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Environmental integrity of green bonds: stakes, status and next steps

Green Bonds Research Program Work Package 2

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I4CE is an initiative of Caisse des Dépôts and Agence Française de Développement. The Think Tank provides independent expertise and analysis when assessing economic issues relating to climate & energy policies in France and throughout the world. I4CE aims at helping public and private decision-makers to improve the way in which they understand, anticipate, and encourage the use of economic and financial resources aimed at promoting the transition to a low-carbon economy.

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Executive summary

The green bond market is increasingly seen as having important potential to contribute to the systematic labelling of financial assets financing LCCR investments. It is therefore crucial to ensure the environmental integrity of the green bond market.

This report presents key findings of the second work package of I4CE's work program on green bonds, exploring the challenges and opportunities to ensure the environmental integrity the green bond market. It explores the understanding of stakes and challenges related to the environmental integrity of green bonds and suggests potential next steps for both private and public stakeholders. First, the stakes for market actors to ensure the environmental integrity of green bonds are identified and categorized. Second, the existing approaches to defining the eligibility of 'green' assets are reviewed and key challenges and next steps are identified. Third, the existing approaches to external review and reporting are reviewed and key challenges and next steps are identified. The report then concludes with recommendations for policymakers and market actors to improve practice in this area.

This report transparently makes the assumption that the objective of ensuring 'environmental integrity' of the green bond market is to support the LCCR transition. While there may not be a full market consensus on the active contribution of the green bond market, this appears to increasingly be the principal policy-related objectives expected by a number of public, private and civil-society stakeholders. Furthermore, this is not just the case for the green bond market, but touches upon the need for 'greening' or 'alignment' of all financial assets as per Article 2.1c of the Paris Agreement.

Ensuring the environmental integrity of the labelled green bonds market is crucial to maximize their contribution to the LCCR transition

Enhanced transparency of information provided by green bonds can unlock a number of benefits for issuers, investors and policymakers supporting the growth of the market. While there is an increasing consensus that this additional transparency brings added value, there are however neither harmonized definitions and taxonomies, nor a common reporting framework for labelled green bonds. This lack of harmonization has already translated into a number of controversies highlighting environmental, reputational and legal risks that the labelled green bond market is currently facing. To ensure its meaningful contribution to the low-carbon transition through improved transparency of information, public and private market actors will need to address these challenges and guarantee the environmental integrity of green bonds and improve climate-related disclosures for other financial products.

Defining the eligibility criteria for 'green' assets: towards convergence of definitions

Currently, there is no single definition of 'green' eligibility and taxonomies; furthermore, an array of actors provide their definitions, which may or may not overlap. The principal divergence on green definitions in the market stems from the national circumstances in China, where improving efficiency of fossil fuel use is included in the national definitions of green assets. This highlights the fact that there are a number of challenges to the establishment of international commonly accepted green definitions including: different investor expectations; divergent national circumstances; time horizon; scope of assessment; and disconnects between green bond issuance and the overall environmental strategy and 'greenness' of an issuing entity.

At the time of writing, three principal initiatives are working to harmonize "green" definitions: the European Commission's High-Level Expert Group on Sustainable Finance (HLEG) at the EU level; the China-EU dialogue at a bilateral level; and the development of ISO 14097 standard at the international level. While each of these processes is functioning at a different level, what appears certain is that three categories of stakeholders are involved: independent expert NGO(s), formal national / international climate policymakers, and other intergovernmental or multilateral development institution(s). As these processes move forward, all of these three categories of stakeholders, as well as market actors, must continue to play an active role in the harmonization process to ensure sufficient adoption of the outputs in practice. Finally, harmonizing approaches for defining green should be properly assessed and treated with caution to avoid being based on the "least common denominator" of criteria used in current practice.

Furthermore, governments could support these processes by speeding up the elaboration and communication of their long-term low-carbon development strategies as mandated by the Paris Agreement and fostering labeling based on best practices. The Task Force on Climate-Related Financial Disclosure (TCFD) has recommended that governments should also foster broader disclosure of environmental impacts and climate-related risks in the financial sector. This appears particularly important for the green bond market that faces the risk of 'greenwashing' due to the zero-sum nature of green labeling in the absence of entity-wide climate-related disclosures.

The results of harmonization: definitions, taxonomy or beyond?

Beyond looking at the harmonization process, it is important to clarify the differences between what is actually being discussed. Currently, market stakeholders calling for harmonization are not all referring to the same thing.

A harmonized framework should at a minimum define a common language for defining 'green'. As a second step, a harmonized framework could present a detailed taxonomy of 'eligible assets'. Such a taxonomy could present all sub-sectors and technologies that would be eligible for a green bond. For example, the final report of the EU HLEG on Sustainable Finance recommends the creation of a taxonomy of assets that should be considered sustainable by a Technical Committee. A last step could require the harmonization process to also cover quantitative impact-focused indicators that investments or projects would have to achieve in order to be eligible for the 'use of proceeds' of a green bond. Such indicators could notably define the maximum carbon footprint that would be accepted per sub-sector and technology depending on the level of activity.

However, the scope and level of flexibility of the harmonization process should be set with caution to allow for 'green' definitions to be based on climate science. Some market actors may argue that a single definition of 'green' is not needed and that top-down regulations may hinder the development of the green bond market. These fears, however, appear to be unsubstantiated from the public policy point of view. Indeed, since the green bond label does not change the underlying investment flows by itself as seen in I4CE's first report in this program1, there is no justification for sacrificing the environmental integrity for the sake of the growth of labeled bond market. Conversely, establishing a commonly accepted taxonomy of green assets (not only green bonds) would help increase the overall transparency of the financial system and help reduce transaction costs in the long-run thanks to standardization and streamlining processes.

External review and information transparency: limited reporting and lack of agreed indicators

Today, contracting an independent external review is the main approach currently used in the labelled green bond market to ensure its environmental integrity. Implementing reporting and assurance procedures for green bonds faces a number of challenges, including: comparability vs. relevance of information; conflicts of interest; choice of impact assessment indicators; voluntary vs. legal reporting obligations; and additional transaction costs. External review and assurance procedures will have to be reinforced and streamlined in order to boost the credibility of the environmental review process for green bonds. In order to ensure the quality of external review and avoid the potential conflict of interest, an accreditation procedure can be implemented in new standards/labels similar to the one practiced by the Climate Bonds Standard or procedures applied in carbon accounting schemes. Moreover, climate-related financial disclosures should be incorporated in general financial reporting as suggested by the Task Force on Climate-Related Financial Disclosure.

Existing green bond frameworks recommend issuers to disclose information on the use of proceeds, which is done for about two-thirds of issuances to date. Conversely, the reporting on environmental impacts of underlying investments remains completely voluntary and is currently done by only a third of issuers, although it is increasingly seen as the best practice. The International Capital Markets Association (ICMA) is piloting the work on impact reporting harmonization, although the existing reporting templates so far cover only three out of ten thematic areas as defined by the Green Bonds Principles (GBP). Currently, there is no harmonized set of impact reporting indicators, which remains a challenge for comparability and relevance of information. Indeed, as it currently stands, the green bond market does not allow investors to assess the alignment of the assets with the LCCR transition. Key sub-sector indicators for impact reporting adapted for climate-related portfolio assessment will therefore need to be developed for green bonds and other financial products.

Next steps for the bond market: harmonization and bolstering of external review and reporting practices

There are a number of challenges related to the external review process including the difficulty in selecting reporting indicators, the lack of comparability of information, potential conflicts of interest and transaction costs. In its report the TCFD recommends that 'organizations provide climate-related financial disclosures in their mainstream [i.e., public] annual financial filings' (TCFD 2017). The logical next step could therefore be the integration of climate-related external review – including, but not limited to, green bonds – in the broader financial accountability. In order to ensure that reviewer organizations possess necessary skills and processes to undertake quality reviews an accreditation procedure could be put in place.

While the majority of labelled green bond issuers report on the use of proceeds, environmental impact reporting remains limited and anecdotal, which may put the environmental benefits of green bonds into question (CBI 2017e). There appears to be the need to balance short term impact evaluation (e.g. GHG emissions) and long-term transformative and strategic changes (alignment with a 2°C scenario). The TFCD report provides certain sectoral starting points that may help clarify the needs of impact reporting. Additional human resource investment will be needed to support robust impact assessment.

1 *See the first report in this series: Nicol et al. (2018) "Green Bonds: Improving their contribution to the low-carbon and climate resilient transition" I4CE Research Report https://www.i4ce.org/download/green-bonds-improving-their-contribution*

Overall, existing and future green bond frameworks – be they market-driven or regulatory – will need to take into account challenges outlined in this report in order to ensure the environmental integrity of the green bond market.

Towards broader climate disclosures in the financial sector

Overall, disclosure and reporting guidelines for green bonds should be coherent with guidelines for reporting on other financial instruments, and above all reporting on the climate impact of a financial portfolio for financial institutions. These approaches currently differ: green bond impact reporting as mostly carried out today does not allow financial actors to directly feed into their reporting on the "greenness" of their portfolio or its alignment with the LCCR transition. Furthermore, financial actors and research centers are currently developing scenario-based methods to assess the impact of climate-related risks and opportunities on the financial performance of corporate actors. Thus, the next challenge for the market is the development of methodologies for green bonds' reporting to go beyond simply checking 'use of proceeds' against a simple taxonomy or reporting on a single indicator of GHG emissions. For green bond reporting to support the analysis of the "greenness" of financial portfolios in the near future, impact reporting should aim to assess the degree of alignment with a 2°C trajectory of the issuing entity – and not only the underlying assets themselves.

Glossary

ABS	Asset-Backed Securities
CBI	Climate Bonds Initiative
CBS	Climate Bonds Standard
ERS	External Review Form
FSB	Financial Stability Board
GBP	Green Bond Principles
GHG	Greenhouse Gas
HLEG	High-Level Expert Group on Sustainable Finance
ICMA	International Capital Markets Association
MRV	Monitoring, Reporting and Verification
NDC	Nationally Determined Contribution
TCFD	Task Force on Climate-related Financial Disclosures

Introduction

Context: Shifting financial flows is crucial to achieve the 'LCCR' Transition

Adopted in 2015 at COP21, the Paris Agreement triggered new momentum in the fight against climate change and confirmed the global target of limiting the rise of global mean temperature to +2°C compared to the preindustrial period. The agreement defines an ambitious goal to orient countries towards developing low-carbon and climate-resilient economies and shifting to a carbon-neutral global economy before the end of the century. Among the objectives, the central role finance has to play to achieve this transition has been reaffirmed in Article 2.1(c): "Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate resilient development". The scale of financing needs requires a shift in the allocation of both public and private finance flows from carbon-intensive activities to investments compatible with a 2°C or low-carbon climate-resilient (LCCR) pathway.

This has contributed to a major emphasis being put on "climate" or "green" finance since the signature of the Paris Agreement. This has expanded the climate finance discussion beyond the issue of transfers of public funds between developed and developing countries that has dominated the climate agenda since the COP in Copenhagen in 2009. For financial actors to redirect their support from carbon-intensive to low carbon assets, they need to understand and be able to track which assets are compatible with a 2°C pathway.

Consequently, market actors are increasingly enthusiastic about green bonds. The green bond instrument, as other green financial products, is structured so as to highlight products aimed at financing assets compatible with a low-carbon and climate resilient economy, referred in this note as "LCCR investments". The green bond market has grown rapidly, reaching USD 81 billion in annual issuance in 2016 (CBI 2017a) and could reach USD 200 billion in 2017 (Moody's 2017).

Corporate actors and banks currently represent the largest share of sources of finance for LCCR investments (Climate Policy Initiative 2015). In the future, banks and corporate actors will certainly continue to provide a significant share of LCCR finance flows, particularly at early stages of project finance where the level of risk is higher. However, the scale of LCCR investments financing needs and the long-term maturity of most LCCR assets may exceed the capabilities of both corporate actors and banks. This is particularly true as the balance sheets of banks and corporate entities continue to be constrained since the financial crisis, with a pressure towards deleveraging (OECD 2015a).

It is therefore crucial to diversify the sources of finance for LCCR investments, and to tap into financial flows managed by institutional investors, which represent a large part of global financial flows. The issue of redirecting part of institutional investors' portfolios towards LCCR assets is thus crucial to ensure that a sufficient volume of financing will be available to LCCR investments. In OECD countries the volume of assets managed by institutional investors is expected to grow to USD 120 trillion by 2019 from around USD 93 trillion in 2013, and the same trend is expected for emerging and developing countries where institutional investors managed around USD 10 trillion in assets in 2013 (OECD 2016). Therefore, according to the consultancy McKinsey, with the right incentives in place private institutional investment in infrastructure – LCCR or not - could grow globally by USD 1 trillion to 1.5 trillion a year from USD 300 to 400 billion today - or more than a third of the infrastructure investment gap (McKinsey Center for Business and Environment 2016).

Bonds are financial instruments particularly well suited to tap into the major sources of capital and financial flows managed by institutional investors. Different bond products make up the largest share of institutional investors' portfolios, representing on average 53% of pension funds' portfolios and 64% of insurance companies' portfolios in 2013 (OECD 2015b). Institutional investors favor bonds as this instrument typically offers a lower risk profile than other financial instruments. Secondly, due to their fiduciary duty2 and the long-term time horizon of their liabilities, institutional investors look for financial assets that minimize risks - while ensuring sufficient performance.

