SDG Factor-In

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LSEG DATA & ANALYTICS

Contents

Model Change Log

Current Version	
Owner	SFI, Model Owner
Department	Sustainable Finance & Investment
Current Version	1.0
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Version Control Table:

Effective Date	Methodology Document Version Number	Model Version Number	Description of Key Changes from Previous Version
01/07/2026	1.0	1.0	First publication to support applicable regulatory disclosures.

Regulatory Information

For the purposes of Regulation (EU) 2024/3005 on the transparency and integrity of ESG rating activities, Refinitiv France SAS is the ESG Rating Provider responsible for the issuance of the relevant ESG ratings within the European Union.

This document describes the methodology used for the production of ESG ratings and related products distributed globally under the LSEG brand. References to LSEG products, methodologies, governance frameworks and related disclosures reflect the global operating framework supporting those products and services.

This methodology document forms part of the disclosure framework established to support compliance with the Regulation (EU) 2024/3005 and should be read together with the publicly available disclosure documents at: https://www.lseg.com/en/data-analytics/sustainable-finance/regulatory-disclosures.

The use of the LSEG brand in this document is for branding purposes only and does not affect, modify or supersede the identification of the ESG Rating Provider for the purposes of Regulation (EU) 2024/3005.

Executive Summary

LSEG D&A ESG scores measure an item's relative performance on fundamental ESG attributes, commitment, and effectiveness across ESG factors. The scores are derived using a proprietary, rule-based methodology applied to publicly available information from sources believed by the London Stock Exchange Group (LSEG) to be reliable; however, the accuracy and completeness of such information cannot be guaranteed. The scores are provided for informational purposes only and do not constitute investment advice or a recommendation. They should not be relied upon as the sole basis for any decision. LSEG makes no representations or warranties and accepts no liability for any loss or damage arising from the use of, or reliance on, the scores.

The objective of this document is to describe the methodology aspects of the SDG Factor-In framework. Its output is a dataset which aims at measuring the countries' progress toward the SDGs and can be used for portfolio reporting, portfolio allocation, or exclusion, as well as index tilting to create ETFs or benchmarks. Furthermore, the model can provide *SDG Wealth Performance*, assessing how countries perform with respect to their level of wealth.

The first part describes the methodology. The second part illustrates some of the model use cases. The last part presents the SDGs "Wedding Cake" concept developed by Stockholm Resilience Institute, an innovative way of viewing the economic, social, and ecological aspects of the SDGs.

Background

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by the United Nations General Assembly in 2015 as a universal call to action to end poverty, protect the planet and ensure that by 2030 all people enjoy peace and prosperity.[1]

Figure 1. UN Sustainable Development Goals

Source: UN (un.org)[1], May 2025

An SDG is typically composed of eight to twelve targets,[2] each using one to four indicators to measure their progress. The targets are either 'outcome' targets (circumstances to be attained) or 'means of implementation' targets. [3]

[1] UN, THE 17 GOALS | Sustainable Development (un.org)

[2] Some targets are not used in this model as their underlying indicators are unavailable (low geographical coverage, redundancy, incomparability across countries etc.).

[3] The official list of SDGs and underlying targets and indicators can be found at: SDG Indicators — SDG Indicators

Overview

SDG Factor-In (or Sovereign SDG assessment) is a sustainable investing product developed by LSEG, covering about 190 countries[4] and leveraging more than 230 KPIs with historical data since 2000. Further details on data sources are available in the appendix. The model uses a robust statistical approach to transform these KPIs into a score for each SDG. The model also provides an *Overall SDG* score as the average of the 17 SDG scores. This solution uses an equally weighted average.

These scores aim to measure the countries' progress toward the SDGs and can be used for portfolio reporting, portfolio allocation or exclusion, as well as index tilting to create ETFs or benchmarks. Furthermore, the model can provide *SDG Wealth Performance*, assessing how countries perform with respect to their level of wealth. (Further details provided in the next section).

1. Methodology Overview

1.1 Raw data

The model leverages about 230 KPIs (or indicators), 80% of which are sourced from the official UN SDG database[5] (i.e., around 185 KPIs). We selectively enhance these metrics through additional KPIs from other high-quality sources, including the World Bank, the International Roads Federation, Enerdata, EMDAT, LSEG KPIs. The covered period runs from 2000 to present.

From a materiality standpoint, the impact component is included in the present assessment due to the nature of the 17 Sustainable Development Goals, which are inherently impact-oriented and represent the main source of data for this assessment. However, the assessment also incorporates additional internal indicators that are not exclusively impact-focused. As a result, while the model maintains a strong impact orientation, it cannot be stated with complete certainty that it is strictly impact-oriented. Given that the assessment is performed at the country level and includes indicators reflecting both countries' impacts on sustainable development outcomes and factors that may influence countries' economic and social resilience, the results can be viewed through a double materiality perspective, encompassing both impact and financial materiality considerations. Impacts are incorporated through the 17 Sustainable Development Goals, which capture countries' contributions to environmental, social, and economic sustainability outcomes and therefore provide an inherently impact-oriented perspective. Risks are reflected through the inclusion of additional internal indicators, which capture country-specific vulnerabilities, resilience factors, and conditions that may affect future economic and sustainability performance, thereby introducing a financial materiality dimension to the assessment.

It is also worth noting that the following model approach is not based on any scientific evidence.**1.2 Indicator score**

Indicator values are normalised to a 1–100 scale (where 100=best and 1=worst) to get the indicator score.

1.3 Target score (sub-SDG)

As described earlier, each SDG is composed of specific targets, with each defined by one to four indicators. For each target, the target score is obtained by averaging the underlying indicator scores and normalising again to a 1–100 scale.

