Climate Risk-Adjusted Methodology

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LSEG DATA & ANALYTICS

Contents

Model Change Log

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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 designed 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

The Climate Risk-Adjusted model quantifies the impact of climate change on sovereign risk by measuring how transition risks, physical risks and resilience collectively shape a country's risk profile.

The Climate Risk-Adjusted model 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 impact of climate change on sovereign risk

First and foremost, what are climate risks and impacts and how do they affect sovereign investors?

The Climate Risk Assessment methodology incorporates a double materiality perspective by assessing both the financial effects of climate risks on sovereigns and the environmental impact of sovereign activities. Financial materiality is reflected across the Transition Risk, Physical Risk pillars, capturing how climate-related shocks affect economic performance, fiscal stability and longterm growth. In parallel, impact materiality is addressed through indicators such as greenhouse gas emissions, implied temperature rise and ecosystem metrics, which measure countries’ contribution to climate change and environmental degradation. These two dimensions are interlinked, as higher environmental impacts can increase future financial risks, while strong policies and resilience can mitigate both exposures, resulting in a more comprehensive and forward-looking assessment framework.

Climate risks can be defined across two main pillars:

(1) Transition risks − the risk of economic dislocation and financial losses associated with the process of transitioning toward a low-carbon economy.
(2) Physical risks − the potential economic and financial losses caused by climate-related hazards.

To consider the overall sovereign climate risk, these must be offset by resilience – the preparedness and adaptive capacity of countries, as well as their level of political commitment, to manage the risks and challenges posed by the transition and physical risks. It is considered that transition risks and physical risks can be mitigated or exacerbated depending on countries’ engagement and their position on various climate change issues.

In this context, climate risk can be considered a function of: Transition risks, Physical risks and Resilience.

The Climate Risk-Adjusted dataset translates the conceptual framework of transition risk, physical risk and resilience summarized above into a quantitative, relative sovereign risk assessment based on 15 indicators across 50+ countries, calculated annually since 2001.

Transition risks

Transition risk refers to the potential economic and financial impacts arising from the transition to a lower-carbon economy. These impacts may result from changes in climate-related policies and regulations, technological developments, shifts in energy systems, market preferences, or evolving stakeholder expectations. The magnitude of transition risk can vary across countries depending on their economic structure, greenhouse gas (GHG) emissions profile, energy mix, and reliance on carbon-intensive activities.

Sovereign issuers may be exposed to transition risk through several channels. These include the level and carbon intensity of domestic economic activity, dependence on fossil fuel production or consumption, the availability of low-carbon energy alternatives, and the scale of emissions reductions required to align with climate-related policy objectives. Countries with higher emissions levels, higher carbon-intensive sectors, or greater dependence on fossil fuels may face comparatively greater transition-related challenges.

Differences in transition risk exposure can also be reflected in emissions trajectories and carbon intensity trends. Countries that have achieved slower reductions in GHG emissions or carbon intensity over time may face greater adjustment requirements under future transition pathways. Conversely, countries with lower emissions intensity, more diversified energy systems, or lower reliance on fossil fuels may be less exposed to certain transition-related risks.

Transition risks are closely linked to the energy sector due to the central role of energy in economic activity and the continued reliance of the global economy on fossil fuels. Fossil fuels currently account for a substantial share of global energy consumption and are a major source of greenhouse gas emissions. As a result, changes associated with the transition towards lower-carbon energy systems may have significant implications for economic activity, public finances, industrial competitiveness, and energy security. Transition risk assessments therefore consider both a country's current emissions profile and its exposure to the economic adjustments associated with the transition to a lower-carbon economy.

Physical risks

Physical risks are the potential economic and financial losses caused by climate-related hazards.

Recent events suggest physical risks are already intensifying, with multiple potential impacts from extreme events (e.g. wildfires, floods, etc.) and more progressive, but potentially damaging shifts (e.g. increased population and territorial exposure to dangerous combinations of hot and humid weather, increased poverty due to lower agricultural yields, etc.).

In this context, physical risk assessments aim to consider country exposures to the various potential physical impacts of climate change, based on both their potential (direct and indirect) social and economic consequences, including disaster related damages, health impacts, migration flows, and conflict risks.

Resilience

Resilience is the ability of social-ecological systems to prepare for, absorb and recover from climatic shocks and stresses and positively adapt and transform their structures in the face of long-term change and uncertainty. It can be seen as the degree to which a country is prepared to meet the challenges of climate change and is actively addressing the risks highlighted in the previous two sections.

Resilience is the most complex element of assessing climate risk. There are many ways in which a country can be resilient, and it is often difficult to disaggregate the resilience from the underlying risk. The resilience can be broadly about the level of development of a country − a wealthy country, with strong institutions and a healthy, diverse economy, will be more resilient to the broader climate transition challenges. Therefore, some indicators, which tend to represent more traditional measures of social and governance, are also very important here. In addition, there are more specific elements of resilience, where countries are directly dealing with climate changes (e.g., investing to change their energy industry or adapt their infrastructure and maintaining ecological elements such as forests, which can act as an important carbon sink).

Many countries are actively investing to boost resilience, mitigating climate change, adapting their infrastructure and transforming their energy systems and economies. .

With these things in mind, Climate Risk-Adjusted Methodology is a unique quantitative, relative and systematic approach, based on 15 indicators for 50+ countries, divided into the three pillars of climate risk assessment presented above.

