



Clarity AI - Sovereign ESG Ratings

Methodology Document

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Version History

Item	Details
Methodology Name:	Sovereign ESG Ratings Methodology
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1. Overview

The Sovereign ESG Ratings measures a sovereign's exposure to, and management of, financially material sustainability risks that could impact its long-term economic performance and fiscal stability. By condensing relevant dimensions of environmental, social, and governance indicators into a single, standardised numerical rating from 1 to 100, this module allows institutional investors to supplement traditional sovereign debt risk models.

The scoring framework operates through a rules-based algorithmic engine, eliminating subjective analyst interventions. Performance is benchmarked globally across the entire covered sovereign universe.

2. Glossary of Terms

Term	Definition
Sovereign / Government	The central executive authority, state apparatus, sub-national body, or supranational governing institution responsible for public policy, fiscal management, and statistical reporting for a designated jurisdiction.
Pillar / Category / Subcategory	The hierarchical levels of aggregation used to structure the assessment: Pillar: The highest level of aggregation, dividing the evaluation into Environmental (E), Social (S), and Governance (G) domains. Category: A thematic grouping of related sustainability issues within a Pillar (e.g., Resource Use, Human Capital, Formal Institutions). Subcategory: A subdivision within a Category that clusters specific metrics.
Metric Rating	The normalised score (ranging from 1 to 100) assigned to an individual indicator or KPI after applying outlier adjustments and

	relative linear scaling across the global peer group.
Sizing Metric	A contextual economic or demographic denominator (such as Gross Domestic Product [GDP] or total resident population) used to scale a rated item's raw data into comparable intensity metrics.
Intensity Metric	A comparable performance indicator derived by dividing a rated item's raw data by an economic or demographic sizing variable (e.g., GDP or population).
Financial Materiality	Financial materiality refers to information that if omitted, misstated or obscured could reasonably be expected to influence economic decisions of investors and other stakeholders
Data Relevance	A measure of available metric data weighted by the importance (materiality) of those metrics for a given rated item.

3. Analytical Framework

3.1. Methodology Overview

The Sovereign ESG Ratings methodology applies to three types of rated item:

- National governments: the 193 UN member states and 5 jurisdictions that issue debt in their own name, maintain separate fiscal and statistical reporting and are treated as distinct by investors (Hong Kong, Macao, Cayman Islands, Bermuda and Taiwan).
- Sub-national governments: the states, provinces and regions of Australia, Canada, France, Germany, Japan, Spain, Switzerland and the United States.¹
- Supranational entities: the ESG Ratings applies only to one supranational entity, the European Union (EU)².

The full list is in Appendix A.

The scope of this methodology is limited to entity-level assessments; it does not independently rate or assign distinct ESG ratings to individual financial instruments,

¹ All states, provinces and regions of these countries are covered except Canada's three territories and six French regions (Corsica, Normandy, French Guiana, Martinique, Mayotte and Réunion). Eleven state financing authorities in Australia and the United States are also rated as sub-national governments (see Appendix A).

² The European Stability Mechanism (ESM) and the European Financial Stability Facility (EFSF) are not listed as separate rated items. They are assessed on the same data as the EU, so financial instruments they issue carry the same rating as the EU.

debt instruments, or financial products issued by these entities. Wherever a rating is shown at the level of financial instruments, it reflects the underlying issuer-level rating.

All rated items are assessed with the same method but on different metric sets: up to 91 metrics for national governments³ and 35 for sub-national governments (Section 4.3). Few governance and institutional indicators are published at sub-national level, so for eight metrics sub-national governments take the value of their national government (Section 7.1).

National, supranational and sub-national governments are compared against each other, not in separate regional or income groups. Ratings are based on observed historical data rather than forecasts, projections or stated targets. Each rating expresses a rated item's current risk position relative to its peers, on a continuous scale from 1 to 100:

- 1 (lowest performance): severe exposure to unmitigated sustainability risks, resource depletion or institutional instability relative to peers.
- 100 (highest performance): strong structural resilience, well-developed institutions and low exposure to unmanaged ESG risks relative to peers.

Our ratings are updated and made available to users at regular intervals through our platform or other delivery mechanisms. A change in an entity's rating occurs if new information becomes available or if there is a material change to the methodology. Section 5.4 describes update frequency and the drivers that can change a rating.

3.2. Methodology Details

Raw data is converted into ESG Ratings in three steps: (1) raw data collection, (2) metric rating calculation, and (3) aggregation of metric ratings into subcategory, category, pillar and overall ESG Rating.

3.2.1. Step 1: Raw Data Collection

Clarity AI collects quantitative raw data for each metric from the public sources listed in Appendix B. Section 5 describes data sourcing, quality controls and update frequency.

3.2.2. Step 2: Metric Rating Calculation

Each metric is converted into a rating from 1 to 100 that compares a rated item with all other rated items in the single peer universe (Section 3.1).