1.4 SDG score

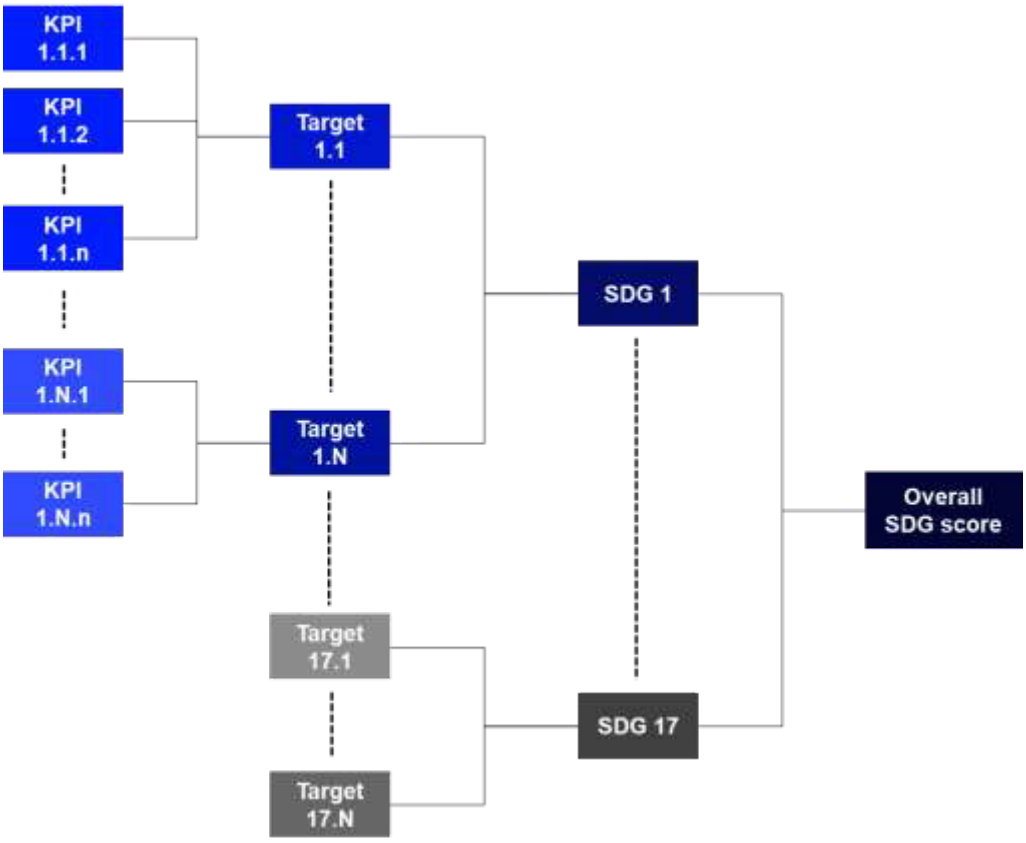
For each of the 17 SDGs, the same average and normalisation process is again applied to the underlying target scores to obtain the final SDG scores. Each SDG is interpreted from a materiality standpoint as the absolute impact a country has on the desired outcomes for people, environment and institutions. Each SDG can be mapped to an E, S or G equivalent, but there should not be a classification made in this sense. By normalising the scores, the model converts absolute progress made by a country towards one of the SDGs to how well the country performs in relation to the others.

The Overall SDG score corresponds to the normalised equally weighted average of all 17 SDG scores.

[4] For some countries, some SDG scores are missing due to lack of data.

[5] The UN SDG database can be found at: UNSDG

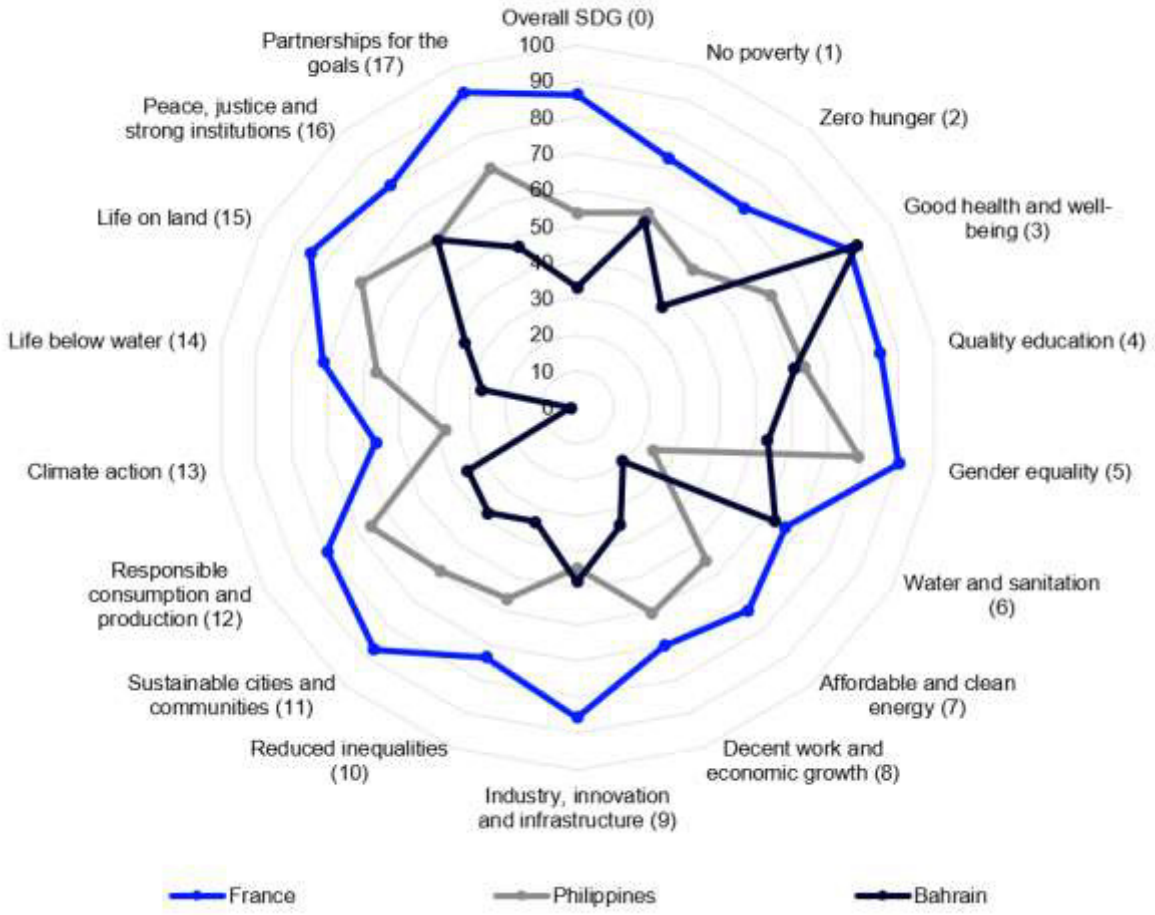
Figure 12. Summary of the data processing for SDG assessment



