

Network for Greening the Financial System

Technical document

A Status Report on Financial Institutions' Experiences from working with green, non green and brown financial assets and a potential risk differential

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Executive summary

A point-in-time survey of how financial institutions are tracking green, non-green and brown risk profiles...

It is important for financial institutions to consider all relevant risks in order to avoid suffering unexpected losses. Such losses could potentially have a negative impact on the stability of the financial system. Against the backdrop of the increasing impact from climate- and environment-related risks in the financial system¹, financial supervisors need to understand how these risks are taken into account by supervised institutions.

Therefore, with the help of a select group of financial institutions, the NGFS has performed a survey to assess whether a risk differential could be detected between green, non-green and brown² financial assets. **This survey focuses on the work performed by financial institutions to track specific risk profiles of green, non-green and brown financial assets (loans and bonds), develop specific risk metrics and analyse potential risk differentials. It aims to present a point-in-time snapshot of current practices among financial institutions**, based on the information these institutions have obtained up until now. Forty-nine banks from the following jurisdictions have submitted their answers (anonymised in this report): Brazil, Belgium, China, Denmark, Finland, France, Germany, Greece, Japan, Malaysia, Morocco, the Netherlands, Portugal, Spain, Sweden, Switzerland, Thailand, the UK, and one supranational. We have also received answers from five insurance companies in Malaysia.

...shows that the institutions have not established any strong conclusions on a risk differential between green and brown

The striking result from the study was the diversity of methods, results and motivations for whether to

undertake a climate- and environment-related risk assessment. Most of the institutions have undertaken an operational commitment towards greening their balance sheets, with 57% of the respondents undertaking commitments that affect their daily operations either by limiting their exposure to brown assets or by setting green or positive-impact targets. However, **the survey responses highlight that the underlying justification is not based on an attested financial risk differential between green and brown assets but rather on a more diffuse perception of risks.** Most banks tend to consider their actions to be part of their corporate social responsibility or mitigation measures for reputational, business model or legal risks.

Backward-looking studies on a potential risk differential have only been performed by five respondents. Another three respondents (banks) indicated that they conducted backward-looking analysis with ESG or energy rating of housing loans, but not strictly using green or brown criteria. In both cases, **they failed to reach strong conclusions on a risk differential between green and brown assets.** These studies have been limited to sub-sectors and performed on a project-basis rather than at counterparty level. Overall, it appears that it is only possible to track the risk profile of green, non-green and brown assets in very few jurisdictions. An important reason for this is that the prerequisites, e.g. a clear taxonomy and available granular data, are not yet in place in most jurisdictions. **These results illustrate the challenges for banks and insurance companies to assess their exposure in the absence of common classifications and the inherent limits of backward-looking analysis in a rapidly developing area.**

¹ See NGFS first comprehensive report "A call for action: Climate change as a source of financial risk", April 2019

² As of yet, there are no clear, uniform definitions of the commonly used terms "green", "non-green" and "brown" are being used. We abstain from adhering to any particular definition. Please see section III.

Using national or international taxonomies and/or principles is the most common approach for classifying green and brown assets...

In its first comprehensive report, the NGFS established the need for a clear taxonomy³ as a prerequisite for a better understanding of possible risk differentials between different types of assets⁴. Given the **the lack of an official taxonomy in the majority of jurisdictions**, the most common approach among the respondents has been to **implement and use an international or national classification in the form of a voluntary classification or principle. The second most frequent approach is to use an internally developed classification**. There is a wide variety of approaches to classify assets, the most common being to classify the assets by the use-of-proceeds method. **The survey shows a growing use of climate-related taxonomies among the respondents:** only 15% of the respondents did not use any taxonomy or voluntary principle, and the majority of them are considering implementing an international/national taxonomy in the future.

...but there are some challenges to overcome when classifying financial assets

The majority of the institutions only apply their internal classification to a part of their assets within each asset category (bonds or loans). Several respondents highlight that they encounter **different challenges when trying to classify different types of assets** (e.g. loans, bonds, investments). For loans in particular, whilst the classification of single purpose loans (e.g. within project finance) may seem quite obvious, **loans for general corporate purposes have a weaker direct link to a physical asset or a project and seem more difficult to classify**.

Lack of harmonised client data and a lack of internal resources are other main challenges

Many respondents stressed the lack of harmonised client data as the main obstacle for defining the greenness of an asset. One root cause identified by some

respondents is the lack of legal disclosure requirements for companies to report verified data on a sector-specific basis, but respondents also highlighted some limitations of international or internal taxonomies and classifications.

The respondents stressed the **internal challenges** posed to their organisations. The integration of climate- and environment-related risk assessment into their usual risk analysis requires the build-up of internal knowledge as well as investment to adapt existing IT systems to track this emerging risk.

Different views on methodologies for assessing the effective riskiness of green and brown assets...

The respondents provided a number of comments on what methodology characteristics are important for assessing the effective riskiness of green or brown assets. In particular, diverging views were expressed with regard to the question of **compatibility with existing methods or models**. Some respondents take the position that climate-related risks can be considered in existing internal rating-based approach (IRB) standards, while others feel that the different timeframes do not allow for this⁵. Some respondents highlighted the need to consider long horizons in a **forward-looking approach** through scenario analysis and forward-looking assessment of relative riskiness.

In terms of the development of **methodologies for the assessment of the vulnerability of counterparties** to climate- or environment-related risks, respondents broadly agreed that the methodologies should **consider key environmental issues** that could **impact the repayment ability of clients or the value of an asset**. For economic sectors, the sensitivity to key parameters could be assessed. However, according to some institutions, it may be necessary to go deeper than the sectoral level and perform risk assessment at an individual or corporate level. Some institutions are currently working on integrating **counterparty ESG factors** into their credit processes and, subsequently, their risk management frameworks.

3 A taxonomy can be defined as a system for organising objects into groups that share similar qualities.

4 See NGFS's first comprehensive report, "A call for action: Climate change as a source of financial risk", April 2019, Recommendation N° 6.

5 The IRB model uses a time horizon of one year, but climate risks are expected to fully materialise over a longer time frame..

Respondents mentioned a variety of **environmental risk monitoring measures** including ESG scoring, Risk Appetite Statement (RAS) limit setting, an internal capital allocation model, and environmental veto systems.

...and some respondents have entirely different views

A few of the respondents consider **monitoring of the specific risk profiles of green or brown assets is not – and should not be – a priority** in their on-going work on climate-related challenges. Some institutions also raised **doubts on the relevance of monitoring risk profiles based on green and brown classifications** and insisted on **other more decisive risk factors**.

Forward-looking studies still at an early stage

Forward-looking studies to assess how different climate scenarios can affect different kinds of activities and assets were performed at the portfolio level by twelve respondents (22%). Of these forward-looking studies, **scenario analyses** and **stress tests** are the most common. These types of analyses are typically at an early stage and often stem from international initiatives such as the TCFD and the UNEP FI pilot, in which some respondents participated.

Tentative conclusions and high-level messages to financial institutions

The survey does not allow us to conclude on a risk differential between green and brown assets. Overall, it appears that in all but a few jurisdictions the prerequisites for tracking the risk profile of green or brown assets are not yet in place. The vast majority of institutions cannot yet conclude on the relationship between greenness and credit risk, pending further analyses, which require a better tagging of exposures and meaningful performance data. With those prerequisites in place, it should be possible to expand the risk management tools already in use for more traditional risk categories to comprise climate-related and environmental risks. Given **the increasing magnitude of climate change and its impact on the financial system, forward-looking methodologies are necessary to assess the impact on individual financial institutions.**

Why focus on potential risk differentials between green, non-green and brown?

Most local and regional prudential frameworks are based on BCBS and IAIS¹ standards for banks and insurance companies. The BCBS guidelines *Principles for the Management of Credit Risk*² state inter alia, that banks should identify and analyse existing and potential risks inherent in any product or activity³.

Against the backdrop of the increasing impact from climate and environmental risks on the financial system⁴, supervisors need to better understand how and to what extent such risks translate to financial risks. An important part of this work is to analyse the potential risk differentials between green, non-green, and brown financial assets and how financial institutions take these risks into account in their credit assessments.

If, for example, a consistent link between brown financial assets (such as loans or bonds) and higher default rates could be established, financial institutions holding such assets would need to safeguard themselves against this increased default risk. This would mean for example, closer risk monitoring and setting aside more economic capital.⁵ Regulators would probably also need to consider increasing regulatory capital requirements⁶ held against these assets in order to safeguard financial stability.

