SDG Factor-In

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LSEG Sovereign Sustainability Solutions

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SDG Factor-In Methodology

The objective of this document is to describe the methodology aspects of LSEG's SDG Factor-In framework. The output of the model 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 section of this document describes the methodology. The second section illustrates some of the model use cases. The final section 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.

Methodology

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



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

Overview

Sovereign SDG Factor-In is a sustainable investing product developed by LSEG, covering about 190 countries⁴ 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. (The default solution uses an equally weighted average, but tailored versions could be developed to emphasise one or more specific SDGs.) A brief description of this process is provided below.

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 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: <u>SDG Indicators — SDG Indicators</u>

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

Raw data

The model leverages about 230 KPIs (or indicators), 80% of which are sourced from the official UN SDG database⁵ (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.

Indicator score

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

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.

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.

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

Figure 1. Summary of the data processing for SDG assessment



Source: LSEG sovereign SDG data, May 2025

⁵ The UN SDG database can be found at: <u>UNSDG</u>

Figure 2 compares the SDG scores for a few countries. Figure 3 shows the highest-10 and lowest-10 scores for the Overall SDG.



Figure 2. Comparison of SDG scores for France, Philippines and Bahrain (2020)

Source: LSEG sovereign SDG data, November 2023



Figure 3. Overall SDG highest-10 and lowest-10 scores (2020)⁶

Source: LSEG sovereign SDG data, November 2023

SDG wealth performance

A recent analysis by the World Bank⁷ 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 highest 10 are high-income countries and the lowest 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 study⁸ 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% higher than countries with similar wealth (and -17% means 17% worse).

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, <u>Dealing with income bias in sovereign ESG scores - Sovereign ESG revisited | FTSE Russell.</u>





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 with low scores 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).

Use cases

Focusing on the use cases of our Sovereign SDG assessment product, in this section we discuss and illustrate the options.

Reporting and disclosure

Financial professionals can use this product as a dataset for portfolio-reporting purposes. Being able to aggregate SDG scores for sovereign portfolios enables asset managers or asset owners to report on how their portfolio performs in comparison with a standard benchmark, and to highlight the best-in-class and worst-in-class constituents.

Researching and benchmarking country performance against SDGs

This model can also be used to benchmark a country's score and Wealth Performance for individual SDGs, an aggregate of SDGs or the Overall SDG (compare Figure 5). The score measures the country's SDG progress while the Wealth Performance evaluates how the country performs compared to its peers.

Country-specific SDG data shown in Figure 5:

- United Arab Emirates and Morocco both have a high SDG score of around 60 on the Overall SDG but Morocco has a much higher Wealth Performance.
- Kuwait and Kenya both have a medium SDG score of around 45 but Kenya has a better Wealth Performance.

Moreover, our Sovereign SDG assessment enables users to flexibility focus on a customised combination of SDGs, showing how countries score on specific themes (e.g., biodiversity, inequalities, climate change, etc.). Figure 6 shows the highest and lowest scores when the biodiversity SDGs are aggregated (SDGs 14 = Life below water; and 15 = Life on land). Figure 7 focuses on a subset of social SDGs (SDGs 1 = No poverty, 2 = Zero hunger, 3 = Good health and well-being, 4 = Quality education, and 5 = Gender equality). This analysis can be enhanced by considering the aggregated SDG Wealth Performance for biodiversity or social SDGs in addition to the aggregated SDG score.



Figure 5. Matrix of overall SDG score versus SDG Wealth Performance (2019)

Source: LSEG sovereign SDG data, November 2023



Figure 6. Biodiversity SDGs aggregated score for the highest 10 and the lowest 10 (2020)⁹





Figure 7. A subset of social SDGs aggregated score for the highest 10 and the lowest 10 (2020)

Source: LSEG sovereign SDG data, November 2023

⁹ Only the SDG 15 score (Life on land) was used for the biodiversity aggregated score for countries that do not border a sea or an ocean, including Slovakia, Czech Republic, Switzerland and Zambia because their SDG 14 score (Life below water) is not available.

Portfolio construction

The Sovereign SDG assessment product can help users define or better understand an investable universe according to SDG Wealth Performance.

In Figure 5 we provide the matrix SDG score vs. SDG Wealth Performance for the Overall SDG. The matrix can be split into four zones depending on SDG score level and SDG Wealth Performance level:

- GREY ZONE (bottom-left): low score and low performance
- ORANGE ZONE (bottom-right): low score and high performance
- YELLOW ZONE (top-left): high score and low performance
- GREEN ZONE (top-right): high score and high performance
- 1. Best-in-class investment strategy for developed markets.

In the FTSE World Government Bond Index¹⁰ (WGBI) more than 20 developed markets represent some of the largest outstanding debts on the planet. Using the SDG scores, we can build an investment strategy where we overweight the WGBI's constituents with an Overall SDG score above 50 and a positive Wealth Performance (i.e., in the green zone). In this top-right quadrant, each country has an Overall SDG score higher than the expected score for a similar level of GDP per capita (wealth). For example, within the WGBI, this strategy would lead to overweighting bond debts held by Nordic countries, the United Kingdom, Germany and France; and lead to de-facto underweighting those held by the United States, Italy and Israel.

