

Post-issuance reporting in the green bond market

2021



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1. Introduction

This is Climate Bonds Initiative's third study of post-issuance reporting in the green bond market. By shedding more light on reporting practices, we aim to understand the availability and attributes of disclosure on the use of proceeds (UoP) and environmental impacts of projects/assets/activities financed by green bonds, as well as identify avenues for improvement.

Post-issuance UoP reporting is a core component of the *Green Bond Principles* (GBP) and the *Green Loan Principles* (GLP), and it is also recommended that issuers report on the environmental impacts achieved. Post-issuance disclosure provides transparency, ensures accountability and underpins the credibility of green bonds and loans. As the market has grown, so has investor interest in UoP and impact reporting to inform decision-making processes, analysis and investor reporting.

Report structure

This report follows a broadly similar structure to our 2019 study, but with greater depth.

The **report summary** gives an overview of the key messages, findings and conclusions, as well as a summary of the key quantitative findings covering different aspects of post-issuance reporting.

The subsequent section covers the availability of **use-of-proceeds (UoP) reporting** analysed through different perspectives, followed by an assessment of the **quality of reporting** using a scoring system almost identical to the one we introduced in 2019. Here we also identify top performers and provide best practice examples.

Climate Bonds Initiative

The Climate Bonds Initiative is an international investor-focused not-for-profit organisation working to mobilise the USD100tn bond market for climate change solutions.

We promote investment in projects and assets needed for a rapid transition to a low carbon and climate resilient economy. Our mission is to help drive down the cost of capital for large-scale climate and infrastructure projects and to support governments seeking increased access to capital markets to meet climate and greenhouse gas (GHG) emission reduction goals, as well as other sustainability objectives.

The **impact reporting** section explores several topics specific to the impact space. We significantly deepened our impacts research this year, and thus cover a broader range of issues than our last report with the explicit aim of supporting further market development and best practice.

Along with impact reporting, many readers may be most interested by **what the future holds**. This section includes extensive critical reflections on past and future market trends, both within and beyond UoP instruments. We hope it can be used as a platform for further progress and harmonisation of sustainability reporting.

The **conclusion** summarises the key findings, provides various best practice recommendations, and gives an overview of where reporting might be headed.

It is a long report. Our overarching aim was to be as comprehensive as possible in order to facilitate the continued evolution of sustainable finance. We have therefore addressed many topics, some of which are quite complex (especially related to impact reporting).

Methodology

Report coverage:

- Green bonds issued from Nov 2017 - March 2019 included in the Climate Bonds Green Bond Database
- Loans and securitized instruments excluded
- The full universe is made up of 694 bonds from 408 issuers = USD212bn

The research underpinning this report looked at all **publicly available information** after the bond has closed. Information sources include bespoke green bond reports, annual reports, CSR/sustainability reports, etc.

The analysis is based on what was available at the time of the research, the bulk of which happened in Q2 and Q3 2020 to allow just over a year for the last included deals to provide post-issuance reporting. This gives most, but not the latest, deals a two-year time frame to report, the maximum recommended by the GBP.

To read more detail about the methodology, please see Appendix 1.

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Glossary

Green bond: Labelled use-of-proceeds debt instrument financing environmental projects/assets and included in the Climate Bonds Green Bond Database (as per our Database Methodology).

Post-issuance reporting: Includes all the publicly available information on a green bond's UoP and impacts after the bond has closed (often referred to simply as 'reporting'). Providing this is a core component of the GBP.

Availability / Quality of reporting: For the purposes of this report, availability of reporting refers to whether post-issuance UoP reporting is available (except in the 'Impact reporting' section); quality of reporting refers to how 'good' the issuer's overall reporting is.

Use of proceeds (UoP): The projects/assets/activities financed by the bond proceeds. In use-of-proceeds instruments, the proceeds are allocated to specific uses.

Impacts: The environmental impacts achieved through the projects/assets financed with green bond proceeds. However, in most of the 'What the future holds' section, takes on a broader definition of the full social and environmental impacts of activities/entities (clarified there).

Measured vs. Estimated impacts: Depends on how the impact is calculated. Measured impacts are derived directly from measurement (e.g. often the case for installed power capacity, energy generated and area conserved/restored). Estimated impacts require some form of estimation and tend to refer to metrics that are hard, if not impossible, to measure directly (e.g. GHG emissions, GHG emissions avoided, transport mode shifted).

Expected (ex-ante) vs. Actual (ex-post)

impacts: Depends on when the assessment is conducted. Ex-ante impacts are forward-looking (i.e. assessment before impact materialises) and therefore necessarily estimated. Ex-post impacts are assessed after the impact actually occurs, and can be either measured or estimated.

Impact metrics: The KPIs that issuers use to measure/estimate and report impacts (e.g. GHG emissions saved, energy generated). There is a wide range, which we grouped together to form a consolidated list – throughout most of this report, 'metrics' refers to the consolidated list.

General vs. Specific metrics: General metrics can be used across several or all project categories (e.g. GHG emissions saved, energy saved, number of units built). Specific metrics are specific to each project category (e.g. building certifications, number of journeys made).

Absolute vs. Relative metrics:ⁱ Absolute metrics reflect absolute measures of performance (e.g. GHG emissions, energy generated, capacity installed, number of journeys made). Relative metrics reflect a comparison against some sort of baseline, such as the performance in a previous period (e.g. energy reduced, water reduced) or in the project's absence / against a relevant benchmark (e.g. GHG emissions avoided, energy avoided, building certifications, number of journeys shifted).

Absolute vs. Relative units: Absolute units express a 'direct measurement' (e.g. kWh/MWh, tonnes, ha) while relative units express a relative amount (almost always in %, but can be an intensity, e.g. kWh per \$ or per m²).

Impact methodologies: Defined as any type of framework that helps issuers decide which metrics to report and/or how to monitor, measure/calculate and/or report them.

Key acronyms / abbreviations

UoP: use of proceeds

DM / EM: developed and emerging markets (according to MSCI classificationⁱⁱⁱ)

SDGs: Sustainable Development Goals

GHG: greenhouse gases

CO₂: carbon dioxide

GBP: Green Bond Principles

ICMA: International Capital Market Association

ICMA Harmonized Framework: Handbook – Harmonized Framework for Impact Reporting (2020)

NPSI Position Paper: Nordic Public Sector Issuers Position Paper on Green Bonds Impact Reporting (2020)

NFRD: EU Non-Financial Reporting Directive

CSRD: EU Corporate Sustainability Reporting Directive (replaces NFRD)

SFDR: EU Sustainable Finance Disclosure Regulation

TCFD: Task Force on Climate-related Financial Disclosures

TNFD: Task Force on Nature-related Financial Disclosures

i. Full list of (consolidated) metrics in Appendix 5, along with classification as general/specific and absolute/relative metrics.

ii. Relative metrics can be expressed in both absolute and relative units (e.g. energy saving in kWh and %); absolute metrics are almost always expressed in absolute units, but can be in relative units if an intensity, or in some cases as a % (when reporting a share, e.g. share of building space covered by LED lighting or smart meters, and recycling/recovery rates).

iii. Frontier markets included within emerging.

2. Report summary

High-level findings & conclusions

● **Availability of post-issuance reporting is widespread**, but UoP is still more commonly reported than impacts.

77% of issuers representing **88%** of the amount issued provided **use-of-proceeds (UoP)** reporting, while **59%** of issuers and **74%** of the amount issued reported on **impacts**.

57% of issuers and **73%** of the amount issued reported on both UoP and impacts, demonstrating best practice.

The amount issued share is generally higher as **larger issuers are more likely to report**.

The reporting share has increased versus the early market (especially on impacts). However, several issuers are still not reporting within one year of issuance.

● **Greenwashing is rare**: from our estimates, almost all non-reporting issuers at the time of research have now reported at least UoP.

Nevertheless, there are improvements to be made: some issuer types and regions are weaker, and impact reporting in particular is highly unstandardised.

Almost no segment of the market has more non-reporting than reporting issuers, but there are still variations in availability of reporting depending on deal size, external reviews, issuer type and geography.

Developed markets (DM) tend to have higher share (and quality) of reporting, but the relationship is not perfect and there are several exceptions.

Quality and consistency of reporting vary more significantly, particularly regarding impacts, i.e. which metrics to report along with how to measure/calculate and report them.

● **An expanding market, together with increasing guidance and developments in reporting practices**, have contributed to a rich and varied reporting landscape – now, harmonisation of disclosure must be the priority, but without losing granularity.

There is still a long way to go until reporting is available market-wide in a consistent fashion, which poses **problems especially in impact comparability and aggregation**. This is hardly surprising given the **fragmented nature of reporting up to now** – in the absence of a common framework to report within, issuers must independently plan, create and publish green bond reports.

UoP reporting more common than impacts

	Reporting Scope			
	Use of proceeds	Impact	Both	At least one
Number of issuers Reporting %	77%	59%	57%	79%
Number of bonds Reporting %	77%	63%	62%	78%
Amount issued (USDbn) Reporting %	88%	74%	73%	88%

NB: A few repeat issuers had reporting and non-reporting deals (latter often more recent). 'Number of bonds' figures are not comparable to the summary table in our 2019 report, since that one included securitized deals, which skewed the figures due to Fannie Mae.

The real evolution is therefore yet to come, in the form of a **common reporting framework and platform that drives greater transparency** through added availability, quality and (crucially) consistency of disclosure.

- There are **several promising efforts to harmonise and centralise reporting globally**, including existing platforms (e.g. Green Assets Wallet and Green Bond Transparency Platform), frameworks (e.g. ICMA Harmonized Framework and NPSI Position Paper), and ICMA Impact Reporting Working Group.
- The **EU Green Bond Standard** may also have the potential to contribute towards a globally adopted reporting framework for thematic debt instruments.
- **Climate Bonds** planning to work more in this space.

● **Beyond UoP instruments: urgent need for comprehensive sustainability reporting to create a purpose-driven economy with impact at its core**

A framework/platform targeting UoP instruments would be beneficial in the interim, but the **current approach to impact reporting among UoP instruments does not provide a real and full picture of impacts**.

There is a need to assess holistic impacts, use absolute – not relative – metrics, and look beyond UoP instruments for entity-level assessments.

There are growing calls for **globally consistent, comparable and reliable sustainability disclosure standards** through a shared, versatile framework.

- The **EU** is leading the drive towards comprehensive sustainability reporting from regulatory perspective through **NFRD** and more recently **CSRD**, supported by **EU Taxonomy for Sustainable Activities, SFDR** and **TCFD**; some other geographies are also working with similar goals.

● **The key is to create a common language to assess impacts/sustainability/ESG performance**.

Integration of efforts is crucial: there is currently a wide range of approaches, ideas, initiatives, tools and resources- creating a common language and framework/platform is of the utmost importance.

Now that the USA is back in climate talks, the time is ripe for a new global initiative that delivers consistent sustainability reporting and rules designed for a rapid, robust, resilient transition.

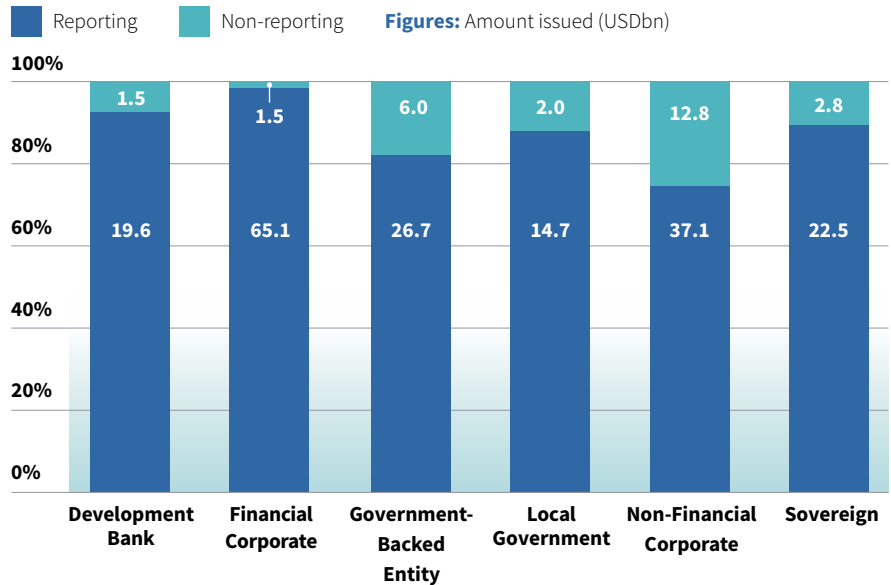
Comprehensive sustainability reporting under a common framework has the power to create a purpose-driven economy with impact at its core, as long as improvements in performance are properly integrated and valued, enabled via adequate institutional set-ups, and supported by coherent policies.

Quantitative findings: more detail

● **Availability of UoP reporting** is widespread but variations exist, especially depending on external reviews and deal size, and to a lesser extent issuer type and region.

- **Reporting share stable throughout sample period**, except for most recent quarter (Q1 2019) due to shorter window to report (research conducted during 2020)
- **Larger issuers are more likely to report:** amount issued share larger than issuer count share across virtually all market segments
- **Reporting availability is positively correlated with deal size**
- **Private sector issuers most polarised in terms of reporting availability**, with financial corporates ranking first and non-financials last
- **Broadly more consistency in reporting availability across public sector issuers** – development banks second overall (like financial corporates, they tend to be large repeat issuers), local governments improving
- **There is clear positive correlation between reporting and external reviews** – bonds with no review are much less likely to have post-issuance reporting
- **Higher reporting share in regions with larger, more mature green bond markets**, driven by large issuers that are more likely to report as well as more robust & consolidated issuing practices, including around reporting
- **Most countries achieved at least 90% reporting** (by amount), including most large developed markets
- **Most issuers delivered on reporting commitments made at issuance:** smaller issuers more likely to over-promise than larger ones, while latter more likely to report in line with commitments at issuance

Financials top, non-financials bottom



● **Quality of reporting is improving**, but still varies considerably; larger issuers and more mature green bond markets more consistent.

Key aspects of quality reporting include providing clear, easily accessible and granular information, as well as reporting in line with commitments at issuance and obtaining external reviews

Most issuers report at project level, and the proportion seems to be rising. In addition, most repeat issuers - especially financial institutions - report at programme level.

The average quality remained stable versus our 2019 study, but still some improvement, including fewer low-quality reporters.

More issuers (majority) now have **dedicated webpages** that make documents more **easily accessible**, more produce **separate green bond reports** or standalone sections within annual, sustainability or CSR reports, and more report at **project level**.

A relatively high simple average reporting score of 19.2 (out of 25) - weighted average of 20.0 reflects higher relative scores of larger issuers.

The **deal size analysis does not point to necessarily higher quality among issuers of large deals** – and instead the average, median and maximum scores relatively constant for all size brackets.

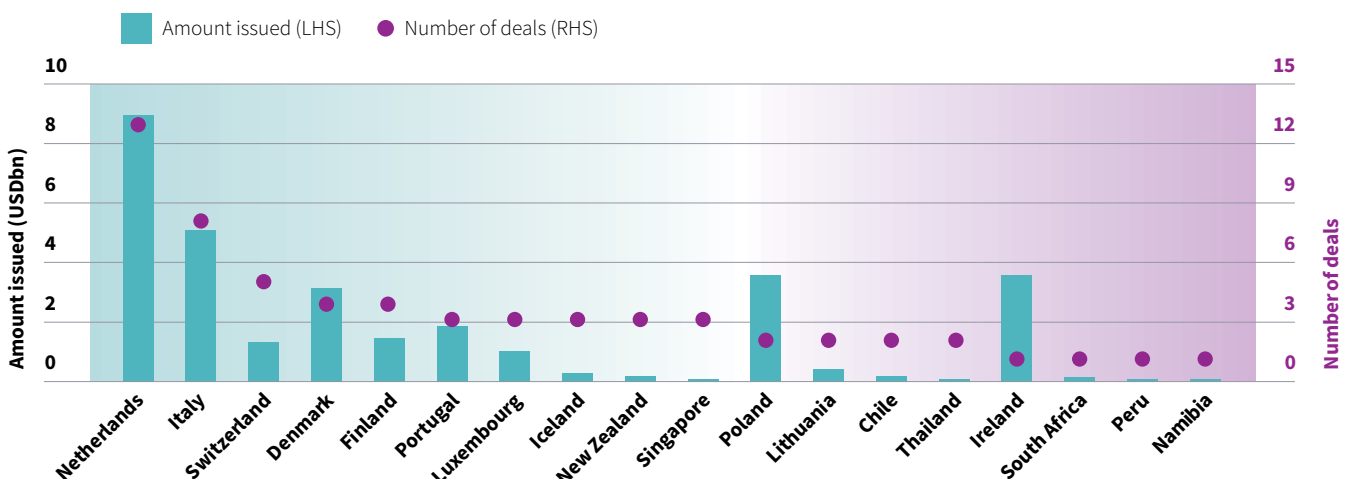
This means that while larger issuers tend to report more often than smaller ones, the average quality is not necessarily higher.

However, there is a clear increase in minimum scores, which suggests **larger issuers are less likely to have poor-quality reporting**.

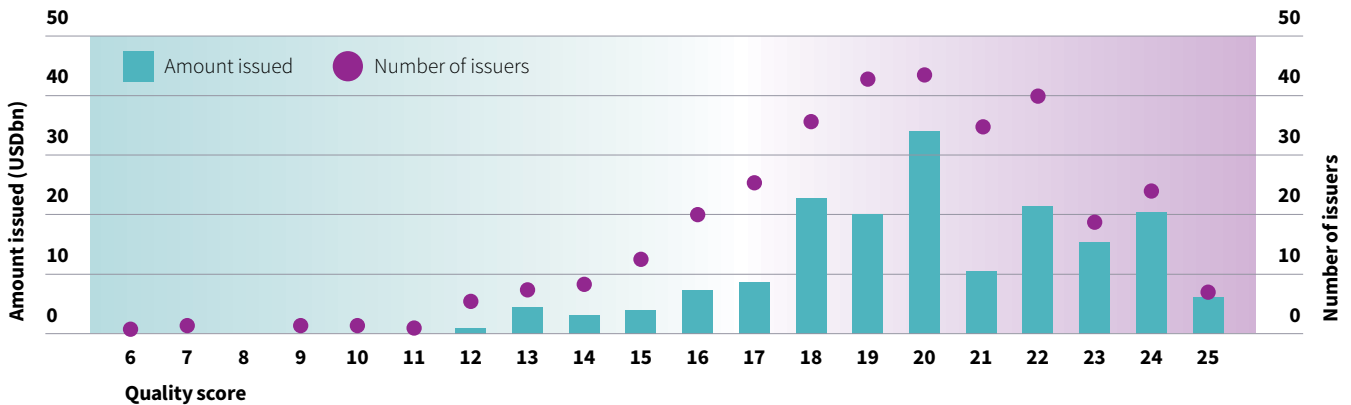
European entities are the most consistent in reporting quality, with 110 issuers ranging between 10–25 points; Asia-Pacific has a 6–25 range, and North America's range is also wider than Europe's even though its issuer count is about half

- Apart from having high scorers, **more mature green bond markets have consistently good-scoring issuers**

Countries with all deals reporting are mainly markets with under 5 deals and/or USD2bn issued



Reporting issuers scored between 6-25 points, with most at the top end



- Spain is the country with most high scorers (previously France), with four issuers scoring at least 24 points; Hong Kong follows, with three

Corporates dominate among top scorers

– seven of the Top 10 issuers are corporates (mostly non-financials), although partly due to the larger sample of corporate issuers.

- Reasonable diversity among top scorers, but more would be welcome; sovereigns, for example, tend to be high-quality reporters and some will likely make it into the Top 10 as more come to market

Impact reporting is increasingly common, but more complex than UoP reporting and highly unstandardised; harmonising impact disclosure is vital (although will only truly come with comprehensive reporting beyond UoP instruments)

Availability

59% of issuers and 74% of the amount issued report impacts post-issuance

Almost all issuers reporting impacts also report allocations (97%) but 74% of issuers that report UoP also provide impacts.

Impact reporting in the USA is considerably weaker than UoP reporting – although this is driven by small US Muni issuers, this is still an area for improvement in the country's sustainable finance market.

Impact reporting practices

Less than half of the issuers, but almost two-thirds of the volume, report impacts at programme level (assessed at the level of most granularity, as a few issuers report at both bond and programme level)

Larger issuers tend to report with less project granularity, as they often finance many projects and include many financial institutions.

Three-quarters of issuers report actual (ex-post) impacts, sometimes alongside. In addition, almost half report a combination of measured and estimated impacts.

Impact metrics

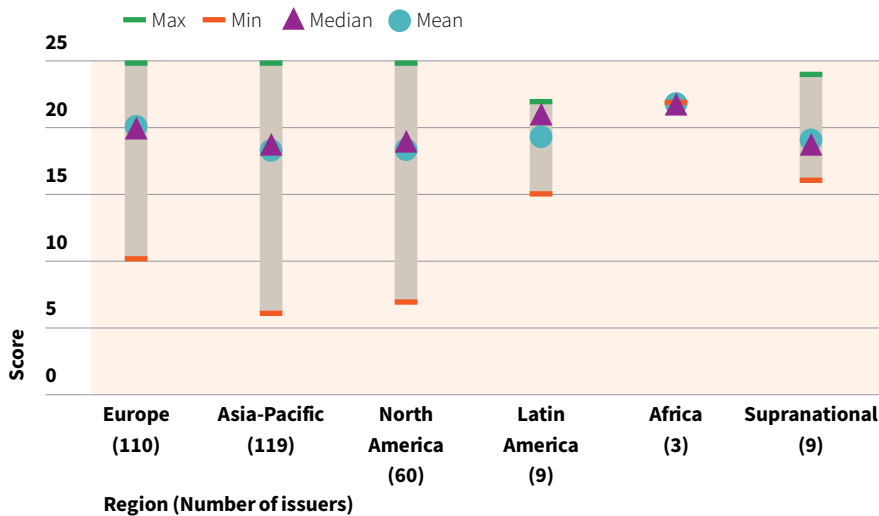
A wide breadth of metrics is used, even within similar project types – these vary between general and specific metrics.

The lack of uniformity in impact data makes it very hard – if not impossible – to compare and aggregate, an issue many investors are acutely aware of

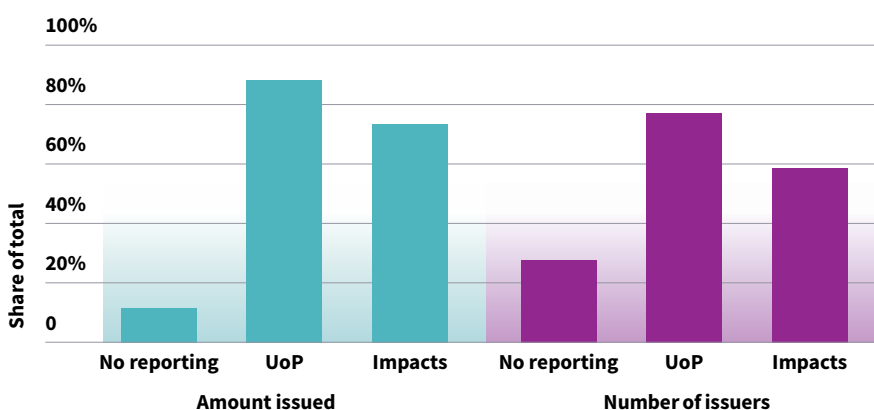
There are many reasons for this, but a key one is the frequent use of relative metrics (especially GHG emissions saved), which inherently depend on the baseline used

The widespread adoption of relative metrics (especially GHG savings) raises questions, and should be viewed with caution as they do not inform absolute performance and trajectory towards climate and other targets.

European issuers most consistent, Africa with highest average



Most issuers report both UoP and impacts



3. Use-of-proceeds reporting

This section delves into how the availability of reporting varies according to different market attributes. **Throughout it, 'reporting' is classified as post-issuance UoP disclosure.**

Reporting share stable except for most recent quarter

The first item we look at is issue date, in order to uncover changes over time. In our previous report, we conducted a yearly assessment of issue dates since the analysis period was longer, spanning 2007-2017. This provides more time for market trends to emerge and we noted the clear upward trend in reporting availability between 2014-17, following the release of the GBP in 2013.

The quarterly analysis in this study yields less striking conclusions. The reporting share remained relatively constant for the first five quarters – at around 90% – but dropped significantly to 71% among bonds issued in Q1 2019.

Despite the GBP recommending a maximum two-year timeframe to report, market best practice is generally to do so within one year of issuing a green bond, which is why we define the issue date cut-off as just over a year (about 400 days) before we conduct the research. Some issuers are therefore not reporting within 12 months of issuance.

However, several issuers – especially those reporting at programme level – do so in cycles, allowing them to aggregate reporting for multiple bonds at a convenient time; usually the start or end of the calendar, or sometimes fiscal, year. In such cases, the post-issuance report tends to cover deals issued up to the preceding year. For example, a report released in 2020 covering all bonds outstanding as of the end of 2019 (project allocations and/or impacts would generally also refer to 2019).

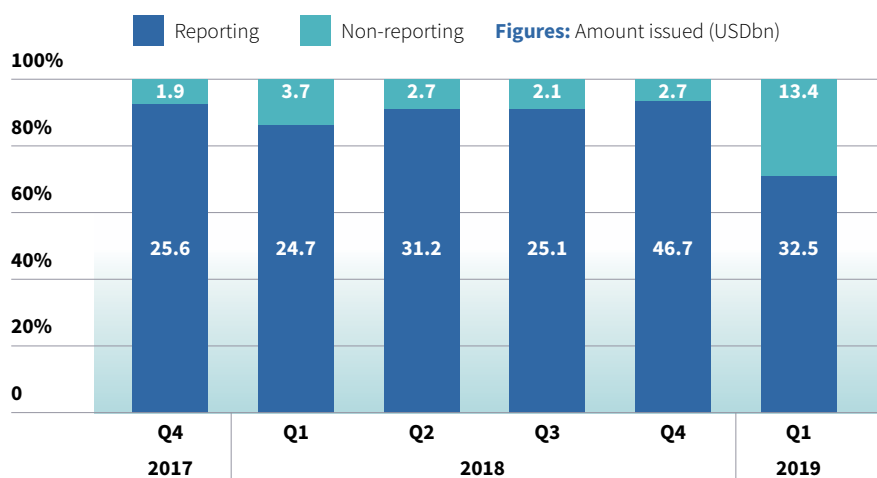
This means that bonds issued in Q1 are more likely to experience a greater reporting lag,

as this may only come in the next calendar year (2020 in the case of 2019 deals). A high-level assessment has confirmed many more reporting deals if the research were repeated now, particularly for those issued in Q1 2019.

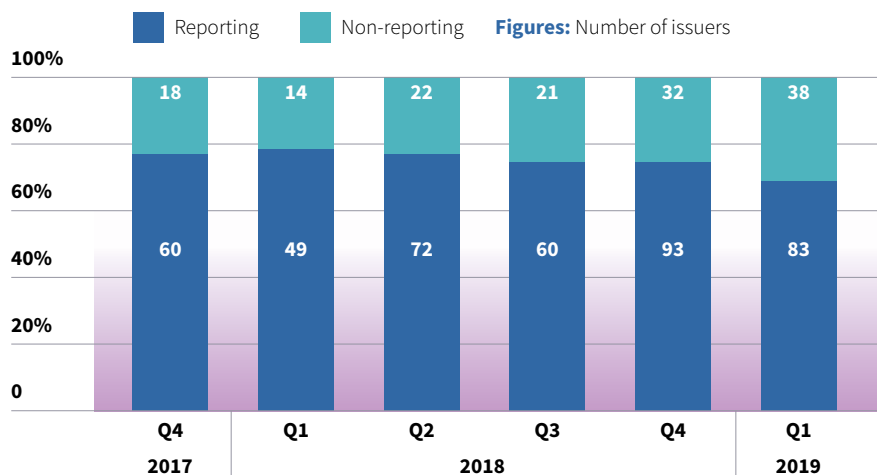
In line with our last study, we also note that **the reporting share was lower by issuer count compared to amount issued in every period, i.e. larger issuers are more likely to report.** This is a near constant finding throughout our study.

Furthermore, the drop in Q1 2019 is far less evident by issuer count – this is due to the lag explained above often applying to repeat issuers reporting at programme level, which tend to be larger.

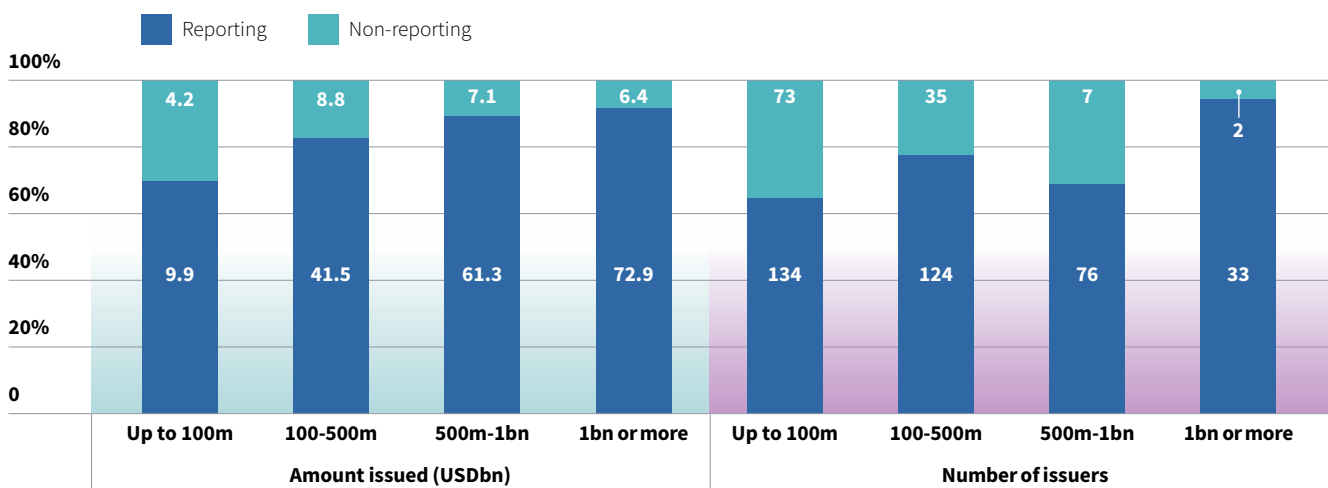
Substantial drop in Q1 2019 deals explained by reporting lag...



... and less visible by issuer count



Large bonds more likely to have reporting; sharpest increase at benchmark size (issuer count)



Reporting share increases with deal size

Slicing the deal universe by issue size paints a similar picture as our 2019 report: that **larger deals are more likely to have post-issuance reporting**. This is visible by comparing the shares of different size brackets, both in terms of amount issued and number of issuers.

To some extent, the positive correlation between bond size and reporting is also noticeable by comparing the amount issued and issuer count shares *for each size bracket*, since deal and issuer sizes are closely linked. The share of reporting by issuer count tends to be lower than by amount issued, i.e. within a given bracket the non-reporting issuers tend to be relatively small.

However, this does not hold among benchmark size deals (USD500m+). In the top two brackets, the few non-reporting issuers are relatively large, so the amount issued share is slightly higher than the issuer count share.

In our last study we had noted the particularly sharp increase in reporting share for benchmark deals. The results this year point to a more gradual increase, although the largest jump is indeed between the 100-500m and 500m-1bn brackets, by number of issuers (78% to 92%). Large deals tend to be from more experienced and repeat issuers, such as financial institutions, and likely benefit from more comprehensive corporate-level monitoring and reporting systems, combined with greater experience in issuing green.

Significant variation across issuer types

There are also differences by issuer type. Several reasons for this may exist, both directly and indirectly related to issuer type. For example, financial institutions are often larger and repeat issuers with more advanced tracking and reporting systems, sovereigns are more likely to be in the public eye and face scrutiny if non-reporting, and local governments may have increased budgetary restrictions that make it harder to provide timely and good-quality reporting.

Corporates polarised, public sector issuers more consistent

Overall, private sector issuers are the most polarised in terms of reporting availability, with financial corporates ranking first and non-financials last. Apart from often being large and repeat issuers, perhaps being close to the

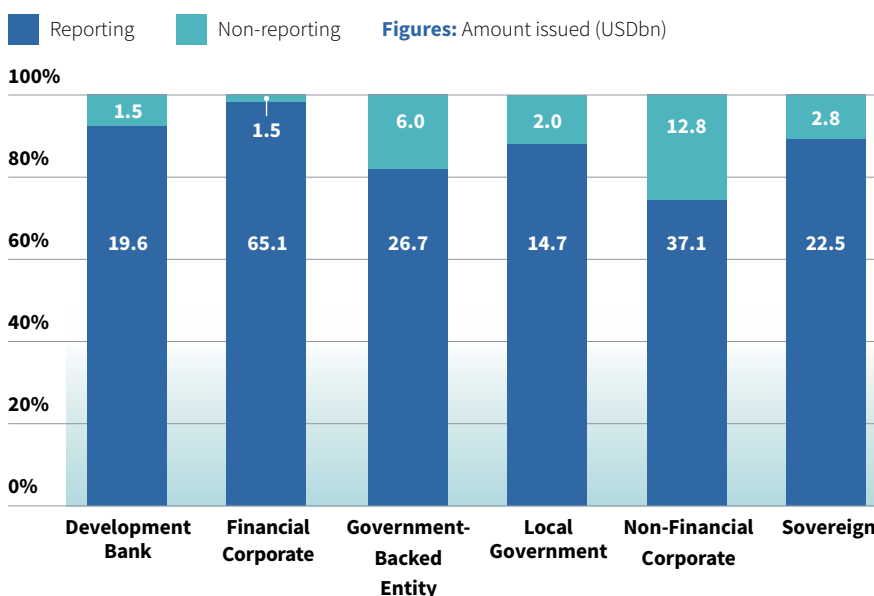
investment community contributes positively to reporting among financial institutions. The lower reporting share among non-financial corporates is partly due to a wider base of smaller issuers, many of which have only issued one bond.