In 2018, the NGFS performed a preliminary stock-take of studies conducted by market participants on credit risk differentials between green, non-green and brown financial

assets. The findings showed that it was not possible to draw any general conclusions on potential risk differentials based on the studies conducted so far. These studies also pointed to differing results depending on the financial assets that had been surveyed, the geography and the underlying factors the study had been able to control for. Based on this, the NGFS pointed to the need for further fact-gathering and analyses.

The NGFS therefore decided to perform an exploratory data collection from selected institutions. The original intention was to analyse the collected data, and assess whether a risk differential could be detected between green, non-green, brown and non-brown financial assets. However, due to the lack of relevant and comparable data, the scope and methodology were slightly altered. **In the end, this survey does not allow a conclusion on a risk differential between green and brown assets. However, it provides a useful and encouraging snapshot of the current practices among a sample of financial institutions around the globe to monitor climate-related financial risks and the challenges these institutions are facing.**

Scope and methodology of the exercise

The scope has been to collect information from financial institutions⁷ on how they have responded to the need to take the emerging climate-related risks into account in their risk assessment.

Given that a number of the prerequisites financial institutions need to do this are lacking, the exercise was confined to tracking the respondents' experiences on specific risk profiles of green and brown financial assets (loans and bonds), and the extent to which they have developed specific risk metrics and analysing if respondents detected any potential risk differentials between such assets.

1 The Basel Committee on Banking Supervision (BCBS) is the primary global standard setter for the prudential regulation of banks. The International Association of Insurance Supervisors (IAIS) is responsible for the regulatory cooperation regarding the supervision of the insurance sector.

2 <https://www.bis.org/publ/bcbs75.htm>

3 Principle 3, article 23

4 See i.a. the NGFS first comprehensive report, April 2019

5 Economic capital is the amount of capital needed to cover a financial institution's risks in a going concern. It is basically a function of Probability of Default (PD), Loss Given Default (LGD) Exposure at Default (EAD) and a factor covering for unexpected losses.

6 Regulatory capital is calculated along the same principles as economic capital but has been adapted to cover regulatory issues.

7 In this report we define financial institutions as only banks and insurance companies.

This exercise aims to present a point-in-time snapshot of current practices among financial institutions based on information they have obtained up to now.

Another objective has been to collect information on the different methodologies used to classify and assess climate and environmental risks at the asset, activity, borrower and/or industry level. The aim is to arrive at a snapshot of current leading practices in financial institutions and also describe challenges encountered.

An information request was sent to large international banks identified by members and observers of the NGFS, (in one jurisdiction it was also sent to large insurance companies). The request for participation was on a voluntary and anonymous basis. Names of individual institutions therefore do not appear in this report.

1. Classification principles

1.1. What is green and what is brown?

An important starting point in the analysis of risk differentials is defining what is meant by green, non-green and brown labels. As the NGFS concluded in its comprehensive report in 2019, there is no clear definition of these labels. The NGFS identified a clear taxonomy around green, non-green, brown and non-brown activities as a prerequisite for deepening its analytical work on, amongst other issues, possible risk differentials between different types of assets.⁸ While efforts are being made to move in this direction, most jurisdictions⁹ did not have an official taxonomy in use at the time this survey was conducted. This was also reflected in the respondents' answers.

In their replies, respondents used different terms, such as climate, climate- and environmental, green, and the broader ESG. In some cases, respondents also incorporated

different aspects into the same term. As a result, it is possible that respondents are categorising the same asset differently. For example, some respondents define palm oil as green since it could replace aircraft fuel. This represents a pure climate perspective. Other financial institutions consider palm oil to be unsustainable, referring to the environmental problems that are related to deforestation and monoculture issues associated with palm oil tree plantations.

Another important aspect in the analyses of risk differentials is the need to clarify if the labels used are applied to physical assets, financial assets or activities, as this also affects how and to what extent it is possible to analyse how the greenness or brownness affects e.g. the credit risk of a counterparty. This is further elaborated upon in Appendix 1.

This chapter aims to outline the different definitions and taxonomies used or developed by industry participants themselves in the absence of a common global taxonomy taking the above-mentioned challenges into account. It should not be seen as a complete description of taxonomies and classification systems. To learn more about each of the taxonomies, classifications and principles described in this chapter, interested readers are referred to relevant webpages or Appendices 3 and 4 of this report. Furthermore, the chapter does not aim to compare or evaluate different approaches.

Taxonomies, classifications and principles

The following definitions will be used throughout the report, and each taxonomy, classification, and principle has been assigned to one of the definitions:

- **Taxonomy** = A taxonomy (established or under development) that has been awarded an official status and is mandatory. We identified the following taxonomies as applicable to the respondents of our survey:
 - The EU Taxonomy¹⁰
 - The Chinese Taxonomy¹¹

8 See NGFS's first comprehensive report, "A call for action: Climate change as a source of financial risk", April 2019, Recommendation No 6.

9 Please see exceptions listed below under the definition of "taxonomy".

10 The European Parliament and the president of the European Council agreed on the text of a EU-wide taxonomy in December 2019. https://ec.europa.eu/info/publications/sustainable-finance-teg-taxonomy_en (Accessed 2020-01-16)

11 Please see Annex II for a short summary of the taxonomy. A comprehensive summary including examples can also be found in the Sustainable Banking Network's report from October 2019, page 51.

Examples of other taxonomies, which have not been covered in this specific survey are:

- The Bangladesh Taxonomy¹²
- The Vietnam Central Bank’s directive on green loans E&S risk management¹³
- The Pakistan Central bank requirement on FI to follow the Green Banking Guidelines including the belonging taxonomy.¹⁴

• **International and/or national classifications and principles** = All voluntary international and/or national classifications and principles. The following classifications and principles were mentioned most frequently by the respondents in our survey:

- The Brazilian banking association’s classification framework at the national level.¹⁵
- Recommendations from the Task Force on Climate-related Financial Disclosures (TCFD).¹⁶
- The United Nations Environmental Programme Financial Institutions (UNEP FI) working group framework, including the Principles for Responsible Banking¹⁷
- Green Bond Principles¹⁸
- Green Loan Principles¹⁹
- Equator Principles²⁰
- The Moroccan Capital Market Authority’s (AMMC) guidelines at the national level regarding green, social, and sustainability bonds²¹

Examples of other international and/or national classifications and principles that have not been covered in this specific survey are:

- The Common Principles for Climate Mitigation Finance Tracking developed by multilateral development

banks (MDBs) and the International Development Finance Club (IDFC)²²

- **Internally developed classifications** = A classification developed by the institution itself. If the classification has been inspired in whole or in part by international classifications or principles, there needs to be some sort of an internally developed classification system for it to qualify for this group.

1.2. Most respondents use a voluntary classification or principle

In this survey, information has been collected on the different methodologies used by financial institutions to classify and assess climate- and environment-related risks at the asset, activity, borrower and/or sector level. The most common approach by far has been to implement and use a voluntary international or national classification or principle (Figure 1).

The second most frequently used approach is to use an internally developed classification. Although this group of respondents is much smaller, it represents an interesting step forward in the work conducted by financial institutions, and we have therefore chosen to dive deeper into the responses from this group.

The study shows that the use of internal classification is a relatively new development since the majority of respondents have first implemented and used such a framework within the past two years. Only a few institutions have used their internally developed classification for

12 A comprehensive summary can be found in the Sustainable Banking Network’s report from October 2019, page 50. The basis for the taxonomy can be found at <https://www.bb.org.bd/mediaroom/circulars/brpd/feb272011brpd02e.pdf> (Accessed 2020-02-17)

13 A comprehensive summary including examples can be found in the Sustainable Banking Network’s report from October 2019, page 50.

14 A comprehensive summary including examples can be found in the Sustainable Banking Network’s report from October 2019, page 51.

15 Please see Annex III for a short summary of the taxonomy. A comprehensive summary including examples can also be found in the Sustainable Banking Network’s report from October 2019, page 51.