Moreover, financing – or refinancing – LCCR assets through bonds could lower capital costs of LCCR projects. Use of bonds can provide a lower cost of capital compared to long-term banking debt given that the cost of project finance debt arranged by banks is often higher than the yield for investment-grade bonds in most jurisdictions. For instance, in the United Kingdom in November 2015 the all-in cost of a 20-year project loan with a BBB- credit quality was roughly 5% while the all-in cost of a project bond of a similar credit quality was roughly 4,5% (OECD 2015a). Furthermore, the bond market may be even more advantageous for project loans with a maturity exceeding 20 years given that banks are generally not prepared to provide loans exceeding 20 years in maturity (OECD 2015a). As the cost of capital represents typically a very large share

2 *Fiduciary duty: Fiduciary duties are the legal principles that protect beneficiaries and society from being taken advantage of by fiduciary agents who are charged with investing assets for the benefit of third-party beneficiaries. Fiduciary duties exist because beneficiaries are forced to rely on fiduciary agents even though they rarely possess the information and expertise to evaluate the integrity and effectiveness of the agent's management services in a timely way. Source: http://www.reinhartlaw.com/wp-content/uploads/2016/01/Introduction-to-Institutional-Investor-Fiduciary-Duties.pdf*

BOX 1. WHAT ARE BONDS?

Bond: Debt instrument used to borrow the funds for a defined period of time usually at a fixed interest rate. On the contrary to bank debt, a bond is a tradable security that can be sold and bought on capital markets at any time during its duration.

There exist many types of bonds within the 'universe' of this financial instrument, often linked either to the type of issuer or the types of assets involved:

- *Corporate bonds* or 'use of proceeds' bonds backed by a corporate's balance sheet.
- *Project bonds* that are backed by a single or multiple projects.
- *Asset-backed securities (ABS)* or bonds that are collateralized by a group of projects.
- *Covered bonds* with a recourse to both the issuer and a pool of underlying assets.
- *Supranational, sub-sovereign and agency (SSA) bonds* that are issued by the IFIs and various development agencies.
- *Municipal bonds* issued by municipal governments, regions or cities.
- *Financial sector bonds* issued by an institution to finance 'on-balance sheet lending'.

of LCCR investments, only a slight decrease in capital costs can significantly improve the economic performance of LCCR investments.

The financing LCCR investments through the bond market could be rapidly scaled up. The potential for scaling up the financing LCCR investments using the bond market is tremendous. According to a study from CBI and HSBC, in July 2016 there was a universe of around USD 700 billion of climate-aligned bonds, i.e. of bonds that reach the definition of climate bonds according to CBI but are not all sold as "green" to investors (CBI 2017a). According to the OECD, the market of bonds financing LCCR investments has the potential to scale up to around USD 1 trillion outstanding in 2020 and to USD 5 trillion outstanding in 2035 (OECD 2017). These figures represent only a lower band of the potential of bonds to finance LCCR investments since it takes into account only 3 sectors - renewable energy, buildings energy efficiency and low-emissions vehicles3 and 4 regions – China, the EU, Japan and the United States. The market of bonds financing LCCR investments therefore has the potential to scale up quickly if necessary conditions are in place, and thus could contribute in filling LCCR financing gaps.

I4CE's research program on green bonds

I4CE's prior research has identified two key challenges for the green bond market. First, the green bond market does not appear to directly stimulate a net increase in green investments, e.g. through a lower cost of capital. Second, the spontaneous bottom-up manner of the development of the green bond market raises reputational and legal risks related to its environmental integrity. In order to realize its full potential to contribute to the LCCR transition, the green bond market will therefore have to overcome these two challenges. I4CE's previous report suggested that at the very minimum, it has to avoid implosion – due to the lack of investor confidence – by ensuring the environmental integrity of green bonds. Furthermore, going beyond information transparency, the impact of green bonds needs to be enhanced by growing the pipeline of underlying low-carbon projects and potentially bringing them tangible financial benefits. These two challenges echo the two key topics currently in discussion at the EU level – providing more information transparency and improving the contribution of the financial sector to sustainable development (European Commission 2017).

Green bonds are increasingly seen as of one of the key 'green' financial products aimed at financing assets compatible with a low-carbon and climate resilient economy. On the one hand, market actors are enthusiastic about the rapid growth of this new market – that reached USD 81 billion in annual issuance in 2016 fueled by growth in China (CBI 2017a) and could reach USD 200 billion in 2017 (Moody's 2017) – as well as the spotlight it drives on sustainable finance. However, on the other hand, some observers are concerned about the risk of 'greenwashing' and that labelled green bonds are not reorienting financial

3 *Low-emissions vehicles refer to plug-in and electric vehicles, fuel cell and hybrid vehicles with emissions of less than 90 gCO_2/km.*

flows to support investment in the low-carbon energy transition. Several papers looking at these issues were published in 2016 including WWF's study 'Green Bonds must keep the green promise' (WWF 2016) and I4CE's study 'Beyond transparency: unlocking the full potential of green bonds' (Shishlov, Morel, and Cochran 2016).

Responding to these concerns, I4CE with support of the Climate Works Foundation launched a research program in 2017 consisting of two work packages:

- **WP1**: analysis of challenges and solutions to improve financial additionality of green bonds;
- **WP2**: analysis of challenges and solutions to ensure environmental integrity of green bonds.

The overarching methodology of the study is based on desk research and bilateral interviews with various public and private actors involved in the green bond market. In order to further facilitate the discussion and exchange of ideas among relevant stakeholders, I4CE together with the World Wildlife Fund (WWF) and the European Investment Bank (EIB) also organized two practitioner workshops on 7 March 2017 in London and on 15 June 2017 in Paris.

Introduction to Work Package 2

This report presents key findings of the Work Package 2 on the challenges and opportunities to ensure environmental integrity of green bonds – and consists of three parts. First, the stakes for market actors to ensure the environmental integrity of green bonds are identified and categorized. Second, the existing approaches to defining the eligibility of 'green' assets are reviewed and key challenges and next steps are identified. Third, the existing approaches to external review and reporting are reviewed and key challenges and next steps are identified. The report then concludes with recommendations for policymakers and market actors to improve practice in this area.

Overall, this report makes the transparent assumption that the objective of ensuring 'environmental integrity' of the labelled green bond market is to support the LCCR transition. While there may not be a full market consensus on the active contribution of the labelled green bond market, this appears to increasingly be one of the policy-related objectives expected by a number of public, private and civil-society stakeholders. Furthermore, this is not just the case for the green bond market, but touches upon the need for 'greening' or 'alignment' of all financial assets as per Article 2.1c of the Paris Agreement.

1. The LCCR transition and the stakes of ensuring the environmental integrity of green bonds

KEY TAKEAWAYS FROM THIS SECTION

- There are two main reasons for assessing the alignment of financial assets with a low-carbon, climate-resilient (LCCR) transition: first, achieving the Paris Agreement requires a shift of financial flows towards LCCR investments; second financial institutions are, and will increasingly be, exposed to the risks relating to climate-related transition risks. To assess the alignment of financial products to the LCCR transition, additional information on these products – as well as on underlying assets – is required. The green bonds market is often seen as having important potential to contribute to this process through the systematic labelling of an increasingly significant portion of the bond market.
- Enhanced transparency of information provided by labelled green bonds is unlocking a number of benefits for issuers, investors and policymakers supporting the growth of the market. While there is an increasing consensus that this additional transparency brings added value, there are however neither harmonized definitions and taxonomies, nor a common reporting framework for green bonds.
- Furthermore, the labelled green bond market has already faced a number of controversies highlighting environmental, reputational and legal issues. To ensure its meaningful contribution to the low-carbon transition through improved transparency of information, public and private market actors will need to address these challenges and guarantee the environmental integrity of green bonds.

Why it is important to align financial markets and products with the LCCR transition?

Across the financial system, calls are being made to better align financial flows with climate-related objectives. The momentum of incorporating climate-related issues into financial practice has been brought to the fore since 2015 – the year of COP21. Given the scale of the redirection and increase in investment flows needed,[4] it is essential that both public and private financial and capital market actors take steps to align their activities with the low-carbon transition. Article 2.1.c of the Paris Agreement states: " This Agreement, […] aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by: […] Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development". Furthermore, finance practitioners and their regulatory authorities are today saying publicly that the transition towards a low-carbon economy presents both opportunities and risks for financial institutions and even for the stability of the financial system (Carney 2016).

The management of climate-related risks has received increasing attention over the last two years. Mark Carney, Governor of the Bank of England, has stated that "financial policy-makers do have a clear interest in ensuring the financial system is resilient to any transition [towards a low-carbon economy] hastened by [governmental decisions and private sector investments]". In France, the Treasury Department has stated that it is "essential for banking institutions to develop suitable methodologies and assemble data, so as to be able to gain a better appreciation of the risks [associated with climate change] to which they are subjected". Beyond managing their direct risks, financial actors are being called to demonstrate their contribution to mitigating society-wide risks. For example, in France, Article 173 of the Law on the Energy Transition for Green Growth (*Loi relative à la transition énergétique pour la croissance verte, LTECV*) requires institutional investors to present in their annual reports the resources implemented in order to contribute to compliance with the national low carbon strategy.

Financial institutions are, and will increasingly be, exposed to the risks relating to climate change: physical, transition and litigation risks (see Hubert, Nicol, and Cochran 2017). If the global economy remains on a "business-as-usual" pathway resulting in the global average temperature rise by more than +4°C between now and 2100 the annual growth of GDP will decline at around 2% between now and 2060 according to the OECD5. Conversely, if the global economy aligns itself with a 2°C pathway, financial players will then be exposed to transition risks. Since both the physical impacts of climate change and the regulatory policies fostering the transition are already occurring,

4 *See the first report in this series: Nicol et al. (2018) "Green Bonds: Improving their contribution to the low-carbon and climate resilient transition" I4CE Research Report https://www.i4ce.org/download/green-bonds-improving-their-contribution*

5 *OECD (2016), The economic consequences of climate change, OECD Publications, Paris DOI: 10.1787/9789264235410-en*

BOX 2. WHAT IS AN ASSET ALIGNED WITH A LOW-CARBON PATHWAY?

In the context of a low-carbon pathway, each activity will see its carbon intensity progressively decrease, at a level and pace depending on its specificities and the technological breakthroughs occurring in its sector. A low-carbon pathway therefore implies a progressive process of decreasing greenhouse gas emissions, rather than requiring assets today to meet an estimated carbon intensity target corresponding to the economy as it will be in its final state of decarbonization. As such, an economic actor aligned with a low-carbon pathway is not necessarily one for which a significant proportion of revenues is drawn today from activities with a very low carbon intensity. Rather, this means an actor whose decrease in greenhouse gas emissions associated with its activity follows the rate – specific to the activities being carried out – that corresponds to the low-carbon pathway.

For example, there will be a need for cement in a 2°C-compatible economy. Thus, a cement producer may be aligned with a 2°C pathway if it achieves its carbon intensity reduction rate in line with a 2°C pathway and initiates enough efforts – in terms of investment and R&D – to keep itself on that pathway. Even if there are different scenarios for decarbonization of the economic activities for the same low-carbon pathway, it is possible to ascertain whether an actor is more or less in line with the expected efforts on its activity, at least relatively (see I4CE's Climate Brief n°46). Such analysis makes it possible to differentiate the actors who currently have the most resilience in a low-carbon economy and the actors who have not made sufficient efforts to decarbonize or redirect their activities and will therefore be impacted in the coming years by highly probably changes in regulatory, fiscal and market environments.

Source: Hubert, Nicol, and Cochran (2017)

the management of both physical and transition risks by financial players is unavoidable.

One possible strategy for the management of climate-related risks for financial players is to align their asset portfolios as early as possible with a 2°C pathway.[6] Aligning a portfolio with a 2°C pathway makes it necessary to analyze the alignment of assets in the portfolio with a given transition or decarbonization pathway. As presented in **Box 2**, this does not mean that all assets in the portfolio must today be "low carbon", but that the underlying assets, no matter whether these are companies, states or other funded entities, should steer their activities and their strategy so as to follow a 2°C pathway. To be capable of making investment or financing decisions taking this criterion into account, financial players must therefore carry out forward looking analyses based on the underlying company's strategy with regard to the low carbon transition.

Thus, additional information on the alignment with a low-carbon, climate resilient (LCCR) transition of all financial products and services – as well as on underlying assets – is needed. The green bonds market is increasingly seen as having important potential to contribute to this process through the systematic labelling of an increasingly significant portion of the bond market. A number of lessons can be drawn from this process both in terms of how to improve labeling in the green bond market, but also in terms of how lessons can be applied to similar actions that will be needed in other financial markets and products.

