



ICE SUSTAINABLE FINANCE

Impact Bond Indicator ~Analysis of GPIF Portfolio~

July 2023



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1 Executive Summary

The Japanese Government Pension Investment Fund (GPIF) is seeking to better understand and report the Environmental and Social Impact of the investments within its portfolio. Intercontinental Exchange, Inc. (ICE) is assisting GPIF to achieve this through a detailed analysis of the Transition Risks and Opportunities of GPIF's portfolio.

In this report, impact from eligible green and social projects from GPIF's holdings of Environmental, Social and Governance (ESG) Impact Bonds is examined. To this end, a framework and methodology were developed to identify, assess, compare, and report the estimated Environmental and Social Impact across seven specific Impact Metrics, as well as providing an overall portfolio impact.

The analytical framework developed aims to provide GPIF with tools to assess the Impact Contribution of individual investments (Impact Bonds) across various categories of impact from Emissions Reduction and Renewable Energy Generation through to Social Impacts such as Job Creation.

Through a structured framework of standardization and normalization of numerous variables, including impact objectives of individual bonds, ICE performed a detailed analysis of GPIF's portfolio impact, in terms of US \$ amount invested.

The results of the analysis allow for a direct comparison regarding the relative effectiveness (impact per US \$ invested) of individual investments, which could assist GPIF with future investment decision making.

For context, the results for each of the Impact Metrics are also expressed in terms of real-world impact, highlighting the direct relative effectiveness of investments.

2 Introduction

2.1 What are Impact Bonds?

Impact Bonds are financial instruments (fixed income) that facilitate the capital raising and financing of projects which have specific aims and objectives to provide positive outcomes and benefits for society or the environment more broadly. Impact Bonds will tend to be issued for specific projects, either individual or multiple projects per bond, and will often have stated metrics against which the impact of the project being financed can be measured¹.

2.1.1 Classification of Impact Bonds

Impact Bonds tend to fall into distinct categories according to the type of project they are funding and the associated anticipated impact. The International Capital Markets Association (ICMA) provides frameworks for identifying impact bonds and provides definition for the different types of projects being funded by an Impact Bond. ICMA identifies three main types of Impact Bond categories:

Green Bonds - aimed at financing projects with environmental benefits, and projects consistent with a transition to a net zero carbon emissions economy.

Social Bonds - for funding socially sound and sustainable projects that achieve greater social benefits.

Sustainability Bonds - provide financing to a combination of both green and social projects.

A fourth category of Impact Bond, **Sustainability Linked Bonds** (SLBs), is considered out of scope for this analysis since the proceeds from SLBs tend not to be assigned to specific projects.

A similar classification of Impact Bonds to that defined by ICMA has been used for the initial identification and categorization process under this analysis. A deeper assessment of the objectives of the relevant bonds was then carried out to allow a more granular analysis of the specific types of impact, followed by a regrouping of the bonds into three main categories to provide a high-level summary. A detailed description of this process is provided below.

2.1.2 What Are Impact Metrics?

Impact bonds are issued to finance specific projects or groups of projects with the aim of delivering real-world positive outcomes. To measure the effectiveness and extent of the impact of these projects, specific performance related metrics related to the outcome or objective of the individual or pool of bonds (multiple bonds from an issuer, pooled together for reporting purposes) are often published during the lifetime of the bond. We refer to these metrics as Impact Metrics for the purpose of this report.

There are many different types of Impact Bonds with a variety of different Impact Metrics. These can range from emission reduction targets for green bonds to job creation for social bonds.

Impact Bonds can also have more than one Impact Metric if the real-world outcomes can be measured in more than one way, e.g. a decrease in non-renewable energy consumption can also be measured with a reduction of greenhouse gas emissions. The bond could also be used to finance projects across more than one category (Green and Social). Hence, the associated Impact Metrics of a bond can be diverse.

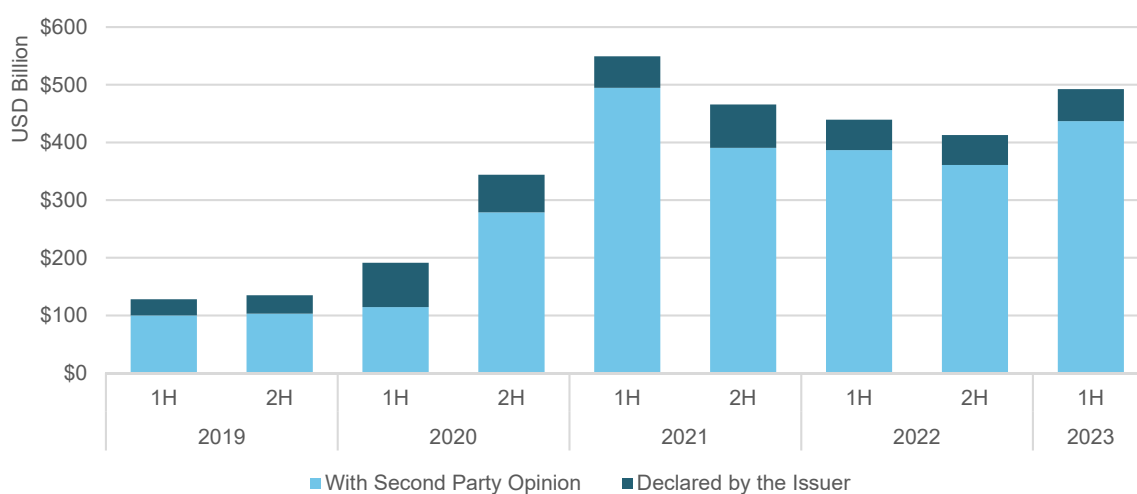
¹ <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/>

The Impact Metrics we have defined for this report should not be confused with Key Performance Indicators (KPIs) used for SLBs. While the KPIs for SLBs are used to measure the performance of the issuer of the bond in a chosen area, they can also affect the coupon or redemption rate of the bond. Hence, KPIs are very specifically defined and typically relate to a company’s broader performance, while the Impact Metric used in this report intend to capture the impact of the use of proceeds from individual Impact Bonds and their funded projects.

2.2 The Growing Importance of Impact Bonds

Global issuance of Impact Bonds has been growing in recent years, a trend that has continued into 2023. Indeed, Impact Bond issuance had a strong start to the year, with US\$487 billion of Impact Bonds launched in the first half of 2023. This represents 12% growth year on year².

Exhibit 1: Global Issuance of Green, Social and Sustainability (GSS) Bonds



Source: ICE Quarterly Impact Bond Report, June 30, 2023

² ICE Impact Bond Analysis Q2 2023, <https://www.ice.com/insights/impact-bond-report-q2-2023>

3 Screening GPIF Bond Universe

3.1 Overview

Screening of GPIFs universe of bonds was carried out to identify the bonds in scope for the analysis. The bonds in the GPIF portfolio were compared to the ICE Impact Bond database³ using the ICE Impact Bond Classification Service⁴ to identify which bonds were Impact Bonds and the category of each Impact Bond.

Bonds that were identified as Impact Bonds were categorized by the specific impact objectives (Use of Proceeds) of the bond and the metric used to assess progress (Impact Metrics). The information reported by the issuer, in both pre and post issuance reports, was used for the categorization process. The methodology and approach used to categorize individual bonds by their Impact Metrics is explained in more detail below in Section 6.

The high-level categorization system used to identify if a bond in the GPIF portfolio is in scope for the analysis follows the ICMA frameworks. Under these frameworks Impact Bonds are classified in three different categories - Green, Social and Sustainability.

For the purposes of this analysis, only labelled Impact Bonds⁵ were included as the Use of Proceeds from these bonds tend to be more clearly defined to specific projects, as previously explained in 2.1.1.

3.1.1 Impact Bond Composition

The Impact Bond screening process shows that the GPIF portfolio is more heavily weighted towards bonds with an environmental (Green) rather than social objective and consequently the impact metrics captured by our analysis are representative of this composition. This heavier weighting towards Green objectives is, however, consistent with the broader impact bond market generally.

The regular analysis and tracking of Impact Bond issuance carried out by ICE (see ICE Quarterly Impact Bond Report⁶) highlights the broader tendency of Impact Bond issuance with Green objectives, relative to Impact Bonds with Social and combined Sustainability objectives. This can be seen in the below chart showing analysis of Global Impact Bond issuance by bond type on a half-yearly basis over the last 4 years to June 30th, 2023.

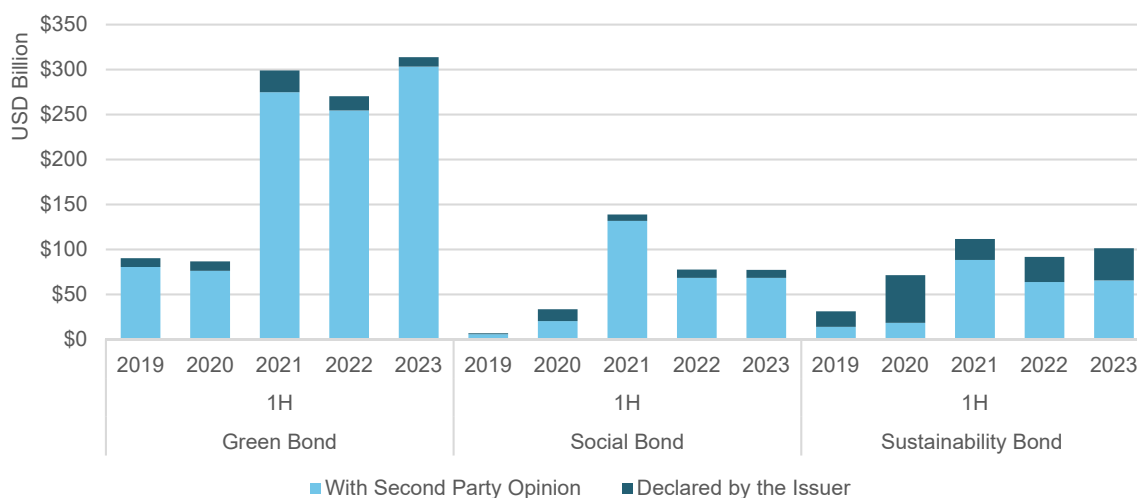
³ ICE Impact Bond Database compiled for multiple sources including data from the Luxembourg Exchange

⁴ ICE Impact Bond Classification

⁵ Impact bonds are defined as green bonds, social bonds and sustainability bonds that are either declared as such by the issuer or certified by a third party.