16 <https://www.fsb-tcf.org/publications/final-recommendations-report/> (Accessed 16 January 2020)

17 <https://www.unepfi.org/publications/principles-for-responsible-banking/> (Accessed 16 January 2020)

18 <https://www.icmagroup.org/green-social-and-sustainability-bonds/green-bond-principles-gbp/> (Accessed 16 January 2020)

19 https://www.lma.eu.com/application/files/9115/4452/5458/741_LM_Green_Loan_Principles_Booklet_V8.pdf (Accessed 16 January 2020)

20 <https://equator-principles.com/> (Accessed 16 January 2020)

21 A comprehensive summary can be found in the Sustainable Banking Network’s report from October 2019, page 50.

22 <https://www.worldbank.org/content/dam/Worldbank/document/Climate/common-principles-for-climate-mitigation-finance-tracking.pdf> (Accessed 17 February 2020)

Figure 1 **Which of the following taxonomies/ classification/principles do the institutions use today?**

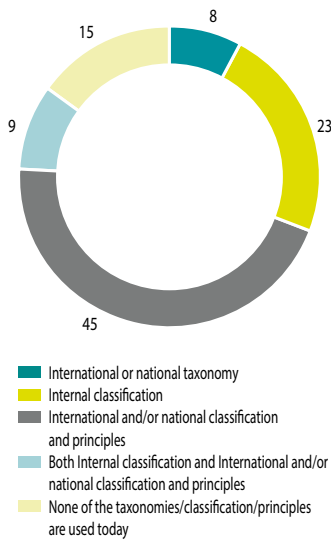
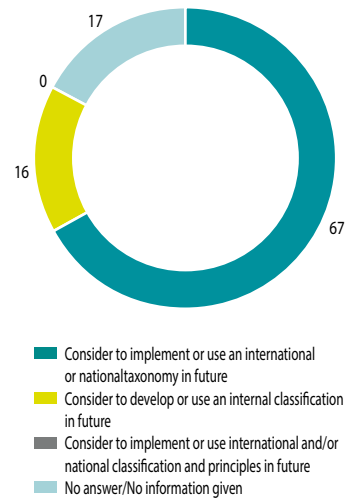


Figure 2 **Of the institutions that do not follow a taxonomy/classification/principle today, how many are considering whether to use one of the following in the future?**



* Note that when an institution has both an internal classification and uses international and/or national classifications and principles, this is because they may be using an internal developed classification on, for example, the loan side while using green bond principles on the bond side.

more than five years. Some respondents do not use an internal classification but are considering whether to do so in the future.

The NGFS can conclude that there is a high degree of variation in the design of the internal classifications developed by institutions. One recurrent approach is to have a scale which ranges from deep green to neutral to dark brown. What is considered to be deep green in these cases depends on the degree of climate-related impact as well as other environmental factors. In Appendix 2, an anonymous case study has been constructed from several examples that can be considered leading practices.

Fifteen percent of the respondents do not use any taxonomy or voluntary principle yet (Figure 1). However, Figure 2 shows that most of them are considering whether to use one of the classification frameworks in the future.

Moving forward, the majority of respondents state that they are considering whether to implement an international/national taxonomy (Figure 3). Respondents refer mainly to the EU taxonomy, regardless of whether the institution operates within the EU or not. Of the 11 percent that are neither considering whether to develop an internal classification nor implementing an international/national

taxonomy/classification or principle, 80 percent state a reason that is further elaborated on in the section “Alternative views on the use of the taxonomies and classifications” at the end of this section.

Figure 3 **Which taxonomies/classifications/principles are the institutions considering whether to use in the future?**

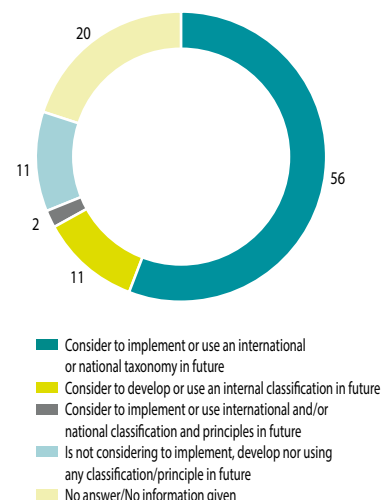
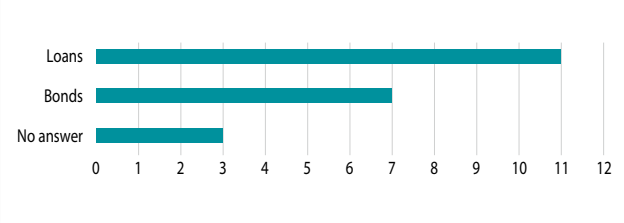


Figure 4 **Number of institutions applying their internal classification to one or more of the following asset categories**



The majority of the institutions only apply the internal classification to part of their assets within a specific type of asset (i.e. bond or loan). The most common approach has been to classify the assets by use of proceeds. Otherwise, a wide variety of approaches were used, for example:

- Qualitative sector scoring in combination with a quantitative scoring method
- Only classifying pure play companies
- Classification by type of activity and credit risk standards on ESG
- Classification by certain predetermined qualitative criteria for each sector

1.3. Alternative views on the use of the taxonomies and classifications

Focus on activities with adverse climate environmental impact

With regards to the classification of assets, some respondents argue for the need to focus on activities with an adverse climate and environmental impact. This view has been presented by some banks active in project finance. Its basis is that if greenness is defined as “producing positive impact on the environment” and brownness as “producing negative impact on the environment”, then the hypothesis is that what is likely correlated with credit risk is not greenness, but rather brownness. The reasoning behind this is that brownness will sooner or later induce intervention from public authorities to reduce the negative impact, which will hamper profitability and cash-flow from such activities. However, on the other hand, respondents have so far not been able to verify a clear corresponding link between greenness and better profitability/cash flow.

According to this view, financial institutions and supervisory authorities should aim for more granular data specifying which activities cause a negative impact on the climate or the environment rather than focusing too much on defining greenness. Thereafter, the focus should be on trying to identify whether there is any correlation between that data (such as CO₂ emissions) and financial risk data (default rates).

Respondents also pointed out that there is sometimes a missing link in taxonomies between the categorisation of an asset and its underlying financial risk. In other words, taxonomies do not necessarily categorise the assets on the basis of underlying financial risks (such as credit risk) with quantifiable evidence.

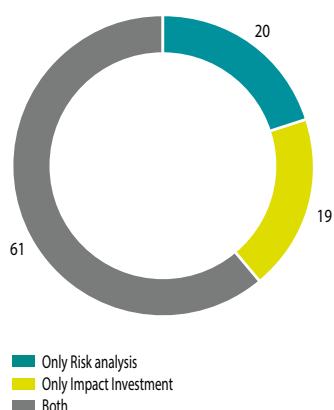
2. Respondents’ views on the risk aspects and risk assessments performed by the industry

2.1. Various motives for engaging in climate- and environment-related issues

A wide range of motives from a risk perspective

Most respondents have undertaken operational commitments for greening their balance sheets, although these commitments are not necessarily based on an attested financial risk differential between green and brown assets. Many financial institutions tend to not act on a pure climate or environmental risk analysis but rather consider their actions to be part of their corporate social responsibility or measures to mitigate reputational, business model or legal risks (Figure 5). **The striking result from the study was the diversity of methods, results and motivations behind the decision whether to engage in such issues.** For example, as an illustration of the diversity of interpretations and positions of climate and environmental

Figure 5 Respondents' motivation for green operational commitments



risks, some financial institutions limit their adverse impact and increase their positive impact on the climate while others introduced sector/industry exclusion policies to avoid stranded assets, primarily to avoid reputational risks.

Few of the responding institutions are not active at all with regard to climate or environmental issues. Only eight respondents (18%) were not planning to take any climate or environmental action in the coming three years. Conversely, 31 respondents (63%) had implemented measures that affect their daily operations, by either limiting their exposure to brown assets or setting green or positive impact targets.

Commercial motives behind most of the increase in green loans and bonds

The level of sophistication in the issuance of green loans differs across both financial institutions and geographies. However, a recurring feature for most respondents is the link between green loans and green bond issuances. The opportunity to place such bonds on the market seems to be a strong incentive for banks to offer green loans. Respondents report that the issuance of green bonds has increased quickly following trends in green financial assets, but their value on the balance sheets of both issuers and investors remains low. Some respondents mentioned that upcoming supervisory and regulatory guidance would affect both the amount and the processes of green loan issuance.

23 International Capital Market Association Green Bond Principles provides guidelines on the approach for issuance of a green bond.

24 The Climate Bond Initiative sets out criteria to verify certain green credentials of a bond or other debt instrument. This framework specifically focuses on climate change.

Issuance of green bonds

All financial institutions that offer some kind of green loan product reported that their green loan book was originated with the purpose of issuing green bonds. Moreover, all these respondents reported that they use the Green Bond Principles²³ in some way as standard. They also reported that:

- Use of proceeds is clearly specified in the issuance frameworks,
- Loan origination is carried out by using a project selection benchmarked on external standards;
- Loans are monitored (monthly, quarterly or yearly) in order to confirm their eligibility.

