S&P Dow Jones Indices

A Division of S&P Global

iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index Guide

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1) iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index

The iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index aims to meet and exceed the standards for EU Paris-aligned Benchmarks (EU PABs) under Regulation (EU) 2019/2089 amending Regulation (EU) 2016/1011[1]. The regulation proposes the definitions of minimum standards for the methodology of any "EU Paris-Aligned" benchmark indices that aim to be aligned with the objectives of the Paris Agreement[2]. The index also incorporates factors that seek to manage transition risk and climate change opportunities in alignment with the recommendations of the Financial Stability Board's Task Force on Climate related Financial Disclosures (TCFD) 2017 Final Report[3], covering transition risk, climate change opportunities, and stranded assets.

The index, administered by IHS Markit Benchmark Administration Limited, measures the performance of eligible corporate bonds from the iBoxx EUR Corporates parent index. The corporate bonds are selected and weighted to be collectively compatible with a 1.5ºC global warming climate scenario[4] at the index level. The index applies exclusions based on company involvement in specific business activities, company violations against the principles of the United Nations Global Compact (UNGC), and involvement in relevant controversies, all outlined in the ESG criteria section. The index rules aim to efficiently track the EUR investment grade corporate bond universe, whilst upholding minimum standards of investability and liquidity.

The index is designed to address turnover and transaction cost challenges related to new issuances, ratings changes, and other factors which lead to monthly constituent changes. The index aims to minimize the turnover and efficiently track the maturity, rating, industry, option adjusted duration (OAD) and duration times spread (DTS) profile of the parent index while achieving the following constraints:

- Reduced overall absolute greenhouse gas (GHG expressed in CO_2 equivalents) emission levels compared to their respective underlying parent index by at least 50%
- Minimum self-decarbonization rate of absolute GHG emissions in accordance with the trajectory implied by Intergovernmental Panel on Climate Change's (IPCC) most ambitious 1.5ºC scenario, equating to at least 7% GHG intensity reduction on average per annum
- Increased exposure to companies which better manage ESG-related issues, as captured by Sustainalytics ESG Risk Score
- Increased exposure to green bonds as deemed by Climate Bonds Initiate (CBI), Environmental Finance (EF), and S&P Market Intelligence Reference Data using the concept of use of proceeds
- Constituent-level capping to address liquidity and diversification
- Reduced exposure to fossil fuel reserves compared to the parent index
- Yield-to-worst (YTW) improvement against the parent index

The index features the exclusion of companies from the underlying parent index as follows:

- Companies involvement in controversial weapons, tobacco, small arms, military contracting, thermal coal, oil & gas production and power generation, oil sands, shale energy as captured by Sustainalytics
- Companies whose revenues from coal, oil, or natural gas exploration or processing activities exceed defined thresholds, and electricity generation companies that exceed stated revenue thresholds as captured by S&P Global Trucost
- Companies non-compliant with United Nations Global Compact (UNGC) principles around human rights, labor, environment, and anti-corruption as captured by Sustainalytics
- Companies involved in relevant ESG controversies as captured by Sustainalytics controversies methodology

The index is an integral part of the global iBoxx index families, which provide the marketplace with accurate and objective benchmarks by which to assess the performance of bond markets and investments.

The index uses multi-source pricing as described in the document *iBoxx Pricing Rules* publicly available at https://www.spglobal.com/spdji/en/.

This document covers the index highlights, ESG data overview, rules, and calculation methodology.

2) Bond selection rules

The following selection criteria are used to determine and weigh the index constituents:

- Bond type
- Credit rating
- Time to maturity
- Amount outstanding
- ESG Criteria

2.1) Bond type

Only fixed-rate bonds whose cash flow can be determined in advance are eligible for the indices. The indices are comprised solely of bonds. T-Bills and other money market instruments are not eligible. The iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index include only Euro and legacy currency denominated bonds. The issuer's domicile is not relevant.

In particular, bonds with the following characteristics are included:

- Fixed coupon bonds ("plain vanilla bonds")
- Zero coupon bonds
- Step-up bonds
- Event-driven bonds with step-up and step-down coupons, such as rating- or tax-driven bonds
- Dated and undated callable subordinated corporate bonds, including fixed-to-floating rate bonds
- Soft bullet bonds. These are bonds with an initial fixed-coupon period, and a variable or step-up coupon period thereafter, that are structured so that they are expected to be redeemed at the end of the initial period
- Bonds with call options where the first and subsequent call dates are on a date when the bond is otherwise no longer eligible for the index, i.e. bonds with American call options within the last year prior to maturity
- Subordinated financial debt with a contingent conversion feature at the point of non-viability, in line with the capital adequacy requirements of Basel III
- Subordinated financial fixed-to-floating rate bonds with a reset date on or after the first call date
- Senior bank bonds with call options where the first call date is 25 months or less prior to final maturity

The following bond types are specifically excluded from the indices:

- Sinking funds and amortizing bonds
- Other callable and undated bonds
- Floating rate notes and other fixed-to-floater bonds
- Optionally and mandatory convertible bonds from non-financial issuers
- Subordinated financial debt with mandatory contingent conversion features that are based on an observable trigger, or with any conversion options before the first call date, is ineligible for the index
- Collateralized Debt Obligations (CDOs) and bonds collateralized by CDOs
- Retail bonds
- Private placements
- Bonds with differences between accrual and coupon payment periods and monthly-paying bonds
- Extended bonds as defined under section 'Maturity extension' in this document

For retail bonds and private placements, publicly available information is not always conclusive and the classification of a bond as a retail bond or a private placement will be made at S&P DJI's discretion based on the information available at the time of determination. Partial private placements where information on the specific amounts publicly placed and privately placed can be ascertained are included in the indices with the amount publicly placed. If the amount publicly placed is below the cut-off, the bond is not included in the indices. Any bond classified as retail or private placement is added to the list of excluded private placements and retail bonds. The list is published at https://www.spglobal.com/spdji/en/ for future reference and to ensure consistency.

In instances where a new bond type is not specifically excluded or included according to the published index rules, S&P DJI will analyze the features of such securities in line with the principles set out in 2.1 of this guide. S&P DJI may consult specific Index Committees. Any decision as to the eligibility or ineligibility of a new bond type will be published and the index rules will be updated accordingly.

2.2) Credit rating

All bonds in the iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index must have an iBoxx Rating of investment grade. Ratings from the following three credit rating agencies are considered for the calculation of the iBoxx Rating:

- Fitch Ratings
- Moody's Investor Service
- S&P Global Ratings

Investment grade is defined as BBB- or higher from Fitch Ratings and S&P Global Ratings and Baa3 or higher from Moody's Investor Service. Bonds with an RD/SD rating are excluded from the iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index.

If a bond is rated by more than one of the above agencies, then the iBoxx rating is the average of the provided ratings. The rating is consolidated to the nearest rating grade. Rating notches are not used. For more information on how the average rating is determined, please refer to the *iBoxx Rating Methodology* document available at https://www.spglobal.com/spdji/en/.

If a new tranche of a bond is not rated, the rating of its parent applies.

2.3) Time to maturity

All bonds must have a remaining time to maturity of at least one year at rebalancing. The time to maturity is calculated from the rebalancing date to the assumed workout date of the bond, by using the day count convention of the bond.

The workout date for a bond is determined based on the bond features as follows:

- For plain vanilla bonds, the expected workout date is the final maturity date
- For dated and undated callable financial hybrid capital bonds, the workout date is assumed to be the first call date
- For non-financial hybrid capital bonds with an interest rate reset, the workout date is assumed to be the first reset date
- For soft bullets, the expected workout date is determined using the first call date

- For senior callable bank bonds, the first call date will be considered as the workout date if the call date is more than 11 months prior to the final maturity. In case the first call date is 11 months or less prior to the maturity date, the final maturity date will be assumed as the workout date to calculate the time to maturity

2.4) Amount outstanding

All bonds require a specific minimum amount outstanding in order to be eligible for the index, as shown below. The figures indicate minimum issue sizes.