⁶ ICE Impact Bond Analysis Q2 2023, <https://www.ice.com/insights/impact-bond-report-q2-2023>

Exhibit 2: Global Issuance of GSS Bonds by Bond Type



Source: ICE Quarterly Impact Bond Report, June 30, 2023

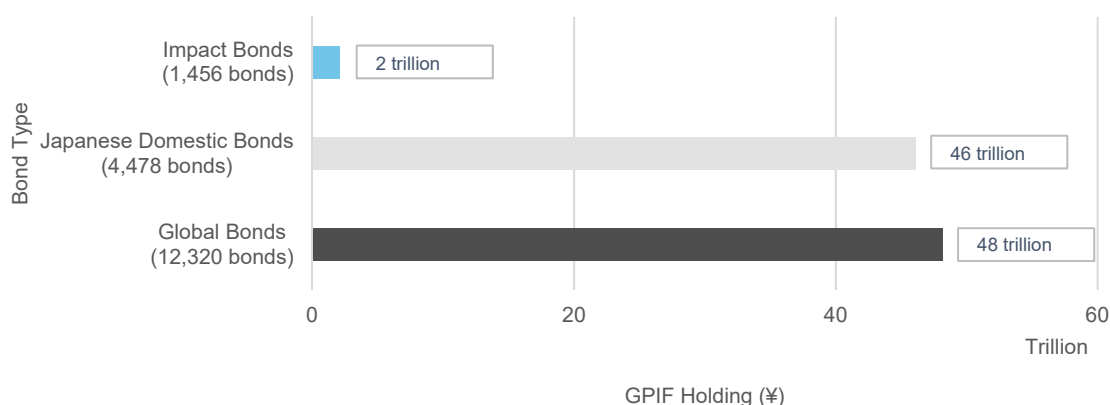
3.2 Impact Bonds - Scope and Coverage

3.2.1 Bonds In Scope

The screening process assessed all the bonds held within the GPIF portfolio, comparing these to the ICE Impact Bond database. Of the 18,254 bonds within the GPIF portfolio as of 31 March 2023, 1,456 were identified as Impact Bonds and were considered for this study, representing nearly 8% of the total GPIF bond portfolio as of 31 March 2023.

The below chart (Exhibit 3) shows the proportion of the GPIF universe to be considered for this study in terms of the number of Impact Bonds relative to the other bonds in the GPIF portfolio, namely Japanese Domestic Bonds and Other Global Bonds.

Exhibit 3: GPIF Holding (¥)



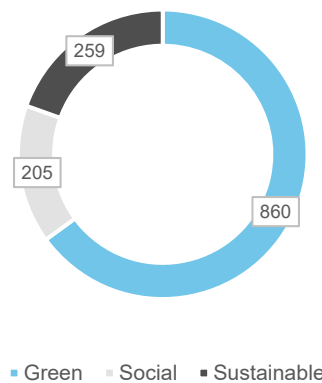
3.2.2 Impact Bond Categorization

Of the 1,456 bonds considered, 1,324 Impact Bonds were identified as in scope for the analysis and categorized by the main three different types, based on the Impact Metrics associated with each individual bond. The process of mapping Impact Metrics and categorizing the individual bonds is explained in more detail below in Section 5. The three different categories used to classify the impact bonds are:

- Green Bonds
- Social Bonds
- Sustainable Bonds

The 132 SLBs identified in the GPIF portfolio are considered out of scope (as explained in 2.1.1.) and are not included in the chart below (Exhibit 4).

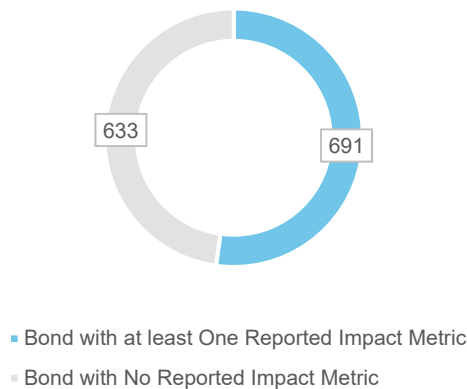
Exhibit 4: Proportion of Impact Bond Type Breakdown (in Scope⁷)



The Impact Bonds identified as in scope were analysed in detail to determine the Impact Metrics associated with each individual bonds. The below chart shows the breakdown of the Impact Bonds in scope by those with at least one (or more) Impact Metric reported by the issuer and those without any Impact Metrics reported by the issuer. As can be seen in Exhibit 5, 52% of the impact bonds considered in scope have at least one reported Impact Metric.

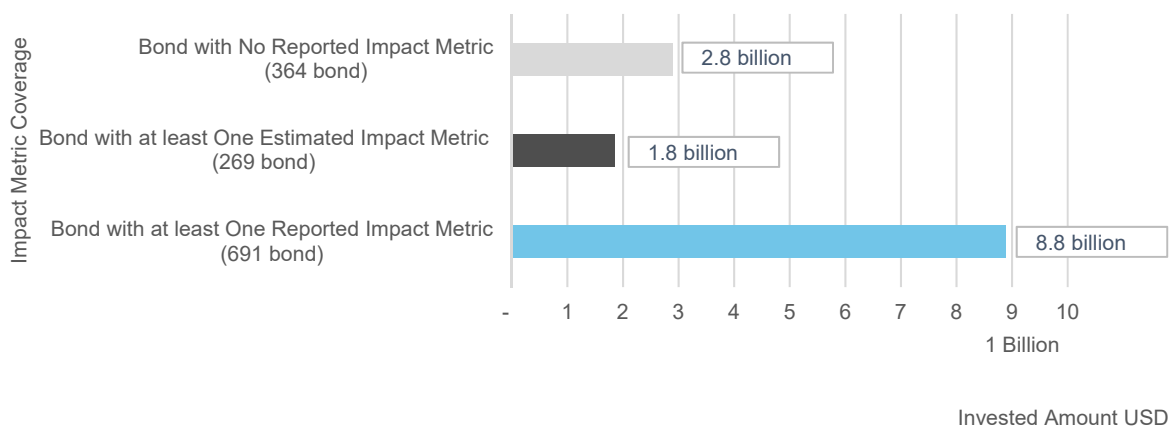
⁷ Sustainability Linked Bonds (132) are not in scope for the Impact Bond Project

Exhibit 5: Proportion of Impact Bonds with Reported Impact Metrics



The below chart shows the proportion of the GPIF portfolio in terms of invested amount (in USD) which is covered by at least one reported Impact Metric, the proportion for which an estimated Impact Metric was produced and the proportion with no Impact Metrics. Overall, nearly \$11Bn of invested proceeds could be assessed for impact.

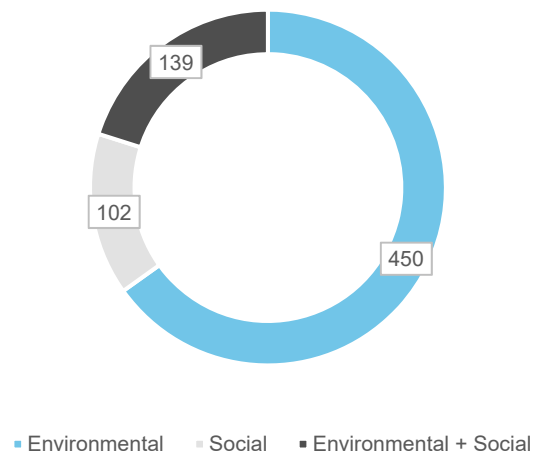
Exhibit 6: Impact Metric Coverage by GPIF Investment Amount



The Impact Bonds with reported Impact Metrics are mapped to High-Level Impact Categories. These High-Level categories are defined as Environmental, Social and Environmental + Social (a combination of both environmental and social impacts).

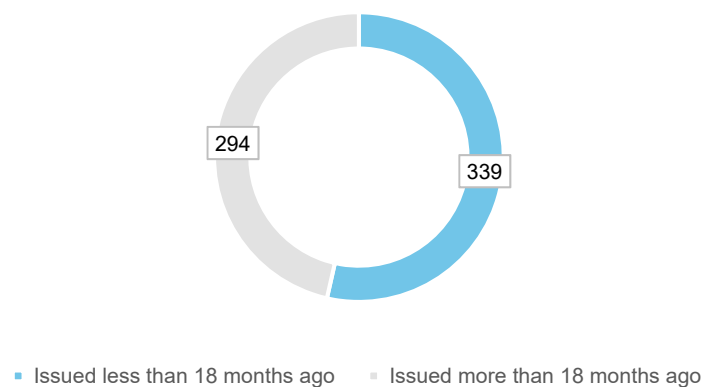
The mapping process considered the type of Impact Metric(s) with each Impact Bond. If for example, there are multiple Impact Metrics and these all relate to climate/environmental projects, the Impact Bond is mapped to the “Environmental” High-Level category. As can be seen in Exhibit 7, 65% of the Impact Bonds in scope with reported Impact Metrics are assigned to the Environmental High-Level category, 15% to the Social category and 20% to the Environmental + Social Category.

Exhibit 7: Proportion of Impact Bonds with Reported Impact Metrics mapped to High-Level Category



3.2.3 Impact Bonds without Impact Metric

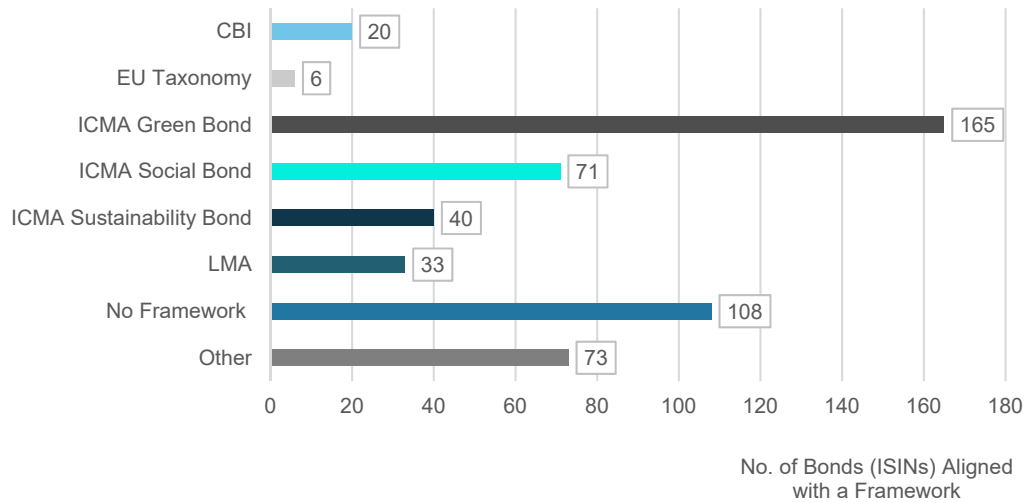
Exhibit 8: Impact Bonds with No Reported Data and/or Impact Metrics



As mentioned above, not all the Impact Bonds identified for analysis in the GPIF portfolio have reported data or Impact Metrics. This could be for a number of reasons. The most common reason is that a bond has been recently issued, and a report has not yet been published by the issuer. Hence, data and/or Impact Metrics would not necessarily be expected for this bond. To identify where this could be the case an 18-month time frame was set since for bonds issued less than 18-months ago (i.e. since January 2022), reporting would not necessarily be expected considering a typical 12 month reporting period with a further 6 month grace period for producing and publishing the report. For bonds issued more than 18-months ago (i.e. before January 2022), reporting would be expected.