There is more consistency in reporting levels across public sector issuers.

Development banks rank second overall, since, similarly to financial corporates, they tend to be large repeat issuers with a more structured approach to applying the GBP guidelines on proceeds management and reporting.

Sovereigns and local governments are the next highest, with 89% and 88% respectively. That not all sovereigns have reported is somewhat surprising given they tend to be high profile issuers facing added public – and potentially investor – scrutiny. In addition, our previous study had found 100% reporting among this group.

Financials top, non-financials bottom



However, there are valid reasons for this.

Firstly, this year's research featured several more sovereign issuers (nine versus two last time) as governments from more countries green their expenditures and jump on the 'thematic debt bandwagon' to finance these. Secondly, all three non-reporting sovereigns – Indonesia, Fiji and Nigeria – have reported as of the time of writing, although we do note that Nigeria could make substantial improvements to the ease of accessibility and granularity of its reporting (its most recent bond already has more detail, so this was likely related to the 2017 deal included in our research having been its first).

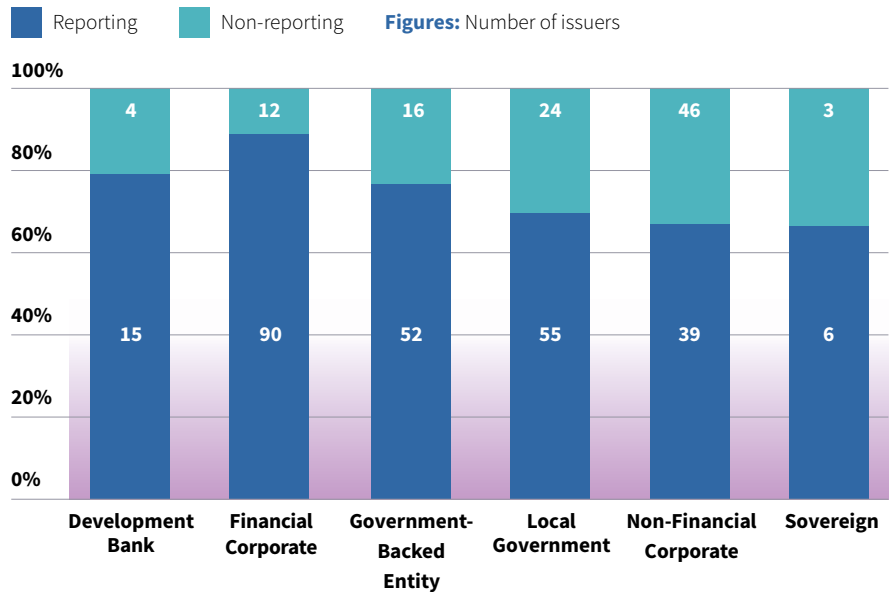
Local governments improving

Reporting among local governments increased since our last study (previously 78%).

A large share of local government issuers consists of **US Munis**, for which reporting is often lacking despite frequent commitments to provide post-issuance information (usually in the bond prospectus), at least for allocations. Indeed, this group accounted for 92% of the unreported amount within local governments; excluding them results in a boost to 98% reporting.

Nevertheless, this is improving. A greater share of US Munis was found to provide post-issuance UoP reporting this year, although it is often unclear where this is made available (e.g. sometimes on EMMA, sometimes on city or state government websites, and occasionally even elsewhere) and robust *impact* reporting is still chronically lacking within this issuer type. The lower availability and quality of reporting among US Munis may be due to budget constraints, incorporation in broader city or state budget reporting, and/or to the fact that they allocate a relatively high share for refinancing, for which post-issuance reporting may be less relevant. Another key reason may be the investor base (e.g. retail), which is less likely to demand reporting, especially for small bonds like US Munis.

Lower reporting shares and different ranking by issuer count



Issuer count analysis slightly more uniform

Finally, we note the smaller reporting shares by number of issuers, which lead to a slightly more uniform picture and different ranking between issuer types. Non-financial corporates and government-backed entities exhibit the smallest difference versus their amount issued shares.

Clear positive correlation between external reviews and reporting

Two categories of external reviews were defined in order to assess how external reviews and reporting correlate. *For details on each type see Appendix 3.*

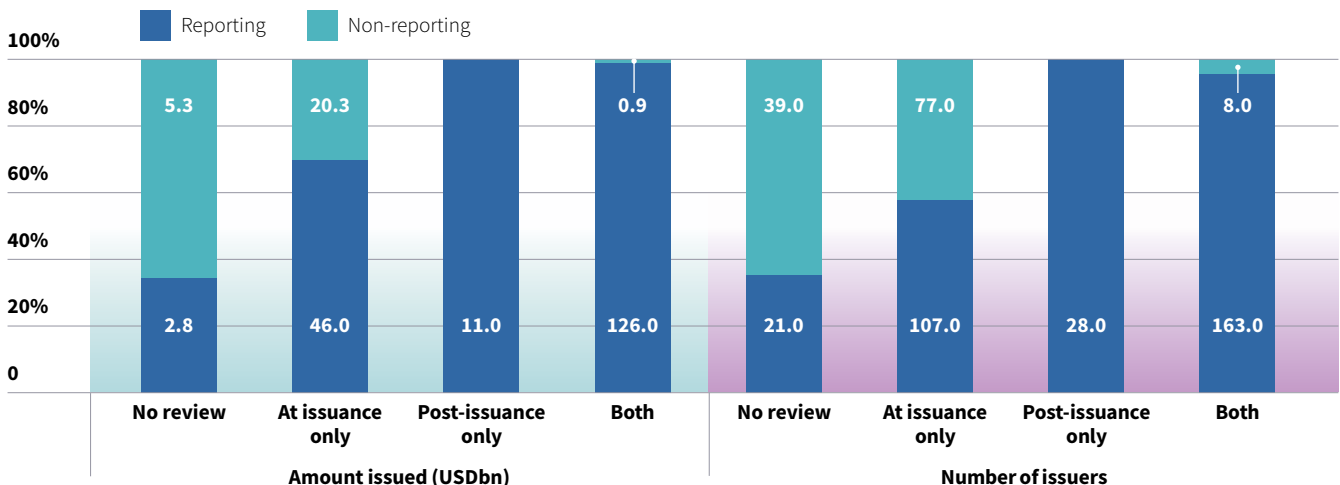
- External reviews **at issuance** include second-party opinions (SPOs), green bond ratings, and Certification (under the Climate Bonds Standard).
- External reviews **post-issuance** include audits/assurance, verification for Certified Climate Bonds, and reviews by SPO providers or rating agencies.

We found that bonds for which there is no review are much less likely to have post-issuance reporting; only 34% by amount issued and 35% by issuer count. These figures jump to 69% and 58% for deals that received an external review at issuance only.

However, the highest proportion of reporting clearly occurs when a post-issuance review is available. 100% of deals with only a post-issuance review had reporting, while for deals with external reviews both at and post-issuance this dropped slightly to 99% of the amount issued and 95% of issuers. The difference is likely due to the many more deals with reviews at both stages versus only post-issuance (i.e. larger sample), since there is no reason to expect the latter to have more reporting.

This analysis points to a similar conclusion as in our last study: **the likelihood of reporting increases significantly with either type of external review, but the relationship is much stronger for post-issuance external reviews.**

Post-issuance reviews excellent predictor of reporting



This makes sense given that a post-issuance review reflects issuer engagement at the post-issuance stage – in fact, many post-issuance reviews are included within green bond reports themselves – and confirms that reviews at issuance should not be interpreted as a guarantee of post-issuance reporting, but rather as a compliance check against the GBP (at issuance).

We also note the substantial difference between amount issued and issuer count shares when a review is available ('at issuance' and 'both', since 'post-issuance only' is at 100%), which is expected given that larger issuers report more often. But when no review is available, the shares are very close, most likely because issuers that do not obtain any review tend to be small anyway.

Regional ranking reflects market size

The regional analysis is clear: **regions with larger, more mature green bond markets have higher reporting shares.**

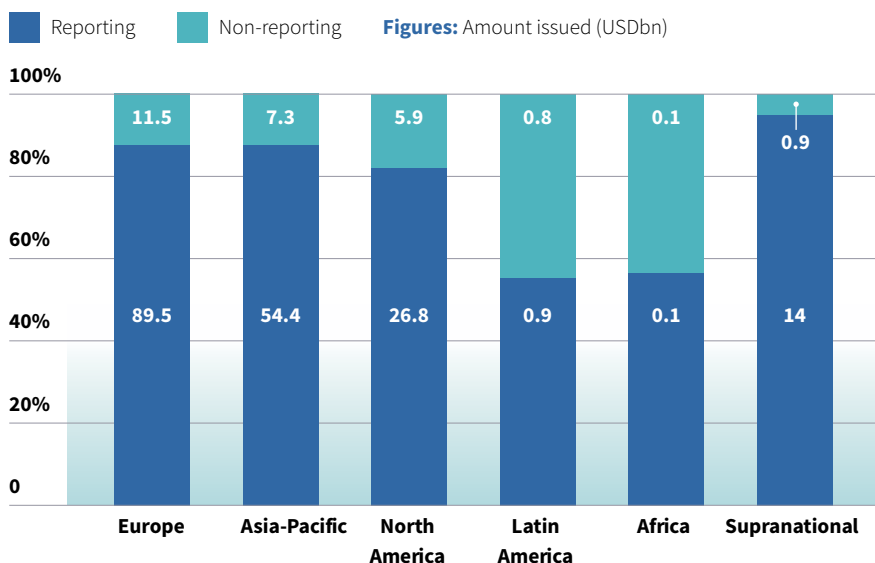
As well as having more large issuers that are more likely to report, they also tend to have more robust and consolidated issuing practices, including around reporting. In addition, the ranking is the same looking at both issue volume and number of issuers, apart from Latin America and Africa which trade places depending on the metric.

Supranationals have the strongest reporting share, with only one issuer (Asian Development Bank) non-reporting at the time of our research – however, both its deals were issued in Q1 2019, and have subsequently had post-issuance reports made available. In this sense, 'Supranational' is the only exception to the 'market size leads to higher reporting' rule, as it is only the fourth largest group; but it consists of several large and experienced issuers that operate at global and regional scales, such as the IFC, World Bank, EIB, NIB, etc.

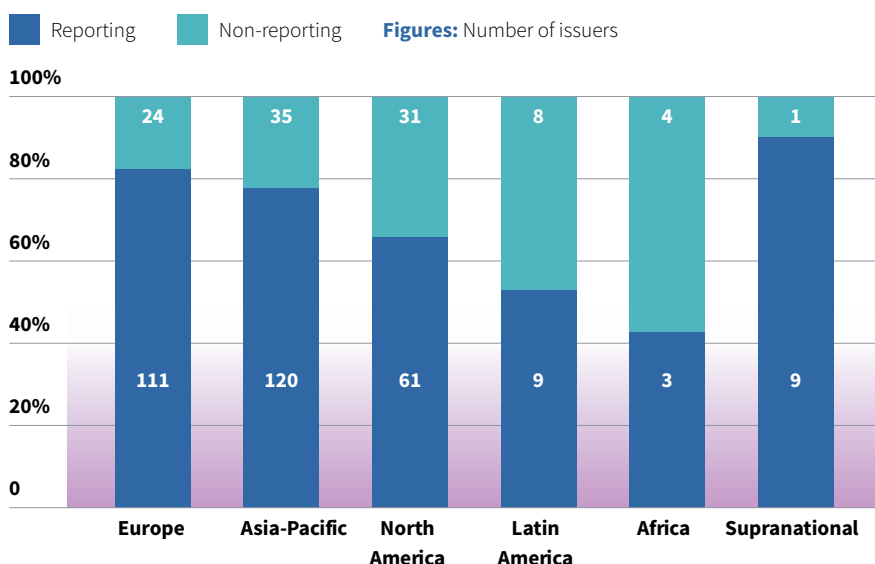
Even so, the current performance of Supranationals represents an increase from our previous study and is a positive development. It is particularly important for multilateral institutions to set a good example as they often set the tone for issuers in the regions where they operate – in line with this, several MDBs are also high-quality reporters (see pages 14-15).

NB: As with all our data, North America only includes USA and Canada. Mexico is classified as Latin America.

Higher reporting share in more mature markets



Issuer count ranking same apart from Latin America and Africa



Higher reporting levels in larger green bond markets

Our research dataset comprises issuers from 50 countries, five more than in our 2019 report. Nine countries have just one bond issued (e.g. Uruguay, South Africa, Lebanon) and thus have either 0% or 100% reporting.

It is worth noting that some of the results below are different to our last study, partly because reporting practices do vary but also due to the particular set of deals issued during the analysis period, including some large issuers that skew the results of their domiciles.

More than half the countries (29 of 50) have a reporting level of 90% or more by amount issued. Of these, 18 boast 100% reporting, but are mostly relatively small green bond markets with less than five deals (see *100% Reporters* chart further down). Owing to the size of their green bond markets, the standouts in this group are clearly the Netherlands (13 deals, USD9.0bn) and Italy (eight deals, USD5.1bn), both of which have improved since our last report.

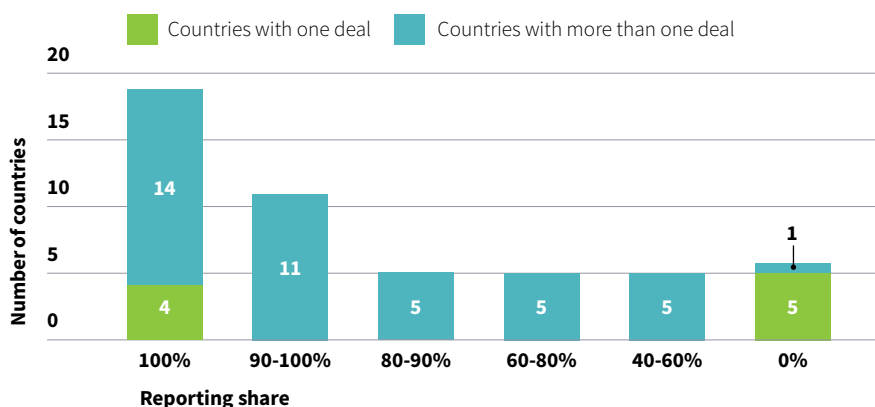
Most large markets with 90%+ reporting

Nonetheless, **most countries with larger, more mature green bond markets (mainly developed economies) fall in the 90-100% reporting level bracket**, such as China, Germany, Sweden, Canada, Belgium, and the UK. A few others follow in the 80-90% range, namely Japan and Spain.

Only four countries with over USD1bn issued – within our analysis cut-off dates – have a reporting share below 80%: the USA (77%), India (74%), Indonesia (72%) and France (68%). With USD24bn each issued, the USA and France deserve a closer look.

France's relatively low share is largely due to a few deals over USD1bn classified as non-reporting: one by Société du Grand Paris (EUR2bn/USD2.3bn), one Green OAT (EUR1.7bn/

Over 90% of volume in 29 out of 50 countries has UoP reporting



USD2.0bn) and one by LISEA EUR900m/USD1.0bn). However, they were all issued in Q1 2019 and have since made post-issuance reporting available.

The **USA** is very different. American issuers had USD5.6bn of non-reporting volume from 40 deals. The vast majority of these deals were US Munis, which is to be expected, but over half (52%) of the volume was contributed by two energy companies: MidAmerican Energy (USD2.2bn) and Xcel Energy (USD700m). Of their combined four deals, two were from Q1 2019 and two from 2018 – again, all now have reporting available, although MidAmerican's only seems to include UoP information.

While it is true that the USA's reporting share has risen from 71% in our previous study, we expect and hope to see this increase further. Now that sustainable finance is gaining more traction under the Biden Administration, continued development of the USA's green bond market is also likely to bring improving post-issuance disclosure practices from both private and public sector entities.

Lowest reporting entirely from small markets

All countries with under 60% reporting have a relatively small issuance volume, below USD500m apart from Mexico with USD787m

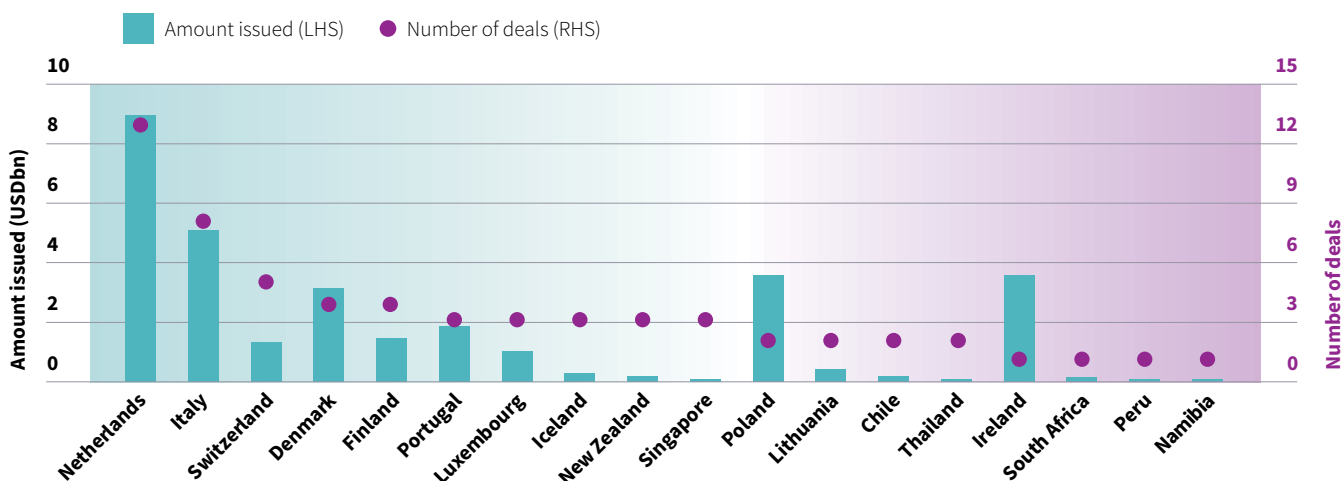
(45% reporting). Taiwan is the only market in this group with more than five deals (7), of which three, representing 48% of the issue volume, lacked reporting at the time of analysis.

Almost all countries with no reporting (i.e. 0%) had only one deal issued. The exception is Fiji, which had four bonds but all sovereigns: however, reporting has since been made available for all of them.

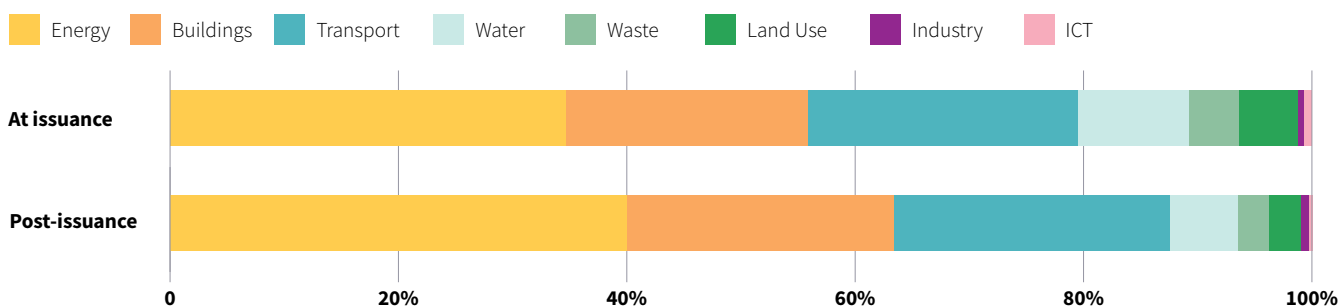
The reporting share among smaller markets fluctuates considerably. For instance, Switzerland and South Africa, which featured in the low-reporting group in our 2019 study, both achieved 100% reporting this time.

Between pages 14-17 we assess the **quality** of reporting through a scoring method, explained there in more detail. However, it is worth noting here that countries with higher reporting levels also tend to score better in terms of the quality of reporting, even though there are several exceptions; for instance, China, Belgium, Singapore and Thailand have high reporting shares but relatively low average scores. A summary of all countries ranked by quality score – and with corresponding reporting shares – can be found in Appendix 4.

Countries with all deals reporting are mainly markets with under 5 deals and/or USD2bn issued



Post-issuance UoP broadly similar to estimates at issuance - largest increases in Energy and Buildings



NB: Unallocated A&R excluded as only allocated amounts included post-issuance.

At issuance versus post-issuance comparison

Actual allocations replace estimates at issuance

One of the reasons for researching post-issuance reporting is to determine the actual allocation of green bond proceeds. At issuance, Climate Bonds screens deals to determine alignment with the Climate Bonds Taxonomy (see Appendix 2) and identify or estimate allocations.

Since most issuers do not or cannot provide sufficient detail at issuance, allocations are often estimated. As new information becomes available – i.e. post-issuance – these are adjusted to reflect the actual use of proceeds.

The post-issuance disclosure analysed as part of our study confirms that proceeds were indeed allocated to assets aligned to the Climate Bonds Taxonomy, and no deals were removed from our Green Bond Database following this research. However, actual allocations to some categories were lower than estimated at issuance, whereas some saw higher allocations.

The post-issuance split in the chart above only includes allocated amounts, since the split of unallocated proceeds would have to be estimated – similarly to how it is rare for issuers to disclose the proceeds split at issuance (apart from asset refinancing, where the expenditure is known a priori), it is rare to see issuers disclosing the expected split for unallocated proceeds at the post-issuance stage. However, it does happen, and where possible we would encourage issuers to indicate this, assuming they are confident enough to do so.

Based on this analysis, the largest increases are in Energy (35% to 40%) and Buildings (21% to 24%), with the most noticeable drop in Water (10% to 6%). The reasons for this are unclear, but could be related to our methodology at issuanceⁱ underestimating allocations to the largest categories and/or to proceeds in these being allocated more rapidly than in other categories, potentially due to a larger share of refinancing. However, the results are slightly different to those in our last report, so part of the changes are likely due to natural variation, the

specific set of deals we looked at, and the fact that the post-issuance split only includes allocated amounts (i.e. not the full amount issued).

A closer look behind allocations

Since UoP allocations are typically estimated based on the information in issuer frameworks and/or external reviews such as SPOs, it is sometimes the case that fewer categories are actually financed, as some issuers may prefer to list many categories at issuance, giving them the option to finance such projects or assets.

This happens most often for repeat issuers with green bond programmes that fall under one framework, and is especially relevant for financial institutions – such as banks and development banks – that are able to lend to many different borrowers, as well as some large corporates that could potentially finance various types of green projects.

In such cases, the issuer may end up financing only one or two project types, and/or it could be that the bond(s) issued during our analysis period happened to only finance some of the categories listed in the issuer’s framework, while future ones may finance a different set.

A good example is the **North American Development Bank (NADB)**, which has issued two green bonds (the latest a two-part deal) included in the Climate Bonds Green Bond Database – but only the first, from 2018, was included in our post-issuance research.

NADB’s Green Bond Framework, which covers both deals, lists renewable energy, water and wastewater management, energy efficiency in buildings, and pollution prevention and control as eligible project categories. In the absence of a concrete split, Climate Bonds allocated proceeds evenly between applicable categories at issuance; in this case 25% respectively to Energy, Water, Buildings and Waste. However, post-issuance reporting for the 2018 bond confirmed that only renewable energy projects were financed, i.e. 100% to Energy and 0% to the other categories. The differences contribute to those in the chart above, and have been reflected in the Climate Bonds Green Bond Database.

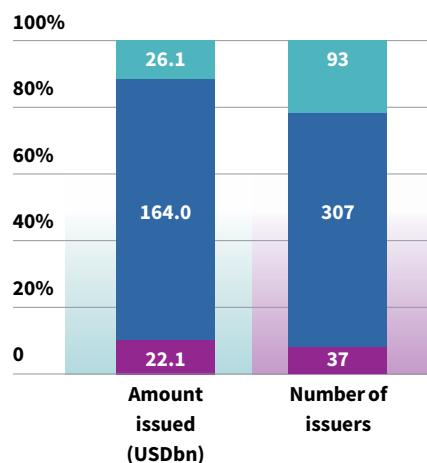
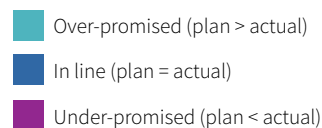
Most issuers delivered on reporting commitments

We also compared actual post-issuance reporting with commitments made at issuance. Whilst providing post-issuance reporting is the single most important aspect of disclosure on a green bond’s UoP and impacts, planning to do so and communicating this effectively at issuance is also important. This is especially relevant given the different possible ‘types’ of reporting: none, UoP only, impacts only, and both UoP and impacts.

In line with our last report, we found that 70% of issuers, accounting for 77% of the amount issued, did as promised, i.e. the actual reporting action was as per the commitment made at issuance (for instance, an issuer planning to report only on UoP and delivering that). The higher share by amount indicates larger issuers are more likely to fall into this group.

The rest either over-promised or over-delivered. Over-promising includes failing to report, as well as committing to report on UoP and impacts but only reporting one of them. Under-promising, or over-delivering, is the opposite: delivering more than the initial commitment.

Smaller issuers more likely to over-promise



i. i.e. splitting proceeds equally between eligible categories, when not known.

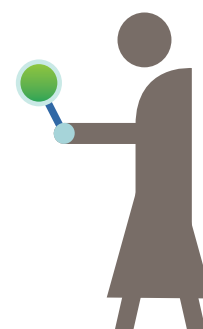
Over-promising seems to be more common than under-promising, which perhaps is not surprising given that many non-reporting deals now have reporting (i.e. would no longer be over-promising). The share of over-promising also falls significantly when looking at amount (12%) versus issuer count (21%), suggesting that smaller issuers are much more likely to over-promise than larger ones, which again is hardly surprising.

Factor in quality assessment

The relationship between actual post-issuance reporting and commitments at issuance is one of the metrics used to assess the quality of reporting. In general, *for a given level of reporting* – ranging from none to both UoP and impacts – the best option is to have planned to report to that level and then do so. In other words, over- and under-promising to report should be avoided, although over-promising (i.e. under-delivering) is, of course, worse. An issuer that committed to report on UoP but did not demonstrates bad practice, more so than one that did not commit to anything but ended up reporting on UoP.

The other way to assess quality regarding commitments is to consider a *given level of commitment*. In this case, issuers should still strive to provide the best reporting possible even if it means under-promising. For example, if an issuer commits to report on UoP but then realises it is also able to report on impacts, it should do so. Such an issuer, therefore, scores higher than if it only disclosed the UoP.

These – and other – considerations are reflected in our quality scoring analysis, which forms the next section.



4. Quality scoring

Process overview

As well as looking at the availability of reporting (i.e. reporting/non-reporting) and its level (UoP and/or impacts), we capture data on many other variables as part of our post-issuance research. Almost all of these refer to each deal's overall reporting characteristics, i.e. are not specific to either UoP or impacts.



12 of these variables are used to evaluate the **quality of reporting** for a given bond, computed as a score which can range from 0 to 25 points. A value is attached to each variable based on what is reported by issuers, and variables are weighted depending on their importance for the quality assessment. *We have tried to be as objective as possible in doing so, and many of the variables feed into the best practice recommendations in the Conclusion.*

Only deals with post-issuance reporting are included. When there are multiple bonds per issuer, an average is calculated for the issuer to avoid skewing the results.

Variables considered crucial for best practice

Communicating commitment at issuance and reporting in line with this:

the quality scoring model assigns most points to bonds that have post-issuance reporting on both the UoP and impacts, and which also committed to report this at issuance. If a report is not available but the issuer committed to producing one, then a penalizing system kicks in and less points are assigned than if there was no commitment at all. *This is closely related to the discussion on pages 12-13.*



Project-level disclosure, at and post-issuance:

comparing at and post-issuance scenarios is also relevant for the degree of project-level disclosure, which is the second most important variable. Here, bonds with specific projects disclosed both at and post-issuance score higher than bonds with projects only disclosed at one stage, which in turn score higher than bonds with only broad project categories (e.g. energy, wind, solar, transport, rail etc) listed. *This is discussed in more detail below.*

External reviews: another influential variable in the model captures whether the bond received reviews from second- or third-party entities – this reflects the reliability and robustness of the disclosure. While external reviews released *at issuance* (e.g. SPOs) are important to verify compliance with the GBP and are included in the scoring, a higher score applies if *post-issuance* auditing is in place. On that note, audited UoP reports have been noticed to increase investors'

confidence, especially in emerging markets (EM).

Other variables considered important for best practice are included in the quality scoring model. Most fall under two broad aspects of reporting: **(1) clarity and ease of finding information**, and **(2) granularity of the disclosure**.

Clarity and ease of access

A key aspect of good reporting is providing information in a clear and easy-to-find way. Having a dedicated green bond webpage with all the relevant material related to the issuer's green bond issuance, including clear descriptions and links to all documents, is highly advised, as it considerably facilitates the process of accessing information.

Anecdotally, we noticed an improvement in this regard versus our 2019 research, with more issuers a) displaying all the information related to their green bonds on their websites, and b) doing so more clearly, largely through dedicated pages.

Furthermore, publishing separate green bond reports – either individually for UoP and impacts, or combined – again makes it much easier to obtain the relevant information. If provided within annual, sustainability or CSR reports, it should be via dedicated, clearly labelled sections.

Also included in this category are:

- **List of deals:** particularly relevant for repeat issuers, providing a list of the bonds issued and their key details (e.g. issue date, amount issued) – either on webpages or ideally within green bond reports – is a plus. This is a variable we added this year.
- **Report language:** providing an English copy of reports alongside local languages supports transparency. Even if issuers do not have a website with an English version (which would also be advised), at least translating green bond documents into English helps significantly, especially since some formats do not allow copying text and/or data.

Granularity

Arguably the most important aspect of high-quality green bond reporting is the breadth and level of detail of the information.

The main features of granular reporting can broadly be divided into two areas: **project versus portfolio** reporting for a given bond; and **bond versus programme** reporting when multiple bonds are issued (i.e. at issuer level).

Project versus portfolio reporting

Most issuers report at project level, although occasionally only for UoP and/or impacts rather than both (the reason is unclear, but for impacts could be related to difficulties in measuring or estimating impacts at project level).

Case studies: examples of good practiceⁱ

Sociedade Bioelétrica do Mondego - SBM (Portugal)

SBM, a Portuguese company wholly owned by the Altri Group, was one of only five issuers scoring the maximum of 25 points, which is especially impressive since it is a one-time issuer. The fact that it only finances one project – a biomass power plant – makes reporting easier, and its [green bond page](#) is both easily reached and laid out very clearly.¹

The [report](#) is correspondingly simple but has all the key information, including the relevant time period for allocations and impacts (which is not as common to find as one might think), the share of financing attributable to the green bond, impact data according to four different metrics, and a methodology for calculating GHG emissions avoided.² A post-issuance external review from Sustainalytics as well as a limited assurance report from Deloitte form the rest of the document.

Swire Properties (Hong Kong)

Swire Properties is another maximum scorer with exemplary reporting. Several property developers have particularly simple reporting when they only finance a few buildings/projects, but Swire combines simplicity with comprehensiveness.

As well as a visually appealing [green financing page](#)³ which summarises most of the data and details of its green financing in a very clear way, its [green bond report](#)⁴ has bond-level allocations and granular information on each project, including environmental impacts that go far beyond the building certifications achieved – this is refreshing, since many issuers only rely on disclosing building certifications as a form of impact reporting, which is not ideal (see page 27).⁵

A summary of the reporting process and calculation methodology is also provided, along with a limited assurance report from PwC. Reporting is available for all the green bonds issued so far, and Swire's webpage also includes a summary of the green loan obtained in 2020 and the sustainability-linked loan obtained from Crédit Agricole in 2019, which is contingent upon a target reduction in energy use intensity of Swire's real estate portfolio as well as continued listing on the DJSI World.

ⁱ There are many more good reporters in the market, including many of the larger, more experienced issuers (e.g. financial institutions, especially from Europe). These are simply some examples, and to some extent we tried to pick some less well-known issuers.

This may be harder for larger issuers that finance many projects. Bonds issued by financial institutions, for example, often lack specific project disclosure. Limitations might derive from loan-level confidentiality agreements with borrowers and/or portfolio granularity (i.e. due to the number of bonds to report on, e.g. 14 of Credit Agricole CIB's green bonds were covered in our research).

The **EIB** is a leader in granularity among large, repeat issuers funding many projects. It gives detailed information on the UoP and impacts for each individual project (there are hundreds), including the share attributable to EIB financing. The **World Bank (IBRD)** and the **IFC** are other leaders, following a similar approach – the IFC additionally identifies contributions to the Sustainable Development Goals (SDGs) for each project.

The proportion of issuers reporting at project level – both for UoP and impacts – seems to be rising. This may be due to more advanced tracking capabilities among issuers, greater adherence to best practice guidelines, and investor demand. However, we note that best practice is to also provide aggregate figures for the bond overall, which should at least be possible for allocations and some impacts – most issuers do so, but several do not.

Bond versus programme reporting

Most repeat issuers, especially financial institutions, report at programme level (i.e. for a combination of multiple bonds, normally those outstanding). While this provides less granularity compared to reports at bond level, it is a reasonable approach when there are many bonds issued.

Financial institutions are usually large organisations with access to more comprehensive systems and greater resources dedicated to reporting. In this regard, they have a greater ability to provide reporting in a timely and granular manner; but doing so at bond level is often not possible given that money is fungible, and the proceeds are disbursed to borrowers from one pool of funds.

Nevertheless, some issuers of multiple – in some cases many – bonds do report at bond level. One of the largest and most frequent issuers falling in this group is **Iberdrola**, which provides allocations and impacts separately for each green bond within a single document (but curiously not combined for the overall programme/portfolio).