1.1. The benefits of green bond labelling for market actors

Labelled green bonds[7] **are fixed-income securities whose proceeds are used exclusively to finance or re-finance projects in targeted areas with environmental benefits, such as, for example, climate change mitigation.** Allocations are reported transparently by environmental or policy-related objective, usually through a process of external review. According to the available literature, the financial characteristics of labelled green bonds appear to be identical to those of comparable traditional 'vanilla' bonds and there is currently little evidence of a non-negligible 'green premium' – or direct improvement in financial conditions for issuers or buyers (OECD 2017).[8]

6 *For a detailed presentation of the different options available, see I4CE's Climate Brief n°43 "How should financial actors deal with climate-related issues in their portfolios today?" at https://www.i4ce.org/wp-core/wp-content/uploads/2017/04/17-04-I4CE-Climate-Brief-46-%E2%80%93-Managing-climate-issues-today.pdf*

7 *Unless specifically noted otherwise, this report uses the term 'green bond' and 'labelled green bond' interchangeably, to be differentiated from 'climate-aligned bond' and 'vanilla-bonds' as described in **Box 3**. It is to be noted that in this report the term 'labelling' is used for any process leading to the issuance of a bond labelled as 'green', either in the framework of a formal 'standard', or through independent third-party 'labelling'. Said differently, any bond sold as 'green' is considered for the sake of the report as 'labelled green'. Any formal 'label' provided after accreditation is named in this report as a 'standard'.*

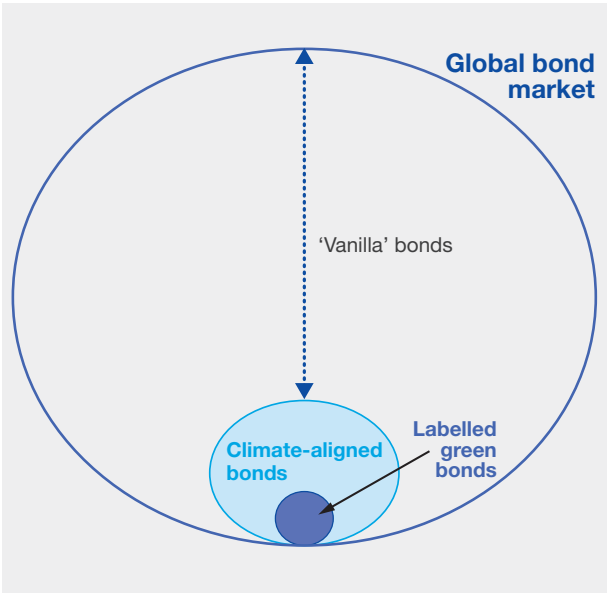
8 *Please see report 1 "Green Bonds: Improving their contribution to the low-carbon and climate resilient transition" (Nicol, Shishlov, and Cochran 2017) for a detailed discussion of the financial and non-financial benefits of green bond labelling identified to date.*

BOX 3. BREAKING THE GLOBAL BOND UNIVERSE INTO VANILLA, CLIMATE-ALIGNED AND LABELLED GREEN BONDS

This report differentiates between a) traditional bonds, b) bonds labeled as "green" at issuance, and c) bonds financing LCCR assets, but not necessarily labelled as being "green" using three terms. While they are not adopted by all market stakeholders, they nevertheless introduce clarity to discussions :

- The term **"vanilla bonds"** refers in this report to all bonds with no specific 'green' component, i.e. the entire bond market expect climate-aligned bonds and labelled green bonds.
- The term **"climate-aligned bonds"** is used in this report to refer to bonds financing or refinancing low-carbon, climate-resilient (LCCR) investments, no matter if they are advertised at issuance as being "green" or not. The market of climate-aligned bonds is much larger than the market of labelled green bonds (CBI 2017a).
- The term **"labelled green bonds"** refers to a subset of climate-aligned bonds that were labeled as "green" at issuance. It includes both green bonds benefiting from a label such as the Green Bond Standard, as well as green bonds with no formal label, but whose green credentials have been reviewed externally prior to issuance.

FIGURE 1. BREAKING THE GLOBAL BOND MARKET INTO VANILLA, CLIMATE-ALIGNED AND LABELLED GREEN BONDS



Source: Authors

Market actors, nevertheless, indicate that labelled green bonds do provide market stakeholders with added value stemming from enhanced transparency of information on underlying assets and issuing organizations. Indeed, the issuance of a labelled green bond implies the disclosure, and usually an external review, of information related to the use of proceeds and environmental impacts of underlying projects and activities. As I4CE initially explored in its 2016 report, this process itself, as well as the resulting additional information, can help unlock a number of benefits for key stakeholders involved (**Table 1**).

TABLE 1. BENEFITS OF LABELLED GREEN BONDS

Stakeholder	Benefits
Issuer	• Helping issuers communicate their sustainability strategies • Improving relationships with investors and broadening the 'investor base' • Creating internal synergies between financial and sustainability departments
Investor	• Helping investors to develop better-informed climate strategies • Helping responsible investors broaden their restricted investment portfolios • Managing climate risks in case of asset-backed securities and project bonds
Policymaker	• Indirectly supporting the implementation of the low-carbon transition policies by better matching supply and demand for green capital and reducing 'friction' • Creating 'discipline' in terms of information disclosure and mainstreaming climate change into the financial decision making

Source: Shishlov, Morel, and Cochran (2016)

On the issuer side, labelled green bonds can help organizations communicate their sustainability strategies, expand and improve relations with investors and create internal synergies between financial and sustainability departments – but are not improving financial conditions for the moment and might not in the future. By disclosing information on the use of proceeds, issuers can highlight their adherence to environmentally friendly investments. Some issuers also cited as a key benefit that they managed to attract new types of investors through the use of labelled green bonds – such as Socially Responsible Investor (SRI) funds or new foreign investors. Finally, several issuers noted that green bonds enable new internal interactions between in-house departments helping mainstream climate and environmental issues throughout the organization. The latest research has demonstrated some anecdotal evidence that labelled green bonds are often heavily oversubscribed, and may therefore offer tighter pricing compared to 'vanilla' equivalents thus sometimes providing slightly cheaper debt for issuers (CBI 2017d). However, these benefits might not be sufficient for some issuers to justify the additional time and effort as well as the certification costs – estimated at USD 18-41 thousand per issuance (Bloomberg 2017). For example, Tesla – whose activities fit into most current definitions of those eligible to be labelled as green – went against expectations and chose to issue a non-labeled traditional USD 1.8 billion bond rather than a labelled green bond in 2017.

On the investor side, labelled green bonds can be useful in implementing better-informed climate strategies. The labelling of bonds can enable responsible investors to have alternatives to broaden their portfolios and, in the case of asset-backed securities (ABS) or project bonds, potentially lead to improved implementation of climate risk management strategies. Given the ongoing process of increasing transparency of the financial sector concerning climate change – promoted by the Task Force on Climate-related Financial Disclosures (TCFD) of the Financial Stability Board (FSB) – labelled green bonds can be a useful 'informational' instrument for investors. Implementing better-informed climate strategies requires that investors have access to information on environmental impacts of underlying assets and green bonds can help provide at least part of this information. For example, SRI funds can use green bonds to expand the scope of investment and diversify portfolios by investing in specific assets from those issuers that could otherwise be screened out. Finally, investors could use green bonds to identify investments aligned with their climate risk management strategy as labelled assets will most likely be more aligned with the LCCR transition (**Box 4**). In the case of asset-backed securities (ABS) or project bonds investors also get direct exposure to underlying green assets rather than the issuers' balance sheets.

Overall, the enhanced transparency of information provided by labelled green bonds can facilitate the implementation of national environmental policies. Green bonds can support a more efficient capital allocation through improved awareness and reduced market 'friction,' thus helping better match supply and demand for green capital (CBI 2017a). Furthermore, the growing labelled green bond market facilitates the 'discipline' of financial

BOX 4. IN WHAT WAY DOES ALIGNING A PORTFOLIO WITH A LOW-CARBON PATHWAY CONSTITUTE A MANAGEMENT STRATEGY FOR TRANSITION RISKS?

Transition risks originate from uncertainties – "radical" on the implementation of a low-carbon pathway and the level of ambition of that pathway, and more "usual" on the terms and conditions (in particular regulatory and market) for implementation of that pathway. Management of transition risks therefore requires: firstly, the limitation of potential losses irrespective of the economic pathway that appears; secondly, the limitation of potential losses relating to the various methods for putting this pathway in place.

One of the strategies to manage transition risks consists in limiting exposure to such risks "at the source" in two ways: by avoiding the financing of risky assets (avoidance strategy) and/or by supporting the progressive implementation of necessary efforts at the counterparty (through shareholder engagement). Aligning a portfolio with a low-carbon pathway thus means choosing counterparties from inside a conventional investment or financing environment who are making the most efforts to place themselves on an ambitious low-carbon pathway.

It is important to note that this type of strategy for the portfolio's progressive alignment with a low-carbon pathway does not entirely remove the exposure to transition risks. It does, however, allow the reduction of vulnerability to transition risks through the removal of those counterparties in a portfolio that will be most affected by the transition, and that would therefore see their performance reduced in comparison with their peers in the event that the introduction of a low-carbon pathway takes place.

Source: (Hubert, Nicol, and Cochran 2017)

actors regarding information disclosure and mainstreaming environmental considerations – and more specifically climate change – into the financial decision-making. However, the end contribution to achieving national policy objectives will be dependent on whether the 'green labelling' process truly ensures that labeled assets are coherent with given short-medium- and long-term policy objectives.

1.2. Why the labelling process counts: avoiding environmental, reputational and legal risks

While the benefits stemming from enhanced transparency outlined above underpin the rapid expansion of the green bond market, some observers point to the increasing risk that green bonds may not 'fulfil their promise' (WWF 2016) turning the market into a 'greenwashing' tool with no real environmental impact. Potential large-scale scandals related to breaching environmental integrity and 'greenwashing' allegations could have devastating consequences for the nascent green bond market (Shishlov, Morel, and Cochran 2016). A loose parallel can be made here with scandals that plagued the market for carbon credits under the Kyoto Protocol's Clean Development Mechanism (CDM) and Joint Implementation (JI) – and partly contributed to their decline. KPMG (2015) identified four possible dimensions of 'greenwashing' that may occur on the green bond market:

- Proceeds are used to fund activities that are not considered green;
- Core business activities are seen as unsustainable;
- Use of proceeds are not tracked properly and not reported in a transparent manner;
- There is insufficient evidence that projects have contributed to better environment.

Besides purely reputational risks, potential violation of 'green promises' creates a legal risk related to allegations of 'mis-selling' of financial products. Labelled green bonds are often heavily oversubscribed compared to 'vanilla' bonds (CBI 2017d) due to the attractiveness of their green characteristics to investors. If these green features do not materialize in practice, investors could try to seek compensation. While until now this risk remains hypothetical, this issue is raised regularly at conferences dedicated to green bonds, thus highlighting the concerns among market participants. In general, climate-related litigation has already entered the financial sector, demonstrating that the legal risks are real. While not directly related to the specific case of green bonds, the Commonwealth Bank in Australia has recently been sued by shareholders for failing to adequately disclose climate-related risks (Guardian 2017).

Reputational and legal risks may threaten the very existence of the labelled green bond market. Indeed, the currently unregulated market is "*exposed to a major risk, namely what would happen if an issuer blatantly violated its 'green' commitments?*" (Claquin 2015). Although so far market stakeholders have managed to avoid large-scale scandals or revelations regarding unjustified or improper green credentials of bonds, the examples of controversies discussed below demonstrate the first signs of these risks looming. There is thus a persistent concern among market participants about the lack of commonly accepted definitions, standards and reporting procedures (OECD 2017).

In addition to reputational and legal risks for the issuer, a potential default on environmental integrity creates a risk of the inefficient use of public funds supporting environmental policy objectives. Some policymakers, e.g. in China, are using the labelled green bond vehicle to provide targeted policy support. In this case, unfulfilled environmental promises would result in free-riding and a waste of public funds. Moreover, labeling existing business-as-usual bonds as 'green' may give a false impression that the amount of green finance is increasing, while in reality it is only a matter of labeling existing volumes.

Finally, if labelled green bonds fail to demonstrate positive environmental impact and contribution to the LCCR transition, green labeling can in fact slow down the transition by diverting public attention and sending wrong signals to the market. Indeed, burgeoning international conferences and green bond roadshows might give an impression that issuers and investors are doing a lot to redirect financing towards LCCR assets. However, if the environmental integrity of green bonds is not ensured and investments that are not in line with the LCCR transition are "sold" to investors as "green", then the positive role played by green bond labeling can be questioned.

Ensuring the environmental integrity of green bonds through labelling can be broken down into two key challenges. The first challenge is the actual 'process' of defining what **assets are considered as 'green' by market actors** and hence be eligible for financing through green bonds. The second challenge is related to **transparency and reliability of information provided** through green bond reporting frameworks (Shishlov, Morel, and Cochran 2016). The next sections of this report looks at these two challenges independently as in many ways one is distinct from the other in terms of questions that need to be addressed. The final section then assesses the next steps to move forward and what actors and institutions have the needed credibility and legitimacy on the issues and areas identified as needed for harmonization.

2. Defining the eligibility criteria for labelling 'green' assets: current practice and remaining challenges

KEY TAKEAWAYS FROM THIS SECTION

- Currently, when labelling there is no single definition of 'green' eligibility and taxonomies; furthermore, an array of actors provide their definitions, which may or may not overlap, and present different degrees of alignment with objectives set in Paris Agreement. More specifically, a major divergence on green definitions in the market stems from the national circumstances in China, where improved fossil fuel efficiency can be included in green assets according to the national standard.
- There are a number of challenges related to the establishment of commonly accepted green definitions including: different investor expectations, national circumstances, time horizon, scope of assessment, and disconnect between green bond issuance and the overall environmental strategy and 'greenness' of an issuing entity.
- However, the harmonization of definitions of 'green' is currently moving forward quickly. At the time of writing, three principal ongoing initiatives are working on harmonization of green definitions including the European Commission's HLEG on the EU level, the China-EU dialogue on the bilateral level and the ISO standard on the international level.
- Attention should be put on ensuring a set of definitions that can be applied at an international level, since financial market are internationally interconnected. Governments should support these processes by speeding up the elaboration and communication of their long-term low-carbon development strategies as mandated by the Paris Agreement. They should also focus on ensuring that agreed international rules enable and foster best practices that assess alignment of financial products with the LCCR transition. More specifically, if public-led standards are to be developed, attention should be put on designing frameworks that are sufficiently flexible to allow for taking into account technological developments, sufficiently robust and based on scientific knowledge on climate risks, and that do not entail excessive transaction costs.

