. Key motivations included the following:

- The prospect of large coal mining projects being developed and financed in Australia. Although environmental and civil society groups argued against these projects on the grounds of their incompatibility with 2-degrees pathways, investors' concerns were focused on the possibility of those assets becoming stranded and the financial implications that such stranding would have on the investors and creditors (banks) involved.
- The initiation of an international agenda on financial institution climate transparency. The international, multistakeholder FEI provided some of the background and impetus to investors' demands for greater climate-related transparency by the banking community at the national level in Australia.

Investors called on the banks for comprehensive and consistent disclosure of the financial risks associated with present and future GHG emissions in their portfolios. In line with the international FEI, the demand was that banks start measuring and disclosing their portfolio-level financed emissions.

The response from the banks was that, while they were prepared to meet investors' demands for comprehensive and consistent carbon-risk disclosure over time, they did not all necessarily agree with the approach and metric of financed emissions. Some banks did not believe that financed emissions methods would be effective in conveying carbon-related risk exposures; other banks started to disclose financed emissions for parts of their portfolios. The end result was that different banks started responding to investors in different ways, using different metrics for different parts of their portfolios.

However, consistency of disclosure—and, with it, comparability of disclosed information over time and between different disclosers at one particular point in time—was one of the key demands of investors, and it was also in the interest of the disclosing banks. Recognizing this, major Australian banks created a working group to exchange views and lessons learned, as well as to identify areas of convergence from which standardization in climate disclosure practice could be achieved.

As discussed in this report, the optimal choice of meaningful metrics for climate-related disclosure will often depend on the characteristics of the typically local economy to which banks are predominantly exposed. Key characteristics include the GHG-emissions profile of the economy as well as the corresponding 2 degrees-compatible trajectory. In other words, metrics to standardize climate disclosure by FIs, including banks, will often have to be context-specific. Banking roundtables at the national level, such as those in Australia and the Netherlands, could be models for processes aimed at defining “metric families” that are sufficiently context-specific and amenable to standardization.

4.3 Moving toward “Science-based Targets” for the Financial Sector

Although currently most banks track climate progress for reasons of mandate or reputational management, the impending energy transition driven by climate policy and techno-economic change is changing the landscape. With the unprecedented capital needs required for the transition, forward-thinking banks are now planning for the transition by seeing the financing needs of the energy transition and climate resilience as an important business opportunity (see “green” financing pledges highlighted above and the Non-state Actor Climate Action Zone pledges from the financial sector).¹¹ Moreover, this realization has coincided with two other important events: first, a formalized agreement by the global policy community to ensure that financial flows are aligned with the global goal to limit climate change to well below 2°C (see Paris Agreement, Article 2.1(c)); and second, a push for companies in the real economy to set science-based targets in line with such climate goals.

Together, these drivers suggest a strong need for science-based metrics and tools for the financial sector that allow financial institutions to set performance benchmarks in line with global climate goals. Such an assessment framework would build on investment needs analysis in a 2°C future (IEA 2016; Accenture and Barclays 2011) to set institution and portfolio-level targets in line with different global decarbonization goals. Key challenges remain in setting such targets, including overcoming the confidentiality, practicality, and aggregation and grouping concerns discussed above. Such target-setting is already in development in the context of the European Commission-funded Sustainable Energy Investment Metrics project for listed equity, corporate bond, and corporate loan books, but further methodological development is needed to assess institution-level target setting and other assets and transactions.

ANNEX A: SUMMARY OF THE FINANCED EMISSIONS INITIATIVE AND PORTFOLIO CARBON INITIATIVE PROCESSES

A1.1 Context: Financed Emissions Initiative and Portfolio Carbon Initiative

In late 2011, the GHG Protocol released the Corporate Value Chain Accounting and Reporting Standard (the Scope 3 Standard). This standard provides a framework to account for emissions from an organization’s entire value chain, including the emissions from its investments (Category 15 of the Scope 3 Standard). However, feedback from stakeholders suggested that more detailed guidance was needed to cater to the realities and needs of the finance sector and to harmonize the various existing approaches. During a year-long scoping phase, and with input from an advisory committee, it was determined that the financial sector needed guidance on two distinct but interlinked challenges:

In order to provide harmonized and meaningful emissions disclosure, financial institutions need accounting guidance on how to measure and report emissions from their financial assets.