Source: LSEG Sovereign Sustainability Solutions, May 2025

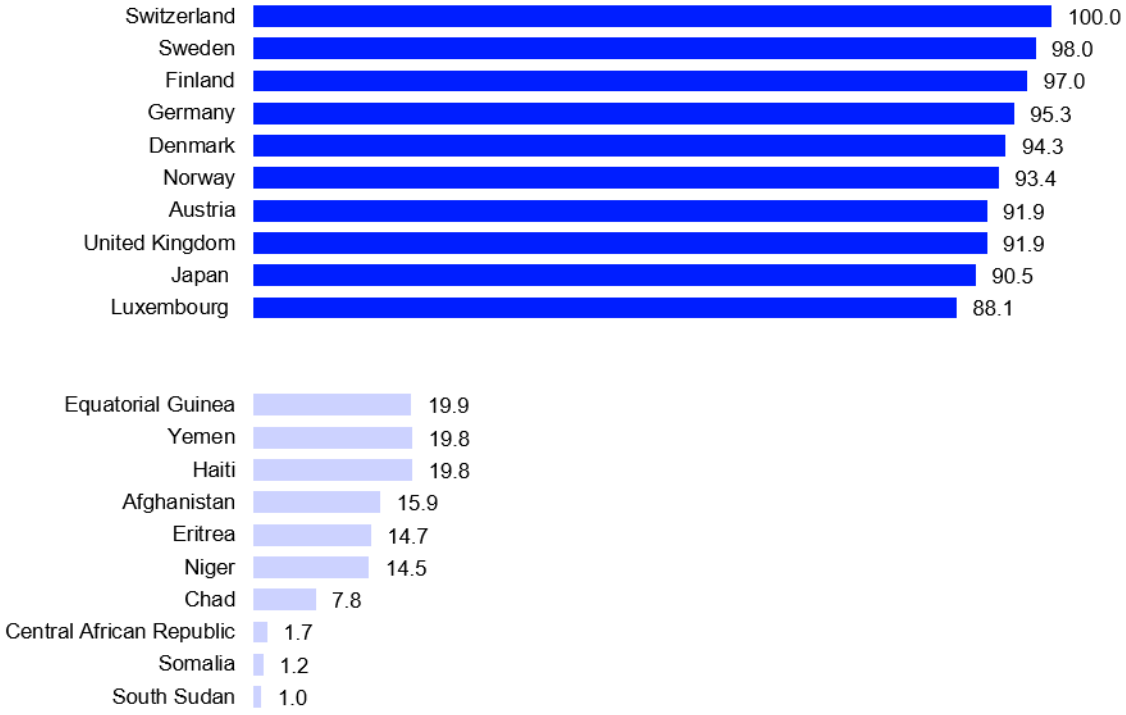
Figure 2Figure 3 compares the SDG scores for a few countries. Figure Figure 34 shows the top-10 and bottom-10 scores for the Overall SDG.

Figure 23. Comparison of SDG scores for France, Philippines and Bahrain (2020)



Source: LSEG Sovereign Sustainability Solutions data, November 2023

Figure 34. Overall SDG top-10 and bottom-10 scores (2020)[6]



Source: LSEG Sovereign Sustainability Solutions data, November 2023

1.5 SDG wealth performance

A recent analysis by the World Bank[7] highlighted a high correlation between sovereign ESG scores and national income. This *ingrained income bias* can lead to unintended outcomes in the use of ESG scores. For instance, ESG investing would drive capital away from low-income countries. Since many of the indicators used in the SDG methodology are similar to those found in ESG assessments, this income bias can be expected to be present in our SDG scores. Unsurprisingly, in Figure 3, the top 10 are high-income countries and the bottom 10 are low-income countries.

To circumvent this problem, we have been implementing income bias correction tools in our methodologies. (For example, see our sovereign ESG case study[8] for an *ex-post* approach to adjusting the income bias). In our SDG assessment model, we calculate the SDG Wealth Performance – the gap between the expected SDG score of a country given its level of wealth and its actual score. The expected score is obtained by smoothing all national SDG scores using the locally weighted scatterplot smoothing (LOWESS) algorithm, as seen in Figure 4 (SDG 2 'Zero hunger', blue line). This expected score can also be viewed as a peer average (i.e., the average value of countries with similar wealth).