LSEG D&A SFI calculates a score on a yearly basis for each indicator, starting from 2001 until the latest year. Each of the 15 indicators is the outcome of numerous adjustments – largely systematic – based on public, private and proprietary data.

All indicators are combined at a pillar level to obtain a pillar score, which is derived from advanced statistical techniques discussed hereafter.

1. Methodology Overview

1.1 Climate Risk-Adjusted Enhanced Methodology – Overall framework

The Climate Risk-Adjusted Enhanced Methodology assesses 15 indicators, or KPIs, from 2001 to the latest yearly available data across three pillars for 50+ countries. Figure 1 provides a brief overview of the enhanced methodology.

This dataset provides an up-to-date assessment of sovereign climate exposure by evaluating two core dimensions: climate -related risks (transition and physical) and resilience, reflecting countries' capacity to mitigate and adapt. It is therefore an environmental score, also covering transition risks.

Figure 1. Climate Risk-Adjusted Enhanced Methodology in a nutshell

Source: LSEG Sovereign Sustainable Solutions, 2026

The breakdown by pillar is as follows: (i) two KPIs for the Transition Risk pillar, (ii) two KPIs for the Physical Risk pillar, and (iii) 11 KPIs for the Resilience pillar. The Resilience pillar is broken down into two sub-pillars, *i.e.*, the Domestic Resilience sub-pillar with eight indicators, and the Territorial & Ecosystems Resilience sub-pillar with five indicators. It is important to note that the Resilience pillar score is calculated as the arithmetic average of its two sub-pillars scores.

1.2 Climate Risk-Adjusted Enhanced Methodology – Inputs

Country climate scores are derived from assessments across the three above mentioned pillars. Both Transition Risk and Physical Risk pillars assessment extensively rely on the work carried out during the enhancement of our sovereign ESG risk assessment.[1]

[1] For more details, please refer to [Rethinking the sovereign environmental score assessment | LSEG](#).

In both Transition Risk and Physical Risk pillars, we include an exposure and vulnerability KPI to account for both past and future conditions, respectively. While the exposure indicator measures countries' current degree of exposure, the vulnerability indicator uses climate models and government policies to forecast countries' capabilities in mitigating and adapting to climate change risks.

1.3 Transition Risk pillar

In the case of transition risks, consumption-based greenhouse gases (GHG) emissions (*i.e.*, territorial plus imported, minus exported emissions) represent the most fitting measure for sovereign footprint as outlined by the Partnership for Carbon Accounting Financials (PCAF).[2] The measure is adjusted to gross domestic product (GDP) per capita to provide a relative view, helping to more accurately represent an exposure to transition risks as it indicates whether countries are over-emitting or under-emitting GHG emissions relative to their level of development.

The forward-looking KPI is represented by the Climate Liabilities Assessment Integrated Methodology (CLAIM) Implied Temperature Rise metric.[3] This KPI assesses countries' implied global warming temperatures based on their national commitments to climate change mitigation, in line with their Nationally Determined Contributions (NDCs) submitted to the UNFCCC in the framework of the Paris Agreement. We use a temperature equation that reflects the scientific consensus [4] on the relationship between GHG emissions and temperature dynamics, which provides an output measured in degrees Celsius.

1.4 Physical Risk pillar

There are six acute and chronic climate hazards that are considered when building physical risks scores: (i) heatwaves, (ii) droughts, (iii) water stress, (iv) riverine floods, (v) coastal floods and (vi) temperature.[5]

Such hazard scores are combined with broad sectoral vulnerability scores (Agriculture, Industry and Services) to calculate one aggregated historical risk score and one aggregated forward-looking risk score for each country. Historical exposure will indicate countries' exposure to harmful climate conditions while forward-looking exposure will shed light on countries' vulnerability to strong changes in climate conditions.

1.5 Resilience pillar

Governments have an active role to play in adapting and mitigating climate risk. Their policies help determine the quality of governance, the degree of preparedness to climate risks, the resilience of infrastructure, economic productivity as well as the quality of human capital. These, in turn, can help determine whether a country is equipped to tackle climate change and attenuate its negative impacts.

However, in the absence of sufficient natural capital, the outcomes of these policies cannot materialise.

1.6 Domestic Resilience sub-pillar

On governance resilience, we refer to the World Bank's World Governance Indicator database. The two selected indicators, Government Effectiveness and Voice and Accountability, represent the quality of policymaking, the liberty for society to participate in politics and the accountability governments hold to all actors and policies. Together, these characteristics help signal governments' capability and adaptability to address climate change.

On economic resilience, we focuse on indicators that analyse social inequality, performance of human capital and productivity.

The Sustainable GDP per capita indicator[6] , developed by LSEG, is an ESG metric which allows countries to be compared. It helps adjust countries' GDP to provide a measure that accounts for its E, S and G performance. Using a proprietary ESG assessment framework and over 190 indicators, countries with similar income levels will be compared with each other to determine the degree to which they overperform or underperform given the average expected performance for a given income level[7] .

Human Development Index is a measure developed by the United Nations Development Programme (UNDP) which emphasizes the importance of people and their capabilities to assess economic development, not economic growth alone. It analyses three main

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[2] For more details, please refer to [The Global GHG Accounting and Reporting Standard for the Financial Industry (carbonaccountingfinancials.com)]().