2.1. Overview of existing frameworks and approaches to define green eligibility in the labelled green bond market

Currently, a number of different approaches and standards are used to establish eligibility in the global labelled green bond market. There is no mandatory standard and market actors are free to choose what and how these different approaches are applied. In many instances, significant convergence has occurred between the different standards with principal differences continuing around the national circumstances in China, where projects and investments to improve fossil fuel efficiency can be included in green assets. In many instances, these frameworks touch on important process issues for green bond issuance, reporting and broader management. This section takes a relatively narrow view to focus only on the green eligibility criteria used by each of the frameworks, an overview of which is presented in **Table 2**.

Green eligibility criteria typically look at how the proceeds stemming from the issuance of green bonds are used by the issuing entity. The majority of these definitions and eligibility criteria focus on how the capital raised will be used in terms of fixed capital investments or the acquisition of durable goods. As such, green bond frameworks tend to focus at what in the following section is referenced to as the 'project' level. Issuers thus commit to – and report on – using raised capital for a set of project-focused investment activities. However, as discussed in report 1 "Green Bonds: Improving their contribution to the low-carbon and climate resilient transition" (Nicol, Shishlov, and Cochran 2017), only in the case of project bonds and asset-back securities are the bonds issued directly connected to a single asset or set of assets rather than the broader balance sheet of the issuing entity regarding financial flows and legal recourse.

TABLE 2. COMPARISON OF GREEN BOND FRAMEWORKS DEFINING GREEN ASSETS ELIGIBILITY

Characteristic	Green Bonds Principles	Climate Bonds Standard	China Green Bond Catalogue	CICERO's "Shades of green"
Region of application	Worldwide	Worldwide, but mainly OECD	China	Worldwide, but mainly Europe
Share of the volume of the green bond market	Most green bonds claim adherence to GBP	~15% of the market in 2016	~40% in 2016 (of which 66% aligned with the CBS)	~59-66% of green bonds undergo external review (of which 70% by CICERO as of 2016)
Criteria for eligibility assessment	Broad sectoral categories, no explicit eligibility criteria	Sub-sectoral eligibility criteria based on the alignment with the LCCR transition with quantitative thresholds for some sub-sectors (e.g. top 15% EE performance)	Sub-sectoral eligibility criteria based on compliance with national regulations and standards (e.g. energy efficiency or buildings sectors)	No strict eligibility criteria, but rather granular assessment of "greenness" based on the LCCR alignment of funded projects, with a rating of the degree of LCCR alignment
Process for eligibility criteria development	N/A	Eligibility criteria developed in sectoral working groups gathering experts and practitioners	Eligibility criteria developed by the Green Finance Committee of the China Society for Finance and Banking based on national regulations	Tailored assessment based on expert knowledge from Cicero's scientific research team
Exclusion criteria	N/A	Nuclear, fossil fuels, EE in fossil fuels, landfill waste w/o methane capture, etc.	N/A	N/A
Principal strengths	Market acceptance and legitimacy, provide overarching guidelines	Science-based eligibility criteria (LCCR alignment) based on conclusions from sectoral working groups	Adapted to national circumstances and directly linked to national policies, mandatory application	Higher granularity (different levels of greenness), more nuanced assessment, allows to take into account innovative technological solutions, allows for comparability between green bonds
Principal weaknesses	No eligibility criteria, no enforcement mechanisms	Criteria for several sectors not developed yet,	Include controversial sectors, do not take into account the temporal scope (potential lock-in effect), based on a basic taxonomy that will need to be revised to integrate technological innovations	More complex to implement than a simple taxonomy, requires expert knowledge for another organization to carry out the same assessment

Source: Authors

NB: From entities performing green bonds external review, only Cicero's framework is detailed in this table as it represented 70% of external reviews in 2016, and since detailed criteria of its assessment framework are publicly available.a

2.1.1. Green Criteria as per the Green Bond Principles (GBP)

The Green Bond Principles (GBP) run by the International Capital Markets Association (ICMA) is a voluntary set of guidelines for green bond issuers that is widely accepted as the main reference platform on the market. These principles are applied worldwide and most green bonds claim that they adhere to the GBP. The GBP, however, mainly focus on the process of management and reporting of use of proceeds and evaluation procedures, rather than giving a clear definition of 'green' projects. The GBP, nevertheless, outline several 'broad categories' of eligible green projects (ICMA 2016):

- renewable energy;
- energy efficiency;
- pollution prevention and control;
- sustainable management of living natural resources;
- terrestrial and aquatic biodiversity conservation;
- clean transportation;
- sustainable water management;
- climate change adaptation;
- eco-efficient products, production technologies and processes.

While the GBP do lay out clear and useful process-focused guidelines, it does not provide criteria for green assets eligibility, nor exclusion criteria. Rather, the GBP suggest that the issuers of green bonds develop their own

eligibility and/or exclusion criteria and recommend that the issuers communicate this information to investors, notably (ICMA 2016):

- the environmental sustainability objectives;
- the process by which the issuer determines how the projects fit within the eligible Green Projects categories identified above;
- the related eligibility criteria, including, if applicable, exclusion criteria or any other process applied to identify and manage potentially material environmental and social risks associated with the projects.

2.1.2. Green Criteria as per the Climate Bond Standard (CBS)

The Climate Bond Standard (CBS) launched by the Climate Bonds Initiative (CBI) in 2011, defines a taxonomy of eligible green assets by sub-sector, as well as disclosure and reporting criteria, promoting the use of labeling through certification. The Climate Bonds Standards Board includes members representing USD 34 trillion of assets under management (end 2017). CBS certification is confirmed once the bond is issued and the proceeds have been allocated to projects and assets. Currently the CBS provides taxonomy and criteria for green projects and activities in the energy, transport, water and low-carbon buildings sectors. Additionally, criteria for natural resource management and industrial energy efficiency are in development (**Table 3**). The CBS is the first – and so far the only – 'prescriptive' green bond standard that has seen significant market uptake. Around 15% of green bonds issued in 2016 were labelled by the CBS (OECD 2017). Furthermore, the CBS taxonomy was used as the basis for the Energy and Ecological Transition Label by the French Ministry of the Environment, and by a number of green bond index providers (Solactive, MSCI and S&P). It is thus often considered one of the top best practices on the market.

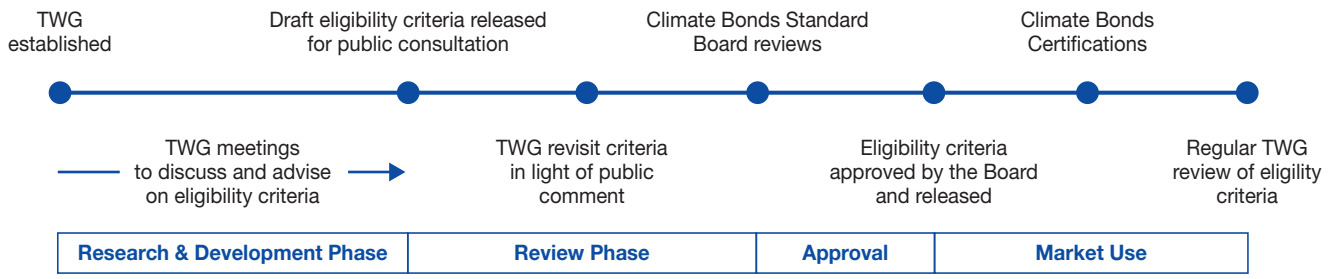
Under the CBS, sub-sectoral green assets eligibility criteria are developed based on the alignment with the LCCR transition by Technical Working Groups (TWGs) comprised of industry professionals and academics. The science-based process of eligibility criteria development includes research and development by the TWGs, public consultation, and regular reviews following the approval (**Figure 2**). While developing the eligibility criteria the CBS "aims to adopt a positive technology or asset approach by specifically including: projects or assets that directly contribute to developing low-carbon industries, technologies and practices that achieve resource efficiency consistent with avoiding dangerous climate change and

TABLE 3. SUB-SECTORAL ELIGIBILITY CRITERIA DEVELOPMENT UNDER THE CLIMATE BONDS STANDARD

Sector	Criteria available	Criteria in development	To be developed
Energy	Wind, solar, geothermal	Hydropower, bioenergy, marine	Distribution and management
Transport	Rail, vehicles, bus/rapid transit		Water transport
Utilities	Water management	Recycling and reuse, waste disposal	IT, communications
Buildings	Residential, commercial		
Natural resources		Forestry, agriculture, fisheries	
Industry			Cement, steel, manufacturing processes

Source: (CBI 2017c)

FIGURE 2. CBI ELIGIBILITY CRITERIA DEVELOPMENT PROCESS



Source: CBI website (www.climatebonds.net)

essential adaptation to the consequences of climate change" (CBI 2017c).

In developing eligibility criteria, the CBS employs both qualitative and quantitative approaches. For example, while solar power is generally considered green, there is a threshold for a maximum non-solar backup capacity set at 15%. Low carbon buildings must achieve a level of carbon emission performance in the top 15% of all buildings in tne city. Similarly, transport projects must meet a certain emissions intensity threshold of gCO_2/passenger-km (for passenger) or gCO_2/t-km (for freight) to qualify for financing by green bonds under the CBS. The CBS eligibility criteria thus goes far beyond the simple "positive list" of sectors suggested by the GBP.

The CBS also provides an explicit list of technologies and projects that are excluded from its green taxonomy. These include: uranium mining for nuclear power; any fossil fuel-based power generation; energy efficiency upgrades to GHG intensive power sources – e.g. cleaner coal technology; energy savings in fossil fuel extraction activities; anything that helps to extend the life of fossil fuel usage; waste landfills without gas capture; waste incineration without energy capture; and rail lines where fossil fuel resources account for more than >50% of freight.

2.1.3. Green Criteria as per the *Green Bond Endorsed Project Catalogue*

The Green Bond Endorsed Project Catalogue issued by the Green Finance Committee (GFC) of the China Society for Finance and Banking provides a list of asset and project types eligible for financing by green bonds in China. This is the first explicit regulated green bond definition standard; as such all Chinese green bonds must comply with it. The introduction of these regulations in late-2015 together with various incentives kick-started the Chinese green bond market helping it reach USD 36 billion in issuance in 2016.

To set the eligibility criteria, the Green Bond Endorsed Project Catalogue relies on domestic regulations and standards. For example, energy efficiency projects must meet the reference value of energy consumption per unit of product as set in the Chinese national standard for industrial energy. Similarly, new residential and public buildings must be rated at least "two star" according to the Chinese national building standards (CBI 2016). China thus provides one of the first example of green eligibility criteria linked to national environmental policies.

While some categories in the Green Bond Endorsed Project Catalogue such as renewable energy and green buildings largely overlap with the CBS, others do not. Among sub-sectors that are not aligned with the CBS are: retrofits to fossil fuel power stations; "clean" coal; electricity grid transmission; infrastructure that carries fossil fuel; as well as large (>50 MW) hydropower electricity generation (currently under consideration by the CBI). CBI estimates that bonds labeled as green, but not aligned with CBS definitions, accounted for about a third of the total issuance in China in 2016 (CBI 2017b). Since the China's eligibility criteria heavily rely on national environmental regulations, the relative "greenness" of Chinese green bonds therefore depends on the level of ambition of national policies and the decarbonization trajectory envisaged by the government.

2.1.4. Green Criteria as per proprietary assessment methodologies

Some external review providers have developed their own assessment frameworks to define "greenness" of projects and assets financed by green bonds. Some bonds that are qualified as green by a number of review providers may not be eligible for the CBS label or under the China Green Bond Catalogue and vice versa. Typically, improved energy efficiency in fossil fuel infrastructure could be eligible for financing by green bonds in China and labeled as "light green" by CICERO, but not eligible for the CBS certification.

However, many external reviewers do not make public the detailed green asset eligibility criteria in their proprietary frameworks. They were therefore not included in this analysis and no comparison between 'greenness' assessment criteria from different service providers has been performed. A notable exception is Cicero that publically discloses details about its assessment framework.

CICERO's proprietary methodology dubbed 'shades of green' ranks bonds as 'dark, medium and light' green depending on their alignment with the LCCR transition (Figure 3). CICERO employs a dynamic perspective whereby investments that are zero-carbon today and can be part of the decarbonized world in 2050 are considered "dark green", while investments that reduce emissions today, but are not aligned with the LCCR transition in the long-run are considered "medium" or "light green". In addition to the alignment of assets, CICERO also considers the issuer's broader climate and environmental policies in its assessment. The advantage of this framework is that it provides for more nuanced assessment rather than simply dividing assets into "green" and "not green". As a reminder, CICERO performed in 2016 70% of external review assessments.