A country SDG score (expressed as grey dots in Figure 4) is compared with the country's expected score for its level of wealth. Here, it's GDP per capita at purchasing power parity (PPP). The SDG Wealth Performance is the gap (in %) between the actual SDG score and the expected one. The green and the red arrows in Figure 4 are examples of Wealth Performance. A score of +24% means that the country in that year performs 24% better than countries with similar wealth (and -17% means 17% worse).

Any new values, either new historical datapoints, or any other countries' disclosures, would directly impact the computation exercise mentioned above and illustrated below in the following cases.

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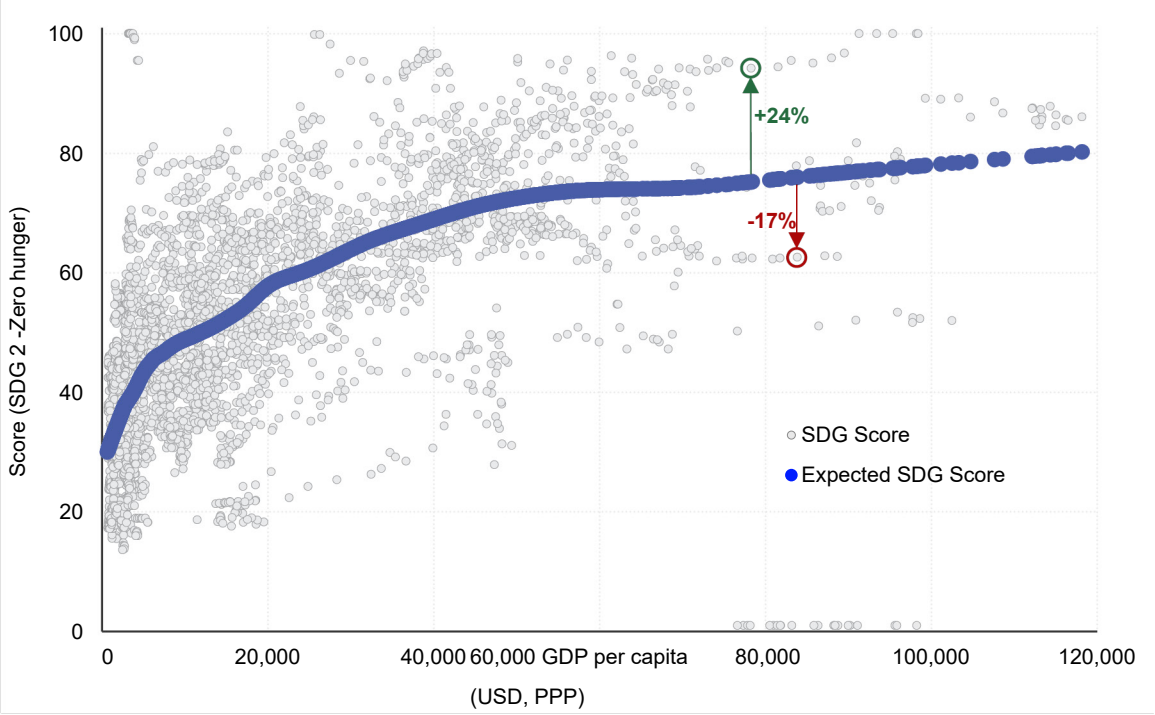
[6] Switzerland has a score of 100 on Overall SDG, but this does not mean it is a perfect country. This score should rather be interpreted as Switzerland being the most advanced country in the progress toward achieving all the 17 SDGs.

[7] World Bank, Demystifying Sovereign ESG (worldbank.org)

[8] FTSE Russell, Dealing with income bias in sovereign ESG scores - Sovereign ESG revisited | FTSE Russell.

Figure 4. SDG wealth performance (gap) for SDG 2 'Zero hunger'



Source: LSEG sovereign SDG data, November 2023

Please note that for some SDGs like 'No Poverty', after a local or global maximum within 40k-60k of GDP per capita (USD, PPP), the expected value (blue curve) decreases for very high GDP per capita because some very wealthy but bad students pull the expected value down. And this gives an advantage to very wealthy countries (we expect less from them). In this kind of situations, the local or global maximum encountered within 40k-60k is extended to flatten the expected value curve (to prevent the curve from decreasing). That is, we expect the same level from very wealthy countries (GDP per capita higher than 60k) as the global or local best country (which is also a wealthy country as its GDP per capita higher than 40k).

For other SDGs like 'Zero Hunger' illustrated in Figure 4, the expected value keeps increasing even after 60k of GDP per capita, which means higher expectations for higher wealth. In this case, we keep the expected value as is (no curve flattening is performed).

The SDGs "Wedding Cake" concept developed by Stockholm Resilience Institute[9] and illustrated in Figure 5, is a new way of viewing the economic, social, and ecological aspects of the SDGs.

This hierarchical categorization is an innovative way of visualizing the SDGs. It shows the interdependence of environmental, social, and economic pillars, which are traditionally seen as separate parts. This approach can be interpreted as a call for action, through partnerships, to achieve a sustainable world where the economy serves society within the capacities of the biosphere.

This inspired us at LSEG to build an aggregated SDG score with layer-dependent weights. The weights have been freely chosen by us to reflect the hierarchy of the "Wedding Cake" layers: Biosphere: 45%, Society: 30%, Economy: 20%, Partnership: 5%.