Two financial institutions mentioned a very special and specific use of their green issuances. One respondent mentioned the use of green bonds in their international cooperation as a way to finance foreign governments. The other mentioned that the issuance of green bonds supports the achievement of meeting the minimum regulatory requirement for own funds and eligible liabilities targets.

Investment in green bonds

Financial institutions investing in green bonds also use the Green Bond Principles for their investment decisions. Some respondents also use the Climate Bond Initiative (CBI) verification.²⁴ While most of the financial institutions have no specific portfolio or investment strategy for this segment, some have set specific targets. Mirroring what was mentioned above regarding the relative size of the green bond market, one respondent referred to this as the main obstacle for setting up separate green bond investment desks.

A few financial institutions reported the use of green bonds as part of their liquidity buffer because of the green bonds' eligibility criteria for high-quality liquid assets in the computation of the regulatory Liquidity Coverage Ratio. Specifically, one financial institution mentioned having established a specific counterbalancing capacity target for green bonds.

Another way in which financial institutions engage in the field of green bonds is the activity of advisory, structuring and origination for large corporates that want to issue green bonds.

2.2. Backward-looking approaches are not conclusive yet on a risk differential

No clear evidence for the existence of an ex-post risk differential for green financing compared to non-green or brown financing...

With respect to performance monitoring, **most of the financial institutions responded that they were unable to detect any ex-post risk differential for green financing compared to non-green or brown financing.** However, some financial institutions mentioned **various risk-based rationales for green loans:**

- Corporates with ESG projects tend to have better risk management. The main argument is that such companies are more in control of the environment in which they operate and are more likely to continue being in business. They are less likely to suffer from extreme events and show better business continuity management.
- Corporates investing in energy-efficiency projects are also more likely to improve their profitability. Financial institutions argue that such companies, especially in energy-intensive sectors, will achieve substantial cost savings and higher margins to pay for both the debt and the new projects.
- Green buildings have a higher value and are more marketable.

One financial institution argues that, in a very low interest rate environment, it is extremely difficult to assess a potential risk differential as financing costs are low for most of the businesses.

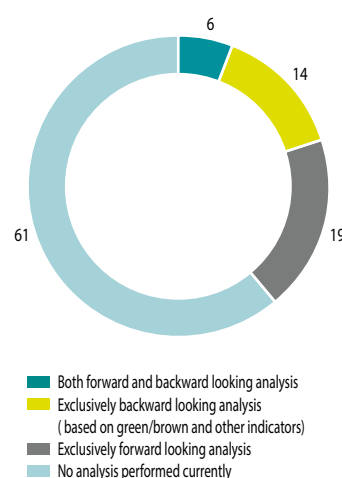
Some financial institutions provided **evidence of a risk differential in the financing of larger projects**, although evidence from different respondents pointed to **both higher and lower risk for green exposures.** Some of the observations come from analyses using historical (backward-looking) data and some are isolated observations.

- Higher risk: Green financing tends to be riskier as it is strictly linked with the ongoing development of the regulatory environment. For instance, a change in the regulatory framework withdrawing support for a certain type of renewable energy production has sometimes led to increased default rates for such projects in the green loan portfolio.
- Lower risk: Green project financing tends to be less risky because the project assessment process is more thorough. In addition, green project financing usually involves specific investment players that are focused on the specific sector, and therefore are better aware of the criticalities.

As can be seen in Figure 6 below, **the majority of respondents have not performed dedicated analyses to investigate the existence of a potential risk differential between green and brown financial assets or activities.**

Only five institutions, representing 10% of the respondents, provided results from a backward-looking analysis purely related to green and/or brown factors, and then only for a subpart of the whole portfolio. Studies either concentrated on (i) a potential green and brown risk differential and (ii) more general environmental risk. Both approaches **fail to reach a strong conclusion.** Studies have been limited to sub-sectors and performed on a project basis rather than counterparty level. The main takeaways from the studies by five financial institutions are presented in Box 1 at the end of this section.

Figure 6 Type of climate and environmental risk analysis performed by banks



Scoring methodologies are considered to be forward-looking analyses.

The **main arguments** presented by respondents who have **not performed** backward-looking analyses are the following:

- **Lack of a taxonomy** in the vast majority of respondents' jurisdictions
- Several respondents consider **such an analysis as irrelevant** given that: (i) **historical data do not reflect future climate-related risks**; and (ii) determining the **greenness** and **brownness** of an asset is **not sufficient** to assess its exposure to climate-related risks.

A large number of respondents highlighted the complexity in defining the level of greenness of an activity or an asset without an official definition. One respondent mentioned that *"the level of greenness and/or brownness is not an exact science. Some sectors could include both positive and negative economic activities, for example hydro power"*.

Box 1

Examples of backward looking analyses on the riskiness of "green" and "brown" assets

Example 1

With regard to the definitions of green and brown used in the studies, two financial institutions reported the use of internal definitions in compliance with the green loan/industry scope set by national regulators. The first institution analysed fourteen industry sectors and found much lower default rates for green assets than the overall default rate of the industry for thirteen sectors, but no further details are provided. This financial institution also defines brownness, but it is not clear from the response whether it is an internal definition or one that corresponds to the national taxonomy. The second financial institution issued an internal classification of its domestic corporate loan customers and projects into four grades and twelve categories according to the impact of loans on the climate and environment. No further information on results or a potential internal definition of *brown* was provided.

Example 2

One financial institution tried to analyse the correlation between greenness and credit risk using an internal rating on the contribution of projects to "climate change mitigation, pollution reduction and maintaining resilient infrastructure" as a proxy for greenness. The institution found no conclusive results for two main reasons: (i) the analysis does not compare equivalent metrics since the greenness is assessed on a project basis while credit risk is measured at a client/counterparty level; and (ii) there is insufficient data to make any further analysis.

Example 3

Another financial institution conducted a proxy analysis for the purpose of this questionnaire. It defined brownness as the financing of "carbon related assets" as indicated by the TCFD recommendations. It analysed the correlation of credit risks between "brown finance" and "non-brown finance". The results indicate that brown finance does not have a correlation with credit risk: the Probability of Default is not necessarily higher for brown finance than non-brown, however no further interpretation of the results is provided.

Example 4

An analysis was conducted specifically for the purpose of this questionnaire based on the bank's project finance portfolio while using proxies for green and brown on the energy industry. The respondent found that, for the project finance portfolio, more downgrade cases could be observed in renewable energy power generation (i.e. green) than in the coal and gas fired power generation (i.e. brown). According to the financial institution, this could be explained by the fact that renewable energy power generation is still partly dependent on public financial support (e.g. feed-in-tariff structure and tax incentives), and its credit profile is adversely affected when there are changes in public financial support resulting in more downgrade cases.

Some respondents conducted backward-looking analyses using a **broader ESG perspective** than green and brown, but they **also fail to reach clear conclusions regarding**

a possible risk differential. Two examples are given in Box 2 below.

Box 2

Examples of backward-looking analyses on the correlation between ESG risk and credit risk or profitability

One institution conducted some initial work on the correlation between ESG risks and various credit-related risk metrics on large corporate customers based on approximately two years of data. The institution finds some correlation between the credit risk ratings in the very extreme ends of the rating range (i.e. highest risk vs. lowest risk), whereas no clear conclusions can be drawn from the middle area. The institution concludes that this was to be expected as ESG ratings are impacted by e.g. reputational factors.

Another financial institution conducted a study which shows that companies with a high external ESG rating also have higher and more stable returns than the market and less share price volatility. However, the financial institution cannot confirm the causality between the factors and results.

...while some respondents assess that there will be enhanced possibilities going forward

Relying on current investigations and projects, some financial institutions stated that they **will be able to assess**

the possible risk profile relationship between green/brown assets, or climate-/environment-related risks, and financial risks **in the near future.** Some of the projects are tied to the ongoing development of the EU taxonomy; please see examples in Box 3 below.

Box 3

Examples of other possible solutions for backward-looking analyses

Some respondents intend to study the correlation between green assets and credit risk going forward and are initiating projects to incorporate the necessary data into the institutions' systems.

One financial institution indicated that it has already started to roll out the EU taxonomy to its credit portfolio,

and that, from 2020, it should be able to classify upcoming transactions accordingly for at least some sectors.

Another financial institution stated that it would endeavour to track its "green" sub-portfolio separately to be able to make comparisons in the future.

Another respondent prefers to analyse the dark brown share of its portfolio in order to monitor the climate transition risk. In a next phase, the financial institution intends to study the possibility of realising a historical analysis of the credit rating history and default history compared to the climate rating of each counterparty.

