

Bloomberg Hydrogen Benchmark Index Methodology

November 2022

Contents

Introduction	3
Section 1: Overview	3
Section 2: Index Eligibility Process	3
Parent Universe	3
Sector Eligibility	3
Market Capitalization Eligibility	3
Liquidity Eligibility	3
Multiple Classes of Securities	3
Section 3: Index Construction Process	3
Index Selection Process	3
Index Weighting	3
Index Rebalance and Reconstitution	4
Section 4: Index Maintenance	5
Index Calculation	5
Deletion Policy	5
Addition Policy	5
Replacement Policy	5
Corporate Actions	5
Section 5: Stakeholder Engagement, Risks and Limitations	5
Stakeholder engagement	5
Risks	6
Limitations of the index	6
Section 6: Benchmark Oversight and Governance	6
Benchmark governance, audit and review structure	6
Index and data reviews	7
Internal and external reviews	7
Expert judgement	7
Data providers and data extrapolation	8
Conflicts of interest	8
Restatement policy	8
Appendix A: ESG Disclosure	9

Introduction

The Bloomberg Hydrogen Benchmark Index is constructed to track the performance of companies with exposure to the production of green hydrogen, equipment and supporting technology to produce or enable its use, and end-markets with the greatest potential.

Section 1: Overview

Name	Bloomberg Hydrogen Benchmark Index
Base date	2015-03-30
Inception Date	2022-11-07
Rebalance	Quarterly
Publication	Weekdays
Currency	USD
Tickers	BHJEN (Price Return) BHJENT (Total Return) BHJENN (Net Return)

Section 2: Index Eligibility Process

Parent Universe

To be selected for the Bloomberg Hydrogen Benchmark Index, a security must be a member of the Bloomberg World Aggregate universe. In addition, a security must be a member of the Developed Markets, China, or South Korea universes. Please refer to the Bloomberg Global Equity Index methodology through the link below for additional details.

[Bloomberg Global Equity Indices Methodology](#)

Sector Eligibility

A security must be classified as belonging to the Gold or Silver tiers within the Hydrogen ecosystem as determined by the Bloomberg Intelligence (BI) Theme-Basket committee.

Please refer to the Bloomberg Thematic Protocol through the link below for additional details on the construction of thematic baskets.

[Bloomberg Thematic Protocol](#)

Market Capitalization Eligibility

A security must have a minimum free float market capitalization of \$200 million.

Liquidity Eligibility

A security must have a minimum 90-day average daily value traded of \$2 million.

Multiple Classes of Securities

One security per issuer is permitted. If an issuer has multiple securities, then the security currently in the Index will take precedence if it has met all other criteria for eligibility. Otherwise, the security with the highest 90-day average daily value traded is eligible for inclusion in the Index.

Section 3: Index Construction Process

Index Selection Process

All securities that satisfy the Index Eligibility Process in Section 2 are eligible for inclusion in the Index.

Index Weighting

The Index is modified equal weighted. The initial weights, W_i , are assigned as follows.

$$W_i = \frac{1}{M}$$

The initial weights are then adjusted such that securities part of the Gold tier as determined by Bloomberg Intelligence Theme-Basket Committee have their weight multiplied by 2 as follows.

$$WM_i = W_i * \{2 \text{ if security } i \text{ is part of Gold tier, } 1 \text{ for all other securities}\}$$

The adjusted initial weight, WM_i , is then normalized such that:

$$WM_i = \frac{WM_i}{\sum_1^M WM_i}$$

Next, an index member's free float market cap weight is determined such that:

$$WFMC_i = \frac{FMC_i}{\sum_{i=1}^n FMC_i}$$

A security cap is set for each Index member as follows.

$$cap_i = 5 * WFMC_i$$

In other words, a security's final weight cannot exceed 5 times its free float market cap weight. A security whose adjusted initial weight as defined above exceeds 5 times its free float market cap weight will have its final weight equal to 5 times its free float market cap weight. Any excess weight from capping is then proportionally distributed to the remaining uncapped securities as follows.