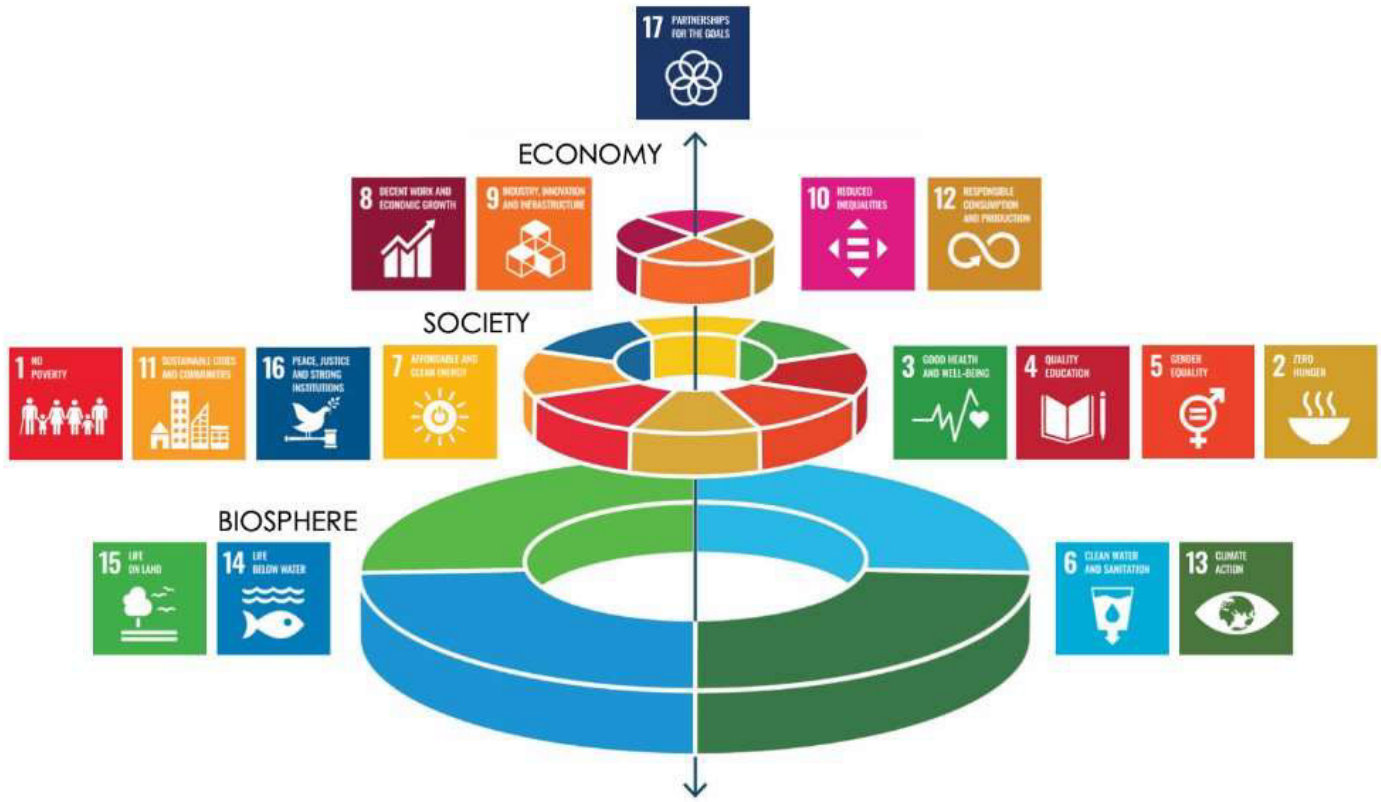
The ponderation above is applied to the four layers' scores defined below (in accordance with the concept illustrated in Figure 5):

- Biosphere: aggregation of SDGs 6 (Water and Sanitation), 13 (Climate Action), 14 (Life Below Water) and 15 (Life On Land)

[9] The SDGs wedding cake - Stockholm Resilience Centre

- Society: aggregation of SDGs 1 (No Poverty), 2 (Zero Hunger), 3 (Good Health and Well-being), 4 (Quality Education), 5 (Gender Equality), 7 (Affordable and Clean Energy), 11 (Sustainable Cities and Communities) and 16 (Peace, Justice and Strong Institutions)
- Economy: aggregation of SDGs 8 (Decent Work and Economic Growth), 9 (Industry, Innovation and Infrastructure), 10 (Reduced Inequalities) and 12 (Responsible Consumption and Production) 9
- Partnership: SDG 17 (Partnerships for the Goals)

Figure 5. The SDGs Wedding Cake by Stockholm Resilience Institute



Source: Stockholm Resilience Institute, May 2025

1.6 Limitations, assumptions and mitigation steps

The methodology is subject to limitations related to data availability, statistical processing and model assumptions. Data coverage varies across countries, indicators and time, with gaps addressed through rule-based imputation (forward/backward filling and linear interpolation), which may introduce estimation bias; this is mitigated through transparent, standardised rules and validation checks. The normalisation of indicators to a 1–100 scale ensures comparability but may reduce sensitivity to absolute differences and compress distributions. The income-bias adjustment relies on LOWESS smoothing to estimate expected scores conditional on GDP per capita, implying assumptions regarding local structure, stability and peer comparability that may not fully capture structural breaks or non-linearities. These modelling choices are mitigated through consistent parameterisation, peer-based benchmarking and periodic review. Despite these controls, residual limitations remain, including potential bias from non-random missingness, smoothing artefacts and imperfect income adjustments, which are monitored through ongoing data validation, outlier checks and governance processes.