Among financial institutions, this is rare. The best example is **Bank of China**, which has issued several bonds with different labels and provides allocations, impacts, case studies and other supporting information for each one, as well as for the overall portfolio.

The **EIB** discloses which individual bond(s) were used to finance each project, although the proportion is not given when proceeds from more than one deal were used. However, unlike Iberdrola and Bank of China, a summary of the allocations and impacts is not provided at deal level, so to obtain this one would have to calculate manually using data from each project, which is very time-consuming.

Other aspects

Other aspects of granular reporting include providing detail on:

- Share of **refinancing** (if applicable)
- Balance – and ideally expected allocation – of **unallocated proceeds**
- **Other sources of financing** (if applicable), which can be used to pro-rata impacts
- Several **others linked to impact reporting** (e.g. clarifying the time periods of impacts, whether impacts are calculated ex-post vs. ex-ante, measured vs. estimated, etc).

These did not feature in our quality scoring model, but may be included in our next study. Another criterion we may add is whether issuers offer the ability to download/export data (e.g. in Excel format), which is still relatively uncommon.

More case studies: examples of good practice

Manulife Financial (Canada)

Manulife issued two green bonds in our sample period, one of which was a Certified Climate Bond financing wind and solar energy.

Manulife's [green bond report](#)⁶ is easy-to-find within the company's Sustainability section, although there is a [page](#)⁷ dedicated to green bonds that is harder to access from within the website.

The report is clearly structured, and despite being short and simple has a good amount of detail. Both bonds are included with their relevant details, and the allocations, impacts and project case studies are disclosed at bond level, which is a plus. The name and location of projects is also given, along with the correct pro-rata share of impacts, a clear explanation of the calculation methodology (referencing ICMA's Harmonized Framework and data sources), qualitative project information, and the value of net proceeds.

Danske Bank (Denmark)

Danske Bank's [green bond page](#) is easily reached from the Investor Relations section of its website, and includes various relevant documents.⁸

Danske Bank may have an advantage versus some other banks (especially European) in that its green issuance programme is smaller; but its [report](#) is nonetheless very well structured, with UoP and impact data given separately for the green bond issued by Danske Bank and those issued by its mortgage subsidiary, Realkredit Danmark.⁹

Clear charts provide a summary of allocations and size of the eligible green loan pool, while a simple table gives the impacts according to several metrics (depending on the category), along with contributions to the SDGs. The share of impacts attributable to the green bond is provided separately, although this could be directly referenced in the table.

Other positive features include a clear methodology for impact calculation and table with all the baselines used, various case studies, details of each bond with a useful breakdown of the allocation to investors, an independent auditor's assurance report, and relevant contact details.

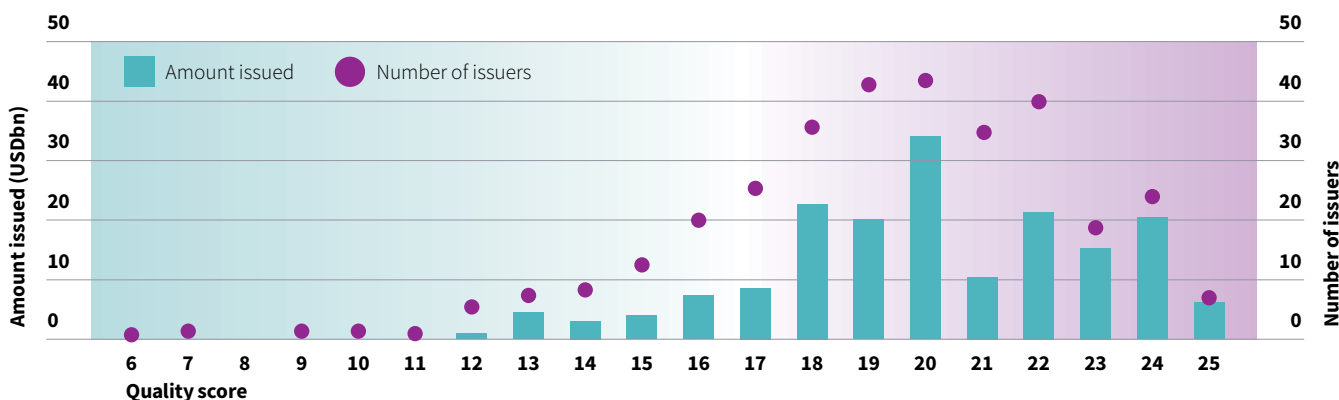
San Francisco Public Utilities Commission - SFPUC (USA)

SFPUC stands out as the US Muni issuer with highest quality reporting, closely related to the Programmatic Certification it obtained under the Water Infrastructure Criteria of the Climate Bonds Standard. We experienced issues accessing SFPUC's website on multiple occasions, but the reporting is still easily reached from the Climate Bonds [website](#).¹⁰

The annual [green bond report](#) includes the amounts allocated and pending allocation at bond- and project-level (there are many), along with qualitative and quantitative information on each one in supporting tables, including contributions to the SDGs (particularly rare among US Munis).¹¹

The green issuance programme is clearly framed within the issuer's sustainability plans at the start of each report, and the pre- and post-issuance verification required by the Climate Bonds Certification scheme – in this case provided by Sustainalytics – is attached at the end. One area for improvement, however, would be to provide project-level quantitative impact data more consistently in the report (although there is more information on this on its website).

Reporting issuers scored between 6-25 points, with most at the top end



Quantitative analysis

The distribution of scores for reporting issuers is similar to our previous study, with most falling in the 16-24 point range – and again with a peak at 20 points, for both amount issued and number of issuers. The simple average stands at 19.2 points versus a weighted average (by amount issued) of 20.0, reflecting the relatively higher scores of larger issuers.

There are also many more issuers relative to amount issued with 17, 19 and 21 points (i.e. on average these are relatively small issuers), while those at the top end (23+ points) are considerably larger. More detail on the top scoring issuers is provided on the next page.

Perhaps somewhat surprisingly for many readers, **the analysis of summary statistics by deal size does not point to necessarily higher-quality reporting among issuers of large deals.** Rather, and in line with our 2019 results, the average, median and maximum scores are relatively constant for all size brackets.

This means that while larger issuers tend to provide post-issuance reporting more often than smaller ones, this does not necessarily translate into higher average quality scores.

However, there is a clear increase in minimum scores, which suggests that **larger issuers are less likely to have poor-quality reporting** (although it may also be partly due to the lower sample size of benchmark size deals).

NB: We refer to 'large issuers' and 'issuers of large deals' interchangeably above even though large issuers may achieve their volume through many small deals; however, these did not feature in our dataset. The most obvious example is Fannie Mae, a highly frequent issuer of small green MBS, but as securitized instruments these have been excluded.

In our 2019 report we assessed scores based on issuer types. A repeat of this analysis now yielded comparable but even flatter results, so we highlight the more interesting regional breakdown instead.

The range of scores is heavily linked to the number of issuers in each region. Taking this into account, European issuers seem to be the most consistent

in terms of reporting quality, with 110 issuers ranging from 10 to 25 points. Asia-Pacific, by contrast, has scores ranging from 6 to 25, while North America's range is also wider than Europe's even though its issuer count is about half. **This suggests that, more than just having high-scorers, more mature green bond markets have consistently good-scoring issuers.**

Africa exhibits the highest mean score, followed by Europe. In the case of Africa this is derived from only having three issuers, but it is still a very positive note for the region's green bond market, and sets a high bar for future issuers to follow. Access Point, Growthpoint Properties and Bank Windhoek, all financial corporates, achieved 22 points.

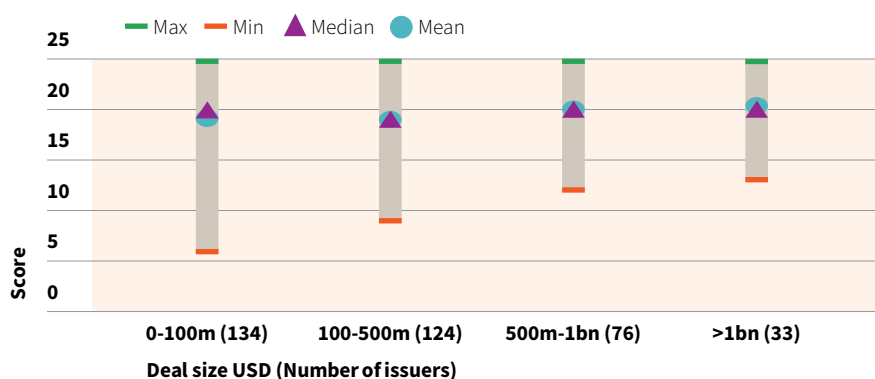
The remaining regions have very similar average scores, but Latin America stands out

with a high median of 21 due to most issuers scoring above the average of 19.5 points. It is interesting that three of the four below-average scorers are financial corporates – Banco Galicia, Bancolombia and BBVA Bancomer – whereas all other issuer types score higher.

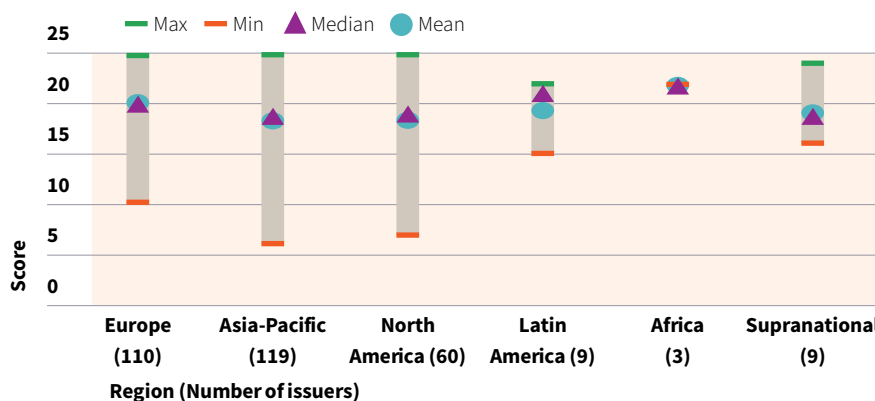
Suprationals have the highest minimum score, after Africa. Their relatively high-scoring range is expected given they consist of larger and more experienced issuers, although the low median signals that most Supranational issuers score below the mean, versus most other regions where the median is above.

In any case, it is important to remember that these scores only cover reporting issuers. We were not able to find reporting for several deals from each region (including Africa).

Minimum scores increase with deal size



European issuers most consistent, Africa with highest average



Top 10 issuers cover various issuer types and countries, but are mostly from developed markets (DM)ⁱ

Issuer	Country	Issuer type	Number of deals ⁱ	Amount (USDm)	Score ⁱⁱ
Sociedade Bioelétrica do Mondego	Portugal	Non-Financial Corporate	1	57	25
Obayashi Corporation	Japan	Non-Financial Corporate	1	89	25
SpareBank 1 Boligkreditt	Norway	Financial Corporate	1	1,240	25
La Poste	France	Government-Backed Entity	1	566	25
Swire Properties	Hong Kong	Non-Financial Corporate	1	500	25
Iberdrola	Spain	Non-Financial Corporate	5	3,860	24.6
Manulife Financial	Canada	Financial Corporate	2	833	24.5
ADIF Alta Velocidad	Spain	Government-Backed Entity	1	717	24
Bank of Dalian	China	Financial Corporate	1	290	24
City of Reykjavik	Iceland	Local Government	1	33	24

NB: 19 other issuers scored 24 points but are not shown in the table: ACS (Spain), Boston Properties (USA), Danske Bank (Denmark), Fingrid (Finland), FS Italiane (Italy), Hitachi Zosen Corporation (Japan), Hong Kong & China Gas (Hong Kong), ING (Netherlands), KBC (Belgium), Kenedix Office Investment Corporation (Japan), Lietuvos Energija (Lithuania), Naturgy Energy Group SA (Spain), New World China Land (Hong Kong), Orsted (Denmark), Royal Schiphol Group NV (Netherlands), SCBC (Sweden), Société du Grand Paris (France), SSE (UK) and Stena Metall Finans AB (Sweden). i. Within sample period. ii. Average per deal if more than one.

Best reporters

Five issuers score the maximum

Five issuers, all from different countries, achieved the maximum 25 points in this year's analysis (only two in our previous study); four of these are corporates, mostly non-financials. *SBM and Swire Properties are highlighted as examples of good all-round reporting in the Case Studies section above.*

Not all issuers in the list are large, reflecting the fact that despite larger issuers being more likely to report, they are not necessarily high-quality reporters. Even so, six of the Top 10 entities issued at least USD500m during our analysis period.

Europe leads again

Issuers from three regions are featured in the Top 10: Europe, Asia and North America. This holds even when including the 19 other issuers that scored 24 points.

Similarly to our last report, Europe leads, this time with six issuers in the Top 10 list. Spain is the only country with two, and boasts another two that scored 24 points, making it the domicile with most top-scoring issuers (previously France). Hong Kong follows, with three scoring at least 24.

Just one EM issuer in Top 10

High-scoring issuers from EM are of particular importance in setting the tone domestically. Investors may associate EM with data scarcity and poor disclosure, so greater transparency in the green bond market can provide comfort to international investors and support their involvement in the

domestic market. This was confirmed by the results of Climate Bonds' [2019 Investor Survey](#).

Only one EM issuer – Bank of Dalian, from China – made it into the Top 10, versus three in our previous report. There was also only one from the list of 19 other issuers scoring 24 points: Lithuania's Lietuvos Energija, a consistent high-quality reporter whose 24 points had already placed it in the Top 10 back in 2019.

The relatively lower presence of EM issuers among the top scorers may be related to the fact that more issuers (all from DM) scored over 24 points this time, but we nonetheless expect the share of EM to increase in future studies.

Corporates dominate among top scorers; GBEs follow

Seven of the Top 10 issuers are corporates (mostly non-financials), in line with our previous study. This extends to the 19 other issuers scoring 24 points, of which 12 are corporates and the rest government-backed entities. This is unsurprising given that most green bond issuers are corporates, and this includes many large, seasoned issuers, particularly from Europe.

Government-backed entities stand out with the most high scorers among public sector issuers, again fuelled by large repeat European issuers such as La Poste, ADIF Alta Velocidad, Fingrid and Orsted.

By contrast, only one local government – the City of Reykjavik – scored at least 24 points, although several achieved 23. There are especially positive signs from North America, including among US Munis which often exhibit weaker reporting practices; for example, San Francisco Public Utilities

Top 3 by issuer type

Issuer	Score
Financial Corporate	
SpareBank 1 Boligkreditt (Norway)	25
Manulife Financial (Canada)	24.5
6 issuers ⁱ	24
Non-Financial Corporate	
Sociedade Bioelétrica do Mondego (Portugal)	25
Obayashi Corporation (Japan)	25
Swire Properties (Hong Kong)	25
Local Government	
City of Reykjavik (Iceland)	24
San Francisco Public Utilities (USA)	23
2 issuers ^{iv}	23
Development Bank	
European Investment Bank	23.5
North American Development Bank	23
2 issuers ⁱⁱ	22
Government-Backed Entity	
La Poste (France)	25
ADIF Alta Velocidad (Spain)	24
7 issuers ⁱⁱⁱ	24
Sovereign	
Republic of France	23
Republic of Poland	22
2 issuers ^v	20

i. ING (Netherlands), Boston Properties (USA), KBC (Ireland), Kenedix Office Investment Corporation (Japan), Bank of Dalian (China), Danske Bank (Denmark); ii. Agricultural Development Bank of China, Fondo Especial para Financiamientos Agropecuarios (Mexico); iii. Fingrid (Finland), Royal Schiphol Group NV (Netherlands), Orsted (Denmark), FS Italiane (Italy), SCBC (Sweden), Société du Grand Paris (France), Lietuvos Energija (Lithuania); iv. Treasury Corp New South Wales (Australia), City of Toronto (Canada); v. National Treasury Management Agency (Ireland), Republic of Indonesia

and the City of Toronto both have exemplary reporting. A developing green finance market in the USA is likely to support further improvements.

We also note the absence of development banks scoring 24 or more. As the table above shows, the EIB scored highest in this group with 23.5 points, compared to our 2019 study which featured BNDES and DBS Group in the Top 10 with 24.

Even so, the diversity in issuer types is reassuring, and stresses the fact that all issuers can, and should, be good reporters. Nevertheless, greater diversity would naturally be welcome; sovereign issuers, for example, tend to be high-quality reporters, and we hope to see some making it into the Top 10 as more come to market.

5. Impact reporting

The previous sections focused on the availability and quality of reporting, defined by whether there was post-issuance **UoP** disclosure. We now turn to an in-depth exploration of several aspects of **impact** reporting, including its availability in the market, different attributes and practices, a close look at the metrics used for each project/asset type, and the impact methodologies used by reporting issuers.

Overview: impact more important than ever

Impact reporting aims to provide insights into the environmental outcomes of green bond financing. The objective is to quantify changes in the performance of an asset, project or portfolio of projects with respect to relevant indicators, although this can also be supported by qualitative indicators and other contextual information.

Disclosure of impacts has become more common in the green bond market over the last few years, and there is now more guidance and resources covering this aspect of reporting. To some extent the increase may also have been compounded by the increasing requirements for investors to disclose the impacts of their portfolios (especially in the EU), putting further pressure on issuers to report impacts and bringing ‘impact’ to the forefront of many discussions in finance. Clearly, the topic is more important than ever.

Our research finds that 59% of issuers and 74% of the amount issued between November 2017 and March 2019 have impact reporting in place, which is lower than the share of UoP reporting.

Almost all issuers that report impacts also report allocations (97%), but this drops vice-versa: 74% of issuers that report UoP also report impacts. Those that report both UoP and impacts tend to be larger, so the shares are higher by amount issued: respectively 99% and 84%.¹²

Since the availability of impact reporting is closely related to that of UoP reporting, we have not included an analysis of how it varies by deal size, issuer type, geography, etc. The results are broadly similar to those in the UoP reporting section.

However, we note that **impact reporting in the USA is considerably weaker than UoP reporting, driven by US Munis.** There appear to be some valid reasons for this, not least the fact that many deals and issuers are small (see page 9); but in the interests of driving greater availability and consistency of impact data, this is still an area for improvement in the country’s sustainable finance market – and one we expect to improve as the market develops, especially under the Biden Administration.

Impact reporting practices¹³

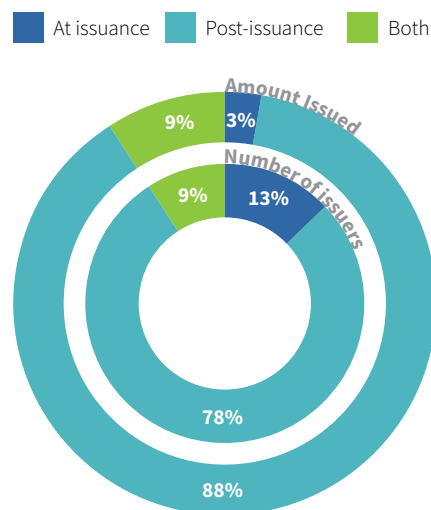
Some issuers report impacts at issuance

The figures above – and throughout the rest of the report – refer to reporting provided post-issuance. However, we did check for impact disclosure at issuance, i.e. within issuers’ Green Bond Frameworks or external review documents.

This is mainly relevant in cases of refinancing, as the project(s)/asset(s) must be known, and some form of impact assessment been conducted. Since the project(s) must be known, it is typically more common among issuers financing only a single project or a few clearly defined projects, which for example rules out financial institutions (unless the beneficiary projects are known at issuance, which is very rare).

In addition, most impact disclosure at issuance is of expected – i.e. ex-ante, or forward-looking – impacts, both for refinanced projects as well as projects planned or in construction. This may be harder to imagine for refinanced assets or projects, but simply refers to impacts for the post-

Most of market only reports impacts post issuance



issuance period, i.e. impacts that have not yet materialised, even though the assets/projects are already operational.

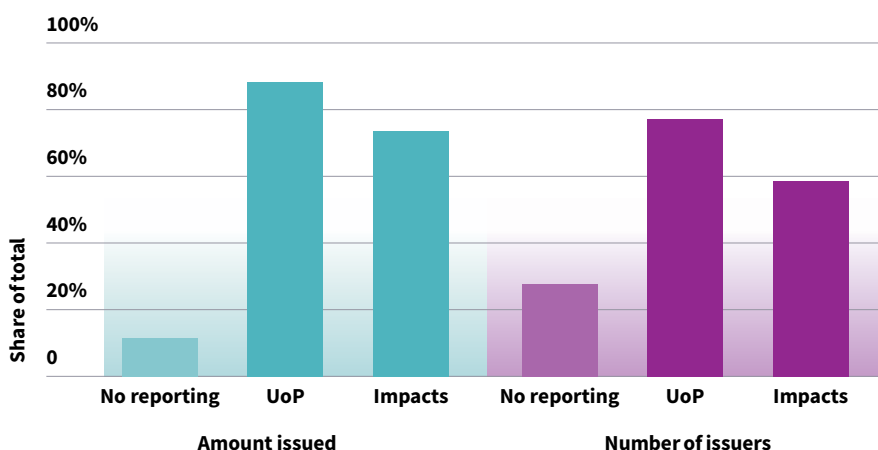
The vast majority of issuers that report impacts only do so post-issuance. Those that only report at issuance tend to be considerably smaller, including various US Munis, seen by the much larger share by issuer count versus amount issued.

Reporting at both stages best, otherwise just post-issuance

Regardless of whether impacts are disclosed at issuance, and projects are being refinanced, impact reporting should also occur post-issuance, as long as the projects are operational and impacts are ongoing. This applies even if the impacts reported at issuance cover the full projected lifetime of the project, since at that point they would necessarily be expected, and actual/ex-post impacts for future periods could be reported post-issuance; if there is no change versus expected impacts disclosed at issuance, issuers could still publish a statement clarifying this.

Thus, we would argue that providing *post-issuance* impact reporting should be the priority for issuers. Providing disclosure at issuance to support this is even better, but if so issuers should take care to clearly explain the period the impacts refer to (and thus whether they are ex-ante or ex-post), and confirm that post-issuance disclosure will also be provided. This is in line with the guidance from the **Handbook – Harmonized Framework for Impact Reporting (ICMA Harmonized Framework) and Nordic Public Sector Issuers (NPSI) Position Paper**.

Most issuers that report UoP also report impacts



Two-thirds of volume covered by programme-level reporting

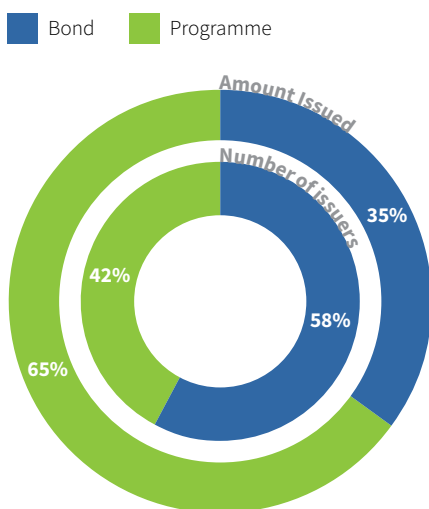
Less than half the issuers, but almost two-thirds of the volume, report impacts at programme level, i.e. repeat issuers reporting collectively for multiple green bonds (typically those outstanding). The large difference is due to programme-level reporters being issuers of both more and often larger deals.

In our previous study we found that 1% of deals had reporting at both levels. This year we assessed reporting at the *level of most granularity*, so these were classified as bond-level, but it remains very rare. Bank of China is one example.

We also found a handful of issuers (<1%), mostly small, that only 'report' at corporate level, i.e. not for the assets/projects financed by the green bond(s) but for the corporate's overall activities – especially related to GHG/CO₂ emissions or emission reductions, and communicated either on webpages or annual, sustainability or CSR reports. This is not considered green bond impact reporting, as it does not directly refer to the assets/projects financed by the green bond(s). A variation of this are entities focused on a single project that may already report its environmental impacts, but do not contextualise the share of green bond financing, e.g. an entity specifically created to develop a wind farm that reports annually on its renewable energy generation, but without disclosing the relevant share of impacts from the green bond(s).

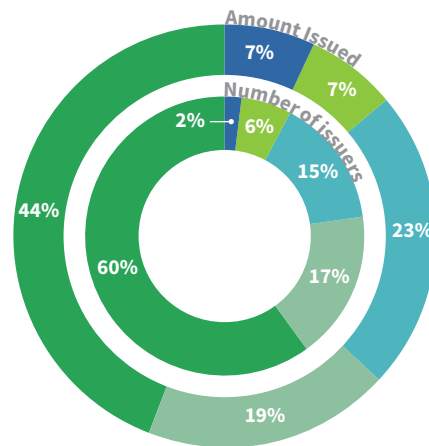
Whether issuers report at bond- or programme-level will generally apply to both UoP and impacts, although not always. The same is true for the level of project granularity.

2/5 of issuers and 2/3 of amount report impacts at programme level



Project-level impacts more common among smaller issuers

Legend: Total (Dark Blue), Category-1 (Light Green), Category-2 (Light Blue), Project-some (Medium Green), Project-all (Dark Green)



Larger issuers report with less project granularity

Impact reporting may come in the form of project-, category- or total-level disclosure.

'Total' applies when issuers report the impacts of all projects and project categories combined; 'category' when the impacts refer to a given project category (e.g. Energy, or Transport) or sub-category (e.g. solar, or rail), which we respectively called Category-1 and Category-2; and 'project' when the impacts are given for each individual project, which can either happen for all projects (Project-all) or only a selection (Project-some).¹⁴

We found that most issuers (60%) report impacts for all projects individually, with a further 17% doing so for some projects, while only 23% report impacts at aggregated category- or total-level. For all groups except Project-all, the shares increase looking at amount issued, **which points to greater project granularity among smaller issuers; however, this is closely tied to the fact that smaller issuers are more likely to finance just one or a few projects.**

Three-quarters of issuers report actual impacts

A key distinction is between **actual (ex-post)** and **expected (ex-ante)** impact assessments, which as the names imply depend on when the assessment is conducted, together with the period the impact refers to.

Impacts reported at issuance – for future periods – are necessarily expected (see above), but it can be harder to ascertain this for post-issuance impact disclosure, because while the period of impacts is typically disclosed, the time of assessment is often not.

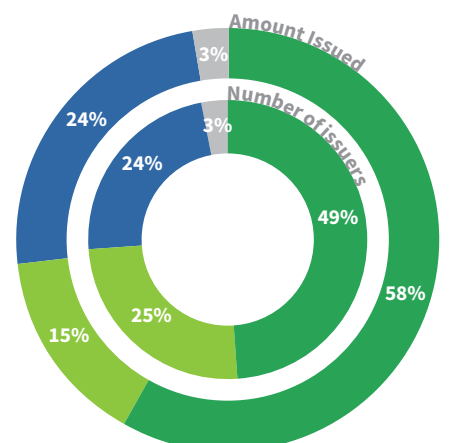
The GBP and NPSI Position Paper treat expected impacts as the minimum requirement, with actual impact reporting being more of an ambition (i.e. to be reported if possible). Issuers should strive to make it clear which one applies.

Where feasible, we made assumptions from all the information available to determine whether a given impact was assessed ex-post or ex-ante, e.g. from the language used, separate methodology documents, and in some cases the metric itself (for example, 'installed capacity' assumed to refer to capacity already installed, i.e. ex-post).

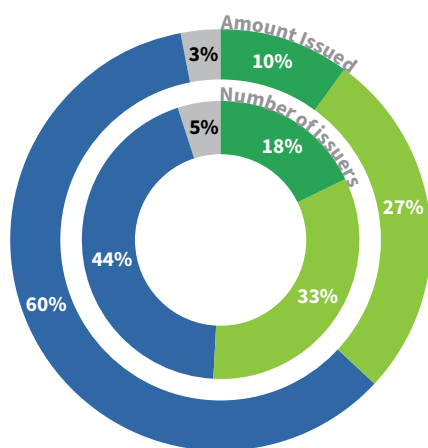
The results point to a higher prevalence of actual versus expected impacts, especially looking at amount issued. Perhaps larger issuers have more resources available to perform ex-post assessments, whereas smaller ones are more likely to rely on ex-ante estimations. About a quarter of issuers and the amount have both, i.e. a combination of metrics with ex-ante and ex-post assessments. The 'N/Av' group, representing 3%, refers to cases where the information was not available and we were not confident enough to make an assumption.

Ex-post impacts more common, especially among larger issuers

Legend: Actual (Dark Green), Expected (Light Green), Both (Dark Blue), N/Av (Grey)



Combining measured and estimated impacts is common



Almost half of issuers report both measured and estimated impacts

Somewhat related to ex-ante versus ex-post assessments, is the concept of **measured** versus **estimated** impacts.

Measured impacts are derived directly from measurement, which is often the case for metrics such as installed power capacity, energy generated and area conserved/restored, which can usually be measured with ease. Occasionally the information may even be available from existing data, e.g. number of journeys made or passengers transported.

By contrast, estimated impacts tend to refer to metrics that are hard, if not impossible, to measure directly. The most obvious example is GHG/CO₂ emission reductions, since both the calculation of emissions and the reduction versus a baseline are done via emission factors, i.e. representative/estimated emissions for a given unit of a particular activity (such as fossil fuel energy generation or rail transport).

The distinction is somewhat related to that of ex-ante versus ex-post assessments because ex-ante assessments are necessarily estimated (you cannot measure something that has not happened yet!) whereas ex-post assessments can happen both via measurement and estimation, with a preference towards direct measurement where possible.

We find that estimated impacts are more common than measured ones, both by number of issuers and amount issued. However, the largest share consists of issuers reporting a combination of measured and estimated impacts.

Larger issuers are more likely to finance a broader range of projects and thus report a broader set of metrics, some of which may be measured while others are estimated. The amount share of 'Both' is thus considerably greater than by issuer count.

Impact case studies

Swire Properties

Swire Properties was highlighted as an example of general reporting best practice on page 14. Its impact reporting is equally excellent and deserves a closer look.

Swire's latest [green bond report](#) features four pages dedicated to the environmental impacts of its buildings.¹⁵ These are reported at project level, along with key details of each project, such as gross floor area, number of storeys, and occupancy rate and/or expected completion date (depending on project status).

Information on each building certification achieved is also provided, including the version, level attained and certification date. Many issuers financing green buildings limit themselves to disclosing the certifications achieved, but Swire gives considerably more detail on both qualitative and quantitative indicators.

The initiatives in each project type (renewable energy, energy efficiency and sustainable water/wastewater management) are described and supported by estimated quantitative impacts, which cover renewable energy generated, carbon emissions avoided, energy savings, water savings and recycled water volume. Data sources used to calculate CO₂e emissions avoided and energy savings are also included, i.e. the emission factor of Hong Kong Electric (CO₂e) and BEAM Plus¹⁶ / LEED¹⁷ (energy savings). A limited assurance by PwC follows, although this only covers the allocation of proceeds (not impacts).

Swire's post-issuance reporting is simple, clear and comprehensive. Our only suggested improvements would be to clarify whether impacts are estimated ex-ante or ex-post and the calculations involved (i.e. in addition to the data sources), to confirm whether the energy savings on page 6 are calculated versus the same BEAM Plus and LEED baselines on page 5, and to provide an aggregated figure for the renewable energy generated across buildings.

Société du Grand Paris

Société du Grand Paris (SGP) is a seasoned green bond issuer. It obtained Programmatic Certification under the Low Carbon Transport Criteria of the Climate Bonds Standard in 2018, in order to finance the [Grand Paris Express](#) metro and commuter rail transport network which surrounds Paris. SGP is an entity set up by the French Government in 2010 with the specific aim of constructing and delivering this megaproject.¹⁸

Totalling EUR16bn (USD18.1bn) so far, its Green Euro Medium Term Note programme is by far the largest in the market, but is supplemented by other funding sources, such as fiscal resources (tax revenues), EU subsidies and public sector borrowing.

Overall, the project is intended to promote sustainable and inclusive economic development while creating many jobs. It is expected to reshape Greater Paris thanks to 68 new stations and 200km of new lines criss-crossing the capital, allowing travel between suburbs without having to transit via the centre.

The metro's main environmental impact will be the lowering of CO₂ emissions. Emissions are estimated to peak at 4.3m tonnes CO₂e during the construction phase, dropping to 110,000 tonnes a year once the metro is in operation. It will become carbon positive between 2026 (best case scenario) and 2031 (worst case), allowing annual savings of between 755,000 and 1.3m tonnes CO₂e a year (versus car traffic, which currently dominates in the area).

Emissions generated during construction are primarily due to the transportation of material, removal of spoil and the operation of building site machinery. To limit this impact, Société du Grand Paris is:

- Maximising the use of alternative means of transport - rail and river - to remove spoil
- Choosing materials, products and processes that generate fewer GHG (mainly through energy savings)
- Contributing to a circular economy by recycling soil from construction sites
- Using a dedicated tool - CarbOptimum - designed to monitor and optimise the carbon footprint of building sites
- Supporting research into depolluting materials such as concrete, wall coverings and paint capable of neutralising toxic substances in the air

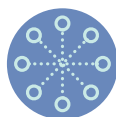
More detailed impact reporting (e.g. energy savings, number of jobs created, modal shift, etc) is available to investors annually; however, we hope at least some of this will become available publicly.

Metrics: analysis approach

The previous section focused on general attributes of impact reporting but already touched upon some topics related to what is perhaps the most important area of impact reporting: the metrics – or KPIs – used by issuers to quantitatively assess impact (qualitative indicators were not analysed).

Methodology

Which metrics are included?



The vast majority of reported metrics refer to relevant environmental impacts, and were included in our analysis.

In some cases, issuers report 'indirect' impacts that fall outside of the core objectives of the project (e.g. NWB Bank often highlights and quantifies the biogas produced as a result of wastewater treatment) – these were still included as long as environmental impacts.