FIGURE 3. CICERO'S 'SHADES OF GREEN' METHODOLOGY

Shades of green		Exemples	
°C	Dark green is allocated to projects and solutions that correspond to the long-term vision of a low carbon and climate resilient future.		Wind energy projects with a governance structure that integrates environmental concerns
°C	Medium green is allocated to projects and solutions that represent steps towards the long-term vision, but are not quite there yet.		Plug-in hybrid busses
°C	Light green is allocated to projects and solutions that are environmentally friendly but do not by themselves represent or contribute to the long-term vision.		Efficiency in fossil fuel infrastructure that decrease cumulative emissions
	Brown for projects that are in opposition to the long-term vision of a low carbon and climate resilient future.		New infrastructure for coal

Source: CICERO (2015)

2.2. Challenges to defining the eligibility criteria for green assets

Achieving consensus – whether formal or informal – on a definition of assets that can be considered as 'green' has proven to be cumbersome due to several challenges that have already resulted in a number of controversies. The socially-responsible investment (SRI) community since its inception has lacked widely accepted definitions of assets (Environmental Finance 2017b). Similarly, there is no consensus on a single accepted definition of green bonds. The analysis of different frameworks and the ongoing debates allow pinpointing key conceptual challenges that are discussed below.

2.2.1. Divergent expectations and rationales from green bond purchasers

Investors often purchase green bonds for different reasons including:

- **Impact investing**. Impact investment funds may specifically choose to target environmental performance. In this case, they may use labelled green bonds to select environmentally sound investment opportunities or to align their portfolios with a 2°C trajectory of the LCCR transition. These investors usually also offer some form of impact reporting and in this respect green bonds may be a useful tool for them.
- **Socially responsible investment (SRI)**. SRI funds may be willing to minimize their reputational risks and may be willing to buy climate-aligned and labelled green bonds only from issuers that fulfill broader environmental, social and governance (ESG) criteria. However, even among impact investors and SRI funds, there is a divergence in expectations. For example, most Nordic countries' SRI funds strictly exclude nuclear, while French funds may accept nuclear as being "green". The EUR 2.5 billion green bond issued in 2014 by GDF Suez (now Engie) aimed at financing renewable energy projects was criticized by some market actors as it could be used to refinance a large hydro power project in Brazil with environmental and social concerns (Petitjean 2014).[9]
- **Investors purchasing green bonds under external pressure.** A number of market participants purchase green bonds because it is increasingly expected that investors' portfolios will contain at least a small percentage of these assets, for example as a consequence of the introduction of the Article 173 of the French Energy Transition Law. Whether for conformity with internal or external expectations, this implies that a number of market participants are not necessarily seeking to ensure that their investments have non-financial impact, but rather seek to be able to communicate to their stakeholders that they are involved in the market.
- **Traditional bond investors.** Finally, some investors may simply purchase green bonds as they would traditional bonds from the same issuers given that they provide similar financial characteristics. These investors therefore do not pay attention to the green label and do not necessarily see any added value compared to 'vanilla' bonds from the same issuers.

Given these different reasons for participating in the green bond market, discussions around establishing eligibility criteria can be controversial with implications for growth of the market. On one hand, those actors aiming to ensure a more impact investing approach favor more stringent eligibility criteria to ensure quality over quantity. On the other hand, those market participants seeking to ensure only that a percentage of their portfolio reflects this new market trend often seek less-stringent eligibility criteria

9 *Moreover, as in most green bonds, use-of-proceed is 'earmarking' and puts no legal constraint or 'ring fencing' on the issuer. In this specific example, there was concern that the issuer might divert proceeds of the green bond to finance nuclear power as a low-carbon energy source (Friends of the Earth 2015).*

to ensure that the market grows rapidly and achieves a high level of liquidity.

2.2.2. The challenge of defining "green" in a dynamic and diverse world

Determining what assets – and more precisely the underlying projects, activities, services, etc. supported by a given financial product or security – are 'green' poses a number of technical challenges given that this definition must exist in a dynamic and diverse world. For example, if it is decided that 'green' eligibility criteria should reflect an asset's contribution to the LCCR transition, criteria must be able to take into account differences between what investments are appropriate given national circumstances, how impacts are assessed and the time period which is relevant for assessing impacts on GHG emissions or resiliency.

- **National circumstances and uncertain decarbonization trajectories**. Countries may have different decarbonization policies, as illustrated by an array of Nationally Determined Contributions (NDCs) – short- to mid-term climate strategies that countries develop under the Paris Agreement. For example, China considers investments in 'clean coal' to be 'green', something that is firmly excluded in the EU (see section 2.1). Some market actors therefore argue that definitions of 'green' must take into account national and/or regional circumstances – and the resulting implications for a given country's LCCR pathway. Even within a single country, the low-carbon transition may be achieved through different trajectories. Lack of clarity on national decarbonization pathways – and an assessment of their credibility and feasibility - therefore makes it difficult to define assets that are fully aligned with the transition. Long-term decarbonization strategies that countries are currently submitting to the UNFCCC could therefore be useful in clarifying decarbonization trajectories.
- **Time horizon.** Some assets that are considered green today may not be green over their lifecycle. One example of this temporal aspect of 'greenness' is the construction sector. Since new buildings may last for 100 years or more, they may create 'lock-in' effects if not aligned with the decarbonization pathway from the start. Similar issues arise with regards to transportation systems and other long-lasting infrastructures. Energy efficiency in polluting industries is another example. In May 2017, Repsol, a Spanish oil and gas company, issued a EUR 500 million green bond to finance energy efficiency measures and low-emissions technologies of underlying fossil fuel assets. While these measures will yield emissions reductions through incremental efficiency improvements, they are considered by some as insufficient to be aligned with the 2°C trajectory by many stakeholders (Whiley 2017). This green bond was therefore excluded from many major green bond indices (Environmental Finance 2017c).
- **Sectoral and technological specificities.** More generally, defining eligibility in the context of the LCCR transition as a list of eligible subsectors/technologies may be more or less relevant, depending on cases. For example, hydro power generally decreases the carbon intensity of the power grid, but needed water reservoirs may in fact emit large quantities of methane when they are not well designed. In another example, large hybrid cars may be emitting less than conventional large cars, but more than conventional small cars. There is therefore a broader question whether positive lists of eligible technologies provide sufficient level of granularity to determine an asset's level of 'greenness'.
- **Technological development.** The last challenge in defining a list of eligible technologies relates to the dynamic nature of the market for low-carbon solutions. All decarbonization scenarios imply the development of technologies that either do not exist today, or have not reached maturity. Therefore, definitions of 'green' should allow new innovative technologies that contribute to the LCCR transition. This could be done either by planning for regular updates of a list of eligible assets, or by determining eligibility based on criteria more complex than a simple 'positive list'.

2.2.3. Scope of the assessment of green bond issuers

Challenges to establishing labelling criteria for green bonds can also stem from the characteristics of the issuing market actors. These characteristics can have an impact on their 'green credentials' of any bond issued whether directly linked to a set of activities, a pool of physical assets or both.

- **Pure player vs. non-pure player issuance.** The debate on whether bonds issued by 'pure-play' green entities, i.e. organizations solely focused on green activities, should be automatically labelled 'green' has been ongoing for several years. In 2016, the GBP ruled that pure-players should not be granted a 'shortcut' and should therefore follow the same procedures as non-pure play issuers. The CBI tracks the issuance of 'climate-aligned' bonds, i.e. bonds not labelled green, but issued by pure-play entities – most notably railway companies.
- **Asset vs issuer greenness.** If a non-pure play entity issues a green bond to finance or refinance the 'green' portion of its activities without changing the overall balance between green and brown activities or assets, the greenness of the general-purpose bonds will be reduced. Investors in green bonds issued by this entity will thus take a larger portion of green assets, while investors in

traditional bonds will take a larger portion of brown assets. This 'zero-sum' nature of green bond labelling raises the question of whether the core activity of an issuer and its commitment to the LCCR transition should be considered as well. In December 2016, Poland issued the first EUR 750 million sovereign green bond. While cheered as a pioneer by some observers, Poland was criticized by others due to the lack of an ambitious national climate policy, leading to 'greenwashing' allegations. Indeed, Poland notoriously vetoed the Doha Amendment prolonging the Kyoto Protocol until 2020, and more recently threatened the EU to block the ratification of the Paris Agreement in light of its strategy to further develop its coal industry (de Carbonnel 2016).

2.3. Next steps: harmonization of the definition of 'green'

The current structure of the green bond market allows for a lax definition of green and while the market does provide important information on potential environmental impacts, it is not enough to identify whether the green bond market is made up of assets that are fully aligned with the LCCR transition. These limitations of the green bond market reduce its value for investors:

- from the impact investor perspective this reduces the added value of the green bond label as the quality of information might not be good enough to select assets appropriately;
- from a general market investor perspective, those that are beginning to take climate change into consideration for risk-related purposes do not have the information they need on 'aligned' investments as a risk management strategy.

Many stakeholders, if not all, are thus currently calling for the harmonization of the definition of 'green'. However this call for harmonization may mask different ideas on what the precise object for harmonization should look like: setting a common language, defining a set of quantitative criteria, etc. Moreover, the harmonization process could entail, but does not necessarily require, the definition of government-led or established standards; it could also be market-led or NGO led – or a mix of the three.

2.3.1. Harmonization of eligibility criteria

2.3.2. Ongoing harmonization initiatives

Creating a common language is often seen by market participants as a significant step forward to help issuers and investors map and compare different approaches to green finance. The establishment of shared reference taxonomies in the relevant fields would permit individual market participants to make unambiguous decisions, while at the same time leaving them free to clarify and be loyal to their own preferences. This would combine clarity with flexibility to accommodate individual needs, including different national trajectories.

A first initiative aiming at harmonization has been carried out since 2015 in France with the launch of the government's Energy and Ecological Transition for Climate label. This label sets minimum thresholds for "green" assets in labeled investment funds and provide a "positive list" or taxonomy of assets eligible as "green". This taxonomy is based on CBS taxonomy, with some additions corresponding to the broader scope of the label than the climate-focused scope of CBS.

In its Final Report published in January 2018, the High-Level Expert Group on Sustainable Finance (HLEG) called the European Commission to introduce 'an official European standard for green bonds. This EU Green Bond Standard, based on the association with the EU Sustainability Taxonomy, should include an explicit definition of an EU green bond and the existing and widely accepted market-developed principles for market processes.' (HLEG 2018, 33). Any type of listed bond instrument would be eligible to be labelled as an 'EU Green Bond' if they met one of three following requirements:

1. The proceeds will be exclusively used to finance or re-finance in part or in full new and/or existing eligible green projects, in line with the future EU Sustainability Taxonomy (see below section 4.1., Use of Proceeds); AND,
2. The issuance documentation of the bond shall confirm the alignment of the EU Green Bond with the four components of the EU Green Bond Standard; AND,
3. The alignment of the bond with the four components of the EU GBS has been verified by an independent and accredited external reviewer.

An issuer may only use the term 'EU Green Bond' if the above criteria are met. This is an important step towards the development of a classification system for sustainable assets. The HLEG has called for the development of a 'single EU classification of sustainable assets that captures all acceptable definitions of 'sustainable'. This could include different policy goals, such as climate change mitigation and adaptation, biodiversity preservation or pollution control. The annexes of the HLEG's final report also include an informal technical supplement on how the EU Green Bond Standard could work in practice, with guidance on use of proceeds, project evaluation and selection, management of proceeds and reporting.[10] The EU Commission is expected to propose a roadmap in March 2018 on how it will move forward with the recommendations of the HLEG's final report.

10 *https://ec.europa.eu/info/sites/info/files/180131-sustainable-finance-final-report-annex-1_en.pdf*

The People's Bank of China and the European Investment Bank have launched a joint EU-China initiative to strengthen the green finance framework. Within this initiative the existing classifications of green bonds will be examined to compare green taxonomies in detail including the Green Bond Endorsed Project Catalogue of the China Green Finance Committee and the Common Principles for climate finance tracking used by the Multilateral Development Banks (MDBs) and the International Development Finance Club (IDFC) (EIB 2017). The objective of this initiative is the development of a shared 'language' that could be used as a 'translation device' to define the equivalence of project types in different taxonomies.

The International Organization for Standardization (ISO) has also launched a process of development of a 'framework and principles for assessing and reporting investments and financing activities related to climate change' (ISO 14097). The standard is expected to be finalized and published by 2020 and will serve a triple objective:

- Assess the impact investments on climate change mitigation (GHG emissions) and adaptation (resilience);
- Assess the alignment of investments with the low-carbon and climate resilient transition;
- Assess the exposure of financial assets to climate-related risks.

While ISO standards are voluntary, governments may choose to apply them as regulations or to refer to them in legislation. The ISO has published 21,728 standards since its foundation in 1947 in a variety of sectors including construction, manufacturing and distribution, transport, medical devices and the environment (Environmental Finance 2017a). The organization can therefore be seen as a legitimate platform for establishing such a reference standard.