2.3. Forward looking approaches may be a better tool for capturing this emerging risk

Forward looking analyses were performed by a total of 12 respondents (22%) within our sample. **Scenario analysis and stress tests are the most common types of forward looking studies performed.** These types of analyses are often at an **early stage**, and in several cases stem from the financial institutions involvements within international initiatives such as the UNEP FI pilot and TCFD.

Referring to on-going initiatives on identification and management of climate-related risks, some financial institutions indicated that they were in the process of **researching the risk profile relationship between environmental/climate-related risks and financial risks.**

Some respondents had conducted analyses on how to quantitatively assess the financial impacts of climate-related risks on all corporate loans or generally for asset management. Other analyses had been conducted on selected portfolios, most commonly Energy (oil & gas in particular), Agriculture and Transports. Most respondents did not share the results of their analyses. However, one respondent stated that, when applying the most ambitious transition scenario, its oil and gas portfolio credit rating would deteriorate by 2030. As a result, the financial institution was considering introducing a risk exposure limit for these sectors.

The majority of the analyses mentioned above have been conducted as part of the implementation of the TCFD recommendations. Most of them have focused especially on carbon-related assets or on sectors vulnerable to transition risks, e.g. based on the New Policies Scenario and the

Sustainable Development Scenario (2 degree scenario) published by the International Energy Agency (IEA). Some other financial institutions explicitly mentioned the Paris Agreement Capital Transition Assessment (PACTA)²⁵ methodology and one financial institution also started greenhouse gas accounting under the PCAF²⁶ methodology.

One respondent had performed a scenario analysis on its mortgage loan portfolio to analyse how different climate scenarios would affect the Probability of Default (PD)/Loss Given Default (LGD) performance. The results indicated that, from a transition risk perspective, higher costs in the form of taxes and insurances could have an impact on the PD. From a physical risk perspective, the main factor affecting the LGD was the location of the mortgage security in relation to the coastline, given the sea level rise in different scenarios.

Four financial institutions performed a scoring of their existing portfolio to reflect their future exposure to climate risk, without necessarily relying on a scenario-analysis methodology but rather based on environmental impact projections.

3. Integrating climate- and environment-related risks into risk monitoring appears to the respondents as a challenging process

3.1. The path towards integration into risk assessment and monitoring

As mentioned in section 2 above, most respondents have undertaken operational commitments for greening their balance sheets. Respondents mentioned a variety of measures to achieve this, including **negative screening**,

²⁵ <https://2degrees-investing.org/resource/pacta/>

²⁶ <https://carbonaccountingfinancials.com/>

Risk Appetite Statement (RAS) limit setting, and environmental veto systems²⁷.

In credit risk assessment, various forms of ESG scoring are widely used. However, only in exceptional cases have respondents integrated these ESG scores into their overall customer credit rating, and in even fewer cases further into the internal rating model. Some of the approaches mentioned by respondents have been anonymously integrated into Appendix 2 (Practical application – internal classification).

One of the most common approaches is **negative screening**, used by eleven respondents (20%). The most recurrent negative screening criterion is to exclude financing of new coal mining or coal-fired plants. Several financial institutions also prohibit financing of Arctic oil and gas activities as well as sand oil.

Another common measure taken by respondents is to **limit their exposure to risk sectors as a percentage of total financing**. One institution used a similar approach, requiring a **personal endorsement** by the head of the relevant business division for projects identified as having possible negative environmental and social impact.

When it comes to actively investing in positive impact activities, nine respondents reported to have set targets to finance clean technologies, renewable energies and green finance or to support the UN Sustainable Development Goals.

Regarding **financing the transition** towards a lower carbon economy, several respondents refer to so-called sustainability-linked loans, where the borrower commits to certain transition targets. As an example, the customer must show a declining CO₂ footprint.

As mentioned above, most respondents reported using **ESG scoring** in some form. It is used both for **investment** and **credit granting** (where applicable) in order to better account for climate and environmental issues. One common rationale among the respondents for taking such measures is to **minimise the financial institution's financing of brown assets**.

Several financial institutions were currently working on further **integrating counterparty climate-related and/or ESG factors** into their credit processes and subsequently into their risk management frameworks. Some examples are given in Box 4 below.

Box 4

Examples of ways to integrate climate-related risks into counterparty or credit risk monitoring

One financial institution created a credit risk materiality matrix to assess the climate-related credit risk rating for existing and new clients.

One financial institution uses (where relevant) sector-specific risk metrics to assess the “greenness” of credit exposure as part of the counterparty analysis. Examples of indicators include “Carbon intensity metrics” like kg CO₂/KWh for the power generation sector and g CO₂/km for the automotive industry. The monitoring of carbon intensity metrics is done on both a backward- and a forward-looking basis and contributes to the assessment

of transition-related risks and alignment with external benchmarks (proposed EU taxonomy, EU regulation or industry benchmarks).

Another financial institution developed a capital allocation model that intentionally “outweighs the brown.” The model rates projects on a seven-point scale and “artificially” increases the risk of the brown parts of project within the internal rating system of the financial institution. The objective is to direct financing toward a greater number of green projects. The model is not linked to the calculation of prudential capital.

²⁷ One financial institution implements “one vote veto system for environmental protection” in the credit granting process. If an environmental protection issue is detected by an analyst or a decision-maker, the credit will not be granted.

Respondents were also asked to give their view on whether they thought **integration into internal credit rating models (IRB-models)** would be possible. Most respondents answering this question pointed to the challenges related to the different time horizons, with IRB models use a one-year horizon while climate risk needs to be assessed from a longer perspective. One respondent mentioned that, *“we have found that ESG risks are not ready yet to be included in internal models, because of regulatory constraints to adapting the models to available data and relevant time horizons. Therefore, the only option seemed scenario analysis”*.

Three respondents had nevertheless chosen to integrate, or were in the process of integrating, climate and environmental risks into their IRB-models. This was done by adding them to the qualitative factors in the model. Hence, these risks were not taken into account when calculating PD and LGD.

Apart from that, one financial institution had developed an internal indicator of climate vulnerability evaluated at client group level for clients in the most exposed sectors. The indicator was defined as an incremental impact on the existing internal rating, and evaluated using a seven-point scale ranging from high negative impacts to high positive impacts over 20 years. The respondent stated that this indicator was used alongside the internal credit rating.

3.2. Challenges and obstacles identified

Respondents listed the following main obstacles for assessing a potential green and brown risk differential: (i) the lack of harmonised data at global level, (ii) the discrepancy between measuring greenness/brownness at exposure level and measuring credit risk at counterparty level, and (iii) organisational challenges in risk assessment and risk measurement processes.

Need for globally harmonised data

Many respondents find that there is **insufficient data to prudently analyse** the effect of climate or environmental factors on the risk related to a certain exposure, **both in terms of coverage and data quality. One root cause identified by the respondents is the lack of legal disclosure requirements for companies to report verified data on a sector-specific basis.** Further, harmonised data both within and across company sectors are key features that need to be addressed. The financial institutions point to this as especially challenging with regard to SMEs.

Challenges linked to classification, taxonomies and human resources

Several financial institutions highlighted that different types of financial assets (e.g. loans, bonds, etc.) encounter different challenges. This also applies within the loan category. For example, many corporate loans are extended for *general corporate purposes*, i.e. they are not single-purpose loans extended for the financing of an easily identifiable physical asset or activity (such as project finance loans). As illustrated in Appendix 1, many companies have both green and brown activities. A general corporate purpose loan to such a company is therefore difficult to categorise in a taxonomy framework. Even if a financial institution only finances the green part of a company’s activities through a single-purpose loan, it could result in a deteriorated credit quality of the loan²⁸ if the counterparty’s brown activities should deteriorate in value, for example, due to the transition to a greener economy, and if the single-purpose loan has not been ring-fenced²⁹.

Respondents also identified challenges in integrating the taxonomy into ordinary banking methodologies (e.g. risk management, information disclosure, efficient screening processes for transactions, etc.). Respondents also pointed to a lack of resources with appropriate knowledge to analyse relevant data. One institution specifically mentioned the training and awareness by front-line bankers as a main challenge.

²⁸ As mentioned above, credit quality is assessed at the counterparty level.

²⁹ “Ring-fencing” is a loan structuring technique using the cash flow from the financed asset/activity as security for the repayment of the loan. It cannot be used for all single-purpose loans as it typically requires the asset/activity to be placed in a special purpose vehicle.