It is worth noting that, technically, not all reported 'impacts' are the project's direct impacts, as some measures can more accurately be described as 'assessments of environmental performance'.

For example, reporting the energy use of a green building does not directly inform a project's impact, but rather the asset's environmental performance; to assess impact one would need to compare against a relevant baseline, namely the energy use in previous periods or in the project's absence. Such cases were considered valid metrics, regardless of whether a relevant baseline to inform actual impact was provided. In any case, this is relatively rare.

Some issuers, especially infrastructure project developers, report on the % share of project completion. This was not considered a valid metric as it does not include any information on the project's environmental outcomes, but it was almost always supported by relevant environmental impacts that were included.

A few issuers listed *financial* metrics, namely monetary savings (e.g. from switching fuels) and monetary losses avoided, within their impact reporting. These were not included for similar reasons.

Social metrics are becoming increasingly common but still cover a small share of the market, being mostly used by larger issuers or funders of large projects. By far the most common social metrics refer to the '**number of people/families/households benefitted**' (which includes customers served or users added) and the '**number of jobs created**', both of which appear across almost all project types to some degree. A more niche example is 'time saved', which appeared for a couple of Transport projects, e.g. by Spain's ADIF Alta Velocidad.

Since we focus on the green credentials of projects and thus environmental impacts, social metrics were not consistently collected and do not appear in the analysis below (we may include this in future studies).

Some metrics highly specific

Finally, we observed some very specific – almost obscure – metrics by individual issuers. These tended to be social in nature and excluded, but for environmental ones we made a judgment call on whether or not to include them, based on what else the issuer reported; if no or few other metrics were disclosed *within the same project category*, we generally included them, but if the issuer reported several other relevant metrics, we did not.

Ireland's NTMA is a good example. As a sovereign issuer, its green bond financed many projects in different categories, some of which have very specific metrics attached, such as:

- Total cost (€) of relief battery electric vehicles (BEV)
- Number of septic tanks upgraded
- Number of people removed from a boil water notice in place for longer than 30 days
- Number of water supply schemes removed from the Environmental Protection Agency's Remedial Action List (RAL)
- Implementation of the Irish Water Lead in Drinking Water Mitigation Plan (number of lead services replaced)

Many more were listed by the NTMA. Financial metrics – such as the cost of relief BEV – and social ones – such as the number of people removed – were not included in the quantitative analysis as per above, but the others could qualify.

However, because a) there were so many (almost 100), and b) they can be classified under an existing consolidated metric (*see below*), these were not included. For instance, the consolidated metric for 'number of septic tanks upgraded' is 'units built/installed/renovated/connected etc', but this had already been captured through another Water-related metric: 'number of new/upgraded water plants'.

Consolidation of metrics for analysis

Issues with impact data: lack of uniformity



As the points above suggest, the impacts space is complex, because measuring impact is often inherently complex. In the absence of a uniform, global framework via which issuers can report impacts and investors – and others – can use impact data, a high level of inconsistency is currently (and understandably!) observed in the market.

To highlight some issues:

The **terminology used by issuers varies**, including to describe metrics, and precise descriptions are not always available

Metric granularity – some metrics are inherently more specific than others and it can be difficult to create consolidated ones to compare projects and issuers. For instance:

- Some issuers – such as the case of NTMA above – report highly specific metrics while this level of granularity is not provided by others. Another example is biodiversity impacts, which we have seen range from e.g. the total number of fauna and flora species protected, to numbers of individual species
- Many different pollutants exist; these are grouped by some issuers but listed individually by others, in some cases even varying within the same issuer for different project types
- Environmental performance in buildings is assessed differently depending on the building certification and it is very hard to compare impacts between them, especially since accurate performance thresholds are almost never disclosed

Metric relevance – the relevance of metrics ultimately depends on the individual projects, so many may be relevant for a given project (even within one project type) while for others there may only be one or two specific metrics

- Furthermore, some metrics make sense to add across years (e.g. energy generation), while others do not (e.g. power capacity) – but many issuers do not seem to make those distinctions between reports

Methodologies to select but especially calculate impacts also vary significantly, making it difficult to compare and aggregate data

- In particular, the baselines used to assess relative metrics (i.e. changes versus a baseline/threshold) vary noticeably, often depending on the project type, metric used, geography, and issuer preferences – see page XX for a critical discussion

Some impacts are calculated ex-ante, others ex-post: what if estimated impacts are considerably different from actuals?

Issues do not always report the correct, pro-rated share of impacts, for example due to:

- Multiple financing sources for a given project, and/or partial project ownership
- Some issuers report the share attributable to green bond financing directly, others report the total impact of the project/asset with the correct share disclosed separately
- Reported impacts occasionally cover a wider set of projects than those financed by the green bond(s), an example of bad practice

For many metrics, obtaining the correct impact share can extend to **selecting the right time period to count impacts**

- It is not always clear when projects / assets became operational, and when their lifetime ends
- This is compounded when issuers finance many projects, but report all of them on an annualised basis

Should the impacts of refinanced projects / assets be treated the same? If not, how?

Repeat issuers do not always specify which green bond(s) financed which projects / assets (this would be ideal, although not expected from issuers combining proceeds under one pool)

Financial institutions use green bond proceeds to finance qualifying projects / assets multiple times over, i.e. relending once borrowers repay loans

- This is great, and demonstrates the enhanced potential of financial institutions to direct capital to sustainable projects; but it **can make it hard to accurately aggregate data between different reports and projects**, because there is often no visibility into the relevant lifetime of individual projects and whether the data refers to the share attributable to green bond financing for each one¹⁹

Comparability / aggregation near impossible

Given that not all issuers report in the same way, the collection of issues above – and others, including some of the differences explored on pages 18-20 – **leads to a central problem of impact comparability when trying to aggregate data from different issuers / bonds**. Indeed, this seems to be one of the main reasons for the general lack of harmonised impact data products.

The problem is typically accentuated when the bonds cover different project types and geographies, but the key factor is the metric itself. In general, **absolute** metrics – such as energy generation – can typically be compared and aggregated, requiring only a potential adjustment of units (e.g. kWh to MWh). This becomes harder for **relative** metrics – such as GHG emission reductions – due to differences in baselines and calculation methodologies. The reduction may be assessed against the project's absence / counterfactuals

or against relevant average emission intensities, which can vary greatly depending on project types, regions and ultimately the issuer itself.

Individual issuers, of course, can aggregate impacts as long as the metric is absolute (e.g. renewable energy generated, water treated, etc) or the methodology for relative metrics remains constant. The World Bank is an example of the latter, aggregating energy savings (a relative metric) at category level since the same methodology applies for all projects.

Broader issue: green bond impacts do not provide full picture

Taking a step back, the impact aggregation / comparability conundrum is also due to an issue central to use-of-proceeds instruments, which are focused on individual projects/assets focused on achieving particular objectives (e.g. renewable energy generation, more efficient buildings, clean transport, water treatment etc). As a result, issuers select metrics specifically relevant to each project/asset, even though the real and full impact of the activities financed goes beyond its particular objective(s) and reported impact(s).

Virtually all projects and assets have impacts on water usage, pollution, material use, employees, surrounding communities, etc, but these are not the focus of the project/asset and its benefits, and are therefore (almost always) left out of green bond impact reporting.

Only a move towards comprehensive entity-level impact assessments that transcend UoP instruments will likely be able to overcome these and other problems, offering a full picture of impacts and true comparability between entities and projects – this is explored in detail in the 'What the future holds' section.

For these reasons, we have not included any aggregated impact data in this report.

Our approach: logic and balance

To analyse the universe of metrics collected, we had to reduce it to a workable set.

This is not trivial. Currently, it is usually the decision of impact data users how to do so, and different possibilities are already reflected by the varied investor approaches to assessing portfolio impact (discussed more on page 39).

In our study, the overall aim was to obtain a good view of market practices by understanding the prevalence of different metrics, with greater depth than our previous report. The raw data was collected directly as reported by issuers, with the consolidation occurring later in the analysis phase.

This process was done on a best-efforts basis, using key principles of logic and balance to create a final set that takes account of similarities between raw metrics/KPIs while not losing the detail we wanted to uncover and present.

Unless otherwise specified, subsequent references to 'metrics' thus pertain to the consolidated list, not the raw metrics/KPIs reported directly by issuers (although the terminology issuers use is often in line with our list).

Process: 'substance' and 'action'

To achieve the final set of metrics, we aggregated the universe of raw metrics/KPIs primarily by the **'substance / item'** they referred to, e.g. CO₂, GHG, energy, water, pollutant, etc.

The subsequent element was the **'action / impact'** described by the metric, e.g. saved, generated, used, built, renovated, conserved, etc. Similar actions – e.g. saved/reduced/avoided – were aggregated for simplicity, even though they may describe slightly different concepts or processes. On the other hand, concepts like energy generation and capacity are clearly distinct (also visible from the units) and were kept separate.

Two metrics were consolidated a degree further than the rest: 'number of units built/installed/renovated/connected etc' and 'area/length protected/conserved/managed/built etc'. The 'units' and 'area/length' refer to a range of things, and further detail is given in each UoP/project category.

Finally, if issuers reported multiple raw metrics/KPIs that fell into a given consolidated metric, it was only counted once. Examples include different GHG and pollutants²⁰, as well as different types of 'area/length' and 'number of units'. This was to avoid distorting the figures, since our aim was to understand how much of the market – by amount issued and number of issuers – is covered by each metric. But readers should be aware that many of the metrics below appear even more often, and the range of raw metrics/KPIs reported by issuers is wider.

Saved vs. reduced vs. avoided

These three terms are often used interchangeably but do not mean the same thing. The ICMA Harmonized Framework only highlights 'savings' as a key reporting indicator, whereas the NPSI Position Paper calls for additional granularity by disaggregating 'saved', 'reduced' and 'avoided'. The argument is that 'reduced' results from an absolute reduction in operative use, whereas 'avoided' indicates comparison to a reference scenario or baseline. 'Savings' are a broader term that can refer to the amount reduced or avoided, or the sum of these.

The NPSI Position Paper therefore recommends distinguishing between the two when savings are disclosed. Based on our observations, and in line with our previous study, this approach is currently too complex for most issuers, and we grouped all three terms together. They mostly apply to GHG (including CO₂), energy and pollutants, and to a lesser extent water, waste and fossil fuels.

GHG vs. CO₂

Metrics that specifically related to CO₂ were separated from those that related to a collection of greenhouse gases (GHG). It is not always clear which GHG are included; for example, some issuers report CO₂ or carbon avoided but give the impact in CO₂e tonnes²¹, thus suggesting the measure actually refers to GHG beyond CO₂.

Due to this, we classified the metric as either 'CO₂' or 'GHG' primarily based on the unit, followed by the issuer's description. 'GHG' was therefore used whenever the issuer referred explicitly to 'GHG', 'CO₂e',²² or any individual GHG apart from CO₂, such as SO₂/SO, NO₂/NO, CH₄, etc. Some issuers (mainly Chinese, given the country's enhanced air pollution problem) reported different GHG/pollutants separately.

In general, GHG is a more encompassing – and we would argue better – measure than CO₂. The ideal approach is to supplement this with separate data on each GHG (as well as other pollutants), if relevant.

General or specific metrics?

The consolidated list of metrics can broadly be divided into:

- a) **General** metrics, such as 'GHG emissions saved/avoided/reduced', 'units built/installed etc' and 'energy saved/avoided/reduced', which can be used across several or all UoP categories of the Climate Bonds Taxonomy and Database
- b) **Specific** metrics, such as 'number of journeys made' and 'energy generated/produced/supplied', which are specific to each UoP category

However, some specific metrics do appear in more than one category below. The reason is that, while the categories below follow those of the Climate Bonds Taxonomy and Database, for the purposes of this report the classification of metrics to each category depends on the context of the project, not the direct UoP (as occurs with the Climate Bonds Taxonomy and Database). This was done to give further detail and does not affect the definition of general versus specific metrics.

For example, 'energy generated/produced/supplied' is a specific metric because it is only relevant to energy projects and these always fall under Energy in the Climate Bonds Taxonomy and Database. However, the metric appears in different categories below when the energy generation is within a building, water or waste management plant, etc. Other examples of similar metrics include 'power capacity installed/added/managed', 'waste managed/processed/recycled' and 'water supplied/treated/managed'.

By contrast, in the Climate Bonds Taxonomy and Database, efficiency projects fall in the category to which the broader asset belongs (e.g. Buildings, Transport, Energy), and an issuer reporting energy, water or waste saved/avoided/reduced does not imply a project focused on achieving these (unlike the example of energy generation above). Energy, water and waste saved/avoided/reduced were thus classified as general metrics, although we recognise that the distinction is not clear-cut.

External application

We highlight that our approach was suited to the needs and objectives of our research – alongside the existing work of Climate Bonds Initiative – and limited by the resources we had available. Not all stakeholders will necessarily agree with the method and terminology used, but we look forward to discussing this with other market participants, including as part of ICMA's Impact Reporting Working Group.

A note that most existing frameworks, such as the ICMA Harmonized Framework and NPSI Position Paper, suggest a few key metrics for each asset/project type, and these do cover the vast majority of the market. However, there are naturally several other metrics used; even apart from the ones included here, since not all those encountered in our previous study were observed this time (due to the different sample of bonds/issuers).

It is important for developers of impact data platforms/databases to consider this. As a general rule, we suggest adopting a similar approach to ours, i.e. balancing the need for standardisation with that of not losing too much granularity. One way, for example, would be to offer a broad range of predefined and consolidated metrics, along with the opportunity for issuers to give additional details about the metric and any supporting methodology, as well as to potentially suggest other metrics that are not adequately covered. This is the approach taken in the Green Assets Wallet and Green Bond Transparency Platform.



Metrics: analysis results

This section dives into the use of metrics in the market, covered in greater depth than in our [2019 publication](#).

Given the breadth and number of metrics, these are displayed alphabetically throughout, as this makes it easier to compare between categories / graphs, and metrics related to similar substances (e.g. GHG, energy, water) thus tend to be grouped together. There are also supporting tables in each category showing the *number* of metrics reported by issuers.

In line with the rest of the report, we looked at amount issued and number of issuers. However, the next section – General metrics – favours an analysis of number of issuers, as it was impractical to show both, and the issuer count tends to be a fairer representation of market practices (due to large issuers skewing the results by amount issued).

General metrics

The graph on the next page shows the use of general metrics. This is expressed as the total number of issuers reporting each metric (on the left), along with the share of issuers in each category reporting a given metric.



The 'Unspecified' category was created to cover cases when it was not clear which project type the metric referred to. This only occurred for 14 issuers that financed multiple categories but reported the impacts in aggregate, since we could otherwise classify them into the relevant category/ies. All the metrics reported by these issuers were thus general.

GHG and CO₂ reductions dominate

GHG saved/avoided/reduced is the most common metric. Most issuers report it, and together with **CO₂ saved/avoided/reduced**, it is the only metric to appear in eight out of nine project categories, being least used in Water (12% of issuers) due to the sector's reduced focus on climate mitigation.

When reporting GHG reductions and GHG emissions/intensity, most issuers refer to GHG collectively; but among those that separate different GHG (many are Chinese, including several banks), sulphur and nitrogen oxides (mainly SO₂ and NO/NO₂) are the most common, followed by methane (CH₄) and other hydrocarbons (e.g. CH₃, CH and NMHC).

The EIB is one of the most granular reporters of GHG emissions, including both absolute and relative (savings) levels for each individual project. However, these are only reported for projects whose estimated emissions are above one or both significance thresholds adopted by the EIB.²³ The high level of granularity is likely related to the fact that it has its own, comprehensive Carbon Footprint Methodology (see page 35).

Among other widely used general metrics are **area/length protected/conserved/managed/built etc.** and **number of units built/installed/renovated/connected etc.**, which are not related to a particular substance and so are even more general than the rest (see page 23). Specific examples are included in each relevant category.

25 issuers reported **fossil fuel saved/displaced**, many of which are from China and referred to 'standard coal saved'. Elsewhere, some issuers – such as Denmark's KommuneKredit – refer to fossil fuels displaced, so we created a broader metric.

Coal energy is often used as a baseline in China, including to calculate GHG emissions avoided – this inflates impacts compared to using average grid emissions, which incorporate energy from less polluting fossil fuels and renewables, and are more commonly used in the rest of the world.

Relative metrics often trump absolute

Where both relative and absolute metrics²⁴ exist for a given substance, such as GHG/CO₂, energy, water and pollutants, relative ones are used more often than absolute. About ten times more issuers report GHG/CO₂ saved/avoided/reduced than absolute emissions/intensity, dropping to five times for pollutants, and twice for energy and water. The larger difference for GHG/CO₂ and to some extent pollutants may be due to the greater difficulty of measuring and understanding absolute emissions, e.g. compared to energy and water use.

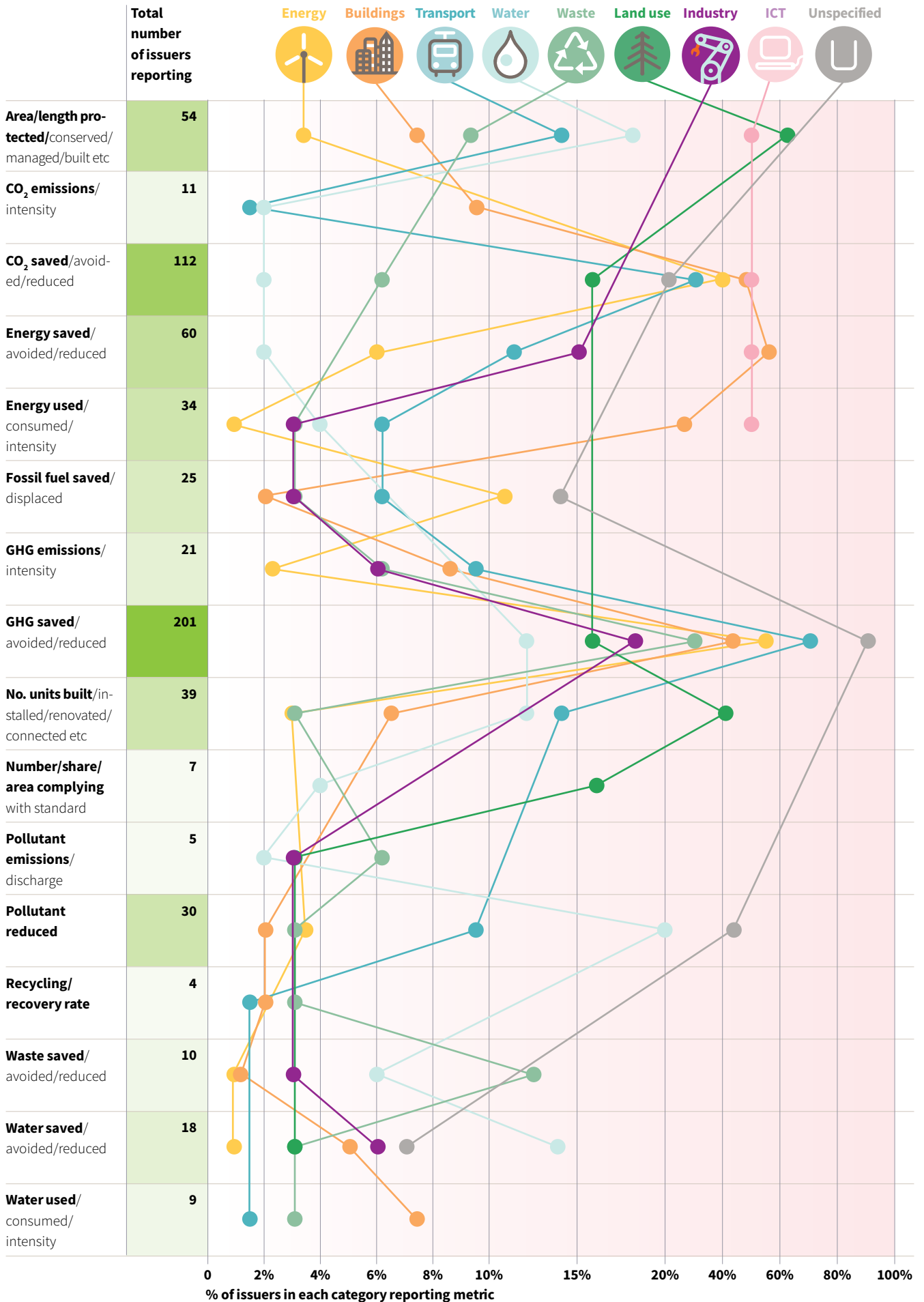
However, the widespread adoption of GHG/CO₂ saved/reduced/avoided as metrics raises questions and should be viewed with caution.

Apart from comparability issues due to different baselines, which can be quite arbitrary, GHG savings do not inform absolute performance and trajectory towards climate targets. We therefore argue that reporting absolute GHG emissions (which may be as an intensity – see page 33) is better, although it should still be accompanied by a reference point to allow a project's 'impact' to be assessed, such as performance in a previous period, in the project's absence, or of a relevant benchmark.

The more absolute metrics become the norm, the more sense they will make; and the less the need for standalone relative metrics, given that relative performance can (over time) be assessed from the absolute figures.

NB: The designation of relative vs. absolute metrics is separate to that of absolute vs. relative units (see page 33).

Most general metrics apply across several project categories, although to varying degrees



Energy

The vast majority of impacts reported for Energy projects/assets relate to four metrics:



- Energy generated/produced/supplied (large skew towards generation/production rather than supply)
- GHG saved/avoided/reduced
- Power capacity installed/added/managed (large skew towards installed/added)
- CO₂ saved/avoided/reduced

Energy generation usually refers to electricity but also includes heat. Energy used/consumed seems very rare, but it is more relevant for entities *using* rather than *producing* energy, and so comes up more often in other categories; in some cases, it includes measures of the share of renewables within total energy use (also relevant in several categories, but far less common).

In terms of power capacity, we included 'managed' as one issuer (EIB) refers to capacity rehabilitated (and for consistency with the water capacity metric, which appears later).

'Area/length' and 'Number of units'

As previously mentioned, these two metrics are 'extra-consolidated' given they refer to common concepts (i.e. an area or extension worked upon in some way, and a number of relevant units), but cover many different things. Within Energy:

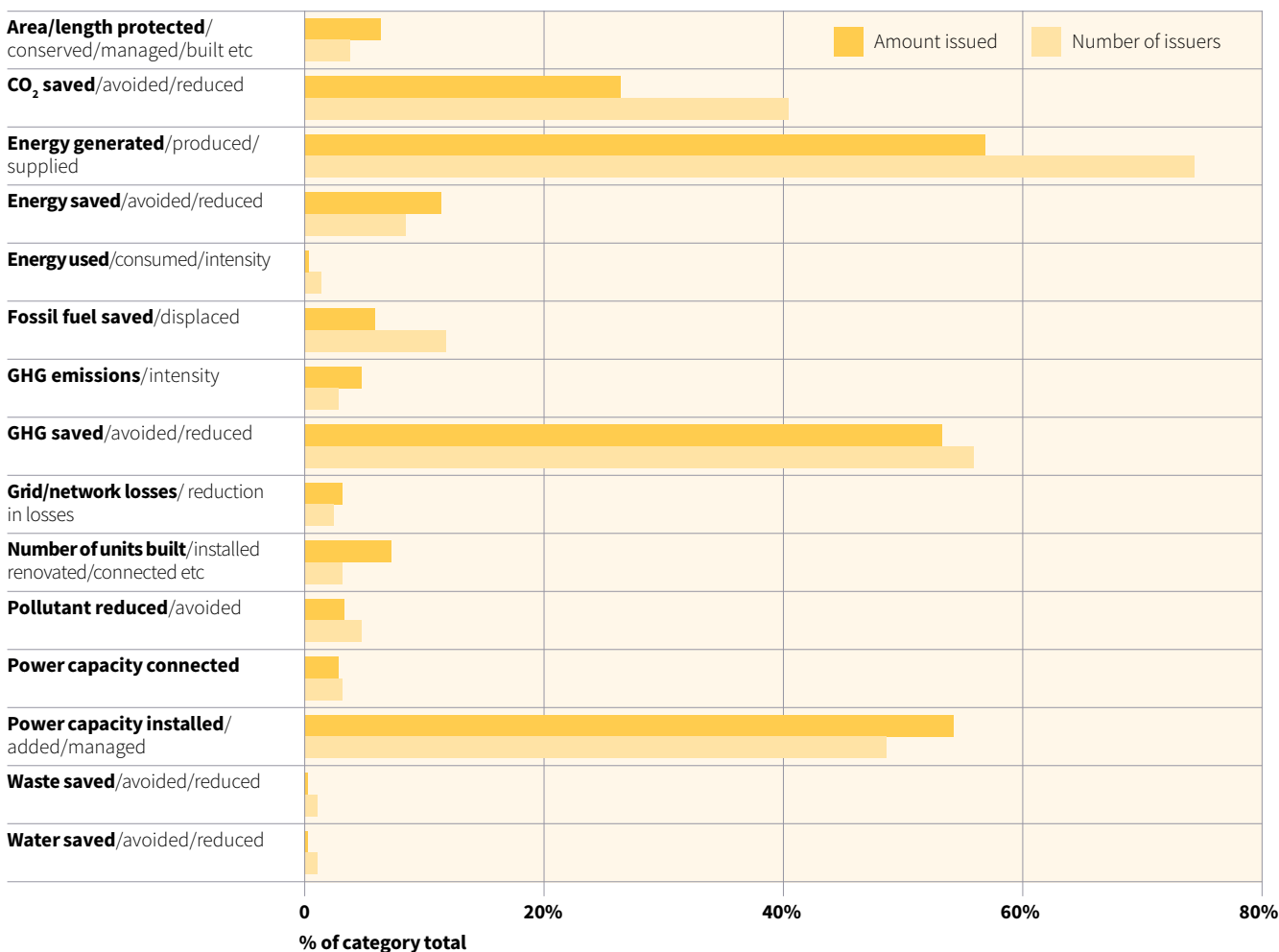
- **Area/length:** mainly refers to transmission lines constructed/added, and to a lesser extent rehabilitated (i.e. for efficiency improvements or repairs) and demolished (e.g. Italian transmission system operator Terna); installation of underground pipes and cables supporting energy generation/transmission also appeared
- **Number of units:** the most common were smart meters installed, power plants / wind turbines built, and renewable production units connected to a network

Vast majority of issuers report up to three metrics

No. of metrics reported	1	2	3	4	5	6	7	
No. of issuers	47	54	45	8	5	2	1	138 Total

NB: # of metrics refers to distinct metrics (of our consolidated list). Individual issuer count larger than total as some issuers report different # of metrics depending on the deal and/or each post-issuance report (each was analysed separately).

Energy generated most common, followed by GHG saved and capacity installed



NB: % of category total calculated based on amount/issuers that report impacts (i.e. excludes non-reporting) in each category. Bold refers to 'substance' + first word of 'action'.

Buildings

Impact reporting in the Buildings sector is often in the form of building certifications achieved.



Several certification programmes were highlighted by issuers in our sample, the most common being BREEAM and LEED. Within these, several levels can and do apply, but we did not analyse this. There are also some regional variations; for example, some Swedish issuers – such as SFF – refer to BREEAM-SE, the country’s adaptation of the global BREEAM scheme.

Building certifications are considered valid metrics for the purposes of our research, but given the inconsistency in levels, performance criteria and thresholds between different schemes, we highly encourage issuers to disclose impact data (i.e. resource use and emissions) where possible, ideally of actual performance.

This may, of course, be given as an intensity (e.g. per m2) and also include relative (i.e. %) improvements. For example, Sweden’s

FastPartner AB demonstrates best practice by disclosing energy intensities (per m2) separately for electricity, heating and cooling processes in its buildings.

The share of issuers reporting building certifications is higher than by amount issued, perhaps due to larger issuers having more resources to disclose direct data on environmental performance alongside, or instead of, certifications. Overall, the most common metrics are overwhelmingly those related to GHG, energy and COs savings, followed by energy and water use.

One issuer, Reykjavik Energy, reported water supplied/treated/managed, as the volume of hot water supplied through district heating.

Regarding waste, the metric ‘waste managed/processed/recycled’ refers exclusively to waste recycled and/or reused (waste processing/management mainly applies to projects in the Waste sector). In addition, recycling/recovery

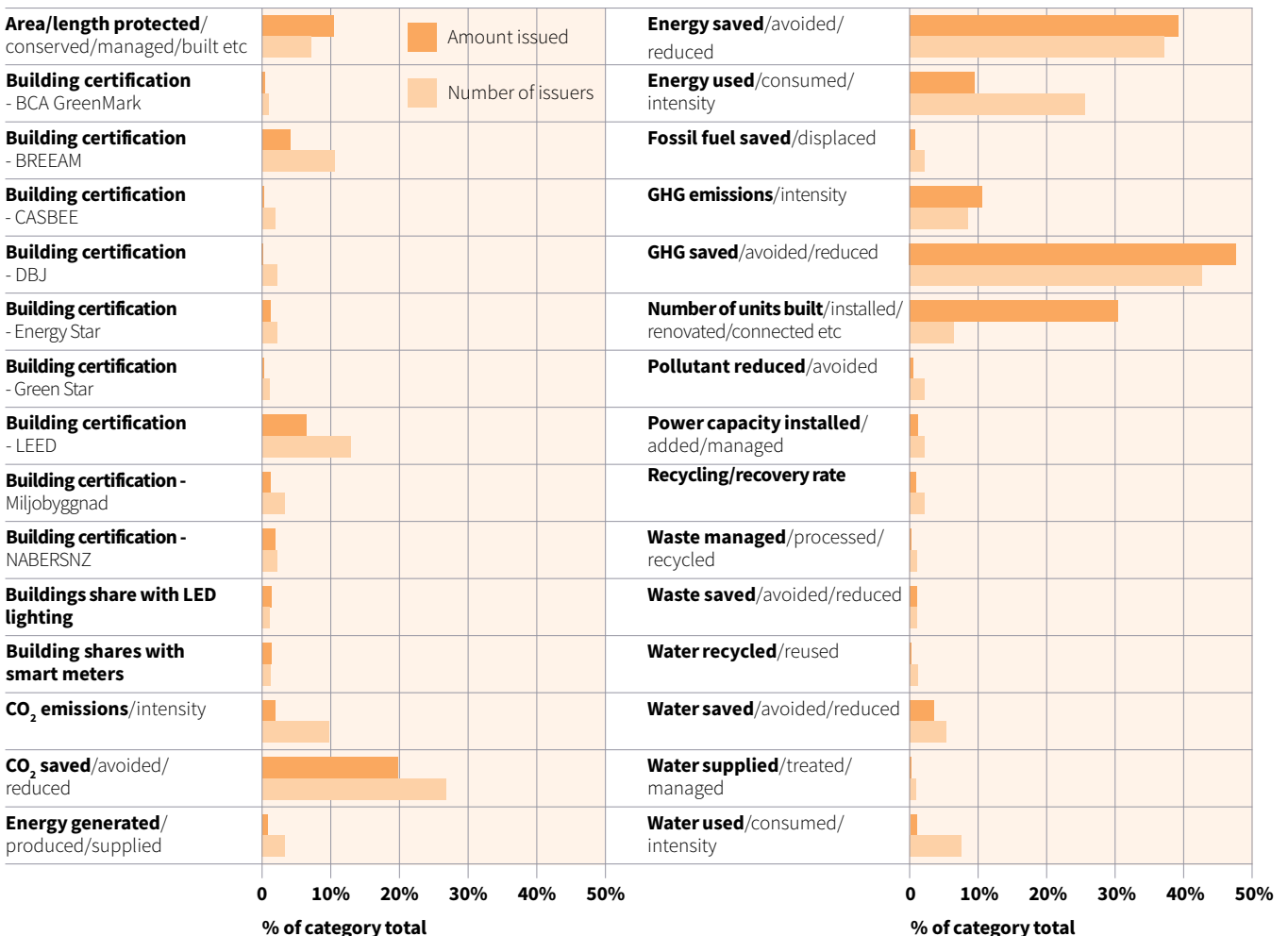
Some issuers report many metrics

No. of metrics reported	1	2	3	4	5	8	9	
No. of issuers	38	36	17	10	3	1	1	94 Total

rate refers to the share of materials used that is recycled/environmentally friendly, such as the proportion of recycled construction materials used; not recycling conducted by the issuers themselves.

- **Area/length:** floor space and/or area of green building created or renovated, length/area of heat insulation and water absorption (in building)
- **Number of units:** homes/buildings constructed or renovated, properties protected, street lamps upgraded/installed

GHG and energy metrics dominate; building certifications higher by issuer count than amount



Transport

Impact reporting in the Transport sector covers fewer metrics than in Buildings, Water and Waste, and is on par with Energy.



GHG reductions are reported more frequently than in any other category (except for Industry, which is much smaller). The second most common metric by issuer count is CO₂ savings, but area/length takes second place by amount issued – this almost always refers to km of transport infrastructure built or managed.

A relatively common metric specific to Transport is the number of journeys/passengers made/added/shifted. When used to represent the quantity of journeys/passengers shifted to cleaner, low-carbon transport methods, it is closely related to the transport mode share/shifted, which was classified as a separate metric.

However, contrary to our expectations, the latter is not that common among issuers, with only two making direct reference to the car use – in passenger km – the project would replace (although they represented a relatively large amount issued).

- **Area/length:** railway tracks built, bus lanes created / upgraded, cycling infrastructure developed / improved
- **Number of units:** vehicles purchased / deployed / in operation (especially trains but also buses), train facilities / platforms built, electric vehicles (EV) produced / added to grant scheme, EV charging stations deployed, EV charges

Transport issuers report up to four metrics

No. of metrics reported	1	2	3	4	
No. of issuers	33	24	12	3	63 Total

Transport with lower breadth of metrics: GHG saved especially prevalent



Water

Since water-related projects are aimed less (directly) at climate mitigation, GHG and CO₂ reductions feature more rarely, although the former still appears quite often. GHG emissions/intensity did not appear at all.