- Corporates: EUR 500 million – EUR 1 billion for legacy bonds (converted from pre-EUR currencies)

2.5) ESG Criteria

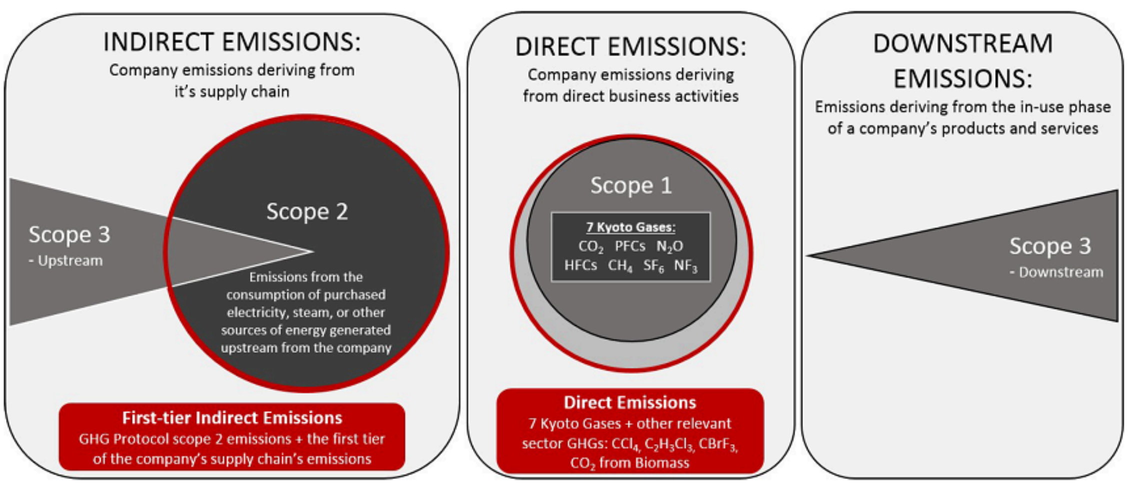
The ESG data is sourced from different ESG vendors, based on data availability and focus.

2.5.1) Greenhouse Gas Emissions

S&P Global Trucost Green House Gas Emissions

Scope 1, 2, and 3 emissions are sourced from S&P Global Trucost to meet decarbonization objectives which are in line with the European Union's benchmark regulations ("EU BMR"). All three scope emissions are measured in tonnes of CO_2 equivalent units.

- **Scope 1 emissions** - emissions from directly emitting sources that are owned or controlled by a company, for example, the emissions produced by the internal combustion engines of a trucking company's lorry fleet
- **Scope 2 emissions** -emissions from the consumption of purchased electricity, steam, or other sources of energy generated upstream from a company's direct operations
- **Scope 3 emissions** - all other emissions associated with a company's operations but that are not directly owned or controlled by the company. Scope 3 emissions therefore include several sources of indirect emissions in both the company's supply chain and downstream from the company's owned or controlled operations (e.g. the emissions from the in-use phase of a company's products or services, such as the driving of a lorry produced by automobile manufacturer). By such a definition, scope 3 emissions are attributed the largest quantity of a company's emissions footprint



2.5.2) Fossil Fuel Reserves

S&P Global Trucost Fossil Fuel Reserves

Fossil fuel companies hold a vast oil, gas, and coal reserves which help determine their market value. Fossil fuel reserves pose climate risks when they are burned. S&P Global Trucost measures fossil fuel reserves across a range of activities including metallurgical coal, thermal coal, conventional oil, unconventional oil, natural gas, shale gas, and many other categories. The reserves are measured in million tonnes CO_2.

2.5.3) Fossil Fuel operations and Power Generation

S&P Global Trucost Sector Revenues

S&P Global Trucost defines 464 sectors that are closely aligned with the North American Industry Classification System (NAICS). S&P Global Trucost's sectors form the basis for the classification process used in the Environmental Register (TER) research process. Companies' revenues for a given financial year are assigned to each relevant S&P Global Trucost sector, mapping a single company to a number of S&P Global Trucost sectors. The sector revenue mapping can be used for excluding companies with a large % of revenue generated from environmental harmful activities (e.g. coal exploration).

As of each rebalancing reference date, companies considered for the iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index are excluded from the eligible universe if the sum of their revenues derived from the relevant S&P Global Trucost sectors breach the following revenue thresholds:

Exclusion Type	S&P Global Trucost Revenue Sectors	Revenue Threshold
Coal Exploration or Processing	Bituminous Coal and Lignite Surface Mining Bituminous Coal Underground Mining All Other Petroleum and Coal Products Manufacturing Pipeline Transportation	≥ 1%
Oil Exploration or Processing	All Other Petroleum and Coal Products Manufacturing Crude Petroleum and Natural Gas Extraction Drilling Oil and Gas Wells Support Activities for Oil and Gas Operations Petroleum Lubricating Oil and Grease Manufacturing Mining and Oil and Gas Field Machinery Manufacturing Tar Sands Extraction Petroleum Refineries Petrochemical Manufacturing Pipeline Transportation	≥ 10%
Natural Gas Exploration or Processing	Crude Petroleum and Natural Gas Extraction Drilling Oil and Gas Wells Support Activities for Oil and Gas Operations Mining and Oil and Gas Field Machinery Manufacturing Natural Gas Liquid Extraction Natural Gas Distribution Industrial Gas Manufacturing Pipeline Transportation	≥ 50%
Power Generation	Coal Power Generation Petroleum Power Generation Natural Gas Power Generation Biomass Power Generation	≥ 50%

These exclusions use the sector revenues dataset from S&P Global Trucost.

2.5.4) ESG Risk Scores

Sustainalytics ESG Risk Ratings

Sustainalytics ESG Risk Ratings are designed to help investors identify and understand financially material ESG risks at the security and portfolio level and how they might affect the long-term performance for equity and fixed income investments. The ESG Risk Ratings, combined with qualitative analyses, provide clients with a differentiated risk signal and deeper insights into the materiality of certain ESG issues for a company and what the company is or is not doing to manage them effectively.

The company's overall score applies the concept of risk decomposition to derive the level of unmanaged risk for a company, which is assigned to one of five risk categories. The score ranges from 0 and 100, with 0 indicating that risks have been fully managed (no unmanaged ESG risks) and 100 indicating the highest level of unmanaged risk. It is calculated as the difference between a company's overall exposure score and its overall managed risk score, or alternatively by adding the Corporate Governance unmanaged risk score to the sum of the company's issue unmanaged risk scores.

2.5.5) Controversies

Sustainalytics Controversy Score

Sustainalytics Controversies Research identifies companies' involved in incidents and events that may pose a business or reputation risk to a company due to the potential impact on stakeholders or the environment. The controversy score is based on the most up-to-date information from a wide range of reliable international and local news and NGO sources. Controversies are rated on a scale from one to five with five denoting controversies that have the most severe impact to stakeholders and the environment, leading to business risks to companies. In particular, the iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index excludes companies that have a controversy score of 5.

2.5.6) UNGC/GSS screening

Sustainalytics Global Standards Screening

Companies are expected to operate within internationally accepted norms and standards related to:

- Human Rights
- Society
- Labor
- Environment

Sustainalytics Global Standards Screening (GSS) assesses companies compliance with the United Nations (UN) Global Compact Principles. It identifies companies that are violating or are at risk of violating these principles, by assigning one of the following three statuses:

- Non-Compliant. Classification given to companies that do not act in accordance with the UNGC principles and its associated standards, conventions, and treaties
- Watchlist. Classification given to companies that are at risk of violating one or more principles, for which all dimensions for Non-Compliant status could not be established or confirmed
- Compliant. Classification given to companies that act in accordance with the UNGC principles and its associated standards, conventions, and treaties

The nature and scope of impact on stakeholders is one of the primary ways Sustainalytics determine compliance status.

Companies classified as Non-Compliant, according to Sustainalytics, are ineligible for the index. Companies not covered by Sustainalytics are excluded from the index.

Please refer to http://www.sustainalytics.com for more information.