$$totalWeightOfCaps = \sum_{i=1}^M cap_i \text{ for } WM_i \geq cap_i$$

$$totalWeightNotCapped = \sum_{i=1}^M WM_i \text{ for } WM_i < cap_i$$

$$WF_i = \begin{cases} cap_i, & WM_i \geq cap_i \\ \frac{WM_i \times (1 - totalWeightOfCaps)}{totalWeightNotCapped}, & WM_i < cap_i \end{cases}$$

The above step is repeated until no security's final weight exceeds 5 times its free float market cap weight.

Where:

W_i	Initial weight of security i
M	Number of Index members
WM_i	Modified initial weight of security i
FMC_i	Free float market capitalization of security i
$WFMC_i$	Free float market capitalization weight of security i
cap_i	The security cap applied to security i
$totalWeightOfCaps$	The total weight of all the securities whose modified initial weight exceeds 5 times their free float market cap weight
$totalWeightNotCapped$	The total weight of all the securities whose modified initial weights is less 5 times their free float market cap weight
WF_i	Final weight of security i

Index Rebalance and Reconstitution

The Index is reconstituted and rebalanced quarterly in March, June, September, and December.

Selection Date

The Index Eligibility Process is applied using data as of the last Wednesday in January, April, July, and October.

Index Share Determination Date

Float Shares are determined using Shares Outstanding and Free Float as of the last Wednesday in January, April, July, and October. Index Weighting is determined using prices as of 3 weeks prior to the Index Effective Date.

Index Announcement Date

An Index reconstitution and rebalance announcement date shall be the last Wednesday in February, May, August, and November.

Index Effective Date

The Index reconstitutions and rebalances go effective after the close of trading on the 2nd Wednesday in March, June, September, and December, respectively.

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Selection Date (Eligibility)	Last Wednesday	X			X			X			X		
Selection Date (Weighting)	3 Weeks Prior to Effective Date		X			X			X			X	
Announcement Date	Last Wednesday		X			X			X			X	
Effective Date	2 nd Wednesday			X			X			X			X

Section 4: Index Maintenance**Index Calculation**

Refer to the [Bloomberg Global Equity Indices Methodology](#) for index calculation details.

Deletion Policy

Index securities are not deleted outside Index Rebalance and Reconstitution window except in the case of a delisting.

Addition Policy

Index securities are not added outside of the Index reconstitution.

Replacement Policy

Index securities are not replaced outside of the Index reconstitution.

Corporate Actions

Refer to [Bloomberg Global Equity Indices Non-Market Cap Corporate Action Methodology](#) for the treatment of corporate actions.

Section 5: Stakeholder Engagement, Risks and Limitations**Stakeholder engagement**

BISL is in regular and ongoing engagement with its users through various channels, including via help desks, sales personnel, and direct communication with product personnel. To help ensure that the Index remains an accurate representation of Global Equities defined in the methodology, BISL endeavors to meaningfully incorporate these engagements into improvements in processes and service. Prior to any change that might meaningfully impact users, BISL consults more broadly with stakeholders, where appropriate, before a recommendation is presented to the Product, Risk & Operations Committee ("PROC") for approval. This concept of shared ownership enables BISL to produce the most relevant Index and helps ensure responsiveness to user needs.

Risks

The following is a summary of certain risks associated with the Index but is not meant to be an exhaustive list of all risks associated with the Index. Although the Index is designed to be representative of the markets it is measuring, it may not be representative of every use case. There is also inherent, though transparent, judgment in its construction, as outlined in this Methodology. The Index is designed for general applicability and not to address the individual circumstances and needs of users. BISL does not advise about the usefulness of the Index to a particular circumstance; users are therefore encouraged to seek their own counsel for such matters. This Methodology is subject to change, which may impact its usefulness to users. Although efforts will be made to alert users of any change, every individual user may not be aware of them. Such changes may also significantly impact the usefulness of the Index. BISL may also decide to cease publication of this Index. BISL maintains internal policies regarding user transitions, but no guarantee is given that an adequate alternative is available generally or for a particular use case. Markets for stocks, as with all markets, can be volatile. As the Index is designed to measure this market, it could be materially impacted by market movements, thus significantly affecting the use or usefulness of the Index for some or all users. Also, certain equity markets are less liquid than others – even the most liquid markets may suffer periods of illiquidity. Illiquidity can have an impact on the quality or amount of data available to BISL for calculation and may cause the Index to produce unpredictable results.