2.3.3. Which process for the harmonization of the definition of 'green'?

Three categories of stakeholders have demonstrated their ability and interest to organize and lead the process to harmonize the definition of 'green': independent expert NGO(s), formal national / international climate policymakers, and other intergovernmental or multilateral development institution(s). In many instances, these actors are currently involved in the processes described above. Moving forward, to ensure sufficient adoption of the outputs of the harmonization process in practice, all of these three categories of stakeholders, as well as market actors, should play an active role in the harmonization process. This could, for example be, structured as follows. First, an international institution could push for a harmonization of 'green' assets at an international level, in order to avoid the growth of the green bond market being stopped by incidences of "greenwashing". Then or in parallel, governments could put in place a set of targeted support measure to steer the green bond market to contribute to their climate- and energy-related objectives. To participate in these support mechanisms, governments could require that standards or eligibility criteria be used. These, in turn, could be based on existing expert or NGO-led initiatives, and involve a consultation process integrating feedbacks from market actors. As a final recommendation, harmonizing methodologies for defining green should be conducted with careful attention to avoiding to be based on the "least common denominator" of criteria used in current practice.

2.3.4. A harmonized 'green' eligibility framework: definitions, taxonomy or beyond?

The harmonizing definitions of 'green' could cover a broad range of issues, and it appears that not all stakeholders are referring to the same thing.

The harmonized framework could at a minimum solely define a common language for defining 'green'. That could mean more precisely defining what is 'an energy efficiency investment' or a 'clean energy project'. For example, for some actors clean energy may cover the most carbon-efficient gas power stations, whereas for others no fossil-fuel power stations should be considered as clean energy.

As a second step, the harmonized framework could present a detailed taxonomy of 'eligible assets'. Such a taxonomy would present all sub-sectors and technologies that could be eligible for a green bond. Green bonds issuers would then have to 'tick the boxes' of this taxonomy when presenting the expected 'use of proceeds' of their green bond issuance. For example, the HLEG in Europe has recommended that the EU Commission put in place such as system as a requirement for bonds being labelled as 'EU Green Bonds'.

A last step could require the harmonization process to also cover quantitative indicators that investments or projects would have to performance against to be eligible for the 'use of proceeds' of a green bond. Such indicators could notably define the maximum carbon footprint that would be accepted per sub-sector and technology, depending on the level of activity. This would enable to exclude those assets not aligned with the LCCR transition in a defined subsector. For instance, this would enable to exclude, in the sub-sector of hydropower, stations that emit large volume of methane – a gas with a high global warming potential, despite producing renewable energy.

Three considerations appear important when determining the scope of the harmonization process to ensure that:

- **A harmonized framework would still allow to take into account technological developments**. If the framework

does include a taxonomy and quantitative criteria, having it included in a formal regulatory framework may impede regular updates taking into account last technological developments. Moreover some technologies may not be very carbon efficient at the beginning of technological development but could be a solution for the low-carbon transition in the long-run – for instance electric vehicles some years ago. The eligibility criteria thus must be designed to be able to evolve over time.

- **A harmonized framework would still allow to discriminate between solutions saving carbon emissions in the word as it is today, and solutions that are fully aligned with a LCCR transition**. One way of reaching this could be to setting a taxonomy defining several level of 'green' and that would allow investors to choose between green bonds depending on their sustainability mandates.
- **The harmonization process should allow for the 'green' definition to be based on climate science.** The process for providing a harmonized green definition could notably include discussions with climate scientific experts within a technical working group, as recommended in HLEG's final report.

2.3.5. Green eligibility criteria: the need to go beyond green bonds

Beyond the harmonization initiatives discussed above, governments could facilitate the process by developing and publishing their long-term low-carbon transition trajectories. Article 4, paragraph 19 of the Paris Agreement mandates the Parties to 'formulate and communicate long-term low greenhouse gas emission development strategies' (United Nations 2015) and Benin, Canada, France, Germany, Mexico and the United States have already submitted theirs to the UNFCCC. These documents should be taken into account by the harmonization processes discussed above to make sure that green asset definitions are aligned with countries' long-term strategies. This echoes the recommendation of the HLEG that 'member states need to provide a plan indicating to investors how they intend to mobilize the capital needed to meet their 2030 goals and the long-term climate and energy obligations of the Energy Union and the Paris Agreement' (European Commission 2017).

The challenge of defining 'green' and choosing eligibility criteria and indicators goes beyond the green bond market and calls for a wider process to improve climate-related disclosures of all financial assets. Indeed, various organizations – such as extra-financial rating agencies, consulting firms and specialized service providers – are developing 'climate' indicators, intended to enable financial actors to assess and address climate-related transition issues. Some service providers are already offering databases for these indicators covering several thousand companies and assets, for the most part listed, together with financial portfolio analysis services based on these indicators. The most relevant choice of indicators for a financial player depends on its objectives and the level of detail required. Reconciling the indicators used for green bonds (see section 2.1) and more macro-level approaches that are used to demonstrate the contribution to or alignment with a LCCR transition of a financial portfolio will be one of the future challenges for the financial sector.

Overall, some market actors may argue that a single definition of 'green' is not possible due to conceptual challenges outlined in section 2.2 and that top-down regulations may hinder the development of the green bond market. These fears, however, appear to be unsubstantiated from the public policy point of view. Indeed, since the green bond label does not change the underlying investment flows by itself,[11] there is no justification for sacrificing the environmental integrity for the sake of the growth of labeled bond market. Conversely, establishing a commonly accepted taxonomy of green assets (not only green bonds) would help increase the overall transparency of the financial system and help reduce transaction costs in the long-run thanks to standardization and streamlining processes. Governments should therefore foster broader disclosure of environmental impacts and climate-related risks in the financial sector as recommended by the TCFD. This is particularly important for the green bond market that faces the risk of 'greenwashing' due to the zero-sum nature of green labeling in the absence of entity-wide climate-related disclosures.

11 *See the first report in this series: Nicol et al. (2018) "Green Bonds: Improving their contribution to the low-carbon and climate resilient transition" I4CE Research Report https://www.i4ce.org/download/green-bonds-improving-their-contribution*

3. External review and reporting of information to ensure transparency and reliability

KEY TAKEAWAYS FROM THIS SECTION

- Independent external review is the main approach currently used in the green bond market to ensure its environmental integrity. Implementing reporting and assurance procedures for green bonds faces a number of challenges, including: comparability vs. relevance of information; conflicts of interest; choice of impact assessment indicators; voluntary vs. legal reporting obligations; and additional transaction costs.
- External review and assurance procedures will have to be reinforced and streamlined in order to boost the credibility of the environmental review process for green bonds. In order to ensure the quality of external review and avoid the potential conflict of interest, an accreditation procedure can be implemented in new standards/labels similar to the one practiced by the Climate Bonds Standard or procedures applied in carbon accounting schemes. Moreover, climate-related financial disclosures should be incorporated in general financial reporting as suggested by the Task Force on Climate-Related Financial Disclosure.
- Existing green bond frameworks recommend issuers to disclose information on the use of proceeds, which is done for about two-thirds of issuances to date. Conversely, the reporting on environmental impacts of underlying investments remains completely voluntary and is currently done by only a third of issuers, although it is increasingly seen as the best practice. The ICMA is piloting the work on impact reporting harmonization, although the existing reporting templates so far cover only three out of ten thematic areas as defined by the GBP.
- Currently, there is no harmonized set of impact reporting indicators, which remains a challenge for comparability and relevance of information. Indeed, as it currently stands, the green bond market does not allow investors to assess the alignment of the assets with the LCCR transition. Key sub-sector indicators for impact reporting adapted for climate-related portfolio assessment will therefore need to be developed for green bonds and other financial products.

In addition to establishing the base criteria to assess the 'greenness' of bonds and underlying assets, a significant issue that the green bond market needs to address is the procedure for reporting and verification. The review process aims at ensuring that information on the use-of-proceeds and environmental impacts is communicated in an efficient, transparent and reliable manner to market players. This section provides an overview of existing practices, identifies remaining gaps and provides some consideration for next steps by market stakeholders in this respect.

3.1. Overview of the green bond review process: the dominance of external reviewers

Independent external review is the main approach currently used in the labelled green bond market to ensure the environmental integrity. The 2016 edition of the GBP recommends that "*issuers use an external review to confirm the alignment of their Green Bonds with the key features of the GBP*" (ICMA 2016). While many entities still issue "self-declared" green bonds, external review is increasingly seen as a common practice on the market. Currently, about 59-66% of green bonds undergo some form of external review (CBI 2017a). There is a variety of ways for issuers to obtain outside input to the formulation of their green bond process and there are several levels and types of review that can be provided to the market. Different types of external reviews can be roughly divided into four categories (**Table 4**).

TABLE 4. DIFFERENT TYPES OF EX-ANTE AND EX-POST REVIEW OF GREEN BONDS.

Type	Scope or review services and deliverables (source: Green Bond Principles)	Key actors	Existing market standards	EU regulatory frameworks
Consultancy and 'second opinion'	An issuer can seek advice from consultancy firms to establish their green bond framework, or for a 'second-opinion' review of the set green bond framework. Some actors provide both services, while some have chosen to provide only 'second-opinion' reviews to avoid conflicts of interest.	CICERO, Oekom, Sustainalytics, Vigeo	Only very broad guidance for consultancy services available under ISO 20700	Unregulated
Certification	An issuer can have its green bond or associated green bond framework or use of proceeds certified against an external green assessment standard. An assessment standard defines criteria, and alignment with such criteria is tested by qualified third parties / certifiers.	Climate Bonds Initiative	Climate Bonds Standard 2.1 (December 2015)	Unregulated
Verification	An issuer can have its green Bond, associated green bond framework, or underlying assets independently verified by qualified parties, such as auditors. In contrast to certification, verification may focus on alignment with internal standards or claims made by the issuer.	Enst&Young, KPMG, PwC	International Standard for Assurance Engagements (ISAE) 3000	Auditing and professional services firms are regulated businesses in most jurisdictions.
Rating	Rating: An issuer can have its green bond or associated green bond framework rated by qualified third parties, such as specialised research providers or rating agencies. Green bond ratings are separate from an issuer's ESG rating as they typically apply to individual securities or green bond frameworks.	Moody's, Oekom, S&P, Cicero	N/A	Credit rating agencies are regulated in by the European Securities and Markets Authority (ESMA)

Source: Authors based on the practitioner's workshop to guide the development of frameworks for external reviews organized by the WWF, the EIB and I4CE on 7 March 2017 in London.

Consultancy. The objective of pre-issuance consultancy is to help issuers clarify what a green bond is, advise on market best-practices and provide detailed guidance on the nature and characteristics of the underlying assets. 'Second-party reviews' seek to assess the 'level of commitment' of the issuer based on each consultant's proprietary assessment tools. The review covers the management processes and procedures that will be put in place in order to ensure that the green bond actually finances what is claimed by the issuer.

Certification. Certification assesses these practices against external standards and may lead to the attribution of a recognized label, such as the CBS. Certification is different from a consultant's 'opinion' in that it is subject to pre-defined assessment criteria. Verification of the fulfillment of these criteria can only be done by entities accredited by a given standard. The CBS covered only 15% of green bonds issued in 2016 in terms of value (OECD 2017).

Verification. The objective of post-issuance external reviews is to verify that 'what has been said is actually what has been done', including so-called 'opinions' or an independent public statements on the reporting prepared by the issuer. Verification typically focuses on alignment of the issuer's green bond practice with processes and procedures of internal green bond frameworks (e.g., as designed by the issuer with the help of consultants) or claims otherwise made by the issuer and may include evaluation of the environmentally sustainable features of the underlying assets and/or verification that the actual use-of-proceeds correspond to the eligibility framework declared pre-issuance.

Rating. Traditionally, the overall sustainability of the issuer is assessed by ESG issuer ratings. More recently, several rating agencies, including Moody's Investor Services, S&P Global Ratings, and Oekom, have started developing rating and assessment tools specifically targeted to the green bond market. One way to look at this task is to expand the scope of 'traditional' credit ratings to include non-financial metrics. S&P Global Ratings' Green Bond Evaluation Tool, for example, is seeking to analyze and estimate the environmental impact of bond projects or initiatives (Wilkins 2016). Moody's provides an evaluation of the bond issuer's management, administration, allocation of proceeds to and reporting on environmental projects financed with the proceeds derived from green bond offerings (Moody's 2016). Other rating agencies provide ESG ratings of issuer as such and not to specific green bonds issuances. In another approach, the external reviewer performs a specific analysis of the 'greenness' of, on the one hand, the assets eligible for allocation from the bond proceeds, and, on the other hand, the transparency and accountability associated with the allocation and reporting related to the bonds, possibly integrating the analysis with consideration of the issuer's overall sustainability. In this case, an ad hoc 'sustainability bond rating' is established, which is not necessarily linked to its financial rating.

3.2. Overview of the ex-post reporting process: growing reporting on the use-of-proceeds, limited impact reporting

3.2.1. Ex-post reporting on the use-of-proceeds

Whether or not external reviewers are involved, the issuer may decide to provide ex-post information to its investors and the public including the reporting on the use-of-proceeds and sometimes reporting on the environmental impact. Most existing reporting frameworks require the disclosure on the use-of-proceeds while impact reporting – i.e. the disclosure of environmental outcomes based on quantitative KPIs – remains voluntary, although it is increasingly seen as the best practice. Both the GBP and the CBS mandate annual reporting on the use-of-proceeds. Other elements of reporting may vary depending on the framework, although no framework details quantitative sectoral/sub-sectoral KPIs to report (**Table 5**).