2.5.7) Product Involvement

Sustainalytics Product Involvement Screening

Product Involvement (PI) provides research on company involvement in products and services, which allow for screening companies according to specific criteria motivated by ethical, impact, compliance or ESG risk considerations. Level of Involvement refers to the company's direct exposure to such products through revenue generation, while Significant Ownership indicates where the company has indirect involvement above a specified level of ownership of a subsidiary company with involvement. Companies not covered by Sustainalytics are excluded from the index. Issuers with exposure to the following activities and at the following thresholds are excluded:

Product Involvement	Category of Involvement	Level of Involvement Revenue Threshold	Significant Ownership Threshold
Controversial Weapons	**Tailor Made and Essential:** The company is involved in the core weapon system, or components/services of the core weapon system that are considered tailor-made and essential for the lethal use of the weapon.	> 0%	≥ 25%
	Non-Tailor Made and Non-Essential: The company provides components/services for the core weapon system, which are either not considered tailor-made or not essential to the lethal use of the weapon.	> 0%	≥ 25%
Tobacco	**Production:** The company manufactures tobacco products.	> 0%	≥ 25%
	Related Products/Services: The company supplies tobacco-related products/services.	≥ 5%	≥ 25%
	Retail: The company derives revenues from the distribution and/or retail sale of tobacco products.	≥ 5%	≥ 25%
Small Arms	**Civilian Customers (Assault Weapons):** The company manufactures and sells assault weapons to civilian customers.	> 0%	≥ 25%
	Civilian Customers (Non-Assault Weapons): The company manufactures and sells small arms (non-assault weapons) to civilian customers.	> 0%	≥ 25%
	Key Components: The company manufactures and sells key components of small arms.	> 0%	≥ 25%
	Military / Law Enforcement Customers: The company manufactures and sells small arms to military/law enforcement.	> 0%	≥ 25%

Product Involvement	Category of Involvement	Level of Involvement Revenue Threshold	Significant Ownership Threshold
	Retail/Distribution (Assault Weapons): The company is involved in the retail and/or distribution of assault weapons.	≥ 5%	NA
	Retail/Distribution (Non-Assault Weapons): The company is involved in the retail and/or distribution of small arms (non-assault weapons)	≥ 5%	NA
Military Contracting	**Weapons:** The company manufactures military weapon systems and/or integral, tailor-made components or these weapons.	≥ 10%	NA
	Weapons-Related Products and Services: The company provides tailor-made products and/or services that support military weapons.	≥ 10%	NA
Thermal Coal	**Extraction:** The company extracts thermal coal	≥ 5%	NA
	Power Generation: The company generates electricity from thermal coal	≥ 5%	NA
Oil Sands	**Extraction:** The company extracts oil sands.	≥ 5%	NA
Shale Energy	**Extraction:** The company is involved in shale energy exploration and/or production	≥ 5%	NA
Oil & Gas	**Production:** The company is involved in oil and gas exploration, production, refining, transportation and/or storage.	≥ 10%	NA
	Power Generation: The company generates electricity from oil and/or gas.	≥ 50%	NA

Please refer to http://www.sustainalytics.com for more information.

2.5.8) Green Bonds

The index leverages external, independent data sources for determining "Green" bonds. The data is provided by Climate Bonds Initiative (CBI), Environmental Finance (EF) and S&P Market Intelligence Reference Data and contains self-labelled as well as other eligible Green bond issuances. The index considers bonds broadly based on the International Capital Market Association's (ICMA) voluntary Green Bond Principles (GBP). The methodology uses dual sourcing, supplemented with (in-house) professional expertise, to determine whether multiple sources classify a given bond as "Green" based on the use of proceeds. This ensures each bond is "Green" labelled based upon at least 2 independent sources. All bonds need to have a clear commitment for the use of proceeds. Data is further verified based on publicly available prospectus and other relevant documents. Bonds for which the classification is pending or unlabeled are not considered "Green".

ICMA is a regulatory authority and trade association that serves European capital markets to promote greater transparency, efficiency and harmony.

Climate Bonds Initiative (CBI)

Climate Bonds Initiative is an international organization working to mobilize global capital for climate action. CBI achieves this through the development of the Climate Bonds Standard and Certification Scheme, Policy Engagement and Market Intelligence work. CBI provide weekly and monthly files to classify green bonds based on use of proceeds.

For more information on CBI, please refer to https://www.climatebonds.net.

Environmental Finance (EF)

Environmental Finance has a reputation in delivering market-leading content on the risks and opportunities present to the financial community of the move to a lower-carbon environment.

For more information on EF, please refer to https://efdata.org/.

S&P Market Intelligence Reference Data

Provides green bonds classification.

S&P Market Intelligence Reference Data offers detailed reference data for bonds which enables a comprehensive view of assets from issuance to maturity. Self-labelled bonds green are captured based on information provided in the bond prospectus.

3) Bond classification

All bonds are classified based on the principal activities of the issuer and the main sources of the cash flows used to pay coupons and redemptions. In addition, a bond's specific collateral type or legal provisions are evaluated. Hence, it is possible that bonds issued from different subsidiaries of the same issuer carry different classifications.

The issuer classification is reviewed regularly based on updated information received by S&P DJI, and status changes are included in the index at the next rebalancing if necessary.

Where the sector classification of a specific entity is not very clear due to the diversified business of the entity, decision will be made at S&P DJI's discretion. S&P DJI will assign the classification according to its evaluation of the business risk presented in the security prospectus and annual reports, if available. S&P DJI will also compare the classification to peers in the potential sectors. Membership lists including classification are published on the FTP server and in the *Indices* section of the webpage for registered users.

3.1) Corporates

Bonds issued by public or private corporations. Corporate bonds are further classified into Financials and Non-Financials bonds and then into their multiple-level economic sectors, according to the issuer's business scope. The category insurance-wrapped is added under Financials for corporate bonds whose timely coupon and/or principal payments are guaranteed by a special mono-line insurer such as AMBAC or MBIA. The sector overview is shown in Table 1 below.

Table 1: Overview of Markit iBoxx Corporates Sectors

	Economic Sector	Market Sector	Market Sub-Sector
Financials	Core Financials	Banks	Banks
		Insurance	Life Insurance
			Nonlife Insurance
	Financial Services	Financial Services	Equity Investment Instruments
			General Financial
			Nonequity Investment Instruments
		Insurance-wrapped	*
	Real Estate	Real Estate	Real Estate Investment & Services
			Real Estate Investment Trusts
Non-Financials	Basic Materials	Basic Resources	Forestry & Paper
			Industrial Metals
			Mining
		Chemicals	Chemicals
	Consumer Goods	Automobiles & Parts	Automobiles & Parts
		Food & Beverage	Beverages

	Economic Sector	Market Sector	Market Sub-Sector
			Food Producers
		Personal & Household Goods	Household Goods
			Leisure Goods
			Personal Goods
			Tobacco
	Consumer Services	Education	Academic & Educational Services
		Media	Media
		Retail	Food & Drug Retailers
			General Retailers
		Travel & Leisure	Travel & Leisure
	Energy	Oil & Gas	Oil Equipment / Services & Distribution
			Oil & Gas Producers
		Renewable Energy	Renewable Energy
	Health Care	Health Care	Health Care Equipment & Services
			Pharmaceuticals & Biotechnology
	Industrials	Construction & Materials	Construction & Materials
		Industrial Goods & Services	Aerospace & Defense
			Electronic & Electrical Equipment
			General Industrials
			Industrial Engineering
			Industrial Transportation
			Support Services
	Technology	Technology	Software & IT Services
			Technology Hardware & Equipment
	Telecommunications	Telecommunications	Integrated Telecommunications
			Wireless Telecommunications
	Utilities	Utilities	Electricity
			Gas / Water & Multiutilities

3.2) Additional classification

Corporate debt is further classified into senior and subordinated debt. Bank senior debt structure additionally differentiates between Bail-in and Preferred bonds. The Bail-in classification captures all senior notes which are subject to write-down or conversion into a subordinated instrument on the occurrence of a resolution event, as well as senior bank debt issued by bank holding companies.

Hybrid capital issued by banking and insurance institutions is further detailed into the respective tiers of subordination.