Table 1. Limitations and mitigation approach

Limitation	Potential impact	Mitigation	Residual limitation
Data availability gaps	Reduced country/time comparability; potential bias (esp. low-income countries)	Multi-source inputs, annual refresh, validation checks	Structural gaps remain; uneven representativeness
Imputation of missing data	Distortion of trends and variance	Rule-based interpolation and carry-forward/backward methods	Bias if missingness is not random
Normalisation (1–100 scaling)	Loss of absolute signal; compression of extremes	Consistent transformation across all indicators	May mask real dispersion and structural differences
LOWESS/income adjustment assumptions	Misestimation of expected scores; smoothing bias	Peer-based benchmarking and standardised smoothing approach	Sensitive to bandwidth/outliers; may miss regime shifts
Income-bias correction framework	Imperfect removal of income effects	Use of SDG Wealth Performance (gap vs expected score)	Residual income bias may persist
Residual methodological limitations	Combined effect of data and modelling constraints	Monitoring, validation checks, periodic review	Not all biases or structural effects fully eliminated

Table 2. Limitations and controls/mitigants in place

Key limitation	Control / mitigant	Residual limitation
Data coverage constraints	Use of UN SDG database + complementary sources; coverage thresholds; annual updates	Incomplete historical series and uneven country coverage persist
Missing data / imputation	Deterministic imputation rules (linear interpolation, boundary carry-forward/backward)	Assumes stable dynamics; may bias results where gaps are structural
Normalisation assumptions	Uniform 1–100 scaling ensuring comparability across indicators and SDGs	Relative scaling reduces interpretability of absolute progress
LOWESS smoothing (income adjustment)	Non-parametric smoothing to derive expected scores by income level	Sensitive to parameter choice; may oversmooth or under-represent extremes
Income bias	SDG Wealth Performance (gap vs peer expectation) for adjustment	Bias correction is partial; structural income effects may remain
Model/process uncertainty	Standardised methodology, validation checks, periodic review and governance	Residual model risk and data artefacts cannot be fully removed

Data Collection Process[10]

The UN SDG Database**Error! Bookmark not defined.** was launched in 2018 and is updated quarterly. It provides over 650 metrics, but not all of them are relevant to this model. For example, some metrics cannot be used as is (metrics in local currencies, metrics to be converted to % of population or % of GDP, etc.). Other metrics are redundant, have poor geographical coverage or are incomparable across countries. Ultimately, around 185 KPIs from the UN SDG Database passed our selection process. We then enriched them with some 45 other KPIs from well-established, respected sources including:

- World Bank (+30 KPIs in areas like agriculture, industry, education, social inequalities, governance, etc.) - Public
- International Roads Federation (two KPIs, roads quality) - Private
- Enerdata (three KPIs, energy and electricity consumption, electric grid quality) - Private
- EMDAT (two KPIs, human casualties due to natural disasters) - Private
- LSEG KPIs (six KPIs, GHG and climate) - Internal

In total, this model leverages more than 230 KPIs, covers 191 countries and spans from 2000–present.

These datasets do not include any indication towards any commitment to the Paris Agreement, nor do they contain any benchmark against those commitments.

The data sources are not mapped against sustainability statements under CSRD or from information disclosed under SFDR, or EU Taxonomy.

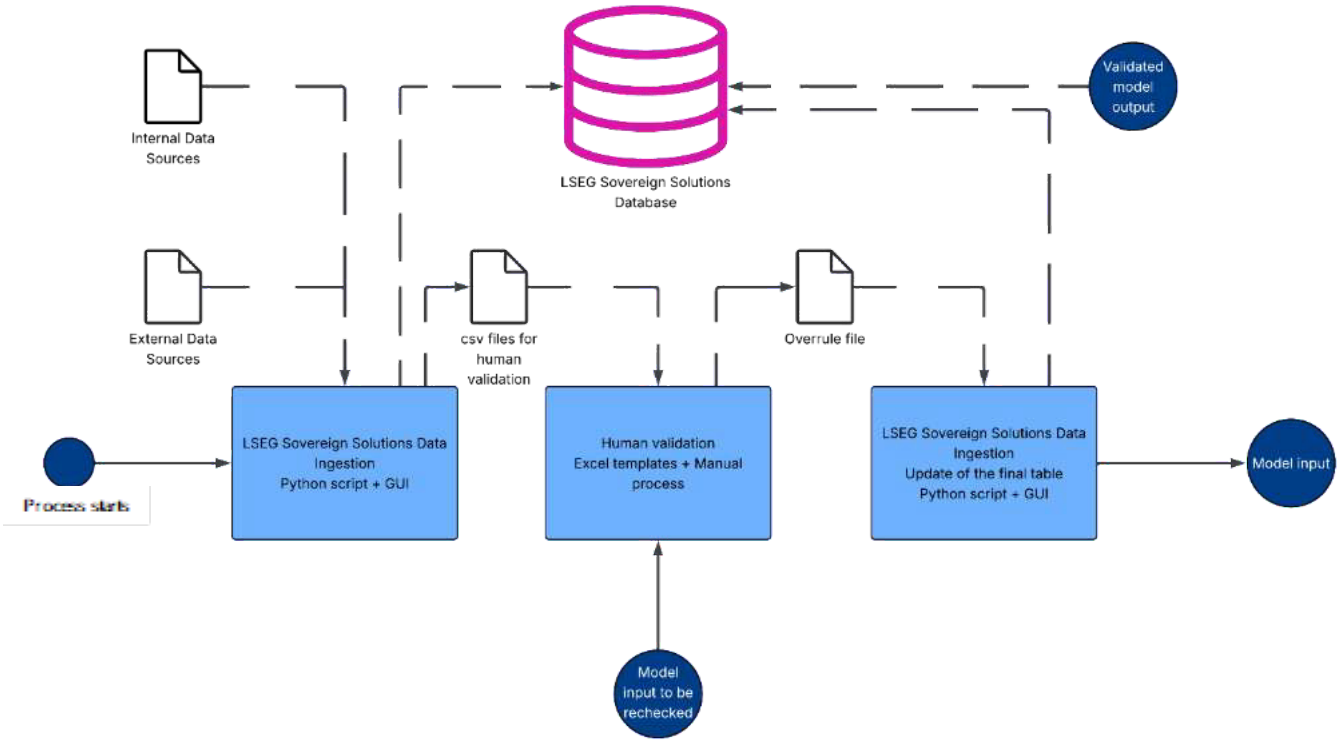
The underlying input data is updated annually, before the refresh. Once the model output is produced, the inputs and outputs become read-only so that we ensure traceability and transparency of the scores whenever they might be requested. The scores are considered valid at any point in time after the latest refresh.

