

JPMorgan Asset Management Carbon Transition Global Equity Index Methodology

September 2020

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1.0 Introduction

This methodology document (this “**Methodology**”) sets out the rules for the construction and management of the JPMorgan Asset Management Carbon Transition Global Equity Index (the “**Index**”). The Index is a rules-based, proprietary index designed to reflect the performance of a subset of the global large and mid-cap companies in developed markets that, based on the Index rules, are determined to be best positioned to benefit from a transition to a low-carbon economy. The Index selects its components from the constituents of the MSCI World Index (the “**Investable Universe**”). The Investable Universe is owned and calculated by MSCI. The Index is calculated by Solactive AG. The calculation of the Index makes use of certain methodologies and calculation formulas as described in the Solactive Equity Index Methodology accessible at https://www.solactive.com/wp-content/uploads/2020/03/Equity-Index-Methodology-1.2_25_03_2020_FINAL.pdf (the “**Calculation Agent Index Methodology Document**”).

NOTHING IN THIS METHODOLOGY CONSTITUTES AN OFFER TO BUY OR SELL ANY SECURITIES, PARTICIPATE IN ANY TRANSACTION OR ADOPT ANY INVESTMENT STRATEGY. THIS METHODOLOGY DOES NOT CONSTITUTE INVESTMENT, LEGAL, TAX, REGULATORY, ACCOUNTING OR FINANCIAL ADVICE OR RECOMMENDATIONS.

1.1 J.P. Morgan Investment Management Inc.

J.P. Morgan Investment Management Inc. (the “**Administrator**”), an investment adviser registered with the Securities and Exchange Commission and an indirect wholly owned subsidiary of JPMorgan Chase & Co., is the administrator of the Index. The Administrator governs the Index pursuant to this Methodology in its capacity as an index administrator and not as a fiduciary in respect of any other person.

Neither the Administrator nor any of its affiliates or subsidiaries or any of their respective directors, officers, employees, representatives, delegates or agents (each, a “**Relevant Person**”) shall have any responsibility to any person (whether as a result of negligence or otherwise) for any determinations, interpretations and calculations made or anything done (or omitted to be determined or done) in respect of the Index or any use to which any person may put the Index. All determinations, interpretations and calculations of the Administrator in respect of the Index shall be at the Administrator’s discretion and shall be final, conclusive and binding and no person shall be entitled to make any claim against any of the Relevant Persons in respect thereof. Once a determination, interpretation or calculation is made or action is taken by the Index Administrator in respect of the Index, neither the Administrator nor any other Relevant Person shall be under any obligation to revise any determination, interpretation or calculation made or action taken for any reason.

1.2 MSCI

MSCI is the administrator of the Investable Universe (in such capacity, the “**Investable Universe Administrator**”). The constituent companies of the Investable Universe are eligible for inclusion in the index.

1.3 Solactive AG

Solactive AG (the “**Calculation Agent**”) is responsible for the daily calculation of the Index. The Calculation Agent will use its best endeavors to use reasonable skill and care to ensure that the Index is calculated, published and maintained correctly pursuant to this Methodology.

1.4 The Investable Universe

The Index selects as its constituents certain securities that are included in the MSCI World Index. The MSCI World Index is a free float-adjusted market capitalization index compiled by MSCI. It is comprised of large and mid-cap companies across 23 Developed Markets (DM) countries which, as of the date of this Methodology, include the following countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, the United Kingdom and the United States. The MSCI World Index covers approximately 85% of the free float-adjusted market capitalization in each DM country. The MSCI World Index is rebalanced on the last business day of each February, May, August, and November (each a “**Rebalancing Date**”). The Rebalancing Dates may be adjusted by the Investable Universe Administrator at its sole discretion. The MSCI World Index uses a global calendar. Additional information regarding the methodology of the MSCI World Index may be obtained from the Investable Universe Administrator’s website. We are not incorporating by reference into this Methodology the website or any material it includes.

1.5 Index Objective

The Index is designed to capture the performance of companies from the Investable Universe selected and weighted based on those that have been identified through its rules-based process as best positioned to benefit from a transition to a low-carbon economy by effectively managing their emissions, resources and climate-related risks. Companies are scored using metrics from 7 Indicator Groups. Companies with the highest scores relative to peers in the same Region and Sector are prioritized for inclusion in the Index over those with lower scores. The Index aims to meet the requirements for EU Climate Transition Benchmarks as defined in the EU Commission’s Technical Expert Group on Sustainable Finance’s Final Report on Climate Benchmarks and Benchmarks’ ESG Disclosures¹ and the EU Climate Benchmarks Final Delegated Acts² (the “EU Climate Benchmarks Final Report”), including, amongst others, a requirement to select, weight or exclude assets in such a way that the resulting Index is on a decarbonisation trajectory. A decarbonisation trajectory means a measurable, science-based and time-bound movement towards alignment with the objectives of the Paris Agreement³.

¹ [The EU Technical Expert Group on Sustainable Finance. \(2019\). TEG Final Report on Climate Benchmarks and Benchmarks’ ESG Disclosures, available at https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/190930-sustainable-finance-teg-final-report-climate-benchmarks-and-disclosures_en.pdf](https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/190930-sustainable-finance-teg-final-report-climate-benchmarks-and-disclosures_en.pdf)

² https://ec.europa.eu/info/law/benchmarks-regulation-eu-2016-1011/amending-and-supplementary-acts/implementing-and-delegated-acts_en

³ **UNFCCC. (2015) The Paris Agreement:** https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf

No assurance can be given that the investment strategy used to construct the Index will be successful or that the Index will outperform any alternative basket or strategy that might be constructed from the securities selected by the Index.

2.0 Index Administration

The Administrator is responsible for all activities related to the production and operation of the Index, including the maintenance of records of the index weightings of all constituents; approval and implementation of changes to the constituents and their weightings in accordance with the Methodology; periodic reviews of the Index and/or Methodology and application of any changes resulting from such reviews; and communication to the Calculation Agent of changes to the constituent weightings resulting from ongoing maintenance and periodic reviews.