The market information on the tier of subordination for insurance capital is often less standardized and clear than the equivalent issues by banks. In these cases, the classification is based on the maturity, coupon payment and deferral provisions of the bond from the offering circulars of the bonds. The table below displays the seniority classification of debt issued by both financial and non-financial sectors.

Table 2: Overview of seniority levels

Market Sector	Seniority Level 1	Seniority Level 2	Seniority Level 3
Bank	SEN	Preferred	*
		Bail-in	*
	SUB	T2 (post-Jan '13 issuances)	T2 callable
			T2 non-callable
		T2 (pre-Jan '13 issuances)	LT2 callable
			LT2 non-callable
			UT2
		T1	T1 step
			T1 non-step
Insurance	SEN	*	*
	SUB	T3	*
		T2 dated	T2 dated callable
			T2 dated non-callable
		T2 perpetual	*
		T1	*
Other sectors	SEN	*	*
	SUB	Other	Hybrid**
			Non-hybrid

** Bonds will be required to fulfil the following criteria to be considered hybrids:

- Subordinated
- Deferrable coupons
- First non-call period >= 5 years
- Either perpetual or ‘long-dated’, where ‘long-dated’ is defined as > 25 years of the time to maturity at issuance

4) Index calculation

4.1) Static data

Information used in the index calculation is sourced from offering circulars and checked against standard data providers.

4.2) Bond prices

For more details please refer to the *iBoxx Pricing Rules* document, available in the *Methodology* section of the webpage at https://www.spglobal.com/spdji/en/.

4.3) Rebalancing process

The iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index is rebalanced monthly on the last business day of the month after the close of business. Changes to outstanding amounts are only taken into account if they are publicly known three business days before the end of the month. Changes in ratings are only taken into account if they are publicly known two business days before the end of the month. New bonds issued are taken into account if they are publicly known to settle until the last calendar day of the month, inclusive, and if their rating has become known at least three trading days before the end of the month.

Four business days before the end of each month, a preliminary membership list is published on the FTP server and in the *Indices* section at https://www.spglobal.com/spdji/en/ for registered users.

Three business days before the end of each month, a membership list with final amount outstanding for each bond is published.

Two business days before the end of each month, the rating information for the constituents is updated and the list is adjusted for all rating changes which are known to have taken place two trading days before the end of the month. Bonds which are known to have been upgraded to investment grade two trading days before the end of the month are not included in the membership, but bonds which are known to have been downgraded to sub-investment grade two trading days before the end of the month do get excluded from the membership. However, if any bonds which are part of the broader EUR universe become eligible two business days prior to rebalancing because of rating or amount changes, they will be included in the Index.

On the last business day of each month, S&P DJI publishes the final membership with closing prices for the bonds, and various bonds analytics based on the index prices of the bonds.

4.4) Index Construction

At each rebalancing, the eligible constituents are selected from the underlying parent index. Next, an optimization process is applied to the eligible constituents to efficiently track the parent index while minimizing the turnover. This section will cover the objective function and constraints which are used in the optimization process.

4.4.1) Objective Function

The objective function is designed to efficiently track the parent index at the sector level and minimize turnover.

$$Minimize\left(\frac{1}{n}\sum\left[\frac{(OptimizedWeight_i - PriorWeight_i)^2}{PriorWeight_i}\right] + \frac{1}{s}\sum\left[\frac{(OptimizedSectorWeight_i - ParentSectorWeight_i)^2}{ParentSectorWeight_i}\right]\right)$$

where:

- $n =$ number of bonds
- $s =$ number of sectors
- $PriorWeight_i$ targets the parent bond weight at index launch and thereafter the prior climate bond weight in each subsequent rebalance. Weights associated with bonds that drop out are reallocated to new bonds on a pro-rata basis.
- $ParentSectorWeight_i$ reflect weights of the parent index
- $OptimizedWeight_i$ and $OptimizedSectorWeight_i$ are solved via optimization

4.4.2) Optimization Constraints

The optimization incorporates transition risk, climate opportunities, return, risk, and tracking constraints.

4.4.2.1) Transition Risk Constraints

Transition risk constraints meet or exceed the EU BMR regulatory requirements and reduce absolute emissions over time. Below constraints help to meet the objectives of increasing exposure to companies with lower environment, social, and governance risk scores and reducing exposure to companies which possess high fossil fuel reserves.

- **Absolute Carbon Emissions (ACE*) Target based on S&P Global Trucost data:** At least 50% less ACE than the underlying parent index, with a 2.5% buffer
- **7% Decarbonization Trajectory ACE* Target based on S&P Global Trucost data:** At least 7% reduction in ACE per year, compared to the index history start date of 31 January 2019, with a 2.5% buffer
- **Weighted-average Sustainalytics ESG Risk Score (waE):** At least 10% lower (better) weighted-average Sustainalytics ESG Risk Score compared to the underlying parent index
- **Fossil Fuel Reserves Intensity (FFR*) based on S&P Global Trucost data:** At most 20% FRR compared to the underlying parent index

** Further defined in Constraint-Related Definitions below.*

Table 3: Transition Risk Constraints

Constraint*	iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index	Data Source
Absolute Carbon Emission (ACE) Target	≤ underlying ACE × 50% × Buffer**	S&P Global Trucost
7% Decarbonization Trajectory ACE Target	≤ AnchorACE*** x $(1-0.07)^{\left(\frac{t}{12}\right)}$ x Buffer** where: t = number of months since January 31, 2019****	S&P Global Trucost
Weighted-average Sustainalytics ESG Risk Score (waE)	≤ 90% x Benchmark ESG Risk Score*****	Sustainalytics
Fossil Fuel Reserves Intensity (FFR)	≤ 20% x FFR of underlying index	S&P Global Trucost

** Constraints are defined in Constraint-Related Definitions below.*
*** Where Buffer = 97.5% to represent a 2.5% margin to allow for drift between targeted and realized ACE.*
**** AnchorACE corresponds to the index ACE level as of the January 31, 2019 which is the history start date.*
***** January 31, 2019 corresponds to the start date of the history*
****** Companies missing a Sustainalytics ESG Risk Score are excluded from the Benchmark ESG Risk score calculation.*

4.4.2.2) Climate Opportunities Constraints

The iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index uses climate opportunities constraints to increase exposure to green companies which issue green bonds through the concept of use of proceeds. Refer to the Green Bonds ESG Eligibility Criteria section for additional details.

Table 4: Climate Opportunities Constraints

Constraint	iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index	Data Source
Green Bond Improvement	≥ 125% x Green Bond Weight of underlying index	CBI / EF / S&P

4.4.2.3) Risk, Exposure and Yield-to-Worst Constraints

These additional constraints are incorporated to manage concentration risk, tracking to the parent index, and yield-to-worst improvement against the parent index.

Table 5: Risk, Exposure and Yield-to-Worst Constraints

Constraint	iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index
Yield-to-worst (YTW) Improvement	≥ Parent YTW
OAD Absolute Deviation Cap	+/- 0.25yrs
DTS Relative Deviation Cap	+/- 5%
Maturity Bucket Weight Deviation Cap	≤ 2%

Constraint	iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index
Rating Bucket Weight Deviation Cap	≤ 2%
Max Issuer Cap	≤ 5%
Max Issue Deviation Cap	≤ 10 x Screened Parent Weight
Min Issue Deviation Cap	≥ 0.05 x Screened Parent Weight

4.4.3) Constraint Relaxation Hierarchy

In the case that the optimization does not solve for a certain period each constraint in the hierarchy will be partially relaxed in the order listed below and repeated, where required, until a solution is found.

