

Network for Greening the Financial System  
Technical document

# Enhancing market transparency in green and transition finance

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## Joint foreword by Ravi Menon and Sabine Mauderer

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**T**he growing threat of climate change and rising geopolitical risks highlight the need to speed up the global transition to meet the goals of the Paris Agreement. The UN's Intergovernmental Panel on Climate Change (IPCC) has warned that global greenhouse gas emissions need to peak before 2025 and drop sharply thereafter for a chance to limit global warming to 1.5°C. We consider it paramount to align global investments – including investments in green and transition projects and innovation in renewables – with the overarching target of net zero emissions.

*Financial markets play a key role in enabling the transition towards carbon neutrality. To mobilise the necessary funding for low-carbon projects and innovations, investors need clear and internationally comparable criteria to assess the environmental benefits and costs of their investments in different jurisdictions. Credible external reviews play an important role in mitigating the risk of greenwashing, or attempts to declare activities as environmentally friendly when they are not.*

*Mandatory global disclosure standards with industry-specific metrics are therefore vital to ensure that financial flows are aligned with green and transition objectives. In this regard, we consider the work of the International Sustainability Standards Board an important step forward.*

*Against the backdrop of a multitude of heterogeneous standards and practices, this report by the NGFS provides a comprehensive account of current practices and key challenges with respect to taxonomies, green external reviews, climate transition metrics and frameworks. Drawing from the experience of our members and observers and providing case studies for reference, we aim to contribute to global efforts for greater harmonisation and help to unleash the transformative power of financial markets to advance the climate agenda. We are grateful to the lead authors of this report and the NGFS Secretariat. We urge all stakeholders to reap the full benefits of our Network as a knowledge hub and platform for exchanging views and experiences, to help green the financial system.*

# Table of Contents

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<b>Foreword</b>	<b>2</b>
<b>Executive summary</b>	<b>5</b>
<b>Preface</b>	<b>9</b>
<b>1. Taxonomies</b>	<b>11</b>
1.1. Introduction	11
1.2. Uses of taxonomies by central banks and supervisors	13
1.3. Transition taxonomies	20
1.4. Green taxonomies: emerging and developing market perspectives	25
<b>2. Green external review and assessment</b>	<b>29</b>
2.1. Introduction	29
2.2. Institutional design: private review processes under regulatory oversight?	31
2.3. Impact reporting	34
2.4. Instruments with built-in quantitative targets: an illustration based on sustainability-linked bonds	37
2.5. Looking forward: will technology enhance data collection for green external review?	41
<b>3. Climate transition metrics, frameworks, and market products</b>	<b>44</b>
3.1. Introduction	44
3.2. Survey results of central banks' use of climate transition metrics and frameworks	45
3.3. Stocktake and assessment of metrics and frameworks used in financial markets	48
3.4. Asset managers and climate transition frameworks	51
3.5. Financial market products – investment funds, ETFs, and indices	56
3.6. Assessment of climate transition frameworks used in asset allocation	63
3.7. Further considerations in emerging markets	66

<b>Concluding observations</b>	<b>69</b>
<b>References</b>	<b>72</b>
<b>Annex 1 – Country and regional experiences in taxonomies and other frameworks for transition finance</b>	<b>77</b>
<b>Annex 2 – Country experiences in regulating green external review providers</b>	<b>86</b>
<b>Annex 3 – Country and regional experiences in dealing with climate-related transition risks</b>	<b>88</b>
<b>Acknowledgements</b>	<b>92</b>
<b>List of acronyms</b>	<b>93</b>
<b>List of tables, graphs and boxes</b>	<b>96</b>

## Executive summary

The community of central banks and financial supervisors is showing a growing interest in issues of market transparency in green finance, particularly with regard to taxonomies, green external review and assessment, and climate transition metrics, frameworks, and market products. This report leverages the experience of NGFS members and observers, as well as a survey of 25 central banks and 24 financial supervisors, to shed light on the state of play and key challenges surrounding these three broad topics. It also aims to inform a broad dialogue with market participants to find potential solutions to policy challenges.

### Chapter 1: Taxonomies

**Taxonomies are classification systems that define criteria to identify assets, projects and activities with environmental benefits or costs.** They are an important tool for achieving high-level environmental objectives such as those established by global accords or national environmental or sustainable development policies. Observed taxonomies vary considerably across objectives, as well as in terms of their granularity and operational targets.

**At the same time, the challenges posed by a fragmented global landscape with many different taxonomies highlight the need to enhance comparability and interoperability across jurisdictions.** The Common Ground Taxonomy being developed by the International Platform on Sustainable Finance (IPSF) represents a key milestone in this regard. Global baseline disclosure standards with industry-specific activity metrics will also assist in this effort. While taxonomies may differ in terms of how their technical criteria are calibrated, commonly agreed minimum disclosure standards would allow for comparison across and within jurisdictions and between companies of different sizes.

**According to an NGFS survey, most central banks and financial supervisors are either using or considering the use of taxonomies, whether they be national, regional or private sector-based taxonomies.** While some central banks and supervisors are encouraging the use of the national or regional taxonomy, others are neutral with regard to the development and selection of

specific taxonomies. In some jurisdictions, supervisors play a key role in supporting the use of taxonomies with the aim of providing clarity and promoting transparency on the sustainability characteristics of financial products. The availability of data to measure environmental impact or assess taxonomy compliance is a significant constraint to the use of many taxonomies, though this is expected to change rapidly over the next few years.

**An increasing number of jurisdictions are exploring transition taxonomies, which define and identify activities (or, more often, criteria for those activities) consistent with a “transition” towards green objectives.** Such taxonomies are characterised by a greater focus on entity-level transition and transformation of the entity’s business model. This can help investors assess whether the entity relying on green finance has a credible transition strategy, what positive and negative impacts are created by its overall business model, and how it compares with its industry peers. Some transition taxonomies are described as “traffic light systems”, whereby an intermediate colour (e.g. “amber”) is assigned to activities/companies with quantifiable and time-bound pathways towards significant decarbonisation. Such taxonomies will often require continuous improvements on an ongoing basis in order for the activity being classified not to fall back to “red”.

**The developers of taxonomies in emerging and developing markets face the challenge of drawing on the design principles of existing taxonomies, such as the EU Taxonomy, whilst aligning with local regulations that reflect their own development paths and growth models, which are often at earlier stages of transition.** While developers are looking for flexible and interoperable solutions, at the same time they have to address the need for transparency that will allow international investors to study and compare taxonomies across jurisdictions – ideally using similar activity metrics from common global disclosure standards, such as those to be issued by the European Commission and the IFRS Foundation’s International Sustainability Standards Board (ISSB) – and reflect their preferences in their investment decisions. Multilateral development banks’ approaches to climate finance can also contribute to supporting sustainable activities in emerging market and developing economies.

## Chapter 2: Green external review and assessment

**Green external review plays an important role in ensuring the proper application of green principles, standards and taxonomies, and thus in promoting market transparency.** Within the NGFS mandate, this report focuses on green external review, the process of independently evaluating the extent to which green bond issuance frameworks, the use of proceeds, or the issuing entities themselves align with defined green or environmental criteria.

**Private sector solutions currently dominate the green external review market, and offer a range of different approaches, such as second-party opinions, third-party certifications, ESG ratings, assurance, and audit, etc.** However, concerns have also arisen regarding the reliability and comparability of green labels, in particular as regards ESG ratings, with calls for the green external review market to be regulated. Some countries, such as China, and also the EU have started to put in place, or have upgraded, regulatory frameworks to guide private external review activities. The Green Bond Assessment and Verification Guidelines introduced in China exemplify the role a central bank can play in ensuring that the institutions conducting assessments and certifications of green bonds are suitably qualified.

**Clear and meaningful reporting underpins any effective external review or assessment of green bonds.** Reporting processes allow issuers to clarify how they have used green bond proceeds (use of proceeds or allocation reporting), and also provide insights into the estimated impacts of these investments (impact reporting) built around science-based quantitative methods. The market calls for standardisation of impact reporting, given its critical role in enhancing understanding of the environmental and climate benefits of green investments and the general lack of consistency and comparability in current reporting practices. There is also growing demand for impact assessments to be expanded beyond the activity level so that they cover the overall impact of an issuer's business model.

**New green finance instruments, and most particularly sustainability-linked debt (such as sustainability-linked bonds, or SLBs), have built-in quantitative targets against performance indicators.**

The built-in mechanism of these instruments allows issuers to achieve some defined and usually verifiable green or sustainability objectives while securing funds for a general purpose. The SLB market has expanded rapidly since 2019, with Europe featuring strongly and both corporate and sovereign issuers tapping the market. A further development of assessment indicators and targets, including their standardisation and specification, could enhance the attractiveness of SLBs to finance the green transition.

**Lastly, greater availability of data is needed to broaden the scope for verifying outcomes related to environmental objectives.** Technological advancement holds promise in this regard. It can enhance market transparency by improving the management of disclosures on sustainability impacts and outcomes, and also by allowing data to be collected in real time or at least at a much higher frequency. Some jurisdictions, for instance in the EU with the proposed EU Corporate Sustainability Reporting Directive, have already started to make progress on enhancing data collections by leveraging new technological capabilities.

## Chapter 3: Climate transition metrics, frameworks, and market products

Chapter 3 expands on the first two chapters by taking a broader market perspective that assesses a range of climate-related metrics, climate transition frameworks, and various market products that are increasingly used by market participants to assess and invest in the climate transition.

**Climate transition metrics and frameworks are important tools for central banks and financial authorities that may be looking to assess and guide an orderly climate transition through the use of market-based approaches.** The NGFS survey found that many central banks are now considering the use, or are currently using, various climate-related metrics and frameworks to assess climate transition risks and opportunities. They do so in portfolio management, market surveillance and financial stability, amongst other responsibilities. Central banks cite a lack of data and consistent, comparable and reliable reporting; inconsistent metrics; and a lack of comparability across frameworks for assessing progress against net zero commitments as challenges that will need to be overcome to make better use of climate metrics and frameworks for

monitoring and assessing the greening of the financial system. In practice, the wide range of differing metrics and frameworks associated with environmental and climate-related impact, and their benefits, biases and limitations need to be better understood by financial authorities to ensure their uses are fit for purpose.

**This chapter also offers a stocktake of the climate-related metrics, environmental pillar ratings and transition frameworks currently in use in financial markets.**

It illustrates a wide range of metrics and approaches to assess carbon emissions, intensity, and climate transition risks and opportunities. There appear to be similar types of metrics used across these approaches, and progress in reporting initiatives could further standardise a core set of metrics across global financial markets to reduce fragmentation. In response, efforts are under way by regulators, international organisations and standard setters to develop recommendations for good practices; the IFRS Foundation's ISSB is endeavouring to develop international baseline reporting standards for climate-related financial disclosures.

**Moreover, a range of transition frameworks are emerging to help assess factors such as issuers' awareness of climate transition risks, ambition and readiness to decarbonise, governance and strategy, and medium and long-term science-based net zero targets.**

Notwithstanding this progress, there is less precision and transparency about how the transition will play out in practice. Moreover, ESG and climate transition framework scores often assign a greater weight to the disclosure of ambition than to actual implementation. In this respect, the vast differences in how metrics are selected, weighted, and prioritised in ratings and frameworks call for greater transparency and comparability so as to strengthen market integrity surrounding the mainstreaming of their use.

**Progress is being made to develop market products to help scale up investments in support of climate transition opportunities and green technologies, yet challenges need to be addressed.**

The great number of climate-aligned indices that are being developed can help investors align their own portfolios towards the transition to low-carbon economies. Yet, funds and ETFs labelled as climate solutions, low-carbon, climate-conscious, and clean energy differ widely in terms of how they measure

emissions and carbon intensity. Given that the strategy of a significant portion of asset owners and managers is to invest in climate transition, greater monitoring, verification, and engagement strategies are necessary to ensure that issuers are held accountable to achieve decarbonisation against their targets.

## Concluding observations

While specific policy recommendations will inevitably differ from one jurisdiction to the next, this report extracts three sets of common and general observations relevant to policymakers.

**Enhance market transparency surrounding green and transition objectives.** Policymakers and investors need to carefully assess and understand the tools that are available at the national, regional and international levels to achieve long-term climate objectives. While current green taxonomies, external review, and climate transition metrics and frameworks have been primarily applied to public and corporate bonds and other fixed-income products, more recently, the rise of ESG practices and products within green equity investment strategies merit further assessment and scrutiny.

**Facilitate comparability and interoperability of taxonomies, frameworks, and principles.** To avoid the risk of various green taxonomies, standards and principles leading to divergent green assessment outcomes, there is a real need to enhance the comparability and interoperability of taxonomies and transition frameworks in order to nurture a common understanding and provide a consistent basis for green external review. The use of performance indicators based on industry-specific activity metrics from common global disclosure standards could act as a common language to translate interoperable taxonomies and frameworks and enhance transparency, comparability and the focus on critical transition outcomes. External review, assessment, and engagement are key to market integrity. In addition, due diligence in the assessment of climate risks by institutional investors forms a sound basis upon which to assess the credibility of issuer transitions. In the case of transition finance, the transformation of the entity's business model is the critical purpose of funding, and entity-level analysis is essential.

***Redouble future efforts on disclosure and reporting.***

Global baseline disclosure standards with industry-specific activity metrics will be an essential complement to effective taxonomies and external review, as they form the basis for consistent, comparable and reliable climate transition plans and climate investment products. The minimum requirements for sustainability reporting

include both forward-looking measures necessary for transition metrics and “hard” measurable sustainability performance indicators for investors to verify whether previously signalled forward-looking targets have been achieved. The comparability of practices for calculating and reporting on environmental impact should be enhanced.



# Preface

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From a wide range of complementary perspectives, central banks and financial supervisors have a keen interest in issues of market transparency in green finance. Taking stock of recent developments<sup>1</sup>, they have collectively identified the development of taxonomies, green external review, and climate transition metrics and frameworks as important steps towards a consistent and effective scaling up of green finance.

Taxonomies are classification systems that define criteria to identify assets, projects and activities with environmental benefits or costs. Green external review is understood as the general process of assessing financial assets or entities against predefined climate-related and/or other environmental criteria with a focus on green labels. And climate transition metrics and frameworks are important tools used by a range of financial market participants, and increasingly central banks, to assess transition pathways and implementation of decarbonisation across businesses and financial institutions.

Developments in these three areas play a significant role in the pursuit of the integrity of green financial markets and instruments, both to foster market development and funding in line with green objectives (e.g. greenhouse gas emissions reductions), and also to contribute to the effective design of public policies. Though many of the ideas discussed in this report also apply to other forms of green finance with broader environmental objectives, as well as even broader sustainable finance goals more generally (e.g. adaptation finance), this report focuses on green and transition finance that is aimed at climate change mitigation.

This report is part of the NGFS's efforts to contribute to the scaling up of green and transition finance. Market transparency is key to this objective: in addition to transparency about the environmental impact of the assets they purchase, investors require transparency about how environmental issues may impact the value of the assets they purchase, which includes taking into account changes to regulation, businesses models, strategies and financial

performance. This report is made up of three chapters – (i) taxonomies, (ii) green external review and assessment, and (iii) climate transition metrics and frameworks.

Chapter 1 covers taxonomies, or classification systems that effectively identify green or transition assets, projects and activities. Observed taxonomies differ considerably across objectives, granularity, operational targets and other dimensions. The results of a NGFS survey of central banks and supervisors, suggest that central banks and supervisors are increasingly considering the use of taxonomies. There has been greater uptake of initiatives to develop transition taxonomies, which define activities consistent with a transition towards green economies. The chapter also documents how developers of taxonomies in emerging and developing economies face the challenge of drawing on advanced economy models and aligning the taxonomies with their own development paths and growth models.

Chapter 2 discusses current practices in the field of green external review, and the key issues to enhance independent, expertise-based and comprehensive green assessment for future market integrity. Private sector solutions currently dominate the market for green external review and offer a wide range of assessment approaches, while some countries, regions and international standard-setting bodies have started to put in place, or have upgraded, regulatory frameworks to guide private external review activities. Alongside the assessment of green bond proceeds, there is growing demand for an evaluation of the environmental impact not only of green finance instruments, but also of their issuing entities, prompting demands for a further standardisation of impact report practices and more comprehensive sustainability reporting at the issuer level. To this end, the IFRS Foundation's International Sustainability Standards Board intends to issue a global baseline of sustainability reporting standards, starting with climate matters, that can facilitate consistent, comparable and reliable sustainability-related financial disclosures. These disclosures will include impacts on environment and society where they are material to enterprise value creation over different time horizons. New instruments, such as

<sup>1</sup> The report covers developments until the end of 2021, but also latest developments in the EU, Japan, as well as the very recent proposals by the IFRS Foundation's International Sustainability Standards Board (ISSB).

sustainability-linked bonds, also include built-in quantitative targets against defined green or environmental objectives without limiting the use of proceeds. Market participants are looking for industry-specific indicators to be established to promote the further development of this market. Lastly, greater data availability is needed to broaden the scope for verifying outcomes related to environmental objectives, as discussed in a recent NGFS Progress Report on “Bridging Data Gaps” (2021). Technological advancement promises to boost the ease of data collection, thus enhancing market transparency and efficiency.

Chapter 3 explores how a host of actors in the financial ecosystem are developing and harnessing climate transition metrics, frameworks, and market products, as well as related methodologies. Following an initial assessment of central bank perspective and practices, this chapter takes an investment management perspective, which distinguishes it from the previous two chapters. It reviews metrics from the Task Force on Climate-related Financial Disclosures (TCFD) guidelines, as well as a variety of metrics from the environmental pillar (the “E” of ESG) at international ESG rating providers, to set a baseline for available data for monitoring and investment purposes. It reflects on the recommendations made by IOSCO, the OECD and other international organisations to address the lack of transparency and comparability of ESG rating methodologies as well as potential conflicts of interest on the part of providers. The chapter continues with an assessment of emerging climate frameworks to understand how they incorporate climate, strategy, and operational information to provide point-in-time and forward-looking perspectives on climate transitions to net zero. It then reviews climate-labelled investment products, including funds, ETFs, and indices, to illustrate the wide range of carbon emissions and intensity levels in each category. After that, this chapter assesses these various approaches in greater detail and identifies key

challenges that could impede the efficient and effective use of these market-based tools to scale up transition finance. It also considers how sustainability-related practices, policies and disclosures in the asset management industry can be improved at the product and asset manager level to address greenwashing concerns about climate-labelled products.

Boxes in the Annexes to this report take a deep dive into many of the country examples as a way of illustrating the commonalities as well as the differences in the type of green taxonomies, external review and assessment processes, as well as climate transition metrics and frameworks currently under consideration in a cross-section of jurisdictions.

The report ends with some high-level concluding observations relevant to policymakers. Policymakers and investors need to carefully assess and understand the tools available at the national, regional and international levels to achieve long-term climate objectives. Taxonomies and climate transition frameworks are at their most effective when they have clear objectives and science-based net zero targets. At the same time, there is a need for comparability and interoperability across taxonomies and transition frameworks to enhance a common understanding and provide a consistent basis for green external review. External review, assessment and engagement are key to market integrity. In addition, future efforts to enhance disclosure and reporting, including the establishment of global baseline disclosure standards which include industry-specific activity metrics, will be an essential complement to effective taxonomies and external review.

This report is also intended to feed into the international discussions in the G20 Sustainable Finance Working Group (SFWG) and other ongoing work in international fora on improving compatibility of approaches to identify, verify and align investments to sustainability goals.

# 1. Taxonomies

## 1.1. Introduction

Making financial flows “consistent with a pathway towards low greenhouse gas emissions and climate-resilient development” (United Nations (2015), Article 2.1(c))<sup>1</sup> is one of the high-level policy objectives of the Paris Agreement. Green finance addresses both the mitigation of and adaptation to climate change as well as other environmental objectives such as biodiversity and water security, to name but two examples. To scale up green finance, investors require greater transparency to assess the environmental impact of the assets they purchase, and make more informed investment decisions.

There is also a growing interest in the central bank and supervisory community in how to improve market transparency in green finance, both to enhance market functioning and preserve financial stability (e.g. vis-à-vis the risks of stranded assets), and also to contribute to the effective design and implementation of public policies, including the mitigation of climate-related risks. Central banks and supervisors themselves find it increasingly important to have clarity as to what constitutes green investments and loans.

Chapter 1 of this report focuses on the development of taxonomies as one of the tools available for achieving greater market transparency in green finance.

In the context of this chapter, taxonomies are classification systems that define criteria to identify assets, projects and activities with environmental benefits or costs. They provide a basis for evaluating whether and to what extent an activity underlying a financial asset supports or hinders given environmental goals. By doing so, they can help investors assess the environmental benefits of a proposed or existing investment and contribute towards quantifying the overall environmental impact of a portfolio. They can also provide

guidance to the financial sector on how to set out transition strategies consistent with the Paris Agreement, including for the part of their portfolios and balance sheets that are carbon-intensive at present. This chapter focuses mainly on green taxonomies, or those that contribute solely to financing for environmental benefits, as opposed to the more general societal benefits that fall under the labels of “social” or “sustainable finance”.

Green taxonomies should provide a strong signal to investors and other stakeholders, and assist their decision making by identifying the type of information needed to classify assets and projects (BIS 2021, G20 2021, IPSF, Common Ground Taxonomy Report 2021). Benefits to be identified can also include those accruing from a transition from a highly polluting to a less polluting state. By providing high-quality definitions, effective taxonomies should diminish the risk of unsubstantiated and misleading signals of environmental benefits, often referred to as “greenwashing”, and thereby contribute to investor protection. They also create a common language that investors can use when investing in projects and economic activities that have a substantial positive impact on the climate and the environment (European Commission 2021),<sup>2</sup> thus providing a signpost for the financial sector to be able to redirect funds into economic activities aligned with the jurisdictions’ environmental goals.

Taxonomies currently vary considerably. In the following, drawing in part on a large current body of literature,<sup>3</sup> this introduction reviews the principal characteristics of green finance taxonomies.

To begin with, the environmental objectives that taxonomies focus on can differ. Even where they are focused on environmental benefits as opposed to more general societal benefits, the objectives can span from the reduction of greenhouse gas (GHG) emissions (and/or carbon neutrality) to

<sup>1</sup> [https://unfccc.int/files/meetings/paris\\_nov\\_2015/application/pdf/paris\\_agreement\\_english\\_.pdf](https://unfccc.int/files/meetings/paris_nov_2015/application/pdf/paris_agreement_english_.pdf)

<sup>2</sup> [https://ec.europa.eu/info/system/files/economy-finance/2022\\_european\\_semester\\_annual\\_sustainable\\_growth\\_survey.pdf](https://ec.europa.eu/info/system/files/economy-finance/2022_european_semester_annual_sustainable_growth_survey.pdf)

<sup>3</sup> The text that follows draws considerably on BIS (2021). For some other recent contributions, see OECD, Developing Sustainable Finance Definitions and Taxonomies (2020), BDG/GFMA, Global Guiding Principles for Developing Climate Finance Taxonomies (June 2021), Climate Policy Initiative, Framework for Sustainable Finance Integrity (October 2021), IPSF/UN-DESA, SFWG G20 input paper, Improving Compatibility of Approaches to Identify, Verify and Align Investments to Sustainability Goals (September 2021), 2021 Synthesis Report of the G20 SFWG (October 2021), and Irving Fischer Committee, Sustainable Finance Data for Central Banks, December 2021.

as far as the protection of natural resources and ecosystems, pollution prevention and control, the sustainable use and protection of water and marine resources, and so forth. In practice, establishing the environmental goals and objectives is the first necessary step. Taxonomies are then designed to assess the profile of activities against those goals and objectives as benchmarks. In the context of this report, the taxonomies examined are all at least partially assessed against the objectives of the Paris Agreement and the reduction of greenhouse gas emissions.

Objectives can also be multiple within a single taxonomy. In the EU Taxonomy, in addition to contributing substantially to one or more of six environmental objectives, an eligible activity must also do no significant harm to any of the others (the DNSH principle). This design is meant to ensure the integrity of the framework and avoid situations where the juxtaposition of multiple alternative environmental objectives provides scope for selective and opportunistic reporting by companies, which might increase the risk of greenwashing. On the other hand, the greater the complexity of a taxonomy with multiple objectives, the higher the costs of implementation and supervision, which might raise the cost of adoption and/or compliance by financial markets.

Granularity is another dimension over which taxonomies can differ. While most taxonomies provide binary classifications for assets, some taxonomies can be more granular to allow for multiple shades of green, for example. More-granular taxonomies can also make a distinction according to the severity of polluting investments, i.e. among those that are inconsistent with climate objectives; we will refer to these below as “red” taxonomies. Such taxonomies can be useful, since the bulk of disclosed carbon emissions comes from a few large emitters.<sup>4</sup> Distinguishing the most polluting emitters can therefore provide an opportunity for more-targeted incentives to reduce carbon emissions. At the most general level, taxonomies can define a spectrum from contributing significantly to environmental objectives at one end, to being highly polluting at the other. Greater granularity may, however, entail higher complexity and costs, which should be a point to consider when deciding on the specific features of the taxonomy to adopt, especially in the case of developing countries.

The target of taxonomies can also differ from activity to entity to asset. Many widely used taxonomies define sustainability from the perspective of an activity or project, rather than the entire entity undertaking the activity (usually a corporation). Taxonomies often need to build on sectoral and/or industry objectives, and define sustainability criteria at the sector level. Some taxonomies, nonetheless, directly link to the entity level by providing disclosure recommendations or requirements. Sometimes, the target of the taxonomy is the asset on the entity’s balance sheet, which would typically be an actual green physical asset. However, taxonomies may also apply to financial investments, and in such cases their target may include financial assets, such as a green loan or bond, provided the physical asset being financed meets the taxonomy criteria.

Although signalling the environmental benefits of business activities at the project level could represent a first step in firms’ activities becoming greener, it does not necessarily imply a similar signal at the entity level, particularly when the reduction of emissions from the green project is relatively small compared to overall emissions from other carbon-intensive activities of the firm undertaking that project. To mitigate the possible mismatch between activity and entity, taxonomies (e.g. the EU Taxonomy) may couple the activity-level focus of their criteria with a secondary, entity-level aggregation of the share of taxonomy-aligned activities over total assets or – as in the case of green bond taxonomies – with entity-level minimum safeguards. More granular taxonomies provide even greater safeguards against the possible disconnect between activity-level alignment and entity-level performance by providing a full picture of the sustainability profile of all an entity’s assets.

Taxonomies can also define and identify activities which, even if they are not green at present, are consistent with a “transition” towards green objectives. More specifically, they can categorise activities that have the scientific/ technological/industrial potential to materially improve environmental performance compared to the status quo. Such taxonomies are increasingly under development; as governments pledge to adjust their economies, finance will be increasingly needed for the transition efforts of companies in industries that emit large quantities of

<sup>4</sup> The 1% of publicly traded firms with the highest carbon intensities account for nearly 40% of total carbon emissions (Ehlers et al. 2020). Providing granularity that distinguishes among polluting assets by the degree of polluting activities can be distinguished from the creation of classifications to capture progress from polluting to less-polluting states (“transition”) as discussed below.

greenhouse gases. Transition taxonomies could prove to be invaluable when it comes to informing investors about which companies are doing this and which are lagging behind, consistent with the need for reporting against transition plans, as planned by the European Commission and the IFRS in their respective standard-setting approaches.<sup>5</sup> Such taxonomies are particularly relevant to emerging market and less developed economies, where demand for affordable energy will continue to grow with urbanisation and modernisation, and it is not realistic to abruptly switch from fossil fuels to renewables. Transition taxonomies should not be considered incompatible with “green” taxonomies; rather, these two tools are complementary and can be integrated into a single consistent framework, where the “green” threshold provides the upper bound of environmental performance, and the “transition” space identifies an intermediate level of environmental performance, calibrated against an objective or performance indicator.<sup>6</sup>

There is widespread agreement that having jurisdictions apply widely disparate taxonomies based on different metrics impairs effectiveness, hence the need to ensure comparability and interoperability of existing and new taxonomies. The G20 Sustainable Finance Roadmap calls for improved “coordination at the regional and international level to facilitate the comparability, interoperability, and as appropriate the consistency of different alignment approaches. [...] Jurisdictions which intend to pursue a taxonomy-based approach [should] consider developing sustainable finance taxonomies using the same language (e.g., international standard industry classification and other internationally recognized classification systems), voluntary use of reference or common taxonomies, and regional collaboration on taxonomies.”

Technically speaking, global baseline disclosure standards for agreed activity metrics will assist in this effort. While taxonomies may differ in terms of their thresholds, common minimum disclosure standards will support a comparison across and within jurisdictions and between companies of different sizes. Applying taxonomies without sufficient coverage will make it difficult to identify the worst

polluters or those most out of line with agreed objectives. Global activity metrics mean that investors can use their own preferred science-based taxonomies to assess companies and monitor progress towards decarbonisation (or other objectives) (See Box 1.1 on the development of such entity-level metrics).

The remainder of this taxonomy chapter is structured as follows. In section 1.2 we focus on the current and planned uses of taxonomies by central banks and supervisors, drawing on a survey recently conducted by the NGFS. In section 1.3, we examine the development of transition taxonomies in greater detail, reviewing a number of recent initiatives worldwide. Section 1.4 focuses on the particular challenges facing emerging market and developing economy jurisdictions as they consider adapting the taxonomies developed in advanced economies, most notably the European Union.

## 1.2. Uses of taxonomies by central banks and supervisors

This section reviews specific use cases of taxonomies by central banks and supervisors, leveraging off a recent survey of NGFS members’ experiences.

Taxonomies can be used by central banks to align portfolios with public policy climate objectives or to manage risk in their capacity as asset owners. Supervisors can use taxonomies to assess the exposure of institutions they supervise to climate-related transition risks arising from potential fiscal and/or industrial policy responses to support public policy objectives. Central banks with an extended policy remit might also use taxonomies to actively support the transition to a low-carbon economy.

Financial market participants, including central banks, are already often relying on implicit taxonomies in their activities, as they make use of standards or sectoral metrics that themselves are based on these taxonomies. For example, they implicitly rely on taxonomies when they purchase green bonds that have been issued in compliance with certain

5 See European Union, European Financial Reporting Advisory Group, “Climate Standard Prototype Working Paper”, September 2021, and IFRS, “Climate-related Disclosures Prototype”, November 2021.

6 On their own, taxonomies do not necessarily affect the transition; they will, however, be one of the pillars for understanding how the firm or sector is transitioning. For instance, taxonomies of sustainable activities can allow firms to show off their transition efforts, e.g. in the EU companies can report on their taxonomy-aligned capex plans; see Platform on Sustainable Finance (2021).

taxonomies – one well-known example is the Climate Bonds Taxonomy, which provides the foundation for the Climate Bonds Standard published by the Climate Bonds Initiative (CBI). A number of central banks have invested part of their portfolios in the Bank for International Settlements' (BIS) green bond funds – and in determining the eligibility of a bond, the BIS assesses whether it complies with certain principles and standards, one of which is the Climate Bonds Standard. Similarly, supervisors may rely on an implicit taxonomy of which sectors are sustainable and which are not in order to identify exposures to high transition risks.

However, the use of taxonomies by central banks and supervisors is currently limited. A survey among NGFS members, conducted for this report, covered 25 central banks (with each of the Eurosystem central bank correspondents being treated as unique individual respondents) and 24 supervisor respondents.<sup>7</sup> This survey shows that a small portion of central bank respondents are already using taxonomies for their monetary policy and non-monetary policy portfolios, while a larger number of respondents are planning to use or are considering using taxonomies (survey results will be discussed further below). As existing taxonomies evolve and new ones are being developed, it may take some time before taxonomies are considered fit for purpose by more central banks and

supervisors. This section of the chapter explores whether taxonomies can be useful tools for central banks and supervisors by examining the potential avenues for, as well as challenges associated with, their use. It draws on the survey responses to shed light on current and planned uses of taxonomies. It does not contain any specific recommendations.

### 1.2.1. Portfolio management by central banks

Central bank securities portfolios can consist of both monetary policy and non-monetary policy portfolios. Policy portfolios are designed to meet strict policy objectives and constitute by far the largest pool of assets on central banks' balance sheets. NGFS (2021a) identified three main operational functions that can be adjusted to factor in climate-related risks from the perspective of central banks as liquidity providers – credit operations, collateral and asset purchases – and presented a number of stylised options.

This section subsequently explores how taxonomies might be used as an input to implement some of the options for policy portfolios highlighted in Table 1.1 (reproduced from NGFS 2021a, which focuses on climate aspects, and provides an assessment of these options).

Table 1.1 Options to adjust central banks' operational frameworks that could involve the use of taxonomies

Credit operations	
• Adjust pricing to reflect counterparties' climate-related lending	Make the interest rate for central banks' lending facilities conditional on the extent to which a counterparty's lending (relative to a relevant benchmark) is <b>contributing to climate change mitigation</b> and/or the extent to which they are <b>decarbonising their business model</b> .
• Adjust pricing to reflect the composition of pledged collateral	Charge a lower (or higher) interest rate to counterparties that pledge a higher proportion of <b>low-carbon</b> (or <b>carbon-intensive</b> ) assets as collateral, or set up a credit facility (potentially at concessional rates) accessible only against <b>low-carbon assets</b> .
• Adjust counterparties' eligibility	Make access to (some) lending facilities conditional on a counterparty's disclosure of climate-related information or on its <b>carbon-intensive/low-carbon/green</b> investments.
Collateral	
• Negative screening	Exclude otherwise eligible collateral assets, based on their <b>issuer-level climate-related risk profile</b> for debt securities or on the analysis of the <b>carbon performance of underlying assets</b> for pledged pools of loans or securitised products.
• Positive screening	Accept <b>sustainable collateral</b> (e.g. green bonds, or sustainability-linked bonds).
Asset purchases	
• Tilt purchases	Skew asset purchases according to climate-related risks and/or <b>criteria applied at the issuer or asset level</b> .
• Negative screening	Exclude some assets or issuers from purchases if they fail to meet <b>climate-related criteria</b> .

Source: NGFS (2021a).

<sup>7</sup> The findings are broadly consistent with a recent survey by the Irving Fisher Committee (among more than 60 member central banks) on the use of taxonomies for sustainable finance policies (Irving Fischer Committee 2021).

Operationalising many of the above adjustments involves the application of some climate-related criteria to facilitate the identification or classification of assets that are “green”, “low-carbon”, “sustainable”, or “contributing to climate change mitigation” (also referred to as “transitional” when related to investment solutions to decarbonise existing carbon-intensive assets) vs. assets that are “carbon-intensive”. While taxonomies, whether they be green, transition or red taxonomies – are not the only tool that can be employed by central banks to identify such assets,<sup>8</sup> they certainly represent one such tool.