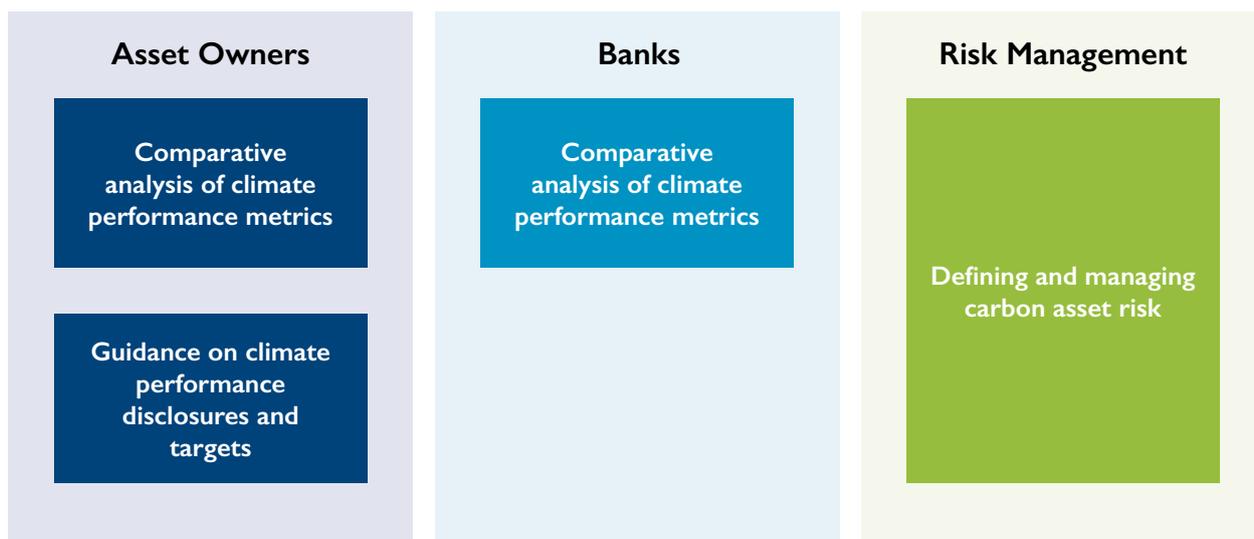
Financial institutions need guidance on how to identify, assess, and manage “carbon asset risks” in their lending and investing portfolios.

In response to these challenges, the United Nations Environment Programme Finance Initiative (UNEP-FI) and the Greenhouse Gas Protocol (GHG Protocol) initiated the **Financed Emissions Initiative (FEI)** project in

early 2014, an international, multistakeholder process to enable practical, meaningful, and actionable disclosure of financial institutions’ Scope 3 GHG emissions from lending and investing activities. The first six months of this process revealed several challenges (see next section), notably a lack of sufficient understanding and consensus as to which climate metrics are most meaningful, practical, and actionable for different purposes. The discussions also suggested that business goals related to accounting and reporting climate-related data can be very different from one type of financial institution to another (institutional investors as universal owners, development banks with an internal climate policy, asset managers facing marketing constraints and opportunities, commercial banks facing reputational challenges, etc.). Thus, a need emerged to tailor the guidance to different segments or actors of the financial system.

Since the launch of the UNEP-FI/GHG Protocol process, a growing appetite has emerged for a robust and global standard for financed emissions by some institutional investors. The recent launch of the PRI Montreal Pledge and the Portfolio Decarbonization Coalition are cases in point.¹² Despite this growing appetite to develop financed emissions guidance for institutional investors, the first six months of the FEI process showed that stakeholders in the process were divided over the practicality and meaningfulness of using the Scope 3

Figure A1 | Summary of Three Work Streams of the Portfolio Carbon Initiative (Asset Owners, Banks, and Risk Management) and Four Products (Two Comparative Analyses, Emissions Accounting Guidance for Asset Owners, and Risk Management Guidance)



Source: Authors.

emissions concept to deliver transparency and disclosure to external stakeholders and shareholders. Further, there was a general agreement that financed emissions were not helpful for internal decision-making.