- Green Bond Improvement
- Fossil Fuel Reserves Constraint
- Weighted-average Sustainalytics ESG Risk Score
- OAD absolute deviation constraint
- DTS relative deviation constraint
- Max Issuer Constraint
- Min/Max Issue Constraint
- Maturity Deviation Constraint
- Ratings Deviation Constraint

The following constraints are considered hard constraints and will not be relaxed:

- Absolute Carbon Emission (ACE) Target
- 7% Decarbonization Trajectory ACE Target

4.4.4) Constraint-Related Definitions

Absolute Carbon Emissions (ACE)

$$\sum w_i \times \text{Carbon Footprint}_i \times Debt^{Parent}$$

where:

- $w_i =$ weight of company i in index
- $\text{Carbon Footprint}_i = \dfrac{GHG1_i + GHG2_i + GHG3_i}{Debt_i}$ (GHG by Debt)
- $GHG1_i =$ Scope 1 GHG emissions in tCO_2e for company i
- $GHG2_i =$ Scope 2 GHG emissions in tCO_2e for company i
- $GHG3_i =$ Scope 3 (upstream and downstream) GHG emissions in tCO_2e for company i
- $Debt_i =$ market value of debt outstanding in the parent index of company i
- $Debt^{Parent} =$ total market value of debt outstanding in the parent index

Fossil Fuel Reserves (FFR)

$$\sum w_i \times \frac{\text{Fossil Fuel Reserves}_i}{Debt_i}$$

where:

- $w_i =$ weight of company i in index
- $\text{Fossil Fuel Reserves}_i =$ the embedded emissions (tCO2) within the fossil fuel reserves owned by company i
- $Debt_i =$ market value of debt outstanding in the parent index of company i

This metric is calculated using the fossil fuel reserves dataset provided by Trucost.

4.5) Index data

The calculation of the index is based on bid prices. New securities are included in the index at their respective ask prices when they enter the index family. In the event that no price can be established for a particular security, the index continues to be calculated based on the last available price. This might be the case in periods of market stress, or disruption as well as in illiquid or fragmented markets. If the required inputs become impossible to obtain, S&P DJI may consult market participants prior to the next rebalancing date. Decisions are made publicly available on a timely basis and S&P DJI may refer back to previous cases.

The iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index is calculated as end-of-day index and distributed once daily. The index is calculated every Monday to Friday. In addition, the index is calculated with the previous trading day's closing prices on the last calendar day of each month if that day is not a trading day as well as on common bank holidays as published in the iBoxx index calculation calendar available at https://www.spglobal.com/spdji/en/. Index data is also available from the main information vendors. Bond and index analytical values are calculated every day using that day's closing prices, or the previous trading day's closing prices on the last calendar day of each month if that day falls on a weekend or a common bank holiday as published in the iBoxx index calculation calendar. Closing index values and key statistics are published at the end of each calculation day in the Indices section at https://www.spglobal.com/spdji/en/ for registered users.

The rebalancing takes place after close of market on the last trading day of a rebalancing month.

4.6) Index calculus

For specific index formulas please refer to the *Markit iBoxx Bond Index Calculus* document, available in the *Methodology* section of the iBoxx Documentation page at https://www.spglobal.com/spdji/en/.

4.7) Index and Analytics Weight

The iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index is weighted through an optimization process to ensure the EU BMR regulations and constraints are met. The amount outstanding of a bond is adjusted to reflect optimized weights.

All calculations are based on the adjusted amount outstanding.

4.8) Treatment of the special intra-month events

Data for the application of corporate actions in the index may not be fully or timely available at all times, e.g. the final call prices for make-whole calls or the actual pay-in-kind percentage for PIK-payment options. In such cases, S&P DJI will estimate the approximate value based on the available data at the time of calculation.

4.8.1) Funged bonds

Bonds may be issued in several tranches. The different tranches are initially legally separate and therefore trade independently for a certain period. On and after the funge date, the tranches will be combined into one bond, i.e. the parent tranche will contain the original security, as well as the additional notional(s) from the new tranche(s). After the funge date, the prices for both the securities are the same, because they constitute one uniform bond. This is reflected in the indices as follows:

4.8.1.1) Parent and new tranche are both index constituents

- After the funge date, the price from the parent tranche is used for the funged tranche; no price for the funged bond
- Funged tranche leaves the index at the next rebalancing and parent amount outstanding increases accordingly

4.8.1.2) Parent is an index constituent, but the new tranche is not

- No special intra-month treatment necessary
- Parent amount outstanding increases at the next rebalancing

4.8.1.3) Parent is not an index constituent but the new tranche is

- No special intra-month treatment necessary
- Funged tranche leaves the index; parent tranche enters the index at the next rebalancing

4.8.2) Full redemptions: exercised calls, puts and buybacks

If a bond is fully redeemed intra-month, the bond effectively ceases to exist. In all calculations, the redeemed bond is treated as cash based on the last price, the call price or repurchase price, as applicable. The redemption factor, redemption and the redemption price are used to treat these events in the index and analytics calculation. In addition, the clean price of the bond is set to the redemption price, and the interest accrued until the redemption date is treated as an irregular coupon payment.

4.8.3) Bonds trading flat of accrued

If a bond is identified as trading flat of accrued, the accrued interest of the bond is set to 0 in the total return index calculation and is excluded from the calculation of all bond and index analytical values.

Bonds will be considered trading flat of accrued in any of the following situations:

- a bond has been assigned a default rating and/or
- issuer has announced a failure to pay a coupon and/or
- issuer has announced an intention not to make a payment on an upcoming coupon (grace period).

4.8.4) Maturity extension

4.8.4.1) Maturity extension for perpetual bonds without a reset date

Maturity	Coupon/call structure	Workout date at issuance	Updated Workout date if not called
Perpetual	Fixed/ Callable	Assume first call date as workout date	Extend workout date until the assumed next call date - 5 years from first call date*.

*Assumes the terms allow for a redemption at the new assumed maturity date.

4.8.4.2) Maturity extension for perpetuals & dated fixed-to-fixed bonds with a reset date

Maturity	Coupon/Call structure	Workout Date at issuance	Updated Workout date if not called
Perpetual	Reset*/Callable	Assume first call date as workout date	Extend workout date until the end of the next reset date*
Dated	Reset/Callable	Assume reset date as workout date	Extend workout date until the end of the next reset date or final maturity date*

*Assumes the bond terms allow for a redemption at the new assumed maturity date

4.8.5) Multi-coupon bonds

Some bonds have pre-defined coupon changes that lead to a change in the annual coupon over the life of the bond. In all instances, the coupon change must be a fixed amount on top of a fixed coupon, i.e. floating coupon bonds are not eligible for the indices. The two main categories of bonds are step-up bonds and event-driven bonds.

- **Step-up bonds:** These are bonds with a pre-defined coupon schedule that cannot change during the life of the bond. The coupon schedule is used in all bond calculations.
- **Event-driven bonds:** These are bonds whose coupon may change upon occurrence (or non-occurrence) of pre-specified events, such as rating changes, e.g. rating-driven bonds, failure to register (register-driven bonds), or failure to complete a merger (merger-driven bonds). In the calculation of the indices and the analytics, the coupon schedule as of the calculation date is used. That is to say, any events occurring after the calculation date are ignored in the determination of the applicable coupon schedule. *Example of an event-driven bond:* A bond's rating changes on 31 December 2003 from A- to BBB+ and the coupon steps up from 6% to 6.25% from 1 March 2004 onward. The coupon dates are 1 October and 1 April each year. The correct coupon schedule for the bond and index calculations is date dependent. The index calculation on 20 December 2003 uses the 6% coupon for the whole life of the bond, while the calculation on 31 January 2004 uses a 6% coupon for the current coupon period to 29 February 2004, and a 6.25% coupon for all later interest payments. The index calculation on 20 March uses a 6% coupon until 29 February, a 6.25% coupon for the remainder of the current coupon period and a 6.25% coupon for all future coupon payments. The index calculation after 1 April uses a 6.25% coupon.

4.8.6) Ex-dividend conventions

Some markets have ex-dividend conventions. Ex-dividend means that the next coupon is detached from the bond several days in advance of the coupon payment date. The date on which the next coupon is detached is the ex-dividend date and the period between the ex-dividend date and the coupon payment date is the ex-dividend period. If a bond is in the ex-dividend period, the next coupon payment will not be paid to a buyer of this bond, but will be paid to the original bond holder.

The indices and analytics calculations take ex-dividend conventions into account. During the ex-dividend period, the accrued interest of the bond is negative, while the next coupon payment is held separate in the variable coupon adjustment. If the bond enters the index during the ex-dividend period, then the next coupon payment and the coupon adjustment will not accrue to the index. However, if the bond was already in the index, the next coupon payment needs to be included in the total return calculations. This is controlled via the ex-dividend indicator which is 0 if the bond enters the index during the current ex-dividend period and 1 if not. The same treatment is also applied to all analytics calculation, i.e. the first cash flow is excluded from the calculations if the bond enters during the current ex-dividend period.