Normalisation. Where raw data is expressed in absolute terms, it is divided by a sizing metric, such as GDP or population, so that rated items of different sizes can be

³ The European Union is assessed on the same metric set and materiality weights as national governments (up to 91 metrics).

compared⁴. Raw data already expressed as a rate, percentage, per-capita value or index is used as reported.

Direction. For each metric, the direction of performance is set in advance. For example, lower emissions and higher renewable energy consumption are better. A higher rating always denotes better performance.

Outlier treatment. Extreme values are treated separately so they do not skew the ratings of other rated items. A value is an outlier if it lies more than three times the interquartile range (the spread of the middle 50% of values) below the first quartile or above the third quartile.. Outliers are excluded when the rating scale is set and are rated in bands at the ends of the scale: up to 1–6 for outliers at the worst end and up to 95–100 for outliers at the best end. The width of each band depends on the number and spread of outliers for that metric, up to 5 points.

Rescaling. All other values are rescaled linearly⁵ from the worst performer to the best across the range between the outlier bands, typically about 6 to 95. Where a metric has no outliers at one end, the scale extends to 1 or 100 at that end.

3.2.3. Step 3: Aggregation

Metric ratings are aggregated bottom-up into 31 subcategories, 9 categories, the 3 pillars (Environmental, Social and Governance) and the overall ESG Ratings. Each level is a weighted average of the metric ratings beneath it, where each metric is weighted by its materiality:

$$\text{Aggregated rating} = \Sigma (\text{Metric rating} \times \text{Metric materiality}) \div \Sigma (\text{Metric materiality})$$

where:

- Metric rating is the 1–100 rating of a metric included at that level.
- Metric materiality is the weight given to that metric in Clarity AI's sovereign materiality matrix (Appendix C).
- Aggregated rating is the resulting rating for the subcategory, category, pillar or overall ESG Ratings.

Materiality weights. There is no industry consensus on how to weigh the financial risk associated with ESG metrics for sovereign entities. The structure of Clarity AI's sovereign materiality matrix follows the capitals approach to sustainable development set out in the World Bank's Changing Wealth of Nations, the UNECE/Eurostat/OECD Recommendations on Measuring Sustainable Development, and the PRI Guide to ESG Integration in Sovereign Debt, described in Section 4.7.

⁴ The Percentage of Global CO₂ Emissions indicator is deliberately not normalised. It measures a rated item's share of global CO₂ emissions, which reflects its contribution to climate change and its exposure to the costs of the climate transition.

⁵ Min-max normalisation puts all metrics on a common scale. It subtracts the minimum value and divides by the range of the metric's values after outliers are removed.

The Environmental pillar covers natural capital, the Social pillar covers human and produced capital, and the Governance pillar covers the institutions that determine how efficiently the other capitals are accumulated and used. Within this structure, and following common industry practice, Governance factors carry more weight than environmental or social factors, human capital is the most significant social risk, and natural resource use is the most significant environmental risk. On this basis, Governance is weighted at 50%, and Environmental and Social at 25% each. Governance carries the highest weight because institutional quality is the factor most consistently linked to sovereign creditworthiness. The specific weight of each metric is set out in Appendix C.

Metric applicability. Not every metric applies to every rated item. Some depend on geography: Fish Exports and the Ocean Health Index apply only to national governments with access to the sea. Others depend on the level of government: sub-national governments are assessed on 35 metrics, where data exists at regional level (Section 4.3). Appendix D shows which rated items each metric applies to. Additionally, the only supranational entity covered (the European Union) uses the same materiality matrix weights as national governments with access to the sea⁶.

Only applicable metrics with available data are included. The weights assigned to metrics with no data are distributed across the remaining metrics. Section 5.3 sets the minimum data required for a rated item to be rated.

3.3. Calculation Example

This example follows one rated item, Denmark, a national government, from raw data to its overall ESG Ratings. It applies the three steps in Section 3.2 to the GHG Emissions subcategory, then shows how subcategory ratings aggregate up to the overall rating.

Raw data and normalisation. Table 1 shows the raw data and source for each metric in the GHG Emissions subcategory. Two metrics are expressed in absolute terms and are divided by GDP based on purchasing power parity (PPP). The other four metrics are already expressed as percentages or per-capita values and are used as reported.

Metric rating. Each normalised value is rescaled against all rated items as described in Section 3.2.2. None of Denmark's values in this subcategory is an outlier. Denmark rates highly on emissions intensity and renewable energy. It rates lower on Percentage of Global CO₂ Emissions⁷ and on Nitrous Oxide Emissions⁸.

⁶ Note that the raw data for the European Union is calculated as a weighted average of the data of the EU's member states, weighted based on the sizing relevant to each metric (e.g., GDP, population).