The financial institutions that stated they use an internal classification listed the following additional challenges:

- The development of an internal classification is a greenfield activity that falls outside of the (historically) ordinary scope of most financial institutions. Some respondents noted that they experienced a lack of knowledge on how to approach the problem at the outset.
- Market practices are almost exclusively based on voluntary principles and standards, which leaves room for user interpretation. Hence, there are a wide range of different approaches and combinations of solutions that might lead to confusion and greenwashing. Therefore, according to several financial institutions, it is very important to develop a uniform global taxonomy framework. Until there is more compulsory guidance in this area, some financial institution have indicated that there is a risk of competitive disadvantages of being first with an ambitious plan and taxonomy/classification.

A small number of respondents consider that monitoring the specific risk profiles of green or brown assets is not – and should not be – a priority in their ongoing work on climate-related challenges. Those financial institutions may be in their early stages of understanding the concept of climate change and environmental risk, currently conceptualising the qualitative aspects of these risks rather than doing quantitative analysis, or putting the focus on TCFD implementation rather than implementing new classification and monitoring systems.

Three respondents also raised doubts on the relevance of monitoring risk profiles based on green and brown classifications. It has been argued, for example in relation to project finance, that the risks of projects are highly dependent on other factors like the overall project structure. As a result, tracking risk profiles dependent on green and brown characteristics would be too simplistic and provide limited added value. One financial institution also stated that there is no clear evidence now that would justify such tracking mechanisms, while another financial institution commented that identifying and monitoring risks is primarily done with the ambition to track the risk associated with a respective asset, not necessarily to compare one asset category (i.e. green and/or brown categories) to other categories.

Other obstacles mentioned by respondents deal with the **IT systems**, which are often not capable of flagging green and brown exposures at the moment; significant efforts and resources would be required to implement new categorisations, again in a context in which definitions vary and are continuously evolving. Some financial institutions also highlighted the **absence of methodological standards**, either in the form of market standards or regulatory guidance, on how to incorporate green or brown characteristics into the assessment or tracking of financial performance and credit risk.

The respondents present several views on what the characteristics should be of methodologies to assess the relative riskiness of green or brown assets compared to other assets

First, with regard to the **question of compatibility with existing methods or models**, one financial institution was of the opinion that the current regulatory standards of assessing Probability of Default (PD)/Loss Given Default (LGD) performance should be the basis for further parameterisation based on green or brown characteristics. Another financial institution considered, on the contrary, that the analysis should include longer time frames than those covered in the Internal Rating Based models in order to capture the full spectrum of increased climate-related risks. As a result, the concepts of Expected Loss, Probability of Default and Loss Given Default would need to be adapted accordingly.

In relation to this, some respondents highlighted the need to consider long time horizons using a **forward-looking approach**. Given the absence of historical series that help trace correlation between the nature of the asset and its risk in terms of climate change, the methodologies should primarily be based on scenario analyses and forward-looking assessment of relative riskiness. These analyses could assess, for example, the level of alignment of sectors or customers with different climate change scenarios, including alignment with the Paris Agreement.

Concerning the development of **methodologies for the assessment of the vulnerability of counterparties** to climate- or environment-related risks, respondents broadly agreed that the methodologies should consider

key environmental issues that could have an impact on the repayment ability of clients or the value of an asset. For economic sectors, the sensitivity to key parameters could be assessed (e.g. local and regional environmental policy developments, share of fossil-based business, potential sales decline, direct emission costs, indirect emission costs, capex requirements, etc.), potentially resulting in portfolio rating migration or expected loss movements. However, according to some financial institutions, it may be necessary to go deeper than the sectoral level and perform risk assessment at an individual or corporate level, e.g. to understand the company's activities, its procedures and internal policies, and its ability and willingness to adapt to new requirements and technologies. As these respondents highlighted, the specific level of environmental risk of a counterparty is indeed also linked to the specific counterparty's business model, geographical operating area, balance sheet structure, and corporate governance.

Finally, one respondent recalled that performing risk assessment of green or brown clients requires taking into account all traditional angles, e.g. compliance, credit, and ESG risks. In the same spirit, risk comparison assessments would require distinguishing between different variables and identifying the relevant underlying factors of potential risk differentials, e.g. the weight of the climate-related factor.

Tentative conclusions and high-level messages to financial institutions

The survey does not allow us to conclude on a risk differential between green, non-green and brown assets.

There is a lack of historical data, mainly due to the fact that greenness/brownness has historically not been flagged as a specific factor in banks' IT systems. It is also difficult to link a specific factor to the overall credit rating/default data of a bank's counterparty. For some asset classes, such as real estate, some positive correlations have been observed between energy-efficient buildings and lower default

rates³⁰. However, no financial institutions have analysed whether this depends on the greenness of the buildings or the overall creditworthiness of the owner/counterparty. Other backward-looking studies performed by financial institutions on project finance loans point to a higher default rate for green projects. Again, this may be more related to the fact that the companies in question have sometimes been small start-up ventures using new technology, all being indicators of a higher credit risk. This impossibility to conclude at this stage about a risk differential between green and brown assets doesn't mean, however, that such a differential does not exist. The NGFS will pursue its work on this topic in coming years to follow up on the progress made by financial institutions in the tracking of these risks.

Overall, it appears that the necessary conditions for tracking the risk profile of green, non-green or brown assets are not yet in place in all but a few jurisdictions.

The vast majority of institutions cannot yet conclude on the relationship between greenness and credit risks, pending further analyses, which requires a better tagging of exposures and meaningful performance data.

The majority of respondents are using voluntary principles for classification and internally developed classifications. This is an important first step to build on.

Most respondents also have operational commitments, e.g. in the form of sector limits and/or steering documents describing how to take climate risk into account in credit assessments, although these documents are not necessarily based on a risk perspective. However, some respondents are taking a more risk-based approach.

Given the increasing magnitude of climate change and its impact on the financial system,³¹ there is a need to continue working with the integration of this new risk category into financial institutions' credit risk assessment. Therefore, institutions can benefit from the following high-level conclusions.

- 1) Given the current limitation of historical data, forward-looking methodologies are good alternatives for exploring the impact of climate change. The NGFS is currently working on global and regional scenarios that

³⁰ See also <https://www.bankofengland.co.uk/working-paper/2020/does-energy-efficiency-predict-mortgage-performance>

³¹ NGFS's first comprehensive report, "A call for action: Climate change as a source of financial risk", April 2019

will be available in the future as solid building blocks for conducting such analysis.

- 2) Institutions should not overlook climate-related risks in their existing risk management framework. As an example, the BCBS standard for credit risk management states inter alia, that banks should identify and analyse existing and potential risks inherent in any product or activity. On the supervision side, based on current practices from supervisory authorities, the Guide for Supervisors

published by the NGFS encourages members of the NGFS as well as the broader community of banking and insurance supervisors to integrate climate-related and environmental risks into their work. This can be achieved, among other things, by setting supervisory expectations to create transparency for financial institutions on the supervisors' understanding of a prudent approach to climate-related and environmental risks.

Appendix I Defining *green* and *brown* – sector, asset, activity and value chain aspects

To build a common understanding about the challenges in determining what is green/brown, this appendix focuses on describing the challenges reported by the respondents, and their approach in dealing with them. It is based on the responses from the financial institutions that have developed an internal classification system. Appendix II will go deeper into the details, and present an anonymous case study of leading practices amalgamated from the examples of several institutions.

The task can be divided into two parts:

1. What is going to be defined?
2. Determining the scale of green or green to brown.

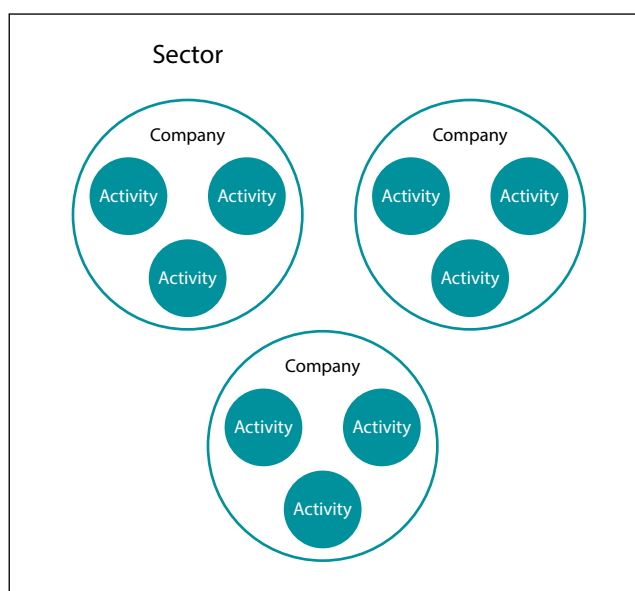
Both challenges are dependent on each other. However, we will treat them separately below.