Any major update will be captured by model using only the input data without any subjective intervention outside the present methodology.

Access to non-public data is performed in two ways, depending on the provider. Where supported, we access the data directly through the provider's platform using authorized login credentials supplied for this purpose and managed in accordance with our security controls. Alternatively, when direct access is not available or when automation is required, we retrieve the data via the provider's API, using a Python-based script to authenticate, request, and process the data securely and in line with the provider's technical and usage requirements.

10 No AI was used in the data collection or rating process and the rating methodology is not based on scientific evidence

Figure 6. Input data quality checks flow



Source: LSEG Sovereign Sustainable Solutions

For the input data checks, some comparisons are done between:

- the previous update and the new one;
- the new update and reference tables (which contains metadata details).

The process is recorded in a csv log file. These checks are standardised to be applied to all the sources used to populate the database.

1. Metadata checks:
   a) Comparisons between countries from the golden data (i.e., data already stored and used for different products) newly imported and the country reference table → check if all countries codes are on the reference table and if codes are the same. A pop-up appears during the ingestion process with the discrepancies:
      i. we can choose to continue the process without updating the reference table (if discrepancies concern regions for example);
      ii. we can update the reference table before further ingestion (add missed countries for example).
   b) Comparisons between indicators metadata details:
      i. check if a golden data is missed;
      ii. check if unit of indicators newly imported is the same as the one described in metadata table. Comparison between data points for the 2 latest updates:
   c) check if data imported contain data for all the countries previously imported or if some countries are missed or added;
   d) check if both new and old value are null;
   e) list all data points which match with abs(new value/old value-1) > 0.3;
      i. for indicators with percentage unit, only those with abs(old_val -new_val)>5
      ii. for indicators with constant prices and deflator, calculate the ratio of value_n -1/value n for each year and check if this ratio is constant.
   f) list all data points which the new value is null and the old value not;

e) list all data points which the old value is null and the new value not;
f) list all data points for which the new value < average-3*std deviation; 13
g) list all data points for which the new value > average+3*std deviation;
h) list indicators with unique value in time series;
i) list indicators for which the unit have changed between the previous and the new update;
j) list indicators for which unit is null and value not;
k) list indicators missed or added between the 2 updates;
l) list of data overruled on the previous update, the value overruled and the new value.

Once all these checks files are validated, data are recorded in the final table which contains all data points (raw data and computed data).

2.1 Model Coverage

If we consider relatively recent data (2017–present) and a universe of 191 countries, the KPIs in this model have the following coverage:

- All countries: 70% of KPIs cover at least 63% of countries
- High-income OECD countries: 70% of KPIs cover at least 85% of countries
- Emerging markets:[11] 70% of KPIs cover at least 70% of countries

As many of the KPIs in the UN SDG Database are recent and are enriched at each update, the coverage is therefore expected to improve in the future.

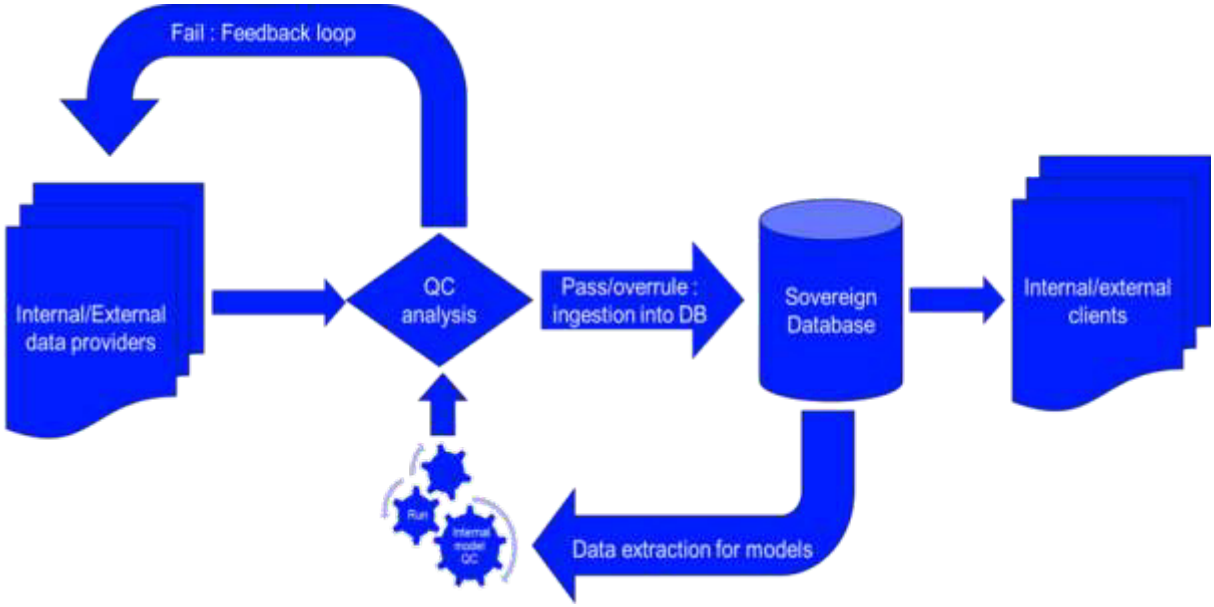
Also, this model covers 104 targets out of 169 defined by the official framework. However, more targets will be covered in the future when relevant KPIs are available in the UN SDG Database or other sources.