At the instrument level, central banks can use taxonomies as an input in their collateral eligibility framework – for instance, the European Central Bank (ECB) has referred to the environmental objectives set out in the EU Taxonomy as some of the criteria to use in determining the eligibility of sustainability-linked bonds as collateral.<sup>9</sup> At the same time, the People’s Bank of China (PBC) has given green bonds – where the issuance proceeds have to be allocated to projects that are eligible under China’s Green Bond Endorsed Projects Catalogue (referred to later as the China Taxonomy) – preferential status as collateral for its medium-term lending facility (Macaire and Naef 2021). Taxonomies can thus also influence the choice of investments that are deemed sustainable by providing the underlying definition of green bond standards.<sup>10</sup>

At the issuer level, a central bank could, in principle, and where taxonomies have been put in place, determine an issuer’s eligibility using a metric that is linked to a taxonomy (e.g. if more than a certain percentage of an issuer’s total revenue is taxonomy-consistent, or if a company’s

decarbonisation strategy is consistent with specified emissions reduction pathways in line with the objectives of a taxonomy). Taxonomy alignment at the issuer level avoids the risk of activities-level labels being extended incorrectly to the issuer. At the same time, it is important to note that taxonomy alignment at the issuer level is more difficult to assess for sovereigns than for corporates. Taking the EU Taxonomy as an example, exposures to general governments are not currently covered by the EU Taxonomy Regulation as the taxonomy screening criteria are applicable only to a limited extent to sovereigns and the latter are not subject to taxonomy-related disclosure obligations. However, the European Banking Authority (EBA 2021a) has noted that new methodologies to assess sovereign alignment with the EU Taxonomy may be developed over time.<sup>11</sup>

Like other investors, central banks may, in principle, also use taxonomies in their management of *non-monetary policy* portfolios, which typically offer greater scope for flexibility than policy portfolios. Central banks’ own portfolios may incorporate other objectives, such as those relating to sustainable investment, in addition to generating financial returns; while pension and third-party portfolios are driven by beneficiaries’ and clients’ demands (NGFS 2019), though they can include investment in green assets. Some central banks currently screen their investment universe and potential counterparties with regards to sustainability criteria (NGFS 2020c; DNB 2019; Riksbank 2021). This could potentially include taxonomy-related criteria, such as whether an instrument is sufficiently aligned with a specified taxonomy, or by using benchmarks adjusted according to minimum taxonomy-alignment criteria.<sup>12</sup>

8 For instance, central banks could use data based on geographical location, metrics based on CO<sub>2</sub>e emissions, or a portfolio alignment approach (e.g. with a given temperature rise target).

9 In order for a sustainability-linked bond to be eligible as collateral for Eurosystem credit operations and outright purchases for monetary policy purposes, the coupons “must be linked to a performance target referring to one or more of the environmental objectives set out in the EU Taxonomy Regulation and/or to one or more of the United Nations Sustainable Development Goals relating to climate change or environmental degradation” (ECB 2021).

10 It should be acknowledged that inconsistency with a taxonomy can reflect a lack of data or an absence of standards adopted to local conditions and does not necessarily imply that the financed activity is harmful or does not contribute to sustainability. See the discussion of the challenges emerging markets may face in adopting criteria that may not comply with local regulations on the one hand, versus potentially losing out on capital flows from global investors on the other, in section 1.4.

11 See also “Commission Delegated Regulation (EU)” at [https://ec.europa.eu/finance/docs/level-2-measures/taxonomy-regulation-delegated-act-2021-4987\\_en.pdf](https://ec.europa.eu/finance/docs/level-2-measures/taxonomy-regulation-delegated-act-2021-4987_en.pdf). Articles 7 and 9 of Commission Delegated Regulation (EU) 2021/2178 of 6 July 2021 supplementing the EU Taxonomy Regulation” specify that the European Commission will review the exemption from including sovereign exposures of financial undertakings in the calculation of the green asset ratio and/or taxonomy aligned activities.

12 The 2021 edition of ICMA’s Green Bond Principles encourages issuers to supply information, if relevant, on the degree of alignment of projects with official or market-based taxonomies.

## Survey results (for central banks)

For monetary policy portfolios, less than 10% of survey respondents indicate that they are currently using taxonomies, though around 55% of respondents are planning to use or are considering using taxonomies (Graph 1.1). The use of taxonomies is slightly higher for foreign exchange reserves and non-monetary policy portfolios, with around 15% of respondents already using taxonomies and around 45% planning to or considering using taxonomies. An important caveat is that some of the central banks reporting that they do not apply taxonomies are using other tools and classification systems that they choose not to call taxonomies.

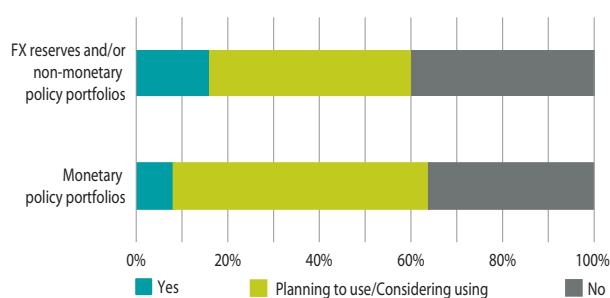
A few respondents that are already using taxonomies for their monetary policy portfolios are doing so to screen asset purchases or to apply preferential haircut treatment. For foreign exchange reserves and non-monetary policy portfolios, taxonomies are currently being used by central banks to identify sustainable investment, either as an asset selection tool, or to calculate a taxonomy-aligned share of their portfolios. More convergence in practices can be expected to take place in the near future.<sup>13</sup>

Of those central banks that are currently using, planning to use, or considering using taxonomies, the choice of taxonomies varies widely. A considerable portion of survey respondents have not selected or specified a taxonomy,<sup>14</sup> around 30% have selected a national or regional taxonomy (such as the EU Taxonomy), around 20% have chosen a market or private sector-based taxonomy,<sup>15</sup> and around 10% have developed taxonomies of their own. An example of a central bank (the Banca d'Italia) developing its own internal taxonomy can be found in Box A1.1 in Annex 1.

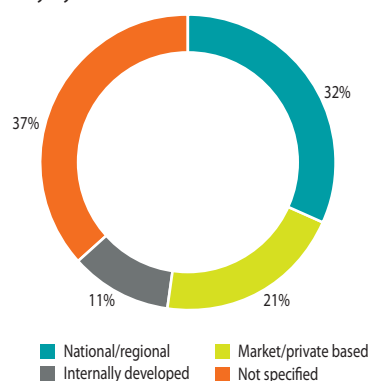
In addition to and in lieu of taxonomies, some central banks use other tools to help them identify sustainable assets. The survey responses highlight a wide range of tools, from the most simple to complex classification systems, that could meet the definition of a sustainable finance taxonomy as they help the user evaluate whether and to what extent a financial asset can support given sustainability goals. It is important to note that if these other tools were regarded as taxonomies, however simplistic they may be, the number of respondents that are using taxonomies would be higher than what is indicated in the survey responses. For example, some central banks that are currently using green bond labels to identify sustainable investments (whether they

Graph 1.1 Use of taxonomy by portfolio and choice of taxonomy type by central banks

Use of taxonomy by portfolio



Choice of taxonomy by central banks



N = 25

Source: NGFS survey.

13 The Eurosystem central banks – the 19 national central banks of the euro area countries and the European Central Bank (ECB) – have defined a common stance for applying sustainable and responsible investment principles in the euro-denominated non-monetary policy portfolios that they each manage under their own responsibility. See [https://www.ecb.europa.eu/press/pr/date/2021/html/ecb.pr210204\\_1~a720bc4f03.en.html](https://www.ecb.europa.eu/press/pr/date/2021/html/ecb.pr210204_1~a720bc4f03.en.html).

14 One respondent indicated that the choice of taxonomies and methodologies is at the discretion of external asset managers.

15 Some of the examples cited are the Climate Bonds Standard issued by the Climate Bonds Initiative, principles issued by the International Capital Market Association (ICMA), and metrics relating to the United Nations Sustainable Development Goals.



be based on Bloomberg's green bond indicator, the ICMA principles, or the Climate Bonds Standard) have viewed these labels in essence as taxonomies, while others have not (instead identifying them as "other" tools). A number of respondents have applied certain criteria based on the carbon footprint<sup>16</sup> and environmental or ESG scores, certifications, and local guidelines. Other tools cited include climate scenario analysis as well as data at the country, industry, company or index level. Some of this analysis is conducted in-house by the central banks themselves, and some is undertaken by or with external asset managers. Some respondents also refer to the Regulation on the EU Climate Transition Benchmarks as another potential reference.<sup>17</sup>

Central bank respondents have also recognised a number of current limitations concerning the (actual or potential) use of taxonomies. Data availability issues and cost of compliance are frequently cited as major challenges, especially as they relate to more complex taxonomies. Incomplete taxonomies are also seen as problematic, with most taxonomies being narrowly focused on green activities. Many respondents, furthermore, are still at the initial stages of discussing the use of taxonomies and therefore not in a position to describe specific issues. One respondent commented that discrepancies in taxonomies across regions is a challenge for globally diversified portfolios.

### 1.2.2. Supervision of financial institutions

Financial sector institutions and supervisors alike are attaching increasing importance to the management of climate, ESG or sustainability risks. The management of these risks requires a forward-looking approach by both financial institutions and supervisors.<sup>18</sup> The methodologies used by supervisors to assess financial institutions' resilience to climate-related risks vary, but one of the steps involved usually requires an assessment of impact by economic sectors, with differing levels of disaggregation – for example, corporate exposures can be classified using international sectoral classifications or even

sustainable finance taxonomies (BIS 2021). By providing a set of environmental sustainability criteria, taxonomies allow for a more granular assessment of exposures, which can be used to classify activities of corporate borrowers, offering insights into climate-related risks faced by financial institutions as lenders.<sup>19</sup> Taxonomies can notably be used to identify activities that are most exposed to transition risk, and therefore, assets that are more likely to be stranded in the future.

In some jurisdictions, taxonomies are used to measure green lending by financial institutions, or the extent to which a financial institution's exposures are associated with environmentally sustainable activities. For example, the European Banking Authority (EBA 2021a) has recommended to the European Commission that the green asset ratio (GAR) be disclosed as the main performance indicator to measure the overall alignment of credit institutions' balance sheets with the EU Taxonomy (for more on the EBA's approach, see Box A1.3 in Annex 1). As per the Delegated Act under Article 8 of the Taxonomy Regulation, the GAR measures the proportion of Taxonomy-aligned exposures (green assets) as a share of total covered exposures.

A clear taxonomy could help in the exploration of possible risk differentials between assets that are otherwise similar but differ in terms of carbon intensity (NGFS 2020c, ECB 2020, NFGS 2022). Taxonomies may be used by prudential regulators in support of capital adequacy assessments if certain activities under taxonomies are found to present greater or lesser financial risk. Some regulators, depending on their policy remit, may also be able to use taxonomies to encourage financial institutions to finance activities that are environmentally friendly or contribute to the transition to a low-carbon economy. The mechanisms by which taxonomies could be used to inform capital adequacy assessments are a relatively unexplored area, largely since taxonomies are still under development and are being designed with other non-regulatory objectives in mind (e.g. supporting

16 The decision to establish a common stance for applying sustainable and responsible investment principles in the euro-denominated non-monetary policy portfolios provides the basis for the measurement of greenhouse gas emissions and other sustainable and responsible investment-related metrics of these portfolios, with an objective to start making annual climate-related disclosures within the next two years (ECB 2021).

17 See <https://www.esma.europa.eu/policy-activities/sustainable-finance/climate-related-benchmarks>. The Regulation on the EU Climate Transition Benchmarks creates two new categories, or labels, of climate-related benchmarks.

18 See NGFS (2020b).

19 While it can be argued that taxonomies applied at the activity level in isolation are inadequate for assessing entity-level risks, an issuer's activities can be rolled up into an item of issuer-level information even if the taxonomy is applied at the activity level. For instance, it may still be possible to determine how much of an issuer's activities are taxonomy-aligned. It is also useful for supervisors to get a sense of which sectors have activities with inherently high levels of transition risk.

investment in green activities). The PRA<sup>20</sup> and the ECB<sup>21</sup> have published initial reports which explore more broadly the links between climate change and the regulatory capital framework. Other international bodies are also considering further work in this area.

### Survey results (for supervisors)

Of the 24 supervisor respondents, around 20% indicate they are currently using taxonomies, while around 60% are planning to use or are considering using taxonomies (Graph 1.2). A large number of supervisors are in the latter category as some jurisdictions only require supervised entities to use taxonomies sometime in the future.

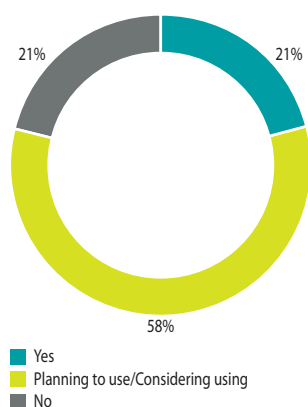
Most respondents cite the use of taxonomies (current, planned or considering) by supervised entities to meet disclosure requirements. Accordingly, most supervisor respondents selected their national or regional taxonomies as the taxonomy of choice. A significant number of supervisors are also planning to use or are considering using taxonomies for environmental risk management, while a few supervisors are using or considering the use of taxonomies for prudential regulation, including the determination

of capital requirements based on risk differentials. Some supervisors are using, planning or considering using taxonomies to identify and evaluate financial institutions' exposures to climate change-sensitive sectors and the potential financial risks arising from such exposures.

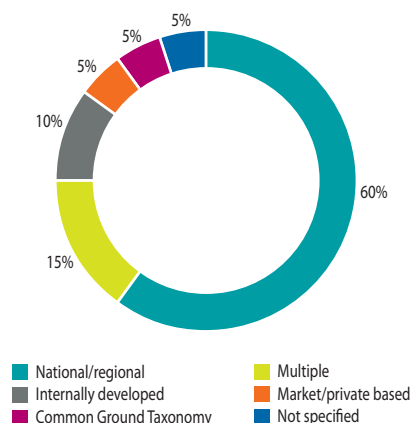
In the absence of a commonly accepted red taxonomy globally, some respondents have also developed their own taxonomies, for example by mapping banks' portfolio exposures using each loan's industry sector code as a means of classifying different economic activities (as green or red) by greenhouse gas emissions on a sectoral basis as a way of enabling them to gauge the implications of transition risk for the domestic banking system. Some respondents also make use of other tools, such as the Climate Policy Relevant Sectors (CPRS)<sup>22</sup> methodology (which classifies activities according to their transition risk), the Paris Agreement Capital Transition Assessment (PACTA), a list of firms involved in polluting sectors<sup>23</sup> and their ESG scores (see Chapter 3 for mixed evidence, however, on the effectiveness of the use of ESG scores). Nevertheless, many survey respondents see value in having a red taxonomy from a risk management perspective (for example, to identify assets most exposed to transition risk) to capture climate-related risks in a comprehensive manner.<sup>24</sup>

Graph 1.2 Use and choice of taxonomies by supervisors

Usage of taxonomy by supervisors



Choice of taxonomy by supervisors



N = 24  
Source: NGFS survey.

20 See PRA Climate Change Adaptation Report 2021, Part B "Climate change and the regulatory capital framework".

21 See ECB macroprudential bulletin article on climate change and the banking regulatory framework, [https://www.ecb.europa.eu/pub/financial-stability/macroprudential-bulletin/html/ecb.mpbu202110\\_1~5323a5baa8.en.html](https://www.ecb.europa.eu/pub/financial-stability/macroprudential-bulletin/html/ecb.mpbu202110_1~5323a5baa8.en.html)

22 See <https://www.finexus.uzh.ch/en/projects/CPRS.html>

23 For example, lists published by non-profit environmental and human rights organisations such as *Urgewald*. That said, the UK's Climate Financial Risk Forum has developed arguments on why GHG emissions are not always an effective proxy for transition risk (see Climate Financial Risk Forum (2021), p. 9).

24 This is consistent with the recommendations on taxonomies in NGFS, A call for action – Climate change as a source of financial risk (2019).

In some jurisdictions, supervisors play a key role in supporting the use of taxonomies with the aim of providing clarity and promoting transparency on the sustainability characteristics of financial products (for example, by requiring green bond issuers to disclose the taxonomy used in project selection), thereby helping to scale up investment in sustainable activities. Taxonomies also allow supervisors to analyse how credit allocation has changed over time.

Respondents also cited challenges with data availability, as disclosure requirements may either not cover certain exposures (such as SMEs and corporates headquartered outside their jurisdiction) or not yet be in force. Some respondents highlighted the need for more granularity, since classifications on a sectoral basis might not be adequate given the wide variability within each sector. Concern was also expressed that assessing alignment with a taxonomy could be a complex exercise and in some cases may require the use of judgment, which not only introduces additional costs in terms of training and verification processes, but also reduces consistency across institutions. Additionally, the taxonomy of choice may not always be applicable to activities in other jurisdictions.

### 1.2.3. Important considerations for central banks and supervisors in developing or selecting taxonomies

In some jurisdictions, central banks and supervisory authorities have played a key role in the development of sustainable finance taxonomies. The PBC published the Green Bond Endorsed Projects Catalogue, which defines the criteria that must be met for a project to qualify as green. Recognising the value of close public-private partnership on the journey towards a more climate-resilient and environment-friendly financial system, the Monetary Authority of Singapore convened the industry-led Green Finance Industry Taskforce (GFIT) to accelerate the development of green finance, including the formulation of the GFIT Taxonomy. In April 2021, Bank Negara Malaysia finalised its Climate Change and Principle-based Taxonomy.

That said, while green taxonomies provide a common framework for the classification of an asset, activity or entity based on environmental benefits, they only really went mainstream relatively recently, and their use by central banks and supervisors is still being explored. Although taxonomies provide a pragmatic means of capturing sustainability-related information by facilitating the identification of assets according to their environmental sustainability or lack thereof, they cannot themselves offer a precise quantification of climate-related risks and risk exposures.<sup>25</sup>

Central banks and supervisors may also choose to be neutral to the development and selection of specific taxonomies. At present, there is a fragmented international playing field, with many taxonomies existing side by side. The ongoing development of new taxonomies as well as international discussions about their interoperability might also convince some central banks to wait until a global consensus emerges and/or to learn from other regulators' experiences.

Given these challenges, some central banks and supervisors have not mandated the use of specific taxonomies but instead decided to take a flexible approach so as not to delay their overall policy response to the issue of climate change. The Bank of Japan (BOJ) provides a case study. In July 2021, the BOJ released its comprehensive strategy on climate change with a view to furthering its efforts on climate change consistent with its mandate. The BOJ decided to introduce a new fund provisioning measure called Climate Response Financing Operations, which provide funds to eligible financial institutions within the amount outstanding of their investment or loans that contribute to Japan's actions to address climate change. Investment or loans that comply with international standards or the Japanese government's guidelines are eligible. Rather than mandating the use of a specific taxonomy, the BOJ has opted to harness market discipline by requiring financial institutions to specify and disclose the standards or guidelines they use as a criteria for selecting the appropriate climate-related investment or loans.

<sup>25</sup> Taxonomies provide information about individual assets and cannot take into account interdependencies with other assets in a portfolio. Scenario analysis and stress tests can be incorporated into the suite of risk management tools used by market participants to better assess exposures to climate-related risks (BIS 2021). Further, activity-based green labels, if focused on in isolation, can provide misleading signals of entity-level risks.

As with many other climate-related alignment approaches, the availability of data is a significant constraint to the use of many taxonomies. Without a taxonomy-supportive disclosure and/or reporting environment, which is currently the case in many jurisdictions, the data required to assess taxonomy compliance may be incomplete or inconsistent. At the same time, this is expected to change rapidly over the next few years. In 2021, the EBA published the results of a pilot exercise undertaken with 29 participating banks, covering their non-SME corporate exposures, specifically focusing on the identification and quantification of exposures to climate transition risk (EBA 2021b). In this exercise, the banks' data were mapped according to different classification systems, including the draft EU Taxonomy (not finalised or adopted at that time). It found that many of the participating banks, in the absence of a common language, were already using their own internal methodologies to classify environmentally friendly or harmful activities. This variation suggests there is room to improve consistency and points towards the value of having a uniform set of definitions. At the same time, the exercise exposed a number of challenges faced by banks at that time in mapping activities to the EU Taxonomy: an occasional lack of the client data needed to assess alignment with the EU Taxonomy; the resources required for its application; and ongoing interpretation issues with the criteria specified by the EU Taxonomy.<sup>26</sup> These issues were also echoed in the survey responses. This highlights the importance of correct sequencing and consistency in the scope of disclosure requirements: for taxonomies to be readily usable, it is essential that jurisdictions establish the right groundwork for collecting information with which alignment with the taxonomies can be assessed, and ideally benchmarked against industry peer performance.

Central banks and supervisors should also consider whether a particular taxonomy meets their specific needs or is fit for purpose with respect to their particular policy goals. A taxonomy that is too restrictive/rigid in defining its boundaries for sustainable investment might be unhelpful since it could constrain a central bank's reach with respect

to its monetary policy implementation. For example, if a central bank were to adopt what is considered to be a highly restrictive taxonomy for its targeted lending facility, it might inadvertently exclude new or emerging innovations/technologies. Given the existence of multiple taxonomies across jurisdictions, a central bank with a diversified portfolio, like other investors, will benefit from the interoperability of taxonomies.

### 1.3. Transition taxonomies

To achieve the Paris Agreement's goal of limiting the global temperature increase to a maximum of 2°C above pre-industrial levels – ideally 1.5°C – by the end of the century, it is essential to provide finance for transition efforts to move industries that emit large quantities of greenhouse gases towards decarbonisation. Therefore, increasing attention is being paid to the development of transition taxonomies around the world. The transition label in taxonomies often refers to two types of activities: (i) activities that are currently transitioning towards a net zero status, with the ultimate objective of being green, and (ii) activities that are enabling (activities in) the economy to transition towards sustainability.

To formalise this transition category, some jurisdictions are developing new frameworks to define transition finance, while others are considering extending the scope of the green taxonomies to include activities that promise a transition away from polluting activities, even if such activities in isolation would not be judged as green.

Hence, economic activities that facilitate the transition to sustainable energy sources, without resulting in a lock-in of assets that are incompatible with net zero based on their operating life, are essential to mitigate climate change. Further, beyond the energy sector, the decarbonisation of key industry segments for which no technologically or financially feasible alternatives currently exist is also important for an orderly transition to a low-carbon economy.

<sup>26</sup> It is worth stressing again that the EBA study took place when the EU Taxonomy had not yet been published. Many of the challenges will be addressed by reporting requirements under the EU Taxonomy that will considerably enhance the availability and quality of data in 2022 and 2023. The United Nations Environment Programme Finance Initiative and the European Banking Federation have also examined the *application of the EU Taxonomy to core banking products* based on case studies from 26 banks.

### 1.3.1. Initiatives to develop transition taxonomies

The current EU Taxonomy does not recognise transitional activities that are viewed as “contributing substantially to climate change mitigation”. While such activities are mostly highly carbon-intensive, they must substantially outperform others in their industry (i.e. be “top of the class”), and not lock in existing practices or hinder the development of alternatives (see Box A1.2 in Annex 1). Further reflection is ongoing in the EU on the possible extension of the EU Taxonomy to include an intermediate transition space, i.e. an “amber” space between the substantial contribution (“green”) and significantly harmful (“red”) spaces. How the EU and similar taxonomies specify the thresholds for industry outperformance will be critical for differentiating better performers from those that have less potential to reduce emissions. The Singapore GFIT Taxonomy, which is being developed, also notably encompasses transition activities, which are viewed as critical for Singapore-based financial institutions operating in emerging Asia (see Box A1.7 in Annex 1).

Malaysia has introduced a principle-based taxonomy for financial institutions to assess and categorise economic activities according to the extent to which the activities

meet climate objectives and promote the transition to a low-carbon economy. Four guiding principles are intended to encourage: (i) climate change mitigation, (ii) climate change adaptation, (iii) no significant harm to the environment, and (iv) remedial measures to support transition, while a fifth outlines prohibited activities.

The Russian taxonomy has been developed to provide for the inclusion of transition projects in a binary context (see Box A1.8 in Annex 1). It defines transition projects (projects that are not green in terms of international standards but do have a positive environmental impact) as those that provide opportunities for companies that seek to transform their activities and contribute to the achievement of environmental goals, but do not yet have an opportunity to implement green projects. This approach takes into account the specifics of the Russian economy and its focus on commodities. The taxonomy thus gives “red/polluting” companies more opportunities for transformation, and does not limit investment flows only to green companies.

### 1.3.2. Classification methods

A number of jurisdictions plan to incorporate more than two labels when designing their taxonomies to incorporate transition activities. The EU Platform on Sustainable Finance

Table 1.2 Main characteristics of selected transition taxonomies<sup>1</sup>

Jurisdiction	Format	Base	Methodology	Sectors	Science-based targets	Requirements for entity
ASEAN	Taxonomy	Activity	Tiered framework, traffic lights	All sectors for 1 <sup>st</sup> tier; 6 focus sectors and 3 enabling sectors for 2 <sup>nd</sup> tier*	2 <sup>nd</sup> tier provides science-based metrics and thresholds	NA
EU (proposed extension)	Taxonomy	Activity	Five categories; Traffic lights	Most relevant sectors	Set science-based criteria for different categories of performance	Entity-level disclosure based on the taxonomy
Japan	Roadmap	Entity	Sector-specific pathway	Hard-to-abate sectors	Formulate science-based roadmaps	Entity-level roadmap
Malaysia	Taxonomy	Activity	Three broad categories	All sectors	NA	NA
Russia	Taxonomy	Entity/Activity	Inclusion of transitional projects in green taxonomies	11 sectors	Thresholds use science-based targets	Classification for both activities and entities
Singapore	Taxonomy	Activity	Traffic lights	8 focus sectors	Thresholds use science-based targets	NA

<sup>1</sup> There are numerous other initiatives of interest in addition to these taxonomies. For example, the South African Taxonomy project leaves room for transitional activities according to the 2021 draft. The Korean Taxonomy adopts an approach similar to the one of the EU Taxonomy. Chile is creating a national taxonomy for sectors where a low carbon transition is required. In January 2022, the Indonesia Financial Services Authority (OJK) published the Green Taxonomy which provides a “towards green” category. Canada is also developing a transition taxonomy.

\* Focus and enabling sectors may be expanded in future iterations of the taxonomy.

Sources: National and regional taxonomies and roadmaps.

(EU Platform), a permanent expert group of the European Commission, has published a “Public Consultation Report on Taxonomy extension options linked to environmental objectives” to extend the EU Taxonomy beyond green. It proposes to classify activities into substantial contribution (SC), intermediate performance (IP), significantly harmful (SH), and no significant impact (NSI) and to categorise the transition from SH to IP as an intermediate transition (see Box A1.2 in Annex 1). The EU Platform also published a Transition finance report in March 2021.

In the Singapore GFIT Taxonomy and the taxonomy established by the Association of Southeast Asian Nations, or the ASEAN Taxonomy, a traffic light system is used to facilitate an intuitive understanding of green, transition and non-green activities. Broadly speaking, in these schemes, green is the label given to activities/companies aligned with the objectives of the given taxonomy, red is assigned to activities/companies that are inconsistent with the objectives of the taxonomy, while amber is given to activities/companies with quantifiable and time-bound pathways either towards green or significant decarbonisation.<sup>27</sup>

Similarly, the Malaysian taxonomy, under its guiding principles mentioned earlier, classifies activities as either Climate Supporting, Transitioning, or Watchlist (the latter category being for companies that do not display any commitment to remediate the harm of their activities or transition).

When considering taxonomies that can incorporate transition activities, one should not lose sight of their dynamic nature. The goalposts are likely to move as economies transition towards a net zero level of GHG emissions in 2050: environmental performance levels may need to continue improving over time if an activity is to remain green or amber, or move from amber to green. This is even more the case for transition activities where continuous improvements on an ongoing basis may be required in order for the activity being classified not to fall back to red.<sup>28</sup> Providing the necessary clarity on how non-green activities can be classified as transition activities on an ongoing basis can help focus attention on the necessary transitions that many jurisdictions are facing. It can also enable companies,

investors and other entities to better understand, develop and explain their narratives for transition, improving access to the necessary funds to finance investments aligned with the goals of the Paris Agreement.

The ASEAN Taxonomy takes a “stacked approach” to developing activity-level thresholds. This means that for each activity, there are multiple decarbonisation pathways and hence multiple thresholds that can be referenced at a single point in time (See Box A1.4 in Annex 1).

In addition to providing labels for activities or assets, transition taxonomies encompass a variety of approaches such as roadmaps towards carbon neutrality, and portfolio alignment tools. In one important country case, Japan has formulated “Basic Guidelines on Transition Finance” and been developing technology-based roadmaps for hard-to-abate sectors such as steel, chemicals, pulp and paper, cement, electricity, and oil & gas. These roadmaps are intended to be credible and science-based, and set out what kind of low-carbon and zero-carbon technologies should be adopted by companies in those sectors with specified timeframes for such adoption. The guidelines and roadmaps not only focus on individual projects that require funding in Japan, but also allow for a comprehensive judgement of project operators’ transition strategies toward decarbonisation (see Box A1.5 in Annex 1).

Transition taxonomies that are science-based mitigate the potential for greenwashing. Issuers would ideally be incentivised to develop their science-based strategies by referring to globally recognised scenarios, trajectories verified by the Science Based Targets initiative, Paris Agreement-consistent Nationally Determined Contributions (NDCs), or industry-specific roadmaps or plans provided by an independent party. In the case of most of the jurisdictions introduced above, the science-based approach is emphasised.

Transition taxonomies are also being provided by independent non-government entities. For example, a granular transition taxonomy for investment funds, the Climate Disclosure Project and World Wildlife

27 By including a category that identifies polluting or unsustainable activities/entities, such taxonomies could be considered “red” taxonomies as defined earlier in this chapter, though the taxonomies reviewed here are wider in scope.

28 Criteria themselves can often be dynamic, defining the level of ambition in the periods ahead. Taxonomies can provide for criteria to be tightened over time following a review process, in order to take into consideration technological developments, the evolution of carbon budget consumption and the impact on some industries’ specific GHG performance.

Fund (CDP-WWF), is based on a temperature rating methodology that converts the emissions reduction targets provided by corporations into temperatures based on the scientific climate scenarios from the IPCC for the funds that invest in the corporations. These temperature ratings provide a simple intuitive scoring of funds' "greenness", relative to the promised reduction in greenhouse gases consistent with the Paris Agreement.<sup>29</sup>

### 1.3.3. Focus on entity-level transition

While the transition concept is applicable at both the activity and entity level, it is vitally important for investors to gauge the aggregate impact of any classified activity on the sustainability of a corporation's full range of economic activities (BIS 2021). While many of the taxonomies discussed earlier in this chapter focus on classifying current activities, in the case of transition finance, the transformation of the entity's business model is a critical purpose of funding. In this sense, a comprehensive judgment of the corporation's transition plans and pathway toward decarbonisation is just as important as an evaluation of individual activities that require funding at a specific point in time. Ultimately, this is just as important for green instruments based on the use of proceeds, as there is little point for investors to buy

green bonds from a company without a credible entity-level transition plan, if climate change mitigation is their ultimate objective.

A focus on entity-level transition also poses data challenges. While disclosure of non-financial data is often a prerequisite for an efficient assessment for how an asset complies with the criteria set out in taxonomies, consistent, comparable and reliable sustainability disclosures at the entity level are often not available within or across jurisdictions, which restricts the level of market transparency that taxonomies can deliver. The EU Taxonomy Regulation attempts to leverage taxonomies to boost market transparency by ensuring that entities publish the percentage of their turnover or investments aligned with the EU Taxonomy. IOSCO has provided recommendations to the IFRS Foundation on the upcoming issuance of sustainability-related financial disclosure standards by its International Sustainability Standards Board (ISSB). These include a greater emphasis on industry-specific quantitative metrics and the inclusion of activity-specific metrics to facilitate comparability and assessment against widely used taxonomies. These recommendations aim to enhance investor protection, and the fairness, efficiency and transparency of financial markets (See Box 1.1).<sup>30</sup>

#### Box 1.1

### The development and alignment of entity-level sustainability metrics

In order for taxonomies to be effective in raising the transparency and efficiency of sustainable finance markets, investors have to be able to use them to assess and benchmark the relative green or red alignment of assets at both the activity and entity levels. Green taxonomies are currently used in debt markets to determine whether activities financed by use of proceeds debt instruments are contributing to environmental objectives. However, financial market participants need additional information to assess whether the entity issuing green bonds or taking out green

loans has a credible transition strategy, and to benchmark it against industry peers. This information includes, inter alia: (a) the entity's transition strategy, (b) the use of proceeds in the context of this strategy, (c) the total capex budget split between green and carbon-intensive activities, (d) the entity's performance relative to industry peers within and across jurisdictions in relation to the current level of alignment to 1.5°C, business model resilience, impact of climate risks and opportunities on financial position and .../...

29 See in BIS (2021), Box A, A granular transition taxonomy for investment funds based on carbon emissions.

30 Three regulatory or quasi-regulatory developments with regard to entity-level transition plans are also worth mentioning: (1) the requirement to publish capex plans at the entity level, covering Taxonomy-eligible and Taxonomy-aligned activities, pursuant to Commission Delegated Regulation (EU) 2021/2178 of 6 July 2021 supplementing the EU Taxonomy Regulation". <https://eur-lex.europa.eu/legal-content/DE-EN/TXT/?from=EN&uri=CELEX%3A32021R2178> – Annex I, 1.1.2.2.), (2) the EFRAG's climate standard prototype that provides for such disclosure <https://www.efrag.org/Assets/Download?assetUrl=%2Fsites%2Fwebpublishing%2FSiteAssets%2FEFRAG%2520PTF-ESRS%2520Climate%2520standard%2520prototype%2520working%2520paper.pdf>, and (3) the IFRS's climate-related disclosures prototype that also provides for such disclosure <https://www.ifrs.org/content/dam/ifrs/groups/trwg/trwg-climate-related-disclosures-prototype.pdf>

performance over different time horizons, level of ambition of transition strategy including whether targets are science-based; and progress against targets.

At present, such information in the form of consistent, comparable and reliable sustainability disclosures at the entity level is not available within or across jurisdictions. Investors cannot accurately ascertain whether the entity undertaking the green activities funded by the green debt proceeds is taking ambitious steps to decarbonise, engaging in greenwashing, or even growing its polluting activities. This restricts the level of market transparency that taxonomies can deliver. Through a fact-finding exercise,<sup>1</sup> IOSCO identified several gaps and shortcomings in the current status of sustainability reporting, including: (i) selective reporting against multiple different standards and frameworks, (ii) a lack of completeness, consistency and comparability, (iii) a lack of investor orientation, with a target audience of multiple varied stakeholders, (iv) limited and inconsistent quantitative information and a lack of standardised narrative discussion, (v) a lack of detail on the impact of sustainability practices on financial performance and business strategy, and inconsistency in the application of audit and assurance.

The International Sustainability Standards Board (ISSB), established in November 2021 by the IFRS Foundation, aims to address some of these gaps and shortcomings by developing a global baseline of sustainability disclosure standards to promote consistent, comparable and reliable sustainability disclosures across jurisdictions. IOSCO's initial assessment of the Alliance prototype climate standard<sup>2</sup> includes, among other considerations, a recommendation that the IFRS Foundation consider "the inclusion of activity-specific metrics to facilitate comparability and, where appropriate, assessment against widely used taxonomies, including those under development". In March 2022,

the ISSB published exposure drafts of the IFRS Climate-related Disclosure Standard and the IFRS General Requirements, which included such taxonomy-aligned industry specific activity metrics. Without a common global baseline of disclosure standards, investors will not be able to fully leverage any taxonomy for investment decisions.

Article 8 of the EU Taxonomy Regulation<sup>3</sup> reflects one approach to leverage taxonomies as a way of boosting market transparency and preventing greenwashing via entity-level disclosure requirements. A Commission Delegated Act specifying the disclosure requirements under Article 8 of the EU Taxonomy Regulation states that "such market transparency through publishing the percentage of their turnover or investments that is aligned with the Taxonomy Regulation should help companies to raise the financing for sustainable activities." Investors assessing green debt instruments issued by non-financial undertakings within the scope of the Non-Financial Reporting Directive (NFRD) will have additional entity-level key performance indicators on the degree of alignment with the EU Taxonomy of the entity's turnover, capital expenditure and operational expenditure. Investors assessing green debt instruments issued by in-scope financial undertakings will have entity-level green asset, investment and/or underwriting ratios.<sup>4</sup>

Information on entity-level taxonomy alignment may be further complemented by (and build on) direct information on the company's key environmental performance indicators. For example, the EU Taxonomy uses lifecycle emissions of CO<sub>2</sub>e per kWh for the utilities sector, and EFRAG's climate standard prototype includes scopes 1, 2 and 3 carbon emissions intensity metrics in tCO<sub>2</sub>e/production unit. This would allow investors as well to directly benchmark companies against the technical criteria applied in taxonomies.