Thus, in response to these divergent opinions and needs, GHG Protocol and UNEP-FI, joined by the 2° Investing Initiative, split the previous FEI into three separate work streams. Two focused on developing climate progress metrics for asset owners and banks—including a broader set of metrics beyond only financed emissions—and a third continued to develop guidance on assessing and managing carbon asset risks (Figure A1). This reorganized initiative was retitled the **Portfolio Carbon Initiative (PCI)** and set out to develop four research products through a multistakeholder process with balanced representation from financial sector companies, governments, environmental groups, academics, and consultants across the globe. This report represents the outcome from the banks' work stream of the PCI.

AI.2 Governance of the FEI and PCI

Both the FEI and PCI were governed by a secretariat comprising WRI, UNEP-FI, and the 2 Degrees Investing Initiative,¹³ as well as an advisory committee and technical working groups. Advisory committee and technical working group members who contributed to either the FEI or PCI are listed in Annex B.

AI.3. Summary of Findings of the FEI

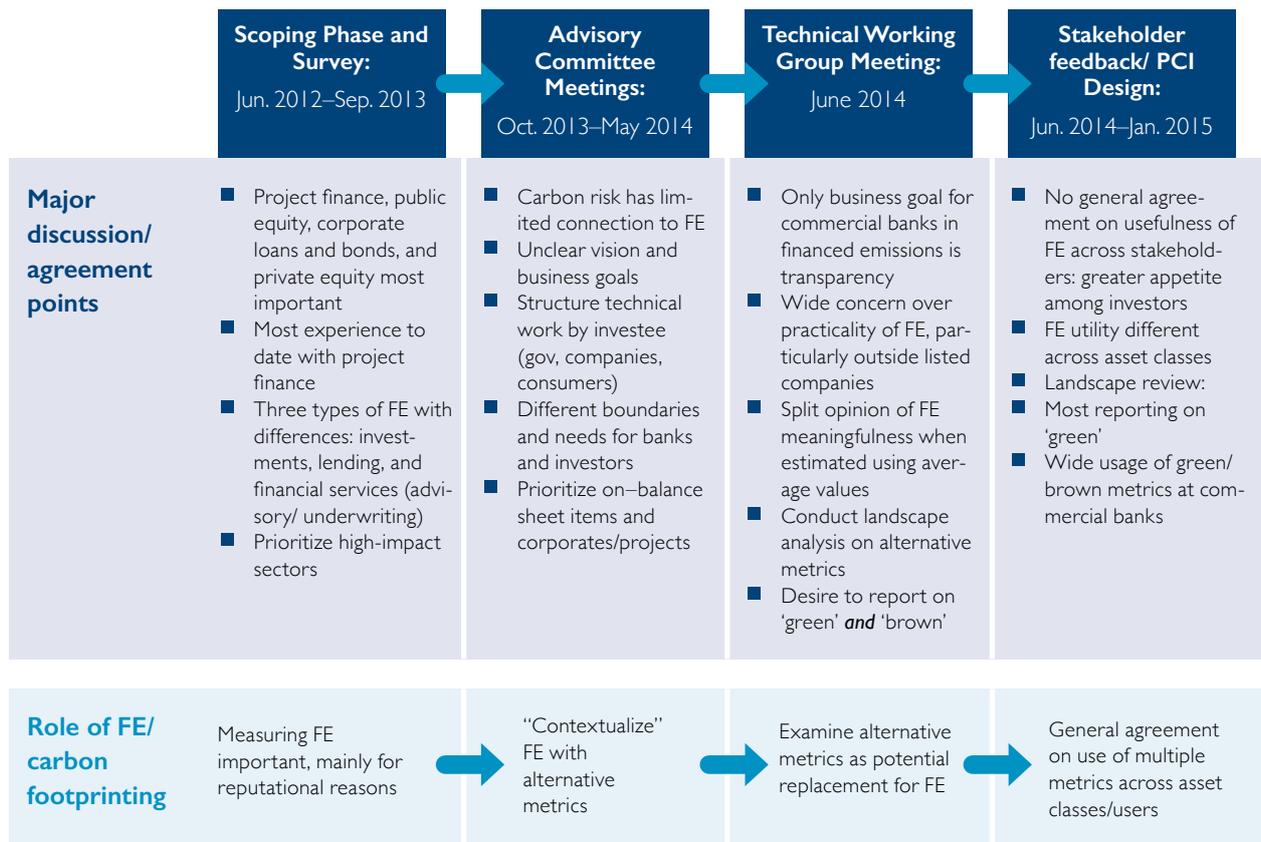
The FEI formed an important precursor to the research presented in this report, notably section 3.2. For this reason, a short description of the process and important points of agreement and disagreement are highlighted in this section. Figure A2 on the following page summarizes major discussion points and the perceived role of financed emissions in the overall scope of climate progress assessment for financial institutions, notably banks.