[3] For more details on the CLAIM Implied Temperature Rise indicator, please refer to how_to_measure_the_temperature_of_sovereign_assets_final.pdf (ftserussell.com).

[4] For more details, please refer to COP29 Net Zero Atlas | LSEG

[5] The temperature hazard can only be included in the forward-looking Physical Risk scores assessment. Please refer to footnote 4 for more details on methodologies.

[6] For more details, please refer to ESG Factor-In Methodology

[7] For example, if the access to electricity rate is 20% higher than it should be for its given income level, we estimate the Sustainable GDP associated with this indicator as 20% above what the reported GDP is. This is done for E, S and G separately, then aggregated into a global Sustainable GDP metric.

dimensions: a long and health life, being knowledgeable and having a decent standard of living, using four indicators. This indicator highlights governments policy priorities for human development outcomes. [8]

GINI Index, developed by the World bank, is a measure of income inequality. It observes the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. A GINI index of 0 represents perfect equality while an index of 100 implies perfect inequality.[9]

On business, we refer to two indicators developed by the World Bank, Ease of Doing Business (EDB) and the Logistics Performance Index (LPI). These capture the ability for the business environment to cushion itself from climate change risks as well as to sustain and accept investment that would reduce vulnerability and improve adaptive capacity.

The EDB focuses on the quality of the regulatory environment to conduce starting or operating a local firm. This is determined by analysing the simplicity in starting a business, dealing with local permits and accessing electricity and financing opportunities, amongst others. The overall score will range from 0 to 100, where higher scores imply better conditions.[10]

The LPI helps identify challenges and opportunities countries may face in their performance on trade logistics. This includes factors such as the competence of logistics services, quality of trade and transport related infrastructure or the efficiency of the clearance process by the concerned agencies.[11]

1.7 Territorial & Ecosystems Resilience sub-pillar

On land cover, we use the forest cover (% of land area) indicator[12] produced by the Food and Agriculture Organization (FAO) and the World Bank. Forest areas are not only critical to conserving biodiversity, but they can absorb carbon from the atmosphere, reduced temperatures, protect communities and can prevent natural disasters. Forest area is considered land under natural or planted stands of trees, whether productive or not. It excludes tree in agricultural production systems (e.g., in fruit plantations and agroforestry systems) and trees in urban parks and gardens. For Taiwan and Hong Kong, we use the Global Forest Watch as an alternative source for a similar measure.

On ecosystem preservation, we use a total for three indicators.

On ecosystem integrity, we make use of the Mean Species Abundance (MSA) indicator [13] developed by GLOBIO (Conservation International), which measures biodiversity intactness. It calculates the abundance of individual species under influence of six human pressures (land use, road disturbance, fragmentation, hunting, atmospheric nitrogen deposition and climate change), compared to their abundance in an undisturbed situation (natural situation/reference). It ranges from 0 to 1, where 1 means that the species assemblage is fully intact, and 0 means that all original species are locally extinct. Local diversity is important for reliable provision of many ecological functions and services that help keep the earth system and in turn, economies functioning[14] .

On marine ecosystems, we use the Ocean Heath Index (OHI) provided by Conservation International[15] . This indicator defines a healthy ocean as one that can sustainably deliver a range of benefits to people now and in the future. Ocean benefits delivered to humans are called goals within the OHI framework and are widely recognized for supporting human well-being and sustainable ocean ecosystems. Goals are assigned a score of 100 if its benefits are maximized without compromising the ocean's ability to deliver those benefits in the future, while lower scores imply that more benefits could be gained or that current methods are harming the delivery of future benefits.

[8] For more details, please refer to Human Development Index | Human Development Reports

[9] For more details, please refer to Glossary | DataBank

[10] For more details, please refer to Glossary | DataBank

[11] For more details, please refer to The New Logistics Performance Indicators 2.0 (LPI 2.0): Methodology and User Guide