⁷ Percentage of Global CO₂ Emissions measures a rated item's share of global CO₂ emissions, not its emissions efficiency. Most rated items are small economies with very small shares. Denmark's share of 0.077% is about twice the median, which places it mid-range.

⁸ Nitrous Oxide Emissions are measured per capita. Denmark's level, about three times the median, reflects its intensive livestock farming and fertiliser use, the main sources of nitrous oxide.

Aggregation. The metric ratings are combined using their materiality, which gives a GHG Emissions subcategory rating of 65.⁹

Table 1: From raw data to the GHG Emissions subcategory rating, Denmark

Metric	Raw data	Source	Sizing metric	Normalised value	Metric rating	Metric materiality
Scope 1 Emissions Intensity, excl. LULUCF	38.3 Mt CO ₂ e	EDGAR	GDP (PPP): USD 475.3 bn (World Bank)	80.5 t CO ₂ e per USD m GDP (PPP)	95	0.66%
Imported Emissions Intensity	78.6 Mt CO ₂ e	OECD	GDP (PPP): USD 475.3 bn (World Bank)	165.4 t CO ₂ e per USD m GDP (PPP)	91	0.66%
Renewable Energy Consumption	39.7%	World Bank	Not needed, used as reported	39.7%	76	0.88%
Methane Emissions	1.33 t CO ₂ e per capita	World Bank	Not needed, used as reported	1.33 t CO ₂ e per capita	60	0.66%
Percentage of Global CO ₂ Emissions	0.077%	Global Carbon Project	Not needed, used as reported	0.077%	49	0.88%
Nitrous Oxide Emissions	0.94 t CO ₂ e per capita	World Bank	Not needed, used as reported	0.94 t CO ₂ e per capita	24	0.66%
GHG Emissions subcategory					65	4.40%

⁹ Ratings are calculated on unrounded values and shown rounded, so the sum of rounded figures may differ slightly from the rating shown.

The same formula is applied at each level above. The GHG Emissions subcategory (score of 65) combines with the Air Pollutant Emissions subcategory (89) to give an Emissions category rating of 72. The Emissions category then combines with the Resource Use and Environmental Externalities categories to form the Environmental pillar, and the three pillar ratings combine into the overall ESG Ratings (Table 2). Denmark's overall ESG Rating is 78.

Table 2: From pillar ratings to the overall ESG Ratings, Denmark

Level	Name	Rating	Materiality
Pillar	Environmental	67	25%
Pillar	Social	73	25%
Pillar	Governance	87	50%
Overall	ESG Ratings	78	100%

4. Rating Product Specifics

4.1. Materiality Objectives & Dimensions

The objective of the sovereign rating is to assess sustainability-related financial risks and structural capital vulnerabilities that could impede a state's long-term economic performance or creditworthiness.

- **Risks Covered:** Economic and structural risks that could limit a rated item's long-term growth and creditworthiness (for more details, see categories and subcategories under Appendix E):
 - **Environmental:** limited access to natural resources, including energy, water, land, oceans and minerals; air pollution and greenhouse gas emissions; exposure to natural disasters and biodiversity loss.
 - **Social:** limits on the quantity, quality and allocation of human capital, including demographics, education, health, inequality, working conditions, employment, economic conditions and access to basic services; poor transport and telecommunications infrastructure; low technological capability.
 - **Governance:** weak formal institutions, including economic, financial, judicial and political rules, government effectiveness and corruption; weak social capital; poor safety and security and adverse migration dynamics.
- **Impacts Covered:** Non-applicable. The methodology does not evaluate a government's impacts on global society or the biosphere as standalone endpoints.

4.2. Factor Scope & Specific Issues

The rating evaluates the aggregated performance of three integrated pillars, each structured into three categories:

- **Environmental (E):** Resource Use, Emissions, and Environmental Externalities.
- **Social (S):** Human Capital, Physical Capital, and Technology.
- **Governance (G):** Formal Institutions, Informal Institutions, and Stability.

For a full breakdown of the 31 subcategories underlying these 9 categories, with one-line definitions for each, please see Appendix E.

Industry classification standards are not applicable to this methodology, as the rated items are governments rather than companies. Rated items are grouped by type (national, sub-national or supranational), not by industry.

4.3. Key Performance Indicators (KPIs)

All rated items are assessed with the same method on subsets of the 93 metrics: up to 91 for national governments and 35 for sub-national governments, two of which are specific to sub-nationals. For eight governance metrics, sub-national governments take the value of their national government (Section 7.1). The complete list of metrics, with definitions and applicability, is set out in Appendix D.

- **National Governments with access to the sea:** Evaluated across 91 quantitative metrics (33 Environmental, 36 Social, and 22 Governance indicators).
- **Landlocked National Governments:** Evaluated across 89 quantitative metrics (31 Environmental, 36 Social, and 22 Governance indicators).
- **Sub-National Governments:** Evaluated across a localised subset of 35 quantitative metrics (10 Environmental, 13 Social, and 12 Governance indicators).