Scope Phase: The scoping phase of the FEI took place starting in early 2013 and consisted of an online survey and a series of scoping workshops (London in February 2013 and New York in April 2013). Although the scoping survey and initial workshops did find appetite for the development of a financed emissions standard—for instance over 75 percent of respondents to the survey reported that financed emissions measurement was an important business issue—even these initial steps showed strong disagreement on core issues, including whether such measurement was relevant for risk or responsibility and whether similar methods were applicable between banks and investors.¹⁴ It was also realized early on that different types of financial relationships (debt, equity, financial services) might require different solutions and that different financial institutions had different opinions on different financial instruments (Figure A2). A final finding was that few institutions had significant experience with financed emissions.

Advisory Committee Meetings: Initial meetings of the advisory committee again showed a diversity of opinion on the shape, scope, and goals of the initiative. A major discussion point at both meetings was the need for clear business goals for financed emissions measurement and management, since the connection with financial risk management was considered tenuous by many committee members. Further opinions were given that a one-size-fits-all approach may not make sense for both banks and investors, given their different predominant activities (primary vs. secondary markets, intermediation vs. investing, etc.). However, despite this growing awareness, a critical decision was made at the first advisory committee meeting to structure technical working groups (TWGs) by investee type (governments, consumers, and companies or projects) rather than by financial institution type (banks vs. investors) or financial instrument type (lending vs. investing vs. financial services). By this time it was becoming clear that financed emissions alone may not represent a holistic and consistent performance metric for some financial portfolios (due to the reasons discussed in section 3.2), and thus it may be necessary to use alternative metrics to contextualize the results for certain types of portfolios or transactions.

Technical Working Group Meeting: Following the advisory committee meetings, the TWGs of both the carbon asset risk and financed emissions part of the FEI met together. There was again agreement on several points but just as many disagreements. Nearly all TWG members present agreed with the advisory committee that financed emissions represented an incomplete metric for assessing carbon asset risk (some members believed more strongly that the metric was completely disconnected from such risk assessment). Thus, it was agreed that the primary business goal for financial institutions to assess financed emissions was for stakeholder engagement and disclosure and transparency. The TWG members also expressed significant concern over the practicality of financed emissions assessment for certain types of portfolios (in particular lending portfolios including private and SME companies) if the assessment was done bottom up on an investee-by-investee basis. Although it was agreed that average sector values could be used instead, some members questioned the value of the calculation if such average values were used. For these reasons, as well as the desire to disclose the financing of both “green” and “brown” activities and companies, it was agreed that the FEI Secretariat should undertake a landscape review of other nonfinanced emissions metrics that could be used in place of financed emissions to measure the climate progress of financial portfolios, the findings of which are shown in several parts of this report (notably chapter 3).

Figure A2 | Summary of Major Discussion Points and the Role of Financed Emissions throughout the FEI and PCI



Source: Authors.