Instead, there is more emphasis on water-related metrics, especially water supplied/treated/managed and water capacity installed/added/managed. The two may seem very similar, but the key difference is that the former refers to 'flow', while capacity refers to 'stock' (somewhat related to the distinction between energy generation and power capacity), and issuers correspondingly distinguish the metric depending on the project's focus.

For simplicity, we considered water supplied/managed/treated as one metric because many issuers combine these, but supplying, managing and treating water are different activities/processes and several issuers do report them separately; for most, though, only one is relevant. We also did

not differentiate between water and wastewater as many issuers refer to water/wastewater combined (although most projects do not include wastewater).

We did observe some nuanced metrics which were not as straightforward to categorise. For example, Cassa Depositi e Prestiti reports reductions in water dispersion²⁵ – this was considered water saved/avoided/reduced.

There were also multiple metrics related to water quality which can be closely related, such as water quality measure/grade, share/area complying with standard²⁶, water treated and pollutants (both discharged and reduced)²⁷. We separated them to maintain consistency in definitions between categories as well as to highlight these nuances, which were additionally manifested by the use of different units.

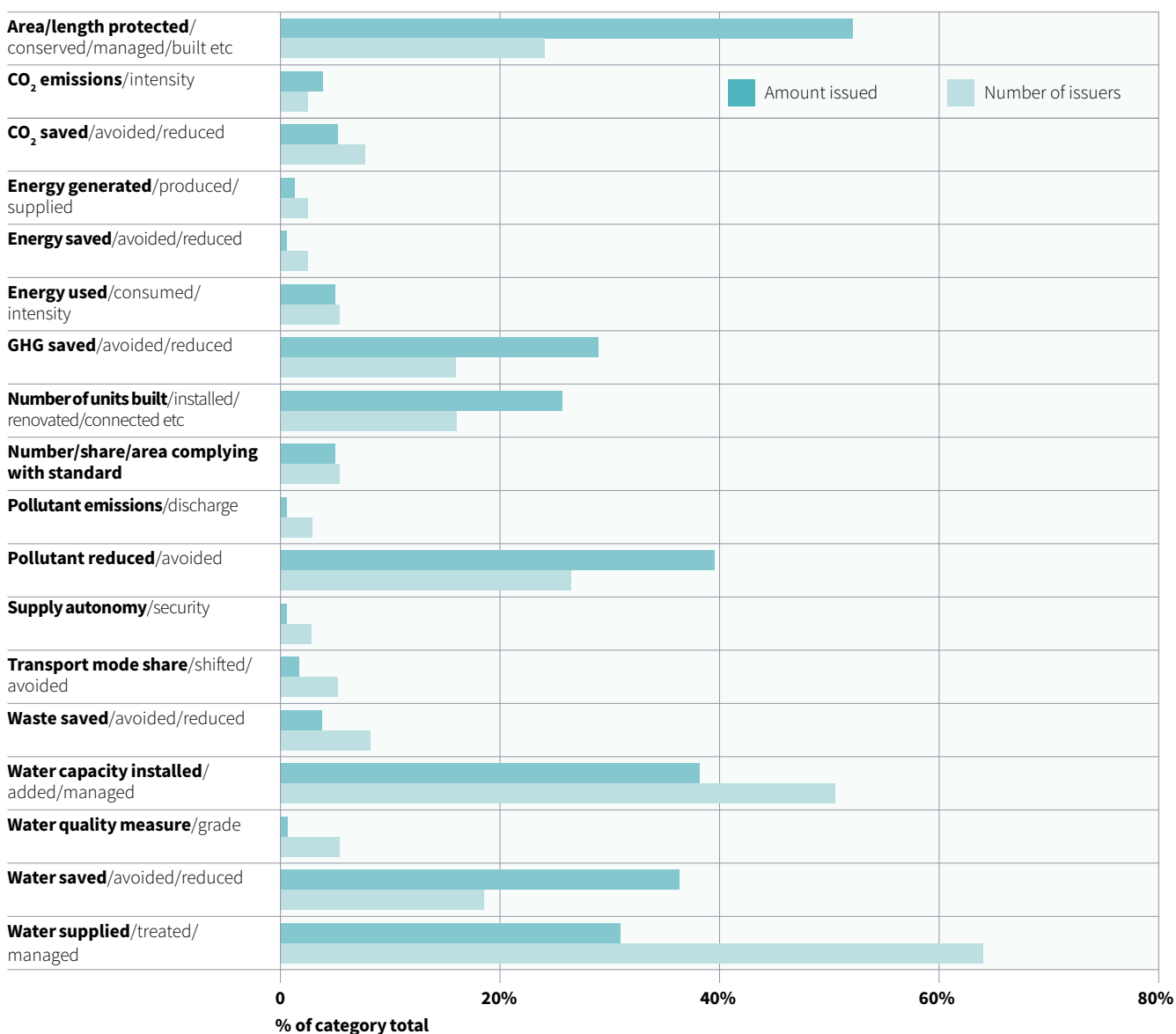
Finally, the general metrics of area/length and number of units are particularly common in the Water sector, with area/length covering a large share of the amount issued, driven by many large Chinese issuers (especially banks).

Half of Water issuers only report one metric

No. of metrics reported	1	2	3	4	5	
No. of issuers	25	19	7	2	1	50 Total

- **Area/length:** km of tsunami / port / island coastal protection facilities built, waterway earthwork excavation, dam reinforcement, area of river management/improvement/dredging, flood control construction, water pipeline installation/repair, water canal management/renovation
- **Number of units:** water treatment plants built/upgraded, number of tsunami port and islands' coastal protection facilities built, water quality stations built, water units renovated, rainwater storage tanks created

Water, area/length and pollutant metrics dominate



Waste

Like in Water, creating a list of consolidated metrics was not trivial given the blurred lines between some projects and metrics. For example, the World Bank collectively refers to waste prevented, minimized, reused or recycled as a metric, but this covers different processes that we wanted to differentiate; as such, this was considered waste saved/avoided/reduced even though it also includes waste recycling/reuse, which would normally fall under managed/processed/recycled.



Looking at number of issuers, a similar principle as in Water applies in Waste, i.e. waste-related metrics are the most frequent. However, KPIs revolving around capacity (of waste processing/management) appear far less than in Water. It is not clear why this is the case, but it could be related to the greater relevance of other metrics – namely GHG/CO₂ emissions performance – in Waste, as well as to the smaller sample size.

GHG-related metrics are more common, understandably due to the more direct climate mitigation impacts among Waste projects in comparison with Water. While GHG reductions rank second by issuer count, they are fourth by amount issued.

Only two issuers report GHG emissions/intensity, but they are both large – EIB and Republic of France – and turn this into the metric with most share by amount (perfectly demonstrating the effect large issuers can have). A similar point can be made for emissions/discharge of pollutants, which are measured and reported by the EBRD and France.

Also noteworthy is the relatively high share of energy generated as a metric (especially by amount), given that several issuers finance waste-to-energy projects with green bond proceeds (both independently and linked to waste management projects also funded by their green bond).

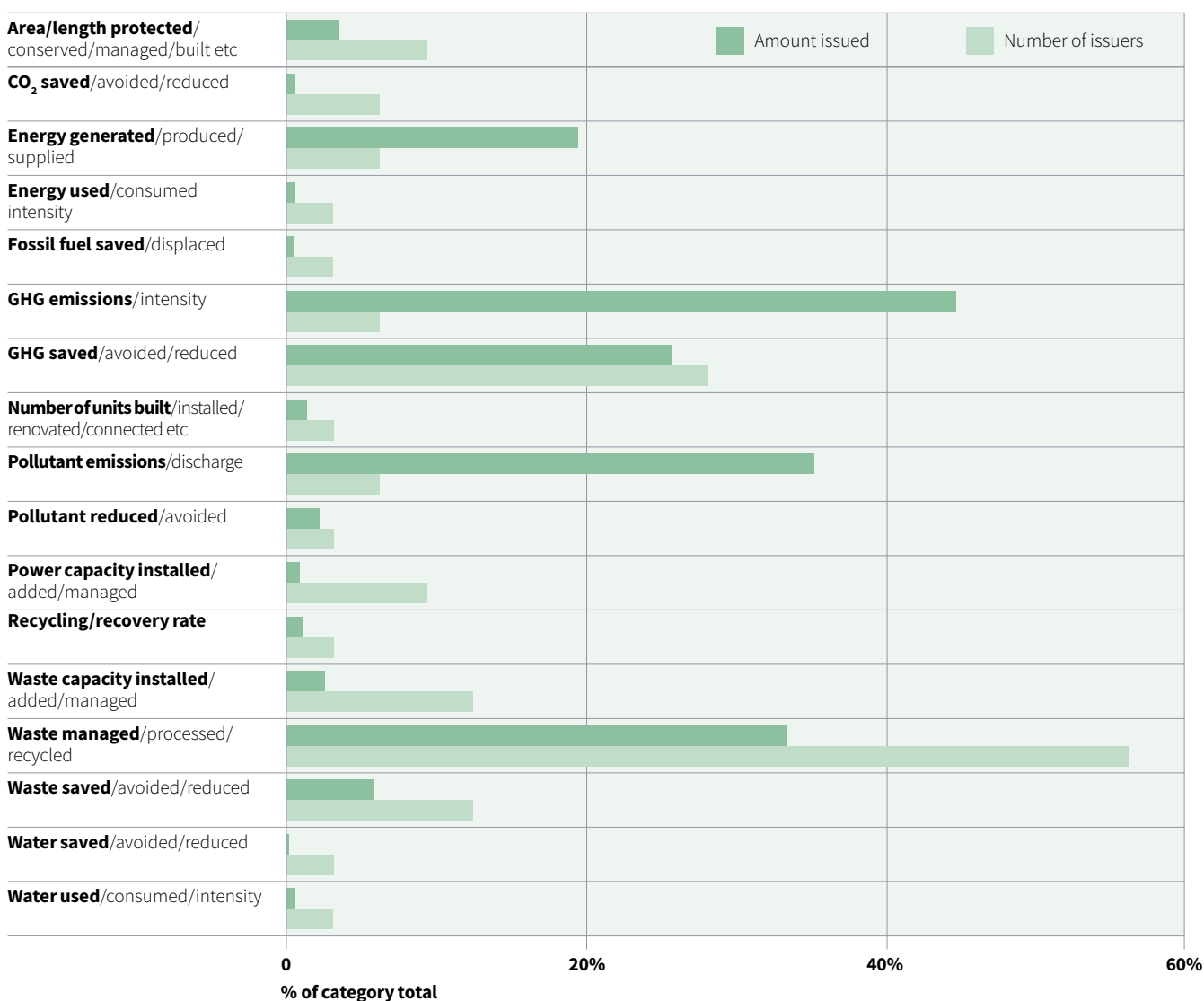
Like Water, half of Waste issuers report just one metric

No. of metrics reported	1	2	3	4	
No. of issuers	16	11	4	2	32 Total

Area/length and number of units are less common than in Water:

- **Area/length:** km of sewage treatment pipe laid/built/renovated, construction of waste/pollution-receiving area
- **Number of units:** sewage treatment stations built, anaerobic digestion tanks built/installed

Waste managed and GHG saved appear most frequently, but GHG and other pollutant emissions with highest amount share



Land use

The most common Land use metric, both by amount and issuer count, is area/length protected etc. Its application in this category is perhaps the most intuitive sense of the metric, as it usually related to the area managed, conserved, protected, restored etc (see examples below).



Land volume rehabilitated/managed sounds very similar but specifically applied to measures of land/wetland volume (in cubic metres, or tonnes) treated, restored or dredged, which a few Chinese banks highlighted.

Compliance with standards was a relatively frequent KPI, most often referring to the area certified by FSC and PEFC and/or complying with national standards, such as with France's green OAT, which included the share of: mainland France subject to protection measures; forests sustainably managed; and maritime areas under protection.

Reporting GHG and CO₂ reductions is fairly common among Land use projects, and we would

only expect this to strengthen given the role these can play in sequestering carbon; indeed, issuers in this category more often refer to carbon or GHG sequestered than saved/avoided/reduced.

Two metrics were highly specific to this sector: forestry goods produced, and fires registered. Both represented a relatively small share. The infrequent use of 'forestry goods produced' (e.g. of sustainable timber) as a KPI was unexpected given that many Land use issuers are forestry-related; but this can likely be explained by the low number of Latin American – especially Brazilian – issuers in our sample, several of which produce forestry goods (a large share is pulp and paper).

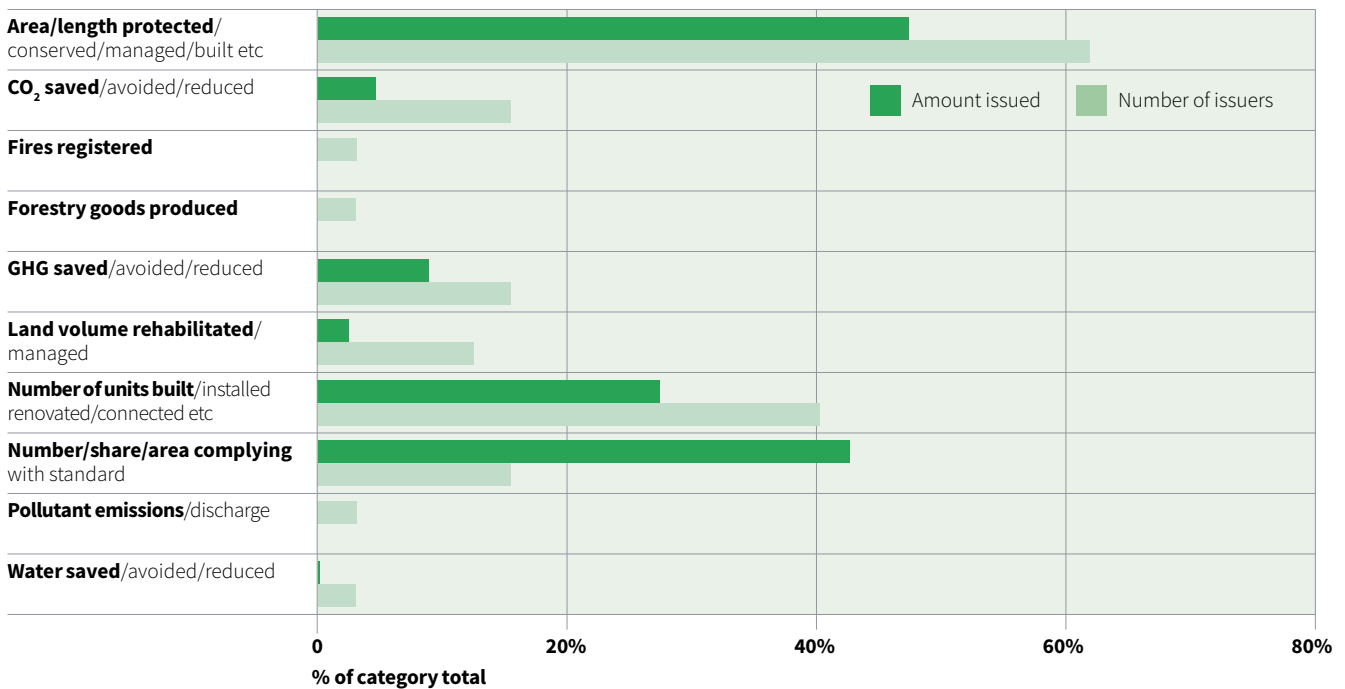
Finally, we noticed a relatively high share of repeated metrics (i.e. for a given issuer) in this category. This almost always applied to area/length protected etc, meaning that the prevalence of this metric for Land use projects is even higher than depicted in the graph (i.e. many issuers report this via slightly different KPIs, such as those listed on the right).

More Land use issuers report two metrics than one

No. of metrics reported	1	2	3	
No. of issuers	14	17	4	32 Total

- **Area/length:** Green area increased, area of community livelihoods, land restoration and conservation corridors created, length of river rehabilitation/restoration, area covered by sustainable land management systems, nature park area developed, area protected from flooding, afforestation/sustainable forest area planted/created
- **Number of units:** sustainable farms financed, trees/seedlings/shrubs planted, trees from certified forests bought, wetland areas built

Area/length metrics most common, GHG saved less so



Industry

Driven by the three issuers that dominate in Industry – Kingdom of Belgium, IFC and EIB – almost all the amount issued discloses GHG reductions. Disclosure of absolute GHG emissions/intensity is less common (only by the EIB and Swedish consumer goods manufacturer Electrolux), but still more so than in several other categories.



materials avoided, which was used by the Kingdom of Belgium and thus achieved a high share of amount issued. No issuers reported metrics related to area/length and number of units.

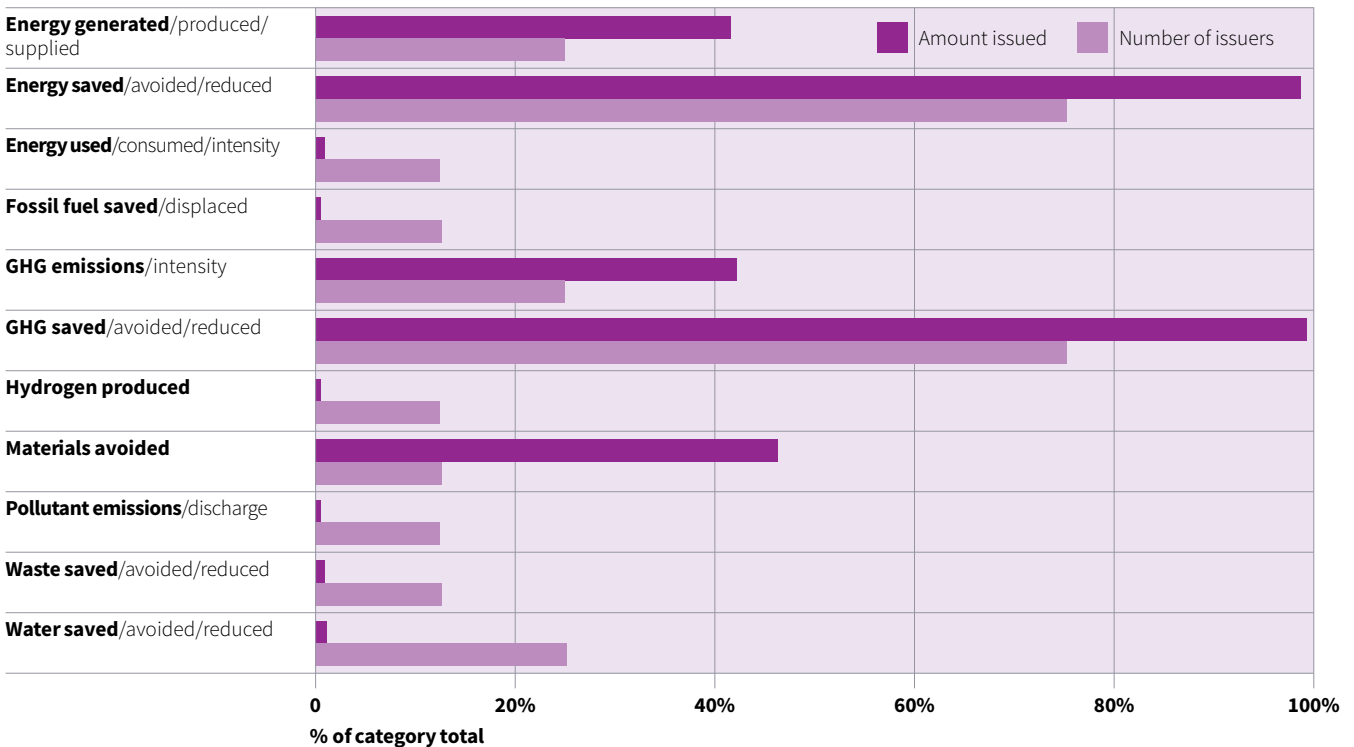
As of now, many Industry projects have focused on improving efficiency (especially of energy use), which is reflected in the choice of metrics. As greener manufacturing processes expand, and more producers of green-enabling products/activities enter the market, we expect the frequency of Industry-specific metrics – such as hydrogen produced – to increase.

No issuers reported one metric, and most reported three

No. of metrics reported	2	3	
No. of issuers	2	6	8 Total

However, it is also true that many industrial producers may be better suited to sustainable financial instruments other than green bonds – namely performance-linked bonds/loans and possibly transition bonds – such that more specific metrics may appear in those market segments.

GHG and energy savings top; not many specific metrics (yet)



ICT

Only two issuers in our sample financed ICT (information and communications technology) projects.



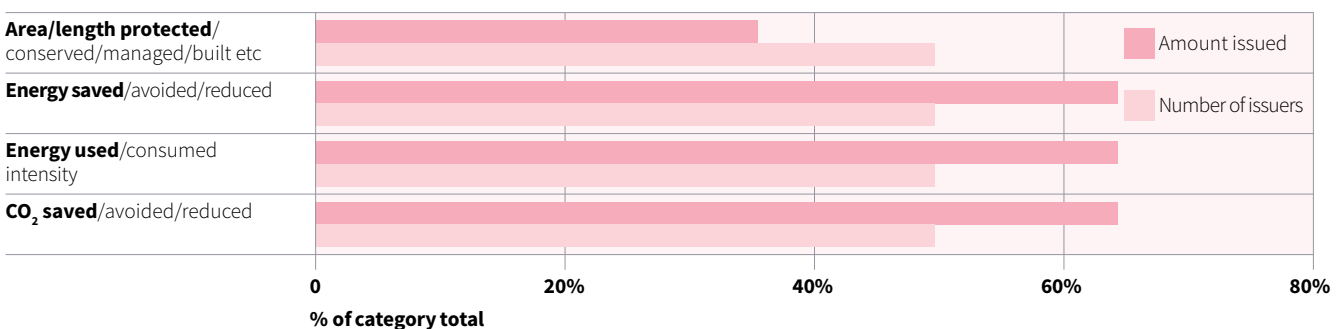
savings from network upgrades and carbon reductions linked to switching copper to fibre optic technology. The other was China's Huishang Bank, which specified the extension of cables / communication lines installed.

Telefónica was the largest, reporting the electricity consumption of its network, energy

Telefónica reported three metrics, Huishang Bank one

No. of metrics reported	1	3	
No. of issuers	1	1	2 Total

Energy performance key in ICT projects/assets



Other relevant findings

We collected information on other aspects of impact data, with the aim of providing additional context and raising further discussion points rather than providing a detailed quantitative analysis.

Units: some metrics have multiple

Reflecting the breadth of metrics, many different *units* are used to report impacts.



Typically, only one unit is used

for each metric, although it may vary depending on the magnitude of the impact. For instance, MWh dominates in energy generation, but kWh and GWh are also used (similar for power capacity in MW/GW); energy use tends to be in kWh. Likewise, impacts reported as an intensity will often employ different but related units (e.g. total GHG emissions in tonnes vs. emissions per passenger km in grams, total water treated in m³ vs. water treated per day in litres).

However, different units are used within a few metrics (even though one usually dominates). For example, energy savings tend to be reported in kWh or MWh, but MJ/TJ and Btu are used too (latter more in the USA).

In addition, some relative metrics – namely energy and water savings – are often provided as a percentage, but without the actual figures. We would encourage issuers to always provide these alongside any % impacts.

Some units may apply across different metrics, both related to the same ‘substance’ (e.g. energy generated and energy used in kWh or MWh) and different ones (especially related to volume, e.g. waste managed, volume transported, materials avoided, emissions / pollutants / fossil fuels saved, which are all often expressed in tonnes/metric tonnes). This is in addition to percentages, which can naturally also apply across metrics.

Unconventional units not uncommon

Some issuers get more creative, for instance disclosing CO₂/GHG reductions in terms of the equivalent number of trees planted, cars taken off the road, smartphones charged, etc. The meaning of the impact is of course the same, so this seems to be motivated by marketing objectives, or perhaps simply because that information is available. Most issuers that do so are large and also report the impact with a ‘common’ unit (e.g. tonnes of CO₂e); but we have come across a few that do not, an example of bad practice.

A few metrics may allow for more flexible choices of core units, depending on the context. For example, Norway’s KBN reports increases in water/wastewater treatment capacity in terms of ‘population equivalents’. According to the issuer, this describes the load and capacity of

waste/wastewater supply, but a conversion factor between regular units of volume and population equivalents is not provided. However, since it reflects a social impact, some may actually consider it to offer a better view of the project’s effects, given that the benefits of water treatment are predominantly experienced by water users (more so than for other project types).

Overall, it is not clear to us whether investors show a preference; but offering more options is usually better, and given that the vast majority of issuers reports using regular/common units, it would seem best to include these alongside more creative ones in the interest of comparability, or at least to provide a conversion factor.

Absolute vs. relative units

We alluded to absolute vs. relative metrics in several parts of this paper. **This is separate to the units themselves, which can also be absolute or relative.** For example, we consider savings or reductions (in GHG / energy / water / waste) relative metrics because they are measured/calculated against some sort of baseline, but they can be expressed using both absolute (e.g. CO₂e tonnes / kWh / m³ / tonnes) and relative (%) units.

Relative units thus refer to the use of some kind of ratio, which is often a percentage but can also include intensities (see below).

Broadly speaking, absolute units are used most often, but are sometimes accompanied by relative units (e.g. energy saving in kWh together with a % improvement). We would consider this the best approach, as it provides a more robust view of impact, and it should be possible unless a counterfactual is not available (e.g. if a previous assessment has not been conducted). A significant proportion of issuers, however, only disclosed improvements/savings in either absolute or relative terms, which provides a less complete view.

Intensity (per unit of ‘output’)

Impacts can also be reported as intensities against a relevant unit, e.g. GHG reductions per unit of energy generated, energy use per unit of building area, GHG emissions per passenger km, water treated per day, etc. Reporting intensities normalises the impacts, generally allowing for easier, more direct comparison between projects and assets.

The most common use of intensities is among Buildings projects, especially to report GHG / CO₂ emissions and energy/water consumption; but they appear in almost all categories in one way or another.

Both within and outside the green bond market, intensities are mainly used to report absolute metrics of performance, such as GHG emissions and resource use (e.g. energy, water), rather than relative metrics such as GHG and energy/

water savings. This is reflected in our naming of metrics, i.e. only absolute GHG emissions and energy/water use have the word ‘intensity’. However, a few issuers do provide intensities for relative metrics, such as Enel reporting CO₂ avoided in tonnes per MWh (i.e. per unit of energy generated).

Intensity (per unit of currency)

A variation of intensity is reporting per unit of *currency*, which almost always refers to the amount invested (not revenue). Large issuers, particularly financial institutions given the nature of their business, seem to do so most often.

Impact per unit of currency invested is a suitable measure to disclose to investors, as on the surface it provides a simple method of comparison of investment effectiveness. However, doing so can be less straightforward than it initially seems.

The ICMA Harmonized Framework (see ‘Methodologies’ section) correctly notes that a comparison of impact per unit of currency without normalisation runs the risk of disadvantaging smaller or less developed economies, where units of currency tend to be worth less. One way to go around this could be to convert all currency to a common base (e.g. USD), and then adjust according to purchasing power, GDP per capita or a similar metric to get a more comparable result across geographies.

In any case, reporting both output and currency intensities should always be accompanied by total figures to enable a better understanding of ‘total’ impact.

Emission factors

Emission factors, or emission intensities, provide the emission rate of a given pollutant relative to the output of a specific activity, or industrial production process. The most common emission factors relate to GHG/CO₂ emissions, such as GHG emissions (in kg) per MWh of coal energy, per m² of a standard regional/national building, or per passenger km for a given method of transport.



In the green bond market, emission factors are typically used to assess GHG/CO₂ emissions saved/avoided/reduced. The Energy category has the highest number of issuers doing so, with GHG savings often calculated against the average emissions from the national grid, or fossil fuel energy (latter more in China). Renewable energy is almost invariably assumed to have no GHG emissions, which may be true for the generation itself but likely not when considering the full life cycle of solar panels, wind turbines and other generation methods.

To a lesser extent, absolute GHG/CO₂ emissions/intensity and metrics related to other pollutants also make use of relevant emission factors.

Overall, a range of sources is used to obtain emission factors, particularly for Energy, Transport and Buildings projects, where many issuers report GHG/CO₂ emission reductions. Among the most common are the resources provided by the **GHG Protocol** and **UNFCCC** and other international agencies such as **IRENA**; but emission factors tend to be country-specific, so national statistics made available by individual governments (e.g. UK's DEFRA) and other national bodies are also regularly used.

Impact reporting guidance: the role of methodologies

The expansion of reporting since the market's inception is positive and has given rise to a breadth of metrics and approaches; but it also raises some concerns, particularly around lack of standards and consistency.

As of now, post-issuance reporting is fragmented, i.e. practiced individually by issuers, although there are signs that this will change, at least in some parts of the world (see 'What the future holds' for a discussion).

UoP reporting is relatively straightforward, but the absence of a common framework to report impacts means that issuers must decide which metrics/KPIs to report along with how to monitor, measure/calculate and report them. In terms of metrics, the recommendations under the GBP are limited to using both qualitative performance indicators and, where feasible, quantitative performance measures with the disclosure of the key underlying methodology and/or assumptions used in the quantitative determination.

Some stakeholders have quoted impact reporting commitments as key barriers to further green bond issuance. The perception of difficulty and costliness relate to an initially steep learning curve, which can be expected to flatten out over time as issuers gain reporting experience; but we firmly believe that ongoing and future initiatives will facilitate the process.

In addition, and similarly to our 2019 report, assurance and verification of impacts is lacking in many cases, and even when observed it often consists of a short, vague statement. The accuracy and reliability of impact measurement and monitoring therefore also present a large potential for improvement.

What are impact methodologies?

Given the context above, attempts to provide clarity and consistency to impact reporting have been underway for a few years. These provide guidance on different aspects of impact reporting, but it is debateable whether they can all be considered impact reporting methodologies/frameworks.

For the purposes of this report, 'methodologies' were defined as any type of framework that helps issuers with the challenges described above, i.e. which metrics/KPIs to report along with how to monitor, measure/calculate and/or report them. These were counted if the issuer referenced it in any way, even if it did not specify how exactly the methodology was used (providing as much information on this as possible would naturally be best practice).²⁸

Most methodologies identified are not specific to green bonds, i.e. they apply to impact reporting more broadly. Furthermore, documents that addressed just one of the aspects above were still considered; indeed, several of them only cover the calculation of impacts, especially of GHG/CO₂ emission reductions.

Quite a few issuers made reference to data sources, especially for GHG emission factors. While these were used to calculate impacts, *data sources were not considered methodologies unless they also provided an approach to selecting, calculating and/or reporting impacts*, which was not usually the case.

Two key methodologies

In our previous report, we focused on and compared in detail the two key initiatives that can most clearly be considered impact reporting methodologies:



- **Handbook – Harmonized Framework for Impact Reporting**, led by ICMA²⁹ (**ICMA Harmonized Framework**)
- **Nordic Public Sector Issuers Position Paper on Green Bond Impact Reporting**³⁰ (**NPSI Position Paper**)

Among all the methodologies identified, these stand out as the:

- a) most relevant and specific to green bonds,
- b) most comprehensive, covering various aspects of impact reporting and a range of sectors, and able to be applied globally, and
- c) most widely adopted (by issuer count), although still only covering a minority of the market.

To some extent, both were initially created by a particular issuer type looking to harmonise impact disclosure within their respective group, but their use has extended beyond these.

ICMA Harmonized Framework

The ICMA Harmonized Framework is the result of a merger between the 'Proposal for a harmonized framework for impact reporting', published by 11 international financial institutions (IFIs) in December 2015, and subsequent sector-specific guidance developed through ICMA's Impact Reporting Working Group under the GBP, which

focuses on providing suggested metrics.

First published in 2019, the latest update of the ICMA Harmonized Framework (from December 2020) features suggested metrics for climate change **adaptation** projects. This complemented the existing guidance for the following project types: renewable energy/energy efficiency, water/wastewater management, waste management and resource efficiency, clean transportation, green buildings, and biodiversity.

Comparing against Climate Bonds' UoP categories, key sectors to be worked include Land use (especially agriculture), Industry and ICT, although some projects within these (e.g. related to resource efficiency and biodiversity) can refer to the existing guidance.

NPSI Position Paper

The NPSI Position Paper was originally launched in October 2017 by a group of ten Nordic public sector issuers, with the aim of being a comprehensive guidance document for impact reporting complementary to the work of the IFIs.

It has undergone multiple updates. The latest version, dated February 2020, features new recommendations regarding the reporting of climate-related physical risks and the SDGs.

Although initially geared towards public sector issuance, the framework laid out in the NPSI Position Paper has been adopted by a multitude of issuers, including commercial banks and various corporate issuers (especially across the Nordics but elsewhere too).

More detail

Our previous study went into considerably more detail on the recommendations of both frameworks, including aspects such as the frequency, period and granularity of reporting, and impact measurement. There is significant overlap between the two, but also some variations.

Most of the comparison provided in our [2019 report](#) is still relevant, and to avoid repetition we have not included it here (it also included a list of suggested metrics in the Appendix). We encourage readers to refer to it for more detail, along with the frameworks themselves.

Many methodologies used, but most issuers either explain their own methodology or do not provide one

Methodology	Number of issuers	Amount issued (USDm)	Methodology	Number of issuers	Amount issued (USDm)
Own	99	83,588	EU TEG	1	1,480
ICMA Harmonized Framework	33	37,085	APTA	1	1,384
Not available	124	35,207	Indonesia MoNDP	1	1,250
CBIRC	3	9,780	NS 3031:2014	1	1,240
UNFCCC	6	8,682	ISO 14.062	1	1,237
NPSI Position Paper	17	6,999	AQSIQ	1	943
EIB	4	3,882	NDRC	1	738
DEAP 4.2	1	3,459	EC Guide to CBA	1	717
PCAF	1	3,109	HEATCO	1	717
GHG Protocol	4	2,522	British Columbia MoE	1	303
IEA-UIC	1	2,310	Korea MoE	1	300
IPCC	2	1,855	US EPA	3	186
			TOTAL (reporting)	269	168,085

NB: Ranked by amount issued. Several issuers use multiple methodologies (sometimes as well as their own), so the figures for each methodology add up to more than the real total.