4.4. EU-Taxonomy Alignment

The percentage of EU Taxonomy alignment under Regulation (EU) 2020/852 is not explicitly incorporated into the sovereign framework. This is due to the fact that the taxonomy's technical screening criteria are designed for corporate economic activities rather than sovereign macroeconomics. Similarly, the methodology does not provide a correspondence to the European Sustainability Reporting Standards (ESRS) or the Corporate Sustainability Reporting Directive (CSRD), as these apply to corporate undertakings and are not applicable to sovereign rated items.

4.5. Weighting & Aggregation Logic

Subcategory, category, pillar and overall ESG Ratings are calculated as a materiality-weighted average of the underlying metric ratings. Weights come from

Clarity AI's sovereign materiality matrix. Section 3.2.3 sets out the aggregation formula and the rationale for the weights.

4.6. Assessment Model

The sovereign methodology operates strictly as a Relative Scoring Model.

- **Benchmark Peer Formulation:** Performance is measured against a single global peer group comprising every covered rated item (supranational, national, special territory and sub-national alike), rather than against regional groupings or separate national and sub-national pools. While sovereigns differ structurally in ways that can affect their financial performance, such as income level, the prevailing market practice is to rate sovereigns on a single global scale, because investors use sovereign ESG Ratings to compare countries with one another. Clarity AI may revisit this approach in future methodology reviews.
- **Threshold Criteria:** The framework does not apply qualitative cut-offs or categorical boundaries. The continuous 1 to 100 rating expresses a rated item's relative position within the peer group on the outlier-adjusted performance range of each metric.

4.7. International Agreement Alignment

The selection of sovereign metrics incorporates indicators that reflect alignment with international environmental, social, and governance agreements and frameworks:

- **Environmental Agreements:** Includes greenhouse gas indicators (share of global CO₂ emissions, and methane and nitrous oxide emissions per capita) tracking historical emissions levels, alongside species indices mapped to the Convention on Biological Diversity (CBD). The methodology does not assess alignment with the Paris Agreement: the greenhouse gas indicators measure historical emissions levels, and no criterion is derived from the Paris Agreement's targets, pathways or commitments.
- **Social & Governance Frameworks:** Integrates indicators reflecting the core tenets of the ILO Declaration on Fundamental Principles and Rights at Work (via the ITUC Global Rights Index, which scores states against ILO core labour standards) and the UN Convention Against Corruption (UNCAC) (via the Control of Corruption index).

The rating is structured around the capitals approach to sustainable development, as set out in the World Bank's Changing Wealth of Nations and the UNECE/Eurostat/OECD Recommendations on Measuring Sustainable Development. A country's long-term economic capacity depends on its stock of natural, human and produced capital, which are the production inputs identified in economic growth theory, and on the institutions that determine how efficiently these capitals are accumulated and used. The Environment pillar captures risks to natural capital, including its depletion through pollution and emissions and its exposure to physical and transition climate risks. The

Social pillar captures risks to human and produced capital, including infrastructure and technological capability. The Governance pillar captures the institutional and social capital, and the stability, that underpin all other capitals.

Additional literature supporting this approach includes the *Principles for Responsible Investment (PRI) Guide to ESG Integration in Sovereign Debt*, which suggests that long-term fiscal stability and debt sustainability depend heavily on the protection of structural non-financial capitals—specifically Human Capital (public health, education), Natural Capital (resource stocks), and Institutional Governance.

We prioritise aligning our methodology and selecting metrics in accordance with science-based standards. Where such scientific standards are lacking, we rely on recognised industry standards and best practices wherever possible. Any gaps or ambiguities in standards are addressed on the basis of scientific findings from reputable publications.

5. Data Sourcing & Quality

5.1. Data Sourcing

Sovereign rating inputs consist entirely of structured quantitative data points collected from public repositories. All sovereign inputs are sourced directly from recognised multilateral agencies, specialised global databases, and public national statistical offices for sub-national data. This methodology relies exclusively on publicly available information.

Primary data sources include the World Bank, the OECD, the United Nations and the International Monetary Fund (IMF), together with specialised repositories. The complete list of data sources is set out in Appendix B: Data Sources. Data collection combines manual and automatic methods, both of which are subject to quality controls. Data is collected on a scheduled basis, which may not coincide with the publication cycles of the source databases. In some cases, a metric can have various sources to cover gaps in regional coverage.

We do not use indicators that capture forward-looking trajectories. All metrics are based on historical observed data. Some measure past trends (e.g. Forest Area Change, GDP Growth), but none use projections, forecasts or stated targets.

5.2. Data Quality & Reliability

We operate a structured data quality control framework applied at each stage of the data ingestion, processing, and release process. The framework covers pre-release validation of raw data, validation of ratings, a defined remediation process, and a policy for the revision of historical data.