2.1 JPMIM Index Governance Committee

Administration of the Index is overseen by the Administrator's Index Governance Committee (the "**Index Committee**"). The Index Committee is responsible for the approval and oversight of all Administrator indices and consists of representatives of the Administrator's indexing business as well as various risk and controls partners. Researchers and portfolio managers associated with J.P. Morgan Investment Management Inc. regularly advise the Committee with respect to new strategies and index performance.

2.2. Maintenance of the MSCI World Index

In order to maintain the representativeness of the MSCI World Index, MSCI may make structural changes to the MSCI World Index as a whole by adding or deleting component country indices. In particular, MSCI may add additional component country indices to the MSCI World Index or subtract one or more of its current component country indices. Currently, such changes in the MSCI World Index may generally only be made on Rebalance Dates. In addition, ongoing event-related changes to the MSCI World Index are made as the result of mergers, acquisitions, spin-offs, suspensions, delistings, bankruptcies, reorganizations and other similar corporate events. Further information about the MSCI corporate events methodology may be obtained from other sources including, but not limited to, the MSCI World Index sponsor's website. We are not incorporating by reference into this document the website or any material it includes. We do not make any representation that such publicly available information regarding the MSCI World Index is accurate or complete.

The results of the application of any such policies by MSCI impacts the securities eligible for inclusion in the Index selection process.

2.3 Index Amendments

Changes to this Methodology are subject to approval by the Index Committee. In the event that the Index Committee makes the determination, in its discretion in accordance with its operating procedures, that an amendment to this Methodology is warranted and that an announcement of such is needed, then the Administrator will endeavor to announce the amendment as promptly as possible following such determination. The public announcement of the Methodology amendment may include a detailed

description of the change, the proposed effective date for the change and a statement as to any impact to the index construction process.

If an MSCI World Index Change Event occurs, then the Index Committee may make any such determinations and/or adjustments to the Index Methodology that it considers necessary and appropriate in order to take into account such MSCI World Index Change Event and which determinations or adjustments are consistent with the objectives of the Index. An **“MSCI World Index Change Event”** means a material change is made by MSCI, in respect of the MSCI World Index, the constituents or the constituent weights of the MSCI World Index, which could have a material impact on the performance of the Index or could alter the ability of the Index to achieve the relevant objective, as determined by the Administrator of the Index, in its sole discretion.

2.4 Index Governance Policies

2.4.1 Expert Judgment

“Expert Judgment” refers to the exercise of discretion by the Administrator. The Administrator will exercise its own expert judgment in compiling the Index weightings in accordance with this Methodology. Determinations with respect to greenhouse gas emissions data may be made from time to time to correct for erroneous data. Exercises of expert judgment by the Administrator are generally overseen by the Index Committee.

2.4.2 Corporate Actions, Market Disruption Events

All corporate actions, market disruption events and/or other events affecting components of the Index and potential resulting adjustments are adopted from the Calculation Agent Index Methodology Document. See the Calculation Agent Index Methodology Document for information regarding the policies by which the Calculation Agent will monitor, and make adjustments for, corporate actions, market disruption and other events.

2.4.3 Error Correction

Subject to the oversight of the Index Committee, the Administrator may make corrections to this Index and/or this Methodology in accordance with its error handling procedures.

2.4.4 Complaints

Any complaints about the Index should be raised to the Administrator at JPMAM.Indices@jpmchase.com.

3.0 Definitions, Constraints & Notations

“**Bucket**” is a combination of Region and Sector.

“**Carbon Transition Score**” is the final company score determined by the process detailed in section 5 of this document which combines the rankings of various metrics with materiality scores which apply to sub-industries.

“**Carbon Intensity**” is the Greenhouse Gas Emissions Rate per Dollar of EVIC of a company.

“**Carbon Trajectory**” is the path representing the maximum Index Carbon Intensity $WACI_P$ over time.

“**Cut Weight**” is the relative effective weight of a security in the Index on the Rebalancing Cutoff Date.

“**Equity**” is a stock issued by a company and is the primary reference instrument of the Index.

“**Equity Price**” is the closing price of an Equity on its primary trading venue.

“**EVIC**” is the Enterprise Value including cash of a company.

“**Inception Date**” is the first rebalance date of the Index. November 30th, 2016.

“**Index Shares**” is the number of shares of a company held in the index at a specific point in time.

“**Investable Universe**” is the list of the constituent securities eligible for inclusion in the Index as well as their respective weightings. It is the Pro-Forma universe delivered 9 business days prior to the Investable Universe’s quarterly Rebalancing Date representing what the expected Investable Universe will invest in on the Rebalancing Date.

“**MDV**” is the Median of the Daily Trading Volume of an Equity over the 22 days preceding and including the Rebalancing Cutoff Date.

“**MktVal**” is the total market value of a security based in the Investable Universe on the Rebalancing Cutoff Date.

“**Rebalancing Cutoff Date**” is the date on which data is gathered from the Investable Universe Administrator and used to determine the Market Cap Weights of each Bucket, as well as the MDV and minimum and maximum weight assumptions for each Equity.

“**Region**” is the grouping of Equities based on the particular location of the Equities home country in the world. Each Region can contain multiple currencies. There are 4 regions in the Index described in Section 4.3.

“**Sector**” is a broad grouping of Equities that are in similar lines of business. The Equities included in the Index are grouped into 12 Sectors as explained in Section 4.3.

“**Sub-Sector**” is the most granular grouping of Equities in the Index. They are used to apply Carbon Materiality in Section 5.8.