1 IOSCO (June 2021), Report on Sustainability-related Issuer Disclosures. A detailed desktop analysis of corporate reports of a total of 90 companies, across five sectors (consumer discretionary, real estate, industrials, energy, and consumer staples) in six jurisdictions: Australia, China, the European Union, Singapore, the United Kingdom, and the United States.

2 IOSCO press release of 28 June 2021. The IFRS Foundation Trustees established a Technical Readiness Working Group (TRWG) of experts to develop technical recommendations to give the new ISSB a running start in developing an initial standard. The TRWG is developing the Prototype climate-related financial disclosure standard published by an alliance of leading sustainability reporting organisations in December 2020, which has the TCFD's recommendations at its foundation.

3 This comes into force on 1 January 2023 for the reporting period 2022.

4 Green asset ratio = proportion of assets invested in Taxonomy-aligned economic activities as a share of total eligible assets, on a stock and flow basis, as well as other related ratios; green investment ratio = proportion of Taxonomy-aligned investments managed as a share of all covered assets under management from both collective and individual portfolio management activities; green underwriting ratio = proportion of "non-life gross premiums written" corresponding to Taxonomy-aligned insurance activities as defined in the Commission Delegated Regulation (EU) 2021/2139 in relation to total non-life gross premiums written.



A number of international organisations have recently contributed to the discussion on how transition taxonomies should be developed for entity-based transition. The International Capital Market Association (ICMA) published a “Climate Transition Finance Handbook” in December 2020 to provide clear guidance and common expectations for capital markets participants on the practices, actions, and disclosures of entities when raising funds in debt markets for climate transition-related purposes. It stipulates that “a ‘transition’ label applied to a debt financing instrument should serve to communicate the implementation of an issuer’s corporate strategy to transform the business model in a way which effectively addresses climate-related risks and contributes to alignment with the goals of the Paris Agreement”. For this purpose, issuer-level credible and forward-looking disclosure is vital, and the transition strategy should be science-based including in terms of targets and pathways.

The Climate Bonds Initiative subsequently released a discussion paper in September 2021, entitled “Transition finance for transforming companies: Avoiding greenwashing when financing company decarbonisation”. This paper presents CBI’s proposal for five hallmarks of a credibly transitioning company: (i) Paris-aligned targets, (ii) robust plans, (iii) implementation action, (iv) internal monitoring, and (v) external reporting. It splits the transition green label into three categories: (i) green (already at net zero), (ii) green transition (on a common sectoral transition pathway that aligns with net zero), and (iii) interim transition (working towards the common sectoral pathway). It mentions that CBI’s view has always been that Use of Proceeds (UoP) criteria should focus on an activity and stand independently of the issuer. However, they recognise that investors voice strong support for any issuance that is also accompanied by the disclosure of a company-level carbon reduction strategy. Particularly in the case of transition related UoP bonds, such information will provide assurance that the UoP issuance is part of a wider, credible transition strategy of the issuer. It also emphasises that the criteria for all transition activities in the taxonomies should be based on climate science and forward pathways since the thresholds for good performance today may not be applicable tomorrow.

The OECD’s working paper of August 2021, “Transition finance: Investigating the state of play”, reviews emerging approaches and instruments to highlight commonalities, divergences as well as issues to consider for coherent market development and progress towards global environmental objectives. It views the essence of transition finance to be the triggering of entity-wide change so as to reduce exposure to transition risk. As a result, transition finance may be better understood as financial instruments with a set of core functions and attributes rather than a specific format or label.

The main characteristics of a number of economies’ transition taxonomies are summarised in Table 1.2. In Japan, guidelines for transition finance require capital market participants to make a comprehensive judgement of the project operators’ “transition strategies” toward decarbonisation. The more detailed and practical roadmaps are intended to serve as the basis for companies to develop their own climate change strategies. The EU Taxonomy is essentially activity-based, but this does not mean that it is indifferent to entity-based transition strategies. As stated above, the EU requires the entity-level disclosure of the percentage of turnover as well as capex plans based on the Taxonomy. The Singapore and Russian cases, which target certain sectors, are described above and also in Boxes A1.7 and A1.8, respectively, of Annex 1.

#### 1.4. Green taxonomies: emerging and developing market perspectives

This section of the chapter focuses on the unique perspectives of emerging markets seeking to balance economic growth with environmental sustainability. Many of them have contributed little to global greenhouse gas emissions but are extremely vulnerable to the effects of climate change (reflecting both physical and transition risks). According to the asset manager BlackRock, emerging markets need US\$1 trillion a year to transition to a low-carbon economy.<sup>31</sup> Clear definitions of green assets, activities and projects can play an important role in shifting financing towards climate-smart and environmentally sustainable growth.

31 <https://www.blackrock.com/corporate/insights/blackrock-investment-institute/financing-the-net-zero-transition>

Acknowledging that the lack of a standardised definition of “green”, “environment-friendly” or “environmentally sustainable” is one of the main barriers to scaling up green finance, a few emerging market regulators created green project and activity lists long before the EU Taxonomy (World Bank 2020). The PBC issued the first iteration of its Green Bond Endorsed Projects Catalogue (China Taxonomy) in 2015. Bangladesh Bank issued a list of 52 products and initiatives that are eligible for green financing in 2017. The Mongolian Financial Stability Council (comprising Mongolia’s central bank, ministry of finance, and financial regulatory committee) released a green taxonomy in December 2019.

### 1.4.1. Balancing global developments with EM developmental needs

Publication of the EU Taxonomy has further motivated regulators around the world, including those in emerging markets, to consider the development of green taxonomies to make it easier for lenders and borrowers to identify eligible assets. The need to mobilise capital to finance the recovery from the COVID-19 pandemic, and pressure to adopt ambitious medium-term climate and environmental investment plans in the run-up to the UN Climate Change Conference (COP 26) have increased interest further. Considering the complexities inherent in defining the contents of a green taxonomy, the highly detailed and rigorous EU Taxonomy, which was developed in consultation with technical experts and scientists, has emerged as a leading reference point for other regulators to develop their own taxonomies.

That said, the EU Taxonomy is based on EU regulations and ambitions, which do not necessarily resonate with emerging markets due to the differences in socio-economic developments, environmental goals and transition pathways. At the same time, given the huge demand for external financing mentioned above, jurisdictions are aware of investors’ need to compare investments across borders and to avoid fragmentation and its unintended consequences for countries that do not follow EU regulations and its ambitious climate and energy targets.

Consequently, emerging market taxonomy developers are trying to strike a balance between aligning with environmental objectives that reflect their own development paths and allowing a certain level of comparability and

consistency of terms and metrics with the EU Taxonomy. This is clearly reflected in the taxonomies in Colombia, Singapore, Russia and Costa Rica (see Boxes A1.6-A1.9 in Annex 1), where taxonomy developers have adapted thresholds and sustainable practices to national circumstances.

This is consistent with the thought process of the Technical Expert Group (TEG) appointed by the EU, which accepted that the criteria defined by other countries “will not be identical to the EU Taxonomy and may vary depending on the specificities of the local market”. At the same time, the TEG suggested that “a common design approach between international taxonomies would enable mutual recognition of Taxonomy frameworks and support market understanding of the environmental performance of economic activities and investments across markets”. The common design principles recommended include (1) clear environmental goals and an explanation about their alignment with international environmental agreements, (2) a clear sector and economic activity classification scheme, (3) clear and common measurement metrics, and (4) quantitative or qualitative performance thresholds for each economic activity and metric. (Technical Expert Group 2020).

Similar design principles have been endorsed by the G20 in its Sustainable Finance Roadmap (G20 Sustainable Finance Working Group 2021). In the Roadmap, the G20 encouraged jurisdictions that intend to develop their own alignment approaches to refer to a set of voluntary principles: (1) ensure material positive contributions to sustainability goals and focus on outcomes, (2) avoid negative contribution to other sustainability goals (e.g., through “do no significant harm” to any sustainability goal requirements), (3) be dynamic in adjustments reflecting changes in policies, technologies, and state of the transition, (4) reflect good governance and transparency, (5) be science-based for environmental goals and science- or evidence-based for other sustainability issues, and (6) address transition considerations.

The World Bank guides emerging markets towards the development of taxonomies based on national environmental priorities with technically sound justifications for the activities and investments and in coherence with local regulations (World Bank 2020). This includes following the EU Taxonomy’s approach to identify which environmental goals should be used to organise the taxonomy, prioritising sectors with the highest contribution to the identified

environmental goals, and selecting eligible activities based on how they meet either a national target or a standard or accepted threshold. This means that the structure of the taxonomy may be similar to the EU Taxonomy, but the content will differ based on local context.

### 1.4.2. Interoperability of taxonomies

Taxonomies that are developed in a consistent manner across jurisdictions as well as within large jurisdictions can contribute to comparability and transparency across markets and help scale up cross-border flows of green capital (G20 Sustainable Finance Working Group (SFWG) Synthesis Report 2021). The PBC, in collaboration with the National Development and Reform Commission and the China Securities Regulatory Commission (CSRC) updated the 2015 catalogue and in April 2021 published the China Green Bond Endorsed Projects Catalogue. The updated catalogue removed clean coal, included climate change mitigation as an environmental objective along with pollution prevention and efficient use of resources, and introduced the “do no significant harm” principle.

The International Platform on Sustainable Finance (IPSF) launched in 2019 is spearheading global efforts to find common principles and metrics for green and sustainability activities, which will facilitate comparability and interoperability of taxonomies across global markets. Within the IPSF, the China and the EU launched a working group on taxonomies in 2020 with the objective of developing the Common Ground Taxonomy, which provided the first comprehensive activity-by-activity mapping and comparison of the EU and China taxonomies in 2021 (IPSF 2021).

Interoperability does not imply that the content of the two taxonomies is identical. The technical screening criteria in the Catalogue reflect China’s own environmental regulations and differ from the EU’s in some areas. This catalogue uses a “white list” approach to focus on green activities making a substantial contribution to climate change mitigation, ecological conservation, pollution prevention and resource efficiency. It does not exactly match the economic sectors identified in the industrial classification standards of the

National Bureau of Statistics, but this approach allows coverage of more objectives and direct investments directly related to green technologies. According to the recently published IPSF Common Ground Taxonomy, the de facto overlap between the EU and China taxonomies is such that the experts from both sides identified common or equivalent technical criteria under a universally applicable classification framework, i.e. the ISIC framework developed by the United Nations. China’s taxonomy excludes natural gas extraction and clean coal projects. Natural gas is allowed for some multi-energy complementary projects as a means of stabilising the energy supply, especially for severely cold areas during the winter.<sup>32</sup>

Bangladesh Bank provides an example of referring to external taxonomies while utilising domestic standards.<sup>33</sup> It built on the eligible activities in its green product list for banks and financial institutions to create a taxonomy of projects and activities that could be supported by green bonds (Sustainable Finance Department, Bangladesh Bank 2021).<sup>34</sup> At the same time, a process to screen for “no significant harm” was introduced. All activities must meet minimum safeguards – including exclusion restrictions – set out in the Bangladesh Bank Sustainable Finance Policy 2020. While screening criteria were identified from the Climate Bonds Taxonomy, the EU Taxonomy, and relevant Bangladeshi standards and regulations, there is a clear focus on ensuring consistency with local norms and regulations. For example, the criteria for green buildings and establishment-related activities were based on both the Sustainable and Renewable Energy Development Authority (SREDA)’s Green Building, Energy Efficiency, and Environment Rating and LEED Gold and Platinum standards, which are widely used in Bangladesh. Similarly, the standards for solar PV generation (grid-tied and distributed solar and off-grid solar) meet the standards set out by SREDA and the Bangladesh Standards and Testing Institution, which are also in line with the Climate Bonds Standard. The taxonomy developers relied on public consultation to determine the suitability of thresholds. For instance, for the renovation of buildings, the reduction in CO<sub>2</sub> emissions meant ensuring that eligibility was based on the EU Taxonomy but lowered from 30% to 20% to make it more suitable in the Bangladeshi context.

32 Differences between the taxonomies also include a direct mandatory use for onshore green bonds/credits in China versus a variety of applications in the EU (regulatory/voluntary), as well as the fact that adaptation to climate change is not an objective in the Chinese taxonomy.

33 Bangladesh taxonomy document is still under preparation at the time of publication of this report.

34 In 2020, Bangladesh Bank updated its green product list to cover 68 activities deemed eligible to meet the green lending requirements for banks and financial institutions. The Green Bond Taxonomy builds on this list.

### 1.4.3. Challenges and important factors going forward

The experience of emerging market regulators that have developed taxonomies highlights common challenges and important factors that can facilitate the adoption of, or adaptation to, the EU Taxonomy and other internationally accepted standards, principles and methodologies. For one, emerging markets recognise the importance of activities that deliver significant environmental improvements relative to the status quo and can transition from high to low carbon intensity and environmental impact, even if they are not fully consistent with a pure green economy. It is therefore critically important for emerging markets to mobilise capital towards the orderly and just transition of industries that are key to the country's economy and development and need to contribute towards the net zero target. This is reflected in the Bangladesh, China, Russia and Singapore taxonomies.

Further, a taxonomy is not a substitute for environmental strategies and policies. Countries need to have clearly defined national strategies, action plans with clear targets as well as regulations and policy frameworks to manage climate change and other environmental objectives. Eligible activities will be based on these national strategies, supported by these policy frameworks, and will contribute to the achievement of these targets. In the absence of a clear policy framework and implementation capacity in one sector, a country may want to focus on environmental objectives for which solutions are known and regulations are clear. Further, good quality data and metrics have to be available to adequately assess compliance, measure progress in targets and support robust disclosure schemes. Development of a green and/or transition taxonomy is complex, time-consuming and requires significant technical expertise. Many of the national taxonomies developed to date in emerging and developing market economies have benefited from technical assistance provided by international agencies and multilateral development banks (MDBs) such as the World Bank Group.<sup>35</sup>

MDBs are also a critical source of sustainable finance for borrowing member countries. For example, the largest multilateral funder of climate investment in developing countries, the World Bank Group, provided over US\$26 billion in 2021 alone. MDBs have their own standards and environmental and social safeguards that apply to all their activities. For climate finance, for example, they have a detailed classification system for reporting (African Development Bank et al. 2021). While the MDB approaches to sustainability in general, and climate finance in particular, are consistent with the intent of various taxonomies, there are differences between the definitions of climate finance used by MDBs and the EU Taxonomy, as well as reporting expectations. These differences reflect the specificities of the countries in which MDBs operate and their current stages of development, similar to the approach used in some emerging market taxonomies.

A number of international initiatives are underway to help enhance interoperability of taxonomies in different jurisdictions, including the efforts of the International Platform on Sustainable Finance described earlier. There are advantages to developing national taxonomies interoperable with those in major capital markets, for instance, to support inter-market capital flows. At the same time, a taxonomy disconnected from local realities could result in emerging market issuers having insufficient assets for international investors that meet the taxonomy's standards. Therefore, emerging market regulators are focused on ensuring that taxonomies are realistic and aligned with environmental objectives that reflect a country's development strategy, so that finance can be driven toward their most pressing challenges.<sup>36</sup> Regulators are looking for flexible solutions, wherein taxonomies are unified in language but not so much in the details, while addressing the need for transparency that will allow investors to study and compare taxonomies across jurisdictions – ideally using similar activity metrics from a common global disclosure standard, as discussed earlier – and reflect their preferences in their investment decisions.

35 The Bangladesh, Colombia, Malaysia, Mongolia and South Africa taxonomies were supported by the World Bank.

36 An ambitious example of the above, which might be termed an "NDC transition" taxonomy, would be a science-based taxonomy based on the activity metrics of a global disclosure standard that was aligned with Nationally Determined Contributions, even if it were not fully aligned with a science-based net zero 2050 sectoral decarbonisation pathway.

## 2. Green external review and assessment

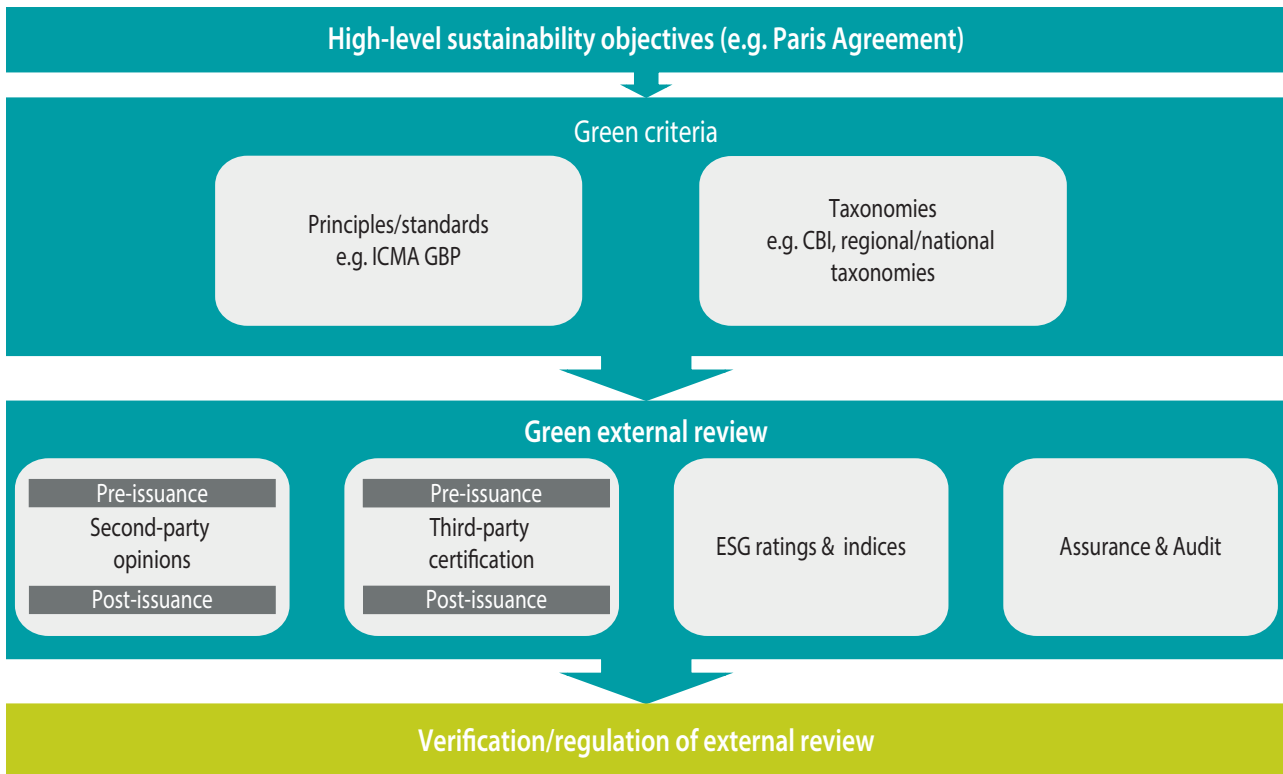
### 2.1. Introduction

As noted in Chapter 1, green taxonomies, alongside some existing industry and international principles and standards, have proliferated to provide guidance on the characteristics of activities that are defined as “green”, namely to contribute to the achievement of climate-related and/or other environmental goals. As illustrated in Graph 2.1, green principles, standards and taxonomies provide a framework of criteria for independent institutions with environmental or sustainability expertise to conduct green external reviews. This is the broad theme this second chapter discusses.

In this report, an external review refers to the general process of assessing financial assets or entities against

predefined environmental, social and sustainability criteria. Within the NGFS mandate, the report primarily focuses on external reviews against green or environmental criteria. A general example for an external review process is the third-party, independent verification of a bond or investment vehicle whose proceeds are explicitly described as being in alignment with a specific environmental goal, such as a green bond. In practice, external reviews could take many different forms, including second-party opinions (SPOs), third-party certification, ESG ratings,<sup>37</sup> assurance, etc. (Graph 2.1). Throughout the chapter, the terms “assessment”, “evaluation”, and “verification” will be used interchangeably to refer to the general idea of external review processes.

Graph 2.1 From green criteria to green external review: various approaches possible



Source: Authors' depiction.

37 It is noted that ESG ratings have three pillars, with the environmental criteria being part of the scorecard. This report focuses on the E pillar of ESG ratings. More details on ESG ratings can also be found in Chapter 3.

There is no doubt that independent green assessments play an important role in ensuring the good application of green principles, standards and taxonomies. A central benefit of having properly designed green assessments or review processes is that they would allow investors or companies to transmit credible signals to the market on their decarbonisation effort, e.g. their alignment with the Paris Agreement or their carbon footprint. Independent and professional external reviews are of critical importance to prevent misleading information about the environmental benefits of an asset and are thus key to mitigate greenwashing.

External reviews can also be one channel for investors to reduce information search costs aimed at confirming the greenness of an asset. Credible external reviews that provide an evaluation in terms of shades of green allow investors to discriminate between assets depending on their environmental properties. By reducing asymmetric information on environmental properties of an asset, external reviews help to enhance market transparency and thus to adequately identify climate change-related risk and opportunities. This is especially important for the investors that do not possess the capacity or in-house technical expertise to conduct a thorough due diligence of the environmental performance of the assets they invest in, and could thus contribute to scaling-up green finance.

In line with the focus of this report, well-designed external reviews could play a key role to enhancing market transparency so that the financial market could fulfil its role as a catalyst in the transition to net zero emissions. And in this regard, central banks and supervisors can also benefit from developments in green external reviews. Credible external reviews facilitate the implementation of Sustainable and Responsible Investing (SRI) strategies, such as a best-in-class approach, for central banks to manage their portfolios, including reserve management, pension management and third-party portfolio investment. They can also foster consistency in central banks' green assessments by providing external reference points. These external reviews could also help central banks to adjust their operational framework to climate-related risks by providing information on their assets' environmental performance. Lastly, widespread use of credible external reviews might facilitate financial stability monitoring as well as micro-supervision.

Instead of focusing on individual forms of green assessment, this chapter aims at addressing a number of high-level issues that are common to external review processes and at highlighting some emerging new trends.

First, which institutions are the best suited to conduct an external review of the greenness of an asset, an instrument or an issuing entity? And how can regulators and financial market participants ensure that these external reviewers provide independent and impartial assessments? These questions will be addressed in section 2.2 focusing on the institutional design of external review.

Second, current data used for green certification are mostly backward-looking, being based on existing or past environmental impact, and are thus of limited use for determining the future impact of green investments. To an increasing extent in the green finance field, data providers, analytics companies and other public and private initiatives have developed tools that assess alignment of green finance instruments with forward-looking sustainability goals. Impact reporting, a set of measurement practices that will be explored in further detail in section 2.3 of this chapter, tries to address these issues.

Third, should an instrument or an issuer be verified? Although activity or instrument-based verification has dominated the market since its inception, entity-based verification has recently begun to attract new-found prominence. This process has been partially driven by the emergence and proliferation of financial instruments such as sustainability-linked bonds (SLBs) and climate transition bonds; international standard setters have also recently placed new emphasis on the need to assess an issuer or entity's balance sheet to ensure risks can be appropriately identified and managed. Section 2.3 highlights some aspects of the new-found focus on assessing an entity's balance sheet and implications for investors. Section 2.4 discusses the verification mechanism that is built into SLBs.

To conclude, this chapter discusses how technological developments hold promise to boost the ease of collection, transparency and market efficiency. Technological advances in measuring carbon emissions at higher frequencies will further reduce data collection costs and increase data availability that central banks, supervisors and other market participants can take advantage of.

## 2.2. Institutional design: private review processes under regulatory oversight?

### 2.2.1. Private solutions currently dominate the market for external review of greenness

As highlighted in Graph 2.1, an external review of greenness can take different forms. Regardless of the form, external review providers – currently mostly private firms – verify issuers' green bond frameworks and use of proceeds against a recognised external standard or label for green, social, sustainability objectives, such as the Climate Bonds Standard of Climate Bonds Initiative (CBI). Some of these entities are organisations operating largely within one country, while others are part of larger well-established firms that provide a wide range of sustainability-related services to clients worldwide (such as big accounting firms, credit rating agencies and financial index providers).

Second-party opinions (SPOs) are the form of external review that emerged first and are still the most commonly used. SPOs review an issuer's overall green bond framework (not an individual bond) and primarily aim to assess whether a framework meets the standards of the Green Bond Principles (GBP) set out by the International Capital Market Association (ICMA). The GBP list, but do not restrict issuers to use, eligible green projects categories and does not provide technical eligibility criteria. Generally, this ultimately involves verification of four core components of the GBP: (i) use of proceeds, (ii) project selection, (iii) management of proceeds, and (iv) reporting. Two prominent SPO providers are Sustainalytics and CICERO Shades of Green. Both are private companies specialising in green analytics that offer independent assessments of greenness.

Both private and public issuers can also have their financial instruments certified by a third-party organisation, for instance using the CBI Certification Scheme, which defines sector-specific eligibility criteria to screen assets and projects. The use of third-party green certification has been growing very rapidly in recent years. According to CBI data,<sup>38</sup> cumulative green bond issuances certified by CBI reached US\$210 billion as of December 2021, representing 14% of the total volume of the green bond market and covering 36 jurisdictions. Before an issuance, the CBI scheme assesses an issuer's internal processes, including its selection process for projects and assets, internal tracking of proceeds, and the allocation system for net proceeds. After the issuance, certification continues and focuses on the use of proceeds during the lifetime of a financial instrument. The gap between actual post-issuance reporting and commitments reported before issuance could indicate the quality of reporting.

Furthermore, assurance or audit reports on green objectives can also be provided by accounting firms. Assurance looks only at a bond's compliance with the chosen framework and does not have any internal methodology to conduct a bespoke assessment of the bond. Given that the International Sustainability Standards Board (ISSB) is working on a baseline for global sustainability reporting, the role of accounting firms in green external review may become even more important in the future.

ESG ratings are increasingly used alongside or, in some cases, as an alternative to labels and certifications for determining the sustainability credentials of green finance instruments. ESG ratings are used directly as key performance indicators (KPIs) for SLBs, in some sustainable funds for negative or positive screening, and underpin some ESG indices which are tracked by passive sustainable funds.<sup>39</sup> This report also discusses in detail ESG ratings used for climate transition in Chapter 3.

38 <https://www.climatebonds.net/2022/01/500bn-green-issuance-2021-social-and-sustainable-acceleration-annual-green-1tn-sight-market>

39 IOSCO (2021b) provides concrete recommendations on how ESG rating providers can enhance public disclosure and transparency while reducing potential conflicts of interest.

Finally, securities exchange-based certification represents an alternative to the private solutions for the external review of greenness listed above. Green exchanges can enhance transparency and reassure investors because they only list products complying with pre-defined requirements. However, they need to deal with the risk of inconsistency across stock exchanges. The design of appropriate cross-listing requirement regimes across green exchanges could enhance interoperability, as the example in Box 2.1 illustrates.

Amid rapidly increasing demand and in the absence of regulatory requirements for green bond certification, private

solutions have come to dominate the market of green external review. Private firms have refined their assessment methodology over the years, acquired subject matter expertise regarding the data landscape, especially micro firm-level data, and developed a specialised workforce. However, concerns have also arisen regarding the reliability and comparability of green labels, in particular as regards ESG ratings, as the report will discuss in Chapter 3. This has led some national regulators, industry associations and providers themselves to call for regulation of the green external review market.

## Box 2.1

### Green exchanges and cross-listing requirements: the case of Luxembourg

The Luxembourg Green Exchange (LGX), part of the Luxembourg Stock Exchange (LuxSE), lists bonds and funds compliant with pre-set ESG requirements, notably based on ICMA's GBP, CBI standards, and taxonomies from China, the EU and the ASEAN. This box highlights the eligibility criteria for LGX listing and describes how LGX cooperates with other stock exchanges to enhance interoperability for cross-listing.

#### Bond eligibility criteria

To display bonds on LGX, issuers must comply with four eligibility criteria: 1) listing, 2) bond classification, 3) transparency and disclosure, and 4) commitment to ongoing reporting. Concerning listing, issuers are required to list their bond at one of the Luxembourg Stock Exchange listing venues. Once admitted to trading, their bond can be displayed on LGX. In terms of classification, LGX asks issuers to declare their bond as green, social or sustainable (in the case of labelled securities) or obtain recognition as a Climate-Aligned Issuer (in the case of unlabelled securities).

Regarding transparency, issuers of labelled securities must disclose the use of proceeds in line with one of several internationally recognised standards. An external review should be sought ahead of applying to LGX.

Issuers are also asked to provide information on the planned and actual use of proceeds through ongoing

reporting starting from 12 months after issuance up until at least full allocation of proceeds.

The eligibility criteria can be seen as complementary to external reviews (e.g. SPOs, certification, scoring/rating) to signal the greenness of a financial product. Eligibility criteria provide additional reassurance to investors, underlining that the instrument fulfilled listing requirements.

#### Fund eligibility criteria

Four eligibility criteria must be met by funds to obtain access to LGX: 1) registration, 2) fund classification, 3) transparency and disclosure, and 4) commitment to ongoing reporting. On registration, funds must register or be listed at one of the LuxSE venues. Regarding classification, funds should be labelled as Socially Responsible Investing (SRI) funds and then classified as green, social or ESG on the basis of the label awarded.

As for transparency and disclosure, each fund must provide information on its investment policy and strategy, exclusion list, impact objectives, and engagement and voting policy. On reporting, funds must commit to ongoing reporting, as a minimum at an annual frequency, and including evidence of the label renewal, the sustainability performance of the portfolio and, if possible, impact statistics such as portfolio footprint. .../...



## Green partnerships for cross-listing

In recent years, the LuxSE has established relations with exchanges in emerging market and developing economies in Africa, Latin America and Asia. Under these partnerships, a cross-listing requirement regime is in place, and green securities can be listed and traded on both LuxSE and the partner stock exchange. The key foreign partners include the Nigerian Stock Exchange, Santiago Exchange in Chile, and the Shanghai and Shenzhen Stock Exchanges in China.

Cross-listing requirement regimes have the potential to support transparency and consistency for investors globally. They can also facilitate access to international finance for issuers in Emerging markets and developing economies (EMDEs), thereby supporting the transition to a greener and more sustainable economy. However, at the current stage their potential is limited to the selected stock exchanges involved in cross-listing regimes and depends on the consistency of international standards referred to in the eligibility criteria.

## 2.2.2. Regulatory oversight is emerging to ensure high-quality verification

To ensure the robust functioning of the green external review market, public regulators have a critical role to play. Market failure, for instance in the form of information asymmetry, could lead to adverse selection, a deterioration of market integrity, and ultimately weaken investors' confidence and protection. For green external reviews, a common concern is that service providers do not fall within the typical remit of securities regulators. The lack of transparency and clarity in green definitions and methodologies has not been adequately addressed in the market and may lead to "greenwashing, capital misallocation and products mis-selling."<sup>40</sup>

The key institutional design objective here is to develop appropriate regulations to admit competent private entities in green assessment, ensure a level playing field for independent and professional assessments, and promote transparency for both green objectives and definitions, and external review methodologies.

Regulators could consider setting the minimum qualification entry requirements for private entities that intend to operate in the green assessment field in a given jurisdiction. This implies that a licence is required for entry, but also after an institution is licensed, regular checks will need to be performed to ensure a licensed entity's track record (see Box A2.1 for some examples). Some external review

providers, such as big accounting firms, have already been subject to specific regulations compared to other ESG data and service providers. Also, CBI, as an international non-profit organisation, is proposing a directory of verifiers approved by its own climate bonds standard board. Official recognition or verification schemes for private verifiers guarantee a set of minimum qualifications to ensure the quality of external review, and enhance comparability across private solutions. For example, the category of green bonds that adheres to the Climate Bonds Standard (based on scientific criteria consistent with the 1.5 degrees Celsius target declared in the 2015 Paris Agreement) must receive certification by an approved verifier.<sup>41</sup> To become an approved verifier, an entity must prove expertise in debt issuance, technical aspects of low-carbon projects, and the provision of assurance services.

In addition, the development of regulatory oversight could encourage private entities to strengthen their assessment methodologies, make them more transparent and ensure consistency across different green verification providers. Currently, only ICMA's GBP provide some voluntary guidelines in this regard. A parallel with credit rating agencies could also be drawn here. After the G20 leaders' agreement in 2009 to enhance the regulatory oversight of CRAs, consistent with the IOSCO Code of Conduct Fundamentals for Credit Rating Agencies (IOSCO CRA Code),<sup>42</sup> credit rating agencies have enhanced measures to make their rating methodologies and any revisions to them more transparent, including greater provision of

40 See ESMA's view on this point: <https://www.esma.europa.eu/press-news/esma-news/esma-calls-legislative-action-esg-ratings-and-assessment-tools>

41 For more details, see <https://www.climatebonds.net/certification/approved-verifiers>

42 See <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD437.pdf>

underlying research and revamped external websites.<sup>43</sup> In a recent report on ESG rating and data products providers, IOSCO (2021b) made recommendations on how regulators can strengthen ESG rating regulatory frameworks in their jurisdictions. Proposed recommendations for ESG rating providers include promoting transparency on methodology and data sources, ensuring appropriate procedures for conflicts of interest management, and improving communication channels between rating providers and the entities covered without undermining impartiality.

Moreover, the involvement of regulators in green external review processes could reinforce the collective reflection on how to use green verification or scores wisely. The public sector's understanding of the country's overall and long-term green objectives, and the potential constraints on the efforts needed to achieve them, could provide useful perspectives on the external reviews provided by private firms.

Other motives for greater public involvement in green assessment include the check on conflicts of interest to ensure objective and independent verifiers. This is relevant as many verifiers are still paid by issuers whose bonds they evaluate, and because some verifiers provide a combination of related services, including ESG ratings and consulting services. Lastly, regulation has a role to play in holding private entities accountable for their actions.

Countries are at different stages of developing regulations governing green external review. Box A2.1 in Annex 2 provides information on recent regulatory developments to supervise private verifiers in three jurisdictions: China, Russia and the European Union. The Green Bond Assessment and Verification Guidelines introduced in China show the role that a central bank can play in ensuring qualifications for the institutions carrying out assessments and certification of green bonds.

### 2.3. Impact reporting

Clear and meaningful reporting underpins any effective external review or assessment of green bonds. Reporting processes allow issuers to clarify how they have used

green bond proceeds, and also provide insights into the estimated impacts of these investments. Both ICMA's GBP framework and CBI recommend two types of primarily ex-post reporting: allocation reporting (also known as use-of-proceeds reporting) and impact reporting. Allocation reporting focuses on how issuers have used the proceeds they receive. Impact reporting assesses, using science-based quantitative methods, the climate or environmental impact of activities and investments that have benefited from these allocations or proceeds. According to CBI (2021), allocation reporting is the most common reporting method relied upon by investors. Impact reporting has increased in use in recent years, with 59% of issuers reporting on the impacts achieved over the survey period (November 2017- March 2019) (CBI 2021).

This section focuses on impact reporting. Impact reporting has a critical role to play in helping to increase understanding of the environmental and climate benefits that can be achieved through investments financed by green bonds. Typically prepared for post-issuance, impact reports help clarify for issuers the non-financial influence of projects and investments along a variety of environmental and climate dimensions. For investors, impact reports can play a complementary role, alongside a range of other tools including pre-issuance green bond frameworks and bilateral due diligence, to inform their own aggregated impact assessments as well as their future investment allocation decisions. However, market practices among issuers in terms of impact reporting vary, and no clear global standard exists. As a result, investors often receive a mix of non-standardised data quantifying impact using a variety of methodologies, complicating efforts to compare investments based on these critical non-financial criteria. Issuers report impact based on expected data, actual data or even a mix of both. As CBI reports have stressed, it is often difficult to tell if the data used are estimated or actual, so the clear disclosure of assumptions and of methodologies is encouraged. Impact reporting would further benefit from standardisation and the set-up of more specific metrics to measure the impact on climate mitigation, adaptation, biodiversity, etc. Currently, impacts are usually based on high-level objectives, such as greenhouse gas emissions reduction.