Prior to each data release, we perform a validation of the candidate raw data dataset proposed for release including coverage checks and absolute value change checks.

All blocked data points are documented and tracked in dedicated tickets. Issues that cannot be resolved within the validation window are discussed on a case-by-case basis. Following raw data validation, relevant experts perform additional product-level checks on ratings, and approve the ratings.

Historical data updates may be triggered by data incidents. The Regulated Entity has established a structured and transparent process for reporting, categorizing, and resolving incidents related to its data, in order to uphold data integrity, accuracy, and reliability as defined in the Regulated Entity's quality framework.

5.3. Missing Data & Estimations

To ensure a rating rests on sufficient data, a sovereign entity is only rated if it meets both of the following minimum data requirements:

- A Data Relevance of at least 25%, meaning the metrics with available data account for at least 25% of the total materiality weight applicable to the rated item
- At least one material metric with available data in each of the three pillars (Environmental, Social and Governance).

All rated items meet both minimum data requirements. Every rated item has a Data Relevance above the 25% threshold. The median is 96%, and 94% of rated items are above 70%. 13 rated items have a Data Relevance between 25% and 50%¹⁰. No estimations or imputations are used, apart from the values assigned to sub-national governments for the metrics listed in Section 7.1 and the European Union, whose raw data is aggregated from its member states.

5.4. Handling of Major New Information

The valid time horizon of the rating is defined as the time between data releases (typically two weeks for rules-based ratings). Our ratings are updated and made available to users at regular intervals through our platform or other delivery channels. A change in an entity's rating occurs if new information becomes available, if an identified data error is remedied, or if there is a material change to the methodology.

Clarity AI collects sovereign data from the sources listed in Appendix B on a scheduled basis. A source may publish newer data before the next scheduled collection, in which case ratings continue to reflect the data from the latest collection until it is collected.

¹⁰ New South Wales, the Northern Territory, Queensland, South Australia, Western Australia, South Dakota, Indiana, Kansas, North Dakota, Oklahoma, Wyoming, Taiwan, and Monaco.

Because ratings are relative to the peer universe, a rated item's rating can change even when its own data has not. A change in one rated item's data shifts the peer distribution and can change the ratings of other rated items. A rating can change because of:

- new or revised data for the rated item;
- new or revised data for other rated items;
- rated items entering or leaving the comparison universe (Section 5.3);
- correction of data errors (Section 5.2);
- a change to the methodology, approved through the governance process in Section 8.

6. Artificial Intelligence (AI) Usage

6.1. Methodology Implementation

The Regulated Entity integrates AI-assisted software development tools to facilitate the translation of approved ESG rating methodologies into production-ready code. In this capacity, AI functions as an engineering support tool to optimize efficiency and code quality by assisting with logic drafting, unit test generation, refactoring, and the systematic identification of potential edge cases or implementation defects.

AI is not deployed as an autonomous decision-maker; it does not independently define or modify rating methodologies. All methodology design, regulatory interpretation, and final deployment decisions remain the sole responsibility of our engineers and methodology owners, governed by established review protocols.

The integration of AI into methodology implementation introduces specific risks, including potential misinterpretation of requirements, subtle calculation errors, or the creation of technical debt through unmaintainable logic. Furthermore, there is a risk of over-reliance leading to insufficient independent validation or reduced traceability if implementation decisions are not rigorously documented and peer-reviewed.

These implementation risks are systematically mitigated through our standard software development lifecycle (SDLC) and rigorous engineering controls.

- **Human Accountability and Review:** All AI-assisted implementations are fully owned and validated by Clarity AI engineers. AI tools are prohibited from approving code or deploying changes. Every methodology-related code change undergoes mandatory peer review to ensure correctness against approved requirements, architectural consistency, and data integrity.
- **Testing and Validation:** AI-assisted code must adhere to a comprehensive testing pyramid, including unit tests for specific calculations, integration tests for data pipelines, and regression tests to ensure historical stability. Deterministic logic is

validated against predefined test cases and controlled datasets to confirm the implementation aligns with the intended methodology behavior.

- **Good Engineering Practices:** We apply standardized MLOps and engineering safeguards, such as version control, continuous integration, and static analysis. By enforcing small, reviewable pull requests and clear ownership of code changes, we maintain high standards of transparency and allow for the rapid rollback of production changes if anomalies are detected.
- **Traceability and Governance:** Every technical implementation is transparently linked back to its underlying methodology documentation and acceptance criteria. AI-generated suggestions are only promoted if they are traceable to approved inputs, ensuring that AI remains a constrained tool within our broader methodology governance framework.