4.0 Index Construction

The Index is comprised of a subset of the securities included in the Investable Universe. Securities from the Investable Universe are selected by the Index based on the application of various additional filters, constraints and proprietary factors to select and weight securities based on those determined by the Index rules as best positioned to benefit from a transition to a low-carbon economy. Index weightings are determined by the iterative application of, rules-based algorithms which seek to overweight exposure to proprietary carbon transition scores across pre-determined target sector allocations. The weighting algorithm is applied to the Investable Universe at each quarterly Rebalance Cutoff Date by the Index Administrator.

4.1 Exclusions

Investment restrictions are placed on certain constituents of the Investable Universe. The maximum weight is set to 0 thereby not allowing any investment in those securities.

The Index excludes securities of issuers engaged in Controversial Weapons activities as defined by the United Nations Convention on Certain Controversial Weapons.⁴ In addition, the common stock of JPMorgan Chase & Co. is excluded from the Index to prevent funds advised by affiliates of JPMorgan Chase and Co. tracking the Index from not being able to properly track it.

4.2 Dual Listings

There are instances where multiple listings of the same company may exist in the Investable Universe. When this happens, the primary listing is determined as the listing with the highest MDV. The primary listing will take on the full MktVal and MDV for a company and the other listings will be excluded from further calculations.

4.3 Sector & Regional Allocations

The securities of the Investable Universe are classified into 12 Sectors using the Investable Universe sector classification schema but breaking out the Automobiles & Components industry group into its own Autos Sector. In addition, the securities of the Investable Universe are also classified into 4 Regions based on the company's country risk classification. Each combination of a Region and Sector is identified as a Bucket.

⁴ [United Nations Office for Disarmament Affairs: *Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons which may be deemed to be Excessively Injurious or to have Indiscriminate Effects: Status of the Treaty*](#)

Table 1

Region	Country of Risk
APAC	Australia
APAC	New Zealand
APAC	Singapore
Europe	Austria
Europe	Belgium
Europe	Switzerland
Europe	Germany
Europe	Denmark
Europe	Spain
Europe	Finland
Europe	France
Europe	United Kingdom
Europe	Ireland
Europe	Israel
Europe	Italy
Europe	Netherlands
Europe	Norway
Europe	Poland
Europe	Portugal
Europe	Sweden
Japan	Japan
NA	Canada
NA	United States of America

Table 2

Sectors
Energy
Materials
Industrials
Consumer Discretionary
Autos
Consumer Staples
Health Care
Financials
Information Technology
Communication Services
Utilities
Real Estate

5.0 Carbon Transition Metrics

Carbon Transition Metrics (each, a “**Metric**”) are measures assigned to each company in the Investable Universe that together drive a company’s ability to adapt to a lower carbon economy over time. When selecting Metrics for inclusion, the Index aims to align each one with one of the following seven indicators which fit into one of three pillars (Emissions, Resource Management, and Risk Management). Metric ranks are calculated for each company within a Bucket using data as of the Rebalancing Cutoff Date. At each quarterly rebalancing, a “**Carbon Transition Score**” is calculated for each company which indicates the relative strength of that company relative to each other company eligible for inclusion in the Index within its Bucket. Companies with a higher Carbon Transition Score are more likely to be selected for inclusion in the Index than those with a lower Carbon Transition Score.

5.1 Emissions

5.1.1 Consumer Emissions & Opportunities

Indicators that assess potential to benefit from a shift in consumer demands towards low-carbon alternatives.

5.1.2 Site Emissions

Indicators identify companies best placed to capitalize on the transition to reducing direct GHG emissions.

5.2 Resource Management

5.2.1 Indirect Emissions

Indicators identify companies that are reducing indirect emissions, i.e. emissions from the usage of electricity.

5.2.2 Waste Management

Indicators identify companies that are reducing waste materials, both hazardous, and non-hazardous.

5.2.3 Water Management

Indicators identify companies that are improving the sustainability of water flow management.

5.3 Risk Management

5.3.1 Physical Risk

Indicators assessing the company’s physical risks, caused by extreme weather conditions.

5.3.2 Reputational Risk

Indicators assessing positive climate stewardship or violations of climate principles such as illegal logging.

5.4 Metric Scores

Companies are assigned a Metric rank within each Bucket or each Metric. The top company or companies would get a rank of 1 and the last company or companies with get a rank of n . Companies with the same Metric value would receive the same Metric rank. A company's Metric rank is then used to compute a company's Metric Score which is the company's percentile rank for a given Metric within a Bucket.

5.5 Missing Data

The default score for companies with missing data is 0 (neutral).

5.5.1 Coverage/Penalty Consideration

A consideration is made for all Metrics to avoid both the ability of a company to score well due to non-disclosure of important issues and the unnecessary inclusion of less relevant data into the scoring. This is done as follows:

- a) Assign a score of 0 to companies in sub-sector where the percentage of companies reporting the Metric is too low. Coverage is defined as the percentage of companies within the sub-sector that have reported the Metric or for non-reported data, where the Metric could be sourced or computed.
- b) Assign a penalty score if a company has not reported a Metric in a sub-sector where the coverage condition is met. This is referred to as the 'penalty coverage'. The penalty will be given as -0.5 which is by definition the 75th percentile of the company's peer group. Note: A value of >100% means that no penalty will be applied and the score for the missing metric will be 0.

5.6 Pre Scaled Scores to Post Scaled Scores

In order to reflect a number of important considerations, the scores calculated in sections 5.4 and 5.5 are scaled by the Metric scale. For example 'Water use/Sales' will have a pre scaled range € (-1, 1). With a Metric scale of 2, the post scaled range will be € (-2, 2). Adjustments from a default scaling factor of 1 will occur for one of the following reasons:

- a) The Metric is utilized in more than 1 indicator group. For example, 'Climate Change Policy' is a Metric under 'Consumer Emissions and Opportunities', 'Site Emissions', and 'Indirect Emissions'. This is because it is applicable to all three indicators. In this case, the metric has scaling factor 1/3 to ensure the Index is not putting 3 times the weight overall in this metric.
- b) The Metric is a forward looking measure of carbon transition risk/opportunity as opposed to backward looking. When this is the case, a scaling factor of 2 is applied.
- c) As per EU Climate Transition Benchmark requirements on Weighted Average Carbon Intensity, the scaling factors for GHG Scope 1,2,3/Sales and GHG Scope 1,2,3/Sales YoY % Chg are designed to represent 10% and 30% of the scaling factors in their indicator groups respectively.