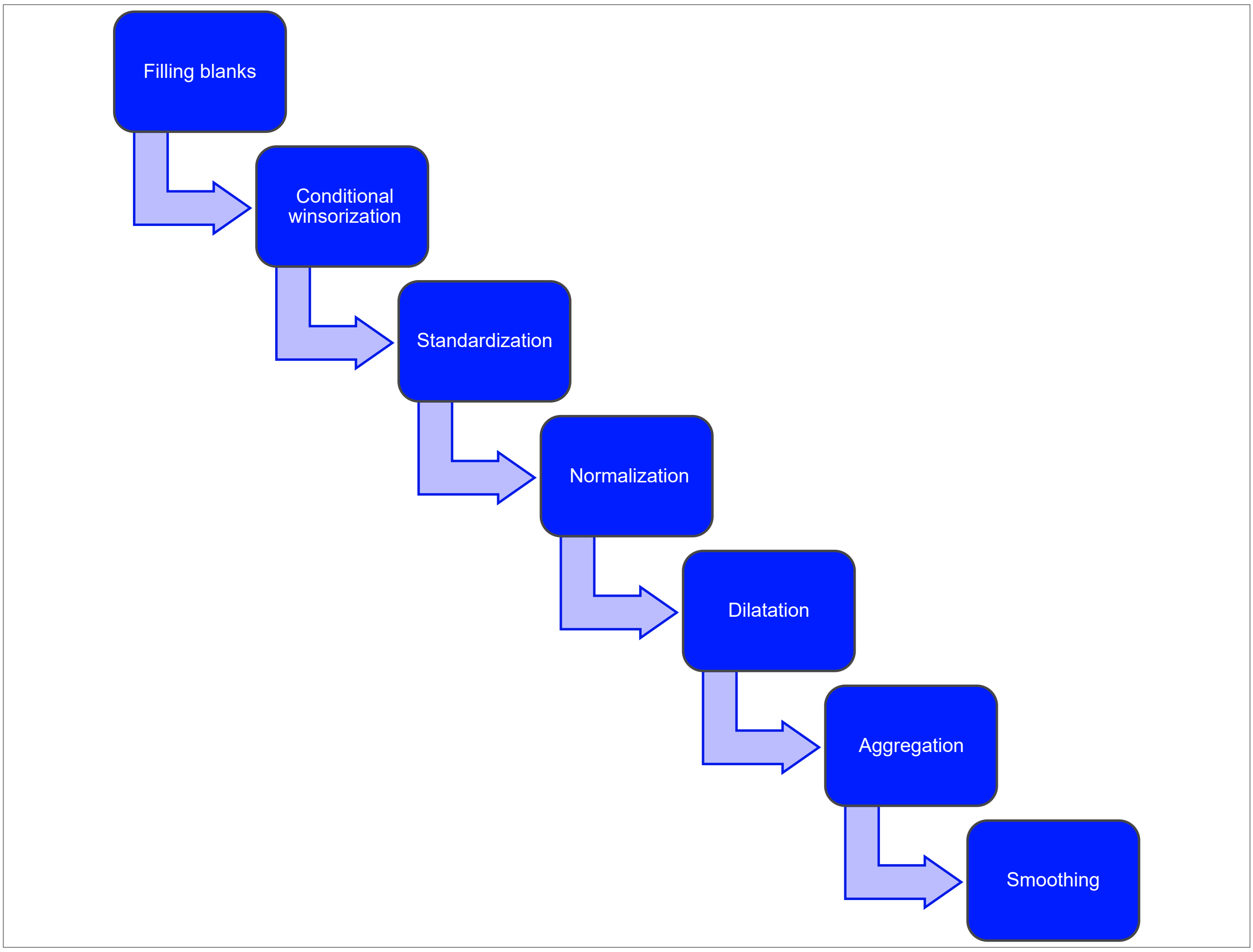
[12] For more details, please refer to 15.1.1 Forest area | SDG Indicators Data Portal | Food and Agriculture Organization of the United Nations

[13] For more details, please refer to What is GLOBIO? | GLOBIO - Global biodiversity model for policy support - homepage

[14] De Palma, A., Hoskins, A., Gonzalez, R.E. et al. Annual changes in the Biodiversity Intactness Index in tropical and subtropical forest biomes, 2001–2012. Sci Rep 11, 20249 (2021). https://doi.org/10.1038/s41598-021-98811-1.

[15] For more details, please refer to Methodology Overview | OHI

Figure 2. Climate Risk-Adjusted Enhanced Methodology scoring framework



Source: LSEG Sovereign Sustainability Solutions, 2026

Figure 2. illustrates the model technical pipeline that progressively shifts information from raw, absolute indicator values toward more relative and context-aware representations, in this case the model assesses how the analyzed countries are performing one vs the others: it starts with **filling blanks**, which restores missing absolute measurements, then applies **conditional winsorization** to constrain extreme absolute values without discarding data. Next, **standardization** recenters and rescales features, so values are expressed relative to their distribution (for example, in terms of deviations from the mean), followed by **normalization**, which further removes scale by mapping values into a common relative range. **Dilatation** then expands local relationships or neighborhoods, emphasizing relative proximity rather than exact magnitudes, while **aggregation** replaces individual absolute observations with summaries that capture collective behavior. Finally, **smoothing** deemphasizes pointwise values altogether in favor of relative trends and patterns over time or space, completing the transition from precise absolute numbers to stable, relational signals.

1.8 Conditional winsorization

To minimize the impact of sometimes erratic data points, all indicators are checked for outliers. An initial test is put in place to analyse the distribution and detect whether for a given year and indicator, a country is found to have a data point above or below three standard deviations from the average. If this is the case, according to the country's position in the distribution, the country will be attributed the maximum value or the minimum value. If no country is detected as an outlier, then no winsorization will be done for the year and indicator. This rule is set to avoid the loss of valuable information and given that the selected sample of analysis is relatively small, any marginal difference in data points from one country to another will be valuable for the steps to follow.

1.9 Standardization

This is the first step towards the harmonisation of the data. For every indicator and year, country z-scores are produced. This allows us to assess the relative risk linked to the initial data and corrects for data scaling.