In the above chart (Exhibit 8) the Impact Bonds identified without data or Impact Metrics are displayed, split by issue date - less than 18-months ago and more than 18-months ago. As can be seen, 294 bonds without Impact Metrics are identified as having been issued more than 18-months ago. Reporting would normally be expected for these bonds.

Exhibit 9: Impact Bonds with No Reported Data and/or Impact Metric & follow one or more Frameworks



Impact Bonds within the GPIF portfolio that do not have a reported Impact Metric and were issued more than 18-months ago (294 bonds) (where a reported Impact Metric was expected but not available), were checked to see if they aligned to a recognised sustainability framework⁸ listed below. It was found that these bonds did align to sustainability frameworks. In fact, the majority of bonds aligned to more than one of the frameworks, hence the above chart (Exhibit 9) includes double counting.

The sustainability frameworks against which the bonds within the GPIF portfolio were aligned to are:

- CBI
- EU Taxonomy
- ICMA Green Bond
- ICMA Social Bond
- ICMA Sustainability Bond
- LMA
- Other
- No Framework

⁸ See Appendix 10.2 for Framework definitions.

4 Impact Bond Data

4.1 Data Sources

The bonds in the GPIF portfolio were compared to the ICE Impact bond database using the ICE Impact Bond Classification Service to identify which bonds were impact bonds and the category of each Impact Bond. The ICE Impact Bond database is compiled using publicly available security documentation such as bond prospectuses, termsheets and exchange listing records. It also draws on the Luxembourg Stock Exchange Sustainability Bond database which contains use of proceeds information collated from pre- and post-issuance documentation such as Allocation and Impact Reports.

Further information regarding each Impact Bond was also collected, including the category of the bond, the Impact Metric against which the bond is reporting, dates of the bond, scope of reporting from issuer, whether the bond reporting is on a standalone basis or is part of a pool⁹ of the issuer's impact bonds, the value of the bond and value of associated bond pools.

The data collected for each individual bond included:

- Bond issuer
- Category of bond
- Impact metric(s) against which the bond is reporting
- Scope of reporting
 - Individual or pooled bond
- Value of bond and value of associated pool
- Date of latest post-issuance report
- Maturity date of bond (and years to maturity)

4.2 Data Structure

4.2.1 Pooled Data

When calculating pool values, the assumption is that 100% of bond issued amounts are included in the pool value. It is also assumed that each pool of bonds is funding a single project and that the Impact Metrics relate to this single project.

For pooled bonds, the total pooled amount is taken, or alternatively the sum of all bonds in pool is taken. The bonds within the pool are adjusted for any differing issuing currencies and converted to US \$. Any dead or expired bonds are removed, leaving just the live bonds within the pool in US \$ terms.

Once a pool value for every pool is produced, the proportion that the pool makes up is calculated so a pro-rate Impact Metric value for each bond can be calculated.

For this analysis, the refinancing of bonds was not taken into account.

4.2.2 Bonds with Multiple Impact Metrics

If a bond has a combination of environmental and social metrics, it was considered necessary to apportion the bond proceeds separately to environmental and social impacts because these cannot typically be achieved with the 'same dollar'. If the full bond proceeds are associated with

⁹ Pool refers to a group of bonds from the issuer whose proceeds are grouped together for reporting purposes and allocated to one or more eligible projects.

each metric, it could be considered to be 'double counting'. So, to be more representative of proceeds allocation to both social and environmental objectives, a straightforward 50% / 50% allocation between Environment and Social Impact Metrics was used.

4.2.3 Bonds Without Impact Metrics

As shown in Exhibit 5 above, the proportion of bonds in the GPIF portfolio with no Impact Metrics reported was 48% and so warranted some further analysis in order to fairly represent the contributed impacts for those bonds from eligible environmental and social projects from ESG bonds in the GPIF portfolio. To achieve this, estimated impacts were applied to some of the bonds (20%). The methodology explaining this in more detail can be found in section 5.2.

4.2.4 Bonds with Other Impact Metrics

Many bonds have Impact Metrics disclosed in post-issuance reports, but which are not using a standardised measure. These are placed under a category of 'Other' because they cannot be compared with metrics from other bonds. Bonds with Metrics that fall into the 'Other' category are not considered in the summary.

5 Impact Metric Matching

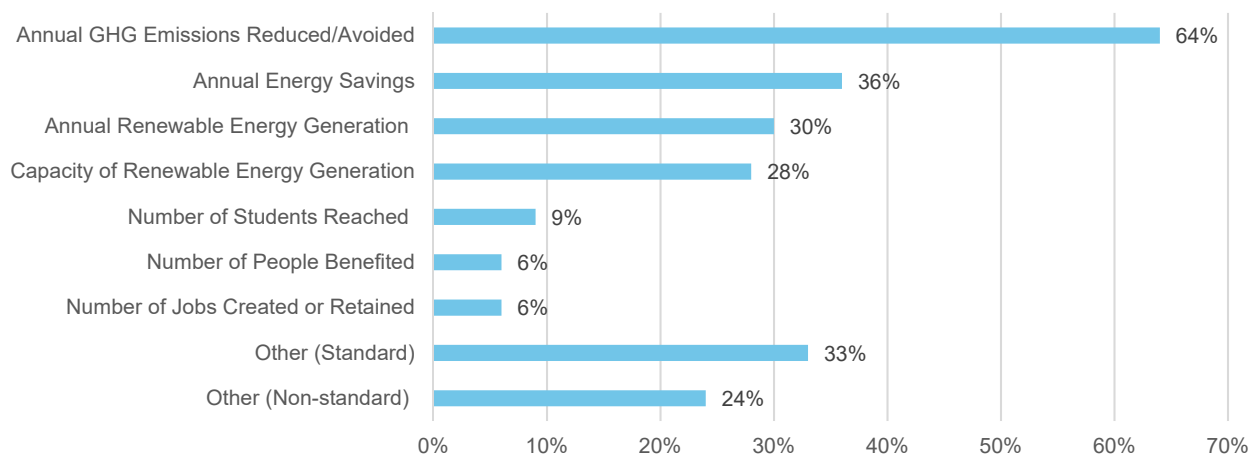
5.1 Identifying Impact Metrics

5.1.1 Impact Metric Selection

Analysis of the Impact Bonds identified within the GPIF portfolio against the ICE Impact Bond database reveals around 50 different impact metrics being referenced. For the purpose of this analysis, tracking the performance of these impact bonds across so many different metrics would not give meaningful results, given the number of bonds reporting some of the metrics would be very small, but the analysis required would still be extensive.

Hence, the 50 identified Impact Metrics were narrowed down to smaller focus groups, representing the Impact Metrics against which the largest number of bonds had reported. Exhibit 10 indicates the frequency at which each of the impact metrics are referenced and identifies the most commonly occurring metrics. The Other (standard) group represents all the other standardised metrics grouped together. The Other (non-standard) group is defined in 4.2.4 above.

Exhibit 10: Most Commonly Reported Impact Metrics



The 7 Impact Metrics identified as most commonly reported are:

- Emissions Reduced/Avoided
- Energy Savings
- Renewable Energy Generated
- Capacity of Renewable Energy Plants Constructed or Rehabilitated
- Number of People Benefited
- Number of Students Reached
- Jobs Created and/or Retained

5.1.2 Impact Metric Groupings

So as not to lose sight of other Impact Metrics which have been reported by an issuer, but which are not the focus of analysis, all 50 metrics are grouped into further categories:

- Emission Reduction
- Energy Efficiency
- Renewable

- Water and Waste Management
- Clean Transportation
- Biodiversity and Sustainable Land Use
- Green Building
- Social - Other, Green Building
- Social
- Social - Other

The bonds are then categorised by which types of metric they are reporting, which are then in turn grouped into three main “high-level categories”.

The High-Level Categories of Impact and their corresponding groupings are:

- Environmental
 - Emission Reduction
 - Energy Efficiency
 - Renewable
 - Water and Waste Management
 - Clean Transportation
 - Biodiversity and Sustainable Land Use
 - Green Building
- Social
 - Social
 - Social - Other
- Environmental + Social
 - Where a combination of Impact Metrics in the above two categories are reported.

The breakdown of bonds into these categories is shown in Exhibit 7 of section 3.2.2 above.

This more granular level of analysis at Impact Metric level, followed by the regrouping into high-level Impact Categories allows for the consideration of all reported metrics, even when they are not the focus of deeper analysis.

Hence, given the alignment to the underlying objectives and the consistency of reporting within the Impact Metrics and Impact groups, these 7 Impact Metric categories and the 3 High-Level Impact groupings are used for the purpose of presenting the results of this report.

5.2 Bonds without Impact Metrics

Not all the identified Impact Bonds within scope have published Impact Metrics. This may include recently issued bonds (issued within the past 18-months), where the issuer has not yet published a report.

For some cases where Impact Metrics are not provided estimations have been made using assumptions based on categorisation by region, issuer type and category of impact.

There are a number of conditions that need to be met for an estimation of the Impact Metric to be carried out. Firstly, a minimum sample size is required for an estimation. Also, only ‘Green’ bonds in the GPIF portfolio were selected to create estimates.

The estimation is based on the categorisation of bonds defined by a combination of type of impact, type of issuer and region. These parameters were used to define a categorization key.

A minimum of 10 bonds with reported Impact Metrics is required per categorization key to be considered for estimation.

Estimated values for the Impact Metric per \$1000 of holding is calculated then multiplied by the GPIF holding value.

Impact Metrics are estimated for all bonds in a category, irrespective of age.