6.2. Data Collection

Sovereign data collection does not involve AI, Large Language Models, or other machine learning systems. Data points are sourced directly from structured, publicly available databases through a combination of:

- Manual retrieval and curation, where analysts identify, extract, and validate the relevant indicator from the sources published dataset or portal; and
- Automated retrieval scripts which programmatically pull structured data points from source websites, APIs, or bulk data files on a scheduled basis.

7. Assumptions & Limitations

7.1. Key Assumptions

The sovereign rating methodology rests on the following assumptions.

- **Comparability across levels of government.** Ratings are calculated within a single global peer group that contains both national and sub-national governments. It is assumed that a national government and a sub-national government can be meaningfully positioned on the same relative performance range for a shared metric, notwithstanding differences in fiscal autonomy, policy competence and statistical methodology between the two levels.
- **National values as proxies for sub-national institutions.** Few governance and institutional indicators are published at sub-national level, yet these characteristics are material to a government's long-term risk. For eight metrics (Rule of Law, Control of Corruption, Regulatory Quality, Ease of Doing Business Judicial

Independence, Press Freedom and Social Network Support), each sub-national government is assigned the value of its national government. It is assumed that a sub-national government performs at the same level as its national government on these metrics, because the laws, courts and regulators they measure are largely set at national level.

- Uniform materiality across governments. A single materiality framework is applied to every rated government, irrespective of income level, population, geography or level of government. It is assumed that the structural determinants of long-term ESG risk are sufficiently common across all governments that differentiated weighting schemes are not required. No adjustment is made for economic development.
- Validity of composite and perception-based indicators. A number of metrics are third-party composite indices, several of which are constructed from expert assessment or survey response rather than from measured statistical output — including the Worldwide Governance Indicators used for Rule of Law, Control of Corruption, Government Effectiveness, Regulatory Quality, Voice and Accountability, and Political Stability. It is assumed that these indices are valid proxies for the institutional characteristics they describe.
- Appropriateness of normalisation denominators. Where a raw indicator is expressed in absolute terms, it is normalised using an economic or demographic denominator, principally GDP or population. It is assumed that the selected denominator is the appropriate basis for cross-jurisdiction comparison of that indicator. Governments with unusual denominator characteristics — very small populations, or an economy whose measured output is disproportionate to its resident population — may not be well represented.
- Sufficiency of partial data. A rating is calculated where a government meets the minimum data requirements set out in Section 5.3, without requiring a complete metric set. It is assumed that a rating derived from the available subset of material metrics is representative of the government's position on the full framework. This assumption weakens as the number of available metrics falls, which is why Data Relevance is disclosed alongside every rating. Data Relevance is above 70% for 94% of rated items (Section 5.3).
- Relative position as the measure of ESG risk. Ratings are calculated relative to the global peer group rather than against absolute thresholds, scientific benchmarks or policy targets. It is assumed that a government's ESG risk is best expressed by its position relative to other governments, because investors use sovereign ESG Ratings to compare and allocate across sovereigns. A high rating therefore indicates favourable positioning within the peer group, not that a government's absolute performance is adequate. Ratings can also change when the performance of other governments changes, even if the rated government's own data does not. If conditions deteriorate across the entire peer group, relative positions and ratings

may stay largely unchanged.

7.2. Limitations in Data Sources

- **Structural collection lags.** Sovereign metrics depend on census updates and country-level reporting cycles, and are subject to publication lags that vary by source. Because Clarity AI collects sovereign data on a scheduled basis, ratings may not reflect data a source has published since the latest collection (Section 5.4).
- **Divergent local infrastructure.** Variance in statistical infrastructure and data-collection capacity driven by factors such as resource constraints, active conflict, or institutional strength, may introduce uneven data availability and data coverage gaps within certain indicators and regions.
- **Invisibility of discrete events.** The framework contains no controversy, incident or event layer. A coup, sovereign default, armed conflict, constitutional rupture or natural disaster does not affect a government's rating at the time it occurs. Its effects become visible only as they propagate into the underlying statistical series, subject to the collection lags described above.
- **Discontinuation and substitution of source series.** Third-party indices and statistical programmes are periodically restructured, suspended or discontinued, and Clarity AI does not control these decisions.

7.3. Limitations in Methodologies and Models

- **Composition of the sub-national entities.** All covered sub-national governments are in high-income countries. Because all rated items share a single global peer group, sub-national ratings largely reflect their national income level, rather than differences between regions.
- **No differentiation between sub-national governments on certain metrics.** Sub-national governments within the same country receive identical values, and therefore identical metric ratings, on the eight metrics taken from the national government. Differences in governance quality between regions of the same country are not captured, and the ratings of sub-national governments in the same country are more alike than their underlying institutions may be.
- **Income-level pattern in outcomes.** Because a single materiality framework is applied globally and many of the underlying metrics are correlated with national income, higher-income jurisdictions tend systematically to occupy stronger relative positions. This is a property of the framework's construction rather than an artefact of any individual metric, and it should be taken into account when comparing governments at materially different stages of development.
- **Exclusion of forward-looking information.** Future trajectories are relevant to a government's long-term ESG risk, but the methodology does not assess them.