<sup>43</sup> Within the United States, under the auspices of the Securities and Exchange Commission, the Office of Credit Ratings (OCR) was established in 2012 to examine and monitor rating agencies to ensure that approved agencies provide sufficient transparency and disclosure to investors.

### 2.3.1. Efforts to standardise impact reporting practices

One major challenge for impact reporting is the general lack of consistency and comparability across the reporting scopes, formats, measurement methodologies and metrics used by different issuers. Not all issuers commission impact reporting, and even if they do, commissioned impact reports are prepared in a number of ways. This makes aggregation and comparison of impact data, especially between issuers or across jurisdictions, very challenging.

For issuers, ICMA's GBP remain the most widely followed set of guidelines for issuers. CBI standards and other frameworks are often aligned with the GBP, but also tend to go further in certain aspects. The GBP provide guidance and recommend, but do not require, reporting on expected and achieved impacts. Impact reporting for use-of-proceeds instruments typically aims to quantify the climate and environmental benefits of activities or projects financed by the proceeds raised by the specific green bond. The same practices are usually applied when aggregating impact reports in order to quantify the environmental benefits achieved by green bond funds. ICMA made several efforts to harmonise its recommendations and guidelines for impact reporting, including through its *Handbook – Harmonized Framework for Impact Reporting*, first published in 2015. Later, ICMA established an Impact Reporting Working Group together with several international institutions and delivered an update of the handbook in June 2021.<sup>44</sup> This handbook and the Nordic Position Paper on Green Bonds Impact Reporting<sup>45</sup> are the most widely used impact reporting guidelines.

Despite these efforts to standardise impact reporting practices, impact reporting remains voluntary under ICMA's GBP. Prospective issuers of green bonds, who might be unfamiliar with the need to report on non-financial metrics, often need to adapt and update their existing systems to meet these new impact reporting requirements. For some issuers, the need to update systems and practices, combined with the voluntary nature of these reports under the widely followed GBP, can mean that the impact reports that are prepared are done in a way that can be seen as minimally compliant, if at all.

For investors, the lack of reporting standardisation and the fact that GBP compliance does not require issuers to prepare impact reports can be key challenges. Most investors typically hold a portfolio comprised of green bonds from multiple issuers. Reporting on portfolio-level impact is difficult when trying to aggregate across non-standardised impact metrics, thus requiring investors to make their own assumptions about how to transform the impact data that they do receive. Impact reports also often serve as the basis for further due diligence by investors to contextualise impact data and assess the meaningfulness of an issuance's impact. Without a standard basis to draw upon, further abstraction and contextualisation of impact becomes even more challenging for investors.

For emerging market issuers or lower-resourced issuers from any market, impact reporting requirements can be onerous in an environment where teams may have less capacity in non-financial reporting. Standardisation of reporting frameworks, as well as making the preparation of these reports compulsory, would ensure that lower-resourced issuers can better anticipate the direct and indirect costs of developing appropriate systems and processes to streamline impact reporting processes. In addition, standardised reporting frameworks that centre on 'output' or 'outcome' focused indicators to start may help lower-resourced issuers improve their reporting processes over time. As these processes become more standardised and grow in complexity, issuers can learn and adapt their systems more quickly. When combined, these factors can further facilitate the development of green bond markets globally.

In a recent input paper to the G20 Sustainable Finance Working Group, the BIS highlighted these concerns and recommended a path forward to improve ex-post issuance impact reporting, for example by reporting on use of proceeds at the project level, using standardised impact metrics, and providing annual impact reports, amongst others (BIS 2021). There is also an ongoing discussion at the ISSB on the definition of the metrics and targets to monitor an entity's performance in relation to climate-related risks and opportunities over time (TRWG 2021). Paris Europlace, an organisation in charge of developing and promoting the Paris financial marketplace, launched the Paris Financial

44 <https://www.icmagroup.org/assets/documents/Sustainable-finance/2021-updates/Handbook-Harmonised-Framework-for-Impact-Reporting-June-2021-100621.pdf>

45 [https://www.kuntarahoitus.fi/app/uploads/sites/2/2020/02/NPSI\\_Position\\_paper\\_2020\\_final.pdf](https://www.kuntarahoitus.fi/app/uploads/sites/2/2020/02/NPSI_Position_paper_2020_final.pdf)

Centre Impact Task Force<sup>46</sup> in March 2021. This gathers more than 80 institutions from the Paris financial centre to contribute to the definition and scope of application of the French vision of impact measurement. Impact Management Project<sup>47</sup> is another international coalition of enterprises and investors that is developing impact management norms. In the future, moving to mandatory interoperable annual impact reporting would improve transparency for investors, thereby helping to facilitate investments that are aligned with an investor's impact goals. Annual periodicity of reporting would help promote regular assessment and comparability of impact across a portfolio.

For its part, the market is responding to the increased investor interest in impact reporting. NASDAQ, for instance, is one of the companies offering access to impact data across a range of sustainable debt instruments through its Sustainable Bond Network. ICMA keeps a list of such database providers on its website.

### 2.3.2. Moving to a comprehensive sustainability reporting system

Beyond the need to improve and standardise impact reporting practices for activities and projects financed by green instrument proceeds, there is also a recognition in the market that impact assessments for green instruments at the activity level are insufficient. As cash is fungible, and investors are exposed to all the risks and impacts related to an issuer's entire balance sheet, fund managers report an increasing awareness of the need to ascertain the credibility of an issuer's sustainability strategy as a whole. Without disclosure on the overall positive and negative impacts that exist at the entity level, investors may inadvertently be funding a balance sheet that has a net negative or lower positive impact than anticipated. The GBP encourage but do not formally require issuers to position the bond issuance related information, "within the context of the issuer's overarching objectives, strategy, policy and/or processes relating to environmental sustainability". Unsurprisingly, most issuers report having to respond to a wide variety of issuer and ESG rating provider information requests outside of impact reports.

SLBs are a specific instrument that aims to align an issuer's balance sheet with a credible sustainability strategy. However, SLBs have their own specific issues, as KPIs are set by individual issuers and are often not comparable within the same industry. This specific instrument will be discussed more at length in the next section.

Standalone transparency relating to specific activities or to specific self-selected KPIs is a necessary but insufficient condition to scale up green finance or achieve net positive sustainability impacts. The IFRS Foundation, IOSCO, and other international bodies have recognised the need for a global baseline of sustainability disclosure standards that is interoperable with complementary standards that are multi-stakeholder based and/or reflect jurisdiction-specific public policy objectives. These standards are intended to create consistent, comparable and reliable disclosures of investor-focused sustainability information that is material to enterprise value creation.

The establishment of the ISSB at COP26 is an important milestone towards capturing external sustainability impacts of a company where these can affect enterprise value creation over the short, medium or long term. The draft documents submitted to the ISSB for consideration (TRWG 2021) include requirements for issuers to disclose the "impact of significant climate-related risks and opportunities on its financial position, financial performance and cash flows at the reporting period end, and the anticipated effects over the short, medium and long term". In addition, the definition of material information includes "an entity's impacts on society and the environment, if those impacts could reasonably be expected to affect the entity's future cash flows". In the medium to long term, negative externalities that are not internalised are likely to be met with a policy response.

With a global baseline set of sustainability disclosure standards using the enterprise value creation lens, investors will be able to access consistent, comparable, and reliable sustainability disclosures that will provide them with a more complete understanding of the material external impacts of the overall balance sheets they are funding. The disclosures should provide the necessary information that will enable investors to:

<sup>46</sup> For more information, see <https://financefortomorrow.com/en/actualites/impact-finance-publication-of-the-first-works-of-the-paris-financial-centre-impact-task-force/>

<sup>47</sup> For more information, see <https://impactmanagementproject.com/impact-management/impact-management-norms/>

- select green bonds from issuers with credible transition strategies and net positive impacts;
- expand their investment universe beyond labelled instruments to include conventional bonds from issuers which are already green or actively transitioning;
- engage with issuers to adopt ambitious science-based transition strategies and direct higher proportions of their capital expenditures towards net zero emissions by 2050 targets whilst striving to maximise net positive impacts; and
- directly compare SLBs between different issuers within the same industry if the KPIs are based on industry-specific activity metrics.

Taken together, comprehensive sustainability reporting at the issuer level is critical to ensuring market efficiency for labelled and unlabelled instruments, and is a foundational building block to scale up financial flows towards sustainable outcomes.

## 2.4. Instruments with built-in quantitative targets: an illustration based on sustainability-linked bonds

Sustainability-linked bonds (SLBs) are financial instruments with an embedded assessment of forward-looking performance against specific sustainability performance targets (SPTs).<sup>48</sup> The performance targets include ESG-related KPIs at the entity level that issuers commit to achieve. Should the issuer fall short of these targets, additional payments to bondholders would be accrued in the form of either a step-up coupon, a redemption premium, or an offset mechanism. Unlike green or social bonds, the funds raised with this instrument are not tagged to a specific use of proceeds but used for a general financing purpose.<sup>49</sup> Issuers are thereby

committing explicitly (including in the bond documentation) to future improvements in sustainability outcomes at an entity-wide level within a predefined timeline. Table 2.1 compares the key features of SLBs with standard green bonds.<sup>50</sup>

Following the emergence of SLBs, some issuers have started to integrate similar built-in verification mechanisms into other types of instruments. For example, “hybrid green bonds” are instruments that include a “green non-certification event” in an otherwise conventional green bond and introduce a coupon step-up if the issuer fails to produce an allocation and impact report within a specified time.<sup>51</sup> The financial penalty embedded in SLBs is designed to give investors protection in cases where proceeds are not allocated to the stated green projects. For short-term instruments, e.g. sustainability-linked commercial paper, a rollover could become impossible should the issuer deviate from its commitment to sustainable targets.<sup>52</sup> This trend has also reached the market for hedging products, with the development of sustainability-linked derivatives integrating incentives mechanisms into their pay-off structure.

Distinct but not dissimilar social impact bonds or development impact bonds adopt similar built-in accountability mechanisms to verify social outcomes. These types of results-based-financing or “pay-for-success” instruments allow for repayment to investors only upon achievement of specified social outcomes. They diverge from SLBs in that investors are rewarded when the outcome is actually achieved and not the other way around.

The market for SLBs has expanded rapidly since 2019, with Europe recording the highest number of issuances so far. Total issuances exceeded US\$30 billion over the first half of 2021, compared to approximately US\$8 billion in the second half of 2020. Despite their novelty, SLBs have attracted issuers from a broad range of sectors,

48 As the focus of this report is on market instruments, sustainability-linked loans are not in the scope of the chapter. These credit instruments embed similar adjustment mechanisms and have also grown very rapidly since the first transaction in 2017.

49 More detailed definitions can be found in <https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/June-2020/Sustainability-Linked-Bond-Principles-June-2020-171120.pdf> and <https://cib.bnpparibas/the-ascent-of-sustainability-linked-bonds>

50 This comparison is based on two actual SLB issuances in Greece. The Greek utility company Public Power Corporation issued two SLBs in 2021 for a total of €1.15 billion. In the event that the company fails to meet the set sustainability objectives, it will pay an additional 50bps from the next coupon date until the maturity date.

51 See the recent instrument issued by US company NextEra Energy Capital Holdings: <https://www.ifre.com/story/2906863/nextera-energy-introduces-coupon-step-up-on-green-bond-ts0fmthcvm>

52 <https://www.enel.com/media/explore/search-press-releases/press/2021/05/enel-updates-its-us-commercial-paper-program-under-sdg-13-a-first-of-its-kind-in-the-us>

Table 2.1 **SLBs vs. standard green bonds**

	<b>Sustainability-linked bond</b>	<b>Green bond</b>
<b>Use of proceeds</b>	General financing purpose	Green projects
<b>Issuer type</b>	Potentially any entity with a commitment to an ambitious sustainability trajectory	Entities able to generate large-scale green projects
<b>Performance indicator</b>	Metrics-based KPIs at the issuer level and associated SPTs	Impact evaluation relying on metrics-based KPIs at the activity level
<b>Penalty for missing green targets<sup>1</sup></b>	Reputational costs and financial penalty	Reputational costs
<b>Pre-issuance review</b>	Second-party opinions, notably on alignment with ICMA's sustainability-linked bonds principles	- Second-party opinions, notably on alignment with ICMA's green bonds principles - Certifications (Climate Bonds Standard)
<b>Post-issuance review</b>	Systematic external verification of KPIs vs. SPTs integrated in the bond documentation	- Generalization of use of proceeds reporting - More variability regarding the availability and quality of impact reporting

<sup>1</sup> This means missing the preset sustainability performance target in the case of a SLB or misallocation of green proceeds in the case of a green bond.  
Source: Authors' depiction.

including financials, pharmaceuticals, shipping, energy, luxury apparel, manufacturing and telecommunications.<sup>53</sup> While they are still dwarfed by the market for green bonds, which reached US\$228 billion in the first half of 2021,<sup>54</sup> SLBs have emerged as a new dynamic market segment that already accounts for 6.7% of total labelled bond issuances (US\$33 billion out of US\$496 billion) less than two years after the first issuance by Enel in October 2019. While corporates and financial institutions are the major SLB issuers, sovereign governments have also entered the market; for instance, Latvia issued an 8-year SLB worth €600 million in December 2021.

SLBs are sometimes perceived by investors as being less transparent, as it may not be clear whether the performance targets are ambitious enough to require significant improvement by the issuer, or could be manipulated (e.g. by selling off carbon-intensive assets). They may lack the simplicity that investors often appreciate in use-of-proceeds instruments such as green bonds. There are also questions regarding the desired magnitude of the financial penalty. For instance, the majority of SLBs<sup>55</sup> include a 25bp coupon step-up, which might be too low to generate sufficient incentives, but around 20% of SLB issuers have already adopted higher penalties in the range of 50bps-100bps.

Some initiatives for standardisation in the market have emerged, most notably the Sustainability-Linked Bond Principles (SLBP) published by the International Capital Market Association (ICMA) in June 2020. The SLBP are voluntary guidelines that outline best practices for financial instruments to incorporate forward-looking ESG outcomes and promote integrity in the development of the SLB market by clarifying the approach for issuance of a SLB. The SLBP provide all issuers with guidance on the key components involved in launching a credible and ambitious SLB; they aid investors by promoting accountability of issuers in their sustainability strategy and availability of information necessary to evaluate their SLB investments, and they assist underwriters by moving the market towards expected approaches to structuring and disclosures that will facilitate credible transactions. Most second-party opinion (SPO) providers have since then integrated ICMA's SLBP into their approach for the assessment of the sustainability-linked framework of issuers. The European Central Bank (ECB) has also decided to include SLBs in the Eurosystem framework for collateral and asset purchase since January 2021,<sup>56</sup> which was perceived as a strong signal on the importance of these instruments in supporting climate transition.

53 <https://www.sustainalytics.com/esg-research/resource/corporate-esg-blog/moving-the-needle-how-loans-and-bonds-are-being-tied-to-corporate-sustainability-performance>

54 [https://www.climatebonds.net/2021/08/climate-bonds-updates-2021-green-forecast-half-trillion-latest-h1-figures-signal-new-surge#:~:text=Cumulative%20labelled%20issuance%20now%20stands,1tn%20at%20end%20H1%202021.&text=Issuance%20of%20green%20debt%20instruments,19%20Impacted%20H1%202020%20\(USD91](https://www.climatebonds.net/2021/08/climate-bonds-updates-2021-green-forecast-half-trillion-latest-h1-figures-signal-new-surge#:~:text=Cumulative%20labelled%20issuance%20now%20stands,1tn%20at%20end%20H1%202021.&text=Issuance%20of%20green%20debt%20instruments,19%20Impacted%20H1%202020%20(USD91)

55 47 issuances in a sample of 80 securities issued between 2019 and September 2021.

56 <https://www.ecb.europa.eu/press/pr/date/2020/html/ecb.pr200922~482e4a5a90.en.html>

### 2.4.1. Advantages of SLBs and similar forward-looking transition instruments

While SLBs are still very recent instruments, a certain consensus has already emerged to identify the key features for the market to thrive in the long term. The SLBP have placed the emphasis on the requirements around structuring and information provision by issuers, which could be relevant to other forward-looking instruments. The selection of KPIs and calibration of associated SPTs have to be grounded in the principles of materiality, measurability, verifiability, comparability and ambition with respect to a “business as usual” trajectory. The financial adjustment associated with a deviation from the chosen performance target needs to be substantial and clearly stated in the bond documentation. Investors have so far tended to favour adjustment through coupon step-ups, as these can be linked to intermediate targets (unlike redemption premia), are straightforward to process (unlike offset mechanisms) and do not embed downsides for the investor (unlike coupon step-downs).

Another key aspect for the selection of KPIs from an investor viewpoint is comparability with industry peers. Ideally, KPIs should be consistently designed and disclosed by firms, including those that do not issue SLBs. This allows investors to better assess how well the issuing firm is performing relative to its peers and how ambitious the SPT is. Using industry-specific activity metrics recommended by reporting standard setters such as ISSB and the European Financial Reporting Advisory Group (EFRAG) as the KPIs for SLBs could enhance comparability and market transparency in this regard.

Forward-looking instruments associated with performance indicators are expected to directly integrate reporting and verification requirements into their contractual documentation. The SLBP notably recommend keeping track of the selected indicators at least on an annual basis through verification by an external reviewer and associated assurance reports. While post-issuance reporting practices have become widespread for use-of-proceeds instruments following the recommendations of the Green Bond Principles, there is still room to improve the

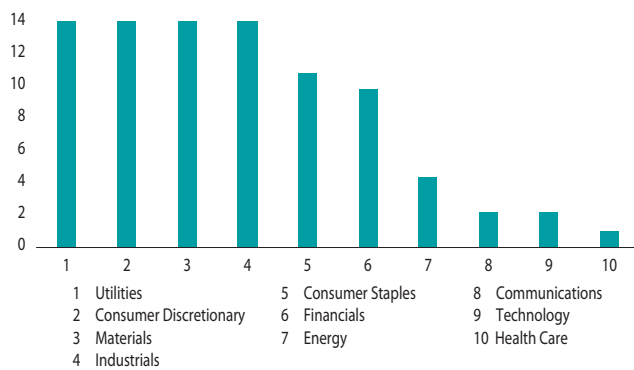
quality, consistency, coverage and timeliness of reporting (CBI 2021). This is particularly the case in the area of impact reporting, where issuers are expected to assess the environmental benefits achieved with the projects financed (see section 2.3). Instruments like SLBs tend to integrate more straightforward reporting and verification mechanisms that are articulated through clear KPIs and SPTs. Though voluntary, second-party opinions have become a cornerstone to ensure the credibility of SLBs, as is the case in the green bond market.

Relying on KPIs and SPTs that reflect entity-wide sustainability efforts presents several additional advantages. SLBs and similar instruments integrate targets associated with overall mitigation efforts such as total greenhouse gas emissions or water consumption. This opens the door to a larger range of issuers that are willing to commit to mitigation efforts but have limited capacity to generate large-scale green projects due to their sectoral specialisation. As KPIs and SPTs are determined at the level of the entity, it is crucial to clearly define which level of the issuing entity the sustainability measures and targets apply to. Activity in the SLB market since 2019 has confirmed this tendency, as issuers originated from a wide variety of sectors (Graph 2.2, left-hand panel) and displayed broad geographic diversity (Graph 2.2, right-hand panel). This suggests that this type of instrument is particularly suitable for issuers from countries and sectors where opportunities to issue green bonds are scarcer, such as in emerging markets.

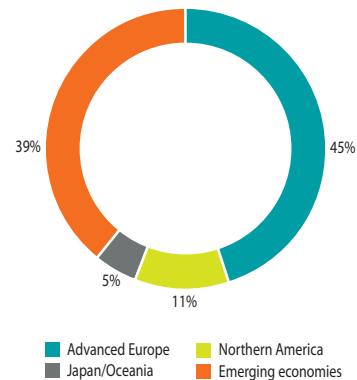
The development of these new instruments can also bring significant benefits from the point of view of ESG investors. Attracting a wider issuer base will in particular offer more diversification options compared to the green bond market, where concentration in a limited number of sectors (utilities and financials, notably) can pose challenges for portfolio managers with an ESG mandate. The availability of clear KPIs and SPTs is, moreover, an important tool to facilitate the alignment of investments with carbon neutrality objectives and other environmental targets. Financial institutions frequently point in this regard to the scarcity of data related to the environmental performance of companies, pushing them to rely on inaccurate and inconsistent proxies to measure the alignment of their portfolios.

Graph 2.2 **SLB issuers from various sectors with Europe and EMEs leading the market**

Number of sustainability-linked bond issuers per industry



Geographical breakdown of sustainability-linked bond issuers



Sources: Bloomberg, European Bank for Reconstruction and Development (EBRD) calculations.

### 2.4.2. Standardisation to scale up climate transition finance with SLBs

Even though the market for SLBs is still in its infancy, SLBs issued to date have already featured a range of underlying KPI categories (Graph 2.3, left-hand panel). While the flexibility with respect to the underlying KPIs enhances market completeness, standardisation of the type of SPTs and KPIs used *within* a given category could help to scale up finance. This can facilitate liquidity in an asset and reduce the burden on investors to understand the specifics. As the dominant share of SLBs with KPIs related to GHG emissions illustrates, investor interest in assets that support GHG emissions reductions, or that are in line with emissions reduction targets implied by the Paris Agreement, is increasing rapidly. Achieving a minimum level of standardisation within this category could therefore help to support transition finance.

Within the category of GHG emissions, KPIs have been based on different emissions scopes (Graph 2.3, right-hand panel)

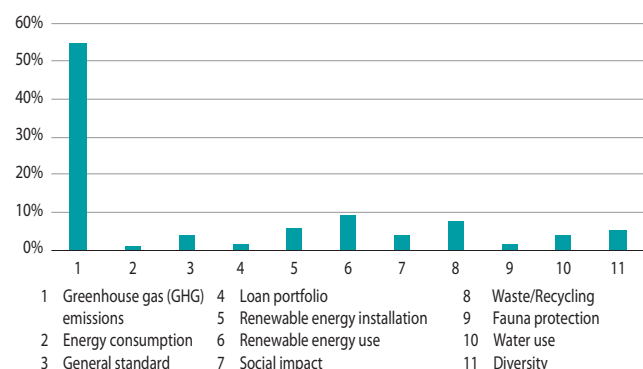
with heterogeneous units of measurement. Depending on the scope of emissions included, GHG KPIs can therefore be measuring quantitatively and qualitatively different levels of emissions, resulting in potentially different GHG emissions dynamics for the issuer. Relatively few issuers have included Scope 3 emissions in their GHG KPIs. Not including indirect downstream and upstream emissions leaves open the possibility for issuers to outsource the carbon-intensive part of production or operation processes and thereby reduce emissions. While Scope 3 emissions are difficult to measure, they can provide a more comprehensive picture of the total carbon footprint of an issuer, especially in industries where Scope 3 emissions account for an important share of total emissions.<sup>57</sup> Transparency on the range of activities included in Scope 3 is also key, as there is a high degree of variability depending on the sector. The use of a common unit of measurement for GHG emissions is also crucial to allow comparability among issuers. The Greenhouse Gas Protocol recommends in this regard that GHG emissions should be expressed in terms of absolute gross tonnes of CO<sub>2</sub> equivalents.

<sup>57</sup> The Science Based Targets initiative recommends setting a target for Scope 3 emissions where they account for more than 40% of total Scope 1 + 2 + 3 emissions.

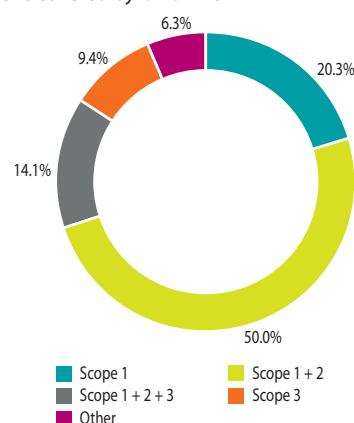


Graph 2.3 **SLBs feature various underlying KPIs, though GHG emissions dominate with different scopes**

Categories of KPIs used in sustainability-linked bonds



Scope of emissions covered by GHG KPIs



Sources: Bloomberg, EBRD calculations.

More generally, it is paramount to ensure that forward-looking indicators and targets used by issuers are sufficiently credible. Central banks and asset managers have highlighted the need for greater transparency and consistency in the methodologies used in order to provide comparable and credible forward-looking metrics (see Chapter 3 for further discussion on this issue). Simple KPIs should be preferred over composite or more sophisticated indicators such as temperature metrics or ESG ratings which are currently highly dependent on the assumptions used by data providers. In this regard, the ECB has decided to exclude ESG ratings from the list of acceptable KPIs for SLBs to be eligible under its collateral and asset purchase frameworks. In this nascent market, the lack of historical data and comparison points make it particularly challenging to assess the degree of ambition of the performance targets. Several issuers have been criticised due to the low ambition of their SPTs and the lack of real progress compared to their “business as usual” trajectory. As the SLB market evolves, there will be a need for more standardisation in the methodologies of data providers and the evaluation methods of external reviewers to ensure those instruments can meaningfully contribute to climate mitigation objectives.

A higher degree of standardisation might be achieved notably by providing more guidance on the choice of industry-specific indicators. The ESG disclosure frameworks that are currently implemented by numerous authorities around the world and initiatives such as the Science Based Targets initiative could provide specific guidance for the choice of KPIs and SPTs in this regard. Improved standardisation is expected to foster peer and

historical comparability amongst issuers and therefore provide better anchors to assess the degree of ambition of the instrument. Relying on indicators promoted by global reporting standards setters (such as the one being developed by the ISSB) will allow comparison with other non-SLB issuers that abide by these standards.

Issuers from emerging markets may stand to benefit. Requirements for other securities, such as green bonds, are often more difficult to fulfil for EME issuers, as only certain categories of projects or even types of technologies qualify. SLBs offer an opportunity for issuers to signal an improvement over time for the issuer as a whole – regardless of the *current* level of sustainability performance. With GHG emissions disclosures becoming more widespread, including in EMEs, SLBs with carbon reduction targets and GHG emissions KPIs can provide an attractive alternative to other sustainable finance instruments for EME issuers and investors alike.

## 2.5. Looking forward: will technology enhance data collection for green external review?

Throughout this report, a recurrent theme that underpins certifying, monitoring and verifying financial products’ greenness is the availability of granular high-quality data. Greater data availability would broaden the means for verifying outcomes related to environmental objectives. The UN Department of Economic and Social Affairs (UN-DESA) and the International Platform on Sustainable Finance (IPSF) have identified the low availability and quality

of data as one of the hurdles for the implementation of sustainable investment approaches by investors (UN-DESA and IPSF 2021). Often, companies select the issues they choose to communicate and have clear financial incentives to communicate those issues that make them appear more sustainable, as sustainability reporting remains largely voluntary. This creates incomplete and even possibly misleading information. Reporting-based data collection also takes time and can lead to outdated information.

Technological advancement holds promise in this regard. It can enhance market transparency by improving the management of disclosures on sustainability impacts and outcomes, allow data collection in real time or at least at a much higher frequency. IOSCO conducted an extensive engagement with 60 asset managers across 19 jurisdictions in 2020 to understand how they use sustainability information and what information they consider to be useful for decision-making (IOSCO 2021a). Asset managers highlighted the lack of a detailed taxonomy for electronic reporting and tagging of sustainability-related metrics which hindered the use of information technologies. Some asset managers called for enhanced digitisation and storage of sustainability information, for example a structured electronic tagging system to support machine-readability and a global central depository. In response, IOSCO has recommended to the ISSB that consideration be given to the application of data taxonomy to support

machine-readability and facilitate consistency, collection, tagging, storage and access to data (IOSCO 2021a).

Some jurisdictions have already started to make progress to enhance data collection, leveraging on new technological feasibilities. In the proposal for a EU Corporate Sustainability Reporting Directive adopted on 21 April 2021, the European Commission proposed to require companies to digitally tag the reported information so that it is machine readable and feeds directly into the European single access point proposed in the EU's capital markets union action plan. In December 2021, International Finance Corporate (IFC) of the World Bank Group, Hong Kong Exchanges and Clearing, CBI and some banks and asset managers launched ESG Book,<sup>58</sup> which provides a new central source for accessible and digital corporate sustainability information for the general public. There are also academic and policy initiatives on green data collection from geo-distributed Internet of Things (IoT) networks using terrestrial communication networks and low-Earth-orbit satellite data.<sup>59</sup> The NGFS is also working on how to facilitate the collection and use of data for green purposes, with a view to helping to bridge the green data gaps (NGFS 2021b, and upcoming report). Box 5.1 provides an overview of Project Genesis, launched by the Hong Kong Monetary Authority and the BIS Innovation Hub Hong Kong Centre in 2021, which provides an illustration on how technology – especially IoT and blockchain – can enhance data collection.

58 See [www.esgbook.com](http://www.esgbook.com)

59 See the World Bank's Spatial Finance project (<https://openknowledge.worldbank.org/handle/10986/34894>) and Huang et al. (2019), to name but two.

## Box 2.2

### Project Genesis<sup>1, 2</sup>

Project Genesis develops prototypes for tokenised government green bonds in small denominations for retail investors, which make real-time sustainability data available for all investors via a dedicated mobile wallet application. The project features two prototypes. One is built on public blockchain infrastructure while the other uses a permissioned blockchain framework. Both prototypes can be used to tokenise government green bonds for retail investors. The project's vision is that retail customers download a mobile app and invest as little as US\$10 in safe government bonds, which will be used to develop a green project, for example a solar farm.

Crucially, investors receive real-time feedback on the green impact related to their bond investment. When linking real-time green data to a financial product, the data's reliability and provenance are crucial to prevent data tampering or double counting. This cannot be offered by traditional (manual) approaches, where independent parties verify periodically, by using electricity bills. By contrast, IoT and blockchain technology supports the automatic tracing of green impact in real time. In Genesis, the electricity generated by each individual solar panel is monitored by a smart meter, which saves these data (meter model and ID, solar panel ID, time interval, electricity generated) on the blockchain and feeds them to the bond tokenisation utility.

Based on the data feed, the utility can then calculate the reduction in CO<sub>2</sub> per bond invested and display this in real time on the user interface. Retail users also have the possibility to additionally verify on the blockchain (using a simple blockchain explorer) immutable green records that have been directly fed in by IoT devices. Over the bond's lifetime, they can observe accruing interest, and track how much clean energy is being generated, and thereby the consequent reduction in CO<sub>2</sub> emissions linked to their

individual investment – all in real time. The advantages of using IoT and blockchain technology are not limited to obtaining high-quality granular green impact data in real time, but also allow operating at lower cost, and minimise human error, relative to manually compiled green datasets. Ultimately this results in better (green) financial terms for both borrowers and lenders.

Finally, green data-tracking technology used in Project Genesis and provided by Allinfra, a private technology company, shows how to prepare economies and financial markets for a future in which reporting frameworks related to the Paris Agreement are increasingly being rolled out. In this respect, measuring green impact tied to financial products via blockchain and IoT offers the additional benefit of fulfilling regulatory (reporting) requirements in an automatic manner, and allows for carbon accounting across companies and nation states. Signatory countries to the Paris Agreement have an interest in accounting for locally produced carbon credits. However, companies that have generated these credits may sell these to a company in another jurisdiction. Without corresponding adjustments, there is the risk of double counting across these two layers. Technology helps in overcoming these issues by automatically collecting high-quality verifiable data and accounting for international transfers that take place.

Project Genesis shows how technology enables the collection of high-quality and real-time green data for green certification and monitoring. At this stage, Genesis is a prototype study that looks at an optimal use case (solar panel) to leverage IoT and blockchain technology to show the art of the possible. Further works will explore the intersection between technology, the financing of green projects and how countries can achieve their carbon reduction targets.<sup>3</sup>

1 For more on the technical side of Project Genesis, see Section 4 of Project Genesis report 1 *A vision for technology-driven green finance*, BIS Innovation Hub Hong Kong Centre and Hong Kong Monetary Authority, November 2021.

2 Marcel Bluhm is thanked for his generous assistance in drafting this box.

3 See the BIS Innovation Hub 2022 work programme: <https://www.bis.org/press/p220125.htm>

## 3. Climate transition metrics, frameworks, and market products

### 3.1. Introduction

Chapter 3 expands on the first two chapters by taking a broader markets perspective, such that it covers climate-related metrics, climate transition frameworks, and market products. This chapter aims to provide an overview that includes high-level stocktakes, assessments, and critiques, so that policymakers and practitioners alike can use it as guidance to further explore the extent to which market practices support climate transition.

ESG ratings and integration are one of the tools by which institutional investors seek to align portfolios with low-carbon transitions.<sup>60</sup> While current green standards and verification have been primarily applied to a subset of green-labelled fixed-income products, ESG practices and the use of climate transition frameworks are being mainstreamed by investors and issuers alike as tools to reflect climate transition. Yet, in the case of ESG scores, climate transition considerations are merely one of numerous environmental factors that are considered. As such, the environmental pillar of ESG incorporates a range of disparate metrics, by design, and may not adequately capture a forward-looking assessment related to climate transition. ESG rating providers and institutional investors use a wide range of definitions and metrics, resulting in a low level of standardisation across markets and jurisdictions. In addition, international bodies such as the OECD and IOSCO have noted the lack of transparency surrounding ESG rating methodologies. As such, the growing use of public companies' ESG ratings could give a false sense of security for investors who might presume that a high environmental score could help reduce the carbon intensity of portfolios or facilitate an orderly climate transition.

Climate transition frameworks are increasingly being used by private sector participants to assess climate transition risks and opportunities, as well as to delineate net zero pathways. Global asset owners and asset managers have recently sought to improve alignment by establishing climate transition

plans that outline key initiatives toward a path to net zero by 2050. A range of frameworks have been developed around these plans, benefiting from the Task Force on Climate-related Financial Disclosures (TCFD) guidance on climate transition metrics, to assess the ambition and commitment of issues to travel the pathway to net zero.<sup>61</sup> Likewise, climate transition frameworks vary across providers, and are based on myriad metrics and methodologies. Moreover, the lack of global standards or interoperability for transition finance taxonomies or classifications, or mechanisms for verification – as described in Chapters 1 and 2 – further highlight the challenges in ensuring credibility and integrity of frameworks by which to assess climate metrics through reporting and issuers' climate transition plans. Certainly, a measure of progress by TCFD, the IFRS Foundation's International Sustainability Standards Board (ISSB) and climate transition framework providers to articulate appropriate metrics and targets has increased the ambition to improve practices. This chapter seeks to help policy communities understand the direction of travel, and what is needed to make further progress.

Market products have also grown rapidly to meet asset owners' demands for climate-oriented products. Such products include investment funds, ETFs, and climate benchmarks and indices. Climate transition indices are increasingly being employed by asset managers to align portfolios, in order to utilise standardised and verifiable metrics to lower carbon emissions and intensity. Moreover, a growing number of funds and ETFs are seeking to position investors for climate awareness, reduction of carbon intensity, and clean energy/green bond funds. The growth of market products is a welcome improvement to help market participants scale up transition finance and improve mechanisms in capital markets to better align pricing and cost of capital with tangible progress in decarbonisation. Despite a constellation of climate-related labels and strategies, many climate-labelled funds and ETFs continue to have relatively high levels of carbon intensity. Therefore, public and private sector scrutiny and engagement are needed to help

60 ESG approaches and integration are used by institutional investors with over US\$40 trillion assets under management, as measured by GSIA and Bloomberg Intelligence.