Use of methodologies expanding

Compared to our previous study, we collected data on more impact methodologies used by issuers.



This also allowed us to factor the use of methodologies into our quality scoring analysis (see page 14), i.e. an issuer scored higher if it explained its own methodology or referenced external ones.

However, the added granularity is partly made possible by the market's development, as the range of methodologies has increased in the last few years.

NB: The results shown are indicative, mainly to give an overview of the breadth of methodologies available. Their use by issuers is not always clear, and the definition of methodologies is somewhat ambiguous, having evolved during the course of our research.

Results: 'Own' top by amount, 'N/Av' by issuers

Our research indicates that 46% of reporting issuers, and 21% of the reported amount, do not have a methodology disclosed ('Not available'), i.e. more common among smaller issuers, in line with various other aspects of the quality of reporting. This share is higher than in our last study due to the stricter definition used this time.³¹

37% of issuers, and 50% of the amount, disclose their **own** methodology (which may, however, be accompanied by a reference to one or more external methodologies – see next two pages). This often involves a simple description of

the relevant assumptions, such as GHG/CO₂ conversion factors used in calculation; it is less common for issuers to disclose the full calculations themselves, although we did notice an increase versus our 2019 study.

Among external methodologies, the **ICMA Harmonized Framework** is used most often, covering 12% of issuers and 22% of the amount (it actually seems to be more common among investors – according to a recent Environmental Finance report, 68% of surveyed funds employed it³²). The **NPSI Position Paper** is next by issuer count, but fourth by amount.

Both the ICMA Harmonized Framework and NPSI Position Paper are commonly used to select appropriate metrics to report, rather than how exactly to calculate them. Although the two frameworks highlight that calculation approaches should be clearly explained, particularly for GHG/CO₂ impacts, some issuers fail to do so. An example of good practice is Canada's Manulife Financial, which offers a clear explanation of its calculation in addition to referring ICMA's Harmonized Framework and the data sources used.

Variety of others

A few relatively large issuers used the **UNFCCC's** project guidance as part of the **Clean Development Mechanism** (CDM). This was mainly for projects linked to renewable energy (*ACM 0002 Grid-connected electricity generation from renewable sources*), and to a lesser extent mass rapid transit (*ACM0016 Mass rapid transit*).

The **EIB's Carbon Footprint Methodology** was used to calculate GHG/CO₂ emissions by four

issuers averaging close to USD1bn in amount issued. Most were Asian (ICBC, Industrial Bank and Korea Development Bank), and one was Lithuania's high-quality reporter, Lietuvos Energija. However, we note that the EIB also uses it, but this was classified as 'Own'.

DEAP 4.2.0 is a web-based tool for producing Building Energy Ratings (BER) and completing BER assessments. It was adopted by Ireland's NTMA to calculate the energy / CO₂ savings from energy efficiency upgrades financed by its green sovereign.

The **GHG Protocol** is broadly used as a way to measure and manage GHG emissions, but only four issuers made direct reference to it in the context of their green bonds. New Zealand's Contact Energy, for instance, uses the framework to assess the GHG emissions of its entire operations.

The **IPCC's Guidelines for National Greenhouse Gas Inventories** were used by the Republic of Indonesia and Sweden's Landshypotek Bank.

The work of the **EU TEG** (namely the EU Taxonomy) was cited multiple times within Crédit Agricole's impact reporting, particularly in the context of selecting appropriate metrics. The Kingdom of Belgium's impact report also mentioned it, but it did not seem to meet our definition of an impact methodology.

Other issuers, such as Norway's KBN, reported the share of projects/financing aligned with the EU Taxonomy. This was relatively rare (mainly among larger European issuers), since the EU TEG's work was very recent during our sample period; but we expect more issuers (particularly

European) to have referred to it since, and even more so going forward.

Almost all the remaining methodologies were only used by one issuer each, and tended to focus on GHG/CO₂ emissions, as well as particular geographies and/or sectors (see below). The exception is the **US EPA**, whose *GHG Equivalencies Calculator* was used by three relatively small but very different issuers: American Municipal Power (AMP), Bank Windhoek and the North American Development Bank. AMP also highlighted the use of the EPA's *Landfill Gas Energy Benefits Calculator* to estimate reduced and avoided GHG emissions from landfill gas energy.

AMP is one of the best reporters among US Muni issuers, and is among the few that discloses a methodology (although many do not report GHG/CO₂ metrics, for which methodologies are most relevant). In any case, an improvement in US impact reporting practices is likely to involve better methodological disclosure. We note that there are already other tools in the USA that can support issuers – especially Munis – to estimate and standardise their impacts, such as the American Carbon Registry (ACR) Green Finance Impact Program.

China²³

Some large Chinese issuers referenced international methodologies such as the EIB's Carbon Footprint Methodology and UIC-IEA Energy and CO₂ Railway Handbook. However, most of those alluded to were still Chinese.

Guidance from the **China Banking and Insurance Regulatory Commission (CBIRC)** was used by a few Chinese banks, most notably Industrial Bank, which specifically mentions the *Guidelines of Credit Granting for Energy Conservation and Emission Reduction*.

Apart from this and a broader explanation of its own methodology, Industrial Bank also used rules provided by **China's General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ)** for the measurement and verification of energy savings and consumption, as well as the EIB's Carbon Footprint Methodology.

Another example of a Chinese methodology are the *Guidelines for Accounting Methods and Reporting of Greenhouse Gas Emissions of Land Transportation Enterprises* provided by the **National Development and Reform Commission (NDRC)**, used by Chengdu Rail Transit Group.

NB: We will explore Chinese methodologies in more detail in a separate country-focused report.

Specific – and different – foci

The (non-exhaustive) list above shows the range of existing, and possible, methodologies. These often have different focus areas, such as:

- Geography (local / national / regional)
- Sector (e.g. energy, transport, etc)
- Metric / impact (especially for GHG/CO₂ accounting, and to a lesser extent energy savings)
- Entity type (e.g. public sector, financial institutions)

Many of the methodologies we observed, including some of the ones already highlighted, combine multiple focus areas. Other examples are:

- **Platform Carbon Accounting Financials (PCAF)**: created by a group of Dutch financial institutions, its *'Paving the way towards a harmonised Carbon Accounting Approach for the financial sector'* publication, based on the GHG Protocol, was used by ING (curiously not part of the group that created PCAF)
- **EUROPA Developing Harmonized European Approaches for Transport Costing and Project Assessment (HEATCO)**: guidelines for project assessment and transport costing targeted at major European infrastructure projects, referenced by ADIF Alta Velocidad
- ADIF Alta Velocidad also used the **European Commission of Regional Policy's Guide to Cost-benefit Analysis of Investments Projects (EC Guide to CBA)** to estimate socio-economic savings (e.g. time saving, modal shift) of its high-speed railway projects
- **UIC-IEA Energy and CO₂ Railway Handbook (IEA-UIC)**: a combined work of the International Energy Agency (IEA) and International Union of Railways (IUC), focusing on energy consumption and CO₂ emission of railways worldwide and used by China's ICBC
- **American Public Transportation Association (APTA)**: its recommended practice to quantifying GHG emissions from transit projects was employed by the Province of Québec
- **Norwegian Standard for Calculation of Energy Performance of Buildings – NS 3031 (NS 3031:2014)**: used by SpareBank 1 Boligkreditt

We also noticed a few methodological guides provided by public sector entities with different sector foci, and used in their respective countries. Most were developed by Ministries of Environment, such as **Korea's** or **British Columbia's**, but the Republic of **Indonesia** for example used guidance from the Ministry of National Development Planning.

Other considerations

As noted, there may be other methodologies that we missed, both due to the specific issuers analysed and the process / assumptions we followed. These are likely to be quite niche, especially with a geographical and/or sector focus. For example, Tokyo Century Corp referred to the Japan Photovoltaic Energy Association's *Standards of CO₂ emissions reduction*, but it was not clear if this was just a data source, and was therefore left out. Another example is Volkswagen Immobilien, which referred to the ENTRANZE (Policies to Enforce the TRAnSition to Nearly Zero Energy Buildings in the EU-27) study.

As with other aspects of impact reporting, the disclosure and explanation of methodologies could be clearer. Several issuers describe the key attributes of external frameworks used (focusing on relevant sections) along with an explanation of how they were applied, which we consider best practice.

ISO standards are still infrequently used. BBVA seemed to be the only issuer to make use of one in the context of impact reporting, again to calculate GHG emission reductions and with a focus on identifying appropriate baselines (**ISO 14.062** – *GHG: Specification with guidance at the project level for quantification and reporting of greenhouse gas emission reductions and removal enhancements*).

In a few cases, issuers alluded to another standards organisation – the **Global Reporting Initiative (GRI)** – but within broader CSR/ Sustainability reports, and it was unclear whether the green bond projects were also covered.

Issuers often engage **external consultants** to undertake impact estimations / calculations. Due to our approach, such cases were not considered valid unless the methodology was explained or otherwise supplied by the issuer. This ruled out about half. (The half considered valid was classified as 'Own')

While rare, some issuers explicitly refer to approaches by other (large, experienced) issuers. The best example is the Kingdom of Belgium, whose impact assessment for railway projects was inspired by the approach taken by SNCF Réseau, a seasoned green bond issuer – on that note, SNCF has developed one of the clearest 'own' methodologies, and seems very proud of it!

Finally, some market participants may consider **building certifications** to be impact reporting methodologies, given they incorporate impact assessments; however, they did not meet our definition, and we viewed them as a metric (see page 27).



Do issuers use more than one methodology?

Absolutely. As the chart right shows, a number of issuers use multiple methodologies (up to three external ones), which often cover a range of types and have different focus areas.

Issuers that used multiple frameworks tended to finance several sectors, and were often also relatively large.

Furthermore, several issuers explained their own methodology in addition to – or supporting – one or more external ones. This mostly occurred if the external methodology/ies did not cover all the aspects, metrics and/or calculations, such that an own methodology covered some of the missing parts. However, it was classified equally when an own methodology was provided but it was not clear whether this covered any extra parts versus the external methodology/ies, which occurred in a few cases.

Should all issuers use external methodologies?

In short, not necessarily (at least not to cover all aspects of impact reporting).

Firstly, depending on the project type and associated metrics, a methodology to *calculate* impacts may not be necessary, for example if just energy generated, volume of water treated or land managed/conserved are reported (all typically ‘straightforward’ metrics to understand and measure).

However, providing additional granularity through multiple metrics – as well as qualitative information – is always positive, and issuers should strive to do so if possible. In this context, reporting GHG/CO₂ emissions becomes likely, and at least those metrics warrant an explanation / methodology. Even if this is not the case, issuers should generally aim to be as clear as possible in all aspects of their reporting. They can therefore still offer an explanatory statement of their thinking and approach if they believe a more detailed methodology is not warranted.

Path to harmonisation and consistency

Looking at the market overall, the primary objective is that issuers report impacts in a clear, and ideally consistent, way – not necessarily to use external methodologies.

However, given the current absence of a globally adopted framework and platform to conceptualise, monitor and report impacts, using methodologies appears the best way to ensure greater clarity and consistency. In this context, and where possible/relevant, using the (evolving) ICMA Harmonized Framework would seem best, since it is ICMA-led, convenes various stakeholders, and is already the most used, having the potential to spread the widest.

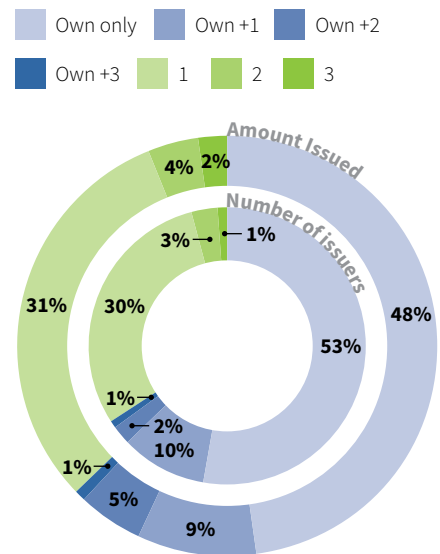
As our analysis has shown, there is a plethora of guidance available, spanning different sectors and other focus areas. In our view, access to common guidance under a centralised source would be hugely beneficial for the market, and eventually help to narrow down the list of ‘providers’ without losing any detail/value (especially in terms of metrics).

Nevertheless, and until such a platform becomes available, **the key is for issuers to explain all relevant aspects of their impact reporting approach, including the choice of metrics, calculations, data sources and any caveats.**

The ICMA Harmonized Framework and NPSI Position Paper convey a similar message.

Further, and depending on the capabilities of each entity, clearly explained individual methodologies may actually work to the benefit of both the issuer and target audience. For example, in our previous study we highlighted the Swedish forestry company Sveaskog, which developed a granular sector-specific methodology that was positively received. Another example, mentioned earlier, is SNCF, whose comprehensive own methodology has already inspired other issuers. It is thus possible for individual issuers – or small, targeted groups – to develop more advanced, specific approaches that can later be extended to other regions, issuer types, and potentially even project types.

Larger issuers more likely to use multiple methodologies



NB: 1, 2 and 3 refer to the number of external methodologies used. Only includes issuers that use / explain a methodology.

6. What the future holds

This section goes beyond the quantitative and descriptive findings of our research. It is a normative exploration that frames the state of post-issuance reporting within the broader context of where the market is, and where it needs to go. The overall aim is to raise key points and offer potential solutions to inform a productive discussion and ways forward, including for the work of Climate Bonds. It is mainly based on the authors' knowledge and reflections.

State of play, and looking ahead

The evolution of reporting practices over the years has led to a rich reporting landscape, especially when it comes to impact reporting. This is positive, but many improvements are still necessary. In particular, there is a long way to go until reporting is available across the board *in a consistent fashion*. The real evolution, we believe, is yet to come.

This is hardly surprising given the fragmented nature of reporting up to now. In the absence of a common framework to report within, issuers must independently plan, create and publish green bond reports, including setting up dedicated channels to make these publicly available. The long list of recommendations in the Conclusion points to the breadth of aspects issuers must keep in mind.

Indeed, the decision to issue labelled debt is not easy for many entities, partly due to the need to create frameworks and engage in regular reporting. Although these 'costs' diminish over time and are usually heavily outweighed by the benefits, this is not always known by prospective issuers before embarking on the journey. Climate Bonds has attempted to demystify some of these notions and highlight the benefits through various workstreams and research pieces such as our *2020 Treasurer Survey*, but we are aware that barriers still remain.

From an observer perspective, it seems unintuitive that issuers must undertake extra work and commitments in order to issue thematic debt, since investing in green and other sustainability objectives is urgent and vital to global progress. The process should be as straightforward as possible, with minimal market entry barriers and roadblocks to issuance (of course, without compromising integrity).

The 'solution'

In our *2019 report* we highlighted the following as potential ways to increase the availability and quality of reporting:



- Market guidelines and templates to address the lack of uniform structure and content of post-issuance reports
- Mechanisms to reduce the cost of reporting
- Reporting database

More than ever, it is now clear that the most direct and effective way to increase the availability, quality and (crucially) consistency of reporting is to create a common reporting framework, so that issuers know exactly what to report and how to report it.

This would support all of the points above, and could incorporate the list of best practice recommendations highlighted in this report (see Conclusion). Building on the metrics in the EU Taxonomy and guidance from existing methodologies (see pages 34-37), the EU Green Bond Standard, which requires reporting on both UoP and impacts, could potentially deliver this.

A valuable addition to this would be to create a centralised reporting platform/database through which:

- Issuers (and/or others, e.g. external review providers) can upload data and other information consistently, and
- The information is available to various market participants – most notably investors but also issuers, policymakers, underwriters, external review providers, etc – and ideally the general public

Having undertaken multiple studies of post-issuance reporting, we are well aware of how much easier this would make the collection and analysis of post-issuance data. **The most important benefit of all would arguably be the harmonisation of impact data**, allowing for easier and more reliable impact aggregation and use by investors.

Platforms under development

Several efforts in this area are already underway, some of which Climate Bonds is actively supporting. ICMA has conducted a mapping of current green bond impact data providers, among which we highlight:

- **Green Assets Wallet (GAW):** blockchain-based product aimed at increasing efficiency and transparency for green debt instruments, with a focus on impact data (uses NPSI Position Paper as framework)³⁴
- **Nasdaq Sustainable Bond Network (SBN):** provides comprehensive information on thematic bonds³⁵ – an external review is required – along with UoP and impact data (uses NPSI Position Paper)³⁶
- **LGX DataHub:** provides comprehensive information on thematic bonds listed on LGX, including post-issuance UoP and impact data (uses ICMA's project categories and metrics)³⁷

- **IDB Green Bond Transparency Platform (GBTP):** recently launched, it offers comprehensive information on Latin American green bonds to support the harmonisation of reporting, including UoP and impact data (uses different impact frameworks as inspiration, with Climate Bonds as an adviser); it also seems to be the only reporting platform capturing first-person external reviewer data³⁸

Green Bond Transparency Platform (GBTP)

The **Green Bond Transparency Platform**

(GBTP) is an initiative developed by the Inter-American-Development Bank (IDB) to support



green investments in Latin America and the Caribbean (LAC). The GBTP supports the harmonisation and standardisation of green bond reporting. The platform is taxonomy-neutral, accessible to everybody, and aims to provide a benchmark for best practice disclosure in the LAC region and beyond.

- For **issuers**, it facilitates reporting on the use of proceeds and impacts of their bonds in a simple format and standardised way, at both the project and project category level.
- For **external reviewers**, it provides a way to present their work with issuers (pre- and post-issuance) and the conclusions of these reviews.
- For **investors**, it enables analysis on the environmental performance and the use of proceeds of specific bonds.
- For **public sector authorities**, the GBTP is an evidence-based data tool to inform discussions on taxonomies and regulation.

Registered issuers and external reviewers receive free-of-charge assistance.

The GBTP was created in close cooperation with key international, regional and local market players. Its data management, templates and information have been piloted with over 40 market actors including issuers, investors, stock exchanges, standard setters, external reviewers and certifiers (informational video [here](#)³⁹).

These initiatives are highly promising, and although they vary in coverage, all are likely to support the development and standardisation of post-issuance reporting in the global thematic bond market. Eventually, the broader aim is to have a globally adopted, common platform, which is freely accessible (several existing ones are not). This may call for a 'host' with further reach, such as ICMA, or a new consortium of market participants, which could build on existing networks from the platforms highlighted above. As a potential key contributor to this, Climate Bonds is planning to expand its work in this space – this will involve collaboration with others, including as part of ICMA's Impact Reporting Working Group : common framework.⁴⁰

Philosophy of impact: problems remain

Centralised platforms can be incredibly valuable for various market participants, especially when it comes to impact reporting. The harmonisation of metrics and calculation methodologies is the key issue preventing aggregation/comparability, particularly for relative metrics (absolute ones can usually be converted, depending on the units).



However, even if such platforms are successful in harmonising green bond impact reporting, one crucial question remains unaddressed in order for 'impact' to be a) compared and aggregated reliably, b) a factor in economy-wide decision-making (which it needs to be).

Does the current approach to green bond impact reporting provide a real, full picture of impacts?

The answer, in short, is no – and at present, platforms providing impact data cannot answer this question, because it is a deeper, broader issue that requires a rethink of how we perceive impact, as well as measure and use impact data.

Why not?

The issue manifests itself in a number of ways. We already alluded to one way on page 22, i.e. that use-of-proceeds instruments are focused on projects/assets focused on achieving particular objectives, and **issuers thus select a few metrics specifically relevant to each project/asset, even though the real and full impact of the activities financed goes beyond its particular objective(s) and reported impact(s).**

Investor impact reporting

If impact was not already a key factor for investors, it has become increasingly so in the last year or two, accentuated by the COVID-19 pandemic and mounting regulatory and public pressure. Our [2019 Investor Survey](#) showed that transparent use of proceeds and impact reporting were among the important factors to make green bond investments more attractive, and 55% of respondents said they would definitely sell a bond if post-issuance reporting was poor. We would expect the shares to be even higher now.

Environmental Finance's (EF) recent *Green Bond Funds Impact Reporting Practices* report found that three-quarters of green bond fund investors considered 'environmental impact' a major investment criterion.⁴¹ While the share dropped to only a quarter for 'reporting procedures', this may well be related to the lack of standardised reporting in the market and the understandable need to compromise rigour and accuracy, for now – in a world more and more concerned with impact, the emergence of standards and rules around reporting will only intensify, and reporting procedures will gain importance.

Lack of harmonisation is key challenge

In line with the findings in the 'Impact Reporting' section, **a key challenge for investors in assessing portfolio impact is therefore the lack of impact comparability between issuers, particularly with regard to relative metrics** (i.e. that rely on baselines). In addition, and as EF's survey also found (and we well know!), collecting impact data is a highly time-consuming, manual task that does not always result in clear and sufficient data being gathered. Attempts are being made to automate this process, but success is limited.

The 'solutions' to this vary considerably in practice, and are ultimately the decision of each investor; for instance, some only report on a few key metrics (namely energy- and GHG-related), others only on metrics that can confidently be aggregated (e.g. energy generated), while others prefer a disaggregated approach (i.e. reporting separately for each bond/issuer).

In other words, there is a frequent need to compromise and be pragmatic, focusing on the information that is most readily available and comparable. Investors typically only cover a representative share of portfolios, rather than aiming for an exhaustive coverage.

They also often make use of external data sources and internal calculations; according to EF, only 45% of funds relied on issuers' publicly listed impact reports. Many resources to support sustainability reporting among investors exist, some of which are mentioned on pages 41-42, and several ESG data providers have also started to offer impact products, although at the moment these broadly do not seem to be meeting the needs of users. Some investors have thus developed individual approaches, in some cases being able to create their own impact database, such as the case of Federated Hermes.⁴²

Overall, it is clear that a common framework and centralised platform to homogenise green bond impact reporting and broader disclosure (without losing granularity) would be of immense value to investors.

Some existing platforms, such as the GAW and GBTP, are especially promising in that they drive harmonisation of metrics while still allowing issuers to add detail and even suggest others.

From conversations we have had with investors, there seems to be some surprise that service providers have not yet created such a product, and Climate Bonds is planning to work more in this space.

Mounting regulatory pressure

Investors of all shapes and sizes are under mounting pressure to report the impacts of their investments in a more comprehensive way, by asset owners and increasingly regulators.

The EU's recent **Sustainable Finance Disclosure Regulation (SFDR)**, hailed as a 'game-changer' by some, is intended to avoid greenwashing by adding transparency and standardising the sustainability credentials of ESG-labelled financial products.⁴³

Applying to asset managers, asset owners and financial advisers with operations in the EU (there is yet to be confirmation of what the equivalent UK regime will look like), the SFDR focuses firms' reporting on three main elements:⁴⁴

- How sustainability risks are managed
- Principal adverse impacts (PAIs) that investments have on sustainability
- Substantiation of individual products' ESG credentials

The regulation became effective in March this year, but the finalised regulatory technical standards will only enter into force on 1 January 2022, and asset managers do not have to fully report how they identify and mitigate the effect of their decisions on the environment or society until 30 June 2023.

Financial service providers will also soon be required to report alignment with the EU Taxonomy, and issuers could support this by including the alignment of projects/assets financed, along with a methodology for calculation.

In the UK, the government recently announced that climate risk reporting will become mandatory for large companies and financial institutions.⁴⁵ This will come into effect for some companies as early as 2021, using guidelines from the Task Force on Climate-related Financial Disclosures (TCFD).

All projects and activities tend to have impacts on water usage, pollution, waste, employees, surrounding communities, etc, but if these are not the focus of the project/asset and its benefits – or are not the most material⁴⁶ – they are (almost always) left out of green bond impact reporting.

For example, if the energy used to power the construction of a power plant or railway is from national grids, it is likely to be largely fossil fuel based (indeed, as Ehlers et. al point out, “green bond projects do not necessarily translate into low or falling carbon emissions *at the firm level*”⁴⁷). A project could also have negative impacts on surrounding communities, or working conditions could be poor. More abstractly, the materials (e.g. metal) used may have been obtained through different methods, with variable types/levels of impact themselves.

Related to this, green bond impact reporting implicitly assumes that impacts are ‘isolated’ or ‘independent’. The real world is intrinsically interconnected in virtually all aspects of life, and the dynamics of cause and effect are often not clear-cut. It is therefore more complex to obtain a full, holistic picture of ‘real impact’.

For instance, it is one thing to finance an entire project through a UoP instrument; but what if only a part is financed, and that part happens to be indispensable to the project’s operation, such as a vital repair to an asset? Is the impact the isolated repair or the asset’s output?

In addition, what if an individual project does not guarantee the asset’s benefits to be realised, such as a renewable-energy power plant without transmission lines connected? The lines are not generating the energy, but without them the energy cannot be supplied.

Considering these aspects is important if one is to obtain a holistic picture of the impacts of different projects and assets, including the full supply chain and life cycle of products. Qualitative information can help the understanding, and more issuers seem to be including this, but ultimately more comprehensive quantitative data is needed.

Absolute measures are what counts

On page 24 we discussed the fact that relative metrics often trump absolute ones when both exist for a given substance e.g. GHG emissions saved (relative) vs. GHG emissions/intensity (absolute). Relative metrics are the most prevalent in the market, and are suggested by various frameworks, including the ICMA Harmonized Framework and NPSI Position Paper.

However, apart from comparability/aggregation issues due to different baselines, **the use of relative metrics poses a deeper problem: they do not inform absolute performance, and in the case of GHG emissions reductions, the trajectory towards climate targets.**⁴⁸

The prevailing view of impact seems to be: if today I am at X and last year was at Y (or if I am at X and the national average is Y), then the impact is the difference between Y and X. But considering ‘impact’ to be the amount saved, avoided or reduced reflects a subjective view of reality that is at odds with the real, objective impact on the world.⁴⁹ **The real impact is the absolute level; the X and Y, not the delta.**

Absolute measures can, of course, be used to assess changes or differences in performance, but we must be acutely aware that they are of a ‘higher order’, determining our actual impact on the world. The extent to which this is understood in the market is unclear, and the use of relative metrics does not seem to be widely challenged at the moment. **Overall, relative metrics can be useful, but should always be accompanied by a measure of absolute performance.**

Climate change depends on the absolute level of GHG (stock) in the atmosphere, with changes in the amount of warming depending on the absolute level of GHG emissions in a given period (flow). Emitting 1,000 tonnes of CO₂e is worse than emitting 500 tonnes, regardless of whether the former represents a decrease and the latter an increase versus the previous state.

Why are relative metrics so common?

One possible reason for the reliance on relative metrics is the ‘feel-good’ factor, in that reporting reductions in GHG emissions, for example, may be perceived better than reporting a positive amount of emissions. This may be an especially relevant factor in investor reporting.

Perhaps it is also due to the idea of ‘additionality’, which implicitly requires a comparison versus some sort of baseline to determine additionality or lack thereof. Many still see the green bond market as being about additionality, but it is much more about signalling, visibility, transparency and credibility. Even excluding cases of refinancing, a significant share of projects financed by green bonds may well have happened anyway, but issuing a green bond increases their visibility and provides a clear market signal; due to reporting requirements, it is also positive for impact disclosure, since it increases the likelihood that the project’s impacts are assessed and reported.

More likely though, using relative metrics has been the norm because of the lack of a framework to measure and compare absolute metrics consistently, and the resulting difficulty in framing or understanding the meaning of absolute figures.

Yet this is changing. Absolute emissions/intensities have been used to determine eligibility thresholds for various types of projects/assets, such as in the Climate Bonds Taxonomy and the EU Taxonomy. It is true that assessing absolute emissions may be harder in some areas, for instance among public sector entities that do not have a revenue or enterprise value to rely on – this will require more work, but the medium- and long-term aim of assessing absolute impacts should be the same, and if we target this, viable approaches will no doubt emerge.

The way we perceive impact, not just in terms of GHG emissions but also energy, water, waste and other aspects, must change in line with this approach. However, this requires a new, more holistic framework to understand, measure and monitor impact.

Looking further ahead

Many of the points raised in the previous pages, as well as in the 'Impact reporting' section, suggest that more thought is needed to create a viable framework that assesses impacts fully and consistently. An important requirement to achieve this is to look beyond UoP instruments.

Beyond UoP instruments: economy-wide

This paper, and more broadly the work of Climate Bonds, focuses on thematic UoP instruments.



What is increasingly clear, however, is that it is not possible to create a robust framework that offers a full picture of impacts and true comparability between entities and projects, as long as the approach to impact assessment is fragmented and isolated, such as it is for UoP instruments.

Thus, while centralised platforms for impact reporting linked to UoP instruments can already exist and may meet the short-term needs of users (namely investors), they are not able to provide a full view of the impacts of projects/assets/entities, which is strictly needed beyond UoP instruments and into the future.

In this light, the calls for common and comprehensive sustainability reporting are growing. The **International Organization of Securities Commissions (IOSCO)** recently stated the need for globally consistent, comparable, and reliable sustainability disclosure standards, announcing its aim to create a **Sustainability Standards Board**.⁵⁰ It noted that "investor demand for sustainability-related information is currently not being properly met; for instance, companies often report sustainability-related information selectively, referencing different frameworks." This is an extension of some of the issues we observe in the green bond market, but also reflects the fact that current ESG data services are not robust and comprehensive enough, and often lack comparability.

There is therefore an urgent need to develop a globally adopted framework/platform for impact measurement and reporting that:

- **Transcends UoP** instruments and projects
- Assesses **all ESG/sustainability factors** in a holistic and absolute way
- Provides **spectrum-based** assessments (i.e. on a scale/continuum), not binary
- Is **versatile**, being able to frame impact at various levels and for various instruments
- Is used to assess the impact of **all entities** (and therefore also all projects/assets)
- Has **transparent monitoring and disclosure**, ideally available to everyone

Existing work and initiatives

A breadth of existing resources could already be leveraged for the development of a comprehensive, integrated sustainability reporting framework/platform, including the work of the EU, sustainability reporting standards, initiatives like the Global Impact Investing Network's (GIIN) IRIS+, Natural Capital Protocol and Alliance for Corporate Transparency, and ESG data services.

The **UN SDG** framework, along with the **guidance and core indicators developed by UNCTAD**, can naturally also provide a base; indeed, target 12.6 explicitly encourages companies to adopt sustainable practices and to integrate sustainability information into their reporting cycles.⁵¹ Moreover, and building on its previous work, **UNEP FI** launched two valuable **Impact Analysis Tools** in 2020 – a *Portfolio Impact Analysis Tool for Banks (Version 2)* as well as a *Corporate Impact Analysis Tool* – aimed at enabling users to implement a holistic approach to impact analysis and management.⁵²

EU driving sustainability reporting

The EU has required large, listed companies, banks and insurance companies to report on selected ESG matters for several years, under its **Non-Financial Reporting Directive (NFRD)**. The directive covers almost 12,000 entities across the region.⁵³ This is complemented by the SFDR, which applies to financial market participants (see page 39).

NFRD revision in 2020

In early 2020, the **European Commission (EC)** launched a public consultation aimed at collecting views with regard to possible revisions to the provisions of the NFRD. The consultation was closed on 11 June 2020.⁵⁴

On 25 June 2020, the EC issued a request for technical advice mandating the **European Financial Reporting Advisory Group (EFRAG)** to undertake preparatory work for the elaboration of possible EU non-financial reporting standards in a revised NFRD.

On 8 March 2021, EFRAG published two reports submitted to the EC, setting out recommendations to this end as well as possible changes to EFRAG's governance and funding if it were to become the EU sustainability reporting standard setter.⁵⁵

Expanded scope under CSRD

In April, the European Commission proposed a new **Corporate Sustainability Reporting Directive (CSRD)**, which will effectively replace the existing NFRD.⁵⁶ This CSRD proposal, which would see draft standards developed by EFRAG and the first set adopted by October 2022:

- **Extends the scope** to all large companies and all companies listed on regulated markets (including SMEs but excluding micro-enterprises)
- **Requires an audit** (assurance) of reported information
- **Introduces more detailed reporting requirements**, and a requirement to report according to mandatory EU sustainability reporting standards
- **Requires companies to digitally 'tag'** the reported information, so that it is machine readable and feeds into the European single access point envisaged in the new **Capital Markets Union (CMU)** action plan, which was adopted in September 2020

Centralised public database / platform

Closely linked to this, the EC planned a 'sustainability database' under the new CMU action plan. The creation of a single access point for sustainability data was the first of 16 legislative and non-legislative actions under the plan. Its core aim would be to provide investors with 'seamless access' to financial and sustainability-related information on companies, alleviating the challenge of insufficient availability of quality, comparable and reliable ESG data.⁵⁷

EFRAG also recommended an EU sustainability database in its March reporting roadmap, calling for a 'public digital sustainability information database' comprising raw data as reported by corporates, along with basic analytical screening functions – for example, screening for EU Taxonomy alignment and industry-specific material sustainability issues.⁵⁸

Other regulator-led reporting frameworks

Sustainability reporting standards, tools and frameworks have also been developed by regulators in other geographies (*IOSCO's work is relevant here but covered further down*).

The **USA's** Securities Exchange Commission (SEC) is becoming more active in this space. Having focused predominantly on climate disclosure in the last two or so years, in March the SEC announced the opening of a comment period regarding climate change disclosures, with the submissions planned to be used in developing future guidance and proposals on ESG issues more broadly.⁵⁹ In this light, SEC Chair Allison Lee recently indicated that the regulator is undertaking concrete steps to develop and implement a mandatory ESG disclosure framework.⁶⁰ Similarly to developments in Europe, one could also expect this to be complemented by stricter ESG fund reporting in the medium-term.