Stated policy intentions, commitments and targets are excluded. A government is therefore rated on the position it currently occupies, as observed in historical data. Improvements or deteriorations become visible only once they appear in the underlying statistical series.

8. Methodology Governance

8.1. Governance Process Overview

The Regulated Entity maintains a robust methodology governance framework designed to ensure that all rating methodologies remain independent, rigorous, systematic, and impartial. To uphold these core principles, the Regulated Entity subjects its methodologies to a structured development, review, and approval process overseen by dedicated internal governance bodies, in line with our ESG Ratings Governance Policy.

Methodologies are reviewed on a regular basis and at least annually to verify that they remain fit for purpose. Emerging regulatory requirements, and market trends are considered in those reviews. Reviewed methodologies are subject to a peer review and mandatory final approval by the Methodology Committee before any update can be deployed.

Changes to existing methodologies are applied across the entire rated universe, including corporate, financial instruments, or sovereign scores, where applicable. When a methodology modification is deemed material, an impact assessment is conducted prior to the scheduled release.

The Regulated Entity is committed to transparent communication to users and rated entities, and makes information about its methodologies publicly available.

Users, rated entities and other stakeholders may submit their feedback in respect of published methodologies via the existing communication channels.

8.2. Engagement Process Overview

The methodology is applied to the assessed universe on an unsolicited basis, relying exclusively on publicly available information. Rated items do not participate in the assessment process. Once the rating is issued, rated entities can access Clarity AI's platform for free to review it, including the underlying data used to calculate the rating, and to submit complaints in case there are any errors.

Appendix

Appendix A: Rated Items Covered

The tables below list the rated items covered by the Sovereign ESG Ratings as at the date of this document. Coverage comprises 397 rated items in total: 156 rated items classified as national governments with a border with access to water (150 national governments, 5 special jurisdictions and 1 supranational entity), 43 landlocked national governments, and 198 sub-national governments. Names are stated as they appear in Clarity AI's entity register.

Governments with a border with access to water (156 rated items)

Albania, Republic of	Algeria, People's Democratic Republic of	Angola, Republic of
Antigua and Barbuda	Argentina, Republic of	Australia, Commonwealth of
Bahamas, Commonwealth of the	Bahrain, Kingdom of	Bangladesh, People's Republic of
Barbados	Belgium, Kingdom of	Belize, Government of
Benin, Republic of	Bermuda, Government of	Bosnia and Herzegovina
Brazil, Federative Republic of	Bulgaria, Republic of	Cabo Verde, Republic of
Cambodia, Kingdom of	Cameroon, Republic of	Canada
Cayman Islands	Chile, Government of	China, People's Republic of
Colombia, Republic of	Comoros, Union of the	Congo, Democratic Republic of
Congo, Republic of	Costa Rica, Republic of	Cote d'Ivoire, Republic of
Croatia, Republic of	Cuba, Republic of	Cyprus, Republic of
Denmark, Kingdom of	Djibouti, Republic of	Dominica, Commonwealth of
Dominican Republic of	Ecuador, Republic of	Egypt, Arab Republic of
El Salvador, Republic of	Equatorial Guinea, Republic of	Eritrea, State of
Estonia, Republic of	European Union	Fiji, Republic of
Finland, Republic of	France, Republic of	Gabon, Republic of

Gambia, Republic of	Georgia, Republic of	Germany, Federal Republic of
Ghana, Republic of	Greece, Republic of	Grenada
Guatemala, Republic of	Guinea, Republic of	Guinea-Bissau, Republic of
Guyana, Republic of	Haiti, Republic of	Honduras, Republic of
Hong Kong Special Administrative Region Government	Iceland, Republic of	India, Republic of
Indonesia, Republic of	Iran, Islamic Republic of	Iraq, Republic of
Ireland	Israel, State of	Italy, Republic of
Jamaica	Japan	Jordan, Hashemite Kingdom of
Kenya, Republic of	Kiribati, Republic of	Korea, Democratic People's Republic of
Korea, Republic of	Kuwait, State of	Latvia, Republic of
Lebanon, Republic of	Liberia, Republic of	Libya, State of
Lithuania, Republic of	Macao Special Administrative Region of People's Republic of China	Madagascar, Republic of
Malaysia	Maldives, Republic of	Malta, Republic of
Marshall Islands, Republic of	Mauritania, Islamic Republic of	Mauritius, Republic of
Micronesia, Federated States of	Monaco, Principality of	Montenegro
Morocco, Kingdom of	Mozambique, Republic of	Myanmar, Republic of Union of
Namibia, Republic of	Nauru, Republic of	Negara Brunei Darussalam
Netherlands, Kingdom of the	New Zealand	Nicaragua, Republic of
Nigeria, Federal Republic of	Norway, Kingdom Of	Oman, Sultanate of
Pakistan, Islamic Republic of	Palau, Republic of	Panama, Republic of
Papua New Guinea, Independent State of	Peru, Republic of	Philippines, Republic of the