4.9) Determination of benchmarks

Benchmark spreads are calculated for every constituent bond as the difference between the annual or semi-annual yield of the bond and the annual or semi-annual yield of its benchmark. The benchmark assignment for the bonds is reviewed monthly. Benchmarks for the bonds in the iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index are equivalent to the benchmarks for the respective bonds in the iBoxx EUR Benchmark universe.

A benchmark bond of the Markit iBoxx EUR Benchmark universe is defined as the most liquid and low risk bond in each of the maturity bands listed below.

The procedure starts at first running a regression algorithm on all bonds in the Markit iBoxx Eurozone index in order to determine the benchmark curve, and bonds with a positive spread to the curve are eliminated. The procedure is then repeated until one of the following is met:

1. R-square above 0.99
2. Standard deviation of yield-spread to curve is less than 3.5 bps
3. Number of bonds left is between 15 and 40.

The bonds remaining after running the procedure above are assigned to Sets A or B depending on their age. An eligible bond is assigned to Set A within a maturity band if it is not older than two years. Otherwise, it is assigned to Set B. The age of a bond is calculated from the first settlement date to the current rebalancing date. The largest bond (by amount outstanding) of all bonds in Set A is selected as the respective benchmark for each defined maturity band. If Set A is empty, then the most recently issued bond of Set B is chosen as the respective benchmark of the band.

Maturity bands are defined as follows:

Benchmark Maturity Bands	Bond Maturity
1 year	< 1.5 years
2 years	1.5 to < 2.5 years
3 years	2.5 to < 3.5 years
4 years	3.5 to < 4.5 years
5 years	4.5 to < 5.5 years
6 years	5.5 to < 6.5 years
7 years	6.5 to < 7.5 years
8 years	7.5 to < 8.5 years
9 years	8.5 to < 9.5 years
10 years	9.5 to < 12.5 years
15 years	12.5 to < 17.5 years
20 years	17.5 to < 25 years
Long	≥ 25 years

For every bond in the Markit iBoxx EUR indices, the benchmark bond with the closest maturity is selected as a benchmark. Therefore, the chosen benchmark is not necessarily the same as the benchmark for the maturity band of the bond. If the time to maturity distance of a bond to its two neighboring benchmarks is exactly the same, then the benchmark bond with the closer coupon is chosen. If the coupon distance of the two neighbouring bonds is also exactly the same, then the younger of the two benchmark bonds is chosen.

4.10) Index history

The Index history starts on 31 January 2019. The index has a base value of 100 on that date.

4.11) Settlement conventions

All iBoxx indices are calculated using the assumption of T+0 settlement days.

4.12) Calendar

S&P DJI publishes an index calculation calendar in the *iBoxx Calendars* section of the iBoxx Documentation page at https://www.spglobal.com/spdji/en/. This calendar provides an overview of the index calculation holidays of the iBoxx bond index families in a given year.

4.13) Publication of the Index

The iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index is calculated as end-of-day index and distributed once daily after market close.

Bond and index analytical values are calculated end of day Monday to Friday using that day's closing prices. In addition, bond and index analytical values are calculated using the previous trading day's closing prices on the last calendar day of each month if that day is not a regular trading day as well as on common bank holidays as published in the iBoxx index calculation calendar. This index calculation calendar is available at https://www.spglobal.com/spdji/en/ under *iBoxx Calendars*. Index data is also available from the main information vendors.

Closing index values and key statistics are published at the end of each calculation day in the *Indices* section of the website for registered users.

4.14) Data publication and access

The table below summarizes the publication of iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index in the Indices section of the S&P DJI website at https://www.spglobal.com/spdji/en/ for registered users and on the FTP server.

Table 6: Data publication and access

Frequency	File Type	Access
Daily	Underlying file – Bond level	FTP Server
	Indices files – Index level	FTP Server / website/ Bloomberg for index levels only
T-3 and T-2	Preview components	FTP Server / website
Monthly	End of month components	FTP Server / website
	XREF files	FTP Server

The index identifiers for the publication channels are:

Indexname	Version	ISIN	SEDOL	BBG Tickers	RIC
iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG	TRI	GB00BQ8WRY24	BQ8WRY2	IBXXEPAB	.IBXXEPAB
iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG	CPI	GB00BQ8WRZ31	BQ8WRZ3	IBXXEPAP	.IBXXEPAP

4.15) Annual index review

In addition to the daily governance of indices and maintenance of index methodologies, at least once within any 12-month period, the Index Committee reviews the methodology to ensure the indices continue to achieve the stated objectives, and that the data and methodology remain effective. In certain instances, S&P Dow Jones Indices may publish a consultation inviting comments from external parties.

5) Summary of key ESG factors

Explanation of how ESG factors are reflected in the key elements of the benchmark methodology	
Item 1: Benchmark administrator	IHS Markit Benchmark Administration Ltd. ('IMBA UK')
Item 2: Type of benchmark	Fixed income
Item 3: Name of benchmark or family of benchmarks	iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index
Item 4. Are there in the portfolio of the benchmark administrator any EU Climate Transition Benchmarks, EU Paris-aligned Benchmarks, benchmarks that pursue ESG objectives or benchmarks that take into account ESG factors	Yes
Item 5: Does the benchmark methodology take into account ESG factors	Yes
Item 6a: List of Environmental factors considered	Exclusions are driven by company exposure to the following factors: ● Thermal coal ● Oil sands ● Shale energy ● Oil & gas ● Coal exploration or processing ● Oil exploration or processing ● Natural gas exploration or processing ● Power generation Weights are further adjusted by company exposure to the following factors: ● Use of proceeds for Green Bonds have to be aligned with the ICMA Green Bond principles. Evidence is based on self-certification ● Greenhouse gas emissions ● Fossil fuel reserves
Item 6b: List of Social factors considered	Exclusions are driven by company exposure to the following factors: ● Controversial weapons ● Small arms ● Military contracting ● Tobacco
Item 6c: List of Governance factors considered	N/A
Item 6d: List of any other overall ESG factors	Additionally, exclusions are driven by the following factors: ● Controversies ● United Nations Global Compact (UNGC) Additionally, weights are further adjusted driven by the following factor: ● ESG Risk Scores
Item 7: Hyperlink to ESG factors information	iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index
Item 8a(i): Source of input	Data is sourced externally from S&P Global Trucost. Data is sourced externally from Sustainalytics ESG Research.

	Data is also sourced externally from Climate Bonds Initiative ("CBI"), Environmental Finance and S&P Market Intelligence Reference Data, supplemented with professional expertise and bond prospectuses.
Item 8a(ii): Data input	S&P Global Trucost has been assessing risks relating to climate change, natural resource constraints, and broader environmental, social, and governance factors since 2000. Sources of S&P Global Trucost Data:The data comes from a variety of sources, including company annual reports, direct disclosures, scientific literature, and a wide array of national, international, and industry databases, industry "top-down" data, as well as sector-specific "bottom-up" data. For further information, please refer to: https://www.support.marketplace.spglobal.com/en/datasets/alternative/trucost_environmental/trucost_environmental_data_methodology_guide.pdf Sustainalytics is a leading independent ESG and corporate governance research, ratings and analytics firm that supports investors around the world with the development and implementation of responsible investment strategies. In particular, this index uses the following ESG Products: Sustainalytics ESG Risk Rating Scores, Controversies, Global Standards Screening and Product Involvement. For details on Sustainalytics ESG Research's full suite of ESG products, please refer to: http://www.sustainalytics.com Sustainalytics' research process involves the collection and analysis of information made available by third parties, including civil society, corporate, government, industry association, investor, media and regulatory sources. Sustainalytics also uses 3rd party data providers about which information is available at https://www.sustainalytics.com/legal-disclaimers/ Climate Bonds Initiative ("CBI"), Environmental Finance and S&P Market Intelligence Reference Data relies on a proprietary methodology informed by a range of data sources. CBI track all self-labelled green bonds, subject to screening criteria explained in CBI Green Bond Database Methodology. All data is collected by the Climate Bonds Initiative and is filtered to include only: ● bonds with at least 95% use of proceeds financing or refinancing green/environmental projects - social bonds are not included ● bonds which are broadly aligned with the Climate Bonds Taxonomy. This means that, for example, bonds financing so-called "clean coal" are excluded. Environmental Finance's database tracks self-labelled green, social and sustainability bond. The dataset includes bonds where the issuer and/or lead manager explicitly states that they are green, social or sustainability focused. S&P Market Intelligence Reference Data offers detailed reference data for bonds which enables a comprehensive view of assets from issuance to maturity. Self-labelled green, social and sustainability bonds are captured based on information provided in the bond prospectus.
Item 8b: Verification and quality of data	For the S&P Global Trucost Research Process:S&P Global Trucost follows a four-step research process designed to minimize the environmental reporting burden of companies ("survey fatigue") and to provide a transparent system for companies to verify their environmental performance profile, and, at any time, contribute to their most recently available data. Four-step research process: 1. MAP company business segments:S&P Global Trucost maps company business segments to more than 450 business