5.7 Indicator Group Scores

Indicator Group Scores are computed by adding the weighted sum of each company's post scaled Metric Scores for each of the 7 Indicator groups *g.* **5.7.1 Normalizing Indicator Group Scores into percentiles**

For each company and Indicator Group, an Indicator Score is calculated within a given Bucket combination.

5.8 Materiality

An important factor in determining weighting of indicators is to consider the financial materiality of an indicator to a particular sub-industry. The following table prescribes a binary indicator of materiality based on the Sustainability Accounting Standard Board's Sustainable Industry Classification System (SICS) Industry. These are then translated into the Sub-Sectors represented in the index.

Table 3

SICS Industry	Site Emissions	Consumer Emissions & Opportunities	Indirect Emissions	Water Management	Waste Management	Physical Risk	Reputational Risk
Consumer Goods - Apparel, Accessories & Footwear	0	0	1	1	1	0	1
Consumer Goods - Appliance Manufacturing	0	0	1	1	1	0	1
Consumer Goods - Building Products & Furnishings	0	0	1	0	1	0	1
Consumer Goods - E-Commerce	0	0	1	0	0	0	1
Consumer Goods - Household & Personal Products	0	0	1	1	0	0	1
Consumer Goods - Multiline and Specialty Retailers & Distributors	0	0	1	0	0	0	1
Consumer Goods - Toys & Sporting Goods	0	0	1	0	1	0	1
Extractives & Minerals Processing - Coal Operations	1	0	1	1	1	0	1
Extractives & Minerals Processing - Construction Materials	1	0	1	1	1	0	1
Extractives & Minerals Processing - Iron & Steel Producers	1	0	1	1	1	0	1
Extractives & Minerals Processing - Metals & Mining	1	0	1	1	1	0	1
Extractives & Minerals Processing - Oil & Gas – Exploration & Production	1	0	1	1	0	0	1
Extractives & Minerals Processing - Oil & Gas – Midstream	1	0	1	0	0	0	1
Extractives & Minerals Processing - Oil & Gas – Refining & Marketing	1	0	1	1	1	0	1
Extractives & Minerals Processing - Oil & Gas – Services	1	0	1	1	1	0	1
Financials - Asset Management & Custody Activities	0	0	0	0	0	0	1
Financials - Commercial Banks	0	1	0	0	0	0	1

Financials - Consumer Finance	0	0	0	0	0	0	1
Financials - Insurance	0	1	0	0	0	1	1
Financials - Investment Banking & Brokerage	0	0	0	0	0	0	1
Financials - Mortgage Finance	0	1	0	0	0	1	1
Financials - Equity & Commodity Exchanges	0	0	0	0	0	0	1
Food & Beverage - Agricultural Products	1	1	1	1	1	1	1
Food & Beverage - Alcoholic Beverages	0	0	1	1	0	0	1
Food & Beverage - Food Retailers & Distributors	1	1	1	1	1	0	1
Food & Beverage - Meat, Poultry & Dairy	1	1	1	1	1	0	1
Food & Beverage - Non-Alcoholic Beverages	1	0	1	1	0	0	1
Food & Beverage - Processed Foods	0	1	1	1	0	0	1
Food & Beverage - Restaurants	0	0	1	1	1	1	1
Food & Beverage - Tobacco	0	0	0	1	0	0	1
Health Care - Biotechnology & Pharmaceuticals	0	0	1	0	0	1	1
Health Care - Drug Retailers	0	0	1	0	0	0	1
Health Care - Health Care Delivery	0	0	1	0	1	1	1
Health Care - Health Care Distributors	1	0	1	0	0	0	1
Health Care - Managed Care	0	0	0	0	0	1	1
Health Care - Medical Equipment & Supplies	0	0	0	0	1	0	1
Infrastructure - Electric Utilities & Power Generators	1	0	1	1	1	1	1
Infrastructure - Engineering & Construction Services	0	0	1	0	0	0	1
Infrastructure - Gas Utilities & Distributors	1	0	1	0	0	0	1
Infrastructure - Home Builders	0	0	0	0	0	1	1
Infrastructure - Real Estate	0	0	1	1	0	1	1
Infrastructure - Real Estate Services	0	0	0	0	0	0	1
Infrastructure - Waste Management	1	0	1	0	1	0	1
Infrastructure - Water Utilities & Services	0	0	1	1	0	1	1
Renewable Resources & Alternative Energy - Biofuels	0	1	0	1	0	0	1
Renewable Resources & Alternative Energy - Forestry Management	0	1	0	0	0	1	1
Renewable Resources & Alternative Energy - Fuel Cells & Industrial Batteries	0	1	1	0	0	0	1
Renewable Resources & Alternative Energy - Pulp & Paper Products	1	0	1	1	0	0	1
Renewable Resources & Alternative Energy - Solar Technology & Project Developers	0	1	1	1	1	1	1
Renewable Resources & Alternative Energy - Wind Technology & Project Developers	0	1	0	0	0	1	1
Resource Transformation - Aerospace & Defense	0	1	1	0	1	0	1