1. The first challenge is to determine what is going to be defined

The respondents all have unique solutions and use either one or several of the following perspectives when determining what is going to be defined.

1.1 Sector perspective:

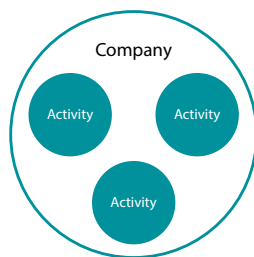
Figure 7: A sector consists of several companies engaged in several different activities



Many respondents in the survey, with or without internal classification systems, use sector (sometimes combined with geography) classifications in their risk appetite statements and risk strategies. An example would be restricting (or abstaining from) lending, insuring or investing in one or several sectors generating high GHG emissions. This could be defined as *high level screening* and in many financial institutions only constitutes the first step of the analysis.

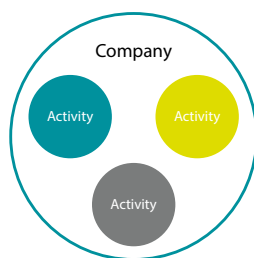
1.2 Company and activity perspective:

Figure 8: A company may be engaged in several activities



The second step for many respondents in the survey is to dig deeper into a mix of qualitative and quantitative analysis of the companies within a certain sector. Some of the approaches have been amalgamated into the anonymous case study described in Appendix 2. The overall aim, however, is to be able to identify which companies are best in class within the sector, from a point-in-time perspective as well as when considering possible transition paths going forward. Many companies have several **activities**, which can be classified differently along a brown to green scale. Also at this level, financial institutions may restrict or abstain from lending, insuring or investing in certain activities (see Figure 9 below).

Figure 9: A company can engage in several activities that are all classified differently



1.3 Asset perspective:

Another approach is to **only consider the asset** while defining what is considered to be green or brown.

Figure 10: "An asset is a part of an activity, and in some examples it is reviewed on a stand-alone basis"



One example of asset-based lending is lending to residential and commercial real estate. Here, the asset's direct climate impact can be measured through e.g. energy-efficiency classifications and/or levels of CO₂ emissions in the day-to-day business. When classifying the asset on a stand-alone basis, most often the climate and/or environmental impact in the building process is not taken into consideration (e.g. emissions when producing cement, steel, etc.). The asset is considered

to be already existing and an end-product in itself. For real estate (with the exemption of new buildings), this could be a valid argument given the long lifetime expectancy.

However, for most other physical assets, it is very important to take the asset’s place in the value chain into account. It is not enough to only relate to the asset’s place on the green-to brown scale in a stand-alone perspective.

To make the example more illustrative, the asset in this case is fabricated wood. The asset in itself is considered in this example to be on the “dark green” part of the scale, e.g. because wood is seen as a renewable material which captures and stores CO₂ (Figure 11).

Figure 11: “Only the asset”



To set **the asset into context**, both the upstream and downstream perspective of the value chain should be added, i.e. how is the wood going to be used (what is the end product) and how was it produced. These upstream and downstream perspectives should be used as a guide for assigning the wood its colour (see Figures 12 and 13 below). In the case illustrated in Figure 12, the wood is the result of sustainable forestry (e.g. harvesting is followed by replanting), but the wood is then used for heating, emitting the CO₂. In this case, the wood can no longer be seen as a green product but as something in-between green and brown.

Compare this with Figure 13, where the wood comes from the same sustainable forestry and where the wood is used to replace concrete the building of houses. Here the wood contributes to lowering overall CO₂ emissions and can be assigned a dark green label.

Figure 12

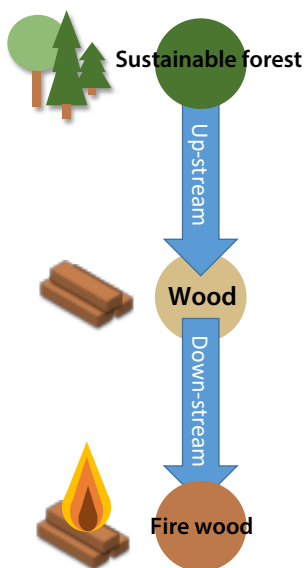
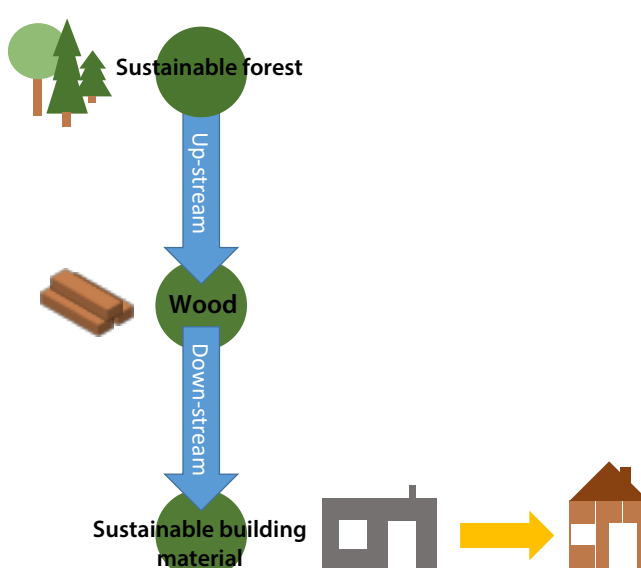


Figure 13

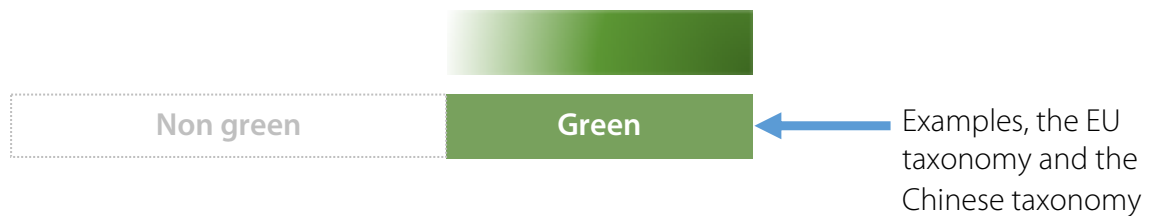


2. The second challenge is to determine the scale from green to brown

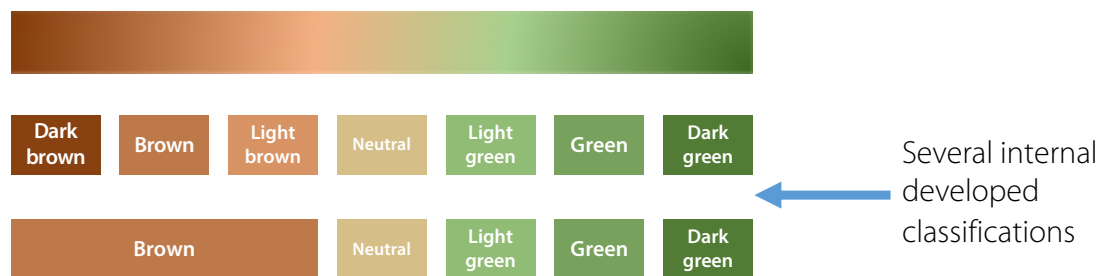
The respondents have presented different scales. The green scale below in *Figure 14* is only for illustrative and comparison purposes, since this type of scale is used, for example, in the EU and the Chinese taxonomies.

Figure 14

Only a green scale:



A brown to green scale:



What the scale measures differs for each financial institution. The recurrent measures used are levels of CO₂ emissions, levels of CO₂ consumption or an overall impact score depending on the climate and environment.

When deciding upon what is to be defined and what scale is to be used, the next step is to apply them together. To answer this question we will dive deeper into the replies of several respondents that have been compiled into a case study of leading practices.