Exhibit 11: Estimation Categorization Key Factors

Type of Impact	Type of Issuer	Region
Energy Efficiency	Corporate	EU
Renewable	Financial	UK
	Sovereign	North America
	Supranational	Japan
	Agency (SSA)	APAC ¹⁰ -Ex Japan
		Asia ¹¹
		Global (Other)

¹⁰ APAC, for the purposes of these calculations, includes Australia, Korea (Republic of), Thailand, Hong Kong, Philippines, New Zealand and Singapore.

¹¹ Asia, for the purposes of these calculations, includes Iran (Islamic Republic of) and India.

6 Methodologies

6.1 Overview

The challenges to developing a framework for measuring and comparing the impact of different bonds are manifold, including the fact that Impact Bonds are issued with a wide array of objectives and Impact Metrics across different Impact Categories with different reporting units of impact. Also, bonds may be issued as individual bonds or as part of a pool of bonds financing multiple projects across different Impact Categories.

The process of categorising Impact Bonds into specific groupings of Impact Metrics and Higher-Level Impact Categories allows for the standardisation of the reporting units within a given Impact Metric grouping and High-Level Impact Category. To allow for more direct comparisons within each Impact Metric and Category an approach using impact per US \$ invested was chosen. This is referred to as the Impact Contribution.

The Impact Contribution approach (impact per US \$ invested) provides the ability to compare the impact of bonds within Impact Metrics and Categories, it also allows the investor to make ongoing assessments regarding the relative impact of their investments.

Within this approach two different methodologies were utilized to provide Impact Contributions for both the Latest Year and Cumulatively.

The Latest Year methodology calculates the Impact Contributions for the latest year a bond is held, while the Cumulative methodology provides the Impact Contribution on a cumulative basis, assuming a bond is held to maturity.

Both methodologies provide useful information, although the Cumulative methodology uses a number of assumptions, including that the distribution of the impact is assumed to be constant throughout the lifetime of the bond. This does not take into account if the impact is seen at the end of the bond when a project comes on stream, or if the impact is a one-off, which can be the case with some Social Impact bonds.

6.2 Standardization of Variables

6.2.1 Standardization of Impact Metric

To enable a consistent approach to be applied to the analysis of each individual Impact Bond, the variables for each bond need to be standardized. This includes the standardization of the Impact Metrics, the level of reporting of the metrics and the categorization of the impact metrics. The treatment of pooled bonds and bonds with multiple Impact Metrics need to be taken into account, while bonds with no reported Impact Metrics had to be estimated.

The approach to reporting the Impact Metrics can vary between bonds, even for bonds within the same category. Metrics can be reported at a global, bond or project level. For pooled bonds, the metric can be reported at an aggregated pooled level. Hence, the method for reporting has been standardized to the bond level across all the Impact Bonds.

6.2.2 Standardization of Units

The units of reporting Impact Metrics by the issuer varied across the Impact Bonds within the GPIF portfolio. Even bonds within the same category or Impact Metric type were found to have differing units of measurement. To be able to calculate a single Impact Metric the units of measurement within each Impact Metric category were standardize and normalised to a single unit of measurement so that direct comparisons can be made.

Eighty-seven different units of measurement across all the Impact Bonds in scope were identified. These 87 units of measurement were mapped to a common standardized unit of measurement for each of the Impact Metrics. For the Impact Metrics in focus for this analysis, the standardised units of measurement are as follows:

Impact Metrics	Unit
Annual GHG Emissions Reduced Avoided	tCO ₂ e
Annual Energy Savings	MWh
Annual Renewable Energy Generation	MWh
Capacity of Renewable Energy Plants Constructed or Rehabilitated	MWh
Number of People Benefited	People
Number of Students Reached	Students
Jobs Created and/or Retained	Jobs

6.2.3 Exchange Rates

All the different currencies of bond issuance were normalised into US \$ with the exchange rate as of March 31, 2023, to be consistent with the GPIF portfolio date used for the overall analysis. The source for the exchange rates was the UK HMRC¹².

6.3 Data preparation

6.3.1 Pooled Bonds

For pooled bonds, the total pooled amount, or the sum of all bonds in a pool is taken, adjusting for the different reporting/issuance currencies. Any dead or expired bonds are then removed leaving just the live bonds within the pool.

Once the pool value for every pool is calculated, the proportion of the pool represented by each individual bond is then calculated so a pro-rated Impact Metric value for each bond can be produced.

6.3.2 Multiple Impact Metrics

For bonds with Impact Metrics across both an environmental and a social theme, efforts are made to avoid a 'double counting' effect – i.e., avoid applying the same US \$ spend to different positive impacts that may not be achievable with the same proceeds. Where this was the case, 50% of the issued amount of the bond is applied to an environmental, and 50% to a social Impact Metric

6.3.3 Bonds Without Impact Metrics

As further defined in section 5.2, Bonds without Impact Metrics were estimated taking into account categorization by region, issuer type and impact category, ensuring a sufficient sample size.

¹² <https://www.gov.uk/government/publications/hmrc-exchange-rates-for-2023-monthly>

6.4 Calculation of Impact Contribution

The Impact Contribution calculations (Impact Metric / US \$1000 invested) provide the output of Impact for each of the 7-Impact Metrics, per US \$1000 invested.

To reach the Impact Contribution values, several variables are required for each Impact Bond. This includes, Bond Issued Amount, Scope of Reporting (bond by bond or pool of bonds), Bonds within the Pool (where applicable), Pool Volume (where applicable), Metric Value and Unit. Where the pool volume was not reported, the volume was calculated from the issued amounts of all the live bonds in the pool. Once all bonds reported as part of a pool had an associated pool value, the proportion (%) of the pool that an individual bond represents was calculated.

Two different approaches were examined to generate the Impact Contribution:

- Latest Year Approach
- Cumulative Approach

These approaches will now be explained in more detail:

6.4.1 Latest Year Approach

To calculate the Impact Contributions for the latest year a bond is held, the reported Impact Metrics are divided by the issued amount of the bond. Where the Impact Metrics are reported for a pool of bonds, the Impact Metrics are pro-rated to apportion to the individual bond.

Impacts Metrics that are reported on a cumulative basis (applies to all Impact Metrics studied where 'annual' is not in the description), an average across the number of years from issuance to the most recent impact report is taken.

The pro-rated impact value is then utilized in the calculation to arrive at a US \$ value. The per US \$1 values are then multiplied by the GPIF holdings (normalised into US \$) to provide an assumed value of the contribution to positive impacts made from eligible environmental and social projects from ESG bonds in the GPIF portfolio - Impact Contribution.

For bonds with Impact Metrics across both an Environmental and a Social theme, efforts were made to avoid a 'double counting' effect – i.e. applying the same US \$ spend to different positive impacts that may not be achievable with the same spend. Where this was the case, 50% of the issued amount of the bond was applied to environmental, and 50% to social metrics.

6.4.2 Cumulative Approach

To calculate the Impact Contribution using the Cumulative approach it is assumed that a bond is held to maturity. However, there are a number of perpetual bonds (10 bonds), and longer dated bonds within the portfolio which have the tendency to skew some of the metrics. This problem was addressed by introducing a cap on the maturity of bonds at 20-years (namely, the year 2043) for the longer dated and perpetual bonds.

To calculate cumulative impacts until maturity of the bond, the number of years to maturity is calculated from the date of the last impact report produced and the per US \$1 value is multiplied by the number of years. To achieve the portfolio view of GPIF contributions to positive impacts cumulatively, the per US \$1 values are multiplied by GPIF holdings (normalised into US \$).

7 Results and Analysis

7.1 Overview

The GPIF portfolio is more heavily weighted towards bonds funding an environmental objective and consequently the impact metrics captured in this report are representative of that. This heavier weighting is, however, representative of the proportion of bonds issued in the market in general. See figure Exhibit 1 for market view of issuance by bond type as of June 30, 2023.

The focus of Impact Metrics chosen for the GPIF analysis was based on those most commonly reported amongst the issuers of bonds held. The most commonly reported metric was Annual GHG Emissions Reduction/Avoidance, which was reported on by 64% of the bonds reporting impact metrics. Consequently, a positive Annual GHG Emissions Reduction contribution can be reported for the GPIF holdings of over 5.2 million tons of CO2 equivalent.

Across the 691 bonds that had reported Impact Metrics in the GPIF universe, the majority (450) were reporting on Environmentally themed impacts. There were a further 139 bonds which reported on a combination of Environmental and Socially themed impacts. The measurement of a reduction in Annual GHG Emissions was the most commonly reported metric, and when looking at the impacts per \$1000 invested, resulted in a contribution of a reduction of 838 tonnes of CO2 (or equivalent) emissions. If the weighting of the GPIF holdings is then taken into consideration, the contribution is a reduction of over 5.2 million tonnes of CO2 (or equivalent) emissions, which in real world terms is equivalent to the carbon sequestered by around 6.2 million acres of forests (in one year) which is around 11.5 times the size of Tokyo, Japan!

7.1.1 Total Impact for Impact Bonds

The Total Impact of Bonds with Impact Metrics are shown in the table below (Exhibit 12). The table shows the total impact value (or aggregated impact), and total impact including estimates, for each of the 7 selected KPIs. The 7 Impact Metrics are Emissions Reduced/Avoided, Energy Savings, Renewable Energy Generated, Capacity of Renewable Energy Plants Constructed or Rehabilitated, Number of People Benefited, Number of Students Reached, Jobs Created and/or Retained.

The 7 Impact Metrics were selected based on the breakdown of Impact Bonds with the most commonly reported quantitative impact metric. At this stage the total impact values are represented in units specific to the impact metric and are representative of the entire Impact Bond's contribution and weighted by the GPIF holding.

Exhibit 12: Total Impact for Impact Bonds with Reported KPIs for GPIF Holdings (Latest Year & Cumulative)¹³

Impact Metric	Latest Year ¹⁴		Cumulative ¹⁵		Unit
	Impact	Impact (incl Estimates) ¹⁶	Impact	Impact	
Annual GHG Emissions Reduced Avoided	5,238,192	8,291,327	29,287,757		tCO ₂ e
Annual Energy Savings	870,179	964,066	3,418,613		MWh
Annual Renewable Energy Generation	4,209,676	6,746,261	15,330,172		MWh
Capacity of Renewable Energy Plants Constructed or Rehabilitated	38,989,228	53,198,394	335,220,952		MWh
Number of People Benefited	17,481,390	-	76,944,833		People
Number of Students Reached	1,581,079	-	8,567,689		Students
Jobs Created and/or Retained	195,227	-	904,525		Jobs

7.2 Impact Metric Results

7.2.1 Annual GHG Emissions Reduced Avoided Types of Projects

Across the 691 bonds that had reported Impact Metrics in the GPIF universe, the majority (450) were reporting on Environmentally themed impacts. There were a further 139 bonds which reported on a combination of Environmental and Socially themed impacts. The measurement of a reduction in Annual GHG Emissions was the most commonly reported metric and when looking at the impacts per US \$1000 invested, resulted in a contributed reduction of 838 tonnes of CO₂ (or equivalent) emissions. If the weighting of the GPIF holdings is then taken into consideration, the contribution is a reduction of over 5.2 million tonnes of CO₂ (or equivalent) emissions.