Resource Transformation - Chemicals	1	0	1	1	1	0	1
Resource Transformation - Containers & Packaging	1	1	1	1	1	0	1
Resource Transformation - Electrical & Electronic Equipment	0	0	1	0	1	0	1
Resource Transformation - Industrial Machinery & Goods	0	0	1	0	0	0	1
Services - Advertising & Marketing	0	0	0	0	0	0	1
Services - Casinos & Gaming	0	0	1	1	0	1	1
Services - Education	0	0	0	0	0	0	1
Services - Hotels & Lodging	0	0	1	1	0	1	1
Services - Leisure Facilities	0	0	1	0	0	1	1
Services - Media & Entertainment	0	0	0	0	0	0	1
Services - Professional & Commercial Services	0	0	0	0	0	0	1
Technology & Communications - Electronic Manufacturing Services & Original Design Manufacturing	0	0	1	1	1	0	1
Technology & Communications - Hardware	0	0	1	0	0	0	1
Technology & Communications - Internet Media & Services	0	0	1	0	0	0	1
Technology & Communications - Semiconductors	1	1	1	1	1	0	1
Technology & Communications - Software & IT Services	0	1	1	0	0	0	1
Technology & Communications - Telecommunication Services	0	0	1	0	0	0	1
Transportation - Air Freight & Logistics	1	0	0	0	0	0	1
Transportation - Airlines	1	1	0	0	0	0	1
Transportation - Auto Parts	0	0	1	0	1	0	1
Transportation - Automobiles	0	1	1	0	0	0	1
Transportation - Car Rental & Leasing	0	1	0	0	0	0	1
Transportation - Cruise Lines	1	1	0	0	0	0	1
Transportation - Marine Transportation	1	1	0	0	0	0	1
Transportation - Rail Transportation	1	0	0	0	0	0	1
Transportation - Road Transportation	1	0	0	0	0	0	1

5.8.1 Transforming materiality

These binary materiality metrics are then transformed into a materiality score m_g depending on the pillar. The rationale is driven by which pillars are most applicable in determining the ability of a company to successfully transition to a low-carbon economy.

Table 4

	Starting Set	Transformation	End Set
Site Emissions	{0,1}	*2+1	{1,3}
Consumer Emissions & Opportunities	{0,1}	*2+1	{1,3}
Indirect Emissions	{0,1}	*2+1	{1,3}
Water Management	{0,1}	+0.5	{0.5,1.5}
Waste Management	{0,1}	+0.5	{0.5,1.5}
Physical Risk	{0,1}	+0.5	{0.5,1.5}
Reputational Risk	{1}	-	{1}

5.9 Carbon Transition Score

The Carbon Transition Score y_i for each company i is calculated as the sum product of the indicator group g score vector from 5.7 and the materiality vector from 5.8.1.

$$y_i = \sum_{g=1}^7 y_{i,g} * m_g$$

5.10 Carbon Transition Percentile

The Carbon Transition Scores computed in step 5.9 are again ranked in each Bucket. Similarly to step 5.4, the ranks are then used to create the final Carbon Transition Percentile.

$$z_i = 1 - \left(\frac{1 + \#(y_n > y_i, n \in S_k) + 0.5 \times (\#(y_n = y_i, n \in S_k) - 1)}{1 + \#(n \in S_k)} \right)$$

Companies with a higher Carbon Transition Percentile are more attractive than those with a lower Carbon Transition Percentile.

6.0 Weighted Average Carbon Intensity

The EU Climate Benchmarks Final Report and EC Delegated Regulation⁵ supplement lay out specific objectives for greenhouse gas emission (“GHG”) reductions and the transition to a low-carbon economy through the selection, weighting, and exclusion of index constituents. The Index must have a Weighted Average Carbon Intensity (“WACI”) at least 30% below its Investable Universe at inception and must reduce its WACI to be less than a trajectory which declines by an inflation adjusted 7% per annum geometrically since inception. An additional constraint has been added that it must also always be 30% better than the investable universe WACI at each Rebalancing Cutoff Date.

As discussed in the EU Climate Benchmarks Final Report⁶, it is necessary to estimate GHG emissions for companies that do not report, as otherwise high emitters would be incented to not report. The broad principle is to set values at the 75th percentile of their peers which reduces the likelihood of allocating to them, and encourages them to report their emissions if better than the default score. The penalty conditions for companies that do not report are laid out in section 6.3.

6.1 Enterprise Value including Cash

The EU Climate Benchmarks Final Report and EC Delegated Regulation supplement mandate Carbon Intensity be computed using an adjusted Enterprise Value (“EVIC”) calculation which includes cash

$$EVIC_i = EQMktVal_i + TotalDebt_i + MinorityInterest_i$$

where,

$EQMktVal_i$ is the full market value of the company unadjusted for Free Float in USD.

$TotalDebt_i$ is the last reported Quarterly, Semi-Annual, or Annual Total Debt reported by the company on their last published filing. The number is computed to USD.

$MinorityInterest_i$ is the last reported Quarterly, Semi-Annual, or Annual Accumulated Minority Interest reported by the company on their last published filing. The number is computed to USD.

6.2 Carbon Intensity for a company

Carbon Intensity for each company is computed in 2 parts. Scope 1 & 2 GHG Emissions are used to compute CI12. Scope 3 GHG Emissions is used to compute CI3. CI12 and CI3 are summed back together to form the final company Carbon Intensity CI_i .

$$CI_{12}_i = \frac{GHG\ Scope\ 1_i + GHG\ Scope\ 2_i}{EVIC_i}$$

⁵ European Commission Delegated Regulation supplementing Regulation (EU) 2016/1011 of the European Parliament and of the Council as regards minimum standards for EU Climate Transition Benchmarks and EU Paris-aligned Benchmarks

https://ec.europa.eu/finance/docs/level-2-measures/benchmarks-delegated-act-2020-4757_en.pdf

⁶ https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/192030-sustainable-finance-teg-benchmarks-handbook_en_0.pdf

$$CI3_i = \frac{GHG\ Scope\ 3_i}{EVIC_i}$$

6.3 Penalty for non-reporting

If a company fails to report GHG Scope 1 + 2 or GHG Scope 3, a penalty is assessed for the company. The rationale is to encourage disclosure by lowering the chances of investment in companies that have not disclosed GHG emissions in line with 'GHG Protocol' standards. The following is carried out for $CI12_i$ and $CI3_i$.