1.10 Normalization

The z-scores are transformed into continuous scores on an interval, ranging from 0 to 1, in accordance with the cumulated distribution of a standard normal distribution (see Figure 3 for more details) – 0 representing the worst score, and 1 the best. Two different cases have to be taken into account:

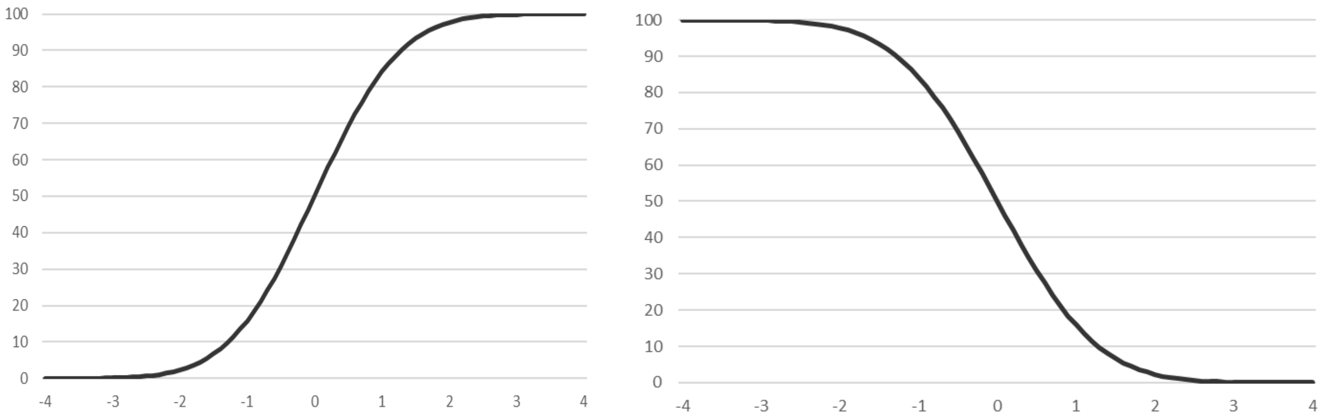
When the optimum is a maximum, the higher the value, the higher the value of the corresponding z-score, and the higher the indicator. This is the case for most indicators.

When the optimum is a minimum, the lower the value, the lower the value of the corresponding z-score, and the higher the indicator. This is the case for the Implied Temperature Rise (ITR) indicator and the GINI index.

Figure 3. Standard Normal Cumulative Distribution Function (x axis: z-scores; y axis: scores)

Optimum: maximum

Optimum: minimum



Source: LSEG Sovereign Sustainability Solutions, 2026

1.11 Dilatation

To maximize the discriminating power between countries, a linear dilation is performed on all scores to ensure they range from 0 to 1 (included). This step allows us to finalize the transformation of raw data points into scores (i.e., indicators).

1.12 Aggregation

At every pillar level, an arithmetic mean will be calculated. For example, the Transition Risk pillar score will be the average of the indicators, ITR and GDP adjusted Carbon Footprint. This will only be done once, except for the Resilience pillar. Since the former is made up of the Domestic Resilience and Territorial & Ecosystems Resilience sub-pillars, an aggregation will occur at the sub-pillar level and then aggregated a second time at the pillar level.

It is key to note that for landlocked countries (i.e., Austria, Czech Republic, Hungary and Switzerland), there will be no Ocean Health Index data point. In these cases, the aggregation at the Territorial & Ecosystems Resilience sub-pillar level is done without taking this indicator into account.

1.13 Smoothing

Following every aggregation, for a given pillar or sub-pillar and country, we will apply a smoothing function to every year. Using an exponential rule, we apply different weights to values in t, t-1 and t-2, with t being assigned the heavier weight and t-2 the lowest. This method allows us to account for fluctuations over the last three years and to smooth potential one-off effects.

Finally, a final dilation will be carried out for each of the three pillar scores to effectively remain between 0 and 1.

1.14 Limitations, assumptions and mitigation steps

The methodology faces challenges related to data gaps, the use of imputed or proxy values, relative rather than absolute scoring, and uncertainty in forward-looking assumptions. Statistical adjustments such as smoothing and winsorisation help improve stability but may reduce sensitivity to extreme outcomes. As summarized in Table 1, these limitations are mitigated through standardized methodologies, multiple data sources, transparent documentation, regular validation and calibration, and ongoing monitoring, although some residual uncertainty remains unavoidable.

Table 1. Summary of limitations and applied mitigation approaches

Shortcoming	Description	Mitigation
Data coverage variability	Coverage differs across countries, indicators and time, with lags and gaps in certain datasets	Multi-source integration, standardized ingestion checks, and consistent update cycles; use of income-group or peer benchmarks to preserve comparability
Imputation and proxy use	Missing data filled via interpolation, forward/backward fill, or proxies (e.g., country substitution) may introduce bias	Transparent, rule-based imputation hierarchy; preference for minimal transformation; validation checks and smoothing to limit artefacts
Relative scoring framework	Scores reflect relative positioning across countries rather than absolute risk levels, potentially obscuring absolute risk magnitude	Clear disclosure of relative nature; consistent peer comparison framework; normalization ensures cross-country comparability
Scenario and model uncertainty	Forward-looking indicators (e.g., climate scenarios, ITR) and composite modelling involve assumptions that may not materialize	Use of established external scenarios (e.g., IPCC), conservative assumptions, and periodic review of model inputs and calibration
Smoothing and winsorisation choices	Smoothing dampens volatility and winsorisation constrains extremes, potentially masking genuine signals or tail risks	Parameter choices are standardized and documented; applied consistently across indicators; complemented by raw data checks and monitoring controls
Residual limitations after controls	Despite controls, structural biases, data quality issues or model simplifications may persist	Ongoing validation, threshold-based flagging of anomalies, expert review, and periodic methodology reassessment