For the bonds which had not reported an Impact Metric, the potential impact contributions for environmental metrics were calculated using an estimation model which looked at the categorisation of bonds defined by a combination of type of impact, type of issuer and region. For the CO₂ (or equivalent) emissions reduction metrics, this brought a further 251 bonds into scope and increased the potential contribution to CO₂ emissions reduction for this year to almost 8.3 million tonnes.

7.2.2 Annual Energy Savings

Looking at the same universe of bonds which have reported an energy saving impact metric, per \$1000 invested a saving of 39 MWh could be contributed. This, weighted by the GPIF holdings,

¹³ Per GPIF Holding (Latest Year of holding)

¹⁴ Refer to section 6.4.1 for the methodology

¹⁵ Refer to section 6.4.2 for the methodology

¹⁶ Only Green or "Environmental" bonds have been selected to complete estimates. Refer to page 14 for further information on Estimates and Estimate Methodology.

results in an annual saving for this year of 870,179 MWh. A further 107 bonds were included in the calculations when estimates were applied to non-reporting bonds and achieving a contributed annual saving of 964,066 MWh for this year.

7.2.3 Annual Renewable Energy Generation

Again, for the same universe of bonds with a renewable energy generation metric, per US \$1000 invested, 807 MWh of energy was generated and weighted by the GPIF holdings is over 4.2 million MWh of energy. With an additional 161 bonds included in the calculations based on estimates of contributed energy generation, the total rises to 6,746,261 MWh generated.

7.2.4 Capacity of Renewable Energy Plants Constructed or Rehabilitated

The contribution towards an increase in the capacity of renewable energy generation facilities per US \$1000 invested is 846 MWh for the GPIF portfolio based on reported metrics. This value, weighted by the GPIF holding comes to nearly 39 million MWh of energy production capacity. With the inclusion of a further 148 bonds for which impact contributions were estimated, this increases to 53,198,394 MWh.

7.2.5 Number of People Benefited¹⁷

When looking at the social metrics which are reported, these are present for 102 bonds in the GPIF universe where exclusively social themed metrics are reported, and for a further 139 where a combination of social and environmentally themed metrics are present. The most commonly-reported social metric was number of people benefited by the project or activity. Per US \$1000 invested, 454 people were benefited and weighted by the GPIF holding, this becomes 17,481,390 people. It was not possible to estimate impacts for social metrics for the purposes of this report.

7.2.6 Number of Students Reached

The social bonds held by GPIF also contribute towards the benefiting of students and when calculating the contribution towards student benefits per US \$1000 invested, 51 students are helped. This, weighted by the GPIF holdings in socially-themed bonds becomes 1,581,079 students reached.

7.2.7 Number of Jobs Created and/or Retained

The final social metric assessed in the analysis of the GPIF universe, is the number of jobs created or retained. Per US \$1000 invested, the aggregate impact is 7 jobs across the bonds invested. However, when weighted by the GPIF holdings in these securities, the number is 195,227.

7.3 **Impact Metric Distribution per US \$100,000 Invested (Latest Year)**

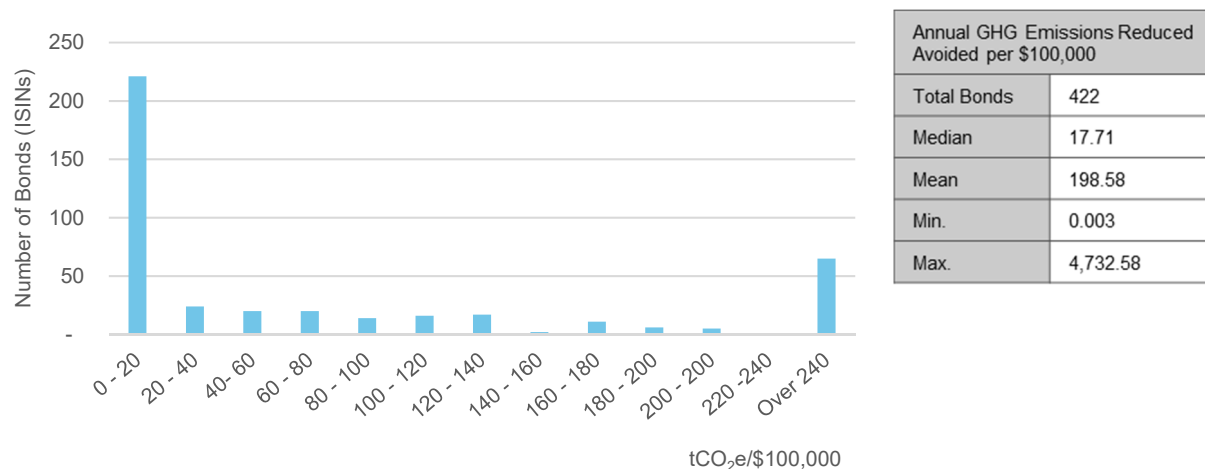
The Impact Metric Distribution charts (Impact Metric per US \$100,000 invested) below show the distribution of investment per bond for each Impact Metric per US \$100,000 invested. For example, the mean tCO₂e reduced (Annual GHG Emission Reduced Avoided) for every US \$100,000 invested is 198.58 tCO₂e. This is based on the latest reporting year methodology.

The distribution graphs represent the reported impact metrics only and not any estimated impacts from our analysis. Impact Metric per \$100,000 Invested was used as the multiple, instead of per \$1000, so that the distribution is easier to read.

¹⁷ The coverage of the 'Number of People Benefited' are impact bonds that are mapped to 'Social' or 'Environmental + Social' high-level categories.

7.3.1 Annual GHG Emissions Reduced Avoided Types of Projects

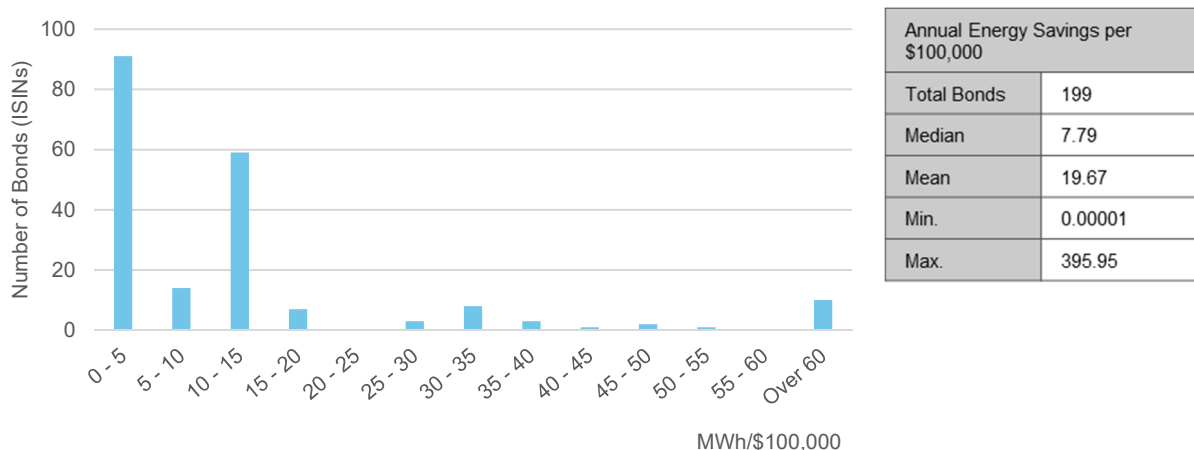
Exhibit 13: Distribution of GHG Emissions Reduced or Avoided per \$100,000 Invested



The median GHG Emissions Reductions or Avoided from investments in the GPIF portfolio is 17.71MWh per US \$100,000 invested, however this number is considerably below the average of 198.58 due to a small number of bonds with very high impact results whose issuers are primarily in the Utilities sector. Whilst there are 22 bonds within 20% of the median impact contribution, there are 71 bonds offering a significant contribution towards positive impacts in GHG reduction terms beyond the average impact.

7.3.2 Annual Energy Savings

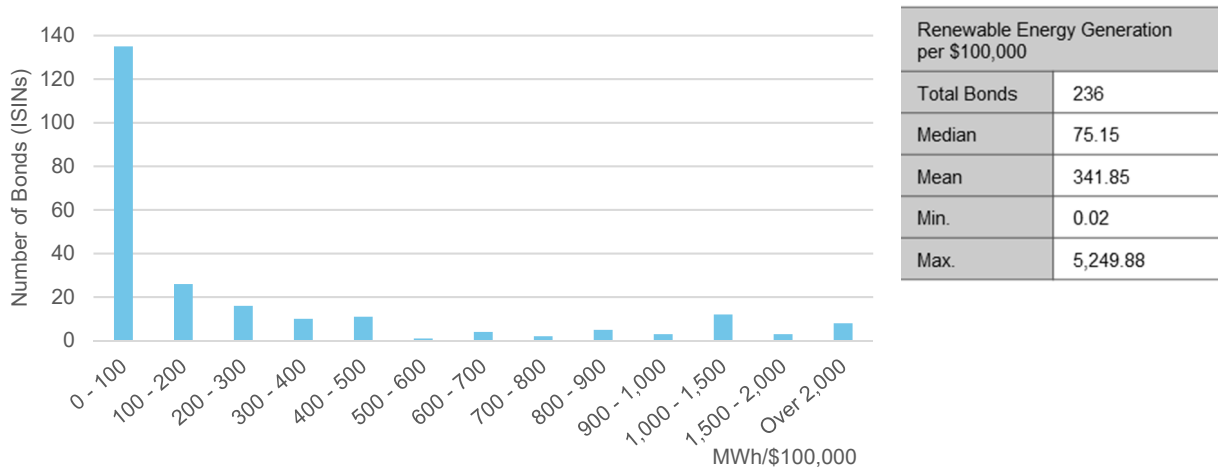
Exhibit 14: Distribution of Annual Energy Savings per \$100,000 Invested



Median Renewable Energy Savings from projects funded is 7.79 MWh per US \$100,000 invested. There were far fewer extreme outliers within this Impact Metric category and so the difference between the mean of 19.67 and median is not so great as for GHG Emissions Reductions. Impact was not concentrated around the median, but rather distributed from very modest contributions per US \$100,000 of 0.001 MWh to highly contributing bonds with 396 MWh per US \$100,000. Those at the top end of the distribution were commonly issued by Supranational issuers where bonds are part of a large issuance programme contributing to huge international projects with big impacts.