Stakeholder Feedback and PCI Design: Following the TWG meeting, the FEI Secretariat conducted the landscape review of available reported metrics and conducted a series of stakeholder discussions with advisory committee and TWG members to ensure that the findings of the in-person meetings were not biased by the members able to attend. These discussions further solidified the lack of universal agreement on the meaningfulness of financed emissions to different stakeholders, some of whom continued to believe the concept represented a valuable data point at both portfolio and financial institution level and others who believed that the concept had very limited value in most asset classes outside of financing for projects. A further divergence

was found between institutional investors and commercial banks on such issues, which led to the conclusion that additional work on climate progress metrics for both groups should likely be discussed separately, with some overlap necessary due to the involvement of universal banks in asset management and investment banking.

Given the feedback that occurred throughout the FEI process, the decision was made in late 2014 to broaden the scope to include all climate progress metrics as well as to split the process into new TWGs representing banks and investors. The first year of the new PCI largely focused on the investors' TWG, leading to the sister report to this document (2dii et al. 2015).

ANNEX B: PORTFOLIO CARBON INITIATIVE ADVISORY COMMITTEE AND TECHNICAL WORKING GROUP MEMBERS

Advisory Committee

Bill Harnett, U.S. Environmental Protection Agency
Chris Walker, WBCSD
Christopher Rowe, Prudential
Daniel Marroquin, National Bank of Mexico
Elisa Tonda, United Nations Environment Programme
Emma Herd, Investor Group on Climate Change
Giorgio Capurri, UniCredit
Jochen Harnisch, KfW Development Bank
Julie Gorte, Pax World Funds
Kaj Jensen, Bank of America
Karsten Loeffler, Allianz
Mark Didden, WBCSD
Matthias Kopp, WWF
Moses Choi, Orange Silicon Valley
Namita Vikas, Yes Bank
Nick Robins, United Nations Environment Programme, HSBC
Robyn Luhning, Wells Fargo
Sefton Laing, Royal Bank of Scotland
Srinath Komarina, Yes Bank
Stanislas Dupre, 2 Degrees Investing Initiative
Steve Priddy, GISMA Business School, Germany

Technical Working Group

Nicky Chambers, Anthesis Group
Candace Chandra, AQEX, LLC
Danielle Fugere, As You Sow
Jeroen Loots, ASN Bank
Ben Walker, ANZ Banking Group Ltd.
Grant Bransgrove, Australia and New Zealand Banking Group
Andres Perilla, Bancolombia Group
Beatriz Ocampo, Bancolombia Group
Maria del Mar Velez Mejia, Bancolombia Group
Yann Louvel, BankTrack
Nathalie Jaubert, BNP Paribas
Lauren Compere, Boston Common Asset Management, LLC
Steven Heim, Boston Common Asset Management, LLC
Jerry Blenman, Calidad Finance
James Hulse, CDP
Eliza Eubank, Citi
Magnus Borelius, City of Gothenburg
Anna Lehmann, Climate Policy Advisory
J Scott Beckerman, Comerica
Conor Platt, Confluence Capital, LP
Santanu Kumar Ghosh, Department of Commerce, The University of Burdwan
Murray Birt, Deutsche Asset Management
Sabine Miltner, Deutsche Bank
Oistein Akselberg, DNB Bank
Oliver Schmid-Schonbein, E2 Management Consulting AG
William Nchembe, Ecobank
Wouter Meindertsma, Ecofys Group
Peter Holt, Energetics
Kal Trinker, EY
Albert Van Leeuwen, FMO
Tom Baumann, GHG Management Institute
Ederson Augusto Zanetti, Green Farm CO2Free
Stephen Donofrio, Green Point Innovations
Bruce Duguid, Hermes Investment Management
Xu Ke, ICBCI
BJ Collins, Individual
Bruce Cahan, Individual
Dick Ligthart, Individual