Climate Bonds Initiative (CBI 2017e) analyzed 191 green bonds and estimated that 74% of them (88% by value) provided public information on the use of proceeds. Government agencies and banks are more likely to provide reporting than corporate issuers. Most listed green bonds provided reporting, while the over-the-counter (OTC) and private placement markets have lower rates of reporting. Finally, larger issuances are more likely to provide reporting with all bonds above USD 1bn publicly disclosing the use of proceeds. This is likely explained by the availability of resources.

However, the requirements of existing frameworks with regards to use-of-proceeds reporting remain rather general and the issuers are not obliged to report detailed quantitative information, such as, for example, the amount of new installed renewable energy capacity. Green bond issuers usually report on the percentage of funds allocated to broad sectoral categories, while some provide information on a project level allocation. The lack of detailed information on the use-of-proceeds in turn makes the evaluation of environmental impacts by observers rather complicated.

TABLE 5. REQUIREMENTS ON REPORTING OF THE USE-OF-PROCEEDS UNDER EXISTING FRAMEWORKS

	Green Bond Principles	Climate Bonds Standard	Country Guidelines
1. Reporting frequency	Annual	Annual	PBoC*: quarterly SEBI**: annual Japan: annual
2. Availability of reporting	"Readily available'	Mandatory to bondholders and Climate Bonds Standard Secretariat; public reporting encouraged	PBoC: disclose 'to the market' quarterly, report to the PBoC annually SEBI: public with annual and quarterly financial results Japan: public
3. Location of reporting	• Annual report and accounts • Annual sustainability reporting • Separate section of website • Investor letter • Separate green bond report	• Annual report and accounts • Annual sustainability reporting • Separate section of website • Investor letter • Separate green bond report	PBoC: not specified SEBI: 'along with annual report and financial results'
4. Period of reporting	Until allocation is complete	For the life of the bond	PBoC: duration of the bond Japan: until full allocation SEBI: not stated
5. Use of proceeds information to include	Mandatory: broad categories and % allocated to each Recommended: • List of projects and assets if not commercially sensitive • Description of projects • Expected impact of projects	• Nominated assets and projects detailed in full 'in line with confidentiality agreements' • Percentage of refinancing • Description of projects • Expected impact of projects	SEBI and Japan: broad categories and % allocated Recommended: list of projects and assets if not commercially sensitive; description of the projects; expected impact of projects PBoC: Proceeds allocation; assessment to green projects (recommended); associated environmental benefits(recommended)
6. Allocation information	• Amount allocated to projects • Percentage of bond to refinancing	• % of bond allocated to date • Percentage of bond to refinancing • Details of unutilized proceeds	SEBI: details of unallocated proceeds Japan: details of unallocated proceeds PBoC: amounts allocated
7. External verification	Recommended	Recommended	SEBI: mandatory PBoC: recommended

**People Bank of China ** Securities Exchange Board of India*
Source: (CBI 2017e)

3.2.2. Ex-post reporting on environmental impacts

None of the existing green bond frameworks mandate the reporting of environmental impacts, which remains voluntary. Consecutively, out of all green bonds that provide reporting, only 38% include some form of environmental impact assessment, while 27% include detailed project-level information (CBI 2017e). There is anecdotal market feedback suggesting that many green bond issuers do attempt impact reporting, but few of them actually disclosed their impact reports to date.

The ICMA has started a process of impact reporting harmonization under the auspices of the GBP. To date, harmonized impact reporting templates are available in the areas of renewable energy and energy efficiency, as well water and wastewater management, which was added in 2017 (ICMA 2017). So far, harmonized impact reporting thus currently covers three out of ten green areas as defined by GBP, although transportation and green buildings may be added in the near future. These and other sectors may take some time to cover as the harmonization work requires additional resources. Generally, market stakeholders are supportive of this GBP guidance/template development process and do not propose major alternatives, with the possible exception of leveraging TCFD guidance. The latter suggests disclosures on GHG emissions (where possible scope 3), but also on other quantitative indicators, such as energy and water use, as well as their comparison with baselines and/or industry standards (TCFD 2017).

3.3. Challenges to external review and reporting of information to ensure transparency and reliability

The review of the four categories of external review as well as the existing practice of reporting on the use-of-proceeds and environmental impacts reveal a number of open challenges and key trade-offs for the green bond market, as well as for the broader climate-related financial disclosures.

3.3.1. *Voluntary principles vs. legally binding rules*

A principal point of discussion for the labeling of green bonds is that of whether the process should be guided by voluntary principals, or dictated by legally binding rules. Currently, only 59-66% of green bonds make recourse to external review (CBI 2017a). Moreover, the external review process is generally not regulated. The Climate Bond Standard (CBS) is the only certification scheme subject to review by accredited reviewers. However, the CBS covered only 15% of green bonds issued in 2016 in terms of value (OECD 2017). Principles and standards that currently exist in the market are voluntary and there are currently no enforcement or dispute resolution mechanisms. In addition, use-of-proceeds is commonly understood as earmarking of funds rather than legally enforceable ring-fencing of funds. This has relegated green labelling to a marketing strategy in the eyes of some market participants. Some stakeholders have therefore suggested that standardized terms sheets and an appropriate dispute-resolution mechanism should be developed (Carney 2016; WWF 2016). Others stress that potential litigation might deter issuers from entering to the market.

3.3.2. *Independent reviewers vs. active market participants*

External reviewers of green bonds often act as consultants helping issuers develop their green bond frameworks. Without an appropriate oversight, a conflict of interest may arise when the same service provider has other business relations with the issuer or subsequently offers a review aiming at validating frameworks that they have themselves helped develop. This limits the reviewer's independence and may lead to 'self-review' threat, which is not consistent with international codes of conduct and assurance ethics (ICAEW 2011). Unlike the financial auditing business, where safeguards to avoid the conflict of interest exist, they are less systematically applied and at times completely absent for ESG rating firms. Similarly, the independence of some green bond review providers is questioned by some market actors and observers.

3.3.3. *Comparability vs depth and usefulness of information*

There is no formally mandated or universally accepted set of information that issuers have to disclose to investors. On the one hand, limiting reporting to a key number of criteria and indicators is thought to foster comparability – particularly when end-users of the information such as mainstream investors will not necessary spend time on reading reports about each bond. On the other hand, the reporting framework can be over-reductive and limit the communication of the nuance of information often needed to understand the contextualizing factors upon which green eligibility may depend. However, as demonstrated above, a large portion of reporting is currently limited to top-level information on the use-of-proceeds whereas the impact KPI reporting remains limited.

In 2016, the Green Bond Principles' governing body adopted the External Reviews Form (ERF) template that identifies and itemizes the core features of green bonds. This aimed to standardize not only the description of external reviews, but also that of the underlying green bonds, and making it easier for investors to compare. The ERF-approach, while remaining voluntary, was strongly praised by capital markets participants as allows investors to easily screen green bonds according to their respective investment criteria. At the same time, some external reviewers voiced

concerns that this 'minimalistic' approach may undervalue the breadth and depth of the analysis undertaken by the external reviewer, thereby underestimating the relevance of its qualitative contribution and impact, and blur the qualitative differences between the methodologies and analysis tools employed by competing external reviewers. Moreover, this standardization approach creates a risk of "setting the bar too low" in order to be acceptable for most issuers and reviewers, while impeding the highlighting and valuing more ambitious and detailed approaches.

3.3.4. *Choice of environmental impact indicators*

As discussed earlier, few green bond issuers currently provide detailed information on environmental impacts and there is no commonly accepted set of quantitative indicators. Multilateral development banks under the auspices of ICMA provided their recommendations suggesting the use of four key impact indicators for green bonds funding renewable energy and energy efficiency projects (World Bank 2015):

1. annual energy savings (EE),
2. annual Greenhouse Gas (GHG) emissions reduced or avoided (EE and RE),
3. annual renewable energy produced (RE), and
4. capacity of renewable energy plant(s) constructed or rehabilitated (RE).

At the same time, the ICMA working group acknowledged that "other indicators might be deemed relevant as well". Indeed, using scope 1 and scope 2 assessment of GHG emissions to define green eligibility may result in ignoring the indirect environmental impacts of a given asset. For example, in September 2016, Mexico City issued a EUR 1.8 billion municipal green bond to finance the construction of a new airport (Harrup 2016). Although the airport buildings are planned to be carbon neutral thanks to its energy efficiency and the use of renewable power, it is likely to contribute to the growth of emissions from aviation due to increased air traffic. In general, in the case of any long-lasting infrastructure such as transport or the construction sector, the carbon footprinting indicators have to be used with caution due to the potential "lock-in" effects, whereby marginal emission reductions do not support the low-carbon transformation and result in carbon intensive lock-in. **Box 5** presents a more general characterization of the limits of GHG-focused approaches.

BOX 5. ADVANTAGES AND LIMITATIONS OF CARBON FOOTPRINT INDICATORS FOR LISTED ASSETS

The carbon footprint and carbon intensity metrics have the great advantages of being easily available to thousands of businesses, and being easy to aggregate at the portfolio level. This is therefore a particularly useful type of indicator for reporting and communication at the level of the portfolio or the financial institution. However, these indicators must be used extremely carefully for the purpose of portfolio management. The comparison of two companies or two portfolios based solely on the measurement of a carbon footprint or carbon intensity in fact presents several limitations:

- Calculations of carbon footprints carried out by different service providers are for the moment based on non-standardized methodologies and scopes.[12]
- With regard to a cross-sectoral comparison, constructing a low-carbon portfolio based on the sole criterion of scopes 1 and 2 carbon intensity can lead to constructing a portfolio that over-represents the service sector in the event that there is no consideration of tracking error and sectoral diversification. Such a portfolio therefore contributes in a limited and indirect manner to the financing of the energy transition.
- With regard to a stock picking approach, i.e. a comparison of companies in the same sector based on a single criterion of the company's carbon intensity scopes 1 and 2 presents two main limitations. Firstly, for most sectors – with the exception of the energy and heavy industry sectors – transition issues are captured only by including scope 3 emissions, which is most of the time not included in databases that are currently available. For example, with regard to car manufacturers, for whom transition risks and opportunities have a direct impact on their strategy, the main issue lies in the carbon performance of vehicles sold, which is captured solely in the scope 3 of the carbon footprint. Even in the case of sectors for which the key issues are direct GHG emissions, a comparison of the carbon intensity of two companies based only on scopes 1 and 2 may not be relevant. Outsourcing a carbon intensive activity is indeed enough to make the carbon intensity fall substantially, even if the company's transition risks remain more or less the same.

Using this type of indicator should therefore be systematically paired with an analysis of the company's activity and the use of forward-looking indicators that are qualitative for the time being.

Source: Nicol and Cochran 2017.

12 *For a detailed analysis of the variations in results obtained for the same companies by different service providers, see in particular the case study from Natixis Research "Enjeux et outils de l'intégration du climat aux stratégies d'investissement – Immersion dans le Carbon Footprinting" (Issues and tools for integrating climate change into investment strategies – Immersion in Carbon Footprinting), April 2016.*

Cost vs. precision and exhaustive nature of assessment

Currently, the issuance of green bonds is associated with additional transaction costs related to the collection of information, paying consultants and verifiers/auditors that provide external reviews, compiling annual reports, etc. These additional costs are absorbed by the issuers and – if they become relatively high – may deter increased green bond labeling. A loose parallel can be made with the market for carbon credits under the UNFCCC's Clean Development Mechanism (CDM), where transaction costs and the complexity of the MRV system were considered to be major barriers to development of projects. Similarly to MRV frameworks for carbon markets there may therefore be a trade-off between the quality and completeness of information and additional transaction costs. The nature of these two financial instruments is very different. The CDM aims at creating tradable carbon credits corresponding to quantified emissions reductions. Conversely, green bonds aim at communicating information without a direct link to carbon pricing. The CDM provides an example of high-quality/high-cost MRV system very different from the existing green bond MRV system, which is rather lax on impact reporting and assurance (**Table 6**).

While the green bond market might not require the level of MRV similar to that of the CDM, some sort of a mid-way to fill the gaps discussed earlier can be envisaged. Indeed, a certification system somewhat similar to that of the CDM could bring two tangible benefits to the green bond market. Firstly, it can help identify more precisely those projects that may need support though a project-by-project 'additionality' test. This would in turn foster the attraction of new net investments in the low-carbon transition. Secondly, using the CDM monitoring methodologies would help quantify mitigation outcomes and identify the projects with the highest 'environmental leverage' ratio, e.g. the amount of GHG emissions reduced per dollar invested. In this perspective and notwithstanding the issue of carbon credits, the CDM is a large source of commonly agreed methodologies certified by the UNFCCC to account for GHG emission reductions as well as a viable system of auditor accreditation (Shishlov, Morel, and Cochran 2016).

3.4. Next steps: harmonization and bolstering of external review and reporting practices

As discussed in Section 3.3, there are multiple challenges related to the external review process including the difficulty in selecting reporting indicators, the lack of comparability of information, potential conflicts of interest and transaction costs. In its report the TCFD recommends that 'organizations provide climate-related financial disclosures in their mainstream [i.e., public] annual financial filings' (TCFD 2017). The logical next step could therefore be the integration of climate-related external review – including but not limited to green bonds – in the broader financial accountability. International assurance standards (ISAE 3000) could offer possibilities to expand the scope of the verification to include standardized non-financial metrics and data, while engaging the 'Big 4' professional services could enable tapping into their expertise in auditing and assurance.