activities in the S&P Global Trucost model. The model is based on the North American Industry Classification System (NAICS), but goes into greater granularity in some areas, such as power generating utilities.

2. ESTIMATE data-modelled profile:Once company business segments have been mapped to S&P Global Trucost sectors and their share of revenue apportioned to each, S&P Global Trucost is able to efficiently generate a data modelled profile for the company. S&P Global Trucost uses its environmentally extended input/output (EEIO) model to estimate data for over 800 environmental and operational metrics across the entire operations of companies, from the raw materials they depend on in their supply chains to the electricity they purchase to power their operations.

3. COLLECT public disclosure:S&P Global Trucost searches for environmental performance information in annual reports, sustainability reports, websites, and other publicly disclosed sources. Third party datasets, like disclosures to the CDP, are also reviewed. We then standardize reported environmental performance data to best practice guidelines so that it can be compared across companies, regions, and business activities. To correct reporting errors, vigorous data control procedures are applied, such as sector specialist data reviews, automated outlier identifications and year-on-year comparisons. Wherever a material metric is not disclosed, S&P Global Trucost uses its modelled value, thus ensuring that all data gaps have been filled.

4. ENGAGE with company:S&P Global Trucost then conducts an annual engagement with every company, providing the opportunity to verify environmental performance and provide additional information. Companies are further welcomed to contact S&P Global Trucost analysts at any point in their environmental reporting cycle to provide their most recently available data. This ensures S&P Global Trucost's data is both accurate and up to date.

For further information, please refer to: https://www.support.marketplace.spglobal.com/en/datasets/alternative/trucost_environmental/trucost_environmental_data_methodology_guide.pdf

Sustainalytics Quality Approach to:

A. ESG Risk Rating:

Universe Management

- Centralized universe definitions and processes for rebalancing
- Quarterly rebalances of Sustainalytics' standard coverage and compliance universes
- Clear, transparent and consistent approach to the allocation of research versus coverage entities

Company Research

- Continuous improvement and maintenance of quality and research standards
- Feedback that is received from Companies in Sustainalytics' Coverage Universe and that are a part of our ESG Risk Ratings and controversy research is taken into consideration, and whenever relevant included
- Quality reviews of ESG assessments before publication
- Reviewing controversy ratings by the Events Oversight Committee – focus on controversy level changes to and from level 4 and 5

	Data and deliverable management ● Quality and reliability of our Covered Company and identifier data through automated quality assurance ● Quality and reliability of our proprietary (i.e. research) data through automated quality assurance, prior to publication ● Quality and reliability of standard deliverables through end-of-gate quality assurance process ● Quality and reliability of custom client deliverables through end-of-gate quality assurance processes (automated and manual) ● Monitoring and investigating ESG score fluctuations and their root causes using automated tools Update cycle ● Sustainalytics aims for annual updates of management indicators for the Covered Companies ● Continuous updates are made as incidents occur and feed into updates of event indicators, which is not disclosure driven ● Annual updates to the rating framework (selection of material ESG issues, weighting of indicators) B. Controversies Company Research ● Continuous improvement and maintenance of quality and research standards ● Continuous refinement of methodologies and guidance to adjust to emerging societal ESG developments ● Continuous screening and curation of news and NGO sources ● Screening of corporate reporting and web disclosure ● Senior sector lead quality reviews of controversy assessments before publication ● For high scoring controversy ratings (Categories 4 and 5), companies are contacted to verify allegations that are relevant in our controversy ratings methodology and their response is taken into consideration, and whenever relevant included ● For our high scoring controversy ratings (Category 4 and 5), proposals for assessment changes are reviewed by an internal oversight body. If the proposal is approved, a written indicator assessment is drafted according to Sustainalytics Controversy guidelines. Before such assessment is published, a quality and editorial review is conducted Data and deliverable management ● Quality and reliability of our Covered Company and identifier data through automated quality assurance ● Quality and reliability of our proprietary (i.e. research) data through automated quality assurance, prior to publication ● Senior sector lead quality reviews of controversy assessments before publication ● Quality and reliability of a biweekly client deliverables through end-of-gate quality assurance processes (automated and manual) ● Monitoring and investigating ESG score fluctuations and their root causes using manual and automated tools

Update cycle

- Continuous daily news monitoring is conducted as incidents occur and feed into updates of our controversy indicators
- Quarterly reviews of high scoring cases regardless the occurrence of incidents
- Three year back controversy screen for entities added to our research universe after every quarterly rebalance
- Annual review of all company's controversy ratings when the overall Risk Rating of a company reviews is annual update
- Analyst discretion to react to relevant developments at any time, regardless the above scheduled reviews

C. Global Standards Screening (GSS)Company Research

- Continuous improvement and maintenance of quality and research standards
- Companies are contacted to verify allegations that are relevant in our Global Standards Screening methodology and their response is taken into consideration, and whenever relevant included
- Quality reviews of ESG assessments before publication
- For our Global Standards Screening, proposals for assessment changes are reviewed by an internal oversight body. If the proposal is approved, a written report is drafted according to the GSS guidelines. Before a Watchlist or Non-Compliant status for an issue is published, a quality and editorial review is conducted on the report and the sources used therein

Data and deliverable management

- Quality and reliability of our Covered Company and identifier data through automated quality assurance
- Quality and reliability of our proprietary (i.e. research) data through automated quality assurance, prior to publication
- Quality and reliability of standard deliverables through end-of-gate quality assurance process
- Quality and reliability of custom client deliverables through end-of-gate quality assurance processes (automated and manual)
- Monitoring and investigating ESG score fluctuations and their root causes using automated tools

Update cycle

- Continuous monitoring is conducted as incidents occur and feed into updates of our Global Standards Screening reports
- Quarterly updates to our Global Standards Screening reports
- New companies added to the universe as a result of rebalancing are researched and updated in client systems quarterly
- Corporate actions are processed in client systems on a quarterly basis in order to capture any involvement changes arising from mergers, acquisitions or other corporate actions.

D. Product InvolvementCompany Research

- Continuous improvement and maintenance of quality and research standards
- All Product Involvement research is reviewed by senior analysts. The review comprises checking the accuracy of the involvement analysis by studying the original source as well as consistency with the research methodology and framework
- Final validation of the research before publication is done by the Research Manager. Assessment changes are additionally reviewed by an internal oversight body

<table>
<tr><td></td><td>Data and deliverable management
Quality and reliability of our Covered Company and identifier data through automated quality assurance
Quality and reliability of our proprietary (i.e. research) data through automated quality assurance, prior to publication
Quality and reliability of standard deliverables through end-of-gate quality assurance process
Quality and reliability of custom client deliverables through end-of-gate quality assurance processes (automated and manual)
Monitoring and investigating ESG score fluctuations and their root causes using automated tools
Update cycle
Product Involvement Research is updated annually
New companies added to the universe as a result of rebalancing are researched and updated in client systems quarterly
Corporate actions are processed in client systems on a quarterly basis in order to capture any involvement changes arising from mergers, acquisitions or other corporate actions
For further information on Environmental Finance research and methodology refer https://www.bonddata.org/policy/methodology.html.