Drew Schectman, Individual
Alan X. Gómez Hernández, Citibanamex
Joe Benegas, Individual contributor
Wendy Engel, Individual contributor
Majella Clarke, Indufor Group
Romain Hubert, Institute for Climate Economics
Victoria Bakhtina, International Finance Corporation
Nathan Fabian, Investor Group on Climate Change
Fredrik Fogde, ISS-Ethix Climate Solutions
Max Horster, ISS-Ethix Climate Solutions
Daniel Gribbin, KPMG
Ali Ali, LIAQAT CORP (PVT) LTD
Robert Charnock, London School of Economics and Political Science
Maria Gaspar, Sustainability Consulting
Sharif Habibu Ahmed, Mautech
Blanca Fernandez, Mercator Research Institute on Global Commons and Climate Change
Rosemary Bissett, National Australia Bank
Jose Celis, National(Mexican) Solar Energy Association
Dominique Diouf, Network for Sustainable Financial Markets
L'gia Carvalho, Pangea Capital
Jan Willem Van Gelder, Profundo

Maaïke Harmsen, Rotterdam School of Management, Erasmus University
Sanjay Kapoor, S2 Consultants
Carolina Learth, Santander Brazil Bank
Guilherme Piffer, Santander Brazil Bank
Miguel Rodriguez, Servicios Ambientales S.A.
Shannon Rohan, Share
Gert Crielaard, SNS Bank
Laura van Heeswijk, SNS Bank
Emmanuel Martinez, Societe Generale
Kristy Murray, The PNC Financial Services Group, Inc.
Pedro Galoppi, UBS
Yann Kermodé, UBS
Gavin Templeton, UK Green Investment Bank
Benjamin Karatzoglou, University of Macedonia, Greece
Felipe Bittencourt, WayCarbon
Robyn Luhning, Wells Fargo
Katie Eisenbrown, WSP
Eric Christensen, WSP
Chaitanya Kommukuri, Yes Bank

ENDNOTES

1. Public-sector banks in this report refer to banks that are partially or wholly owned by the public sector, such as development finance institutions. Commercial banks refer to banks—whether listed publicly or not—owned by private interests, individuals, or institutions.
2. Announcement [here](#). Signatories supporting these voluntary principles pledged to commit to climate strategies, manage climate risks, promote climate smart objectives, improve climate performance, and account for their climate action.
3. Although there is an overlap between the business objective (climate risk or opportunity) and societal objective (climate problem or solution), these two drivers are not the same.
4. See, for instance, Prudential Regulation Authority 2015.
5. For example, the Asset Owner Disclosure Project targets climate disclosure for large institutional investors, and Article 173 (VI) of France’s Energy Transition Law mandates such reporting for institutional investors in France (2dii 2015b).
6. This may not always be true. For instance, some authors argue that traditional electric utilities may be less able to incorporate renewable power than alternative owners in a distributed generation model.
7. See, for instance, Boston Common 2015. The desire for disclosure of the financing of such sectors was a large point in discussions in the FEI process (see Annex I).
8. For instance, Bank A may have a “greener” loan book than Bank B but still trail in total dollar amounts of “green” financing due purely to the smaller size of its loan book. Conversely, expressing the “green” financing as a percentage of total loan book may cause Bank B to trail despite a much larger volume of financing in absolute terms.
9. As an example, two FIs with similarly low GHG/\$ portfolios could have anywhere from 0 to 100% green activities in their portfolios if the “green” activities have an impact in their use phase (e.g., Scope 3) and the GHG accounted for in the financed emissions metric only represent direct (Scope 1) and energy-related (Scope 2) investee emissions.
10. The UN-sponsored Non-state Actor Climate Action Zone platform currently tracks over 400 financial institution–led climate commitments.
11. See 2dii et al. 2015 for further details.
12. 2dii joined the secretariat at the start of the PCI process.
13. A significantly higher fraction of investors (77 percent) reported that financed emissions were an important business issue than did commercial banks (52 percent).
14. For instance, only 34 percent of banks reported that corporate bonds were important to include, vs. 90 percent of investor

GLOSSARY

Brown financing: Financial flows toward activities and technologies that contribute significantly to GHG emissions.

Climate impacts: Activities that contribute to producing significant GHG emissions.

Climate progress: The financial institution's intent to contribute to GHG emissions reductions and the transition to a low-carbon economy through investment activities, such as by financing climate solutions or by limiting the financing of GHG-intensive sectors and technologies. Financing actions can contribute to positive climate progress or negative climate progress.