Source: LSEG Sovereign Sustainable Solutions, 2026

2. Data Collection Process[16]

2.1 Climate Pillars and Indicators

Table 2. Climate Risk-Adjusted Enhanced Methodology climate pillars and indicators

Climate Pillar	Sub-pillar	Indicator	Indicator description	Source(s)	Lag[17]	History[18]	Public?
Transition Risk	GDP-Adjusted Carbon Footprint	GDP-Adjusted Carbon Footprint	The deviation between consumed GHG emissions and the average emitting activity of countries with a similar level of income. Consumed GHG emissions are defined according to Partnership for Carbon Accounting Financials (PCAF)'s standards, which includes territorial, and imported emissions and excludes exported emissions.	LSEG D&A	2-3 years	2000	No, produced internally, based on public and private data
	Implied Temperature Rise	Implied Temperature Rise	Provides an approximation of the global warming level (in the year 2100) if the whole world had the same carbon budget overshoot than a specific country. This overshoot of a country is defined as the gap between its 1.5°C-consistent carbon budget and the carbon budget induced by its emission target (formalised in its Nationally Determined Contributions – NDC).	LSEG D&A	1 year	2022	No, produced internally, based on public and private data
Physical Risk	Historical Physical Risk Score	Historical Physical Risk Score	For seven climate hazards (heatwaves, droughts, water stress, intense precipitations, riverine floods, and coastal floods), we use raw climate data to calculate how its frequency and/or intensity impacts a country, depending on the repartition on its economic sectors. We use this to create a single, multi-hazard score that summarizes the country's overall absolute historical exposition to physical climate risk, using the average of the three highest hazard-specific scores for each country.	LSEG D&A	1 year	2000	No, produced internally, based on public data

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

17 Time period between indicator measurement and indicator publication.

18 First available publication date for each indicator.

Climate Pillar	Sub-pillar	Indicator	Indicator description	Source(s)	Lag[17]	History[18]	Public?
	2050 Delta Physical Risk Score	2050 Delta Physical Risk Score	For seven climate hazards (heatwaves, droughts, water stress, intense precipitations, riverine floods, coastal floods and average temperature), we use raw climate data to calculate how its frequency and/or intensity will impact a country, depending on the repartition of its economic sectors. Forward-looking exposure is defined by the change in climate conditions, calculating the difference between future and past climate indicators (e.g., additional warm days). Forward-looking data is based on the IPCC SSP5-8.5 climate scenario. We use this to create a single, multi-hazard score that summarizes the country's overall relative change in physical climate risk by mid-century, using the average of the three highest hazard-specific scores for each country.	LSEG D&A	1 year	2000	No, produced internally, based on public data
Resilience	Domestic Resilience	Voice and accountability	Voice and accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.	World Bank WGI	1-2 years	2000	Yes
		Government effectiveness	Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.	World Bank WGI	1-2 years	2000	Yes
		Sustainable GDP per capita	Adjusted GDP per capita measure, that corrects countries' GDP per capita by comparing their ESG performance level to one of a fictional country.	LSEG D&A	1-2 years	2000	No, produced internally, based on public and private data
		Human Development Index	Measures three key dimensions of human development: a long and healthy life – life expectancy at birth, being knowledgeable – expected years of schooling and mean years of schooling, and standard of living – Gross National Income per capita.	World Bank WDI, UNDP	1-2 years	2000	Yes

Climate Pillar	Sub-pillar	Indicator	Indicator description	Source(s)	Lag[17]	History[18]	Public?
		GINI index	Measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution.	World Bank WDI	0-5 years	2000	Yes
		Ease of doing business	The distance of an economy to the “frontier,” which measures the gap between an economy’s performance and a measure of best practice across the entire sample of 41 indicators for 10 Doing Business topics.	World Bank Doing Business	0-1 year	2009	Yes
		Logistics performance index	Reflects perceptions of a country’s logistics based on efficiency of customs clearance process, quality of trade- and transport-related infrastructure, ease of arranging competitively priced shipments, quality of logistics services, ability to track and trace consignments, and frequency with which shipments reach the consignee within the scheduled time.	World Bank	0-1 year	2007	Yes
	Territorial & Ecosystems Resilience	Forest cover	Proportion of the country covered by vegetation and evolution of this vegetation cover. Represents natural carbon storage areas as well as the ability for forests to contribute to milder local temperatures.	World Bank, FAO, Global Forest Watch	2-3 years	2000	Yes
		Share of protected areas	Percentage of protected areas (terrestrial and marine) of total territorial area. Terrestrial protected areas are totally or partially protected areas of at least 1,000 hectares that are designated by national authorities as scientific reserves with limited public access, national parks, natural monuments, nature reserves or wildlife sanctuaries, protected landscapes, and areas managed mainly for sustainable use. Marine protected areas are areas of intertidal or subtidal terrain - and overlying water and associated flora and fauna and historical and cultural features - that have been reserved by law or other effective means to protect part or all of the enclosed environment. Sites protected under local or provincial law are excluded.	AXA Climate	1 year	2023	No, provided by AXA Climate