- i. If more than 10 companies have a CI in the company's peer group (Bucket), assign a CI that is the 75th percentile of the company's peer group (Bucket).
- ii. Else if zero companies have a CI in the company's Sector (all regions), assign a CI that is the 75th percentile of all companies in the Investable Universe.
- iii. Else if zero companies have a CI in the company's peer group (Bucket), assign a CI that is the 75th percentile of the company's Sector (all regions)..
- iv. Else assign a CI that is the *maximum* of all companies in the peer group (Bucket).

$$CI_i = CI12_i + CI3_i$$

6.4 Benchmark WACI

$$WACI_B = \sum CI_i * w_{cap,i}$$

6.5 Launch WACI

The Launch WACI is the WACI that is required to meet benchmark regulation standards on the inception date of the Index (November 30th, 2016). It is computed by multiplying the Benchmark WACI on that date by a 30% reduction in Carbon Intensity.

$$WACI_{B,launch} = WACI_{B,inception} * (1-30\%)$$

6.6 Carbon Trajectory

The carbon trajectory is the path representing the maximum Index Carbon Intensity $WACI_P$ over time. It is the minimum of (1-30%) of the Benchmark WACI $WACI_B$ and the inflation adjusted Launch WACI $WACI_{B,launch}$ adjusted by 7% per annum.

$$WACI_P \leq \min \left((1 - 30\%) * WACI_B, WACI_{B,launch} * \frac{(1 - 7\%)^{\frac{q}{4}}}{1 + Inf} \right) * buffer$$

where

q is the number of quarterly rebalances since the Index inception date.

Inf is the benchmark inflation of average EVIC since Index inception. This accounts for changes in EVIC of the entire Investable Universe.

$$Inf = \frac{EVIC_{B,R}}{EVIC_{B,Launch}}$$

$$EVIC_{B,R} = \frac{\sum EVIC_{i,r}}{n,r}$$

$$EVIC_{B,Launch} = \frac{\sum EVIC_{i,Launch}}{n,Launch}$$

buffer is a tolerance held to ensure the Index stays in compliance between quarterly rebalances and is set to 95%.

7.0 Index Rebalancing Methodology

Weights are assigned to Buckets and companies based on a multi-stage process which takes into consideration relative market capitalization weights, constraints on individual stock liquidity, Carbon Transition Percentiles and concentration risks while trying to minimize turnover and meet EU Climate Transition Benchmark rules.

7.1 Establish Cut Weights

On the Rebalance Cutoff Date, the current effective weights of the securities in the Index, referred to as the “**Cut Weights**” are determined. The Cut Weights are used as the starting point for the weights for the Rebalancing Date immediately following such Rebalance Cutoff Date. The Cut Weights for each security is calculated based on the current Index Shares, Equity Price and the foreign exchange rate (if applicable).

The Cut Weights ($w_{i,Cut}$) are calculated as follows:

$$w_{i,Cut} = \frac{S_{cut}^i * P_{cut}^i * FX_{cut}^i}{\sum_N^i S_{cut}^i * P_{cut}^i * FX_{cut}^i}$$

Where

S_i is the index shares

P_i is the Equity Price

FX_i is the rate of quoted currency of the Equity against USD.

Note: Cut Weights on the inception date are set to 0.

7.2 Initialize Standard Weights, Caps and Floors

x_1 is the cap on the pre-adjustment weight in any Equity (first standard weight), it is defined as a function of the free float adjusted market capitalization weights of each constituent i , $w_{cap,i}$ –

$$x_1 = f(w_{cap}^i) = \min(4 * w_{cap}^i, 50 \text{ bps} + w_{cap}^i)$$

x_2 is maximum adjusted weight per Equity (second standard weight)

$$x_2 = f(w_{cap}^i) = \min(3.5 * w_{cap}^i, 40 \text{ bps} + w_{cap}^i)$$

w_{max-c}^i is the maximum position size at rebalance for stock i –

$$w_{max-c}^i = f(w_{cap}^i) = \min(4.5 * w_{cap}^i, 60 \text{ bps} + w_{cap}^i)$$

x_{min}^i is the minimum holding constraints in stock i :

$$x_{min}^i = \begin{cases} 0, & \text{if } w_{cap}^i - 40 \text{ bps} < minnw \\ w_{cap}^i - 40 \text{ bps}, & \text{otherwise} \end{cases}$$

Where,

w_{cap}^i is the Market Cap Weight of Equity i in the Investable Universe.

$minnw$ is the minimum new weight of an Equity. .2bps

Note: For exclusions noted in section 4.1, all weights above are set to 0.

7.3 Liquidity Constraints

The goal is to ensure the liquidity and capacity of any fund that might track the Index. There are liquidity needs of a tracking fund during both rebalancing and creation/redemption process. These constraints act respectively to limit the minimum liquidity of the Index as a whole, to limit the liquidity usage on rebalance days, and to limit the concentration of risk in any given Equity. The methodology then applies the tightest of these constraints.

The MDV v_i is computed for each Equity by taking the median trading volume (adjusted for corporate actions) over the past 22 days preceding and including the Rebalancing Cutoff Date and multiplying it by the price on the Rebalancing Cutoff Date and FX Rate if applicable.

δ_{max} the maximum trade in days of median daily volume at hypothetical NAV – 1 day

l_{max} the maximum position size in days of median daily volume at hypothetical NAV – 4 days

τ the fraction of universe total market capitalization represented by the hypothetical NAV – 2bps

V the total market capitalization of the universe

$w_{L,i}$ the maximum weight constrained by liquidity

$\Delta_{L,i}$ the maximum weight change of an Equity

$$w_L^i = \frac{l_{max} v_i}{\tau V}$$

$$\Delta_L^i = \frac{\delta_{max} v_i}{\tau V}$$

Note: For the inception date, the maximum trade in days of MDV was set to 4 days.