Climate-related risk: Financial risk associated with climate-related investments and activities, including carbon asset risk or transition risk, physical risk, and legal risk.

Climate-relevant: Investments that have a clear climate change mitigation or adaptation intent or impact or that contribute significantly to GHG emissions or their abatement.

Climate solutions: Activities and technologies that are low-carbon or that contribute to significantly reducing GHG emissions.

Exposure-based metrics: Green/brown metrics that use a monetary unit (e.g., \$, €, ¥). Green/brown metrics measure the relative prevalence of climate solutions (green) and/or climate problems (brown) within a portfolio. Exposure-based metrics and sector-specific metrics can both be types of green/brown metrics.

Financed emissions: Portfolio-level aggregation of GHG emissions associated with a portfolio's underlying entities or projects. Financed emissions are included in an annual corporate Scope 3 inventory of a financial institution.

Green financing: Financial flows (such as lending, equity positions, or underwriting and advisory services) associated with zero- or low-carbon assets or activities. This term is often used to reflect non-climate-specific "green" activities as well, such as "green" bonds, which can support climate-relevant activities or water, conservation, and other related activities.

Greenhouse gas (GHG) accounting: Greenhouse gas accounting techniques that include two primary approaches to tracking GHG emissions resulting from a company's operations: (1) corporate accounting through an annual GHG inventory, which involves financed emissions as part of the accounting; and (2) project accounting through estimating net emissions reductions or increases from individual projects or activities relative to a baseline scenario.

IFIs (International Financial Institutions) and DFIs (Development Finance Institutions): IFIs are international financial institutions, and DFIs are all financial institutions with a development or climate focus. In this report, *IFI* and *DFI* are used synonymously with each other to mean a government-associated financial institution with an explicit "green" and/or development focus.

Project accounting: Estimating the net emissions or reductions resulting from a project compared to a baseline scenario that represents the conditions most likely to occur if that project does not take place.

Scope 1 emissions: Emissions from operations that are owned or controlled by the reporting company.

Scope 2 emissions: Emissions from the generation of purchased or acquired electricity, steam, heating, or cooling consumed by the reporting company.

Scope 3 emissions: All indirect emissions (not included in Scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.

Sector-specific metrics: Energy or carbon intensity metrics that use a physical unit denominator and are applicable to a specific sector. Examples include kg CO₂/MWh (power), MWh/m² (real estate), etc.