61 In this chapter, climate transition frameworks refer to climate transition plans reported by issuers, and investment frameworks by institutional investors, to assess factors that relate to entities and portfolios with respect to net zero targets, pathways, and strategies to achieve decarbonisation.

strengthen market practices and pricing mechanisms to better assess, monitor, and incentivise an orderly transition to low-carbon economies.

Ensuring the efficacy of market products for environmental impact and climate transition alignment to net zero is increasingly urgent. Despite the growing availability and use of market metrics, frameworks and investment products, many listed companies are still not sufficiently aligned with the aim of limiting global warming to 1.5°C without catastrophic consequences for societies. According to the MSCI Net-Zero Tracker, listed companies are on track to cause average temperatures to rise by nearly 3°C above preindustrial levels.<sup>62</sup> Moreover, the majority of listed companies are still not committed to temperature and net zero targets.

Notwithstanding a measure of progress, further efforts to strengthen market transparency, comparability, and credibility are required to ensure that public authorities and market participants can hold the financial and corporate sectors accountable through climate transition metrics, frameworks and instruments. These frameworks, metrics, and related market products all currently suffer from shortcomings which could lead to substantial green and “climate transition washing” that could hamper market-based mechanisms to incentivise decarbonisation toward net zero interim targets by 2030. Therefore, greater efforts are needed to assess these practices, to ensure that both public and financial sector institutions that wish to better align practices and portfolios with climate transition are able to do so, with trust in market efficiency and integrity.

This chapter will assess how environmental metrics and climate transition frameworks have emerged and are being leveraged by a range of types of market participants, including central banks. The sections are organised as follows:

Section 3.2 assesses the results of a survey among NGFS central bank members to gauge how they use market metrics and frameworks to assess climate transition developments.

Section 3.3 offers a stocktake of the main metrics in the Environmental (E) pillar of ESG, and also an assessment of what might drive E pillar scores, and the extent to which

these metrics correlate with climate transition objectives, such as reducing GHG emissions and climate intensity, and the extent of alignment with net zero pathways.

Section 3.4 provides a stocktake and assessment of how climate transition (net zero) frameworks are being used in the markets by asset managers and asset owners, their key features, and metrics that seek to align behaviours with pathways to net zero.

Section 3.5 first evaluates the extent to which market valuations are beginning to incorporate climate transition, and then explores how market products – funds, ETFs, and indices – are being used to incorporate climate transition into their practices and offerings as well as the improvements that need to be made to climate-related disclosures pertaining to these products.

Section 3.6, reflecting on the prior sections, outlines the key challenges given the current state of metrics, frameworks, and financial products.

Section 3.7 reviews ESG and climate transition assessments that are distinct for Emerging markets and developing economies (EMDEs), and challenges to overcome shortcomings. It provides case studies for greening policies and climate transition strategies in EMs.

### 3.2. Survey results of central banks’ use of climate transition metrics and frameworks

Over the last few years, international efforts to raise awareness of climate-related physical and transition risks to financial systems and long-term sustainable growth have attracted greater scrutiny from international fora and a host of public sector institutions.

Through the NGFS and other international bodies and fora,<sup>63</sup> central banks are becoming increasingly aware of the need to utilise metrics and frameworks to help monitor or contribute to the greening of the financial system, and to facilitate the transition to low-carbon economies. The NGFS sustainable

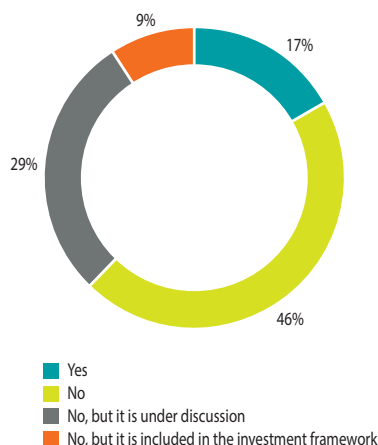
62 MSCI (2021), The MSCI Net-Zero Tracker: A quarterly gauge of progress by the world’s listed companies toward curbing climate risk, October.

63 G20 Sustainable Finance Working Group, APEC, G7, Financial Stability Board, IMF, World Bank, and OECD, and IOSCO, BCBS, and IOPS have developed assessments and policy guidance with respect to forms of sustainable finance, from ESG to climate-related risks and opportunities.

responsible investment survey of central banks indicates that central banks are using ESG factors in investment processes as a means of improving returns and managing risks, and also to better align portfolios with sustainability considerations.<sup>64</sup> The World Bank notes (Graph 3.1, left-hand panel) that fewer than 20% of major central banks currently incorporate ESG factors into reserve portfolio management, for instance

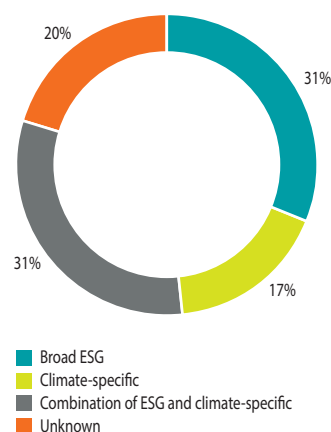
(due to a return mandate) but those who do incorporate ESG are driven primarily by environmental and social considerations, or reputation management.<sup>65</sup> The NGFS sustainable responsible investment survey notes (Graph 3.1, right-hand panel) that of those central banks that do incorporate some form of sustainable responsible investing, nearly 50% do so for some form of climate specific considerations.<sup>66</sup>

Graph 3.1 Central banks – Incorporation of ESG and climate-specific risks



N = 114.  
Source: World Bank Treasury.

Sustainable and Responsible Investment (SRI) scope taken by central banks



N = 35 (all surveyed central banks that adopt some form of SRI practices in one or more of their portfolios).  
Source: NGFS portfolio management survey 2020.

This section provides results of an NGFS survey among central banks regarding climate transition metrics and frameworks to better understand how, why, and to what extent central banks are using them. The survey asked central banks about the use of climate transition metrics and frameworks for internal purposes, from market surveillance to stability monitoring to own funds portfolios. This establishes a benchmark from which to assess the evolving practices and shortcomings of their use across financial markets.

Central banks are increasingly cognisant of the use of climate transition frameworks to assess pathways to net zero. These frameworks have the potential to be useful for a range of central bank activities, from approaches to consider:

- through market surveillance, changes to market valuations due to climate transition risks (e.g. acceleration of stranding of assets, or growing climate opportunities);
- financial stability risks from a sharp shift in market

valuations, and potential net losses from a sharp change in credit downgrades and defaults, potential spillbacks to the financial system, (e.g. banks could face an erosion of asset quality, and open-ended funds could contribute to selloffs and amplify risks).

Furthermore, these frameworks can be used to:

- inform supervisory strategies to assess aspects of banks' operations, credit management, and securities and loan portfolios;
- inform ESG considerations and risk-adjusted return dynamics in central banks' reserve portfolios;
- moreover, incorporation of climate information in tail scenarios could inform perspectives on a possible erosion of the efficacy of monetary policy transmission, causing both disinflation due to slowing economic growth and pockets of inflationary pressures in the energy supply chain;

64 NGFS (2020), Progress report on the implementation of sustainable and responsible investment practices in central banks' portfolio management.

65 World Bank (2021), ESG Investing: A Primer for Central Bank Reserve Managers.

66 NGFS (2020), Progress report on the implementation of sustainable and responsible investment practices in central banks' portfolio management.

- lastly, central banks can use such frameworks to help guide their own assessment and communication of how they are seeking to achieve the net zero commitment by 2050.

Central banks and supervisors can use climate transition frameworks across the range of their activities. Like other investors, they can leverage climate transition frameworks to help them assess climate-related transition risks and opportunities, and implement sustainable and responsible investment strategies, for their non-monetary policy portfolio management activities. Central banks also report that climate transition frameworks can be of use for monetary policy purposes, macroeconomic monitoring, financial stability monitoring and micro-supervision. However, most central banks are at an early stage in integrating climate transition frameworks into their activities.

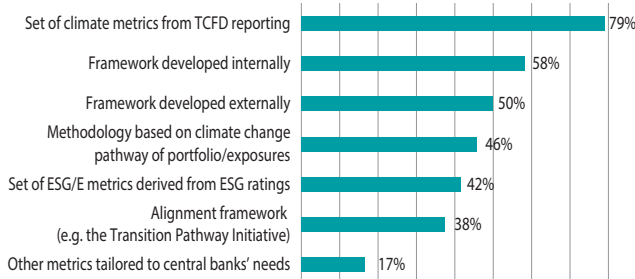
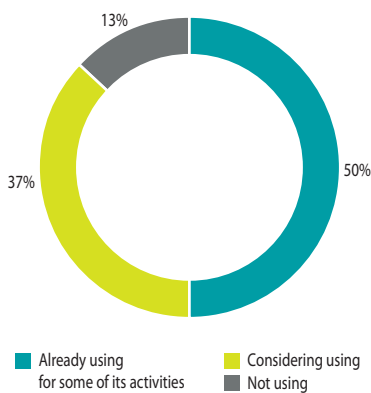
Most commonly cited metrics are used in the context of TCFD-aligned disclosure, including the weighted average carbon intensity (WACI) used by some central banks to measure the carbon profile of their portfolios. Some central banks are also starting to use forward-looking metrics, in particular to assess alignment with climate transition goals. Another area where transition frameworks are increasingly used is financial stability monitoring and supervision: central banks are using forward-looking scenarios – such as those developed by the NGFS – to stress test financial institutions’ exposure to physical and transition risks associated with a number of climate pathways.

Selected core metrics currently used by central banks include:

- ESG environmental scores;
- GHG emissions, carbon intensity, weighted average carbon intensity;
- exposure to physical/transition risks;
- portfolio alignment with a temperature target, and other forward-looking metrics, such as implied temperature rise, warming potential;
- other metrics for financial stability monitoring/stress testing (climate VaR);
- qualitative assessments (whether a company has net zero commitments and its interim targets; questionnaires/interviews).

In addition to metrics, a number of central banks are using, or planning to use, tools to help assess carbon emissions and intensity in their portfolios. A number of central banks acknowledge some interest in, and use of, climate transition frameworks, noting the Transition Pathway Initiative and the Science Based Targets initiative in doing so (Graph 3.2). Also, at least several respondents mentioned the use of, or the intention to use, models such as climate VaR, PACTA (Paris Agreement Capital Transition Assessment), and implied temperature rise methodologies to assess the climate resilience of their own funds portfolios. Several central banks highlight that the data they would like to utilise consistently include metrics that are currently found in at least some of these frameworks. Half of the respondents mentioned that they are already using a framework or set of established metrics to assess climate transition risks and opportunities, with another 38% indicating that they are considering doing so (Graph 3.2)

Graph 3.2 Central banks’ use of framework/metrics to assess climate transition risks



N = 24  
Source: NGFS survey.

Central banks identify a number of issues that prevent a thorough assessment of climate transitions. These include:

- **Issues around data:** Like other market participants, central banks are facing issues related to the backward-looking nature of the data available; the lack of consistency and comparability across data providers; low and inconsistent coverage for Scope 3 GHG emissions; and the low availability of relevant data specific to climate transitions, such as transition plans and targets, especially from non-financial corporates.
- **Issues around methodologies and frameworks:** Central banks report the lack of established methodologies for forward-looking indicators as the main issues to use transition metrics; methodologies and assumptions are also insufficiently disclosed; the lack of an established or science-based climate transition framework for sovereigns is another specific obstacle that is of particular interest for central banks, considering the share of sovereign assets in their balance sheets.
- **Expertise:** A portion of central banks note the lack of internal expertise on how to use and interpret these frameworks. Several note the use of external consultants to provide guidance on how to utilise metrics and frameworks, whereas others manage the analytical process internally.

The current state of frameworks and metrics does allow for a variety of approaches, which in combination give central banks the means to assess climate transition risks from various perspectives. Nevertheless, the obstacles are formidable and undermine central banks' ability to assess or develop policies based on such assessment for purposes of supervision, financial policy or reserve management.

With such a heavy focus on issues related to data,<sup>67</sup> central banks identify increased data availability and more consistent, comparable and reliable disclosure requirements as the main step to facilitate the assessment of climate transitions. In this light, central banks indicate several approaches to overcome these obstacles:

- increased disclosure requirements that are more consistent, comparable, and reliable;
- increased data accessibility (databases);
- standardisation of a few reference scenarios (NGFS and IEA, in particular), and a better understanding of the macroeconomic impact of different transition scenarios;

- development of a transparent and interoperable methodology and consistent metrics to develop consistent, comparable and reliable reporting;
- additionally, central banks mention that it would help if more companies provide information on their transition plans, including science-based and interim targets; likewise, clear and credible national roadmaps, with interim steps and measures, would help assess transition risks for the sovereign shares of central bank portfolios.

In sum, central banks highlight the need for more transparent and interoperable methodologies of frameworks, and more consistent, comparable and meaningful forward-looking metrics that they can use to assess and compare, and from which they can draw meaningful and decision-relevant conclusions. Therefore, a global baseline climate disclosure standard, interoperable taxonomies and sound science-based definitions will be needed to help ensure and drive standardisation across emerging methodologies and reporting related to climate transition plans.

With these concerns in mind, section 3.3 now takes stock of various tools highlighted by central banks across financial markets.

### 3.3. Stocktake and assessment of metrics and frameworks used in financial markets

This section offers a stocktake and assessment of various ways in which financial market participants have developed frameworks and incorporated metrics to capture environmental and climate considerations, including climate transitions. It then illustrates a wide range of metrics, methodologies, frameworks and practices for different stakeholders with distinct objectives.

#### 3.3.1. ESG rating agencies' environmental pillar score and metrics

As noted by the NGFS survey of central banks in section 3.2, central banks are increasingly leveraging forms of ESG ratings and data for monitoring, assessing, and even portfolio alignment. Therefore, the extent to which the environmental pillar score – the letter “E” in “ESG” – can be effectively used to

67 In this respect, the NGFS has dedicated a workstream to assessing and addressing climate-related data gaps.



help green the financial system, and its potential shortcomings, is a relevant consideration. Currently, the environmental pillar scoring reflects the environmental impact, re-orientation towards renewables, climate-related risk management and adaptation, as well as operational processes to improve water use, waste management and impact on biodiversity. As such, ESG scores offer the potential to unlock substantial information on environmental and physical climate-related risks. It could also represent an important market-based mechanism to help investors make decisions on long-term carbon prices and climate transition risks.

While institutional and retail investors use ESG, and the environmental pillar, as a tool to help align portfolios with environmental resilience, the extent to which climate transition information and metrics are found in the E score varies considerably across rating providers, and generally the climate transition risks and opportunities are only a

modest portion of the overall range of metrics. This may have implications for how central banks and other market participants can utilise E scores in the absence of their underlying metric data and clarity about how they are weighted within the overall E score.

A review of the environmental pillar metrics of ESG illustrates the range of metric categories and subcategories that are found in the E pillar. Several major providers (Bloomberg, MSCI, S&P and Refinitiv) collect and use environmental metrics that fit into several broad categories of core metrics, found in Table 3.1. This table illustrates that there appears to be core metric categories, and metrics that relate to specific elements of climate transition, in terms of risks and opportunities. This suggests that the metrics found in the subcategories could be the basis for consistent monitoring and evaluation over time, in particular as disclosure transparency and consistency improves.

Table 3.1 **Environmental Pillar of ESG Metrics**

Core metric categories	Metrics regarding climate transition
<ul style="list-style-type: none"> <li>• Emissions and carbon footprint</li> <li>• Energy, resource and water sourcing, use, and intensity</li> <li>• Waste management and output</li> <li>• Renewable energy</li> <li>• Climate mitigation</li> <li>• Ecology and biodiversity</li> </ul>	<ul style="list-style-type: none"> <li>• GHG Emissions, and other types of emissions</li> <li>• Carbon policy</li> <li>• Carbon intensity</li> <li>• Climate and/or environmental strategy</li> <li>• Investment in renewable energy</li> <li>• Green buildings, operations</li> <li>• Green products and services</li> </ul> <p><i>Also, partially related to the transition:</i></p> <ul style="list-style-type: none"> <li>• Supply chain</li> <li>• Product stewardship</li> </ul>

Sources: NGFS (2020, 2021), OECD (2020).

Key metrics reflect elements of guidance from the TCFD with respect to environmental risks, impact, and climate transition, and also reflect elements of Sustainability Accounting Standards Board (SASB) and Global Reporting Initiative (GRI) reporting. Nevertheless, the specific subcategory metrics and their weighting within the composite E score can vary significantly. Methodologies differ in terms of the relative weights associated with financial vs. double materiality; inputs and risk management vs. outputs and impact; and how ESG rating providers consider risk planning (e.g. preparedness to handle and

mitigate controversies). As such, the E scores can differ significantly across providers, and their use as a barometer for aspects of climate transition can vary in efficacy. For example, as illustrated in Graph 3.3, carbon emissions and carbon intensity (emissions by revenue) are not systematically lower for higher E scores of several prominent ESG rating providers. This has implications for how the ESG and E pillar may be used to help green the financial system, which will be further assessed.<sup>68</sup> In addition to the inconsistency in approach, the lack of transparency around methodologies, processes and data sources used by ESG

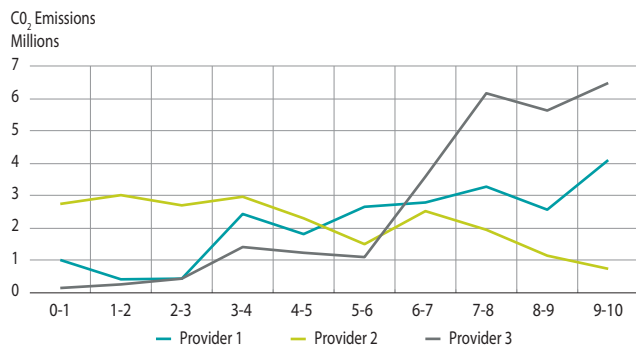
68 See Boffo, R., C. Marshall and R. Patalano (2020), "ESG Investing: Environmental Pillar Scoring and Reporting", OECD Paris.

raters and how potential conflicts of interest are managed have been highlighted as concerns by some regulators.<sup>69</sup> IOSCO has recommended that regulatory or supervisory authorities, where they have authority over ESG ratings

and data products providers, consider how the reliability, comparability and interpretability of ESG ratings and data can be enhanced through regulatory expectations on governance and transparency.

Graph 3.3 ESG ratings providers' E pillar ratings compared to measurements of GHG emissions

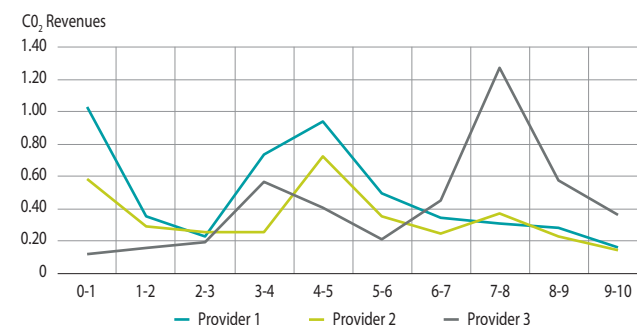
CO<sub>2</sub> emissions by E pillar score



Note: Average tonnes of estimated CO<sub>2</sub> and CO<sub>2</sub> equivalent emissions (Scope 1 and Scope 2, as reported by Refinitiv's methodology for estimating emissions) by E pillar deciles for different providers.

Sources: Bloomberg, MSCI, Refinitiv, OECD calculations.

CO<sub>2</sub> emissions intensity (CO<sub>2</sub>/revenues) 2019



Note: Average tonnes of estimated CO<sub>2</sub> distributed by Revenues, by E pillar deciles for different providers.

### 3.3.2. Assessment of ESG ratings frameworks and the extent of climate transition alignment

The stocktake highlighted that a portion of central banks and supervisors use ESG ratings, and environmental pillar metrics in particular, to assess the greening of the financial system and climate transition risks. In this vein, the sharp increase in attention that institutional investors are devoting to the alignment of their portfolios with net zero, amid the mainstreaming of ESG integration for sustainable finance, raises a key question: to what extent is the environmental pillar score of ESG aligned with climate transition objectives and, if isn't, what are the impediments, and why?

This subsection indicates that ESG rating agency frameworks differ materially, and their environmental pillar scores are not well aligned with climate emissions, intensity, or evidence of reduction in intensity. This is in part due to the inherent role of E pillar scores to reflect a wide range of factors, including physical risks, climate risk governance, waste, etc., that can contribute to financial materiality over the medium term. Notwithstanding this

reflection, analysis indicates that the E pillar score and climate ratings are more aligned with the mere *act of disclosing well-crafted climate transition strategies*, with evidence that the firm acknowledges the major risks and opportunities, as seen in Graph 3.4, but *not the quality of forward-looking metrics such as interim targets, or the implementation against such targets* (e.g. metrics that measure reduction in carbon intensity over time combined with increased investment in climate mitigation, adaption and renewable energy). In this manner, the E scores tend to incorporate numerous climate transition metrics, but do not focus on those very metrics that are being more closely utilised by climate-specific initiatives such as Transition Pathway Initiative and Climate 100+. This has implications for investing, as it suggests that prevalent frameworks that seek to capture climate transition may have an assessment bias that favours larger firms with high market capitalisation that are better able to communicate on fairly complex forward-looking measures and strategies, but are not necessarily demonstrating actions to reduce carbon intensity in the near term.<sup>70</sup>

When the E-pillar metrics and methodologies are assessed in actual use in major indices – ESG vs. the traditional

69 See ESMA's view on this point: <https://www.esma.europa.eu/press-news/esma-news/esma-calls-legislative-action-esg-ratings-and-assessment-tools>

70 Based on an OECD discussion document developed for the G20 Venice Climate Summit.

market indices –, results show that E-weighted portfolios do not often result in lower climate emissions or intensity of the portfolio. Assessment of the S&P, MSCI and STOXX portfolios shows that the portfolio weights of a number of industries that have higher carbon intensity can actually increase due to the use of ESG-tilting approaches to overweight industries and stocks with relatively high E scores. Also, assessment of the construction of portfolios with high E scores using Score 1 and 2 data suggest that high ESG scoring portfolios could actually have higher carbon emissions.<sup>71</sup> Given the trends found in the stocktake in section 3.2, it may well be the case that the E-tilted portfolio might be more influenced by other environmental factors, such as resource use, water, waste, or by aspirational aspects of climate transition, such as plans to invest towards climate opportunities.

This does not necessarily complicate the climate transition strategies of central banks or institutional investors, as long as they are aware of the outcomes, and in some cases the need for active engagement with issuers or asset owners/managers to ensure that there are sufficient

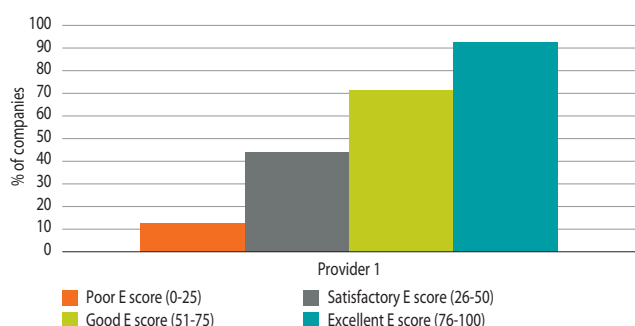
incentives for capital to flow to where net-zero pathways are being implemented.

These findings suggest that the E score itself lacks sufficiently precise insights to assess climate transition risks and opportunities, and therefore a much more thorough assessment would be needed to consider factors in climate transition frameworks not reflected in prominent ESG rating providers' E pillar methodologies. These concerns are reinforced by recent market research, such as from MSCI (2021), which suggests that a vast number of firms do not have adequate comprehensiveness of emissions (Scope 1, 2, 3), ambition (setting net zero 2050 and interim and near-term targets), and feasibility to meet their net zero commitments (track record, reasonableness). As such, portfolios of most investment funds are still far from the 1.5°C goal and credible transition plans are missing, partially due to methodological and data challenges.

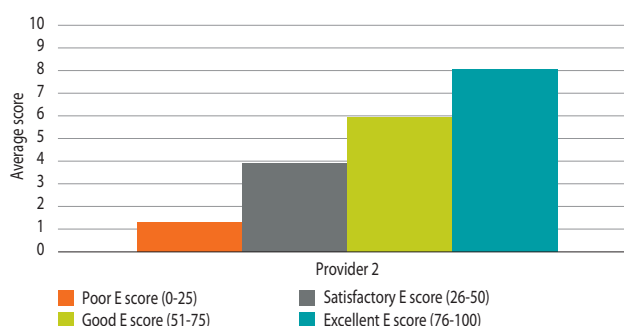
The next two sections better assess how asset managers and owners, and investment products, account for these challenges.

Graph 3.4 Relationship between the environmental pillar score and climate transition issues

Share of companies disclosing awareness of climate change risks and opportunities



Climate change risk category score



Note: Metrics on disclosure of policies are binary (1 = true (company discloses awareness); 2 = false (company does not disclose awareness)). Information provided for 2,870 companies. Classification is based on Refinitiv ESG scores' quartiles. Sources: Bloomberg, MSCI, Refinitiv, OECD calculations.

### 3.4. Asset managers and climate transition frameworks

Given the increasing prevalence of ESG-related investment strategies, a growing number of asset managers have integrated climate transition metrics into their investment processes.

Many of the largest asset managers have taken the further step of committing to net zero portfolio emissions by 2050, aided by the net zero investing frameworks associated with initiatives such as the Net-Zero Asset Owners Alliance and the Net Zero Asset Managers Initiative.<sup>72</sup> In addition to net zero 2050 commitments, the main frameworks also call on

71 Boffo, R., C. Marshall and R. Patalano (2020), "ESG Investing: Environmental Pillar Scoring and Reporting", OECD Paris.

72 The Net Zero Asset Managers initiative is an international group of asset managers committed to supporting the goal of net zero greenhouse gas emissions by 2050 or sooner, in line with global efforts to limit warming to 1.5 degrees Celsius; and to supporting investing aligned with net zero emissions by 2050 or sooner. It has 220 signatories and US\$57 trillion in assets under management. See <https://www.netzeroassetmanagers.org>

managers to set interim emissions reduction targets (generally 2030 targets, consistent with most governments' nationally determined contributions), and often, targets for investments in climate solutions, such as renewable energy. Some net zero frameworks call for regularly updated interim emissions targets every five years to ensure steady and credible implementation.

Since 2020 many large asset managers have announced their goals of net zero emissions for all their assets under management (AUM) by 2050, and set clear interim targets for 2030. For example, nearly 130 signatories to the Net Zero Asset Managers Initiative have committed to set interim targets for 2030, consistent with a fair share of the 50% global reduction in CO<sub>2</sub> identified as a requirement in the IPCC special report on global warming of 1.5°C. In March 2021, the Institutional Investors Group on Climate Change published a detailed Implementation Guide for the Net Zero Investment Framework.<sup>73</sup> Practices to achieve the net zero target include portfolio alignment, shareholders' stewardship and aligning executive remuneration with meeting climate goals. However, the credibility of such plans varies due to a lack of standardisation of taxonomies, terms, targets and verification.

Asset managers have found it difficult to set and assess interim portfolio decarbonisation targets. To establish interim targets, managers must first calculate emissions from a base year, which may be difficult due to current data availability problems. Meeting interim targets may also be challenging due to the uncertain nature of forward-looking emissions metrics by which to evaluate assets. Given these hurdles, some asset managers have been slow to establish baseline emissions and set interim targets, possibly impeding their ability to deliver on net zero commitments.<sup>74</sup>

For portfolio-wide emissions analysis and target-setting, managers employ a variety of quantitative metrics, broadly divided between absolute emissions metrics, carbon intensity metrics (Table 3.2), and factors that influence these outcomes, such as transition risks and opportunities. Best practices generally recommend reporting on both absolute and intensity-based metrics, though asset managers tend to prefer the latter as they partially avoid distortions created by portfolio performance or changes in AUM. Also, emissions intensity targets at the portfolio and company level (whether using total sales, enterprise value

Table 3.2 **Common High-level Carbon Metrics**

Metric	Description
Portfolio Carbon Footprint	<ul style="list-style-type: none"> <li>Total carbon emissions for a portfolio normalized by the market value of the portfolio, expressed in tons CO<sub>2</sub> emissions/\$M invested.</li> </ul>
GHG Emissions <i>Absolute Scope 1, Scope 2, and Scope 3</i>	<ul style="list-style-type: none"> <li>Absolute Scope 1, Scope 2, and Scope 3 GHG emissions.</li> <li>Financed emissions by asset class.</li> <li>GHG emissions per MWh of electricity produced.</li> <li>Gross global Scope 1 GHG emissions covered under emissions-limiting regulations.</li> </ul>
Carbon Intensity	<ul style="list-style-type: none"> <li>Volume of carbon emissions per million dollars of revenue (carbon efficiency of a portfolio), expressed in tons CO<sub>2</sub> emissions/\$M revenue.</li> </ul>
Exposure to Carbon-Related Assets	<ul style="list-style-type: none"> <li>The amount or percentage of carbon-related assets in the portfolio, expressed in \$M or percentage of the current portfolio value.</li> </ul>
Transition Risks <i>Assets or business activities vulnerable to transition risks</i>	<ul style="list-style-type: none"> <li>Volume of real estate collaterals highly exposed to transition risk.</li> <li>Concentration of credit exposure to carbon-related assets.</li> <li>Percent of revenue from coal mining.</li> </ul>
Climate-Related Opportunities <i>Revenue &amp; assets aligned with climate-related opportunities</i>	<ul style="list-style-type: none"> <li>Net premiums written related to energy efficiency and low-carbon technology.</li> <li>Number of (1) zero-emissions vehicles (ZEV), (2) hybrid vehicles, and (3) plug-in hybrid vehicles sold.</li> <li>Revenues from products or services that support the climate transition.</li> <li>Proportion of homes delivered certified to a third-party green building standard.</li> </ul>

Sources: TCFD (2020 and 2021).

73 See IIGCC (2021), Net Zero Investment Framework: Implementation Guide. <https://www.iigcc.org/download/net-zero-investment-framework-implementation-guide/?wpdmdl=4425&refresh=616822864f043163421453474>.

74 According to ESMA, only 10% of the roughly 8,000 listed companies in the EU have disclosed any targets. These tend to be concentrated in very large firms more exposed to public scrutiny, representing 69% of the combined market capitalisation of listed EU firms (or €6.2 trillion).

or other metrics as a denominator) are used by investors who believe this can better accommodate portfolio and investee company growth. Some frameworks, such as the Net-Zero Asset Owners Alliance, recommend absolute emissions targets as a preferred approach for portfolio-level targets, which have a closer link to cumulative carbon budgets, though they allow intensity-based targets as well.

To measure portfolio-wide emissions and set portfolio emissions reduction targets, a number of private sector-led net zero initiatives and the TCFD universally recommend including the Scope 1 and 2 emissions of investee companies, and generally aim to incorporate Scope 3 emissions over time as data availability improves. A particular challenge is posed by Scope 3 emissions, which in many cases, despite representing the bulk of overall emissions in sectors such as logistics and oil and gas, go unreported. Estimates of Scope 3 emissions also vary significantly by provider, depending on accounting methodology decisions related to upstream and downstream emissions, and can lead to additional issues related to double counting within a portfolio. For asset managers to properly measure and meet net zero goals and interim targets, improvements in the availability and comparability of Scope 3 emissions are needed.

While asset managers find Scope 1 and 2 emissions data to be generally reliable, gaps still persist. Some publicly traded companies have yet to disclose reliable emissions data, causing managers to rely on third-party estimates, which can vary significantly. Accordingly, some asset managers have voiced support for regulators to mandate standardised emissions reporting for Scope 1 and Scope 2 emissions, which would bolster asset managers' engagement strategies to improve data quality. However, they express concern on the risk to both issuers and investors of regulatory fragmentation if regulators across different jurisdictions fail to coalesce around common global standards. The ISSB's planned issuance of a global climate-related financial disclosure standard seeks to address this through an international baseline standard.

Asset managers receive emissions data mainly through external data providers (e.g. MSCI<sup>75</sup> or S&P Global's Trucost),

which in turn often obtain data either directly from issuers or through third-party organisations such as CDP. Asset managers and the leading net zero frameworks expect investee companies to express current emissions and emissions targets in either absolute or intensity-based terms, ideally both. Emissions recorded either in intensity terms or as a rate of change in absolute emissions both accommodate differences in firm size and provide good metrics for measuring Paris alignment. Still, the two methods carry advantages and disadvantages: intensity metrics can accommodate companies decarbonising through growing their market share (e.g. by adding renewables) in ways that absolute metrics cannot. In this respect, such metrics may portray companies' behaviours favourably even if the companies are not reducing emissions. For these reasons, managers often prefer the use of both accounting metrics, such that growth through renewables is rewarded, yet overall emissions reduction is also assessed.

The ability of asset managers to set credible portfolio decarbonisation targets also depends on their ability to assess companies' decarbonisation plans, because the decarbonisation trajectory of investee companies is important for meeting net zero goals. As a result, many managers also ask for investee company emissions reduction targets and use third-party metrics (temperature alignment metrics being among the most commonly used ones) to assess company plans. Temperature alignment metrics use sector carbon budgets to assess an individual company's temperature path, with both historical data and forward-looking commitments (such as Science Based Targets) serving as model inputs. PACTA is one such model for assessing various scenarios and a five-year assessment of production to reduce carbon emissions to levels that align with 2 degrees Celsius.<sup>76</sup> Unfortunately, temperature metrics differ considerably across providers as even small changes in assumptions can alter temperature scores significantly, which casts doubts on the reliability of these indicators. While net zero frameworks have largely coalesced around TCFD emissions disclosure methodologies, no equivalent accepted standard methodology exists for assessing company temperature or emissions target-setting.

<sup>75</sup> MSCI reports that companies' decarbonisation targets have multiple dimensions, and it can be difficult to compare these targets among companies.

<sup>76</sup> The Paris Agreement Climate Transition Assessment (PACTA) tool methodology considers companies' five-year production and investment plans using two models (one for equity and corporate bond investors and one for bank loans). This methodology also measures different alignment targets per sector, covering power, coal mining, oil and gas upstream sectors, auto manufacturing, cement, steel and aviation. See <https://2degrees-investing.org/resource/pacta/>

## Box 3.1

### Diversity in climate transition frameworks and efforts to consolidate them

Over the past few years, multiple financial sector and corporate initiatives have developed frameworks to facilitate the transition of the global economy to net-zero.

- **The Transition Pathway Initiative (TPI)** – a global initiative led by asset owners and supported by asset managers – assesses firms’ progress toward decarbonisation from the two perspectives of “Management Quality” and “Carbon Performance”. The TPI focuses on these categories separately, given that companies with strong climate management policies may have high emissions, and vice versa. In its “Management Quality” assessment, TPI rates firms from 1-5 based on evaluations of companies’ governance/management of GHG emissions. In its “Carbon Performance” assessment, TPI evaluates companies’ carbon emissions against different climate scenarios and compares firm performance against a Paris-aligned sectoral benchmark.
- **Climate Action 100+ (CA100+)** – a prominent investor engagement initiative focusing on the major corporate GHG emitters and their decarbonisation – developed a series of benchmark indicators to assess the progress in net-zero transition of focus companies representing over 80% of global industrial emissions. Broadly, CA100+’s benchmark indicators consist of either target-setting assessments or climate management assessments. For the former, CA100+ uses ten key indicators to assess ambition and readiness to achieve net zero, short, medium, and long-term targets for GHG emissions, and implement decarbonisation strategies. For the latter, CA100+ uses sector-specific indicators regarding the adequacy of companies’ climate governance frameworks, capital allocation plans, and their relative alignment with the companies’ stated emissions reduction targets. (see Table 3.3).
- Unlike the TPI and Climate Action 100+ frameworks, other climate performance frameworks (described in the table below) focus almost exclusively on emissions: the **Science Based Targets initiative (SBTi)** focuses on emissions-target validation alone, while the

**MSCI Net-Zero Carbon Tracker** evaluates companies based on current emissions and emissions targets. While many of these initiatives share the key goal of accelerating companies’ efforts in the transition to net zero by improving the governance, disclosure, and reduction of GHG emissions, a variety of practical approaches exist to facilitate the climate transition of companies and assess their progress.