Limitations of the index

Though the Index is designed to be representative of the markets it measures or otherwise aligns with its stated objective, it may not be representative in every case or achieve its stated objective in all instances. It is designed and calculated strictly to follow the rules of this Methodology, and any Index level or other output is limited in its usefulness to such design and calculation.

Markets can be volatile, including those market interests that the Index measures or upon which the Index is dependent to achieve its stated objective. For example, illiquidity can have an impact on the quality or amount of data available to the administrator for calculation and may cause the Index to produce unpredictable or unanticipated results.

In addition, market trends and changes to market structure may render the objective of the Index unachievable or to become impractical to replicate by investors.

In particular, the Index measures global equity markets. As with all equity investing, the Index is exposed to market risk. The value of equities fluctuate with the changes in economic forecasts, interest rate policies established by central banks and perceived geopolitical risk. The Index does not take into account the cost of replication and as a result a tracking portfolio's returns will underperform the Index with all else equal. As the Index is designed to measure those markets, it could be materially impacted by market movements, thus significantly impacting the use or usefulness of the fixings for some or all users.

In addition, certain sub-indices may be designed to measure smaller subsets of the Index such as specific styles, size, and sector. Some of these sub-indices have very few qualifying constituents and may have none for a period of time. During such period, the sub-index will continue to be published at its last value, effectively reporting a 0% return, until new constituents qualify. If no constituents are expected to qualify (due to changes in market structure and other factors), the sub-index may be discontinued. In such an event, this discontinuation will be announced to index users.

Section 6: Benchmark Oversight and Governance

Benchmark governance, audit and review structure

BISL uses two primary committees to provide overall governance and effective oversight of its benchmark administration activities:

- The PROC provides direct governance and is responsible for the first line of controls over the creation, design, production and dissemination of benchmark indices, strategy indices and fixings administered by BISL, including the Index. The PROC is composed of the personnel with significant experience or relevant expertise in relation to financial benchmarks. Meetings are attended by Legal & Compliance personnel. Nominations and removals are subject to review by the BOC, discussed below.
- The oversight function is provided by BISL's Benchmark Oversight Committee ("BOC"). The BOC is independent of the PROC and is responsible for reviewing and challenging the activities carried out by the PROC. In carrying out its oversight duties, the BOC receives reports of management information from members of the PROC as well as Legal & Compliance members engaged in second level controls.
- In addition, the BISL board of directors is composed of senior executives a majority of which are independent of BISL and is empowered to set the strategy, objectives, and overall direction of BISL, and oversees and monitors BISL's decision-making.

On a quarterly basis, the PROC reports to the BOC on governance matters, including but not limited to client complaints, the launch of new benchmarks, operational incidents (including errors & restatements), major announcements and material changes concerning the benchmarks, the results of any reviews of the benchmarks (internal or external) and material stakeholder engagements.

Index and data reviews

BISL reviews the Methodology on a periodic basis, and at least annually, to determine whether it continues to:

- (i) be robust and reliable;
- (ii) have clear rules, including regarding discretion;
- (iii) be rigorous, continuous and capable of validation;
- (iv) be resilient and ensures the Index can be calculated in the widest range of possible circumstances, without compromising its integrity; and
- (v) be traceable and verifiable.