Climate Pillar	Sub-pillar	Indicator	Indicator description	Source(s)	Lag[17]	History[18]	Public?
		Ecosystems integrity	Measured by the Mean Species Abundance (MSA) metric, it is an indicator of local biodiversity intactness. MSA ranges from 0 to 1, where 1 means that the species assemblage is fully intact, and 0 means that all original species are extirpated (locally extinct). This metric represents local terrestrial biodiversity intactness as a function of six human pressures: land use, road disturbance, fragmentation, hunting, atmospheric nitrogen deposition and climate change.	GLOBIO	10 years	2000	Yes
		Ocean health index	The underlying philosophy behind the Index is that a healthy ocean sustainably delivers a range of benefits to people now and in the future. Participating scientists, economists, and sociologists reviewed existing studies of what people want and expect from the ocean and then grouped them into ten categories called 'goals.' Each goal is scored on the delivery of specific benefits with respect to a sustainable target. A goal is given a score of 100 if its benefits are maximized without compromising the ocean's ability to deliver those benefits in the future. Lower scores indicate that more benefits could be gained or that current methods are harming the delivery of future benefits.	Conservation International & National Center for Ecological Analysis and Synthesis	1 year	2012	Yes

Source: LSEG Sovereign Sustainable Solutions, 2025

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

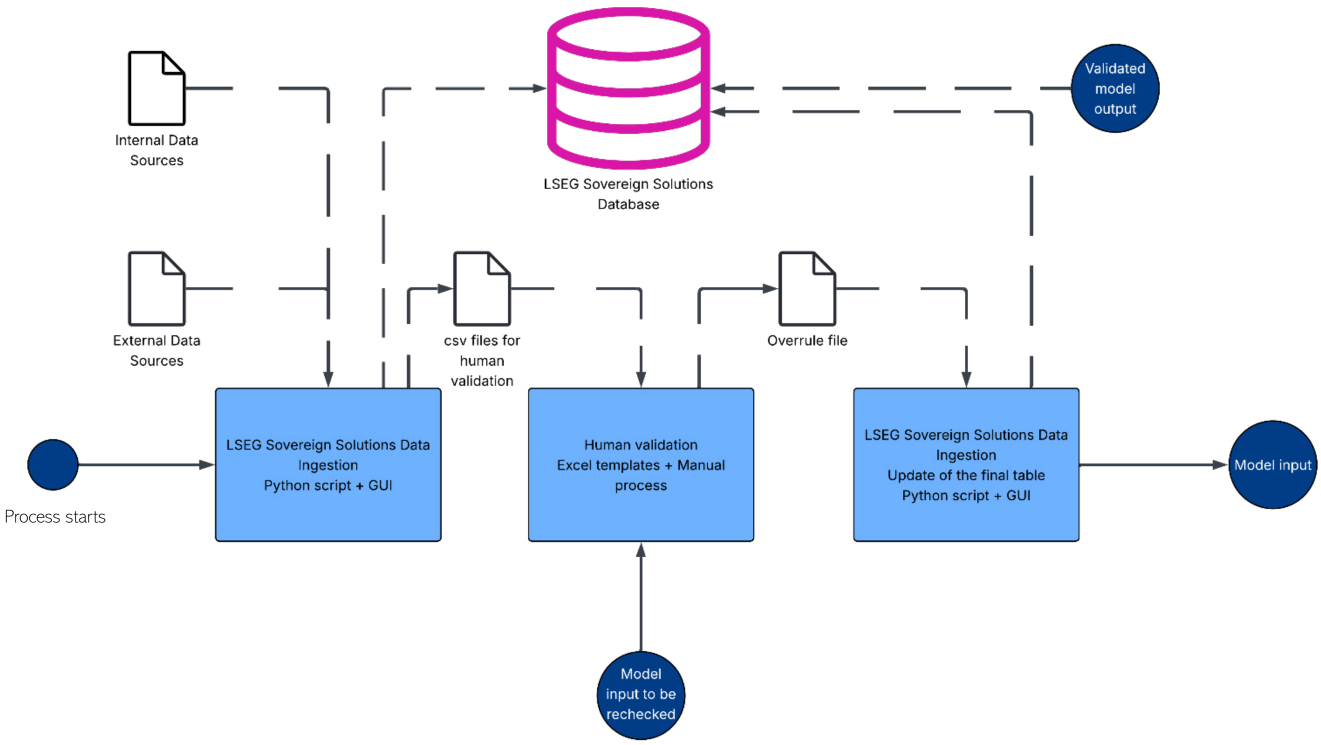
Raw data inputs for a total of 15 indicators, from year 2001 until today, are statistically transformed into scores. In this way, all 50+ countries can be compared fairly. Indicator scores range between 0 and 1, where higher scores signify better resilience, less risk and in turn, better performance. Within each climate risk pillar and resilience sub-pillar, the underlying indicators are equally weighted to produce aggregated climate risk and resilience pillar scores (i.e., Transition Risk, Physical Risk, Resilience).

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.

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, therefore the scores are considered valid for a period of one year between updates. 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.

Figure 4. Input data quality checks flow



Source: LSEG Sovereign Solutions, 2026

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.

2. Comparison between data points for the 2 latest updates:
    a) check if data imported contain data for all the countries previously imported or if some countries are missed or added;
    b) check if both new and old value are null;
    c) 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.

d) 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; 16
f) list all data points for which the new value < average-3*std deviation;
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).