7.4 Set Maximum Weight

The maximum weight of an Equity i is set to the minimum of Maximum Weight w_{max-c}^i and the Maximum Liquidity weight $w_{L,i}$.

$$w_{max}^i = \min(w_{max-c}^i, w_L^i)$$

7.5 Trim concentrated holdings and apply minimums

Positions larger than the first standard should be adjusted downward by the minimum of the cut weight w_{cut}^i – the maximum trade size $\Delta_{L,i}$ or first standard weight x_1 . Adjust position upward to the minimum position size x_{min}^i if it's smaller.

$$w_0^i = \begin{cases} w_{\text{cut}}^i - \Delta_L^i > x_1, w_{\text{cut}}^i - \Delta_L^i \\ w_{\text{cut}}^i > x_1, x_1 \\ w_{\text{cut}}^i < x_{\text{min}}^i, x_{\text{min}}^i \\ \text{otherwise}, w_{\text{cut}}^i \end{cases}$$

7.6 Bucket Weights

The Index tries to remain market cap neutral to Regions and Sectors. Compute the Market Capitalization weights, and current weights of the Buckets.

$$mcw_k = \sum_{i \in S_k} mcw_i$$

$$w_0^k = \sum_{S_k}^N w_0^i$$

7.7 Populate Buckets

In this step, the Index begins by measuring the difference in Market Cap Weight mcw_k of each Bucket against its current weight w_0^k .

For Buckets that are underweight, the Index increases the weight of Equities with the highest Carbon Transition Percentile that have trading capacity. These Equities must have a Carbon Transition Factor Percentile higher than or equal to the Investable Threshold Percentile z_{min} . For Equities where the Index currently has no weight allocated $w_0^i = 0$, the Index also ensures that the weight increase is above the Minimum New Investment Threshold w_{min} .

If the Index is overweight within a Bucket, it lowers the weight of the Equities that have current weight within that Bucket with the lowest Carbon Transition Percentiles that have trading capacity. The change in regional-sector weight at this stage means that turnover is able to serve a double purpose: to ensure sector targets are met and to improve the average Carbon Transition Percentile.

z_{min} is the Investable Threshold Percentile – 20th percentile

Initialize w_1^i to w_0^i

7.7.1 Buckets that are underweight

For Buckets which are underweight, the Index increases the weight of Equities until the target weight is reached, starting with the companies with the highest Carbon Transition Percentile.

7.7.2 Buckets that are overweight

For each Bucket which is overweight lower the weight of the Equities until the target is reached, starting with those with lowest Carbon Transition Percentile.

7.8 Constrained Reallocation

Where constraints prevent the Index from reaching 100% investment, the Index uses additional allocation rules. Most of the Index weight comprises allocations made from the previous step. In all but very extraordinary circumstances, these rules will only top up the allocation and ensure 100% investment.

For each Region r with weight less than the target weight, increase the weight of every Equity which is already held in proportion to their weight in a capitalization weighted index, until full investment is reached or every stock is constrained. Do not lower the weight of Equities which are breaching constraints at this stage.

7.9 Increase Factor Exposure

Since the turnover from weight reallocation in previous steps may be low, additional turnover may be required to ensure that Equities whose Carbon Transition Percentile has been reduced are removed from the Index.

γ_{\min} is the Minimum Turnover Threshold = 6%

γ is the Two Way Turnover. It is computed as the absolute difference in current weights vs the cut weights plus 1 – the sum of the cut weights. This accounts for any Equities that are removed from the Investable Universe that the Index had an allocation in.

z_{turn} is the best Carbon Transition Percentile at which the Index will reduce the weight of Equities – 40th percentile

Initialize $w_3^i = w_2^i$

$$\gamma = \sum_i |w_3^i - w_{\text{cut}}^i| + (1 - \sum w_{\text{cut}}^i)$$

If the turnover up to this point is below the Minimum Turnover Threshold γ_{\min} , reduce the weight in the least attractive Equities (in order of their Carbon Transition Percentile) and increase the weight of the most attractive Equities until Minimum Turnover Threshold γ_{\min} is reached. This step is subject to the same liquidity constraints. The final weights are also subject to the maximum underweight constraints.

Iterate until the Minimum Turnover threshold is met or there are no Equities left to reduce the weight of.

7.9.1 Find Equity to reduce the weight

Find the Equity with the lowest Carbon Transition Percentile that has capacity to reduce its allocation. The Carbon Transition Percentile must be lower than z_{turn} . Its current weight must be greater than its minimum weight and it must not have in a Bucket that has another Equity with a higher Carbon

Transition Percentile that has capacity to increase the weight. For this Equity, compute its possible weight reduction.

7.9.2 Find Equity to increase the weight in the same Bucket

Find the Equity in the same Bucket as the Equity to reduce the weight that has the highest Carbon Transition Percentile and still has capacity to increase the weight. The Carbon Transition Percentile must be higher than the score of the Equity being reduced in weight. For this Equity, compute its possible increase in weight. The Equity must also be able pass the minimum new weight threshold if it currently has a weight of 0.

7.9.3 Re-compute Turnover

$$y = \sum_i |w_3^i - w_{\text{cut}}^i| + (1 - \sum w_{\text{cut}}^i)$$

Notes:

In these reductions and increases in weight, all of the constraints in section 7.9 are active for both the Equity being increased and the Equity being decreased (in addition to a minimum size for new allocations in the Index). The total amount increased (decreased) is the first binding constraint of these. Then move on to the following company (either being increased or reduced). In this way for as long as there are names below the turnover score threshold z_{turn} available to reduce and there is sufficient liquidity in securities with score above this threshold to increase, continue adding trades increasing the average Carbon Transition Percentile of the Index until the minimum turnover is reached.