Considering the diversity of practical approaches and frameworks applied by different initiatives, efforts to consolidate them are also underway.

- The **Glasgow Financial Alliance for Net Zero (GFANZ)**, which aggregates multiple net-zero finance initiatives across the financial industry into one sector-wide strategic alliance, is currently attempting to establish best practices for the financial sector to accelerate the net-zero transition in the real economy by highlighting commonalities across different existing frameworks. While some differences exist, GFANZ summarises that financial institutions broadly need to know whether a company’s plan has the following four elements:
  1. A strategy that sets out how the company will achieve Paris-aligned net zero targets;
  2. Governance that gives confidence in the ability to deliver on the strategy;
  3. Targets and metrics that allow external stakeholders to track progress in reducing emissions; and
  4. An understanding of the risks and opportunities around the proposed plan.

Forming best practices from multiple frameworks developed by different initiatives is complex and it may take time to assess various plans and issuers’ subsequent adherence to implementation. Yet, it would bring significant benefits to both the corporate and financial sectors by clarifying the expectations of leading financial actors and thereby enabling companies to enhance their efforts for the climate transition.

Table 3.3 Climate Transition Frameworks

Components and Indicators	Transition Pathway Initiative	Climate 100+	MSCI Net Zero Carbon Tracker	Science-Based Targets initiative	GFANZ
<b>Target-setting</b>	<ul style="list-style-type: none"> <li>Assigns binary score on whether company has set emissions reductions targets</li> <li>Does not reward net zero targets specifically</li> </ul>	<p>Rewards:</p> <ul style="list-style-type: none"> <li>Net zero 2050 targets</li> <li>2025 and 2035 emissions reductions targets</li> <li>Interim targets receive additional points for Paris-alignment</li> </ul>	<p>Rewards:</p> <ul style="list-style-type: none"> <li>Net zero 2050 targets</li> <li>The scope comprehensiveness (i.e., scope 3 inclusion) of those targets</li> <li>High annual emissions reduction rates</li> </ul>	<ul style="list-style-type: none"> <li>Targets range from 5-year targets to 2050 targets</li> <li>Targets must be Paris-aligned, though not explicitly net zero</li> </ul>	<ul style="list-style-type: none"> <li>Net zero 2050 target</li> <li>Medium-term target for 2030 or sooner</li> </ul>
<b>Emissions</b>	<ul style="list-style-type: none"> <li>Uses the Sectoral Decarbonization Approach (SDA) to compare companies, based on past, current, and future emissions (derived from targets)</li> <li>Scores based on emissions intensity performance relative to an industry benchmark</li> </ul>	<ul style="list-style-type: none"> <li>Focuses more on forward-looking targets and on climate policy commitments than on current emissions assessments</li> </ul>	<ul style="list-style-type: none"> <li>Uses absolute emissions to calculate each firm's contribution to total emissions from listed companies</li> <li>Uses emissions reduction targets to calculate temperature score</li> <li>Includes scope 3 emissions</li> </ul>	<ul style="list-style-type: none"> <li>Mandates reporting on absolute emissions and recommends inclusion of intensity metrics</li> <li>If a company's scope 3 emissions are &gt;40% of total emissions, a scope 3 target is required</li> <li>Allows for use of SDA</li> </ul>	<ul style="list-style-type: none"> <li>Targets must cover the majority of scope 3 emissions, with coverage increasing over time</li> <li>Permits use of carbon credits to reach net zero</li> </ul>
<b>Other criteria</b>	<p>Rewards companies that:</p> <ul style="list-style-type: none"> <li>Link executive pay to climate performance</li> <li>Advocate for climate policy action</li> <li>Submit to third-party emissions verification</li> <li>Acknowledge climate change as a business issue and incorporate it into planning</li> <li>Publish TFCF-aligned emissions disclosures</li> </ul>	<p>Rewards companies that:</p> <ul style="list-style-type: none"> <li>Link executive pay to climate performance</li> <li>Perform climate planning and publish decarbonization plans</li> <li>Align and publish capex plans with climate goals</li> <li>Advocate for climate policy action</li> <li>Board oversight over climate policy</li> <li>Publish TFCF-aligned emissions disclosures</li> </ul>	<ul style="list-style-type: none"> <li>Mostly emissions-focused, but rewards high-quality emissions disclosures, especially of scope 3 emissions</li> </ul>	<ul style="list-style-type: none"> <li>N/A (SBTi entirely focused on emissions target-setting)</li> </ul>	<p>Calls on financial institutions to:</p> <ul style="list-style-type: none"> <li>Advocate for a net-zero aligned global policy framework</li> <li>Produce detailed decarbonization plans</li> <li>Adopt financed-emissions measurement and disclosures best practices</li> </ul>

Sources: websites of Transition Pathway Initiative, Climate 100+, GFANZ, Science Based Targets Initiative, MSCI.

Asset managers and the main net zero investing frameworks generally view shareholder engagement as an important tool to influence corporate behaviour towards Paris alignment through GHG emissions reductions in their portfolio companies. Asset managers use engagement to address and improve two key challenges impeding portfolio decarbonisation efforts: corporate emissions data disclosures and credible corporate emissions reduction plans. Many asset managers set engagement targets and develop criteria triggering engagement with portfolio companies, including companies that: (i) represent the highest percentage of emissions within the portfolio, (ii) fail to adequately disclose emissions, and (iii) lack credible decarbonisation plans. Engagement often begins with requests for investee companies to improve emissions

disclosures and set credible emissions reduction targets and plans. If portfolio companies fail to meet requests under given deadlines, asset managers can escalate by voting at shareholders' meetings against some of the company policies or board member nominations. If engagement is unsuccessful or no credible decarbonisation pathway emerges, asset managers may consider divestment as a last-resort measure. Practices vary, with some asset managers communicating in more explicit terms the consequences of underperformance with respect to carbon targets. Some asset managers also coordinate their actions to improve the effectiveness of their engagement. Forms of action include sending coordinated letters and/or holding joint interviews with companies that have relatively high GHG emissions. However, the KPIs that asset managers

use are mostly on a best-effort basis (for example # of companies engaged with) and often lack information about the outcomes of this engagement.

### 3.5. Financial market products – investment funds, ETFs, and indices

As achieving net-zero emissions by mid-century will require significant investment, global financial markets play a key role in efficiently reallocating capital to incentivise and finance the transition across countries and industries. There is mixed but growing evidence that companies' climate transition commitments and pathways to lower risks from carbon intensity and stranded assets are increasingly being factored into investor sentiment and market valuations. Also, there has been a surge in interest in environmental, social and governance (ESG) as well as climate-related financial investment products in recent years, with impact and environmental funds experiencing the fastest growth.

While market valuations are not the focus of this assessment, this section will begin with a brief assessment of the extent to which information from environmental pillar and climate transition frameworks influence market pricing of equity and debt. This suggests investors are improving their ability to assess climate transition risks and opportunities, based on a growing body of information on risks and opportunities.

Yet, the prior section highlights that the tools being used by market participants vary in approach, choice and weight of metrics, and measurements of frameworks. This lack of comparability and alignment raises questions about how these myriad investor-oriented initiatives can serve as a genuine catalyst for the immediate changes in business practices and investment that are urgently needed to make collective progress.

Therefore, this section will also evaluate the challenges of climate-related market products such as funds, ETFs and indices, including climate-related disclosures at product level. In this context, the investment products are assessed

relative to the needs of central banks and other financial authorities to assess exposures, climate impact such as total emissions and pathways to net zero, and implied temperature rise.

#### 3.5.1 Is climate transition being priced into markets and credit?

The evidence from a growing range of metrics, ratings approaches, frameworks, and their use in market products suggests that market participants are increasingly leveraging them to make decisions about climate-related exposures with respect to risks and opportunities. This subsection suggests key factors that are driving prices, and synthesises research finding that climate transition factors influence valuations and credit fundamentals

Conceptually, market valuations should be impacted by downward pressures that erode firm value, and upward pressure where the transition provides opportunities for efficiencies, and new products and customers. A key driver of downward pressure on market valuations is from stranded assets that occur due to a rise in expectations of declines in demand for fossil fuels.<sup>77</sup> This could lead to a rise in the cost of capital for carbon-intensive assets. Also, policies such as carbon pricing may result in a shift in input costs and operating expenses. Increases in market valuations can occur due to companies' investments and R&D in clean energy technologies and products that use renewables. Capital investment in energy efficient processes could increase productivity over time, due to the capital and knowledge-intensive nature of low-carbon energy supplies. Furthermore, access to new markets can bring opportunities for revenue growth and customer acquisition and retention, and increased returns due to greater demand for low-emission infrastructure, technologies and services.<sup>78</sup>

Box 3.2 highlights emerging evidence that climate transition considerations are being factored into investment decisions, thereby impacting market valuations. There is evidence that markets are beginning to reward companies for carbon reduction pathways, all else equal, and improved climate disclosures can also have a positive benefit on credit ratings.

77 Stranded assets are fossil-fuel-dependent assets that suffer from unanticipated or premature write-downs, devaluations, or conversion to liabilities.

78 OECD (2021b).



## Box 3.2

### How market valuations are capturing climate transition risks and opportunities

Most of the academic literature which shows evidence of climate change considerations has so far focused on metrics that capture climate risks (e.g. GHG emissions, ESG ratings), while only limited space has been given to climate benchmarks which include climate-related opportunities. With this in mind, we provide a literature review of evidence for the pricing of transition risks.

On balance, studies analysing the potential presence of risk premia and the sensitivity of asset prices to climate news in the equity market are weighted towards a positive carbon risk premium and suggest that markets are sensitive to transition risks (ECB 2021). Focusing on the cross-sectional of stock returns, a number of studies rely on GHG emissions and emissions intensity to capture transition risk exposure. Bolton & Kacperczyk (2021), for example, find that a carbon premium can be found using the level and changes of emissions, but no relation with carbon intensity exists. Related research finds that green firms outperform carbon-intensive firms and that firms with higher carbon emissions are valued at a discount. Also, green assets outperform when positive shocks on climate-related concerns affect the ESG factor, as found in Choi et al. (2020) and Ilhan et al. (2021).<sup>1</sup>

The literature on the impact of transition risk news on equity prices suggests that the market, at least to some extent, prices transition risks. Batten et al. (2017), find that returns of renewable energy companies react to transition risk news. Recently, Bua et al. (2021) find evidence that returns of firms with poor E and ESG performances, as well as firms with high GHG emissions levels and intensity decrease as transition risk rises, suggesting that market participants are sensitive to news on transition risks.

The climate finance literature on corporate bond markets also finds evidence that markets are beginning to price in transition risks. Studies looking at different measures of transition exposure suggest that climate risks may have a bearing on corporate bond pricing, at least from the perspective of corporates with less room to mitigate such risks (e.g. Seltzer et al. 2020). Duan et al. (2020) argue that bonds of firms with higher carbon emissions intensity earn significantly lower returns, and document that the premium is due to carbon emissions intensity being a predictor of lower future bond returns – as investors underreact to these risks.

A small but growing body of empirical research has investigated the relationship between climate-related transition and credit risk, and finds several relationships. One study suggests firms with higher GHG emissions and poorer environmental scores exhibit greater credit risk as measured by bond yield spreads and distance-to-default (Capasso et al. 2020 and Barth et al. 2020). Carbone et al. (2021) find that higher GHG emissions intensities are associated with higher credit risk and that credit rating agencies assign worse ratings to firms that operate in jurisdictions where a carbon market is in place. According to an ECB study, firms that are better prepared to transition to a low-carbon economy have lower credit risk; such firms have both better credit ratings and a more favourable market-based credit risk assessment (measured as distance-to-default). Rating agencies and market participants consider disclosures and the disclosed level of current GHG emissions, rather than third-party inferred emissions. But they also price in emissions reduction targets – which indicate a firm's environmental strategy – as firms with more ambitious targets have better credit ratings and a greater distance-to-default. .../...

<sup>1</sup> Other studies have implemented relatively more sophisticated screening methodologies to test whether investors go beyond GHG emissions to identify policy-sensitive firms, and have found some evidence of a price differential (Görge et al. 2020; Alessi et al. 2021). Specifically, Görge et al. (2020) build a green-brown score based on carbon intensity, ESG scores and an adaptability score, while Alessi et al. (2021) build a greenness indicator combining ESG disclosure scores with quantitative measures on emissions.

Furthermore, recent studies show that improved disclosures lead to GHG emissions reduction both for financial and non-financial corporations. Grewal (2017) finds that UK non-financial corporations reduced emissions by on average 9.2% to 17.4% in the years after climate disclosure regulation, relative to

firms that continue to disclose voluntarily.<sup>2</sup> Mesonnier and Nguyen (2020) show that institutional investors subject to the new disclosure requirements introduced in France in 2016 curtailed their financing of fossil energy companies by some 40% compared to investors in the control group.

2 In June 2012, the UK became the first country to pass a national-level law requiring all UK-incorporated publicly traded companies to report GHG emissions in their annual financial reports. See [https://corporate-sustainability.org/wp-content/uploads/Grewal\\_Effects\\_of\\_Transparency-Regulation.pdf](https://corporate-sustainability.org/wp-content/uploads/Grewal_Effects_of_Transparency-Regulation.pdf)

### 3.5.2. The use of investment funds, ETFs and indices to align with climate transition

Market products, including open-ended funds, ETFs, and indices aligned with climate transition, are growing rapidly to meet investor demand to improve the alignment of their investment strategies and portfolio allocation with the climate transition. This subsection will first review the growth of ESG exchange-traded products, and then focus more precisely on climate products.

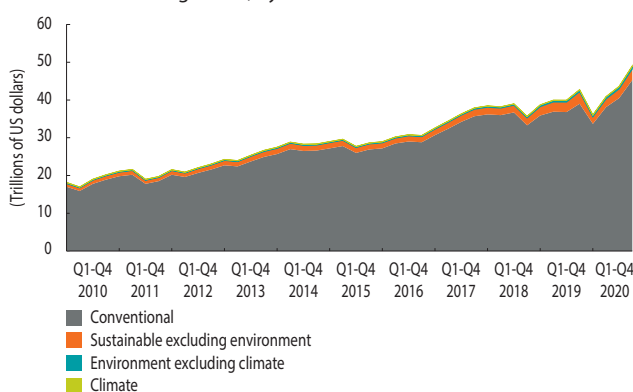
Global assets invested in ESG exchange traded funds (ETFs) and exchange traded products (ETPs) increased by 206% in 2020, with assets of US\$ 187 billion from 113 providers listed on 35 exchanges in 29 countries.<sup>79</sup> In the EU alone, sustainable open-ended funds and ETFs available to European investors attracted net inflows of €233 billion

in 2020 – almost double the figure for 2019. In addition to launching new funds, asset managers in the EU have been vastly repurposing existing conventional funds by changing their funds’ investment objective and/or investment policy.<sup>80</sup>

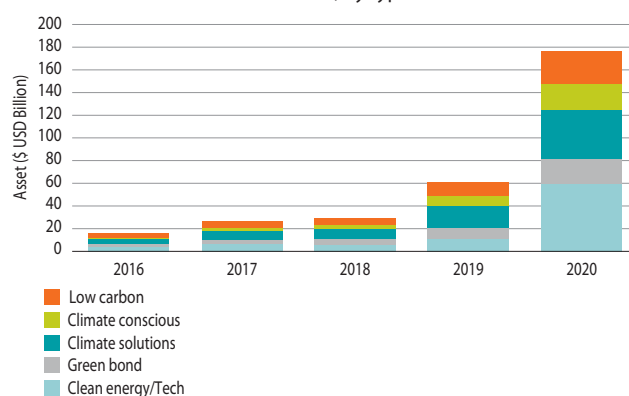
The carbon exposure of funds with high ESG scores ranges widely. An MSCI study of the largest 20 ESG funds collectively accounting for approximately 13% of total assets under management globally in ESG equity funds<sup>81</sup> shows that, depending on the strategy, high-ESG funds (i.e. funds that include assets with higher-rated ESG scores) can have a wide range of carbon intensity, from very low to very high. To this extent, it is interesting that high-ESG funds tend to have much lower exposure to energy stocks, but this has little bearing on the carbon intensity, which varies widely across such funds.

Graph 3.5 Climate funds are growing but account for a small share of total funds

Assets under management, by Fund Label



Growth of climate-aware fund assets, by type



Sources: IMF, Morningstar Direct, Morningstar Research.

79 <https://etfgi.com/news/press-releases/2021/01/etfgi-reports-assets-invested-esg-environmental-social-and-governance>

80 <https://www.morningstar.co.uk/uk/news/209411/sustainable-funds-record-breaking-year.aspx>

81 MSCI (2021), The Top 20 Largest ESG Funds – Under the Hood.

ESG funds often communicate that they account for environmental considerations, and are shaped in part using metrics of carbon intensity and climate transition targets. Climate-specific funds are also growing across regions and are becoming more accessible for use by institutional investors (see Graph 3.5), yet they remain a very small part of the overall fund sector. Climate funds come in a range of forms, which have different implications for carbon intensity. Morningstar data show that climate funds have grown sharply, from under US\$20 billion in fund assets in 2016 to over US\$275 billion in 2021, with clean energy and climate solutions funds taking the largest share (Graph 3.5, right-hand panel). These fund types include:<sup>82</sup>

- **Low carbon funds**, which invest in companies with reduced carbon intensity or that have lower carbon emissions relative to a benchmark index. Some of these funds exclude investments in fossil fuels companies or activities altogether.
- **Climate-conscious funds** tilt their portfolios toward companies that consider climate change in their business strategy and therefore are better firms for the transition to a low-carbon economy. Some may exclude companies involved in the fossil fuels industry, but most include fossil

fuels companies that are transitioning their businesses to low-carbon activities.

- **Climate solutions funds** specifically target companies benefiting from products and services that contribute to the low-carbon transition.
- **Clean energy funds** focus on specific investments that provide green products or technologies, in firms that specifically contribute to or facilitate the clean energy transition. Most of these companies are in the utilities, industrials, and tech sectors.
- **Green bond funds** invest in debt projects that seek to facilitate the climate transition.

To this end, while low-carbon funds have reduced GHG emissions exposure, the climate solutions funds seek to invest in solutions that facilitate climate transition, either by investing in companies committed to the transition, or companies that develop products and services that help facilitate this transition. Climate funds are largely being developed in Europe, and are more focused on clean energy and carbon solutions, and much less so on “low carbon funds” that foster and directly reward the transition.<sup>83</sup>

Graph 3.6 Global scale of types of climate-aware fund and measurements of carbon intensity



(LHS chart) Chart shows the % of funds with a portfolio carbon intensity below the Morningstar Global Target Market Exposure. See Morningstar (2021), “Investing in Climate-Aware Funds: A Look at the Product Landscape”.

(RHS chart) The compared methodologies are arranged vertically. Circles correspond to central values of compared portfolios, dashed arrows to range. Light green: LC100 2018, dark green: LC100 2019, light blue: SBF120 2018, dark blue: SBF120 2019. LC stands for Euronext Low Carbon 100 index; SBF 120 for the French index (Société des Bourses Françaises).

Sources : Morningstar Direct, Morningstar Research (LHS chart), Institut Louis Bachelier (RHS chart).

82 <https://www.morningstar.com/articles/1063628/how-can-you-invest-in-climate-funds>

83 See Morningstar (2021), Investing in Times of Climate Change: A Global View of the Expanding Choice Available to Climate-Aware Investors.

Irrespective of the label, climate funds vary widely in terms of carbon intensity, which has implications for how investors engage through the funds to facilitate climate transition. In this respect, evidence from Morningstar shows that low-carbon and climate-conscious funds most often have a carbon intensity level below the benchmark average, while *climate solutions, green bonds, and clean energy* have an average fund climate intensity well above the average benchmark level (Graph 3.6, left-hand panel). This suggests that such funds are marketed as a vehicle to help transition higher-emitting firms to reducing their carbon intensity and footprint. Therefore, these funds require very different strategies to verify and engage with executive management to ensure transitions are proceeding in line with the established target. Yet again, this suggests that institutional investors (including central banks) that wish to use such funds would need to look closely at the funds' holdings and monitoring of climate exposure, and also their stated climate engagement strategy with firms, particularly those that are concentrated (e.g. top ten exposures) in these funds, to be sure that there are some mechanisms and assurance that the investments will help facilitate the transition.

In light of these developments, the momentum toward ESG and climate-related funds and ETFs warrants caution, as it gives rise to concerns that some asset managers are rebadging funds as ESG/E-friendly, with little impact on the environment.<sup>84</sup> A report from EDHEC Business School finds

that a key feature of popular investment funds' climate strategies is an improvement of portfolio greenness scores, e.g. by underweighting high-emissions sectors without encouraging firms to reduce emissions.<sup>85</sup> On a similar note, a fact-finding exercise by IOSCO found a range of product level greenwashing, including misalignment between a product's investment objectives and its sustainability-related name or marketing materials, a failure to follow through sustainability-related investment objectives, through to misleading and sometimes deliberately deceptive claims about the sustainability-related performance of products. IOSCO has recommended that regulators clarify and/or expand existing, or create new regulatory requirements or guidance to improve product-level disclosure.<sup>86</sup>

There is recent evidence that private, institutional, and public investors may use divestment to encourage firms to reduce their carbon footprint.<sup>87</sup> Multiple ESG engagement strategies exist, with different levels of commitment and consequences. Integrating an ESG approach is furthermore complicated by the variety of metrics that can be used to select firms and by the inconsistencies of ratings and benchmarks available across rating agencies.<sup>88</sup> A consensus is emerging that the environmental performance of investment funds should be assessed through forward-looking targets, transition paths and consistent strategies set up by investment funds to achieve the climate objectives.

84 <https://www.ft.com/content/8e9f8204-83bf-4217-bc9e-d89396279c5b>

85 [https://www.investmentofficer.lu/sites/default/files/2021-09/2109\\_edhec\\_doing\\_good\\_or\\_feeling\\_good.pdf](https://www.investmentofficer.lu/sites/default/files/2021-09/2109_edhec_doing_good_or_feeling_good.pdf)

86 IOSCO (2021c).

87 A study by Rohleder et al. (2022) shows that mutual fund decarbonisation affects the stock prices of divested firms and creates an incentive for those firms to reduce their carbon emissions. See Rohleder, M., Wilkens, M., & Zink, J. (2022), The effects of mutual fund decarbonization on stock prices and carbon emissions, *Journal of Banking & Finance*, 134, 106352.

88 Billio et al. (2020), *Inside the ESG Ratings: (Dis)agreement and performance*, University Ca'Foscari of Venice, Dept. of Economics Research Paper Series No 17.

Table 3.4 **Minimum standards of EU Climate Transition Benchmark (EU CTB) and Paris-aligned Benchmark (EU PAB)**

Minimum standards	EU CTB	EU PAB
<b>Risk-oriented minimum standards</b>		
Minimum Scope 1 + 2(+ 3) carbon intensity reduction compared to investable universe	30%	50%
Scope 3 phase-in	Up to 4 years	Up to 4 years
Baseline Exclusions	Yes Controversial Weapons Societal norms violators	Yes Controversial Weapons Societal norms violators
Activity Exclusions	No	Coal (1% + revenues) Oil (10% + revenues) Natural Gas (50% + revenues) Electricity producers with carbon intensity of lifecycle GHG emissions higher than 100 gCO <sub>2</sub> e/kWh (50% + revenues)
<b>Opportunity-oriented minimum standards</b>		
Year-on-year self-decarbonisation of the benchmark	At least 7% on average per annum: in line with or beyond the decarbonisation trajectory from the IPCC's 1.5°C scenario (with no or limited overshoot)	
Minimum green share / brown share ratio compared to investable universe (VOLUNTARY)	At least equivalent	Significantly larger (factor 4)
Exposure constraints	Minimum exposure to sectors highly exposed to climate change issues is at least equal to equity market benchmark value	

Sources: EU Climate Benchmarks: A Guide (March 2020). <https://www.ssga.com/content/dam/ssmp/library-content/pdfs/insights/eu-climate-benchmarks-a-guide.pdf>

The TCFD report highlights the heterogeneity of forward-looking metrics used by institutional investors.<sup>89</sup> This multiplicity of analytical frameworks and methodologies to assess portfolio alignment, as well as a lack of transparency and sometimes consistency of these frameworks create an obstacle to the credibility, comparability, and usefulness of the results. Reports by the Portfolio Alignment Team (PAT)<sup>90</sup> of the TCFD and the Institut Louis Bachelier<sup>91</sup> also indicate that methodologies to estimate implied temperature rise (ITR) metrics, one of the available metrics, rely on judgements alongside differences in data input that may make the outputs difficult to compare (see Graph 3.6, right-hand panel). This suggests that further effort is needed to align the standards, scope and data inputs of the methodologies to assess portfolios alignment with the Paris Agreement.

Various index providers have created climate-aligned indices to help investors align their own portfolios with the transition to low-carbon economies. Amongst others, MSCI offers examples of multiple climate indices which

vary according to objectives, ranging from reducing fossil fuel exposure, mitigating transition and physical risks, capturing opportunities, and aligning with the goals of the Paris Agreement. MSCI's Low Carbon Indices, which were first introduced in 2014, are aimed inter alia at capturing the exposure to carbon emissions and fossil fuel reserves, while more recently, its Climate Paris Aligned Indices are designed to mitigate climate transition and physical risks, capture novel investment opportunities, and allocate capital in a way that supports the decarbonisation of the economy while being compatible with the Paris Agreement. The methodology and metrics behind these indices are proprietary and include a combination of backward- and forward-looking measures, as well as in-house value at risk models aimed at capturing the contribution of a company's activities towards climate change. Along the same lines, S&P recently announced the inclusion of ESG considerations in its Paris-aligned indices, with the index name being Net Zero 2050 Paris-Aligned ESG Index.<sup>92</sup> The indices go beyond the requirements of the EU

89 [https://assets.bbhub.io/company/sites/60/2021/07/TCFD\\_Consultation\\_ForwardLooking\\_Final.pdf](https://assets.bbhub.io/company/sites/60/2021/07/TCFD_Consultation_ForwardLooking_Final.pdf)

90 <https://www.tcfidhub.org/wp-content/uploads/2020/10/PAT-Report-20201109-Final.pdf>

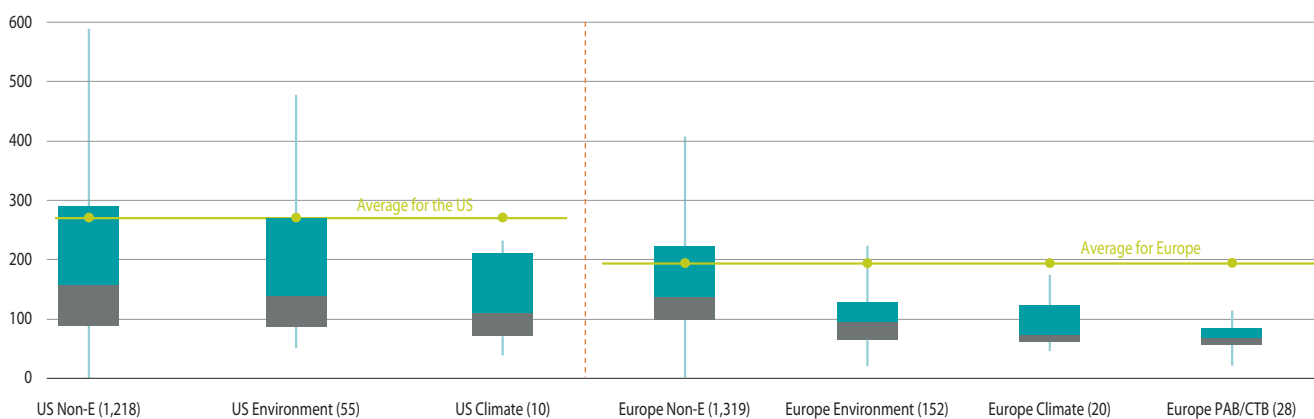
91 The report was commissioned by the French Ministry for the Ecological and Inclusive Transition (MTES) and the WWF France. See <https://www.louisbachelier.org/wp-content/uploads/2020/10/cookbook.pdf>

92 Reference to these indices is merely to illustrate how major index providers are tailoring their indices in an effort to align with climate net zero targets.

benchmark criteria (see Table 3.4), including considerations on physical risks, fossil fuel reserve reductions and ESG scores, but they do not set stricter decarbonisation requirements. STOXX Paris-Aligned Benchmark Indices

also seem to strictly follow the EU Paris-aligned Benchmark requirements. In terms of the quantitative targets, the market indices tend to align with the minimum criteria established under the EU Benchmark Regulation.

Graph 3.7 Carbon intensity<sup>1</sup> statistics for various subgroups of index equity funds<sup>2</sup>



- 1 The Morningstar carbon intensity metric aggregates at the fund level the relative emissions of each holding (emissions divided by revenue) provided by Sustainalytics.
- 2 The sample is composed of 2,802 equity index funds (including ETFs) domiciled in the US or in Europe. Four subgroups of funds were then created:
  - 1) **PAB/CTB funds** are identified if their names contain one of the following keywords: "Paris-Aligned", "PAB", "Climate Transition" or "CTB" (this category only applies to European funds);
  - 2) **Climate funds** are identified if their names contain one of the following keywords: "Low Carbon", "Transition", "Climate", "Decarbonisation" or "Zero";
  - 3) **Environmental funds** are funds which were not previously categorised as "climate" or "PAB/CTB" and were identified with one of the following Morningstar flags: "Environmental Sector Fund", "Impact Fund – Low Carbon Fossil-Fuel Free" and "Impact Fund – Environmental";
  - 4) **Non-E funds** are funds that are not included in any of the above categories.

Note: The extremities of the box plots represent the smallest and largest adjacent values<sup>3</sup>, the bottom of the box represents the first quartile, the middle line the median and the top of the box the third quartile. The figures in brackets indicate the number of funds contained in each group. For each area, the average values are computed across all funds.

3 The smallest adjacent value is obtained by the following formula:  $Q_1 - \frac{3}{2}(Q_3 - Q_1)$  while the largest adjacent value is obtained by the following formula:  $Q_3 + \frac{3}{2}(Q_3 - Q_1)$ , where  $Q_1$  corresponds to the first quartile and  $Q_3$  to the third quartile.

Sources: Morningstar, Sustainalytics, ESMA.

To ensure that passive funds and ETFs marketed as such contribute to the transition, clear standards need to be established for climate-themed indices. Graph 3.7 shows the distribution of carbon intensities of equity index funds in Europe and the US by category: all funds,<sup>93</sup> environmental, climate and CTB/PAB funds. The stricter the definition, the lower the carbon intensity distribution of funds' portfolio. Climate funds, notably those focusing on transition, low-carbon, and decarbonisation strategies show a better environmental performance than all the funds and environmental funds both in Europe and the US, while the carbon footprint of funds following CTB/PAB indices is significantly lower. European funds have a better environmental performance overall than

US funds. This evidence highlights the importance of quantitative targets such as those established by CTB/PAB indices, while minimum standards of decarbonisation will have to be adjusted regularly according to progress in reducing emissions.

The use of climate indices to assess the level of climate alignment of sovereign issues is increasing. Many climate transition indices incorporate the traits of the climate transition benchmarks, such as the EU benchmarks mentioned above, to offer more tailored and investable solutions to the markets. For example, the S&P PACT (Paris-Aligned & Climate Transition) Indices, which incorporate the above-mentioned European benchmark

93 Except the ones included in the other categories.

parameters, may serve to help asset managers transition to net zero. This can help bond investors better align their portfolios with emissions reduction across both sovereign and corporate issues, to help achieve their own portfolio-level ambitions of net zero.<sup>94</sup>

### 3.6. Assessment of climate transition frameworks used in asset allocation

A balanced assessment of asset managers' and owners' frameworks for climate transition and their alignment, including underlying climate metrics, is critical to determine the extent to which various tools reviewed in the stocktake are individually and collectively effective to drive genuine decarbonisation across industries. The International Energy Agency (IEA) recently suggested that total investments needed to decarbonise the global economy will be around US\$150 trillion over the course of the next 30 years – getting there requires a fundamental realignment of capital with decarbonisation.<sup>95</sup>

As explored in the stocktake and assessment, there are many frameworks and initiatives aiming at net zero transition in 2050. One way to analyse an investment's alignment with climate goals is to split it between different activities, each of which has precise goals in terms of technological deployment or carbon trajectory.

#### 3.6.1. Commonalities among metrics and frameworks

Though they are aimed at different companies and decarbonisation targets, frameworks and metrics have some major commonalities. Most frameworks rely on the "2 degrees scenario", which is consistent with the overall aim

of the Paris Agreement, with a target horizon of 30 years (around 2050), although recent discussions point to the need to aim at 1.5°C rather than 2°C (see the IPCC report and the UNFCCC report on NDCs released ahead of the COP26 climate conference).<sup>96</sup> Moreover, the further development of climate-specific metrics in the TCFD reporting guidance, and key frameworks, suggest *a core set of metrics and targets are beginning to be mainstreamed, at least by larger institutional investors and companies.*

Generally, a carbon budget is allocated based on a sectoral budget, using revenues as a proxy for a fair allowance share. Some frameworks (namely the PACTA tool) try to differentiate alignment targets per sector, taking into account that some sectors ("high stakes" sectors – those accounting for about 75% of global greenhouse gas emissions, following PACTA) need to move more quickly than others (for instance, power generation and oil & gas).

Usually, methodologies for frameworks provide specific insights for "high stakes" sectors with tailored calculation principles. Moreover, other commonalities can be found in interim targets (e.g. 5-year or 10-year targets),<sup>97</sup> such as the Net Zero Asset Managers Initiative), needed to achieve the net zero long-term target. Capex commitments are also starting to be included in different initiatives (for instance, inclusion of capex metrics in the CA100+ net-zero benchmark). Scope 1 and 2 emissions ("induced emissions") and Scope 3 emissions coverage is essential for disclosure, targets and plans, as well as a fossil fuel phase-out well ahead of 2050 horizon. Some methodologies (such as CDP's Assessing low-Carbon Transition – ACT – initiative), are adapting decarbonisation pathways to regional characteristics.<sup>98</sup> These approaches are important to help facilitate the transition in a prioritised and targeted manner.

94 A growing tendency of investment funds to use carbon offsetting as a way of achieving net zero seems to involve a significant risk of detracting from decarbonisation. First, that tendency distracts from the real goal of reducing GHG emissions. Second, carbon markets are still subject to significant greenwashing in the absence of clear standards on credible offsets.

95 To this end, climate transition risk metrics, if applied by the majority of financial market participants in their risk assessment, might translate into relatively coherent market pricing signals for the least and most exposed firms.

96 UNFCCC (2021), "Nationally determined contributions under the Paris Agreement", Synthesis report by the secretariat.

97 The interim targets for 2030 are set consistently with a fair share of the 50% global reduction in CO<sub>2</sub> identified as a requirement in the IPCC special report on global warming of 1.5°C.