In doing so, BISL will assess whether the Index continues to represent the market that it is intended to measure. More frequent reviews may result from extreme market events and/or material changes to the underlying market. Non-exhaustive examples of extreme market events include trading events such as trading interruptions or unexpected market closures, resulting in unusual market illiquidity or market volatility; exchange closures, government interventions, a pandemic or a natural catastrophe resulting in exceptional periods of stress.

Criteria for data inputs include reliable delivery and active underlying markets. Whether an applicable market is active depends on whether there are sufficient numbers of transactions (or other indications of price, such as indicative quotes) in the applicable constituents (or similar underlying constituent elements) that a price (or other value, as applicable) may be supplied for such constituent(s).

Other than as set forth in this Methodology (read in conjunction with the [Bloomberg Global Equity Index Methodology](#)), there are no minimum liquidity requirement for Index constituents and/or minimum requirements or standards for the quantity or quality of the input data. The review will be conducted by product managers of the Index in connection with the periodic rebalancing of the Index or as otherwise appropriate. Please see the [Bloomberg Global Equity Index Methodology](#) for further information on calculation of the Index in the event of market disruption.

Any resulting change to this Methodology will be subject to the review of the PROC under the oversight of the BOC, each of which committees shall be provided all relevant information and materials it requests relating to the change. Details regarding the PROC and BOC are described above. Any relevant changes will be reflected and tracked in updated versions of this Methodology.

BISL will consult with users of the Index on changes to the Methodology and seek user input. The stakeholder engagement will set forth the rationale for any proposed changes (including whether the representativeness of the Index or its appropriateness as a reference for financial instruments or contracts would be at risk if the proposed changes are not made), the key elements of the Methodology that would, in BISL's view, be affected by the proposed change, as well as the timeframe and process for responses. BISL will provide at least two weeks' notice prior to any change going into effect. In the event of exigent market circumstances or if required by law or regulation, this period may be shorter. Subject to requests for confidentiality, stakeholder feedback and BISL's responses will be made accessible upon request.

Internal and external reviews

BISL's Index administration is also subject to its Legal & Compliance function, which periodically reviews various aspects of its businesses to determine whether it is adhering to applicable policies and procedures, and assess whether applicable controls are functioning properly. In addition, BISL may from time to time appoint an independent external auditor with appropriate experience and capability to review adherence to benchmark regulation and the IOSCO Principles. The frequency of such external reviews depends on the size and complexity of the operations and the breadth and depth of Index use by stakeholders. For the Indices, BISL anticipates an external review to be conducted every two years.

Expert judgement

The Index is rules-based, and its construction is designed to consistently produce values without the exercise of expert judgment or discretion. Nevertheless, BISL may use expert judgment or discretion with regards to the following:

- Index restatements
- Extraordinary circumstances during a market emergency
- Data interruptions, issues, and closures
- Significant acquisitions involving a non-Index company

When expert judgment or discretion is required, BISL undertakes to be consistent in its application, with recourse to written procedures outlined in this Methodology and internal procedures manuals. In certain circumstances exercises of expert judgment or discretion are reviewed by senior members of BISL management and Legal & Compliance teams, and are reported to the PROC, BISL's governance committee, which operates under the supervision of BISL's oversight function, the BOC. BISL also maintains and enforces a code of ethics to prevent conflicts of interest from inappropriately influencing index construction, production, and distribution, including the use of expert judgment or discretion.

Data providers and data extrapolation

The Index is rules-based, and its construction is designed to consistently produce Index levels without the exercise of discretion. The Index is produced without the interpolation or extrapolation of input data.

In addition, BISL seeks to avoid contributions of input data that may be subject to the discretion of the source of such data and instead seeks to use input data that is readily available and/or distributed for a number of non-index or benchmark creation purposes. Accordingly, the index requires no 'contributors' to produce and no codes of conduct with any such sources are required.

Conflicts of interest

The Index confers on BISL discretion in making certain determinations, calculations and corrections from time to time. In making those determinations, calculations and corrections, BISL has no obligation to take the needs of any product investor or any other party into consideration. BISL is committed to avoiding and, where necessary, managing actual or potential conflicts of interest in the BISL decision-making process and has established a Conflicts of Interest Policy to minimize or resolve actual or potential conflicts of interest. BISL does not create, trade or market products.