Sometimes constraints may mean that after cycling through every company the target turnover is not reached. In this case the Index's Carbon Transition exposure is maximal subject to constraints and this step is complete even at the lower level of turnover.

7.10 Remove Small Allocations

Remove allocations so small as to be deemed unlikely to be essential to meeting the aims of the Index strategy. Note that this final step can lead to small violations in other constraints.

w_{rem} is the Removal Threshold - .1bps

- a) Set to zero any security weights smaller than the minimum threshold.
- b) Rescale pro-rata all other allocations to achieve 100% investment.

7.11 Re-Allocate to High Impact Sectors

To prevent greenwashing, the EU Climate Benchmarks Final Report requires keeping the exposure to sectors that have a high impact on Climate Change in line with those of the Investable Universe. It defines high impact sectors using the NACE sector scheme⁷ which has been mapped to the sector scheme of the Investable Universe. In this step the Index measures the Total Market Cap Weight of the High Impact Sub-Sectors within the Investable Universe and the Total Current Weight of the High Impact Sub-Sectors of the Index. If the allocation to high impact sub-sectors is lower than the Investable Universe, scale up all the weights in the Index to match the high impact and reduce the weights of the low impact sub-sectors pro-rata.

- a) S_H is the set of securities in high carbon intensity sub-sectors
- b) $gap = \sum_{i \in S_H} w_4^i - \sum_{i \in S_H} w_{cap}^i$
- c) If $gap < 0$ then scale the allocations for companies in high carbon intensity sub-sectors and low carbon intensity sub-sectors respectively:
 - a. For $i \in S_H$, $w_5^i = w_4^i * 1 + \left(\frac{\sum_{i \in S_H} w_4^i - gap}{\sum_{i \in S_H} w_4^i} \right)$
 - b. For $i \notin S_H$, $w_5^i = w_4^i * 1 - \left(\frac{\sum_{i \in S_H} w_4^i + gap}{\sum_{i \notin S_H} w_4^i} \right)$

Else if $gap \geq 0$: $w_5^i = w_4^i$

7.12 Re-allocate to Low Carbon Intensity Equities

Section 6.6 measures the Carbon Trajectory. The Target WACI for the Rebalance period $WACI_P$ is the maximum WACI of the Index. If $WACI_5 > WACI_P$, then the Index re-allocates from Equities with high Carbon Intensity to Equities with lower Carbon Intensity until the Index WACI matches the target $WACI_P$.

To achieve this goal, the Index attempts to minimize the number of transactions by finding the pair trade that will yield the largest impact on Index WACI given all trading constraints from previous steps. In addition to isolating the trades to a particular bucket so previously implemented constraints are not breached, the Index also isolates the trades to high vs low impact sub-sectors.

Initialize $w_6^i = w_5^i$

For each iteration j , measure the Index WACI.

$$WACI_j = \sum CI_i * w_{6,j}^i$$

For each iteration, compute each Equity's capacity to increase weight cb_i and capacity to reduce weight cs_i .

$$cb_i = \max(\min(w_{cut}^i + \Delta_L^i - w_{6,j}^i, x_1 - w_{6,j}^i, w_L^i - w_{6,j}^i), 0)$$

⁷List of NACE codes https://ec.europa.eu/competition/mergers/cases/index/nace_all.html

$$cs_i = \max(w_{6,j}^i - (w_{\text{cut}}^i - \Delta_L^i), w_{6,j}^i - x_{\text{min}}^i)$$

Additionally, for Equities where the Index currently has no allocation, $w_6^i = 0$, it must also ensure that new allocations are above the Minimum New Investment Threshold w_{min} .

Next, compute the top pair in each combination of Bucket and high/low impact by finding the Equity with the highest Carbon Intensity that has capacity to reduce weight and the Equity with the lowest Carbon Intensity with capacity to increase weight. The difference in Carbon Intensity between the Equity with the highest Carbon Intensity and the Equity with the lowest Carbon Intensity is noted as $cd_{B_{khl}}$. The trade size $ts_{B_{khl}}$ is the lower of the capacity to increase weight cb_i and capacity to reduce weight cs_i .

$$cd_{B_{khl}} = ci_{i,h} - ci_{i,l}$$

$$ts_{B_{khl}} = \min(cb_i, cs_i)$$

Compute the Carbon Intensity Change per Trade $cis_{B_{khl}}$ to measure the impact the trade will have on Index WACI $WACI_j$.

$$cis_{B_{khl}} = cd_{B_{khl}} * ts_{B_{khl}}$$

Reduce the Trade Size $ts_{B_{khl}}$ if the Index WACI minus the Target WACI is less than the Carbon Intensity Change $WACI_j - WACI_p < cis_{B_{khl}}$. Compute the new trade size by dividing the gap in Carbon Intensity by the Carbon Difference of the trade $cd_{B_{khl}}$.

$$ts_{B_{khl}} = (WACI_j - WACI_p) / cd_{B_{khl}}$$

For security to reduce weight. $w_6^i = w_6^i - ts_{B_{khl}}$

For security to increase weight. $w_6^i = w_6^i + ts_{B_{khl}}$

7.13 Set Adjusted Shares

Use the Final Target Weights w_6^i to calculate Theoretical Adjusted Shares S_i . Multiply the Final Target Weight w_6^i by the total Market Capitalization of the Investable Universe and Fraction of the Universe assumption τV . Then divide by the Price & FX Rate (if applicable) of Equity.

$$S_i = \frac{w_6^i * \tau V}{P_i * FX_i}$$

8.0. Calculation of Index Value

The daily closing Index value will be based on the Theoretical Adjusted Shares and will be calculated by the Calculation Agent pursuant to the methodology and Divisor formula for calculating index values set forth in the Calculation Agent Index Methodology Document.

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10.0 Index Data Availability

Bloomberg Ticker Measure

JPMIGCTT	Total Return Index Level
JPMIGCTP	Price Return Index Level
JPMIGCTN	Net Total Return Index Level