98 The ACT – Deep Decarbonization Pathways (2019 to 2021), for instance, are dedicated to the regional adaptation of ACT methodologies in Brazil and Mexico, informing the development of national decarbonisation pathways. Sectors include power generation, cement, meat production and passenger urban transport. ACT workstreams involve transition standard setting, tool development and capacity building.

Temperature alignment indicators are generally based on a benchmarking approach. Different methodologies for temperature alignment are usually built around a 2°C approach, but the 2°C portfolio test is only possible for those few sectors (usually power, fossil and road transport portfolios) that account for high levels of emissions. Indeed, all 2°C scenarios (and in particular the IEA's 2DS ETP scenario) are built on the idea that each sector could achieve alignment with a 2°C trajectory through a few technologies (e.g. the electric vehicle for the automobile industry). However, achieving these technologies is a work in progress.

Emissions reduction targets generally follow a top-down approach, often based on scientific evidence and aligned with a 1.5°-2°C outcome.<sup>99</sup> Top-down approaches measure emissions against the global carbon budget, as country-level emissions data are often more reliable and consistent than those at the firm level. Additionally, top-down approaches tend to capture more readily the networked effects of interacting climate risk drivers, including policy, technology and physical risk.<sup>100</sup>

On the other hand, bottom-up methodologies provide a more granular assessment with arguably more accurate near-term results. They also tend to provide more detailed information at the firm level and on the supply chain.<sup>101</sup> Among bottom-up methodologies, the Carbon Impact Analytics methodology allows the carbon impact ratio to be computed at the company level: this indicator enables companies to be identified which have significantly improved the carbon efficiency of their operations, as well as companies that sell products and solutions leading to GHG emissions reduction over their lifetime.

### 3.6.2. Differences in metrics and frameworks

As climate transition frameworks and metrics improve and become more transparent, the vast variety of existing frameworks and metrics can lead to significantly different

assessments of the same company, given differences in data, the depth of risk analysis, underlying scenarios and modelling assumptions. Bingle et al. (2021) analyse the extent to which the use of different metrics proposed by different providers delivers heterogeneous results.<sup>102</sup> Their findings show that a considerable degree of divergence exists across various providers of transition risk metrics, reflecting the complexity of assessing climate risks, as well as the different methodologies and data underpinning these metrics (CEP 2020). For firms, this creates incentives to pick those climate-related metrics which portray their climate transition situation in the most favourable light. For investors, the divergence in assessments raises important questions about reliance on a single metric for investment decisions and calls for greater international efforts to forge greater consistency and comparability.

Comparing the vast universe of climate transition metrics is far from straightforward, given different methodologies and data underpinning these metrics. For example, there is a low correlation among the different providers' reporting of companies' Scope 3 carbon emissions. This is a result of the divergence in estimation methods, as well as gaps in the data collected and their complexity. Analysis by Qontigo (2021),<sup>103</sup> a provider of analytics and indices, illustrates such divergence issues by comparing methodologically similar forward-looking climate metrics for 135 companies from three different data providers. After transforming and normalising scores from the different sources, the analysis finds only a modest positive relationship between the providers. Several initiatives are underway to bridge existing data gaps. For instance, the IMF has created a Climate Change Indicators Dashboard that brings together the climate-related data needed for macroeconomic and financial policy analysis. The OECD's International Programme for Action on Climate provides macro-level data at the country level to assess carbon intensity, carbon pricing, and public sector expenditures related to climate mitigation and adaptation. Building on these and other public sector initiatives, the NGFS has developed an assessment of climate data gaps and initial

99 Emissions reduction plans by sector are available in the UTS One Earth Climate Model (supported by UNEP and the Net-Zero Asset Owner Alliance), the IRENA 2021 World Energy Transition Outlook, Carbon Brief (2020) and The Committee on Climate Change (2020).

100 Ortec Finance's Climate MAPS is one example of this approach.

101 Such approaches include Baringa Partners' Climate Change Scenario Model, Carbone 4's Carbon Impact Analytics, PwC/The CO-Firm's Climate Excellence, Planetrics' Climate Risk Toolkit, Verisk's Transition Risk Tool and MIS' Carbon Transition Assessment and V.E's Carbon & Energy Transition metrics.

102 Their analysis covers a sample of 69 transition risk metrics delivered by nine different climate transition risk providers covering the 1,500 firms of the MSCI World index.

103 Qontigo (2021), Forward-looking Climate Metrics: An introduction to the current global landscape, white paper.



recommendations on how to bridge those gaps (NGFS 2021b). The TCFD has published proposals enhancing and amending the TCFD framework, particularly around metrics related to transition risk, such as Scope 3 emissions, risks to value chains, and financed emissions. Technological solutions by data providers have also been employed to help collect and distribute data and make data analytics available at scale for stakeholders (Ferreira et al. 2021).

### 3.6.3. Shortcomings of metrics and frameworks

The top-down based methodologies do not offer sufficient granularity, however, which leads to asymmetric information issues in financial markets. For example, a company in a high-emitting sector such as the automotive industry might have a higher carbon footprint than companies in other less-carbon-intensive sectors but this company could have credible net zero targets and could be well aligned for transition. Qualitative analysis of the kind included in the TPI framework can offer a broader insight, but can also lead to distortions, as companies that are high emitters but highly “aware” have often received better scores than companies that are very low emitters but do not have transition plans or reporting.

Depending on the sector, there are big differences among companies in terms of their emissions reduction capacity. A company operating in a low-emitting industry (e.g. a media company) can do relatively little to reduce its carbon footprint, but one operating in a high-emitting industry can do a great deal to decarbonise. Hence, mobilising capital towards the most efficient companies in the most polluting sectors requires a more in-depth analysis of their transition plans. Bottom-up methodologies could better address this issue, such as comprehensive due diligence of climate-related risks based on international standards.<sup>104</sup> Well-designed climate transition metrics should offer a more granular approach and employ sector-specific benchmarks to enable comparison between the carbon impact of a company and that of its sectoral peers.

There is insufficient focus on the level of ambition and credibility of frameworks and plans that may embrace breakthrough innovations in energy and decarbonisation technologies. A number of frameworks provide high-level metric guidance on decarbonisation efforts and net zero targets, but are often rather vague about how the transition will occur in practice. Greater clarity to document the necessary energy innovations (e.g. hydrogen, bioenergy) and decarbonisation technology (carbon capture and storage) to help facilitate netting opportunities, as well as any reliance on the scaling up of voluntary carbon markets,<sup>105</sup> should be further articulated in assumptions on climate transition plans.

In addition, further work is required to address the challenges of double-counting issues. Since supply chains are interconnected networks, efforts should be made to avoid counting emissions multiple times. For example, if an oil and gas company sells all its fuel to a mining company, and that mining company uses only this company’s products to run its mine, the downstream Scope 3 emissions of the oil and gas company should essentially be equivalent to the mining company’s Scope 1 emissions. If both the oil and gas company and the mining company were in the same portfolio, these emissions might be counted twice, thereby overstating the carbon footprint of the entire portfolio. Some metrics providers developed tools to address this issue. For instance, MSCI adjusts for double counting by applying “de-duplication multiplier” by looking at roughly 12,000 companies.<sup>106</sup> However, this multiplier seems to be derived from analysis based on expert judgement rather than on a quantitative exercise. To tackle this issue, data availability and quality will be paramount for metrics providers to design methodologies and derive multipliers which, when applied, limit double counting and provide figures closer to the actual carbon footprint.

Since past performance indicators offer limited insight into future risks and opportunities, forward-looking climate metrics are needed to assess companies’ expected climate performance. These provide insights into where company

104 OECD (2022b).

105 These carbon credits would come from four categories: avoided nature loss (including deforestation); nature-based sequestration, such as reforestation; avoidance or reduction of emissions such as methane from landfills; and technology-based removal of carbon dioxide from the atmosphere. McKinsey (2020) notes that the gigatons of potential supply could be limited to 1-5 by 2030, instead of 8-12 gigatons, due to mobilisation challenges.

106 <https://www.msci.com/www/blog-posts/scope-3-carbon-emissions-seeing/02092372761>

performance is heading and which firms are better aligned to climate transition goals. However, there is currently insufficient information with respect to key forward-looking metrics to help judge whether firms are on a credible path to transition. The TCFD public consultation (2020-21) on potential forward-looking metrics for financial firms found that three-quarters of the 209 respondents reported using some form of forward-looking metrics, but they define such metrics rather broadly. At the same time, respondents agreed with a wide variety of current challenges, with roughly three-quarters being particularly concerned with their reliance on assumptions to derive future emissions, future uncertainty, and opaque or difficult methodologies.<sup>107</sup> For instance, forecasts of future carbon prices may not be correct. In the context of the TCFD consultation on forward-looking financial sector metrics, the Institute of International Finance (IIF) notes that a widespread shift towards greater disclosure of forward-looking metrics in the absence of a clear understanding of the implications of differences in approaches could create a risk of disclosures not being reliable.<sup>108</sup> These assessments call for addressing methodological challenges and establishing clear and robust verification practices to enable market discipline. To this extent, emissions reduction targets collected by service providers (Bloomberg, MSCI and so on) as well as targets validated by the Science Based Targets initiative (SBTi) might prove particularly useful.

Nevertheless, forward-looking metrics and targets are not sufficient: they need to be credible, verifiable by third parties, and they need to be accompanied by periodic (annual) reporting against the pathways to achieve such targets. Doing so would address a concern raised by a number of central banks in order for them to be comfortable with greater use of such market-based frameworks. Therefore, shareholders' engagement and stewardship can be an efficient tool to foster the transition. However, higher transparency of AGM votes is needed, particularly in Europe, and harmonised voting data to assess the efficiency of voting on emissions reductions. In the absence of Europe-wide requirements for the mandatory disclosure of voting records,<sup>109</sup> information on AGM votes is patchy with national stewardship codes in certain countries

and investor initiatives requiring signatories to disclose such information.<sup>110</sup> A metric reflecting voting records can usefully complement disclosure on the GHG emissions of portfolio holdings and help assess transition plans of investment funds.

### 3.7. Further considerations in emerging markets

Emerging and developing economies are set to account for the bulk of emissions growth in the coming decades unless much stronger action is taken to transform their energy systems. Substantial efforts will be needed to improve the domestic conditions for renewables investment as well as international efforts to accelerate inflows of capital. Yet, many emerging and developing economies do not yet have a clear vision, or the supportive policy and regulatory environment, to catalyse the necessary climate transitions (IEA 2021). Moreover, developed countries have thus far fallen short of their pledged US\$100 billion per year to support developing countries in this transition (OECD 2021c). To help address this, the Italian G20 Presidency put forth a proposal for MDBs to coordinate in support of countries' preparation and eventual implementation of climate-informed development strategies, and they explored factors that hinder large-scale private investment in climate projects in a range of countries.

Sovereign ESG frameworks vary in terms of metrics and methodologies, and incorporate factors that reflect both national and business conditions and practices that relate to environmental, social and governance factors. For example, drivers such as environmental performance, carbon emissions, climate vulnerability, air quality, water stress, gender equality and corruption may reflect standards that are also present in corporate sector ESG scores. However, natural resources depletion, forestry conservation, renewables as a percentage of consumption, for example, offer a more macro-oriented perspective on the depth of climate transition and resilience, and even aspects of biodiversity.

107 <https://assets.bbhub.io/company/sites/60/2021/03/Summary-of-Forward-Looking-Financial-Metrics-Consultation.pdf>

108 [https://www.iif.com/Portals/0/Files/content/Regulatory/02\\_03\\_2021\\_TCFD.pdf](https://www.iif.com/Portals/0/Files/content/Regulatory/02_03_2021_TCFD.pdf)

109 Note that some investment firms will now have to disclose information on investment policy (for further details, see <https://www.eba.europa.eu/eba-publishes-final-draft-regulatory-technical-standards-disclosure-investment-policy-investment>).

110 See, for example, *Danish Stewardship Code*, *Dutch Stewardship Code*, *UK Stewardship Code*, *UN PRI* and *EFAMA Stewardship Code*.

Academic and financial industry literature over the last few years illustrates that higher sovereign ESG scores tend to be associated with both higher income and lower credit spreads. The correlation is apparent in EMEs, yet the deviation from the mean suggests that countries often have higher or lower scores within their economic growth and income per capita, which suggests that there is a wide range of environmental, social and governance practices even among countries of similar economic conditions. Capelle-Blancard et al. (2017) reflects investors' preferences for diversification, returns and ethical investment considerations.<sup>111</sup> There is also evidence of the "E" in "ESG" in sovereign ratings – Cevik and Jalles (2020) find that countries that are more resilient to climate change have narrower spreads. As such, more analysis is needed to determine what climate factors drive sovereign E scores, in particular in EMEs, and how countries can strengthen their commitment to environmental conditions and the preservation of natural capital.

Financial flows to EMEs through climate-based products such as funds and indices are growing from very low levels, amid challenges in scaling up investment opportunities. According to the Climate Bonds Initiative, developed countries issued 82% of green bonds in 2020, while

emerging markets' share fell to 13% from 21%. A key challenge is that emerging markets often rely heavily on power sources like coal. Transitioning rapidly out of fossil fuels in these markets, which also often have high levels of poverty, could have a negative impact on communities.

From the private sector, the acceleration of inflows of capital could be further supported by market-based products and services that are now helping to scale up financing in advanced economies. Yet, there are concerns that ESG products, which often favour large companies and advanced economies that have the resources to address more sophisticated environmental challenges and reporting complexities, could see the mainstreaming of ESG in ways that might disadvantage EMEs. In particular, the income bias of sovereign countries leads to perverse investment outcomes: tilting investment portfolios towards higher ESG scores leads to rich countries being rewarded for their prosperity while undermining necessary flows to EMEs where capital could benefit sustainability the most. This is particularly true for climate transition and social factors such as those addressing the COVID-19 crisis.

Box 3.3 highlights a World Bank assessment of these challenges and how it might disadvantage EMEs.

<sup>111</sup> Capelle-Blancard, G., Crifo, P., Diaye, M.-A., Oueghlissi, R., & Scholtens, B. (2019), Sovereign bond yield spreads and sustainability: An empirical analysis of OECD countries, *Journal of Banking & Finance*, Elsevier, Vol. 98(C), pp. 156-169.

### Box 3.3

## Sovereign benchmark indices and implications for EMs

### As climate-related risks accelerate, they are attracting increasing attention from government bond investors.

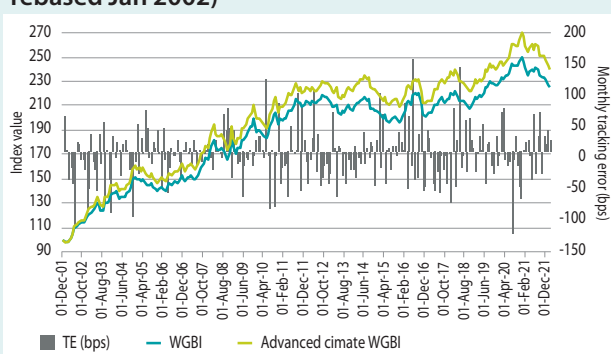
As a result, some index providers are looking to fill this gap by launching climate-based investment products in fixed income, focused on the sovereign debt asset class. For example, the FTSE Advanced Climate Risk Adjusted Government Bond Index Series claims to offer investors a compromise between “a 2-degree pathway alignment and deviations in market-value weighted portfolio characteristics, while at the same time effectively positioning investors to benefit from the potential mispricing of government bonds”. Another sovereign index recently launched by asset manager Ninety-One called the Net Zero Sovereign Index,

“aims to support sovereign-bond investors’ engagements with governments, so that they can hold public officials to account and encourage positive change”. From a regulatory perspective, sovereign debts are not eligible constituents of the EU Climate Transition Benchmarks or the EU Paris-aligned Benchmarks. Notwithstanding that, investment managers will have certain disclosure requirements under the Sustainable Finance Disclosure Regulation (SFDR).

### The potential increased use of such indices may pose challenges from an EM perspective.

Climate benchmarks with methodologies overly focused on risks will likely significantly favour higher-income countries compared to lower-income countries. In addition, sovereign bond indices where the underlying methodology focuses on “good” sovereign climate performance also face problems, particularly with respect to the methodology used to access climate outcomes. Many investors are also beginning to publicise “net zero” portfolios. Market thinking on the construction of sovereign climate-aligned and “net zero” portfolios is likely to continue to evolve over the coming years. In this context, it will be important to highlight the marginal benefits of the emerging market debt asset class, given significant relative underinvestment in this asset class, particularly from institutional investors in advanced economies.

Advanced climate WGBI vs WGBI (USD unhedged, rebased Jan 2002)



Sources: FTSE Russell & Beyond Ratings.

Source: World Bank (2021).

Emerging markets central banks and integrated supervisors have made progress in identifying and assessing the risks from climate transition risks and opportunities. While some surveys note that the emerging markets central banks are cautious concerning the uptake of practices and climate-related instruments, good practices are beginning to take shape, for example at central banks in Asian emerging markets. The vast majority believe that they should be playing a key role in this regard, whether through providing capacity building, setting the regulatory framework, encouraging green loans and products, or introducing climate change considerations into their monetary and financial policy frameworks (Durrani et al. 2020). Some central banks from emerging countries are already considering more active policy measures such

as green disclosure and reserve requirements. For example, the Bank of Lebanon has already employed differential reserve requirements, with the objective of shaping the allocation of credit in favour of investment in renewable energy and energy efficiency. Other central banks have started to include climate-related considerations in their prudential regulatory frameworks (Ainio 2020). For example, the Central Bank of Brazil has been among the first central banks to issue binding amendments to its macro-prudential regulatory framework taking the exposure to environmental damages and risks into account. Examples from Mexico and Colombia (see Annex) highlight initiatives adopted in EMEs over the last few years to better reflect green policies and the assessment of climate transition risks.

## Concluding observations

Over the previous three chapters, we have examined the role of taxonomies, external review, and climate transition metrics and frameworks in promoting market transparency in green finance. While specific policy recommendations must inevitably differ from jurisdiction to jurisdiction, the report extracts three sets of common and general observations relevant to policymakers.

### Concluding observation 1:

*Enhance market transparency surrounding green and transition objectives*

***Policymakers and investors must carefully assess and understand the tools that are available at the national, regional and international levels to achieve long-term climate objectives.*** Given the myriad approaches and labelling, understanding the implications of underlying metrics and methodologies is essential for authorities in a given jurisdiction to develop their own taxonomies, transition paths, and to determine whether their policy toolbox is appropriate and fit for purpose. However, the tools to ensure that corporate issuers have verifiable interim targets within acknowledged pathways remain at early stages of development. Greater efforts are needed to assess the shortcomings in the alignment of widely varying investment approaches, to ensure that the carbon emission and renewables-related metrics are compatible with key metrics and interim targets in the climate transition plans of major emitters, both across industries and jurisdictions. Furthermore, those investors wishing to maximise their environmental impact through indices or index funds should favour indices and funds with strict quantitative targets for annual decarbonisation. Consistent, comparable and reliable climate-related disclosures are a critical foundation to ensure the tools are functional and effective. Central banks and supervisors need to take into account potential shortcomings and carefully assess any tools they consider using for the purpose of

better incorporating climate-related considerations into their activities.

**While current green taxonomies, external review and assessment, and climate transition metrics and frameworks have been primarily applied to public and corporate bonds and other fixed income products, more recently, the rise of ESG practices and products within green equity investment strategies merit further assessment and scrutiny.** Though ESG ratings and integration are among the primary tools by which institutional investors seek to align portfolios with low-carbon transitions, different institutional investors and ESG rating providers use a wide range of terminologies and metrics, resulting in a low level of standardisation across markets and jurisdictions. The lack of transparency around methodologies underpinning ESG ratings prevents investors from understanding the actual performance of rated entities against objective climate-related criteria. Central banks should endeavour to understand the extent to which this multiplicity of approaches and products is well-suited for use by central banks and supervisors when looking at incorporating climate-related considerations into their activities.

***Taxonomies and climate transition frameworks are most effective when they have clear objectives, and science-based net zero targets.*** Taxonomies and frameworks used in financial markets should be assessed to confirm that they are establishing science-based net zero targets, interim (2030) targets, annual reporting of climate-related metrics in accordance with guidance from the Task Force on Climate-related Financial Disclosures (TCFD) on climate transition plans, and all in a consistent way that can be assessed over time, and relative to the established pathways. Central banks and supervisors should consider their choice of use of one or more frameworks based on clarity of alignment with their objectives and mandates.

### **Concluding observation 2:**

*Facilitate comparability and interoperability of taxonomies, frameworks and principles*

***To avoid the risks that various green taxonomies, standards and principles lead to divergent green assessment outcomes, there is a real need to enhance comparability and interoperability of taxonomies and transition frameworks, in order to enhance a common understanding and provide a consistent basis for green external review.***

Further standardisation around targets and methodologies for green verification could also promote the operationalisation of green taxonomies and principles. While complete convergence is not always feasible and may not always be desirable, common approaches and the mapping of matching or similar concepts across taxonomies – such as those staked out by the IPSF’s Common Ground Taxonomy – can facilitate cross-border investment without unduly constraining sovereign decisions on how to encourage the transition to a low-carbon economy. It is not as effective to have jurisdictions applying disparate taxonomies based on different metrics. Rather, there is a need to ensure comparability and interoperability of new taxonomies with existing principles, standards and norms. Where relevant, central banks and supervisors can contribute to the identification of commonality in the taxonomies and climate transition frameworks across jurisdictions.

***External review, assessment, and engagement are key to market integrity.*** To mitigate the risk of greenwashing, a high-quality and consistent verification process is critical. Verification is needed to ensure consistency in green bond issuance frameworks, the achievement of announced targets and use of proceeds, and the realisation of expected environmental impact. Surveillance and verification are needed to ensure that the industry and company paths are proceeding as intended in accordance with climate transition plans. In this sphere, the roles of the private and public sectors are complementary. While private solutions currently dominate the market for green external reviews, offering a wide range of assessment approaches, some countries have started to consider or have put in place

regulatory frameworks to guide the verifiers of green labels. Many other jurisdictions are relying on both reputational mechanisms and market-oriented approaches to ensure accuracy in labelling and impact assessment. Engagement strategies with issuers, including with boards and executive management, help clarify rewards and disincentives that affect cost of capital. There is also a strong case to consider issuer-level assessment in addition to activities for green instruments. This is to ensure that the net balance sheet being financed is on a credible decarbonisation trend.

***In addition, due diligence in the assessment of climate risks by institutional investors forms a sound basis from which to assess the credibility of issuer transitions.***<sup>1</sup> Investors wishing to invest in funds with strong environmental impact should look for information about the funds’ forward-looking targets and paths, and strategy to achieve these targets, as well as alignment with past trajectory, engagement with investees and past proxy-voting patterns. This also applies to central banks when managing their own portfolios.

***In the case of transition finance, the transformation of the entity’s business model is the critical purpose of funding, and entity-level analysis is essential.*** Comprehensive judgement of the corporation’s transition plans and pathway toward decarbonisation is just as important as the evaluation of individual activities being funded.

### **Concluding observation 3:**

*Strengthen future efforts on disclosure and reporting*

***Global baseline disclosure standards with industry-specific activity metrics will be an essential complement to effective taxonomies and external review, as they form the basis for transparent, comparable and credible climate transition plans and climate investment products.*** Even where taxonomies differ in terms of thresholds, common minimum disclosure standards will allow for comparison across and within jurisdictions and between companies of different sizes. Without sufficient coverage, taxonomies will not identify the worst polluters.

<sup>1</sup> See OECD (2022 b).

Global activity metrics will allow investors to use their own preferred science-based taxonomies to assess companies and monitor progress on decarbonisation. Authorities would benefit from defining clear disclosure standards, making mandatory (or highly recommended) the disclosure of forward-looking targets and transition paths of financial and non-financial corporations and set minimum requirements for funds to be marketed as climate transition funds.

***The minimum requirements for sustainability reporting include both forward-looking measures necessary for transition metrics and “hard” measurable sustainability performance indicators for investors in order to verify whether forward-looking targets have been achieved.*** Sustainability reporting requirements would ensure the

proper application of sustainable finance classifications (including taxonomies) in green investment. For private sector market surveillance to be effective, minimum disclosure requirements are key for market participants to make informed assessments of the potential sustainability benefits of financial assets.

***The comparability of practices for calculating and reporting on environmental impact should be enhanced.***

There are different approaches that can be used to calculate and report on the environmental impact that is being achieved. Central banks have an interest in the development of common practices and comparable metrics, including for the purpose of managing climate-related risks on their balance sheet.

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## Annex 1 – Country and regional experiences in taxonomies and other frameworks for transition finance

### Box A1.1

#### The Bank of Italy's internally developed taxonomy

The central bank of Italy uses its own internal taxonomy for investment purposes. Consistent with sustainability criteria set in the Bank's Responsible Investment Charter, the taxonomy is aimed at classifying companies in relation to their exposure to transition risk (measured by carbon intensity) and their overall sustainability profile (measured via ESG scores). More broadly, the taxonomy is based on two pillars: 1) norm-based exclusion criteria (UN Global Compact, ILO conventions, conventions on controversial weapons); and 2) best-in-class criteria based on ESG scores and carbon intensity.

Being aware that carbon intensity alone is a backward-looking and informationally-limited measure of transition

risk, the Bank is exploring the addition of forward-looking indicators of climate transition risk, such as (the portfolio's) implied temperature rise and carbon transition risk. The current approach has partially overcome the backward-looking nature of carbon intensity metrics with the forward-looking considerations.

The central bank of Italy also uses internally developed taxonomies for research purposes to measure the carbon content of Italian bank loans as well as Italian banks' exposure to non-financial firms in terms of physical risks (namely flood risk) and transition risks (by means of carbon intensity), or a combination of the two.

*Source: Banca d'Italia.*

### Box A1.2

#### The EU Taxonomy and possible extensions

The EU Taxonomy is a classification system, one that is still under development, to identify economic activities that make a "substantial contribution" (SC) to at least one of six environmental objectives, whilst ensuring that the activity will "do no significant harm" (DNSH) to any of the other five objectives and also meet minimum safeguards. Activities with a level of performance that meets the relevant technical screening criteria (TSC) thresholds for SC and DNSH are referred to as "taxonomy-aligned". The purpose of the taxonomy is to increase financial flows towards sustainable activities and avoid greenwashing by setting science/evidence-based criteria for different categories of performance.

The EU Taxonomy also recognises as environmentally sustainable economic activities, transition activities and enabling activities. Pursuant to Article 10(2) of the Taxonomy Regulation, these are defined as making a substantial

contribution to environmental objectives in the same way as low-carbon activities are already (pursuant to Article 10(1)). In particular, transition activities within the framework of the EU Taxonomy are those that substantially contribute to climate change mitigation and for which there are no technologically and economically feasible low-carbon alternatives. These activities support the transition to a climate-neutral economy in a manner that is consistent with a pathway to limit the temperature increase to 1.5°C above pre-industrial levels, for example by phasing out greenhouse gas emissions. To ensure that transition activities remain on a credible transition pathway consistent with a climate-neutral economy, the European Commission shall review the technical screening criteria for those activities at least every three years and, where appropriate, amend them in line with scientific and technological developments. .../...

In March 2021, the EU Platform on Sustainable Finance was asked by the European Commission to provide advice on transition financing and produced a report in March 2021 putting forward a number of recommendations under three headings: (1) Maximise current taxonomy; (2) Develop future taxonomy; and (3) Use other policies and tools. On 12 July 2021, the Platform published a draft report for consultation on taxonomy extension options linked to environmental objectives, basically on extending the EU Taxonomy “beyond green”. The final report of the Platform was published in March 2022, describing the provisions that would be required to extend the scope of the EU Taxonomy Regulation beyond environmentally sustainable economic activities. The European Commission is to consider options for an extension of the EU Taxonomy framework to possibly recognise economic activities performing at an intermediate level.

**Architecture:** The draft report is an important step in the Platform’s deliverables to advise the Commission on potential extensions of the taxonomy framework beyond environmentally sustainable activities. The draft report focuses on support for the environmental transition needed in the whole economy by recommending further clarity on both activities that are significantly harmful to environmental sustainability, and those that have no significant impact on it. The aim is to support transitions in areas currently of “significant harm” by transitioning to a level that at least does not cause significant harm, even if they do not actually reach the level of a substantial contribution (green). The Platform therefore recommended

identifying an additional type of transition for activities moving out of the “significant harm”/“red” performance category that do not meet the criteria for “green”/SC, to be called “intermediate transitions”.

By contrast, it is worth noting that while the current EU Taxonomy recognises transitions, it only recognises them into the substantial contribution levels (green). It does not currently recognise transitions towards levels that do not meet the SC/green criteria.

For further clarity, the Platform draft report introduces traffic lights for sustainable finance: green (which means GO for SC), red (which means STOP for DNSH) and amber (orange-yellow) for the space in between. In particular, the report highlights the importance of understanding amber, the space between the green (SC) and red (DNSH) criteria due to the still possibly large negative impact on the environment that some of the activities in that area may have. Any movement out of red (without reversal) is considered a “valid transition” in addition to “green transitions” which are transitions into the green category. However, any improvement in performance that stays within the red category does not count as a valid transition.

The Commission will analyse and consider the Platform report in light of the continuing development of the EU Taxonomy, as laid out in the new sustainable finance strategy.

*Sources: Platform on Sustainable Finance, European Commission.*

## Implications of the use of the EU Taxonomy for EU banks

One important area where the EU Taxonomy will affect credit institutions relates to disclosures, in line with the primary purpose of the European taxonomy to increase transparency and limit the risk of greenwashing and market fragmentation in the classification of green activities. Institutions will have to comply with taxonomy-related transparency requirements introduced by the EU Taxonomy Regulation (Article 8), the Regulation on Sustainability-Related Disclosures in the Financial Sector (product-level disclosure requirements) and the Capital Requirements Regulation (EBA implementing technical standards on prudential disclosures on ESG risks in accordance with Article 449a of the Capital Requirements Regulation (CRR)).

The EBA views these initiatives as supporting the provision of more consistent and comparable information. Financial institutions' disclosures of the extent to which their activities are associated with taxonomy classifications, together with the targets set by institutions, will help investors and other stakeholders better understand institutions' positioning and strategies. By reporting these together with information on exposures vulnerable to transition and physical risks for Pillar 3 purposes, this information will also highlight some of the actions institutions are implementing to adjust their exposures and mitigate the likelihood of materialisation of climate change-related risks.

The EU Taxonomy may also support institutions in their strategy setting in accordance with institutions' risk appetite. Financial institutions that wish to align more closely with the EU Taxonomy could, for example, set a target of a certain proportion of their overall credit or investment portfolios to be associated with activities that qualify as environmentally sustainable under the taxonomy.

In addition to setting and disclosing strategic objectives and/or limits and related key performance indicators, financial institutions should assess the need to potentially develop sustainable products or to adjust features of existing products in alignment with their strategic objectives and/or limits. Furthermore, when engaging with counterparties, institutions may also rely on the taxonomy, as it provides an understanding of the degree of sustainability of activities in which counterparties operate. This assessment can then potentially be used to set out how counterparties plan to move towards greater taxonomy alignment over time and to set up related targets.

By construction, the EU Taxonomy does not aim to address all prudential risks associated with environmental factors, nor does it resolve the critical issue of environmental risk management. Nevertheless, by providing the basis for a harmonised classification of green activities, the taxonomy is also expected to play a supporting role in the longer term, to assess the risk profile and risk characteristics of exposures associated with green activities. This would prove instrumental in assessing the relevance of a dedicated treatment of those assets, as is already mandated to the EBA under Article 501c of the CRR.

The EBA has invited institutions to actively consider the implications of the taxonomy for their operations in all the areas discussed above (disclosures, product design, classification of exposures, strategic objectives and targets in line with institutions' risk appetite). In addition, the EBA has recently performed a pilot exercise on climate risk in which (voluntarily) participating banks were required to classify their exposures according to several methodologies, including the EU Taxonomy.

*Source: European Banking Authority (2021a, 2021b).*

## The ASEAN Taxonomy

In November 2021, the Association of Southeast Asian Nations (ASEAN) established the ASEAN Taxonomy for sustainable finance as an overarching guide for ASEAN Member States (AMS) that caters to the different ASEAN economies, financial systems and transition paths. ASEAN is composed of ten Member States with varying degrees of development and economic activity, which is why a one-size-fits-all taxonomy is not regarded as the best solution. The ASEAN Taxonomy was conceived according to a multi-tiered concept – namely, a Foundation Framework (FF) which is applicable to all AMS and allows a qualitative assessment of activities, and the Plus Standard (PS) with metrics and thresholds to further qualify and benchmark eligible green activities and investments. The FF classifies all economic activities using sector-independent qualitative screening criteria into green, amber and red, while the PS uses additional activity-level threshold criteria to determine if they are ‘green PS’, ‘amber PS’ or ‘red PS’. The PS covers six focus sectors and three enabling sectors.<sup>1</sup> Amber PS will typically belong to one of three types of activities: (i) activities that are not currently zero or near-zero emissions, but are following a decarbonisation pathway aligned with the trajectory required by the Paris Agreement, (ii) activities facing significant barriers to decarbonisation, and (iii) interim solutions.

The ASEAN Taxonomy takes a “stacked approach” in developing activity-level thresholds. This means that

for each activity, there are multiple decarbonisation pathways and hence multiple thresholds that can be referenced at a single point in time. For this approach, it is important that the thresholds are based on the guiding principles for screening criteria, i.e. binary, science-based and subjected to periodic revisions. Thresholds should be transparent to allow investors to understand whether this aligns with their expectations of green. Less stringent tiers will be retired over time to ensure movement to the most stringent tier that is aligned with global net zero by 2050 and/or the Paris Agreement. The least stringent tier should only be available to users in the short term, after which they will need to shift to the next tier. The time frame established by the criteria will be different for different activities – e.g. it may be 2030 for electricity and 2035 for cement manufacturing, etc. This caters to different starting points of entities and encourages near-term actions to improve emissions performance by providing thresholds which are closer to the current efficiencies, rather than overly ambitious and distant. It also incentivises steady, ongoing improvements in emissions performance to progress to the next best tier of emissions performance and because less efficient tiers are retired over time according to clearly stipulated end-years.

*Source: ASEAN Taxonomy for Sustainable Finance (2021).*

<sup>1</sup> The six focus sectors are (i) agriculture, forestry & fishing, (ii) electricity, gas, steam and air conditioning supply, (iii) manufacturing, (iv) transportation & storage, (v) water supply, sewerage, waste management, (vi) construction & real estate; while the three enabling sectors are (i) information & communication, (ii) professional, scientific & technical, (iii) carbon capture, storage & utilisation.



## Climate transition finance in Japan

In December 2020, the Japanese government formulated its Green Growth Strategy Through Achieving Carbon Neutrality, which positioned transition finance as an important financial tool to achieve this goal. As part of government-wide efforts, the Financial Services Agency (FSA), the Ministry of Economy, Trade and Industry (METI), and the Ministry of the Environment jointly established a Taskforce on Preparation of Environment for Transition Finance. After intense discussion with experts from both private and public entities, the Taskforce published “Basic Guidelines for Climate Transition Finance” in May 2021.

**Architecture:** The Guidelines are a general guide for fundraisers and financial institutions on labelling transition bonds and loans. They aim to introduce more funds especially in hard-to-abate sectors in order to contribute to achieving Japan’s 2050 carbon-neutral goals and the Paris Agreement, by popularising transition finance, which is in its start-up phase, and ensuring the credibility of financing activities labelled as transition finance. Considering that transition finance is a new concept, to establish a reliable market in Japan, it was viewed as essential that the concept aligns with the international capital market consensus for transition. At the same time, it is also important to understand that a pathway to decarbonisation will vary from country to country and from sector to sector. The Guidelines have accordingly been formulated with due consideration to alignment with the International Capital Market Association (ICMA) Handbook. They provide the approaches for the four key elements the ICMA Handbook identifies: (i) issuers’ climate transition strategy and governance, (ii) business model environmental materiality, (iii) climate transition strategy

to be science-based including targets and pathways, and (iv) implementation transparency. The Guidelines require climate transition strategy to be science-based, including targets and pathways. The pathways are set in accordance with the regional and sectoral characteristics, resulting in various pathways being created.