7.3.3 Annual Renewable Energy Generation

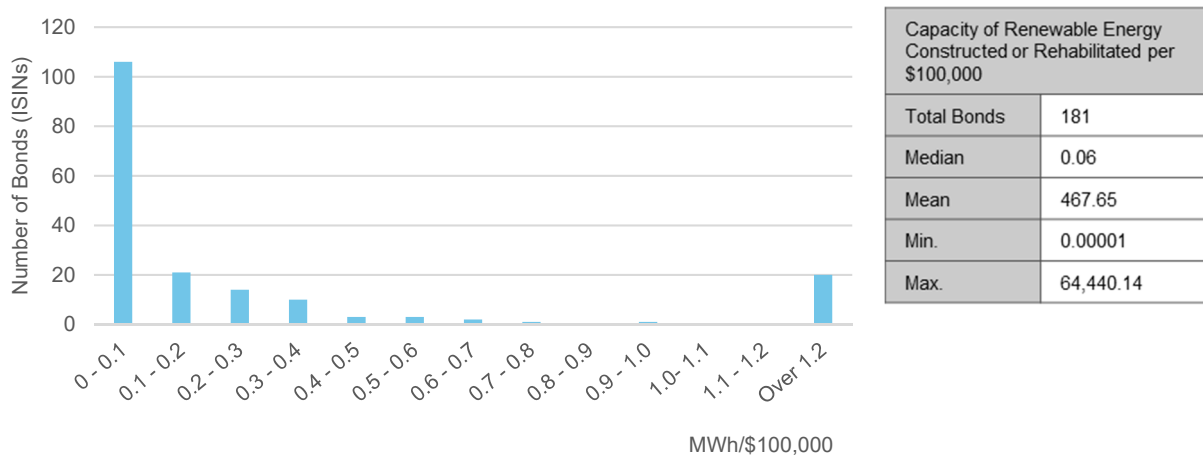
Exhibit 15: Distribution of Renewable Energy Generation per \$100,000 Invested



The contributed impact towards Renewable Energy Generation is, in the median, 75.15 MWh per US \$100,000 invested, whilst the average is 341.85 MWh. The achievement of bonds in the GPIF portfolio is broad, spanning from 0.02MWh per US \$100,000 invested to 5,250MWh. There are 55 bonds which have contributed positive impacts which are greater than the average value of 341.85 MWh, some of these are issued by financial organisations looking to finance environmental projects as well as a number of utilities companies.

7.3.4 Capacity of Renewable Energy Plants Constructed or Rehabilitated

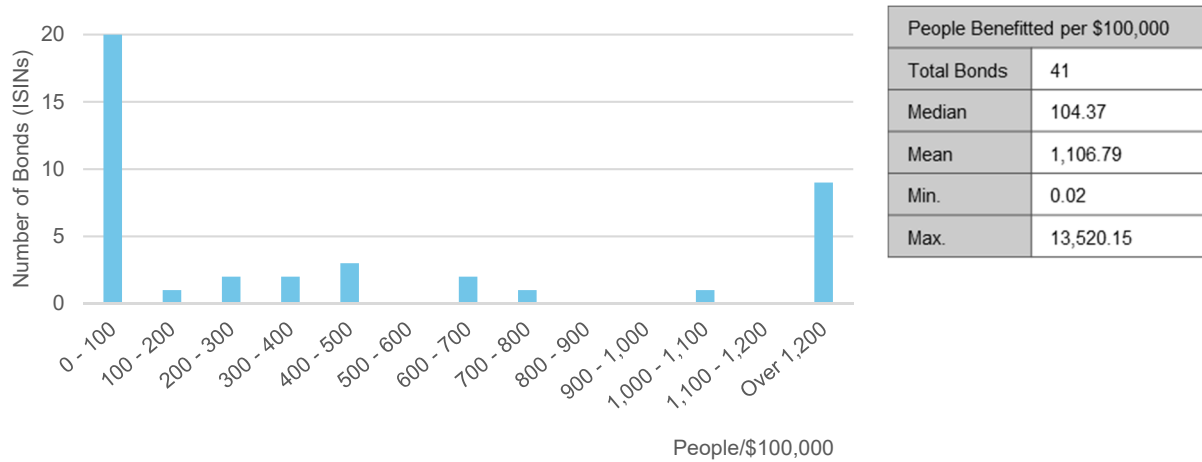
Exhibit 16: Distribution of Capacity of Renewable Energy Plants Constructed or Rehabilitated per \$100,000 Invested



The capacity of Renewable Energy Plants is resulting in a very broad distribution of results from 0.00001 MWh to 64,440.14 MWh per US \$100,000 invested. In this category there are 2 large outliers which have moved the average significantly to 467.65 MWh per US \$100,000 invested, whereas the median capacity is 0.06 MWh. Both outliers were issued by the European Investment Bank where they are financing large international investment programmes aligning with the EU's Green Taxonomy objective for Climate Change Mitigation. Aside from the two EIB Bonds, there are 149 bonds which have impacts 20% greater than the median.

7.3.5 Number of People Benefited

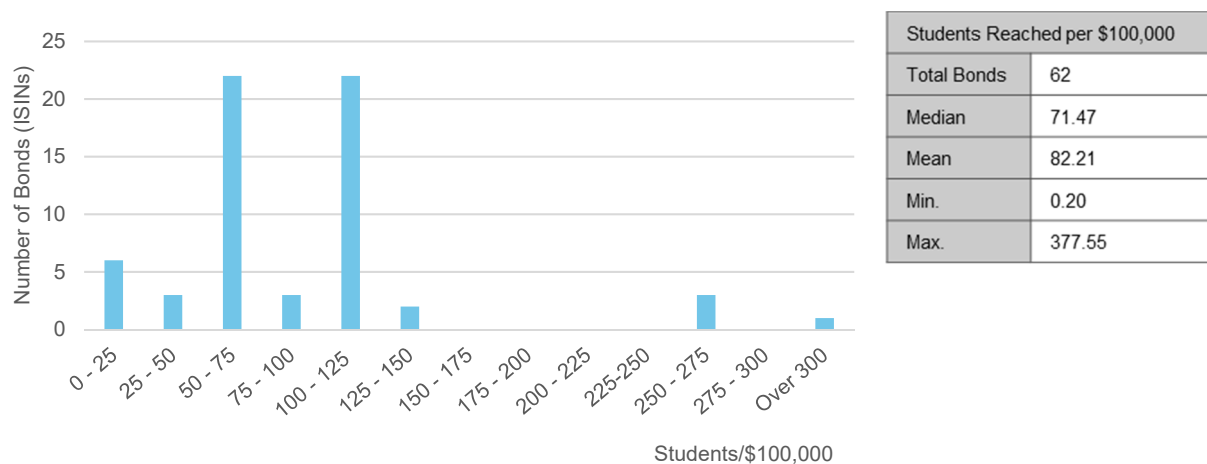
Exhibit 17: Distribution of People Benefited per \$100,000 Invested



The distribution of impact results for Average People Benefitted from projects funded by GPIF is also very broad, leading to a median of 104.37 people per US \$100,000 invested but with an average of 1,107 people. Eight of the top 25 contributing bonds in terms of people benefitted are issued by the African Development Bank and a further 7 from the International Bank for Reconstruction and Development.

7.3.6 Number of Students Reached

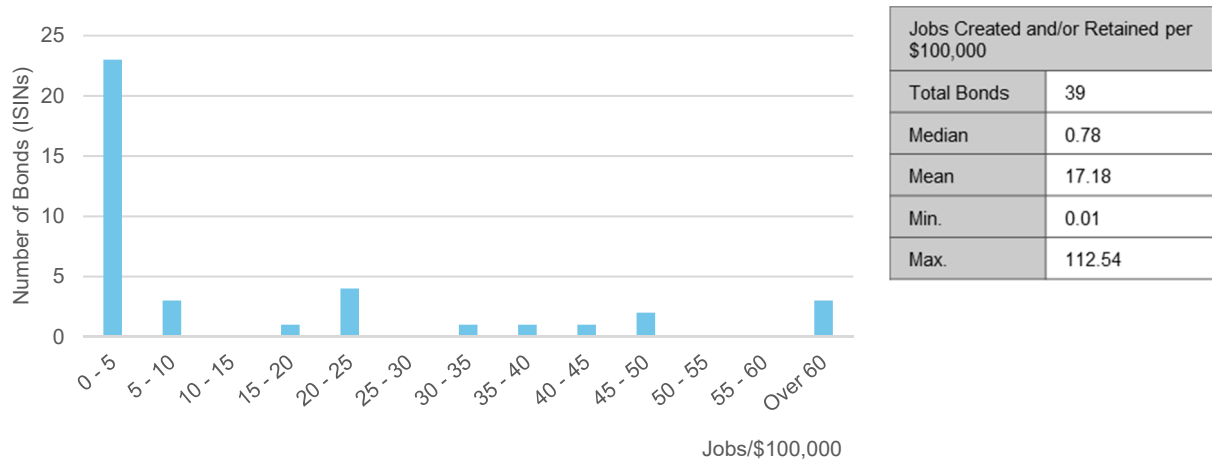
Exhibit 18: Distribution of Students Reached per \$100,000 Invested



Although there is a larger cohort of bonds which are reporting positive contributions in terms of Average Number of Students Reached, the distribution of results is narrower with a median benefit of 71.47 students per US \$100,000 invested and an average benefit of 82.21 students. The GPIF portfolio which contributes towards student beneficiaries is 65% issued by the International Bank for Reconstruction and Development as well as some investments in the Japan Student Services Organisation but with the largest contributing issuer being Agence Francaise de Development EPIC.

7.3.7 Number of Jobs Created and/or Retained

Exhibit 19: Distribution of Jobs Created and/or Retained per \$100,000 Invested



The impact results for Jobs Created or Retained are fairly widely distributed spanning from 0.01 jobs created per US \$100,000 invested and 112.5 jobs, resulting in an average number of jobs created per year of 17.2 but a median of 0.78 jobs. Over 40% of the bonds reporting impacts relating to job creation were issued by Supranational Agencies funding large international programmes spanning a range of objectives. A further 26% of the bonds are issued by German Semi-Government Agencies predominantly funding environmental projects but which have the additional impact of creating jobs in the sector.