Appendix II Case study: Practical application – using an internal classification system

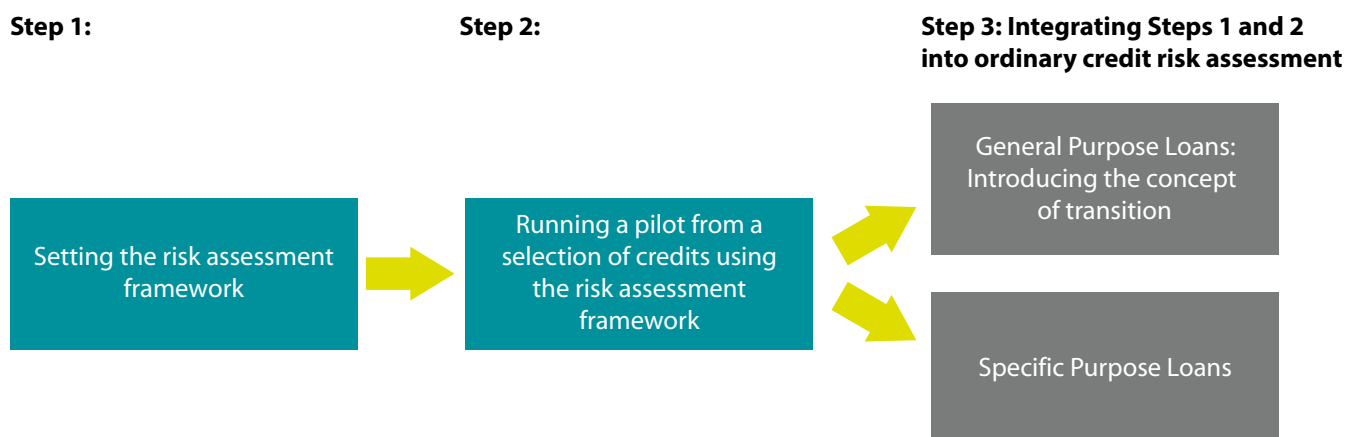
This appendix describes leading practices used as an internal classification system in the form of an anonymous case study. Since most respondents use either voluntary international/national classifications/ principles or a national taxonomy when defining bonds, these will not be covered in this section.

Building on the answers to the survey, we have put together a leading practice case blending several individual solutions in order to safeguard respondents' anonymity. The leading practice case is applicable to lending to retail clients as well as lending for general corporate purposes, and for specific purposes. In Figure 15 below, the blue boxes illustrate the common approach and the grey boxes illustrate the two separate approaches for corporate lending.

The leading practices that have been identified and compiled from several respondents can be divided into two main steps in relation to credits. First, a risk assessment framework for determining what is green/brown, and a scale from brown to green need to be set and linked to the credit. Second, there is a need to run a pilot on a selection of credits to evaluate the accuracy of the risk assessment framework. Finally, the developed risk assessment framework is integrated into the ordinary credit risk assessment. How the integration is performed depends on the characteristics of the loan, i.e. is it a general purpose loan or a specific project loan, etc.

In the diagram below, the leading practices are outlined in detail. The detailed items and the related information given in the boxes should be viewed as inspiration on how an institution could integrate a framework for green/brown definitions and how it could be rolled out on a large scale.

Figure 15: The leading practices can be divided into three main steps.



Step 1: Setting the risk assessment framework

- Setting risk appetite limits for e.g. overall GHG emission level in the credit portfolio, with breakdowns for the sectors and geographies already used in the credit risk portfolio;
- Identifying Key Risk Indicators, such as GHG emission level, levels of CO₂ consumption or other measures of carbon footprint and negative impact;
- Tagging products and exposures that meet certain criteria ("green label");
- Building a scale with scores based on KRIs, while incorporating "green" criteria;
- Creating internal instructions for applying the scores in ordinary credit assessments;

Step 2: Running a pilot from a selection of credits using the risk assessment framework

- Applying the scores when performing credit assessments. This will initially have to be performed manually for many types of credits, except for those that can be tagged with a green label in the financial institution's IT systems (such as green mortgage loans). It is therefore recommended that this be first tested in a pilot project for select credits. *More examples of how to develop and run a pilot from a selection of credits can be found in the report "Extending our horizons" published in April 2018 by UNEP FI. The pilot was performed by 16 banks and can serve as a practical how-to example.*

Step 3: Integrating Steps 1 and 2 into ordinary credit risk assessment

Next, Step 2 above can be applied to the entire credit portfolio. An alternative approach could be e.g. to assess clients at the sector level first to allocate a colour grading. A more detailed procedure is then applied depending on whether the loan is a general purpose loan or a specific loan. Please see the different approaches below.

General Purpose Loans: Introducing the concept of transition

- Select climate scenarios to act as a backdrop for the reasoning on possible futures. Focus on clarifying the evolution of certain variables (e.g. carbon tax, investments in new technologies, changes in energy prices);
- Identify relevant risk factors;
- Analyse the client's climate strategy;
- Assess the client's transition vulnerability, based on the above;
- Structure the credit accordingly, e.g. with a performance-to-pricing grid (i.e. when a client reaches certain objectives it will obtain better financing terms);
- Assign a score based on the structure of the credit.

Specific Purpose Loans:

1. Using the sector specification above, assign qualitative sector scores based on certain predefined criteria. In certain sectors, the green criteria can sometimes be directly related to a specific asset/technology (e.g. wind power and renewable energy may be seen as dark green).
2. In the credit assessment, use a two-step approach and assign the qualitative scoring in the first step. Determine the sector to which the credit may be allocated.
3. The next step in the process is to assign a quantitative score based on the actual quantitative impact of the project (e.g. tons of CO₂ avoided and green kWh produced). The main categories here would typically be: Increased impact = shades of brown, Neutral = beige and Decreased impact = shades of green.
4. The qualitative and quantitative scores can then be aggregated into one single climate/environmental score. The weighting should be determined by each institution in order to achieve an outcome in line with the institution's credit risk appetite and strategy. As an example, with an equal weighting, the sector categorisation becomes important in relation to the impact from the specific project.

It should be noted that the concept of enabling transition through financing can of course also be applied to specific purpose loans. To a large extent, it is possible to use the same approach as described above, but in a simplified manner as it is not always necessary to assess the whole company. This however depends on how the loan is structured.

Appendix III A summary of the Chinese taxonomy

In China, the definition of green loans was introduced in 2013 by the China Banking and Insurance Regulatory Commission (CBIRC) in *Guidance on Green Loans*. This green loan definition included twelve categories, such as renewable energy, green transportation, green building, etc.

In 2015, the Green Finance Committee of China Society of Finance and Banking put forward the Green Bond Endorsed Project Catalogue¹.

The taxonomy is built up in the form of a catalogue covering the following six areas with several sub-levels under each area:

1. Energy Saving
2. Pollution Prevention and Control
3. Resource Conservation and Recycling
4. Clean Transport
5. Clean Energy
6. Ecological Protection and Climate Change Adaption

¹ "Green Bond Endorsed Project Catalogue", 2015 Edition prepared by the Green Finance Committee of China Society of Finance and Banking (2015-12-22).

Appendix IV The Brazilian classification framework

Brazil's Protocolo Verde (Green Protocol) was set up voluntarily by five Brazilian state-owned banks and the Ministry of the Environment in 1995 and updated in 2009 by the Brazilian banking federation (FEBRABAN).

In parallel to this voluntary initiative, the Brazilian Central Bank released a series of regulations to address specific ESG issues in the financial industry: Regulation N°3,545 on the financing requirements at the Amazon Biome (2008), Regulation N°3,813 on sugar cane investment (2009), and Regulation N°3,876 on slave labour prevention (2010).

By 2014, the Central Bank's Resolution N°4,327 required financial institutions (FIs) to formalise an E&S responsibility policy. Based on the principles of relevance and proportionality, regulation is applied differently by the various institutions and segments of the financial sector depending on their business profiles, E&S risk exposure and the complexity of their activities. FIs should build up an appropriate governance framework to ensure compliance with their own policy's guidelines and goals, and an action plan should be tailored to clarify the nature of activities to be carried out under the policy directives. Therefore, the regulation allows flexibility for a market perspective, and the level of ambition of the required policies and action plans is determined by the FIs themselves based on their E&S risk exposure. The E&S risk should be considered as a component of financial institution's pre-existing risk management process (credit, market or operational), and, more recently, Resolution N°4,557 (2017) requires FIs to implement a structure for continuous and integrated risk management, which includes E&S risks as defined in Resolution N°4,327.

The Brazilian banking sector is also measuring annual finance flows going to the green economy, namely the twelve sectors that "result in improvements in well-being and social equality, while significantly reducing environmental risks and ecological scarcity, and have the following main pillars: low carbon emissions, efficient use of resources, and social inclusion". In 2014, FEBRABAN issued guidelines to support banks' compliance with principle-based regulatory requirements.

In 2016, FEBRABAN and the Brazilian Business HLEG Council for Sustainable Development (CEBDS) released their Guidelines for Issuing Green Bonds in Brazil. Green bonds have been issued in Brazil since 2010, and the Brazilian National Bank for Economic and Social Development (BNDES) was the first Brazilian bank to issue a green bond in 2017 (US\$1 billion).

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