Restatement policy

BISL strives to provide accurate calculation of its indices. However, to the extent a material error in index levels is uncovered following publication and dissemination, a public notification will be made alerting of such error and the expected date of a revised publication, if warranted.

An error to an equity Index in excess of 3 basis point over one day will automatically be reviewed for restatement. If the Index in error is a Primary Index (listed below) and has occurred in the last 2 business days, a restatement will be made for all impacted indices. Errors occurring beyond the last 2 business days will be evaluated on a case-by-case basis.

Real-time indices are not considered for restatement, all real-time dissemination is considered indicative.

Primary Indices:

- Bloomberg US Large Cap Equity Index (B500T)
- Bloomberg Developed Markets Large & Mid Cap Index (DMTR)
- Bloomberg Emerging Markets Large & Mid Cap Index (EMTR)

If the error affects a non-Primary Index the following factors will be reviewed to determine whether to restate. Not all conditions need to be present to warrant a restatement, and certain factors may be more determinative than others depending on the circumstances of the given error.

- The relative importance of the data field impacted by the error;
- When the error occurred and when it was discovered;
- The number of indices and sub-indices affected;
- Whether the impacted indices are linked to tradable products;
- The magnitude of the error;
- The burden of restatement on client re-processing relative to the impact of the error;
- The impact of the restatement on analytical tools.

Best efforts will be made to address errors in non-Primary indices as outlined in the table below:

Event	Action (If discovered within 2 business days)
Missed corporate action	
Spin-off	Restate indices and reissue file
Regular cash dividend	
Special cash dividend	
Stock split	
Stock dividend, bonus	
Mergers & acquisition	Update made the next business day; no restatement and no reissuance of files
Delisting	
Reclassification	
Change in listing	
IPO incorrectly added	Update made at next rebalance
Rebalance	
Incorrect add	Unless the error is discovered during pro-forma period, update will be made at next rebalance
Incorrect removal	
Share changes	

Appendix A: ESG Disclosure

EXPLANATION OF HOW ESG FACTORS ARE REFLECTED IN THE KEY ELEMENTS OF THE BENCHMARK METHODOLOGY	
Item 1. Name of the benchmark administrator.	Bloomberg Index Services Limited ("BISL")
Item 2. Type of benchmark or family of benchmarks. <i>Choose the relevant underlying asset from the list provided in Annex II to Commission Delegated Regulation (EU)2020/1816.</i>	Equity
Item 3. Name of the benchmark or family of benchmarks.	Bloomberg Hydrogen Benchmark Index
Item 4. Does the benchmark methodology for the benchmark or family of benchmarks take into account ESG factors?	No
<p>Item 5. Where the response to Item 4 is positive, please list below, for each family of benchmarks, those ESG factors that are taken into account in the benchmark methodology, taking into account the ESG factors listed in Annex II to Delegated Regulation (EU) 2020/1816.</p> <p>Please explain how those ESG factors are used for the selection, weighting or exclusion of underlying assets.</p> <p>The ESG factors shall be disclosed at an aggregated weighted average value at the level of the family of benchmarks.</p>	
(a) List of environmental factors considered:	Not applicable
(b) List of social factors considered:	Not applicable
(c) List of governance factors considered	Not applicable
<p>Item 6. Where the response to Item 4 is positive, please list below, for each benchmark, those ESG factors that are taken into account in the benchmark methodology, taking into account the ESG factors listed in Annex II to Delegated Regulation (EU) 2020/1816, depending on the relevant underlying asset concerned.</p> <p>Please explain how those ESG factors are used for the selection, weighting or exclusion of underlying assets.</p> <p>The ESG factors shall not be disclosed for each constituent of the benchmark, but shall be disclosed at an aggregated weighted average value of the benchmark.</p>	