REFERENCES

- 2dii (2 Degrees Investing Initiative). 2013. "From Financed Emissions to Long-Term Investing Metrics." http://2degrees-investing.org/IMG/pdf/2dii_financed_emissions_short_diff.pdf.
- 2dii. 2015a. "Carbon Intensity ≠ Carbon Risk Exposure." http://2degrees-investing.org/IMG/pdf/rapport_correlations_en_v8_combined.pdf?iframe=true&width=986&height=616.
- 2dii. 2015b. "Decree Implementing Article 173-VI of the French Law for the Energy Transition: Challenges and First Recommendations." http://2degrees-investing.org/IMG/pdf/energy_transition_law_in_france_-_briefing_note_final.pdf?iframe=true&width=&height=
- 2dii. 2015c. "Assessing the Alignment of Portfolios with Climate Goals: Climate Scenarios Translated into a 2°C Benchmark." http://2degrees-investing.org/IMG/pdf/2dportfolio_v0_small.pdf.
- 2dii. 2017. "Asset-Level Data and Climate-Related Financial Analysis: A Market Survey." http://2degrees-investing.org/IMG/pdf/assetdata_v0.pdf.
- 2dii, UNEP-FI (United Nations Environment Programme-Finance Initiative), and WRI (World Resources Institute). 2015. "Climate Strategies and Metrics: Exploring Options for Institutional Investors." http://www.ghgprotocol.org/sites/default/files/ghgp/standards/Climate%20targets_FINAL_med.pdf.
- ABN-AMRO. 2015. "Financial Institutions to Develop Yardstick for their Climate Impact." November 28. <https://www.abnamro.com/en/newsroom/press-releases/2015/financial-institutions-to-develop-yardstick-for-their-climate-impact.html>.
- Accenture and Barclays. 2011. "Carbon Capital: Financing the Low-Carbon Economy." http://nstore.accenture.com/Geneva/Studie_FINAL.pdf.
- Bank of England. 2015. "The Impact of Climate Change on the UK Insurance Sector." <https://www.bankofengland.co.uk/prudential-regulation/publication/2015/The%20impact%20of%20climate%20change%20on%20the%20UK%20insurance%20sector>.
- Boston Common AM. 2015. "Are Banks Prepared for Climate Change?" https://bostoncommonasset.com/Membership/Apps/ICCMSViewReport_Input_App.ashx?IX_OB=None&IX_mld=18&IX_RD=Y&ObjectId=731308.
- CPI. 2015. "Global Landscape of Climate Finance 2015." <http://climatepolicyinitiative.org/wp-content/uploads/2015/11/Global-Landscape-of-Climate-Finance-2015.pdf>.
- Deutsche Bank. 2013. "Making a Difference: German SMEs and Their Financing Environment." http://www.dbresearch.com/PROD/RPS_EN/HIDDEN_GLOBAL_SEARCH.alias.
- IFI (International Financial Institutions). 2015a. "International Financial Institution Framework for a Harmonised Approach to Greenhouse Gas Accounting." http://www.worldbank.org/content/dam/Worldbank/document/IFI_Framework_for_Harmonized_Approach%20to_Greenhouse_Gas_Accounting.pdf.
- IFI. 2015b. "IFI Joint Approach to GHG Assessment in the Transport Sector." <http://documents.worldbank.org/curated/en/539971467995662988/pdf/101533-WP-PI43154-PUBLIC-Box394816B-Joint-IFI-Transport-GHG-Accountingclean120115.pdf>.
- IFI. 2015c. "IFI Approach to GHG Accounting for Energy Efficiency Projects." https://www.thegef.org/sites/default/files/file_attach/Joint-IFI-EE-GHG-Accounting-Approach.pdf.
- IPCC (Intergovernmental Panel on Climate Change). 2015. "Climate Change 2014: Mitigation of Climate Change." Working Group III Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. <http://www.ipcc.ch/report/ar5/wg3/>.
- Kepler Chevreux. 2015. "Kepler Chevreux in Partnership with 2°ii, IIGCC, and Deloitte. Carbon Compass: Investor Guide to Carbon Footprinting." http://www.iigcc.org/files/publication-files/Carbon_Compass_final.pdf?iframe=true&width=986&height=616.
- NCI, Germanwatch, and 2dii. 2015. "Developing 2°C-Compatible Investment Criteria." <https://newclimateinstitute.files.wordpress.com/2015/11/2criteria-final.pdf>.
- Prudential Regulation Authority. 2015. "The Impact of Climate Change on the UK Insurance Sector." <http://www.bankofengland.co.uk/prudential-regulation/supervision/activities/pradefra0915.pdf>.
- UNEP-FI and WRI. 2015. "Carbon Asset Risk: A Discussion Framework." http://www.unepfi.org/fileadmin/documents/carbon_asset_risk.pdf.
- UNEP, 2dii, and CDC Climat Recherche. 2015. "Financial Risk and the Transition to a Low-Carbon Economy: Towards a Stress-Testing Framework." Working Paper. http://unepinquiry.org/wp-content/uploads/2015/10/2dii_risk_transition_low-carbon_workingpaper_jul2015.pdf.
- WRI and UNEP-FI. 2014. "Landscape Review of Alternate Climate Metrics." http://ghgprotocol.org/sites/default/files/ghgp/standards-supporting/Landscape_Review_924%20%28002%29.pdf.
- WRI and WBCSD (World Business Council for Sustainable Development). 2005. "The GHG Protocol for Project Accounting." <http://ghgprotocol.org/standards/project-protocol>.
- WRI and WBCSD. 2011. "Corporate Value Chain (Scope 3) Standard." <http://www.ghgprotocol.org/standards/scope-3-standard>.