7.4 Real World Impact (Latest Year)



Based on the analysis conducted on 591 bonds within the GPIF portfolio, the approximate total Annual GHG Emissions Reduced or Avoided (5,238,192 tCO_{2e}) is equivalent to the carbon sequestered by around 6.2 million acres of forests (in one year) which is around 11.5 times the size of Tokyo, Japan¹⁸. This becomes carbon sequestered by around 9.8 million acres of forests (in one year) which is 18 times the size of Tokyo, Japan, when the estimated impacts (8,291,327 tCO_{2e}) of an additional 251 bonds are included in this calculation.



Based on the analysis conducted on 591 bonds within the GPIF portfolio, the approximate total Annual Energy Saved (870,179 MWh) is equivalent to the annual energy consumption of around 208,000 Japanese households¹⁹. When estimated impacts for an additional 107 bonds are included, annual energy consumption (964,067 MWh) increases to the equivalent of around 230,000 Japanese households.



Based on the analysis conducted on 591 bonds within the GPIF portfolio, the approximate total of Renewable Energy Generated (4,209,676 MWh) is equivalent to the annual energy consumption of around 1.01 million Japanese households²⁰. With the inclusion of an additional 161 bonds for which impacts were estimated, Renewable Energy Generated (6,746,261 MWh) is the equivalent of around 1.6 million Japanese households.



Based on the analysis conducted on 591 bonds within the GPIF portfolio, the approximate total Capacity of Renewable Energy Plants Constructed or Rehabilitated (38,989,235 MWh) is equivalent to the annual energy consumption of around 9.3 million Japanese households²¹. The Capacity of Renewable Energy Plants (53,198,394 MWh) increases to the equivalent of the annual energy consumption of around 12.7 million Japanese households when the estimated impacts of a further 148 bonds are included.



Based on the analysis conducted on 229 bonds within the GPIF portfolio, the approximate total impact of People Benefited (17,481,390 People) is equivalent to benefitting around 1.2 times the number of residents of Tokyo (as of 2023), Japan²².



Based on the analysis conducted on 229 bonds within the GPIF portfolio, the approximate total impact of Students Reached (1,581,079 Students) is equivalent to benefitting around 9% of all students in Japan (as of May 2021)²³.



Based on the analysis conducted on 229 bonds within the GPIF portfolio, the approximate total impact of Jobs Created and/or Retained (195,227 Jobs) is equivalent to around 86% of the total unemployment rate in Tokyo, Japan (as of 2022)²⁴.

¹⁸ 1 acre of afforestation is 0.85 of tCO_{2e} avoided, <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

¹⁹ <https://www.env.go.jp/content/000084571.pdf>

²⁰ <https://www.env.go.jp/content/000084571.pdf>

²¹ <https://www.env.go.jp/content/000084571.pdf>

²² <https://www.metro.tokyo.lg.jp/tosei/hodohappyo/press/2023/04/26/05.html>

²³ https://www.mext.go.jp/content/20220530-mxt_chousa01-000021527_01.xls

²⁴ <https://www.metro.tokyo.lg.jp/tosei/hodohappyo/press/2023/03/29/27.html>

8 Future Developments

The proportion of bonds with decision-useful metrics reported for the GPIF portfolio was not as large as might be expected. Although the ICMA first published the Harmonised Framework in 2015, offering issuers guidance and best practice on impact reporting for labelled bonds, not all issuers are following this guidance. However, with an increasing focus on the measurement of impact through such investments, as well as the publication of the EU Green Bond Framework, we hope to see greater uptake of standardised reporting approaches which will further improve availability of decision-useful data for investors.

9 Conclusions

The analysis presented in this report shows that monetary value of the Impact Contributions from eligible environmental and social projects from ESG bonds in the GPIF portfolio is considerable across the metrics analysed. When considering the metric tonnes of CO₂ (or equivalents) avoided or saved over a year, if those emissions had to be offset under a compliance market such as the EU Emissions Trading Scheme, the cost of a tonne of carbon at the Daily Future Rate at close of business on 30th June 2023 is €87.51²⁵ (¥13,783.26)²⁶, meaning the cost to offset 8,291,327 tonnes of carbon would be approximately ¥100 billion.

When further analysing the energy usage saving, to put the GPIF contribution to energy savings into a monetary context; with the average Japanese household consisting of 2.24 people²⁷ and the average Japanese utility bill for a house with that number of occupants being ¥141,234²⁸, the equivalent utility costs for 230,914 households would be approximately ¥32.6 billion.

Moving onto the contribution to energy generation projects, based on the average cost in Japan of ¥35.764 per MWh²⁹, the energy generated, if it was all in Japan, would be worth around ¥200 million to Japanese consumers. Similarly, the value of the energy production capacity added could be approximately ¥1.9 billion to Japanese consumers if it was all generated and consumed in Japan.

The metric capturing the number of people benefited by a project is broad and captures a wide range of means to benefit people and so, performing a deeper analysis of those values is not meaningful without additional detail which was not available for the purposes of this report.

The nature of the benefit to students is also not completely transparent in the metric disclosure from issuers, however a few ways in which they could be benefited include tuition fees or accommodation costs. The admission fees to Tokyo university are ¥485,900³⁰. If 1.5 million students were helped with their tuition fees for a year, the value could be around ¥700 billion. The typical monthly cost for student accommodation at a university is ¥11,900 a month and so the value of helping 1.5 million students with their accommodation costs could be approximately ¥18 billion per month.

With the average monthly salary in Tokyo as of May 2023 being ¥574,000 per month³¹ the value of creating 195,227 jobs if they were in and around Tokyo could be around ¥1 trillion in salaries going back into the community.

²⁵ Source: <https://www.theice.com/products/18709519/EUA-Daily-Future/data?marketId=400431>

²⁶ FX Rate for EUR/JPY taken 30/06/23. Source: https://www.google.com/finance/quote/EUR-JPY?sa=X&ved=2ahUKEwiMr_Slwuv_AhVTGVkFHUy9ClkQmY0JegQICRAc

²⁷ Source: <https://www.globaldata.com/data-insights/macroeconomic/number-of-households-in-japan-2096153/#:~:text=Japan%20had%20an%20average%20household,2021%2C%20between%202010%20and%202021>

²⁸ https://www.stat.go.jp/data/kakei/sokuhou/tsuki/index.html#nen?page=1&layout=datalist&toukei=00200561&tstat=000000330001&cycle=7&year=20190&month=0&tclass1=000000330001&tclass2=000000330004&tclass3=000000330005&result_back=1

²⁹ Averaged to account for different costs per usage banding. Source: <https://www.tepco.co.jp/ep/private/plan/standard/kanto/index-j.html>

³⁰ <https://www.timeshighereducation.com/student/advice/cost-studying-university-japan>

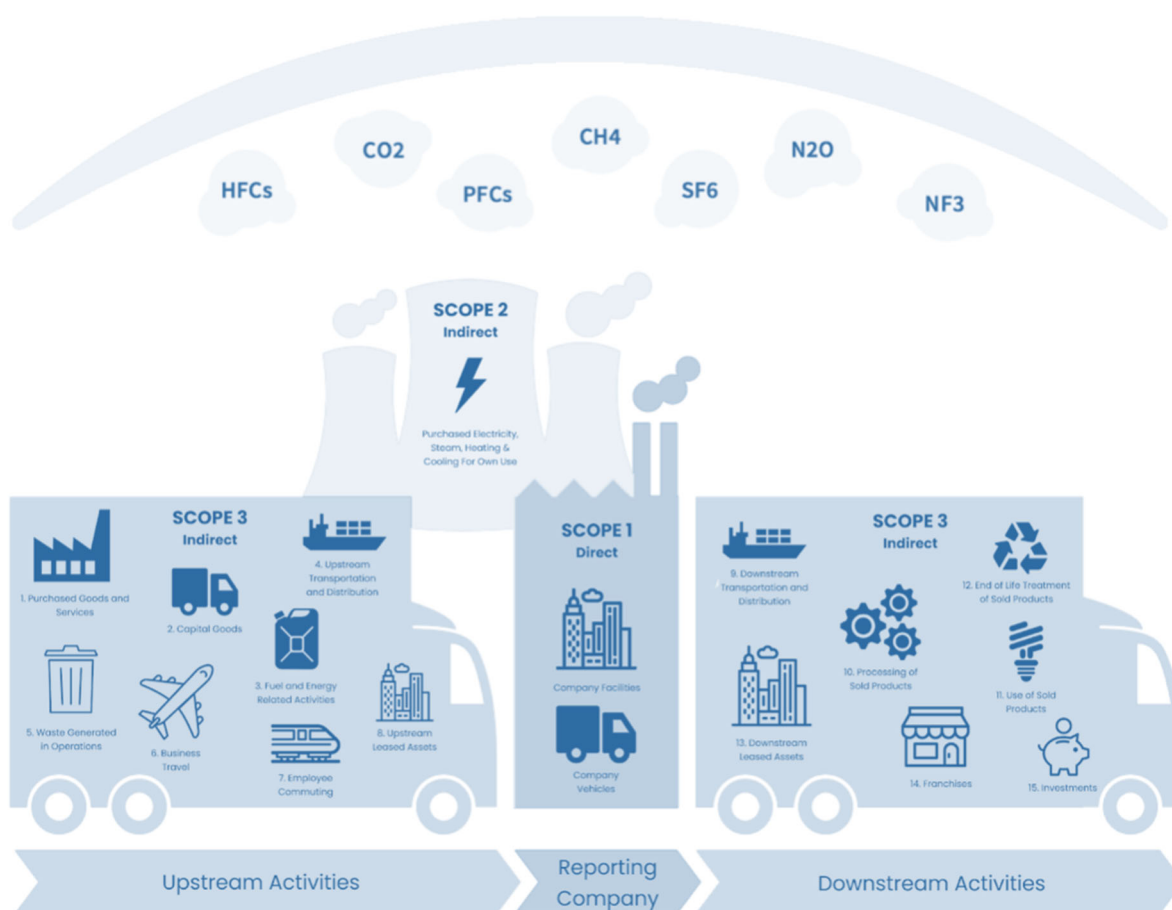
³¹ [https://www.timedoctor.com/blog/average-salary-in-japan/#:~:text=The%20average%20salary%20in%20Japan%20is%206%2C170%2C000%20Japanese%20Yen%20\(JPY,exchange%20rate%20in%20May%202023\)](https://www.timedoctor.com/blog/average-salary-in-japan/#:~:text=The%20average%20salary%20in%20Japan%20is%206%2C170%2C000%20Japanese%20Yen%20(JPY,exchange%20rate%20in%20May%202023))

10 Appendix

10.1 GHG Emissions Scopes

The GHG Protocol Corporate Standard classifies a company's GHG emissions into three 'Scopes'.