China has a strong tradition of reporting requirements and is planning a mandatory ESG disclosure framework, mapped to the SDGs.⁶¹ Led by financial regulators, in particular the China Securities Regulatory Commission (CSRC), this will build on existing ESG reporting requirements for listed companies on some exchanges, such as the Hong Kong stock exchange (HKEX). *We plan to analyse post-issuance reporting in China in a separate report, and will include more detail on broader disclosure and reporting there.*

In **India**, the Institute of Chartered Accountants of India (ICAI) recently developed the **Sustainability Reporting Maturity Model (SRMM) Version 1.0**, with an objective to deploy a comprehensive sustainability scoring tool.⁶² ICAI has also set out a strategy for developing Version 2.0 of SRMM based on inputs from corporates with regard to the implementation of Version 1.0.

Breadth of reporting frameworks and standards

A number of organisations and initiatives from around the world have developed frameworks, standards and other tools to drive sustainability reporting. Various ancillary resources to support impact assessments also exist, such as UNEP FI's *Impact Analysis Tools*, GII's *Methodology for Standardizing and Comparing Impact Performance*⁶³, Sustainalytics' *Impact Framework and Metrics*⁶⁴, and others developed by smaller groups, such as the Upright Project, MultiCapital Scorecard and Evercity, to name a few.

Impact Management Project

Among the most promising global initiatives is the **Impact Management Project (IMP)**, which provides a forum for building global consensus on measuring, managing and reporting sustainability impacts.⁶⁵ This includes the **IMP Structured Network**, a collaboration of organisations that, through their specific and complementary expertise, are coordinating efforts to provide complete standards for impact measurement, management and reporting.⁶⁶ These standards are centred around three areas:

- Processes for managing impacts (practice)
- Frameworks and indicators for measuring and reporting impacts (performance)
- Valuation for comparing impacts (benchmarking)

In this context, five of the organisations in the Structured Network, all of which are framework- and standard-setting institutions of international significance, recently co-published a shared vision of the elements necessary for more comprehensive corporate reporting and a joint statement of intent to work towards this goal. **CDP**, the **Climate Disclosure Standards Board (CDSB)**, the **Global Reporting Initiative (GRI)**, the

International Integrated Reporting Council (IIRC) and the **Sustainability Accounting Standards Board (SASB)** are working together and engaging with other key actors, including **IOSCO** and the **International Financial Reporting Standards (IFRS)**, the **EC**, and the **World Economic Forum's (WEF) International Business Council (IBC)**.⁶⁷

GRI, SASB, CDP and CDSB set the frameworks and standards for sustainability disclosure – including climate-related reporting, along with the recommendations of the TCFD. The IIRC provides the integrated reporting framework that connects sustainability disclosure to reporting on financial and other types of capital. Taken together, these organisations guide the overwhelming majority of sustainability and integrated reporting.

Notable recent developments

Since the release of the paper in September 2020, the group of five has co-authored an illustration of how their current frameworks, standards and platforms, along with the elements set out by the TCFD, can be used together to provide a running start for the development of global standards that enable disclosure of how sustainability matters create or erode enterprise value.⁶⁸ This was supplemented by a prototype climate-related financial disclosure standard.

The group also wrote an open letter to Erik Thedéen, Chair of **IOSCO's Sustainable Finance Task Force (STF)**, to reiterate its shared commitment towards a globally accepted, comprehensive corporate reporting system. The positive response from Mr. Thedéen welcomed the consultation by the Trustees of the IFRS Foundation about possible ways it might contribute to this development, which was followed by the announcement earlier this year that a **Sustainability Standards Board (SSB)** under the IFRS Foundation structure will be established (mentioned on page 41).

IOSCO also established a new **Technical Expert Group (TEG)** under its STF, which will be led by the **US SEC** and the **Monetary Authority of Singapore**.⁶⁹ The TEG works closely with the IFRS Foundation's working group and will be tasked with reviewing and assessing its technical recommendations focused on enterprise value creation.

Another notable development in the last year or so was the announcement by the **WEF's IBC** of its own set of universal sustainability metrics for reporting (working with the Big Four accounting firms), which factors in a 'stakeholder capitalism' perspective.^{70,71} The IBC's stated objective was "to encourage greater cooperation and alignment among existing standards as well as to catalyse progress towards a systemic solution, such as a generally accepted international accounting standard in this respect".⁷²

Integration is key: need common language

Overall, the status quo of the reporting landscape is rich, more so than ever before. The breadth of initiatives may have created duplication of efforts to some degree, but more importantly the many existing methodologies, perspectives and tools provide a vast array of options, presenting a great opportunity to find common grounds.



Yet creating a common framework that integrates the existing wealth of resources is of the utmost importance, for we live in a shared, globalised world and need to speak the same language in the face of a common problem. One of the key stated benefits of the EU Taxonomy is indeed the creation of a common language.

The IMP, IOSCO and WEF's IBC explicitly recognise this, highlighting the need for coherent guidelines in order to mainstream impact management. The work of the EU, particularly through CSRD and by definition EFRAG, aims to be a 'one-stop-shop' for sustainability reporting and will complement such efforts from a regulatory perspective – investor reporting could eventually also be integrated under the same framework. The TCFD guidelines, along with its twin Task Force on Nature-related Financial Disclosures (TNFD) which is currently under development, provide further helpful frameworks that ultimately could be integrated under a single reporting system.

Now that the USA is back in climate talks, the time is ripe for a new global initiative under a shared language, with the potential to drive consistent sustainability reporting – and a robust, resilient transition – around the world.

Holistic impact assessment

Crucially, a successful framework/platform must consider the full range of impacts of activities/entities.



In the spirit of a truly common and versatile framework, the full array of criteria would be used to assess the ESG performance of every entity in an integrated and consistent way. This is despite not all impact criteria being necessarily relevant or material to each entity, such that they could be weighted if creating overall 'scores' (e.g. based on the magnitude of each versus an industry/sector average).

Environmental and social: two sides of the same coin

On the **environmental** side, there has been a considerable focus on GHG emissions given the urgency of climate change and perhaps greater ease of collecting – or estimating – emissions

data (the availability of methodologies discussed on pages 34-37 stresses this). Yet broader air and water pollution, soil degradation, biodiversity loss and deforestation are but a few widespread environmental issues that need attention, and the contributions of activities/entities to all of these must be measured.

The EU Taxonomy recognises this, providing a useful starting point to begin assessments. The eligibility thresholds are currently only based on climate mitigation and adaptation, with broad Do No Significant Harm (DNSH) criteria applying to the remaining environmental objectives along with minimum social safeguards; but there will be another consultation this summer to develop criteria for substantial contributions to biodiversity, pollution prevention, circular economy and water management. Many other initiatives, including the EU's CSRD, are equally clear about the need to look at all impacts.

Defining criteria for **social** impact assessments may be slightly harder, given that these are often less well-defined, lack clear quantitative measures, and may face political/legal boundaries.⁷³ However, the SDGs can naturally be used as a base, and identifying different stakeholder groups and considering potential impacts on each would also seem a logical approach, following naturally from the concept of 'stakeholder capitalism', which is not new. In addition, methods of quantitative measurement of social impacts are increasingly being developed and used, and stakeholders themselves can be used as a source of data; in any case, we would argue that the key is to get the ball rolling, with a view to implementing continuous refinements.

It is worth noting that separating impacts into 'social' and 'environmental' is a useful categorisation exercise, but they are two sides of the same coin: the externalities – or external impacts – of activities, which are typically not factored into economic decision-making by private parties (see page 45). The lines between the two can also be blurred; for one thing, a better environment naturally has positive impacts on social well-being, and even vice-versa if we consider the effects of human behaviour on the environment.

Beyond climate – and eventually beyond SDGs?

Much of the attention placed on sustainability matters worldwide has focused on **climate change** (carbon, net-zero, etc). A multitude of initiatives, alliances and coalitions, campaigns and plans have been built around this. These are, of course, generally positive, reflecting the drive that exists globally and representing a massive improvement versus doing nothing (especially given that climate change is perhaps the most pressing issue we face as a species).

But focusing only on climate misses the point on the real, holistic transition that a) needs to happen, b) will inevitably happen. Evolution is

an unstoppable force, and this great transition is just a matter of time – the question is: will it take a decade, two, a century, a millennium? And will we be smart and make systemic changes voluntarily, or will we be forced into them due to even greater environmental and social stress?

The point is: we will not be able to solve the climate crisis and achieve a successful transition without tackling other sustainability dimensions, because everything is interconnected, the problems share the same root cause(s), and in broad terms the way to solve one is the way to solve the others (i.e. measure, monitor and value impacts so that they are accounted for in decision-making). Independently solving the climate crisis is thus a paradox, and attempts to do so an illusion.

To drive a rapid and robust transition we need an inclusive, concerted, holistic approach, which requires a paradigm shift. If we have the vision to adopt such an approach now, we will be in a much better position to deliver on all the SDGs – including climate action – and perhaps even to create a viable path for improvement *beyond these*. At Climate Bonds, we originally focused more on climate but swiftly expanded to green more generally, and are now increasingly looking at the social dimension and broader SDGs.

Measuring and comparing

How to measure impacts is a separate question. Methods will inevitably vary between different impacts, and will likely depend on local contexts and resources available. However, advances in technology – such as satellite monitoring, drones, IoT and increasingly reliable pollution measures – are promising, and have the potential to be applied widely. This could be supported by the use of blockchain technology to support monitoring, data validation and reporting itself.



An area which seems to have been less explored is of human monitoring, especially for localised impacts. Employees, surrounding communities, consumers and others may all have a role to play, and could be leveraged to provide more holistic measures of performance, especially for social impacts but potentially also environmental ones, e.g. to raise red flags if a producer is polluting secretly. Principles borrowed from Ostrom's work on the management of commons, for example, could prove effective and resilient solutions.

Once impacts are measured, they could – and perhaps must – be translated into an intensity per relevant unit of output (or of 'need met') to allow for comparison between projects and entities. But they should also be available as a total; efficiency measures are useful but not everything, and total absolute impacts also count. This may provide added motivation for larger entities to improve their aggregated ESG performance, even if they already perform well on an intensity basis.

What would such a framework enable?

Adopted globally and across activities, the benefits of such a framework would be immense, especially if the data is made available via a freely accessible platform. For example, it would allow:

1. A much more holistic view of the real impact of projects/assets/entities, due to:

- The inclusion of a **full set** of sustainability criteria
- A clearer way to understand and assess impact **materiality**
- **Spectrum-based** data (a continuum, as opposed to binary 'in or out' assessments)
- **The availability of data for different entities**, which could be factored into the performance assessment of others, especially those in respective supply chains (the benefits of this may well increase exponentially as more entities are covered)

2. Conclusions to be drawn about relative performance, i.e. changes over time for individual projects/entities/sectors/regions etc as well as differences between projects/entities/sectors/regions etc

- With the data existing on a continuum/spectrum, the level of granularity obtained is much higher, and allows for continuous performance improvements *regardless of where on the scale an entity is* (e.g. regardless of whether it is Paris-aligned or not)
- This also enables context-based assessments to occur, benchmarks to be set and transition pathways to be better understood and monitored, as well as higher levels of ambition due to a greater focus on 'increasing positives', not just 'reducing negatives'

3. Progress and contributions toward goals – such as the SDGs, 1.5/2°C target, net zero, and others – to be measured clearly and continuously

- However, it would not be specifically built to achieve any targets or milestones, which allows for constant progress – eventually above and beyond such short-term⁷⁴ targets

4. Translating the SDGs into a robust framework to be applied economy-wide, which will **enable the much-needed move beyond GDP as a measure of economic progress and systemic health**

5. A much easier process of identifying the most polluting sectors/entities and those with the most urgent need for transition, as well as other types of analysis that currently represent an enormous amount of work

- Similarly to the EU Taxonomy, this could be used to direct funding / investment to specific activities, including for public sector expenditures
- It also enables greater policy coherence – without the base of a clear framework to assess and monitor impacts holistically, isolated policies to support more sustainable practices in one activity are more likely to be incoherent versus policies (or lack thereof) in other areas, which makes them less effective

6. The impact of various financial instruments, including bonds, loans and even equities, to be assessed under a common framework

7. Issuers, investors and other stakeholders to assess and report impact consistently, achieving considerable time and resource savings (following an initial learning process)

Many of these benefits directly address the pain points and recommendations identified by a recent consultation with investors (and to a lesser extent issuers) as part of **ICMA's Impact Reporting Working Group**.

Through its consistency and transparency, such a framework also has the power to overcome the obscurity and associated lack of ambition in much of the 'impact discourse' today. As the Finland-based Upright Project puts it, the current discourse is often:⁷⁵

- Stuck at minimizing downsides (“we no longer use suppliers on this blacklist”)
- Confusing big and small things (“we are now using recycled office paper”)
- Focused on compliance data (“we have now written an ethics code of conduct”)
- Hidden in sustainability reports (“we produced this 400-page report”)

Perhaps the greatest and most overarching benefit of all, however, would be that competitive forces could come into play directly in the field of impact, greatly accelerating the progress towards achieving climate goals and the SDGs. If ESG performance were reliably and consistently known for all entities, performing life cycle assessments (LCA) of products would become much easier, while also taking account of other ancillary impacts that currently do not form part of LCA. This would allow consumers to make more informed choices and producers to preference suppliers with better ESG performance.

Encouraging network-based solutions

The availability of this information would also facilitate the emergence of network-based approaches (spanning different groups, entities, activities, regions, etc) to problem-solving, particularly if a space for dialogue/exchange and an 'economy map' (see below) are created within, or alongside, the impact reporting framework/platform.

A highly pertinent example is the transformation of design needed across many products to allow their materials to be continuously reused (or, as McDonough and Braungart put it, 'upcycled' via cradle-to-cradle design⁷⁶) and a true circular economy to emerge, which would constitute a huge public good. This involves a concerted effort across producers and supply chains, and its lack in almost all sectors is an example of market failure.

Another, somewhat related, example might be the large amount of unnecessary waste related to packaging. There is massive potential to reduce this, especially through widespread use of reusable containers, smarter retail methods, bulk food and initiatives that promote the reutilisation of packaging (e.g. in food delivery). Producers, retailers, consumers and policymakers will all likely have a role to play.

Network-based solutions can also emerge naturally at the community level, building social cohesiveness and fostering collaborative processes towards shared goals.

Driving system-wide clarity and transparency

The structure of our economic system, its dynamics and mechanisms, should be understood by everyone. This is at the *macro* level; the *micro* intricacies and nuances (e.g. activity-specific contexts) are naturally another story.

At the moment, many of us do not know or understand how significant parts of the system, or indeed its entirety, function and interconnect. There is a lack of clarity and transparency of the inner workings of the economic and especially financial system that make it near impossible to understand these for much of the global population – we know there are cogs, but we cannot always see the wheels and what they are turning.

Even to people working in economics and finance things are often not clear. The research that has gone into this report, for example, has uncovered a wide range of work, initiatives and resources globally, which makes it difficult to know exactly 'what is out there', and how it all compares and fits together (and this is just within reporting and disclosure!). To a large extent, and perhaps due to the individualistic mindset that underpins capitalism, our efforts to drive real change are still too fragmented.

A single framework to measure and report impacts economy-wide would go a long way towards expanding the understanding of our

system globally. Another key element of this would be to create an 'economy map' that shows the different sectors/activities (e.g. sorted by 'needs', by type of goods and services, and/or by primary, secondary and tertiary sectors), and ideally the interdependencies between them, in a visual way. As well as driving much-needed clarity and transparency, this would facilitate the understanding of networks (existing and potential) and the emergence of network-based solutions.

Access to data is necessary, but not sufficient

Access to consistent, reliable data is necessary as a source of information, but on its own is insufficient to deliver all of these benefits. The fact that the information exists does not necessarily mean different entities will improve their ESG performance – it must also be used productively to this end.



The valuation of impacts, along with implementation of coherent policies and effective institutional structures, will be key enablers of a rapid transition. Rewarding positive – and punishing negative – ESG performance can be achieved through 'forced' regulation, and to some extent also be driven by investors and consumers. But a much more powerful tool to cause organic changes in behaviours and decision-making is the introduction of direct incentives to align financial and ESG performance at the roots of the system; which, of course, can only occur when data is available. (One can imagine the changes that would come to Amazon's delivery practices, for instance, if its use of packaging materials were measured and there were direct incentives to reduce this.)

Critically, access to consistent ESG data would therefore also enable policymakers to introduce incentives and other mechanisms to align ESG and financial performance, which would truly shift the needle much closer to where it needs to be. This is all the more important given the short time we have left to transition.

Existing work could also be leveraged to this end. An example is the **Value Balancing Alliance (VBA)**, a corporate-led group which aims to translate environmental and social impacts into comparable financial data by embracing the two major perspectives on value: value to society and value to business.^{77,78} VBA hopes this can drive a move from *profit maximisation* to *value optimisation*.

Moreover, linking ESG and financial performance is certainly not a new concept, and in fact has already been quite widely adopted in the sustainable finance market in the form of KPI- or performance-linked instruments.

Performance-linked instruments

As opposed to financing a specified pool of assets and projects, Sustainability-Linked Bonds (SLBs) and Sustainability-Linked Loans (SLLs) are tied to meeting one or more predefined, time-bound KPIs related to wider sustainability performance targets at the entity level. In principle, there are few restrictions on how the issuer spends the funds raised; so long as the performance improvements are verifiably achieved and steady progress towards them is made over time.

SLLs are currently much more common than SLBs. An example of the latter is the General Purpose SDG-Linked Bond issued by Italian energy utility Enel, a seasoned green (use-of-proceeds) bond issuer, in September 2019. To avoid a step-up of the bond's coupon by 25 basis points, the company has committed to increasing its installed renewable generation capacity to 55% of its total capacity by the end of 2021.

SLBs and SLLs are a valuable addition to the sustainable finance landscape, particularly in enabling entity-level transitions. Climate Bonds' breakthrough *Transition Principles* and associated *Financing Credible Transitions Whitepaper* start to iterate guidance around transition definitions and appropriate levels of ambition, whereas ICMA's *Climate Transition Finance Handbook*⁷⁹ lays out useful preliminary guidance around the issuance process.

As the promising development that they are, Climate Bonds is planning to start tracking performance-linked instruments more comprehensively in the near future. However, according to our knowledge, their scope is still limited in three important ways:

- A variety of KPIs covering different themes is sometimes used, but there still seems to be an over-reliance on climate and GHG emission performance, i.e. not built to drive positive impacts holistically
- The outcome is still binary (i.e. there are only two possible outcomes and achieving a single minimum threshold is enough)
- The variation in interest rates is low, so the incentive is limited

The creation of a common and comprehensive sustainability reporting framework has the power to solve the first two, and to lay the foundations for incentives to become more material. It can also ensure that incentives exist for entity-wide financing, not just for particular instruments.

Getting there: the paradigm shift

To achieve these objectives, **a paradigm shift needs to happen in how we understand and view life, evolution and the relationships between each other and our environment, and how that translates into the systems we build and use.**

Most of us are aware that there needs to be a shift in the way we do things, but what we mean by this varies considerably.

Within sustainable finance, there is a lot of work around transition, Paris alignment, net-zero, sustainability, and other related concepts. Several countries now have net-zero targets, most with a 2050 horizon.

However, there is still no real roadmap – certainly at a global level – for how to make those changes happen, and our failure to reduce GHG emissions worldwide over the last decade (along with other drivers of environmental stress) suggests that more structural changes are necessary.

The EU has been a clear leader, doing groundbreaking work to identify green assets and key priority areas, and sending clear market signals that these will be favoured through various programmes. Its reporting directives will drive more consistent sustainability reporting in the EU and could form the basis for a global framework. The creation and adoption of the EU Taxonomy among various market participants is another notable development, representing the first real attempt to map sustainable activities economy- and region-wide (although the focus is still on those with positive *environmental* impacts, and eligibility is binary).

To a large extent, we need to take a few steps back to engage the right mindset and philosophy, before deciding exactly what we want and how to get there.

Addressing the root cause(s)

To successfully solve problems, we need to tackle their root cause(s).

In the case of the environmental degradation (and many social issues) resulting from human activities, this largely stems from a misled view that humans are external to – even somehow above – Nature, which results in a failure to assess, monitor and value 'external' impacts.⁸⁰

Market forces capture the private costs and benefits of production and consumption, and very effectively at that. Yet they do not consider public costs and benefits, which are termed 'externalities' in economics and largely excluded as factors in decision-making.

Some people tend to think of externalities as only existing when there are clear impacts on external parties, such as smoking and significant

pollution; but the truth is, every single activity has externalities that are not captured by market forces. We live in an interconnected world with shared resources, so there is always some degree of external impact. And to treat these as external is to misunderstand reality.

'Tug of war' dynamic

Due to this, attempts to solve ESG problems without addressing the disconnect that often exists between financial and ESG performance create a 'tug of war' dynamic, whereby ways to achieve higher financial returns (at least in the short-term) are frequently at odds with ways to improve ESG performance.

When there is a disconnect, financial considerations almost always win, and this is not surprising. More enlightened companies may see the long-term value in improving their ESG performance even if it means foregoing returns in the short-term. But companies cannot reasonably be blamed for their negative impacts if they operate within a system that often rewards these, and where short-term performance rules. Like people, companies do not want to harm the environment, but it becomes hard to avoid if it is profitable to do so and they can get away with it (e.g. due to lack of monitoring or sanctions).

For the most part, existing policies do not address this dichotomy, failing to challenge the fundamental drivers and dynamics of organisational decision-making.

Economy is man-made: we can change the rules

If external impacts were captured by market forces, goods with net positive externalities would be priced lower than they currently are, and goods with net negative externalities would be priced higher. Consumption levels would therefore be different, and financial performance would be more – perhaps even fully – aligned with the common good.

At present, there are already technical solutions in some activities with lower or no negative external impacts that are not adopted due to cost barriers. The same happened with various forms of renewable energy production, which are fortunately now becoming cost-competitive (even cheaper) versus fossil fuels in many parts of the world.

But not adopting 'positive' technologies due to economic reasons is like saying we cannot turn the steering wheel of a car heading towards a wall. Unlike the laws of nature, which we cannot change, economic systems and economic rules are man-made, and can be changed in line with what we want to achieve. If they are currently leading to outcomes different to those we want, we can design and implement rules that tilt the playing field towards the outcomes we do want.

An economic system is essentially a 'game' – a game designed by us which we can change the rules of.



Principles for a solution

Given the impracticality of having all parties affected by externalities involved in each transaction, and the unrealism of expecting private agents to consider external impacts above their own needs/wants when these are at odds with each other, we must find ways to make sure 'external' impacts are incorporated into economic decisions and activities.



Engage internal forces

External regulation, such as fines for using slave labour or for dumping toxic waste into a river, can play a role. But the most successful systems in nature, including organisms, operate differently: they grow naturally. 'Growing' (from the inside out) is different to 'making' or 'enforcing' (from the outside in).

Our aim should therefore be to create a system that allows entities, as well as entire societies, to develop organically in ways we deem positive – for example, by introducing smart, coherent and inclusive incentive structures aligned with what is 'good', encouraging economic 'players' to improve their behaviour and impacts continuously, no matter where they sit on the scale (versus specifying what is 'good' and 'bad' in a binary fashion, and forcing behaviours correspondingly). The world is not binary, and neither is impact.

Use continua that reflect reality

Language and semantics play a big role in our understanding and perception of the world, including how we process information and find solutions to problems. The use of names and labels, for instance, is a tool that enables us to make sense of reality and communicate with others.

But reality is much more complex and nuanced than this. When we say something is 'green', 'sustainable' or 'responsible', we are implicitly using a binary threshold to determine this, and a degree of granularity is actually lost in that classification, since it is not an accurate reflection of the real world, simply an approximation to aid our understanding and perception. In reality, 'good' and 'bad' – and greenness, responsibility, sustainability – exist on a continuous scale, not an 'either-or' basis.

Going forward, our aim must be to find ways of framing transition, sustainability, responsibility and other related concepts as spectrums that reflect reality. Instead of starting by defining 'good' and 'bad' via hard thresholds, we should think in terms of **the criteria that should define 'better' to 'worse' continua**.⁸¹

An entity can then say: with this project/ investment/product etc we are aiming for an X% improvement in our GHG emissions performance (from X1 to X2), a Y% improvement in our water use (from Y1 to Y2), a Z% improvement in our

worker satisfaction or gender ratio (from Z1 to Z2), etc. Financial instruments can also be built around this performance, with sustainability considerations permeating finance and without the need for fixed labels (see below). Of course, in parallel, or at the end, an assessment can be done of how much of an economy, sector, portfolio is aligned against different definitions/ thresholds/goals (e.g. 'green' or 'Paris-aligned') – in other words, 'good' and 'bad' can still be defined for particular purposes based on measurements on the continua.

Labels are an interim tool

Many efforts to promote more sustainable and responsible outcomes, certainly in the world of finance, have done so through specific labelling and taxonomies. The rise of labelled instruments in the last decade or so has been a very positive development and helped to mainstream sustainable finance, and will be further supported by the EU Taxonomy.

But if we are successful in creating a new system designed for positive impact, the need for binary labels and eligibility disappears, because sustainability/ESG considerations become an intrinsic part of everything we do.

Limitations most visible in 'transition'

The problems arising in trying to properly define a 'transition' label illustrate the limitations of labels better than any other, since unlike a 'green' bond financing specific projects or assets that meet a minimum threshold, transition is about change over time. It is about relative improvements, and as the discussion on relative metrics has shown, it is hard to harmonise relative impacts – in fact, the issue is compounded in creating a transition label, because while different green bond issuers/ projects can assess relative metrics with common baselines (e.g. average grid emissions in country X), 'transition' is even more at the entity level, and assessing it must be based on performance improvements *within that entity* (i.e. even more context-specific, and even harder to harmonise) as well as against national/sectoral standards or trajectories.

Several initiatives globally focus on defining appropriate trajectories. Examples include the Science Based Targets Initiative (SBTi), Transition Pathway Initiative (TPI), Assessing low-Carbon Transition Initiative (ACT Initiative), and the Rocky Mountain Institute. Much progress has been made on this front, which can inform the development of transition-labelled instruments; yet this is still only looking at decarbonisation pathways, not the many other sustainability/ESG dimensions that also require improvement.

Climate Bonds has also produced some breakthrough guidance on what constitutes

a credible transition under a framework that highlights the need for ambition, flexibility and inclusivity.^{82,83} This is already helping to inform the use and understanding of transition labels among issuers and investors – but the end goal is for the principles of transition to apply across all projects, activities, entities, industries and by definition financial instruments, because ESG performance can always be improved, and we should be aware of this to avoid being limited by fixed labels and binary assessments.

The **principle** of tying financial to ESG performance, which for example exists with performance-linked instruments, likely provides the best way to drive entity-level transitions – however, as we mention the previous page, in the case of KPI-linked instruments it must incorporate more sustainability factors, more granularity in performance assessments, and more significant incentives, as well as extending to entity-level financing (not only a particular instrument). And even within thematic UoP instruments, a similar principle could be employed through a 'shades' approach.

Principles and values come first; metrics, milestones and targets last

In this light, building a framework around achieving a particular outcome – such as net-zero or 2°C warming – is bound to a) deprioritise other sustainability aspects that are also important, and b) limit ambitions to achieving only that goal, remaining on a predefined trajectory which will often be achieved at best. It is also a more brittle approach, in that specific goals or milestones are likely to evolve and this requires reshaping the framework or system.

If instead we define adequate criteria based on the principles and values we hold dear (the 'axes of progress', which could be closely related to the SDGs), along with what direction in each constitutes progress, we can achieve more in less time, while still being able to set goals/milestones and track performance towards them. Of course, this rests on devising suitable indicators to measure the performance in each; but there is already much to go on (including the findings from this report), and under a versatile framework we can achieve harmonisation without losing detail and context. This is the central idea behind the framework discussed since pages 41-44.

For instance, given that we value the reuse of materials, this could be one criterion (or sub-criterion within 'circular economy'). Agreeing that a higher rate of reuse is better, we could introduce broad metrics to track progress *that directly reflect this*, which may be followed by more specific, context-dependent ones. The setting of targets comes at the end, and may

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include a classification based on a level of reuse that is 'good enough' (i.e. meeting a minimum threshold) in the interim; but this should merely be an indicator, and the granularity of the actual measurements should not be lost.

This path mirrors the more suitable approach to education; it is better to teach children the principles to allow them to make good decisions and become good people, rather than creating a catalogue of all possible situations/decisions, defining which are good and which are bad, and building the education process around achieving a specific target or meeting a threshold. The former offers a stable, versatile and resilient approach, built for complete and continuous positive development.

Summary: impact at the core

The widespread availability and use of consistent, holistic ESG data will allow 'impact' to transition from being on the periphery of economic decision-making, or at best in parallel with financial factors, to being at the core of an economy's purpose and real value creation. **This is the paradigm shift that needs to happen.**



As discussed above, it is unreasonable to expect impact/ESG considerations to consistently replace financial ones, and that is not what this means; rather, **the aim is to develop a system where impacts are aligned with financial returns, namely by assessing performance based on real value across all forms of capital and introducing incentives – feedback loops – that reward improvements in impact/ sustainability/ESG performance** (even if not perfect at first).⁸⁴

These incentives could potentially involve variable taxes (e.g. corporate, VAT) and interest rates (the latter is already being tried with KPI-linked instruments, albeit to a limited degree), as well as other innovative mechanisms and policies that have yet to emerge. Holistic sustainability/ESG performance determines real value creation, which means an organisation with better performance creates more real value, leading to lower costs and greater benefits at a societal level; very likely, it therefore makes sense that it should face lower costs to operate, invest and grow (and vice-versa for organisations creating less value).

Improvements in our ability to monetise different impacts and understand real value, such as through the work of the Value Balancing Alliance, are also promising. Such tools could, for example, be employed to determine appropriate magnitudes of incentive mechanisms, although this approach is likely to face limits in some areas given that it is hard, if not impossible, to properly value all of Nature. As a whole, one could argue the value of Nature is infinity, since

life is not possible without it – and if so, the value of a forest, a river, an ecosystem should also be approximated to infinity, because the Earth is one organism and all its components are interconnected, such that destruction to one will contribute to, and at some point directly lead to, a breakdown of the whole system. This is a macro, top-down approach to understanding natural value that is at odds with the bottom-up, reductionist approach that has influenced much of our education and understanding, but is very important to keep in mind.

The key, however, is that signals are introduced to encourage economic actors to improve their performance in the right direction, even if the magnitude is not perfectly accurate. Ultimately, ESG considerations must permeate all entities, activities and instruments, with all of finance responsible and sustainable, designed for positive transitions economy-wide.

Only with such a paradigm shift will progress towards achieving climate goals and the broader SDGs significantly accelerate, particularly if coupled with measures that facilitate improvements in sustainability performance, such as access to information and coherent, well-functioning institutional frameworks aimed at delivering the common good.

The broad developments needed to put 'impact' at the core of organisational decision-making can hence be summarised as:

- 1. Create a framework to assess impact/ sustainability/ESG performance holistically**, defining suitable criteria to be measured on 'better-to-worse' continua and building on the rich existing wealth of approaches, initiatives and tools
- 2. Implement clear methods to measure and monitor performance across all activities/entities**, and where viable normalise data to allow comparisons; introduce granular classification systems
- 3. Develop a platform for comprehensive, consistent and transparent disclosure**, ideally available to everyone and including an 'economy map'
- 4. Identify priority areas, set goals, track progress** across entities/sectors/regions, and **implement coherent policies, initiatives and institutional frameworks** accordingly
- 5. Introduce incentives that align financial and ESG performance and act as a signal**, relevant to all entities no matter where they sit on the scale⁸⁵
- 6. Transparently monitor, discuss and refine** as required

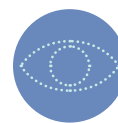
Final remarks & food for thought

The points raised throughout much of this section have ventured far beyond post-issuance reporting in the green bond market, but they follow naturally from the discussion of impact reporting and its application beyond UoP instruments.

Overall, in order to achieve a real transition economy-wide, we need to put impact and real value at the core of the economy's purpose – in fact, this may represent a useful way to frame human evolution more broadly.

Seeing the bigger picture

This is not about achieving net-zero, carbon- or climate-neutrality, limiting warming to 2°C, or indeed being sustainable.⁸⁶ It is also not about growing green finance, sustainable finance, transition finance, etc. Those will come naturally, but this is much broader.



The big picture is about integrating green, sustainability and transition factors/principles throughout the economy, and by definition finance. It is about addressing the root causes of environmental – and social – degradation by changing the fundamental rules that drive this under the current set-up, which requires centring progress around positive impact.

This is not down to any one entity or group. It involves (re)designing our market system at the core to create a purpose-drive economy that expands the common good indefinitely, which in turn will allow us to reach net-zero, carbon-neutrality, <2°C warming and other related targets, and faster than under current trajectories – but also much more beyond them, in a process of continuous evolution to get ever closer to a 'perfect' world. To a large extent, **quality** (of life, work, products and their impacts, etc) is the metric that must become a guiding force economy-wide, because quality reflects what is 'good' in a certain context; we just need to define what we mean by it, i.e. the criteria along which good/better and bad/worse can be assessed.

Until now, we have failed to properly define what the purpose of our economic system is, and making money became it.⁸⁷ Yet money is merely the flow that enables the system to operate and develop, much like the blood that flows through our bodies allows our body to function – it is the means, not the end.