Alternatively, all of this information may be provided in the form of a hyperlink to a website of the benchmark administrator included in this explanation. The information on the website shall be easily available and accessible. Benchmark administrators shall ensure that information published on their website remains available for five years.	
(a) List of environmental factors considered:	As above
(b) List of social factors considered:	As above
(c) List of governance factors considered:	As above
Item 7. Data and standards used	
(a) Data input. (i) <i>Describe whether the data are reported, modelled or sourced internally or externally.</i> (ii) <i>Where the data are reported, modelled or sourced externally, please name the third party data provider.</i>	Not Applicable
(b) Verification and quality of data. <i>Describe how data are verified and how the quality of those data is ensured.</i>	Not Applicable
(c) Reference standards <i>Describe the international standards used in the benchmark methodology.</i>	N/A
Date on which information has been last updated and reason for the update:	October 2022

Disclaimer

BLOOMBERG, BLOOMBERG INDICES and Bloomberg Global Equity Indices (the "Indices") are trademarks or service marks of Bloomberg Finance L.P. Bloomberg Finance L.P. and its affiliates, including Bloomberg Index Services Limited, the administrator of the Indices (collectively, "Bloomberg") or Bloomberg's licensors own all proprietary rights in the Indices. Bloomberg does not guarantee the timeliness, accuracy or completeness of any data or information relating to the Indices. Bloomberg makes no warranty, express or implied, as to the Indices or any data or values relating thereto or results to be obtained therefrom, and expressly disclaims all warranties of merchantability and fitness for a particular purpose with respect thereto. It is not possible to invest directly in an Index. Back-tested performance is not actual performance. Past performance is not an indication of future results. To the maximum extent allowed by law, Bloomberg, its licensors, and its and their respective employees, contractors, agents, suppliers and vendors shall have no liability or responsibility whatsoever for any injury or damages - whether direct, indirect, consequential, incidental, punitive or otherwise - arising in connection with the Indices or any data or values relating thereto - whether arising from their negligence or otherwise. This document constitutes the provision of factual information, rather than financial product advice. Nothing in the Indices shall constitute or be construed as an offering of financial instruments or as investment advice or investment recommendations (i.e., recommendations as to whether or not to "buy", "sell", "hold", or to enter or not to enter into any other transaction involving any specific interest or interests) by Bloomberg or a recommendation as to an investment or other strategy by Bloomberg. Data and other information available via the Indices should not be considered as information sufficient upon which to base an investment decision. All information provided by the Indices is impersonal and not tailored to the needs of any person, entity or group of persons. Bloomberg does not express an opinion on the future or expected value of any security or other interest and do not explicitly or implicitly recommend or suggest an investment strategy of any kind. Customers should consider obtaining independent advice before making any financial decisions. © 2022 Bloomberg. All rights reserved. This document and its contents may not be forwarded or redistributed without the prior consent of Bloomberg.

The BLOOMBERG TERMINAL service and Bloomberg data products (the "Services") are owned and distributed by Bloomberg Finance L.P. ("BFLP") except (i) in Argentina, Australia and certain jurisdictions in the Pacific islands, Bermuda, China, India, Japan, Korea and New Zealand, where Bloomberg L.P. and its subsidiaries distribute these products, and (ii) in Singapore and the jurisdictions serviced by Bloomberg's Singapore office, where a subsidiary of BFLP distributes these products.

Take the next step.

For additional information,
email indexhelp@bloomberg.net
or press the <HELP> key twice
on the Bloomberg Terminal*

[bloomberg.com/indices](https://www.bloomberg.com/indices)

Beijing

+86 10 6649 7500

Dubai

+971 4 364 1000

Frankfurt

+49 69 9204 1210

Hong Kong

+852 2977 6000

London

+44 20 7330 7500

Mumbai

+91 22 6120 3600

New York

+1 212 318 2000

San Francisco

+1 415 912 2960

São Paulo

+55 11 2395 9000

Singapore

+65 6212 1000

Sydney

+61 2 9777 8600

Tokyo

+81 3 4565 8900