The European Commission has started to look into ways how standardization could spur the sustainable growth of the green bond market and a recent study advised to explore how a common 'European Green Bonds Standard' could underpin this objective (European Commission 2016). More specifically, building on existing market-led initiatives, the study provided recommendations for pre-issuance and post-issuance review, including different types of external reviews that currently exist in the market, such as consultant review, verification, certification and ratings. At the EU Member State level, the French government has pioneered this development and taken

TABLE 6. COMPARISON OF MRV SYSTEMS FOR GREEN BONDS AND THE CLEAN DEVELOPMENT MECHANISM

MRV component	Clean Development Mechanism	Green Bonds
Additionality	Demonstrated prior to certification	N/A
Certification	Mandatory, by an independent international body under the UNFCCC	Voluntary, CBS currently certifies only 15% of green bonds
Monitoring of environmental impacts	Mandatory, detailed and complex sub-sector-specific monitoring methodologies	Voluntary, no specific impact monitoring methodologies
Reporting	Mandatory, with sub-sector-specific rules	Voluntary, no specific rules
Verification	Mandatory, by accredited auditors	Voluntary (CBS: by accredited auditors)
Relative Costs	High (USD 0.1-1.5 per tCO_2)	Low (up to USD 50K per issuance)

Source: Authors

active steps to promote the green bond market as a tool to underpin the environmental and ecological transition in France, and has identified the need to further increase the comparability and consistency of reporting and external review practices by promoting and harmonizing best practices (MEEM 2016).

In order to ensure that reviewer organizations possess necessary skills and processes to undertake quality reviews an accreditation procedure could be put in place. Accreditation would make reviewers accountable, as it is done in other sustainability standards (e.g., FSC, MSC, ASC), technical certification schemes (e.g., ISO) or in most carbon pricing mechanisms (e.g. the EU ETS, the CDM, etc.). Moreover, reviewer accreditation could include the requirements to put in place a "firewall" separating consulting and auditing services in order to prevent the potential conflict of interest in external review, as it is done for financial audit firms. Indeed, past research on carbon accounting schemes demonstrated that the risk of losing accreditation appears to be a strong deterrent for auditors to manipulate environmental data (Bellassen et al. 2015). For firms to request accreditation, a standardization of the definition of green, of required processes for issuing a green bond and of evaluation methodologies could be necessary. In the absence of such standards, potential external reviewers/verifiers could be deterred from providing this service as it represents a reputational risk for them.

While the majority of green bond issuers provide reporting on the use of proceeds, environmental impact reporting remains anecdotal, which may put the environmental benefits of green bonds into question (CBI 2017e). The I4CE workshop participants highlighted existing tools incorporating impact reporting such as, for example: green evaluation tools by S&P, or Sustainalytics' portfolio carbon evaluation service. Nonetheless, there was an appetite among participants to see more, better, more consistent and comparable, and more timely disclosure. One example of such process is the joint harmonization work on impact reporting among Nordic public sector issuers coordinated by Kommuninvest (Kommuninvest 2017). There appears to be the need to balance short term impact evaluation (e.g. GHG emissions) and long-term transformative and strategic changes (alignment with a 2°C scenario). It was also highlighted that a dialogue with issuers is key to identify impact reporting approaches and metrics with new project types, such as adaptation. The TFCD report provides certain sectoral starting points that may help clarify the needs of impact reporting. Additional human resource investment will be needed to support robust impact assessment.

Overall, existing and future green bond frameworks – be they market-driven or regulatory – will need to take into account challenges outlined in this report in order to ensure the environmental integrity of the green bond market. Table 7 summarizes these challenges and gaps to external review and reporting discussed earlier, and outlines potential next steps for improvement.

Today green bonds do not enjoy the level playing field with traditional 'vanilla' bonds, as they are associated with additional transaction costs related to collection and reporting of information that the latter do not have to provide. Besides the additional transaction costs, this disparity creates a greenwashing risk related to the zero-sum nature of green labeling. Indeed, if a non-pure-play company that has both 'green' and 'brown' assets issues green bonds to finance or refinance eligible assets, its 'vanilla' corporate issuance automatically become 'less green'. Without the entity-wide disclosures and understanding of the broader transition strategy of an organization, green bond labeling may therefore be perceived as pure 'greenwashing'. Lack of mandatory climate-related disclosures on the entity-wide level may therefore negate the benefits brought about by the improved transparency through green bonds discussed earlier.

One of the largest efforts to promote climate-related financial disclosures was undertaken by the Task Force on Climate-related Financial Disclosures (TCFD) of the Financial Stability Board. In its final report the TCFD provided recommendations at four levels (TCFD 2017):

- Disclose the organization's governance around climate-related risks and opportunities.
- Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material.
- Disclose how the organization identifies, assesses, and manages climate-related risks.
- Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.

Implementing the TCFD recommendations could potentially allow the evaluation of 'greenness' of any corporate bond, which would be a significant step forward from the current coverage of green bonds that account for a tiny fraction of the overall debt market. France has already pioneered regulations for climate-related financial disclosures with the Article 173 of the Energy Transition Law, although so far the application results have been mixed (INDEFI 2017). The HLEG has acknowledged that 'an EU-wide equivalent of France's Article 173, or an obligation to disclose how sustainability is taken into account could boost sustainability investments' (European Commission 2017).

TABLE 7. STEPS TO IMPROVE THE GREEN BONDS REVIEW AND REPORTING PROCESS

Type	Advantages / functions	Market challenges / limitations	Ways how challenges could be addressed
Consultant review (ex-ante and sometimes ex-post)	Improvement on issuer disclosure. Ensuring the information investors are looking for is disclosed. Can be tailor-made and reflect the information most relevant to a given issuer.	(Perceived) transaction costs potentially limiting scaling of the market. Reviews may lack independence. Reviews often provide limited disclosure of environmental performance criteria.	Increased consistency and detail in disclosure for second party reviews. Creating codes of conduct to separate consulting and review services to minimize the risk of the conflict of interest.
Certification (ex-ante)	Reducing transaction costs through standardization. Verifiers undergo an accreditation procedure. Independence from issuer increased compared to second party review model if certification is carried out by an independent body. Eligibility criteria set in advance.	It is time-consuming and resource intensive to develop robust sector-specific criteria that would be applied in a given certification scheme. Issuers may be under the perception that undertaking third party assurance is costlier, in effort and money than a second party review, but this depends on cases. Ambitious certification standards might be difficult to spread due to the relative complexity of the process.	Governments could create new or support existing best-practice labels by offsetting the cost of certification in sectors that are deemed priority and/or aligned with a national decarbonization strategy.
Verification (ex-post)	Transaction costs can be lower, as the assurance can be integrated with general financial audits for the issuer. More independence than the second party review through adherence to international assurance standards.	In most cases, verification/assurance does not cover the environmental impacts of the projects funded by the bond. Post-issuance verification might result in a requalification of the green bonds and the risk for investors to see their investments classified as not green. Post issuance verification can give rise to confidential price sensitive information that must be managed with due consideration (market sensitivity, legal and regulatory implications).	International assurance standards (ISAE 3000) could offer possibilities to expand the scope of the verification to include standardized non-financial metrics and data. Engaging the 'Big 4' professional services tapping into their expertise in auditing and assurance. Engaging local auditing firms, while requiring them to apply a standardized approach to enable scale and improved access to international investors.
Ratings (ex-post)	The green bond reviews could benefit from rating agencies' credibility in the mainstream financial markets.	Certain rating agencies, such Moody's, are currently exploring green bond assessments that are focused on rating the process (management of proceeds, disclosure and reporting). Others, such as S&P Global, Vigeo, Sustainalytics or Oekom are providing detailed rating on how green the projects funded by the green bonds are. In some instances, this is combined with providing an overall ESG rating of the issuer (rather than the issuance). Investors may want more information on green asset quality, which some rating agencies do not directly have the expertise to assess.	Adapt methodologies to ensure that a green bond cannot get a high green bond rating based on good management of proceeds and reporting processes alone if the bond is not funding sound green projects.
Reporting on the use of proceeds (ex-post)	Reporting on the use-of-proceeds serves to ensure that the money raised through the issuance of green bonds is actually spent on green projects.	Three quarters of green bonds provide reporting on the use-of-proceeds, however, the level of detail may range from only broad categories to the level of projects. Existing frameworks do not mandate the use of concrete KPIs for different sectors.	Reporting on the use-of-proceeds should become mandatory as it is the essence of green bonds. The level of detail and concrete type of information to be reported has to be specified in future and existing frameworks.
Impact reporting (ex-post)	Impact reporting serves to provide investors and observers with information on environmental outcomes of investments underlying green bonds.	About a third of green bond issuers provide information on environmental impacts and only a quarter provide detailed information. The choice of impact indicators is not regulated and remains a challenge for comparability and relevance of information.	Ratchet up the work of the ICMA on harmonized impact reporting for all sectors and develop sub-sectoral KPIs. Explore the possibility of adapting existing GHG calculation methodologies (e.g. the CDM) for the green bond market.

Source: Authors

Conclusions:

Harmonization of green criteria and improved reporting are required for labelled green bonds and across the financial sector

This report aimed at improving the understanding of stakes and challenges related to the environmental integrity of labelled green bonds and suggesting potential next steps for both private and public stakeholders. Financial institutions are, and will increasingly be, exposed to the risks relating to climate change: physical, transition and litigation risks. Managing climate-related risks and opportunities requires additional information on all financial products and services – as well as on underlying assets – to assess their alignment to the low-carbon climate resilient (LCCR) transition. The green bonds market is increasingly seen as having important potential to contribute to this process through the systematic labelling of an increasingly significant portion of the bond market. While there is an increasing consensus that this additional transparency brings added value, there are however neither harmonized definitions and taxonomies, nor a common reporting framework for green bonds. This lack of harmonization has already translated into a number of controversies highlighting environmental, reputational and legal risks that the green bond market is currently facing.

There is a number of challenges related to the establishment of commonly accepted green definitions including: different investor expectations, national circumstances, time horizon, scope of assessment, and disconnect between labelled green bond issuance and the overall environmental strategy and 'greenness' of an issuing entity. As of publication, three principal initiatives are working on harmonization of green definitions including the European Commission's HLEG at the EU level, the China-EU dialogue at the bilateral level and the ISO standard at the international level. Governments should support these processes by speeding up the elaboration and communication of their long-term low-carbon development strategies as mandated by the Paris Agreement and fostering labeling based on best practices. Moreover, establishing a commonly accepted taxonomy of green assets (not only green bonds) would help increase the overall transparency of the financial system and help reduce transaction costs in the long-run thanks to standardization and streamlining processes.

Implementing reporting and verification procedures for green bonds faces a number of challenges, including: comparability vs. relevance of information; conflicts of interest; choice of impact assessment indicators; voluntary vs. legal reporting obligations; and additional transaction costs. External review and assurance procedures will have to be reinforced and streamlined in order to address these issues and boost the credibility of the environmental integrity process for green bonds. In order to ensure the quality of external review and avoid the potential conflict of interest, an accreditation procedure can be implemented in new/existing standards/labels similar to the one practiced by the CBS or procedures applied in carbon accounting schemes.

While about two-thirds of labelled green bond issuers report on the use-of-proceeds, the reporting on environmental impacts of underlying investments is currently done by only a third of issuers, although it is increasingly seen as the best practice. The ICMA is piloting the work on impact reporting harmonization, although the existing reporting templates so far cover only three out of ten thematic areas as defined by the GBP. Moreover, there is no harmonized set of impact reporting indicators, which remains a challenge for comparability and relevance of information. Indeed, as it currently stands, the green bond market does not allow investors to assess the alignment of the assets with the LCCR transition. Key sub-sector indicators for impact reporting adapted for climate-related portfolio assessment will therefore need to be developed for green bonds and other financial products.

Overall, disclosure and reporting guidelines for green bonds should be coherent with guidelines for reporting on other financial instruments, and above all reporting on the climate impact of a financial portfolio for financial institutions. These approaches currently differ as most green bond impact reporting carried out today does not permit financial actors to directly input this information into reporting on the overall "greenness" of their portfolio. Notably, financial actors currently use carbon intensity metrics mainly for reporting on the climate-impact of their portfolio whereas GHG emissions reporting is rarely provided in green bond reporting (see section 3.2). Furthermore, financial actors and research centers are currently developing scenario-based methods to assess the impact of climate-related risks and opportunities on the financial performance of corporate actors. Thus, the next challenge for the market is the development of methodologies for green bonds' reporting to go beyond simply checking 'use of proceeds' against a simple taxonomy or reporting on a single indicator

of GHG emissions. For green bond reporting to support the analysis of the "greenness" of financial portfolios in the near future, impact reporting should aim to assess the degree of alignment with a 2°C trajectory of the issuing entity - and not only the underlying assets themselves.

Based on the conclusions above, several areas for future research to support the harmonization of green definitions and bolstering of the impact reporting processes can be identified:

- Detailed evaluation of different climate-related indicators – e.g. GHG intensity or GHG emissions reductions against a baseline – and the assessment of how each indicator could or could not contribute to aligning financial portfolios with the LCCR transition;
- In-depth analysis of the additional burden in terms of transaction costs that issuers would have to incur should the green bond market move towards more robust MRV system, such as the one used by the UNFCCC under the CDM;
- Assessment of different policy options to encourage or mandate climate-related financial disclosures across the financial sector beyond the green bond market, which could in turn help address the "zero-sum" nature of green bonds.

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