Allegory of the cave

It is easy to lose sight of this. The subjective nature of perception can cause deep-rooted misconceptions, famously illustrated by Plato's allegory of the cave. As alluded to earlier, this can also be observed by much of the language

we use. The fact that ‘externalities’ are called as such in traditional economic theory reveals a fault in thinking, because they are swiftly treated as external to economic decision-making despite being directly related to the common good, and the long-term ability of the system to survive (let alone thrive). Equally, GDP growth is still widely used as an indicator of economic progress, despite being widely known to be an inaccurate measure of value that ignores many important aspects.

Another example is the common expression ‘the fight against climate change’. Its use is deeply misleading, pointing to a) a fight, where in reality it is a change in our own behaviour that needs to occur, b) climate change as the enemy, where in reality the problem is the system we have created and our own impact, not the fact that nature has self-regulating mechanisms such as a changing climate.

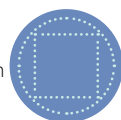
We therefore need to take a step back and see the big picture, which is that we are a part of Nature, not external to it in any way. We need to look at the problem and its root causes (more objectively, understanding the role of our system and its mechanics in driving it; and we need to be clear about what we want to achieve as a society and species.

Making systems work for us

Economic systems are man-made, and we can adjust them.

We can define new rules in line with what we want to achieve, such as the ability for everyone to meet basic needs, a clean and biodiverse world, health, justice, greater equality, more decentralised power, etc – the SDGs reflect much of this. If our systems are not designed to deliver these goals (and broadly they are not), they must be redesigned, or indeed designed in the first place. Evolution is an unstoppable and continuous force, and change is the only constant.

Furthermore, and perhaps as a reflection of the reductionist approach to understanding the world that has pervaded much of science, we tend to find solutions to problems with a ‘black-and-white’, ‘either/or’, binary mentality. Yet, in complex problems especially, the answer is often ‘both’ (or ‘it depends’), and the key principle is balance.



In trying to meet people’s needs, two main market systems have been attempted:

- **Capitalism**, which stresses private ownership, and private costs and benefits
- **Communism**, which stresses the common good, and public costs and benefits

Left on its own, neither one works. Recent (post-WW2) history suggests capitalism is better, but a system that leads to its own destruction cannot be considered successful.

Although a simplification, the reason is that to a large extent both are unidimensional, one only considering the ‘individual’ and the other only the ‘collective’. Mirroring healthy systems in nature (the principle of biomimicry), what we need is to drive the *common* good while meeting the *individual* needs of entities and people. The key is that individual needs are met in a way that is ultimately positive for the system overall.

A fresh, multidimensional and inclusive approach

It is therefore time to try something fresh – a multidimensional approach that marries both the individual and the collective in its intrinsic design,

as well as the full range of impacts that activities can have. For lack of a better term in the interim, and in the spirit of this paper, call it ‘impactism’ (realistically, ‘multicapitalism’, ‘holism’ and ‘earthism’ might be more suitable).

The central idea is that what are currently ‘external’ impacts should be measured and valued, such that they can be a factor in decision-making along with private costs and benefits. If they become integrated, the combination of competitive market forces and feedback loops can drive the creation of the world we truly want, with positive impact and real value creation as the guiding forces.

A healthy – high, but not too high! – degree of **diversity** is a fundamental characteristic of well-functioning systems. We thus need a healthy diversity of organisations providing goods and services, but in terms of system structure and architecture, we need **unity**: a single yet versatile framework that is applied economy-wide.



This requires a common language built on common goals: just like the laws of Nature, one set of rules designed to achieve progress and health for the system – or organism – as a whole.

In this context, perhaps the thoughts presented in this report can form the basis for a new impact-based economy to emerge; one that addresses the fundamental role that private market dynamics have played in driving crises.

However, even if implemented perfectly, they will need to be complemented by other measures, namely on the social and institutional front. For example, mechanisms to decentralise power, encourage collaborative and responsible consumption, broaden ownership structures, and limit inequality / distribute wealth are needed – the latter will be particularly relevant in the ‘age of automation’, as many people may lose jobs and capital may become even more concentrated if left to free market forces (closely related to the concept of ‘just transition’).

Needless to say, measures of systemic progress must also evolve far beyond current ones (such as the highly limited GDP). As highlighted in the Dasgupta Review, they could involve inclusive measures of wealth and all forms of capital, one of which is of course natural capital.⁸⁸ But they should also include direct measures of wealth distribution and of how well the needs of different groups are being met. In addition, under a framework that measures sustainability performance in a holistic and standardised way for all entities, assessing average, median and variance scores would be possible, and could also provide useful metrics to determine progress.

The lack of a working framework, and/or inability to measure and monitor performance, may have been key factors why this has not happened yet. If so, no longer can they be used an excuse. Our generation has an incredible potential to create a beautiful system and a beautiful world; and we have all the tools needed, we just need to agree and deliver.

7. Conclusion

Findings overview

The main findings of our research are broadly similar to those in our 2019 paper.

The availability of post-issuance UoP reporting in the green bond market is widespread, and impact reporting is not far behind. The share of issuers reporting has increased versus the early stages of the market as well as in recent years, particularly for impact reporting. Some aspects of reporting practices have also evolved, albeit not drastically.

While there are naturally variations in the availability of reporting by region, issuer type, deal size etc, it is rare to find any segment of the market which has more non-reporting than reporting issuers. The lowest shares of reporting are observed for deals without an external review, deals under USD100m, and deals from African issuers.

One area for improvement is the availability of impact reporting in the USA, particularly among municipal issuers – many of these are small, but greater availability and consistency of impact data would nevertheless be positive, and several resources to support issuers do exist. The USA is the largest issuing nation of green bonds, so this is an important aspect that we believe will improve as sustainable finance develops further in the country under the Biden Administration.

The quality and consistency of reporting vary considerably by issuer. This is driven by differences in the accessibility, clarity and granularity of information, as well as in the use of methodologies for impact reporting. Impact reporting practices in particular still vary considerably between issuers.

The average quality of reporting is similar to in our previous study, but the quality is generally still increasing, as there are fewer low-quality reporters. For example, more issuers now have dedicated webpages to make documents more easily available, more produce separate green bond reports or standalone sections within annual, sustainability or CSR reports, and more report at project level.

Overall, while the availability of reporting in the green bond market is relatively high, there is often less attention placed on the quality of that reporting. Indeed, Climate Bonds' post-issuance research and analysis is partly motivated by this, since it is lacking from other organisations, especially at a global scale.

Evolution of impact reporting

Within UoP instruments

Despite the evolution of green bond reporting practices over the years and the resulting rich landscape that currently exists, improvements in green bond post-issuance reporting are still necessary, and there is a long way to go until reporting is available across the board in a consistent fashion. **The real evolution, we believe, is yet to come.**

This is hardly surprising, given the fragmented nature of reporting up to now. In the absence of a common framework to report within, issuers must independently plan, create and publish green bond reports.

The way to increase the availability, quality and (crucially) consistency of reporting is to create a common reporting framework, so that issuers know exactly what and how to report – the EU Green Bond Standard, which already requires UoP and impact reporting, may have the potential to deliver this by setting more structured rules.

In parallel, a **centralised reporting platform/database** accessible by a range of stakeholders would be immensely valuable, particularly for investors – several are under development in different parts of the world, but there does not yet seem to be a plan to create a comprehensive, global product. Through collaboration with others, Climate Bonds is planning to expand work in this space.

However, even if such a platform is successful, the current approach to measuring green bond impacts is incomplete and not fit for future: **to obtain a real and full picture we need to assess holistic impacts, use absolute – not relative – metrics, and look beyond UoP instruments for entity-level assessments.**

Beyond UoP instruments: economy-wide

There are growing calls for globally consistent, comparable, and reliable sustainability disclosure standards. In particular, **there is an urgent need to develop a framework/platform for impact measurement and reporting that is adopted economy- and planet-wide and:**

- **Transcends UoP** instruments and projects
- Assesses **all ESG/sustainability factors** in a holistic and absolute way
- Provides **spectrum-based** assessments (i.e. on a scale/continuum), not binary
- Is **versatile**, being able to frame impact at various levels and for various instruments
- Is used to assess the impact of **all entities** (and therefore also all projects/assets)
- Has **transparent monitoring and disclosure**, ideally available to everyone

However, while access to holistic, consistent and reliable data is necessary, it is not sufficient to deliver all of its potential benefits and to enable a rapid transition. The valuation of impacts through coherent incentives and institutional structures is key.

Economic systems are man-made, and we can adjust them. **In order to achieve a real, robust and rapid transition economy-wide, we need to create a purpose-driven economy, with impact at its core.**

This is not about being sustainable, achieving net-zero, or indeed limiting warming to 2°C. It is much broader. It is about redefining the core purpose of our systems so that positive impact is the guiding force of progress, which in turn will allow us to reach those targets, and much quicker than under current trajectories – but also much more beyond them, in a process of continuous evolution to get ever closer to a 'perfect' world.

Best practice recommendations for issuers

Below is a comprehensive list of recommendations for issuers to improve the quality of reporting. However, the key is to provide comprehensive, clear and granular information on the use of proceeds and impacts in an easily accessible and timely manner.

Communicate commitments and location of reporting clearly at issuance, and provide post-issuance reporting in line with this

- However, issuers should still strive to report as much relevant information as possible regardless of previously made commitments (e.g. if possible, report impacts too even if only UoP reporting was planned at issuance)
- If expanding the scope, update frameworks and maintain this for future bonds

Provide clear and easily accessible information

- Create a dedicated, easily accessible page for all the information and documents related to green/sustainable finance
- Publish separate green bond reports (either individually for UoP and impacts, or combined), as this makes it much easier to obtain the relevant information. If provided within annual, sustainability or CSR reports, create dedicated, clearly labelled sections
- Less is more: one or two documents are typically enough, more can be confusing

Provide bond-level information,

where possible

- Repeat issuers should report at bond- rather than programme-level, so that the information can be traced to a particular deal
- However, also provide summary figures at programme/portfolio level (for data that can be aggregated, such as allocations and impact metrics with a common methodology)

Provide project-level information,

where possible

- However, ideally also provide summary figures at category and/or total bond level (for data that can be aggregated, such as allocations and suitable metrics, i.e. absolute or with constant methodology)

Clarify all relevant pieces of information, such as:

- Shares attributable to green bond financing (e.g. due to multiple sources of financing)
- Shares of refinancing
- Balance of unallocated proceeds, ideally with expected allocation if known
- Relevant time periods (e.g. report coverage, project(s) construction/operation and impacts)
- Relevant dates (e.g. report publishing, proceeds allocation, impact data measurement)
- Actual (ex-post) vs. expected (ex-ante) impacts
- Measured vs. estimated impacts

Within impact reporting specifically:

- Include at least one (ideally more) commonly used metrics for each project type, such as those suggested in the ICMA Harmonized Framework and NPSI Position Paper
- For relative metrics (e.g. GHG saved), use consistent baselines / benchmarks as much as possible, and make these clear

Absolute metrics (e.g. GHG emissions) are arguably better, and may be as an intensity (e.g. per m²) – but until they become commonplace and ‘gain meaning’ (likely only when consistent sustainability reporting exists economy-wide), relative metrics will still be useful

If possible and relevant, issuers should strive to report both until then, e.g. energy use (absolute) along with energy saving (relative), and any relevant benchmark (e.g. national average building energy use per m²)

- Where possible, use at least one ‘common’ unit per metric and/or provide conversion factors, and report in absolute units (e.g. kWh) alongside any relative ones (e.g. %)
- Reporting intensities (per unit of output and/or currency) is often helpful, but should still be accompanied by total impact
- Conduct ex-post assessments in addition to ex-ante estimates, where possible
- Report the correct, pro-rated share of impacts where relevant, or at least provide the necessary figures to perform the calculation
- Aim for consistency

Explain own methodology and any external ones used, especially for impact reporting

- Describe key attributes of any external methodologies used (focusing on relevant sections), along with an explanation of how they were applied
- If longer, can be an ‘appendix’ within green bond report(s) or as a separate document, as long as clearly referenced and accessible
- Include any external data *sources* used

Offer the ability to export/download data, e.g. in Excel format

Provide qualitative information and context alongside quantitative data, to contextualise projects and provide more robust impacts

- Case studies are useful, especially when many projects/assets are financed

Report in a timely fashion, ideally within one year of issuance and annually thereafter (for as long as relevant)

Report in English alongside any local languages

Include the details of the bond(s) issued on the webpage, and those included in each green bond report

Obtain and disclose external reviews, including at the post-issuance stage (e.g. audit) and ideally covering both UoP and impact verification; this increases the reliability and robustness of reporting

Strive to maintain consistent location of information, presentation format and coverage, although improvements are of course welcome

Provide other supporting information, such as contextualising the bonds within a **sustainability strategy**, identifying **contributions to the SDGs** and reporting **alignment with the EU Taxonomy** (ideally supported by a calculation methodology), all of which are increasingly valuable to investors

Provide relevant contact details

Appendix 1: Research methodology

Research universe

This report is based on a review of all green bonds issued between November 2017 and March 2019 included in the Climate Bonds

Green Bond Database (database methodology available [here](#)), a process which involved a dedicated team and several months of work during 2020.

Bonds that matured by April 2020 were removed from the research. Consequently, all amount figures refer to the amount issued for outstanding bonds only.

However, loans and securitized instruments were excluded due to their different practices and requirements. Green loans should still provide post-issuance reporting, but we are typically not able to verify this as it is usually done privately with lenders; for example, in our previous report only one of six had publicly available reporting (Contact Energy), because it was Certified under the Climate Bonds Standard. On the other hand, for debt secured on green assets – such as Fannie Mae’s green MBS – the proceeds are allocated to the collateral pool in full at issuance. Post-issuance UoP reporting is therefore not required, although issuers may still report on the impacts achieved.

This yields a research universe of 694 bonds from 408 issuers worth USD212bn. Apart from the number of bonds, this is similar in size to our 2019 report (1,905 bonds from 367 issuers totalling USD281bn), which covered deals issued up to November 2017. The large drop in deal count is due to the upfront exclusion of securitized deals this time around, which meant the prolific issuance under Fannie Mae’s green MBS programme was excluded (in practice, most of our 2019 analysis also excluded securitized instruments).

NB: We are hoping to look at post-issuance reporting among other sustainable debt instruments (namely social and sustainability bonds, given the upcoming launch of the Climate Bonds Social & Sustainability Bond Database) in the future.

What is meant by “reporting”?

Post-issuance reporting includes all the **publicly available** information on a green bond’s UoP and environmental impacts after the bond has closed. Information sources include bespoke green bond reports, annual reports, CSR/ sustainability reports, etc.⁶⁹

‘Reporting’ can thus refer to UoP, impacts, or both combined. For the purposes of this report, ‘reporting’ is defined as UoP disclosure, since this is the main requirement for issuers in the thematic debt market (although impact reporting is also expected).

If a bond only has impact reporting in place, it is therefore considered non-reporting (in practice, very few deals fall into this group). The exception is, of course, in the ‘Impact reporting’ section.

In some cases, such as private placements and loans, reporting may be shared privately with investors. We made a note of cases where issuers stated this, but deals with non-public post-issuance reporting are considered non-reporting in our research and analysis.

In addition, the analysis is based on what was available at the time of the research, the bulk of which happened in Q2 and Q3 2020 to allow just over a year for the last included deals to provide post-issuance reporting. This gives most, but not the latest, deals a two-year time frame to report, which is the maximum recommended by the GBP.

This approach means a deal was considered non-reporting if reporting was not available when we checked for it (also applies to accessibility, i.e. if the issuer’s website and/or documents were unavailable). In practice, the vast majority of non-reporting issuers have now made reports available, mostly within the period recommended by the GBP.

This suggests any greenwashing in the market is negligible, and the fact that no deals were excluded from our Green Bond Database based on the post-issuance research highlights our robust database methodology and the fact that issuers genuinely finance green projects/assets.

While we rely on a quantitative analysis, the results are overall intended to be indicative, helping to inform and guide future market development.

Bonds, issuers or amount?

The data was analysed primarily in terms of two variables/metrics: **amount issued** and **number of issuers**.

As with all our reports, the amount issued (USD equivalent) was used since volume is widely employed as an indication of the market’s size.

The analysis also prioritises the number of issuers as this is arguably the fairest representation of reporting practices in the market and is not skewed by the effect of large issuers. In addition, it is preferable to number of bonds as many issuers report collectively on all their deals and it appears that decisions on reporting and its scope are taken predominantly at issuer level. Looking at number of deals also skews results toward more prolific bond issuers.

It is true that an analysis by bond count is better suited to uncover changes in issuer practices over time as each deal may be counted independently

– and indeed we do refer to number of deals occasionally in this report. However, the analysis period is relatively short, so changes in issuer practices are unlikely, and any that do occur are still captured by counting the same issuer across categories as relevant (e.g. a repeat issuer may be counted in both the USD0-100m and USD100-500m deal size ranges if applicable). Due to this, the sum of issuer counts may sometimes be larger than the actual total.

What about missing information?

If post-issuance reporting did not detail how unallocated proceeds will be used (most common), the unallocated amounts were assumed to be earmarked for investment across all eligible categories in equal amounts.

An adjusted approach was employed for repeat issuers reporting at programme level, mainly financial institutions. In the absence of bond-level data, we assumed that proceeds were spent in equal proportions for each of the issuer’s bonds – the same applies to impacts, which were prorated across multiple bonds when necessary.

Finally, as per our Green Bond Database Methodology, bonds used to finance energy efficiency projects fall in the category to which the investment is applied (e.g. Buildings).

Appendix 2: Climate Bonds Taxonomy

Climate Bonds Taxonomy

The Climate Bonds Taxonomy identifies the assets and projects needed to deliver a low carbon economy and gives GHG emissions screening criteria consistent with the 2-degree global warming target set by the COP 21 Paris Agreement. More information is available at <https://www.climatebonds.net/standard/taxonomy>.



ENERGY	TRANSPORT	WATER	BUILDINGS	LAND USE & MARINE RESOURCES	INDUSTRY	WASTE	ICT
Solar	Private transport	Water monitoring	Residential	Agriculture	Cement production	Preparation	Broadband networks
Wind	Public passenger transport	Water storage	Commercial	Commercial Forestry	Steel, iron & aluminium production	Reuse	Telecommuting software and service
Geothermal	Freight rail	Water treatment	Products & systems for efficiency	Ecosystem conservation & restoration	Glass production	Recycling	Data hubs
Bioenergy	Aviation	Water distribution	Urban development	Fisheries & aquaculture	Chemical production	Biological treatment	Power management
Hydropower	Water-borne	Flood defence		Supply chain management	Fuel production	Waste to energy	
Marine Renewables		Nature-based solutions				Landfill	
Transmission & distribution						Radioactive waste management	
Storage							
Nuclear							

Certification Criteria approved
 Criteria under development
 Due to commence

10/2020

Appendix 3: External review types

Pre-issuance review	Scope	Providers
Assurance	Positive or negative assurance on compliance with the Green Bond Principles (GBP) or the Green Loan Principles (GLP)	EY, Deloitte, KPMG, etc
Second Party Opinion (SPO)	Confirm compliance with GBP / GLP. Provide assessment of issuer's green bond framework, analysing the "greenness" of eligible assets	CICERO, Sustainalytics, DNV GL, Vigeo Eiris, ISS-Oekom, etc
Green bond rating	Rating agencies assess the bond's alignment with the GBP and the integrity of its green credentials	Moody's, S&P, RAM (Malaysia), R&I (Japan)
Pre-issuance verification	Third party verification confirms that the use of proceeds adheres to the Climate Bonds Standard and sector-specific criteria	Approved Verifiers under the Climate Bonds Standard
Post-issuance review	Scope	Providers
Assurance or SPO	Assurance of allocation of proceeds to eligible green projects	Audit firms, ESG service providers, scientific experts
Impact report	Reporting that seeks to quantify the climate or environmental impact of a project/asset numerically	As above
Post-issuance verification	Assurance against the Climate Bonds Standard, including allocation of proceeds to eligible green projects and types of green projects	Approved Verifiers

Appendix 4: Country/region ranking by average reporting quality score

The following table shows a country/region ranking for green bonds included in our analysis. The ranking is based on the average quality score (last column). Note that the reporting percentages refer to reporting on UoP (not impacts) and the data is as of the time of research.

Country/Region	No. of deals	No. of issuers	Amount issued (USDbn)	UoP reporting % (by amount issued)	Average score (for reporting bonds)	Country/Region	No. of deals	No. of issuers	Amount issued (USDbn)	UoP reporting % (by amount issued)	Average score (for reporting bonds)
Luxembourg	3	2	1.0	100%	23.0	Canada	20	13	8.2	96%	19.6
Denmark	4	4	3.2	100%	22.8	Supranational	63	10	14.9	94%	19.4
Finland	4	4	1.4	100%	22.8	Japan	41	35	6.0	88%	19.3
Poland	2	1	3.5	100%	22.0	South Korea	9	8	2.6	80%	19.0
Nigeria	3	3	0.1	44%	22.0	Mexico	5	5	0.8	45%	19.0
Namibia	1	1	0.005	100%	22.0	Austria	4	3	0.7	99%	19.0
Brazil	4	4	0.3	61%	22.0	New Zealand	3	3	0.3	100%	18.7
Peru	1	1	0.03	100%	22.0	Philippines	6	4	1.0	85%	18.6
South Africa	1	1	0.1	100%	22.0	USA	108	79	24.4	77%	18.1
Chile	2	1	0.1	100%	22.0	Switzerland	5	3	1.2	100%	18.0
Iceland	3	3	0.3	100%	22.0	Germany	22	14	9.7	93%	17.9
Italy	8	5	5.1	100%	22.0	Belgium	6	3	7.7	98%	17.8
Indonesia	5	4	2.7	72%	21.8	China	100	63	38.7	90%	17.8
Spain	15	9	9.4	81%	21.7	Taiwan	7	7	0.4	52%	17.5
France	41	17	24.0	68%	21.6	Colombia	2	2	0.1	81%	17.0
Netherlands	13	8	9.0	100%	21.5	India	8	5	2.2	74%	16.5
Australia	9	6	4.8	97%	21.3	Argentina	3	3	0.2	56%	16.5
Portugal	3	2	1.9	100%	21.0	Thailand	2	2	0.2	100%	15.0
UK	10	6	4.3	99%	20.3	Singapore	3	2	0.2	100%	13.0
Hong Kong	14	9	2.1	90%	20.3	Fiji	4	1	0.05	0%	N/A
Ireland	1	1	3.5	100%	20.0	Lebanon	1	1	0.1	0%	N/A
Lithuania	2	2	0.4	100%	20.0	Morocco	1	1	0.04	0%	N/A
Norway	15	11	4.9	99%	20.0	Seychelles	1	1	0.02	0%	N/A
Malaysia	5	5	0.4	54%	20.0	Slovenia	1	1	0.1	0%	N/A
Sweden	99	36	9.9	90%	19.6	Uruguay	1	1	0.1	0%	N/A

Appendix 5: List of (environmental) impact metrics identified

List of consolidated metrics organised by project category and classified as general/specificⁱ and absolute/relative metrics.

ENERGY		
Metric (consolidated)	General / Specific	Absolute / Relative
Area/length protected/conserved/managed/built etc	G	A
CO ₂ saved/avoided/reduced	G	R
Energy generated/produced/supplied	S	A
Energy saved/avoided/reduced	G	R
Energy used/consumed/intensity	G	A
Fossil fuel saved/displaced	G	R
GHG emissions/intensity	G	A
GHG saved/avoided/reduced	G	R
Grid/network losses/reduction in losses	S	AR ⁱⁱ
Number of units built/installed/renovated/connected etc	G	A
Pollutant reduced	G	R
Power capacity connected	S	A
Power capacity installed/added/managed	S	A
Waste saved/avoided/reduced	G	R
Water saved/avoided/reduced	G	R

BUILDINGS		
Metric (consolidated)	General / Specific	Absolute / Relative
Area/length protected/conserved/managed/built etc	G	A
Building certification - BCA GreenMark	S	R
Building certification - BREEAM	S	R
Building certification - CASBEE	S	R
Building certification - DBJ	S	R
Building certification - Energy Star	S	R
Building certification - Green Star	S	R
Building certification - LEED	S	R
Building certification - Miljöbyggnad	S	R
Building certification - NABERSNZ	S	R
Buildings share with LED lighting	S	A
Buildings share with smart meters	S	A
CO ₂ emissions/intensity	G	A
CO ₂ saved/avoided/reduced	G	R
Energy generated/produced/supplied	S	A
Energy saved/avoided/reduced	G	R
Energy used/consumed/intensity	G	A
Fossil fuel saved/displaced	G	R
GHG emissions/intensity	G	A
GHG saved/avoided/reduced	G	R
Number of units built/installed/renovated/connected etc	G	A
Pollutant reduced	G	R
Power capacity installed/added/managed	S	A
Recycling/recovery rate	G	A
Waste managed/processed/recycled	S	A
Waste saved/avoided/reduced	G	R
Water recycled/reused	S ⁱⁱⁱ	A
Water saved/avoided/reduced	G	R
Water supplied/treated/managed	S	A
Water used/consumed/intensity	G	A

i. Five specific metrics appear in more than one category (explained on page 23): energy generated/produced/supplied, power capacity installed/added/managed, waste managed/processed/recycled, water supplied/treated/managed and transport mode share/shifted/avoided.

ii. Very infrequent metric, not worth separating into absolute/relative (but mostly refers to reductions, i.e. relative).

iii. Refers to rainwater recycled/reused. Classified as specific as only seems to be relevant in Buildings (only reported by one issuer).

TRANSPORT		
Metric (consolidated)	General / Specific	Absolute / Relative
Area/length protected/conserved managed/built etc	G	A
CO ₂ emissions/intensity	G	A
CO ₂ saved/avoided/reduced	G	R
Congestion rate	S	A
Energy saved/avoided/reduced	G	R
Energy used/consumed/intensity	G	A
Fossil fuel saved/displaced	G	R
GHG emissions/intensity	G	A
GHG saved/avoided/reduced	G	R
Number of journeys/passengers made/added/shifted	S	AR ⁱ
Number of units built/installed/renovated/connected etc	G	A
Pollutant reduced	G	R
Recycling/recovery rate	G	A
Transport mode share/shifted/avoided	S	AR ⁱⁱ
Volume added/transported	S	A
Water used/consumed/intensity	G	A

WATER		
Metric (consolidated)	General / Specific	Absolute / Relative
Area/length protected/conserved/managed/built etc	G	A
CO ₂ emissions/intensity	G	A
CO ₂ saved/avoided/reduced	G	R
Energy generated/produced/supplied	S	A
Energy saved/avoided/reduced	G	R
Energy used/consumed/intensity	G	A
GHG saved/avoided/reduced	G	R
Number of units built/installed/renovated/connected etc	G	A
Number/share/area complying with standard	G	R ^{iv}
Pollutant emissions/discharge	G	A
Pollutant reduced	G	R
Supply autonomy/security	S ⁱⁱⁱ	A
Transport mode share/shifted/avoided	S	R
Waste saved/avoided/reduced	G	R
Water capacity installed/added/managed	S	A
Water quality measure/grade	S	A
Water saved/avoided/reduced	G	R
Water supplied/treated/managed	S	A

i. Depends (made is absolute, added/shifted relative), but infrequent so not worth separating.

ii. Relative to a given standard.

iii. Could theoretically be relevant in other categories (e.g. Energy), but most relevant in Water and only reported by one issuer (in 'hours of autonomy'), so classified as specific.

iv. Depends (share is absolute, shifted/avoided relative), but infrequent so not worth separating..

WASTE		
Metric (consolidated)	General / Specific	Absolute/ Relative
Area/length protected/conserved/ managed/built etc	G	A
CO ₂ saved/avoided/reduced	G	R
Energy generated/produced/ supplied	S	A
Energy used/consumed/intensity	G	A
Fossil fuel saved/displaced	G	R
GHG emissions/intensity	G	A
GHG saved/avoided/reduced	G	R
Number of units built/installed/ renovated/connected etc	G	A
Pollutant emissions/discharge	G	A
Pollutant reduced	G	R
Power capacity installed/added/ managed	S	A
Recycling/recovery rate	G	A
Waste capacity installed/added/ managed	S	A
Waste managed/processed/ recycled	S	A
Waste saved/avoided/reduced	G	R
Water saved/avoided/reduced	G	R
Water used/consumed/intensity	G	A

LAND USE		
Metric (consolidated)	General / Specific	Absolute/ Relative
Area/length protected/conserved/ managed/built etc	G	A
CO ₂ saved/avoided/reduced	G	R
Fire registered	S	A
Forestry goods produced	S	A
GHG saved/avoided/reduced	G	R
Land volume rehabilitated/managed	S	A
Number of units built/installed/ renovated/connected etc	G	A
Number/share/area complying with standard	G	R
Pollutant emissions/discharge	G	A
Water saved/avoided/reduced	G	R

INDUSTRY		
Metric (consolidated)	General / Specific	Absolute/ Relative
Energy generated/produced/ supplied	S	A
Energy saved/avoided/reduced	G	R
Energy used/consumed/intensity	G	A
Fossil fuel saved/displaced	G	R
GHG emissions/intensity	G	A
GHG saved/avoided/reduced	G	R
Hydrogen produced	S	A
Materials avoided	S	R
Pollutant emissions/discharge	G	A
Waste saved/avoided/reduced	G	R
Water saved/avoided/reduced	G	R

ICT		
Metric (consolidated)	General / Specific	Absolute/ Relative
Area/length protected/conserved/ managed/built etc	G	A
Energy saved/avoided/reduced	G	R
Energy used/consumed/intensity	G	A
CO ₂ saved/avoided/reduced	G	R

Endnotes

1. Grupo Altri, [Green Bond: Sustainable Finance at Altri](#), 2021.
2. Grupo Altri, [2020 Green Bonds Allocation and Impact Report](#).
3. Swire Properties, [Green Financing](#).
4. Swire Properties, [Green Bond Report 2020](#).
5. A closer look at Swire's impact reporting is provided on page 20.
6. Manulife, [2019 Annual Green Bond Report](#).
7. Manulife, [Making an impact with green bonds](#).
8. Danske Bank, [DB'S Green Bonds](#), 2021.
9. Danske Bank, [Green Bond Impact Report 2020](#).
10. Climate Bonds Initiative, [San Francisco Public Utilities Commission](#).
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12. It is very uncommon for issuers to report impacts but not allocations. The few cases are mostly refinanced projects for which UoP reporting is not necessary but the issuer disclosed post-issuance impacts, as well as one case of UoP disclosed privately to investors but impacts publicly.
13. Throughout this section, issuers were counted in multiple categories if relevant, e.g. due to different practices between different bonds, or due to changing practices between reports (e.g. if reporting impacts with different metrics).
14. The designation of either total- or category-level depends on the relevance of projects. If the impacts are reported for the total bond but only one category (e.g. Energy) is financed, 'Category-1' applies; if only one sub-category (e.g. solar), then 'Category-2'.
- For the 'Project-some' group, the implication is that while some impacts are project-level, the remainder are reported at category- or total-level. Nevertheless, a small number of issuers fails to do so, quite surprisingly providing impacts only for some projects and with the full impacts undisclosed. This was still considered 'impact reporting' within our research, but is certainly not good practice.
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16. Based on Building Energy Code 2012 Edition as baseline.
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18. Société du Grand Paris, [Investing in the Grand Paris Express](#), 2021.
19. Impacts for each project are generally annualised.
20. We defined these as any pollutants that are not considered GHG. Mostly they refer to some sort of air pollutant/particulate, but water pollutants/particulates/contaminants also appear quite often.
21. CO₂ equivalent.
22. Several issuers reporting CO₂e may only emit CO₂, but this was treated as a GHG metric due to the unit (it is rarely specified anyway).
23. >100,000 tonnes of CO₂e/yr for absolute emissions and >20,000 tonnes CO₂e/yr for relative emissions (positive or negative). The EIB's back testing of these thresholds has indicated that they capture c. 95% of emissions its project investments.
24. Relative metrics involve changes versus a baseline/threshold, such as amounts saved, reduced or avoided; absolute metrics do not, such as area/length protected, GHG emissions/intensity and resource use.
25. Defined as the "difference between the volumes of water transfer into the system and the volumes of water distributed", which results in an increase in efficiency.
26. The broader 'number/share/area complying with standard' metric includes raw KPIs not linked to water quality, such as the number of flood defences complying with safety standard.
27. In Water, pollutant reduced refers to water pollutants. In most other cases it refers to air pollutants only.
28. This is separate to assurance processes (such as ISAE 3000).
29. ICMA, [Impact Reporting](#), 2020.

30. [Nordic Public Sector Issuers Position Paper on Green Bonds Impact Reporting](#), 2020.
31. The use of methodologies by issuers is not always clear. In some cases, the issuer may have used one but we did not find this information.
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33. The data for Chinese methodologies is less reliable due to resource constraints and to some extent the language barrier. More issuers may use the methodologies we identified, as well as others.
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35. Green, social and sustainability (GSS) bonds.
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37. [LGX DataHub](#), 2021.
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44. Investors' corner (BNP Paribas), [An introduction to the SFDR](#), 2021.
45. Anthesis Group, [Mandatory Climate-Related Financial Disclosures for the UK](#), 2020.
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81. A 'shades of green' approach approximates this to some degree, although broadly still relies on threshold-based classifications, simply more of them.
82. Climate Bonds Initiative, [Financing Credible Transitions White Paper](#), 2020.
83. Climate Bonds Initiative, [Financing Credible Transitions: Summary note](#), 2020.
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85. Although potentially adjusted based on the relevance of each criteria, which will largely depend on the activity (e.g. biodiversity impacts will be more relevant for land use projects, whereas circular economy will be more relevant for high-street retailers).
86. Sustainability is broadly defined as 'meeting the needs of the present generation without compromising the ability of future ones to meet theirs'. It is therefore a minimum requirement of a successful system (i.e. a reflection, and one of the outcomes, of good design) – not its core or ultimate aim.
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89. Investor impact reporting is not included in the analysis, but is discussed in the 'What the future holds' section.



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