[11] Emerging markets: Saudi Arabia, Türkiye, Mexico, Indonesia, Qatar, Brazil, Russia, Argentina, Philippines, Colombia, Egypt, Dominican Republic, Peru, Oman, South Africa, Uruguay, China, Chile, Ukraine, Nigeria, Bahrain, Ghana, Hungary, Ecuador, Angola, Kazakhstan, Kenya, Sri Lanka, Pakistan, Poland, Paraguay, Jamaica, Costa Rica, El Salvador, Jordan, Kuwait, Guatemala, Croatia, Iraq, Belarus, Mongolia, Côte d'Ivoire, Gabon, Azerbaijan, Uzbekistan, Senegal, Trinidad and Tobago, Bolivia, Honduras, Armenia, The Bahamas, Serbia, Vietnam, Namibia, Mozambique, Rwanda, Barbados, Papua New Guinea, Georgia, Tajikistan, Belize, Thailand, Malaysia.

3. Model Management

3.1 Model Input/Output Validation

Figure 7. General Quality Assurance diagram



Data validation is a process that encompasses all activities aimed at identifying, processing, and, if necessary, correcting data entering the SFI information systems. The importance of this process lies in the fact that the data is later used by internal or external clients. This process is centralized upstream of the Sovereign DB, which is the master database for sovereign SFI data and it is performed after each model run (annually). It consists of three parts:

1. **Metadata checks:**
    1. Comparisons between countries from the “golden” data (*i.e.*, data already stored and used for different products) newly imported and the country reference table check if all countries codes are in the reference table and if codes are identical.
       After checks, discrepancies can:
        1. Either be ignored if it does not impact downstream flow
        2. Or lead to an update in the reference table before further ingestion (add missing countries for example).
    2. Comparisons between indicators metadata details:
        1. check if a golden data is missing;
        2. check if units of indicators newly imported are the same as the ones described in metadata table.
2. Model specific checks:
    1. The top 30 countries by GDP, the top 30 countries by population, the High Income OECD countries, the High Income Non-OECD countries with a population over 500.000, EuroCredit countries and Emerging Markets countries are in scope of the checks
    2. All SDG scores and performance scores with a gap larger than 10 percentage points are flagged and the underlying indicators are used to provide a narrative – please note that the value of 10 for the threshold is subject to change so that a minimum of datapoints are validated, 10 being the maximum value.
3. **Comparison between data points for the latest 2 updates allows to flag suspicious datapoints:**
    1. check if imported dataset contains data for all the countries previously imported or if some countries are missing or have been added;

2. check if both new and old values are null;
3. list all data points where abs(new value/old value-1) > 0.3;
    1. for indicators expressed in percentage, only those with abs(old value -ne value) > 5 are flagged 15
    2. for indicators with constant prices and deflator, calculate the ratio of value n-1/value n for each year and check if this ratio is constant.
4. list all data points where the new value is missing but not in the previous instance;
5. list all data points where the old value is missing and not the new value;
6. list all data points where the new value < average-3*std deviation;
7. list all data points where the new value > average+3*std deviation;
8. list indicators with unique value in time series;
9. list indicators where the unit have changed between the previous delivery and the new update;
10. list indicators where unit is missing but not the value;
11. list missing or added indicators between the 2 updates;
12. list of overruled data on the previous update, the value overruled and the new value.

Once all these checked files are validated, data are recorded on the final table which contains all data points (raw data and computed data). Where a data point fails one or more of the validation checks described above and no supporting evidence can be obtained from publicly available sources, the overrule procedure is applied. If no decision is made, questions are raised back to the provider for further investigation and justification.

An overrule is applied only in exceptional circumstances where a data point is identified as erroneous and its inclusion would result in an unjustified increase or decrease in a country's score. Following validation of the issue, the affected variable is replaced with the value reported in the most recent data refresh where the variable was considered reliable. Where no reliable historical value is available, the variable is assigned a null value. This process is intended solely to mitigate the impact of confirmed data errors on the scoring results and to ensure the consistency, comparability, and robustness of the methodology pending correction of the underlying data issue.

3.2 Data Limitations

The missing values imputation is carried-out for each country and each indicator. Throughout this section, a time series is defined by indicator values for a given country from 2000 to present.

For each time series, the missing values imputation is performed in the following order:

1. When some values are missing at the beginning (resp. end) of the time series, we duplicate the first (resp. last) available value at the beginning (resp. end) of the time series.
2. When some values are missing in the middle (encircled by available values) of the time series, we linearly interpolate the missing values using years as abscissa and values as ordinates.