Another version of this strategy would be targeting developed markets in a narrower area in the green zone (e.g., with an Overall SDG score above 70).

2. Diversified portfolio for emerging markets.

In the FTSE Emerging Markets US Dollar Government Bond Index¹¹ (EMUSDGBI) over 60 investment-grade or high-yield emerging market governments issued US-dollar denominated debt. Our SDG assessment framework can help to build an investment strategy where we overweight top performers about the Overall SDG Wealth Performance in the EMUSDGBI (i.e., in the green and orange zones). This strategy would lead to underweighting constituents such as the Gulf countries, Turkey, South Africa and Pakistan; and overweighting some Latin American countries, Poland, Hungary and Morocco, among others.

Addressing a narrower area in the green and orange zones could be another example of this strategy (e.g., with an Overall SDG Wealth Performance above +15%).

Index tilting

With continued developments in sustainable investing in index construction, LSEG / FTSE Russell has pioneered climate and ESG solutions for government bond indices and has now added SDG solutions to the emerging market government bond index space. The research paper 'How can SDG sovereign indices support impact investing?' by LSEG¹² discusses the construction of the FTSE Emerging Markets SDG-Aligned Bond Index.

¹⁰ FTSE World Government Bond Index (WGBI) Series | LSEG.

¹¹ FTSE Russell | FTSE Emerging Markets Fixed Income Indices | Overview (Iseg.com).

¹² LSEG | How can SDG sovereign indices support impact investing? (refer to the second part of the paper: Index tilting)

The SDGs Wedding Cake

The SDGs "Wedding Cake" concept developed by Stockholm Resilience Institute¹³ and illustrated in Figure 8, is a new way of viewing the economic, social, and ecological aspects of the SDGs.

This hierarchical categorisation is an innovative way of visualising 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 8):

- Biosphere: aggregation of SDGs 6 (Water and Sanitation), 13 (Climate Action), 14 (Life Below Water) and 15 (Life On Land)
- 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)
- Partnership: SDG 17 (Partnerships for the Goals)

¹³ <u>The SDGs wedding cake - Stockholm Resilience Centre</u>



Figure 8. The SDGs Wedding Cake by Stockholm Resilience Institute

Source: Stockholm Resilience Institute, May 2025

Appendix

More on raw data sources

The UN SDG Database⁵ was launched in 2018 and is updated quarterly. It provides over 650 metrics, but not all of these metrics 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.)
- International Roads Federation (two KPIs, roads quality)
- Enerdata (three KPIs, energy and electricity consumption, electric grid quality)
- EMDAT (two KPIs, human casualties due to natural disasters)
- LSEG KPIs (six KPIs, GHG and climate)

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

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:14 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.

¹⁴ 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.



Generic QC flow for sovereign datasets

Data validation is a process that encompasses all activities aimed at identifying, processing, and, if necessary, correcting data entering the sustainable finance and investment (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 centralised upstream of the Sovereign database, which is the master database for sovereign SFI data.

It consists of two parts:

- 1. Metadata checks:
 - 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. 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
 - 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;
- 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). For suspicious datapoints, other sources are considered, and this might lead to an overrule. If no decision is made, questions are raised back to the provider for further investigation and justification.

Governance of methodologies

Prior to launch, SFI products are submitted to a Products and Commercials Board which considers, among other aspects, the risks associated with new products. The underlying models and methodologies are scrutinised by LSEG Model Risk Management team before submission.

SFI products methodologies are subject to regular review to ensure they reflect the purpose for which they have been created. Criteria for datapoints inclusion or changes in methodologies are considered by LSEG D&A SFI Regulatory Governance Committee (SRGC) which oversees methodologies' compliance with regulations and codes of conduct. The data metrics and methodology used for products is periodically evaluated to ensure its relevance and accuracy. Similarly, when new logic is developed, or existing logic modified, impact analysis is performed to understand the potential effects on the product and its outputs. This analysis helps in identifying any potential limitations, biases, or unintended consequences that may arise from the changes. Changes, enhancements and impact analysis is thoroughly documented to maintain transparency and accountability.

Conflicts of Interest management

LSEG D&A SFI business has processes in place to identify, assess and manage potential conflicts of interest (COI). Any conflicts of interest are recorded in a conflicts of interest register and reviewed periodically in line with our governance framework.

Conflicts of interest may arise in areas including:

- organisational ownership;
- product design and management;
- clients, partners or suppliers;
- individual employees/directors.

These COI management processes are subject to review by the LSEG D&A SRGC on an annual basis, or more frequently if the possibility of a conflict arises. Following a conflict being identified, management and Compliance assess the nature of the conflict and determine what controls may be put in place to manage the conflict adequately, and any disclosure that may be required. In the event that satisfactory controls cannot be established the activity will be declined or discontinued. The range of mitigating processes, controls and governance put in place to manage the potential conflicts identified as part of the framework, aims to remove any residual material conflicts.

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