**Sectoral scope:** The government ministries are currently developing sector-specific technical roadmaps to realise the orderly transition to net zero. These roadmaps are intended to be used as a baseline for companies to develop their own strategies and climate change measures, and for financial institutions to understand technologies aimed at the decarbonisation of sectors. In the sectors in which the roadmap is already being formulated, companies are utilising the framework of transition financing to obtain the funds they need to implement their own transition strategies. For instance, in 2021, major international shipping companies used transition loans and bonds to finance their purchases of LNG-fuelled ferries which significantly reduce their CO<sub>2</sub> emissions, taking into account the Roadmap to Zero Emission from International Shipping developed by the Ministry of Land, Infrastructure, Transport and Tourism in 2020.

METI developed roadmaps for seven more hard-to-abate sectors such as iron & steel, chemical, power, gas, oil, paper & pulp, and cement. The use of transition loans and bonds is expected to increase further as these roadmaps got formulated.

*Sources: Japan Financial Services Agency, Ministry of Economy, Trade and Industry and Ministry of the Environment.*

## Colombia green taxonomy

The Colombia green taxonomy was developed by the country's financial regulator (Superintendencia Financiera de Colombia, the SFC) and the Ministry of Finance (Ministerio de Hacienda y Crédito Público, the MHCP), in coordination with the Department of Planning, the Department of Statistics and the Ministry of Environment and Sustainable Development, with technical assistance from the World Bank Group (World Bank and IFC). The core principles of the taxonomy are to (i) align with international standards (including the EU Taxonomy), where possible, (ii) align economic activities with international standard industrial codes, (iii) identify eligibility criteria and requirements for each asset and/or activity, and (iv) reference, where necessary, practices or standards from environmental certification systems.

**Environmental objectives:** Climate change mitigation, climate change adaptation, protection of water resources, circular economy, pollution prevention, protection of ecosystems and biodiversity and land use management.

**Architecture:** The Colombia Taxonomy is structured much like the EU Taxonomy, in that eligible activities must comply with technical screening criteria; do no significant harm to other objectives; and comply with social safeguards.

**Sectoral scope:** Buildings, energy, ICT, industry, transport, water and waste, emissions control and capture, and land use (livestock, agriculture, and forestry).

**Tailored approach:** For the first seven sectors, Colombia conducted a gap analysis to identify activities that could be directly adopted or adapted from the EU Taxonomy. The land-use sectors were customised to suit Colombia's natural and socioeconomic context, recognising that solutions to key land-use environmental issues are cross-cutting and need to be viewed through an integrative lens.

Colombia boasts world-class biodiversity and abundant natural resources, which provides for a vast array of productive landscapes. The socioeconomic backdrop is dominated by small farms, with few very large estates. In addition, areas of the country lack secure land titles and suffer from insecurity where land is illegally occupied, cleared, and used for speculation, which has resulted in deforestation and soil degradation. The taxonomy considers this socioeconomic context and the associated environmental challenges and targets (i.e. water and soil management, climate mitigation and adaptation, protecting biodiversity and ecosystem services) that the country has incorporated into its environmental policy and regulatory system. For each sector, the taxonomy's eligibility criteria consist of the minimum legal requirements locally applicable, "do no significant harm" measures to protect natural resources, and a set of sustainable practices and technologies that have been tried and tested and deemed feasible in Colombia. Due to the predominance of small farms, the taxonomy classifies land-use improvements in three levels of complexity and cost – basic, intermediate, and advanced –, thus allowing farms of all sizes to introduce improvements according to their circumstances. All farms or forestry units are required to justify the proposed level of improvement and to incorporate environmental measures through a farm reconversion or forest management plan, respectively.

This type of tailored approach is consistent with other taxonomies under development and, once tested, holds promise to serve as a useful model for other emerging countries.

*Sources: Superintendencia Financiera de Colombia and World Bank.*

## Singapore Green Finance Industry Taskforce Taxonomy

In January 2021, the Green Finance Industry Taskforce (GFIT) convened by the Monetary Authority of Singapore (MAS) published a consultation paper on a proposed GFIT Taxonomy for Singapore-based financial institutions, particularly those active across ASEAN, to identify and classify activities that can be considered green or transition. To ensure that the taxonomy would be usable and not inconsistent with taxonomies elsewhere, the taxonomy seeks to adopt international best practices, particularly the EU Taxonomy, and adapt them in recognition of the varying stages of economic and institutional development within ASEAN. The taskforce is currently in the process of developing activity-level criteria and thresholds.

**Environmental objectives:** Climate change mitigation, climate change adaptation, protect biodiversity; and promote resource resilience.

**Architecture:** Eligible activities should contribute to at least one environmental objective, and must not significantly harm any of the objectives, nor impose a negative impact on the social and economic well-being of communities (unless the trade-offs can be justified in the long run), nor breach local laws and regulations.

**Sectoral scope:** The GFIT Taxonomy includes a list of proposed sectors for targeted and further development, including agriculture and forestry/land use, construction/real estate. These sectors cover the majority of GHG emissions across ASEAN, and also play an important role in economic activity, representing 90% of GHG emissions across the ASEAN region, and more than 40% of economic activities.

The GFIT Taxonomy includes activities that allow for a progressive shift towards greater sustainability, including those that enable the transition from fossil fuel to sustainable energy sources and the decarbonisation of key industries for which no technologically or financially feasible alternatives currently exist. For instance, under “Climate change mitigation”, an activity can be considered

to have met the objective if it makes a substantial contribution to “reducing GHG emissions”. These refer to transition activities that are currently high-carbon and critical to the functioning of the economy, but have demonstrated clear pathways to transition to less-carbon-intensive business models.

In addition, the taskforce has proposed a “traffic light” system as a broad conceptual framework to classify activities as green, yellow, or red according to the level of alignment with environmental objectives.

- Green – This category includes activities/companies clearly aligned with the stated environmental objectives, or undertaking a transition consistent with emissions reduction pathways aligned with meeting the objectives of the taxonomy.
- Yellow – This category includes activities/companies with quantifiable and time-bound pathways towards either green (if the technology exists) or significant decarbonisation that will contribute to the objectives of the taxonomy. Activities/companies in this classification are not yet undertaking a transition consistent with emissions reduction pathways aligned with meeting the objectives of the taxonomy.
- Red – This category includes activities/companies that are inconsistent with the objectives of the taxonomy. This may include a) activities/companies that are carbon-intensive and where viable alternatives exist (i.e. coal-fired power generation, thermal coal mining); and b) activities/companies that fail to meet the criterion of “do no significant harm” (i.e. agricultural commodity businesses that do not meet no deforestation, no peat, no exploitation (NDPE) commitments).

The definitions set out above are expected to be further refined as the taskforce progresses in its work to develop activity-level criteria and thresholds to operationalise the traffic light system.

*Source: Monetary Authority of Singapore.*

## Russia Green Finance Industry Taxonomy

Development of the national green financing system was initiated by the state corporation VEB.RF and launched for public discussion in April 2020. Participants included representatives from the business community, professional community, non-profit organisations, as well as the World Bank, the OECD, the Climate Bonds Initiative (CBI), the International Capital Market Association (ICMA), and the International Development Finance Club (IDFC). In parallel, discussions were organised with the Central Bank of the Russian Federation, the Moscow Stock Exchange, the Ministries of Natural Resources and Ecology, Industry, Energy, Transport, and Construction. The draft taxonomy was finalised and submitted for consideration to an Interdepartmental Working Group formed by a decision of the government of the Russian Federation under the Minister of Economic Development. The government of Russia approved the goals and directions for sustainable development, and criteria for sustainable development projects in July and September 2021, respectively. Together, these two documents form the crux of the Russian Taxonomy. The first sets out the general principles and requirements for sustainable development projects, and the second specifies the metrics.

**Architecture:** Eligible projects must focus on achieving the goals of the Paris Agreement or SDG 6 (Clean water and sanitation), 7 (Affordable and clean energy), 8 (Decent work and economic growth), 9 (Industry, innovation and infrastructure), 11 (Sustainable cities and communities), 12 (Responsible consumption and production), 13 (Climate action), 14 (Life below water), and 15 (Life on land), contribute towards one or more of the environmental objectives, and comply with the “do no significant harm” principle by meeting the Russian Federation environmental law.

**Environmental objectives:** Environmental conservation, protection or improvement; reduction of pollutant

emissions and effluents and prevention of their environmental impacts; reduction of greenhouse gas emissions; energy conservation and energy efficiency enhancement.

The Russian Taxonomy takes into account the local ecology, industrial development strategy for processing, recycling and disposal of industrial and consumer waste 2030, strategy for the development of the forestry industry 2030, energy strategy 2030, and national action plan for the first stage of adaptation to climate change 2022.

**Sectoral scope:** Waste management, energy, construction, industry, transport and industrial equipment, water supply and sanitation, natural landscapes, rivers, reservoirs and biodiversity, agriculture, sustainable infrastructure. Specific qualitative and quantitative criteria have been developed for each area. For example, products made of biodegradable materials should not lead to the formation of microplastics, and new street lighting systems are eligible only if they consume 20% less electricity than conventional equivalents.

Like the Singapore GFIT Taxonomy, the Russian Taxonomy includes both green and transitional projects that have a positive impact on the environment and correspond to national priorities. Thus, the Russian Taxonomy includes:

- production and processing of hydrocarbons, such as the utilisation of petroleum gas, mine methane, reduction of gas losses during transportation;
- thermal generation projects aimed at reducing emissions of pollutants and greenhouse gas emissions;
- waste management projects – energy waste;
- reconstruction and construction projects of large dam hydroelectric power plants.

Source: Central Bank of Russia.

## Costa Rica green taxonomies

Currently, Costa Rica does not have a single taxonomy officially recognised as being in common use for all social sectors in the country. To date, however, there have been three specific initiatives aimed at establishing general definitions and lists of eligible activities and projects for the following specific purposes: 1) promote the issuance of social, green and sustainable bonds, 2) regulate the issuance and approval of bond issuance, and 3) improve the registration of banking financing mechanisms for climate change and the availability of data to monitor capital flows to adaptation and mitigation actions. These taxonomies were drawn up by the Bolsa Nacional de Valores (National Stock Exchange), the Congress of Costa Rica and the banking supervisor Superintendencia General de Entidades Financieras (SUGEF) in coordination with the Ministry of Environment and Energy. Also, the prudential supervisor for the securities market, Superintendencia General de Valores (SUGEVAL), made regulatory improvements to make explicit the expectations of the prudential supervisor and to regulate the issuance and approval processes.

**Environmental and social objectives:** Transport, energy, urban development and spatial planning, infrastructure, industrial processes, waste management, agriculture, environment, health, tourism, risk management and disasters.

**Architecture:** Eligible actions and projects should contribute to at least one environmental objective and be aligned with government strategies in addressing climate change. Classification is focused on climate change mitigation and climate change adaptation actions. Some classifications may differ from international taxonomies due to government priorities.

**Sectoral scope:** Energy efficiency, renewable energy, clean transport, pollution prevention, natural resource management, biodiversity conservation and land-use management, sustainable water management, protection of water resources, affordable basic infrastructure, access to basic services, affordable housing, employment generation, food security, empowerment and socioeconomic improvement.

**Tailored approach:** While existing taxonomies, methodologies, principles and international standards were consulted and taken as a reference as part of the process of developing these taxonomies, in general, they prioritised alignment with government policies in addressing climate change and climate change mitigation and adaptation actions defined at the government level.

Thus, the lists of eligible actions and projects are aligned with the following government policies: Nationally Determined Contributions, the National Adaptation Policy and the National Risk and Disaster Management Policy 2016-2020. In addition, the National Decarbonization Plan 2018-2050, Law 9405 Approval of the Paris Agreement and the National Adaptation Policy DE-41091-MINAE.

Additionally, in the case of taxonomies, standards and regulations issued for local securities market regulation, these explicitly adopted the ICMA international principles and bond standards, with the purpose of maintaining alignment with international best practices in capital markets.

*Source: Banco Central de Costa Rica.*

## Annex 2 – Country experiences in regulating green external review providers

### Box A2.1

#### Recent developments in regulations on green verifiers

##### China

The People's Bank of China (PBC) and the China Securities Regulatory Commission (CSRC) introduced the Green Bond Assessment and Verification Guidelines (Interim) on 26 October 2017, which specify the qualifications for institutions carrying out assessments and certifications of green bonds. Such institutions must have the necessary organisational structure, work flow, technical methods and quality control, and follow other relevant rules needed to conduct green bond assessment and certification business. They also need to have the qualifications for practice in the rating, certification, attestation, energy, climate, or environment field granted by competent authorities. They should have suitably qualified staff in the accounting, auditing, finance, energy, climate, or environment field. Furthermore, they should have committed no violations of laws and regulations and maintained a spotless record of integrity in the last three years or since their formation.

On 24 September 2021, under the guidance of the PBC and the CSRC, the Green Bonds Standard Committee introduced the Guidelines for the market-based assessment of green bond assessment and certification institutions. These new guidelines aim to create discipline to govern assessment and certification institutions providing green bond certification. The certifier verification process will be led by the 25 members of the Green Bonds Standard Committee, which are public entities, under the leadership of the National Association of Financial Market Institutional Investors. By strengthening the verification of verifiers, China aims to prevent greenwashing and enhance the credibility of green certification. Currently, assessment and certification institutions providing green external review are very much heterogeneous in size, methodology and level of transparency.

##### Russia

In Russia, green verification is required to comply with the "Verification system requirements for sustainable

(including green) development projects", a legal document approved by the Russian Government.

The standards set out in the document enable securities issuers to carry out verification in accordance not only with the Russian requirements, but also with internationally recognised principles (e.g. GBP or CBI standards). Certified verifiers are included in the list of verifiers of VEB.RF (the Russian methodological centre), ICMA or CBI.

In accordance with the Russian requirements, VEB.RF is responsible for selecting verifiers and maintaining the list of verifiers and the list of verified sustainable development projects. It also takes charge of developing and updating the criteria, requirements, approaches to impact assessment, etc.

Verification by VEB.RF takes place at two stages: first, at the stage of determining compliance by sustainable financial instruments with pre-funding requirements (before any bond issue is registered or any loan decision is approved); second, at the stage of confirming compliance by sustainable financial instruments with post-funding requirements. In this second case, compliance is obtained: once, within 24 months after funding is obtained, unless otherwise specified in the terms and conditions of any sustainable financial instrument; at least once a year during the life of any sustainable financial instrument, based on the issuer's regular reports.

Issuers can choose between two formats of verification: (1) regular format: the verifier conducts all the verification stages listed above and provides an opinion on each verification stage; (2) standard format: the verifier conducts the verification stages listed above (excluding the annual verification) and provides an opinion on each verification stage.

.../...

VEB.RF includes an applicant in the list of verifiers after assessing that all the requirements of the application have been met.

The further development of the verification requirements system has seen the emergence of new sustainable financial instruments. Due to the specifics of these financial instruments, the skills and abilities of verifiers should also be expanded. The regulation of verification in this context will require additional attention.

### The EU

The Technical Expert Group on sustainable finance (TEG) set up by the European Commission published a report on 18 June 2019<sup>1</sup> in which it recommended an accreditation regime for verifiers of the EU green bond standard. The report analysed four different options for improved oversight and supervision of external review providers through accreditation:

- 1) A centralised regime for authorisation and supervision by the European Securities and Markets Authority (ESMA), in close cooperation with the EU Platform on Sustainable Finance. This is also the recommended option in the report.
- 2) A decentralised regime, involving national competent bodies (national regulators, national eco-labelling authorities) in EU Member States on a harmonised

basis, possibly coordinated by ESMA in cooperation with other EU institutions (e.g. European Environment Agency, European Banking Authority (EBA), European Central Bank).

- 3) Do nothing, i.e. status quo and/or de-facto harmonisation with ISO 14030.
- 4) Market-based regime with European Commission participation, in the form of an interim scheme convened by a market-based initiative in coordination with the EU Platform on Sustainable Finance.

Following TEG's proposal, the European Commission in July 2021 published a legislative proposal for an EU green bond standard,<sup>2</sup> which is aimed at creating a voluntary high-quality standard for green bonds with a common definition, disclosures, and reporting framework to support the financing of green investments whilst addressing concerns around greenwashing. Under the proposed regulation, all European green bonds must be checked by an external reviewer to ensure compliance with the Regulation and EU Taxonomy alignment of the funded projects. In addition, external reviewers providing services to issuers of European green bonds must be registered with and supervised by ESMA. This will ensure the quality of their services and the reliability of their reviews to protect investors and ensure market integrity.

<sup>1</sup> [https://ec.europa.eu/info/sites/default/files/business\\_economy\\_euro/banking\\_and\\_finance/documents/190618-sustainable-finance-teg-report-green-bond-standard\\_en.pdf](https://ec.europa.eu/info/sites/default/files/business_economy_euro/banking_and_finance/documents/190618-sustainable-finance-teg-report-green-bond-standard_en.pdf)

<sup>2</sup> EU Commission proposal for a regulation on green bonds; see <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0391>

## Annex 3 – Country and regional experiences in dealing with climate-related transition risks

### Box A3.1

#### Austrian banks' exposure to climate-related transition risk

This box estimates the Austrian banking sector's exposure to climate risks resulting from a disorderly transition towards a carbon neutral economy.

##### **Austrian banks' exposure to climate-related transition risk is examined as follows:**

1. *Definition of financial risks induced by climate change – focus on banks' exposure to transition risk.*
2. *Presentation of bank exposure data that are used for the analysis:* Combination of granular supervisory data of banks with a detailed methodology on identifying climate policy-relevant sectors (CPRSs) to assess banks' exposure to potentially vulnerable assets (about 85% of Austrian banks' total exposure – unconsolidated).
3. *Description of methodology applied to classify the exposure of banks' loans and bonds:*  
CPRSs have been identified using the following criteria: (i) direct and indirect contribution to GHG emissions, (ii) relevance for climate policy implementation, (iii) the role in the energy value chain, (iv) six main climate policy relevant sectors (+ about 20 subsectors), and (v) fossil fuels/utilities/energy-intensive/buildings/transportation/agriculture.
4. *Result and findings.*

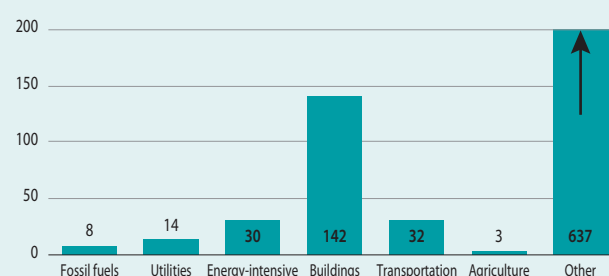
Austrian banks hold CPRS assets worth €228 billion. About 26% of Austrian banks' financing is exposed to climate-related transition risks that may result from disorderly changes in climate policies, technological breakthroughs or preference shocks. The bulk of Austrian banks' climate-related exposure is mapped to the buildings category (16%). The results are compared by bank size, banking sector, geographical location of

banks, and by instrument used. Concerning Austrian banks' exposure to energy production, the distribution of assets across the different energy types is interesting to note: 20% of assets are composed of wind power producers, 19% of mixed renewable energy producers and only 9% of hydroelectric producers – whereas the actual energy mix consists of 59% of hydropower and only 9% of wind power. This can be explained by the higher cost of wind parks, which is reflected in the credit data, and the fact that many hydropower plants were built decades ago and are therefore no longer reported on banks' balance sheets.

The Austrian banking sector's direct exposure to CPRSs seems to be manageable and is comparable to exposures in other countries. Nevertheless, as some banks are particularly exposed to climate transition risk, this risk should be taken seriously and monitored closely for supervisory purposes. The analysis shows that at present, data limitations persist for a detailed analysis at the level of individual asset characteristics.

##### **Austrian bank assets aggregated to climate policy-relevant sectors (CPRSs)**

Assets in EUR billion



Source: OeNB.



## Dutch studies on inflation and exchange rate effects

Based on a study by the DNB,<sup>1</sup> in order to gain a proper understanding of the climate impact of financial institutions' investments, it is important to consider inflation and exchange rate fluctuations. Indicators of relative CO<sub>2</sub> emissions are often used to determine whether the financial sector contributes to the objectives of the Paris Climate Agreement through its investments and the extent to which institutions face climate-related transition risks, thereby weighting emissions according to revenue, i.e. 'tonnes of CO<sub>2</sub> equivalents/EUR million revenue'. By relating emissions to revenue, the economic value produced by a firm is linked to the climate impact it causes. This allows for a better comparison of the investment portfolios of various financial institutions.

However, the weighting according to revenue also means that inflation and exchange rate fluctuations may impact the figures. For instance, inflation has an upward effect on revenue, which consequently leads to a downward impact on the indicator of relative CO<sub>2</sub> emissions. And if an investment portfolio contains assets denominated in several currencies, the exchange rate fluctuations

may – depending on their direction – have a downward or an upward effect on relative CO<sub>2</sub> indicators, even without any actual change in CO<sub>2</sub> emissions.<sup>2</sup> Adjusting carbon disclosure metrics for inflation and exchange rate fluctuations makes a significant difference to the level and dynamics of these metrics over time.

Also, the DNB study looked at the weighted average carbon intensity (WACI) of the portfolios of listed equities and corporate bonds of Dutch pension funds and insurers, including investments through Dutch investment funds.<sup>3</sup> The WACI for Dutch pension funds, unadjusted for inflation or exchange rate fluctuations, decreased by 34.5%, while the adjusted WACI fell by only 24.1% in the period 2012-19. For insurers, the unadjusted decrease is 31.0% and the adjusted decrease 23.7%. As pension funds invest largely in assets denominated in US dollars, the differences here are mainly explained by the exchange rate fluctuations between the US dollar and the euro. Insurers invest largely in euro-denominated assets, which means that the exchange rate effects are less pronounced, and the differences can be attributed mainly to the inflation correction.

1 See Janssen et al. (2021).

2 In addition, IOSCO recommends that measurement should be performed based on activity-specific metrics to facilitate comparability and, where appropriate, assessment against widely used taxonomies. This allows investors to (i) compare companies within the same industry regardless of size, geography and stock market valuation, and (ii) directly benchmark companies against the technical criteria applied in taxonomies. Also, company-specific metrics, for example for sustainability-linked bonds, can be helpful in creating comparability, as long as they are structured correctly and transparently.

3 See Janssen et al. (2021).

## Box A3.3

### Assessing climate-related risks and opportunities – cases in emerging markets

#### ***Evolution in the financial system in Mexico***

Over the past years, the financial system in Mexico has undertaken public and private sector-led efforts and initiatives towards capacity building and integration of environmental and ESG risk factors in financial decision making. These include the Sustainability Protocol and the green taxonomy of the Mexican Banks Association, the adoption of environmental and social risk management systems (ESRMSs) by banks, the issuance of the Green Bond Principles MX by the Advisory Council for Green Finance, the establishment of the Sustainable Finance Committee as part of the Financial Stability Council, and the recent launch of a private sector-led Mexican TCFD Consortium inspired by the Japanese TCFD Consortium that has a key role in promoting the voluntary adoption of its recommendations. The Green Bond Principles MX are based on ICMA's Green Bond Principles, but importantly require an independent external second-party opinion which is a safeguard for transparency and robustness as the market grows. The Sustainable Finance Committee is a platform that since 2020 convenes key financial authorities, market actors and NGOs. It has four technical working groups with established timelines and deliverables developing a sustainable taxonomy, fostering sustainable capital mobilisation, developing climate scenarios and capacities for ESG risk management as well as analysing standards and reporting requirements.

Much work has been devoted to raising awareness and training financial institutions and the publication of reports. Notably in 2020, Banco de México, in collaboration with the UN,<sup>1</sup> published the report "Climate and environmental risks and opportunities in Mexico's Financial System. From diagnosis to action";<sup>2</sup> based on a survey and direct interviews conducted over 2019 with top management from 66 financial institutions in Mexico. This report, which is structured around the pillars of the TCFD recommendations,

helped raise awareness of the relevance of climate and environmental risks and disclosure frameworks at the highest levels of financial institutions and of the importance of integrating these risks and opportunities into their decision making. The TCFD Consortium is continuing to significantly expand this work, as it provides training and promotes the exchange of good practices and will issue implementation guides for companies and investors.

#### ***Mobilising public data for the assessment of climate-related risks at Colombian pension funds<sup>3</sup>***

Given the country's vulnerabilities to natural disasters, Colombia's financial regulator, the Financial Superintendence of Colombia (SFC), in 2018 designed a strategy to manage the risks that climate change presents for financial stability while also harnessing the opportunities it offers. The SFC's strategy focuses on the following four areas: (i) assessing climate-related financial risks in the financial system, (ii) integrating sustainability factors into investment decisions by the financial sector, (iii) developing a taxonomy of economic activities, and (iv) ESG disclosure. Several regulators and supervisors are developing stress tests to assess the risks from climate change. For Colombia, the SFC has been working on two initiatives:

First, the SFC asked the World Bank Group for support in **designing and implementing a vulnerability analysis on the impact of climate change on risks in the Colombian banking sector**. The analysis focused on the impact of risks related to physical damage from flooding and risks related to aligning the economy with a 2°C pathway.

Second, the SFC worked with 2° Investing Initiative (2DII) **on a portfolio analysis on mandatory pension funds**. They developed a report that provided evidence on the existence of potential exposure to climate-related  
.../...

1 United Nations development and environmental programmes.

2 <https://www.banxico.org.mx/sistema-financiero/d/%7B3A8C7F15-9FE1-9A2A-DCF7-6C6D11A0E1DB%7D.pdf>

3 This document was developed based on the summary of the report developed by 2DII and SFC on "Mobilizing public data for the assessment of climate-related risks: A case study of the Colombian pension funds market".

financial risks, in particular transition risks. The SFC's main objective was to strengthen the discussion being held with pension fund administrators regarding their investment practices for the development of best practices. The SFC used the complete report and its results to build capacity, and engage and discuss climate risk with the pension funds administrator's investment and risk teams.

Also, the SFC worked with 2DII to assess the exposure of Colombian pension funds to climate-related risks and opportunities. For the analysis, 2DII applied two different methodologies: (i) the PACTA scenario analysis methodology, which looks at the short-term risk exposure and measures portfolio alignment per sector or per technology to decarbonisation pathways, and (ii) a stress testing methodology, which looks at the long-term risk exposure of a late transition. The main takeaways from the analysis were:

**Risks.** Colombian pension funds are exposed to transition risks in both their listed equity and corporate bond portfolio. However, the listed equity portfolio exposure is higher than that of the corporate bond portfolio not only due to its size (3.6 times larger) but also because of the lower exposure to low-carbon technologies. At the sector or technology level, the most relevant risks found are in the:

**Oil and gas sector:** The listed equity and corporate bond portfolios are aligned with a <2°C scenario in the next

five years, but the long-term value loss shows that these technologies are responsible for most of the pension funds' portfolio value loss of 91% on average.

**Power sector:** The listed equity portfolio is not aligned with a 2°C scenario in coal, oil, and gas power capacity projections. However, these three technologies are contributing to a higher sectoral value, equivalent to 1.4% for the listed equity portfolio and 1.7% for the corporate bond portfolio. Coal and gas capacity are the technologies with the highest negative impact on the listed equity and corporate bond portfolios, respectively.

**Opportunities.** Pension funds are seizing the opportunities the transition will bring with low-carbon technologies. The listed equity portfolios' renewable power trajectory is aligned with a 2°C scenario, and this is also the case for the corporate bond portfolio trajectory in hydro power: these exposures contributed positively to a decrease in the portfolio's value loss, account for US\$73.1 million in the listed equity portfolio and US\$26.8 million in the corporate bond portfolio.

Based on these results, the SFC developed a set of recommendations, complemented their best practices report and issued regulations on ESG integration as a risk factor for mandatory pension fund administrators.

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# List of acronyms

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<b>AGM</b>	Annual general meeting
<b>ASEAN</b>	Association of Southeast Asian Nations
<b>AUM</b>	Assets under management
<b>BCBS</b>	Basel Committee on Banking Supervision, the primary global standard setter for the prudential regulation of banks
<b>BIS</b>	Bank for International Settlements
<b>BoJ</b>	Bank of Japan
<b>CA100+</b>	Climate Action 100+
<b>CBI</b>	Climate Bonds Initiative
<b>CDP-WWF</b>	Climate Disclosure Project and World Wildlife Fund
<b>CGT</b>	Common Ground Taxonomy
<b>COP</b>	Conference of Parties, the supreme decision-making body of the United Nations Framework Convention on Climate Change
<b>CPRS</b>	Climate policy-relevant sector
<b>CRA</b>	Credit rating agency
<b>CTB</b>	Climate Transition Benchmark
<b>CSRC</b>	China Securities Regulatory Commission
<b>DNB</b>	De Nederlandsche Bank, the central bank of the Netherlands and prudential supervisory authority
<b>DNSH</b>	“do no significant harm”
<b>EBA</b>	European Banking Authority, an independent European Union authority that works to ensure effective and consistent prudential regulation and supervision across the European banking sector
<b>EBRD</b>	European Bank for Reconstruction and Development
<b>ECB</b>	European Central Bank
<b>EFRAG</b>	European Financial Reporting Advisory Group
<b>EMDE</b>	Emerging markets and developing economy
<b>EME</b>	Emerging market economy
<b>ESG</b>	Environmental, social and governance criteria that are used by responsible investors and can be financially material
<b>ETF</b>	Exchange traded fund
<b>ETP</b>	Exchange traded product
<b>EU</b>	European Union
<b>GAR</b>	Green asset ratio
<b>GFANZ</b>	Glasgow Financial Alliance for Net Zero
<b>GFIT</b>	Green Finance Industry Taskforce
<b>GHG</b>	Greenhouse gases – according to IPCC99, those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of terrestrial radiation emitted by the Earth’s surface, the atmosphere itself and by clouds

<b>GRI</b>	Global Reporting Initiative
<b>ICMA</b>	International Capital Market Association
<b>IEA</b>	International Energy Agency, an autonomous agency whose primary mandate is to promote energy security amongst its member countries through a collective response to physical disruptions in oil supply, and provide authoritative research and analysis on ways to ensure reliable, affordable and clean energy for its member countries and beyond
<b>IFRS</b>	International Financial Reporting Standard
<b>IIF</b>	Institute of International Finance
<b>IOSCO</b>	International Organization of Securities Commissions
<b>IoT</b>	Internet of Things
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>IPSF</b>	International Platform on Sustainable Finance
<b>IRENA</b>	International Renewable Energy Agency, an intergovernmental organisation that supports countries in their transition to a sustainable energy future, and serves as the principal platform for international co-operation, a centre of excellence, and a repository of policy, technology, resource and financial knowledge on renewable energy
<b>ISSB</b>	International Sustainability Standards Board
<b>ITR</b>	Implied temperature rise
<b>KPI</b>	Key performance indicator
<b>LGX</b>	Luxembourg Green Exchange
<b>LuxSE</b>	Luxembourg Stock Exchange
<b>MAS</b>	Monetary Authority of Singapore, the country's central bank and integrated financial regulator
<b>MDB</b>	Multilateral development bank
<b>NDC</b>	Nationally Determined Contribution
<b>NDPE</b>	No Deforestation, No Peat and No Exploitation
<b>NFRD</b>	EU Non-Financial Reporting Directive
<b>NGFS</b>	Network of Central Banks and Supervisors for Greening the Financial System
<b>OCR</b>	Office of Credit Ratings
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>PAB</b>	Paris-Aligned Benchmark
<b>PACTA</b>	Paris Agreement Capital Transition Assessment
<b>PAT</b>	Portfolio Alignment Team
<b>PBC</b>	People's Bank of China, the central bank of the People's Republic of China
<b>SASB</b>	Sustainability Accounting Standards Board
<b>SBTi</b>	Science Based Targets initiative
<b>SFWG</b>	Sustainable Finance Working Group
<b>SLB</b>	Sustainability-linked bond
<b>SPO</b>	Second-party opinion
<b>SPT</b>	Sustainability performance target
<b>SREDA</b>	Sustainable and Renewable Energy Development Authority

<b>SRI</b>	Sustainable and responsible investing
<b>TCFD</b>	Task Force on Climate-related Financial Disclosures, a private sector-led task force chaired by Michael R. Bloomberg with support from the Financial Stability Board, which provides a global standardised framework on climate disclosures
<b>TEG</b>	Technical expert group
<b>TPI</b>	Transition Pathway Initiative
<b>TRWG</b>	Technical Readiness Working Group
<b>UN-DESA</b>	United Nations Department of Economic and Social Affairs
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>UoP</b>	Use of proceeds
<b>WACI</b>	Weighted average carbon intensity

# List of tables, graphs and boxes

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## List of tables

- Table 1.1** Options to adjust central banks' operational frameworks that could involve the use of taxonomies
- Table 1.2** Main characteristics of selected transition taxonomies
- Table 2.1** SLBs vs. standard green bonds
- Table 3.1** Environmental pillar of ESG metrics
- Table 3.2** Common high-level carbon metrics
- Table 3.3** Climate transition frameworks
- Table 3.4** Minimum standards of EU Climate Transition Benchmark (EU CTB) and Paris-aligned Benchmark (EU PAB)

## List of graphs

- Graph 1.1** Use of taxonomy by portfolio and choice of taxonomy type by central banks
- Graph 1.2** Use and choice of taxonomies by supervisors
- Graph 2.1** From green criteria to green external review: various approaches possible
- Graph 2.2** SLB issuers from various sectors with Europe and EMEs leading the market
- Graph 2.3** SLBs feature various underlying KPIs, though GHG emissions dominate with different scopes
- Graph 3.1** Central banks – incorporation of ESG and climate-specific risks
- Graph 3.2** Central banks' use of frameworks/metrics to assess climate transition risks
- Graph 3.3** ESG rating providers' E pillar ratings compared to measurements of GHG emissions
- Graph 3.4** Relationship between the environmental pillar score and climate transition issues
- Graph 3.5** Climate funds are growing but account for a small share of total funds
- Graph 3.6** Global scale of types of climate-aware fund and measurements of carbon intensity
- Graph 3.7** Carbon intensity statistics for various subgroups of index equity funds

## List of boxes

- Box 1.1** The development and alignment of entity-level sustainability metrics
- Box 2.1** Green exchanges and cross-listing requirements: the case of Luxembourg
- Box 2.2** Project Genesis
- Box 3.1** Diversity in climate transition frameworks and efforts to consolidate them
- Box 3.2** How market valuations are capturing climate transition risks and opportunities
- Box 3.3** Sovereign benchmark indices and implications for EMs
  
- Box A1.1** The Bank of Italy's internally developed taxonomy
- Box A1.2** The EU Taxonomy and planned extensions
- Box A1.3** Implications of the use of the EU Taxonomy for EU banks
- Box A1.4** The ASEAN Taxonomy



- Box A1.5** Climate transition finance in Japan
- Box A1.6** Colombia green taxonomy
- Box A1.7** Singapore Green Finance Industry Taskforce Taxonomy
- Box A1.8** Russia Green Finance Industry Taxonomy
- Box A1.9** Costa Rica green taxonomies
- Box A2.1** Recent developments in regulations on green verifiers
- Box A3.1** Austrian banks' exposure to climate-related transition risk
- Box A3.2** Dutch studies on inflation and exchange rate effects
- Box A3.3** Assessing climate-related risks and opportunities – cases in emerging markets



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