- Scope 1 emissions are direct emissions from owned or controlled sources. Mobile emissions, process emissions and fugitive emissions are counted as Scope 1 if the company owns or controls the activities or equipment associated with the emissions.
- Scope 2 emissions are indirect emissions from the generation of purchased energy. The emissions resulting from the production of grid electricity are accounted for under Scope 2.
- Scope 3 emissions are all indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.



Source: ICE, Greenhouse Gas Protocol

10.2 Frameworks

Framework	Overview	Source
CBI	The Climate Bonds Standard and Certification Scheme is a labelling scheme for bonds and loans. Rigorous scientific criteria ensure that bonds and loans with Certification, are consistent with the 1.5°C warming limit in the Paris Agreement. The Scheme is used globally by bond issuers, governments, investors and the financial markets to prioritise investments which genuinely contribute to addressing climate change.	https://www.climatebonds.net/standard/the-standard
EU Taxonomy	Ahead of the launch of the EU Green Bond Standard, issuers have been reporting their funded projects in terms of alignment with the EU Taxonomy. This alignment approach will be formalised in the EU Green Bond Standard. On 28 February 2023, the Council of the European Union and the European Parliament announced (the Announcement) that they had reached a provisional agreement on the creation of European green bonds (EuGB). The EuGB Regulation will lay the foundation for a common framework of rules regarding the use of the EuGB designation for bonds that pursue environmentally sustainable objectives as defined by the EU Taxonomy Regulation. It also sets up a system for registering and supervising companies that act as external reviewers for green bonds aligned with the EuGB framework.	-
ICMA Green Bond	- Green bonds enable capital-raising and investment for new and existing projects with environmental benefits. The Green Bond Principles (GBP) seek to support issuers in financing environmentally sound and sustainable projects that foster a net-zero emissions economy and protect the environment. The GBP, updated as of June 2021, are voluntary process guidelines that recommend transparency and disclosure and promote integrity in the development of the Green Bond market by clarifying the approach for issuance of a Green Bond. The GBP recommend a clear process and disclosure for issuers, which investors, banks, underwriters, arrangers, placement agents and others may use to understand the characteristics of any given Green Bond	https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/green-bond-principles-gbp/
ICMA Social Bond	- Social bonds are use of proceeds bonds that raise funds for new and existing projects with positive social outcomes. The Social Bond Principles (SBP) seek to support issuers in financing socially sound and sustainable projects that achieve greater social benefits. SBP-aligned issuance should provide transparent social credentials alongside an investment opportunity. The SBP, updated as of June 2023, are voluntary process guidelines that recommend transparency and disclosure and promote integrity in the development of the Social Bond market by clarifying the approach for issuance of a Social Bond.	https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/social-bond-principles-sbp/

ICMA – Sustainability Bond	<p>Sustainability bonds are bonds where the proceeds will be exclusively applied to finance or re-finance a combination of both green and social projects. The Sustainability Bond Guidelines (SBG), updated as of June 2021, confirm the relevance of the Principles in this context and facilitate the application of their guidance on transparency and disclosure to the sustainability bond market. The common four core components of the Principles and their recommendations on the use of external reviews and impact reporting therefore also apply to sustainability bonds.</p>	https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/sustainability-bond-guidelines-sbg/
LMA	<p>Originally published in March 2018, the Green Loan Principles provide a high-level framework of market standards and guidelines allowing for consistent methodology to be applied across the wholesale green loan market. The principles constitute voluntary recommended guidelines to be applied to any form of loan instrument that may be categorised as “green”. In December 2018, The LMA, together with the APLMA and LSTA, published an extended iteration of the Green Loan Principles (GLP), providing a more in-depth explanation as to how the GLP can be applied to revolving credit facilities whilst maintaining the integrity of the green loan product. In April 2021, The LMA, APLMA and LSTA announced the publication of the Social Loan Principles (SLP). The SLP aim to create a high-level framework of market standards and guidelines, providing a consistent methodology for use across the social loan market, whilst allowing the loan product to retain its flexibility and preserving the integrity of the social loan market while it develops. The SLP build on and refer to the Social Bond Principles (SBP) administered by the International Capital Markets Association (ICMA), with a view to promoting consistency across financial markets.</p>	https://www.lma.eu.com/news-publications/press-releases?id=160&search_str=green%20loan%20principles https://www.lma.eu.com/news-publications/press-releases?id=187
Other	<p>‘Other’ is the consolidation of a number of other frameworks which exist for issuers</p>	

10.3 Additional Metrics

During the analysis of the GPIF Impact Bond universe, there were 50 Impact Metrics identified as reported by issuers of the invested bonds, including those falling into the 'Other - non-standard' category (see 4.2.4 above). Whilst 7 key Metrics were selected for deeper analysis as previously explained, the contribution that bonds in the GPIF portfolio make in these 50 categories is shown in the following table (NB: this is not weighted by GPIF holding, and some may be applicable to the pool of bonds):

Metric	Grouping	Bond Contribution Value	Unit of Measure
AREA UNDER CONSERVATION OR PRESERVATION	Biodiversity and Sustainable Land Use	901,849,560	HA
AREA UNDER CERTIFIED LAND MANAGEMENT	Biodiversity and Sustainable Land Use	19,769,064,245	HA
NUMBER OF CLEAN VEHICLES DEPLOYED	Clean Transportation	421,309	Vehicles
NUMBER OF ELECTRIC VEHICLE CHARGING STATIONS	Clean Transportation	57,930	Stations
TRAIN LINES BICYCLE LANES BUS CORRIDORS ETC BUILT OR UPGRADED	Clean Transportation	1,721	KM
PASSENGER KILOMETRES IN NEW MEANS OF TRANSPORTATION	Clean Transportation	34,789,333,558	KM
REDUCTION OF AIR POLLUTANTS VS LOCAL BASELINE	Clean Transportation	721	Tonnes
TRANSMISSION AND DISTRIBUTION LINES BUILT OR UPGRADED	Clean Transportation	78,778	KM
ESTIMATE REDUCTION IN FUEL CONSUMPTION	Clean Transportation	-	KM Driven
ANNUAL GHG EMISSIONS REDUCED AVOIDED PER VEHICLE	Clean Transportation	164	tCO ₂ e
ANNUAL GHG EMISSIONS REDUCED AVOIDED	Emission Reduction	58,546,795,373	tCO ₂ e
ANNUAL GHG EMISSIONS REDUCED AVOIDED INTENSITY	Emission Reduction	2,106,807,342	tCO ₂ e BY CUR MN
ANNUAL GHG EMISSIONS REDUCED AVOIDED LIFETIME	Emission Reduction	132,936,569	tCO ₂ e
ANNUAL ENERGY SAVINGS	Energy Efficiency	49,992,518,175	MWh
NUMBER OF SMART METERS DEPLOYED	Energy Efficiency	55,016	Meters
ANNUAL ENERGY AVOIDED PER GROSS BUILDING AREA	Green Building	10,427	KWh by M ²
NUMBER OF GREEN BUILDINGS WITH CERTIFICATION	Green Building	198	Buildings
GHG EMISSIONS REDUCED AVOIDED PER SQM	Green Building	277	TCO ₂ BY M ²

ENERGY SAVINGS PER SQM	Green Building	-	KWh by M ²
GREEN FLOOR SPACE	Green Building	17,515,481	M ²
NUMBER OF GREEN BUILDINGS	Green Building	284,003	Buildings
NUMBER OF HOUSE RECEIVED SOLAR PANEL	Green Building	360,000	Houses
BREEAM CERTIFICATION	Green Building	Non-numeric Output	-
LEED CERTIFICATION	Green Building	Non-numeric Output	-
BUILDING CERTIFICATION	Green Building	Non-numeric Output	-
ANNUAL RENEWABLE ENERGY GENERATION	Renewable	1,630,496,471	MWh
CAPACITY OF RENEWABLE ENERGY PLANTS CONSTRUCTED OR REHABILITATED	Renewable	1,291,056,668	MWh
NUMBER OF RENEWABLE PROJECTS	Renewable	5,532	Projects
ANNUAL WATER SAVINGS	Water and Waste Management	660,812,600	M ³
ANNUAL AMOUNT OF WASTE PREVENTED MINIMISED REUSED OR RECYCLED	Water and Waste Management	8,634,103	Tonnes
ANNUAL AMOUNT OF WASTEWATER TREATED REUSED OR AVOIDED	Water and Waste Management	566,058,232	M ³
ANNUAL ABSOLUTE GROSS WATER USE	Water and Waste Management	131,180,275	M ³
ANNUAL AMOUNT OF WASTE COLLECTED TREATED COMPOSTED OR DISPOSED OF	Water and Waste Management	12,583,867	Tonnes
PIPING AND CONDUIT BUILD OR UPGRADED	Water and Waste Management	3,759	KM
INCREASE IN SEWAGE SYS	Water and Waste Management	780	Tonnes
NUMBER OF PEOPLE BENEFITED	Social	2,660,172,547	People
NUMBER OF STUDENTS REACHED	Social	7,015,771,975	Students
JOBS CREATED AND OR RETAINED	Social	21,257,153	Jobs
NUMBER OF PEOPLE PROVIDED HOUSING	Social	10,135,000	People
NUMBER OF INDIVIDUALS FAMILIES BENEFITING FROM SUBSIDIZED HOUSING	Social - Other	12,000,959	Families
NUMBER OF LOANS	Social - Other	1,627,193	Loans
NUMBER OF LOANS TO SMES AND OR MICROENTERPRISES	Social - Other	241,624	Loans
NUMBER OF PATIENTS REACHED	Social - Other	1,511,620,904	Patients
NUMBER OF HOSPITALS AND OTHER HEALTHCARE FACILITIES BUILT UPGRADE	Social - Other	72	Facilities

NUMBER OF PLACES AND BED IN HEALTHCARE FACILITY	Social - Other	737,684	Beds
NUMBER OF SCHOOLS	Social - Other	-	Schools
AVERAGE DISPOSABLE INCOME OF PEOPLE PROVIDED HOUSING	Social - Other	131,315	US\$
NUMBER OF DWELLINGS	Social - Other	16,600,229	Houses
OTHER - NON-STANDARD	Other	Non-comparable Output	-

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