The CBI Green Bond Database screening process is available at https://www.climatebonds.net/files/files/Taxonomy/CBI_Taxonomy_Tables-08A%20%281%29.pdf

For further information on S&P Market Intelligence Reference Data refer to https://ihsmarkit.com/products/pricing-and-reference-data.html.</td></tr>
<tr><td>Item 8c: International reference standards</td><td>While there are no specific reference standards that apply to the S&P Global Trucost data, where possible, S&P DJI uses international sustainability disclosure frameworks such as, SASB, GRI, UN Global Compact and the recommendations of the Financial Stability Board's Task Force for Climate-related Financial Disclosures as published in the 2017 Final Report.

The methodology behind Sustainalytics Global Standards Screening is based on the following international standards:
UN Global Compact Principles
OECD
World Governance Indicators
Industry specific standards or initiatives. Examples are the Round Table on Sustainable Palm Oil, the standards for Systemically Important Banks, local Corporate Governance codes, and many others
Said industry specific standards are incorporated in assessments of companies' management of ESG issues in ESG Risk Ratings
Controversies research tracks incidents through various media and NGO sources and is not a comprehensive screening product. The following standards are included in the framework for analysis for the Controversies research, however reference to the exact standards or norms breaches is not described, given that Sustainalytics does not assess the issuer's compliance with such conventions, but only provides an indication of the expected</td></tr>
</table>

	impact the reported allegations may have for businesses and stakeholders ● UN Global Compact Principles ● OECD ● Industry specific standards, initiatives or principles as further elaborated in underlying conventions and authoritative guidelines For Product Involvement Sustainalytics does not rely on international standards or conventions. ICMA Green Bond Principles (GBP), Social Bond Principles (SBP) and Sustainability Bond Guidelines (SBG).
Additional Disclosure requirements for EU Climate Transition and EU Paris-Aligned Benchmarks	
Item 9a: Forward-looking year-on-year decarbonization trajectory	7.0%
Item 9b: Degree to which the IPCC decarbonisation trajectory (1.5°C with no or limited overshoot) has been achieved on average per year since creation	7.5%
Item 9c: Overlap between the benchmark and its investable universe, using the active share at asset level	73.8%
Disclosure of the alignment with the objectives of the Paris Agreement	
Item 10a: Does the benchmark align with the target of reducing carbon emissions or the attainment of the objectives of the Paris Agreement	Yes
Item 10b: The temperature scenario, in accordance with international standards, used for the alignment with the target of reducing GHG emissions or attaining of the objectives of the Paris Agreement	1.5°C with no or limited overshoot
Item 10c: Name of the provider of the temperature scenario used for the alignment with the target of reducing GHG emissions or the attainment of the objectives of the Paris Agreement	The Special Report on Global Warming of 1.5°C from the Intergovernmental Panel on Climate Change (IPCC)
Item 10d: Methodology used for the measurement of the alignment with the temperature scenario	Refer to the Emission Limits section of this guide.
Item 10e: Hyperlink to the website of the temperature scenario used.	https://www.ipcc.ch/sr15/
Information updated on	**Reason**
31 August 2022	Index launch
31 August 2023	Annual update to decarbonisation trajectory disclosures

6) Governance and regulatory compliance

IHS Markit Benchmark Administration Limited (IMBA UK) is the Index Administrator of iBoxx indices. Information on IMBA UK's governance and compliance approach can be found here. This document covers:

- Governance arrangements, including external committees
- Input data integrity
- Conflicts of interest management
- Market disruption and Force Majeure
- Methodology changes and cessations
- Complaints
- Errors and restatements
- Reporting of infringements and misconduct
- Methodology reviews
- Business continuity

More details about IMBA UK can be found on the Administrator's website.

7) Changes to the iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index

Aug. 31, 2023	**Annual Index Review 2022** ● Treatment of distressed debt exchanges ● Introduction of new economic sector classification "Energy" with new market sector classification "Renewable Energy" ● Maturity extension section added
Aug. 31, 2022	● iBoxx EUR Corporates Net Zero 2050 Paris-Aligned ESG Index launch ● Absolute emission levels are anchored to January 31, 2019 (i.e. start of history)

8) Footnotes

Footnotes
1. Pursuant to Articles 19(a)(2) and 19(b)(1) of Regulation (EU) 2019/2089, Commission Delegated Regulation (EU) 2020/1818 lays down the minimum standards for EU CTBs and EU PABs https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32020R1818.
2. UNFCCC. (2015). The Paris Agreement: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement.
3. Financial Stability Board's Task Force on Climate-related Financial Disclosures' (TCFD). (2017). Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures, available at https://www.fsb-tcfd.org/wpcontent/uploads/2017/06/FINAL-2017-TCFD-Report-11052018.pdf
4. A climate scenario of 1.5ºC above preindustrial levels has been deemed important by the IPCC: Masson-Delmotte, V., Zhai, P., Pörtner, H. O., Roberts, D., Skea, J., Shukla, P. R. Waterfield, T. (2018). Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C. IPCC, available at https://www.ipcc.ch/sr15/.

9) Further information

Client support

For client support please contact:

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Phone:	**Asia Pacific**	Japan: Singapore:	+81 3 6402 0127 +65 6922 4210
	Europe	General: UK:	+800 6275 4800 +44 20 7260 2111
	USA	General:	+1 877 762 7548

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Please note: spdji_compliance@spglobal.com should only be used to log formal complaints.

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Disclaimer

Performance Disclosure/Back-Tested Data

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Please refer to the methodology for the Index for more details about the index, including the manner in which it is rebalanced, the timing of such rebalancing, criteria for additions and deletions, as well as all index calculations.

Information presented prior to an index's launch date is hypothetical back-tested performance, not actual performance, and is based on the index methodology in effect on the launch date. However, when creating back-tested history for periods of market anomalies or other periods that do not reflect the general current market environment, index methodology rules may be relaxed to capture a large enough universe of securities to simulate the target market the index is designed to measure or strategy the index is designed to capture. For example, market capitalization and liquidity thresholds may be reduced. In addition, forks have not been factored into the back-test data with respect to the S&P Cryptocurrency Indices. For the S&P Cryptocurrency Top 5 & 10 Equal Weight Indices, the custody element of the methodology was not considered; the back-test history is based on the index constituents that meet the custody element as of the Launch Date. Back-tested performance reflects application of an index methodology and selection of index constituents with the benefit of hindsight and knowledge of factors that may have positively affected its performance, cannot account for all financial risk that may affect results and may be considered to reflect survivor/look ahead bias. Actual returns may differ significantly from, and be lower than, back-tested returns. Past performance is not an indication or guarantee of future results.

Typically, when S&P DJI creates back-tested index data, S&P DJI uses actual historical constituent-level data (e.g., historical price, market capitalization, and corporate action data) in its calculations. As ESG investing is still in early stages of development, certain datapoints used to calculate certain ESG indices may not be available for the entire desired period of back-tested history. The same data availability issue could be true for other indices as well. In cases when actual data is not available for all relevant historical periods, S&P DJI may employ a process of using "Backward Data Assumption" (or pulling back) of ESG data for the calculation of back-tested historical performance. "Backward Data Assumption" is a process that applies the earliest actual live data point available for an index constituent company to all prior historical instances in the index performance. For example, Backward Data Assumption inherently assumes that companies currently not involved in a specific business activity (also known as "product involvement") were never involved historically and similarly also assumes that companies currently involved in a specific business activity were involved historically too. The Backward Data Assumption allows the hypothetical back-test to be extended over more historical years than would be feasible using only actual data. For more information on "Backward Data Assumption" please refer to the FAQ. The methodology and factsheets of any index that employs backward assumption in the back-tested history will explicitly state so. The methodology will include an Appendix with a table setting forth the specific data points and relevant time period for which backward projected data was used. Index returns shown do not represent the results of actual trading of investable assets/securities. S&P DJI maintains the index and calculates the index levels and performance shown or discussed but does not manage any assets.

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