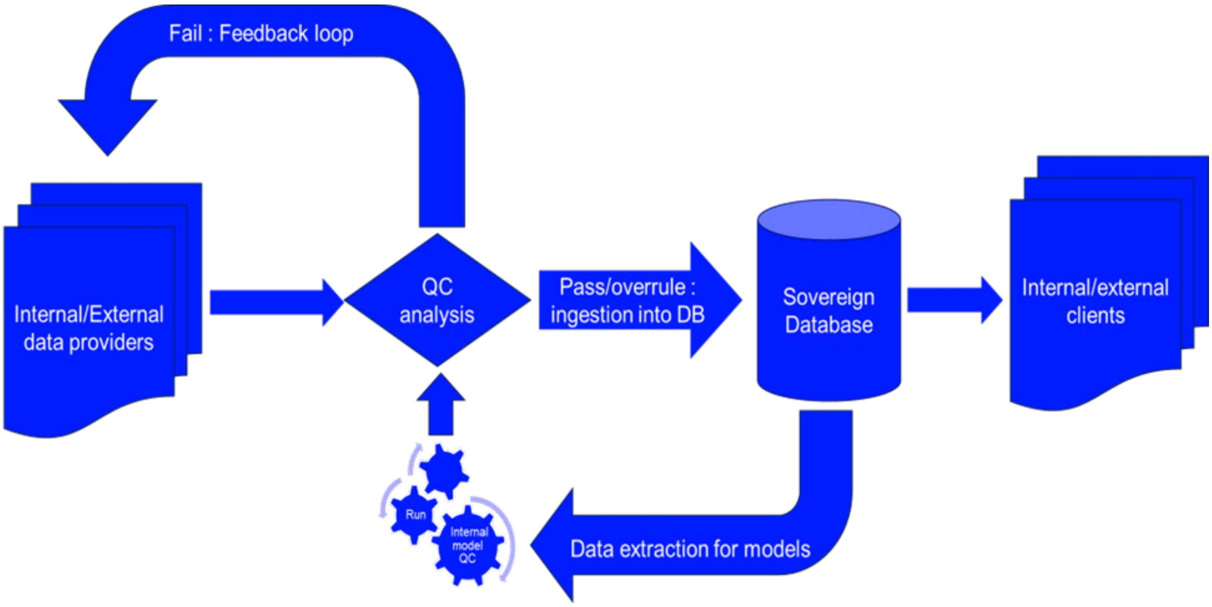
2.2 Model Coverage

Countries were chosen based on data availability and based on our index-building clients feedback and asks at the time of the development.

3. Model Management

3.1 Model Input/Output Validation

Figure 5. Data validation flow



Source: LSEG Sovereign Sustainability Solutions, 2026

Note: In Figure 5, “Run” refers to the regular updating of methodologies.

Data validation is a process that encompasses all activities aimed at identifying, processing, and, if necessary, correcting data entering the Sustainable Finance (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 Database (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:

a) Comparisons between countries from the newly imported "golden" data (i.e., data already stored and used for different products) and the country reference table. First check revises if all countries codes are in the reference table and if codes are identical.
   After checks, discrepancies can:
   i. Either be ignored if it does not impact downstream flow
   ii. Or lead to an update in the reference table before further ingestion (add missed countries, for example).

b) Comparisons between indicators metadata details:
   i. Check if a golden data point is missing;
   ii. Check if the unit of a newly imported indicator is the same as the one described in metadata table.

2. Model specific checks:
   All countries are checked for any differences and a narrative is attributed to them regardless of the magnitude.
3. Comparison between data points from the 2 latest updates allows the flagging of suspicious datapoints:

   i. check if the imported dataset contains data for all the countries previously imported or if some countries are missing or have been added;
   ii. check if both new and old values are null;
   iii. list all data points which match with abs (new value/old value-1) > 0.3;
   - for indicators with a percentage unit, only those with abs(old_val -new_val)>5 are flagged
   - for indicators with constant prices and a deflator, calculate the ratio of value_n-1/value n for each year and check if this ratio is constant.
   iv. list all data points where the new value is missing but not in the previous instance;
   v. list all data points where the old value is missing and not the new value;
   vi. list all data points where the new value < average-3*std deviation;
   vii. list all data points where the new value > average+3*std deviation;
   viii. list indicators with unique value in time series;
   ix. list indicators where the unit have changed between the previous delivery and the new update;
   x. list indicators where unit is missing but not the value;
   xi. list missing or added indicators between the 2 updates;
   xii. list of overruled data on the previous update, the value overruled and the new value.

Once all these check files are validated, data is recorded in 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.

4. Data Limitations

All indicators have different levels of coverage. For some indicators, data may be widely available across all 50+ countries but may become less available over time. In other cases, data may be available from year 2000 until today but not for all countries. To tackle the coverage gaps, for each country and each indicator, we carry out the following steps:

- When values are missing at the beginning of the time series, we duplicate the first value to fill up the series until year 2000. When values are missing at the end of the time series, we duplicate the last value to fill up the series until the current year.
- When some values are missing in the middle (encircled by available values) of the time series, we linearly interpolate the missing values using years.
- When a whole time series is missing: for some indicators, there will be no data for a given country. When this is the case, we apply the following:

- Attribute the World Bank group average value: for every year and indicator, we will calculate the average value by country income groups, according to the World Bank Income Group's country classification: low-income, lower-to-middle income, upper-to-middle-income, high-income countries. 18
- Use of proxy, where suitable: for indicators, such as the Ocean Health Index, no data is available for Hong Kong. In such cases, we use China as a proxy.

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