Poland, Republic of	Portugal, Republic of	Qatar, State of
Romania	Russia, Federation of	Saint Kitts and Nevis
Saint Lucia	Saint Vincent and the Grenadines	Samoa, Independent State of
Sao Tome and Principe, Democratic Republic of	Saudi Arabia, Kingdom of	Senegal, Republic of
Seychelles, Republic of	Sierra Leone, Republic of	Singapore, Republic of
Slovenia, Republic of	Solomon Islands	Somalia, Democratic Republic of
South Africa, Republic of	Spain, Kingdom of	Sri Lanka, Democratic Socialist Republic of
Sudan, Republic Of	Suriname, Republic of	Sweden, Kingdom of
Syrian, Arab Republic	Taiwan, Republic of China	Tanzania, United Republic of
Thailand, Kingdom of	Timor-Leste, Democratic Republic of	Togo, Republic of
Tonga, Kingdom of	Trinidad and Tobago, Republic of	Tunisia, Republic of
Turkey, Republic of	Tuvalu	Ukraine
United Arab Emirates	United Kingdom of Great Britain and Northern Ireland	United Mexican States (Mexico)
United States of America	Uruguay, Oriental Republic of	Vanuatu, Republic of
Venezuela, Republic of	Vietnam, Socialist Republic of	Yemen, Republic of

Landlocked national governments (43 rated items)

Afghanistan, Islamic Republic of	Andorra, Principality of	Armenia, Republic of
Austria, Republic of	Azerbaijan, Republic of	Belarus, Republic of
Bhutan, Kingdom of	Bolivia, Plurinational State of	Botswana, Republic of
Burkina Faso, Republic of	Burundi, Republic of	Central African, Republic
Czech Republic	Ethiopia, Federal Democratic Republic of	Hungary

Kazakhstan, Republic of	Kyrgyzstan, Republic of	Laos, People's Democratic Republic
Lesotho, Kingdom of	Liechtenstein, Principality of	Luxembourg, Grand Duchy of
Malawi, Republic of	Mali, Republic of	Moldova, Republic of
Mongolia	Nepal	Niger, Republic of
North Macedonia, Republic of	Paraguay, Republic of	Rwanda, Republic of
San Marino, Republic of	Serbia, Republic of	Slovak Republic
South Sudan, Republic of	Switzerland, Confederation of	Tajikistan, Republic of
Tchad, Republic of	Turkmenistan, Republic of	Uganda, Republic of
Uzbekistan, Republic of	Zambia, Republic of	Zimbabwe, Republic of
eSwatini, Kingdom of		

Sub-national governments: regional governments (198 rated items)

Aargau, Canton of	Aichi, Prefecture of	Akita, Prefecture of
Alabama, State of	Alaska, State of	Alberta, Province of
Andalucia, Autonomous Community of	Aomori, Prefecture of	Appenzell Ausserrhoden, Canton of
Appenzell Innerrhoden, Canton of	Aragon, Autonomous Community of	Arizona, State of
Arkansas, State of	Australia, Northern Territory of	Australian, Capital Territory of
Autonomous Community of Cantabria	Auvergne Rhone Alpes, Region of	Baden Wuerttemberg, State of
Balearic Islands, Autonomous Community of	Basel Stadt, Canton of	Basel-Landschaft, Canton of
Basque, Autonomous Community of	Bavaria, State of	Berlin, State of
Bern, Canton of	Bourgogne Franche Comte, Region of	Brandenburg, State of
Bremen Free Hanseatic, City of	Bretagne, Region of	British Columbia, Province of

California, State of	Canary Islands, Autonomous Community of	Castilla la Mancha, Autonomous Community of
Castilla y Leon, Autonomous Community of	Catalonia, Autonomous Community of	Chiba, Prefecture of
Columbia, District of	Commonwealth of Pennsylvania	Connecticut, State of
Delaware, State of	Ehime, Prefecture of	Florida, State of
Fribourg, Canton of	Fukui, Prefecture of	Fukuoka, Prefecture of
Fukushima, Prefecture of	Galicia, Autonomous Community of	Geneva, Canton of
Georgia, State of	Gifu, Prefecture of	Glarus, Canton of
Grand Est, Region of	Grisons, Canton of	Guadeloupe, Region of
Gunma, Prefecture of	Hamburg Free and Hanseatic, City of	Hauts de France, Region of
Hawaii, State of	Hessen, State of	Hiroshima, Prefecture of
Hokkaido	Hyogo Prefectural Government	Ibaraki, Prefecture of
Idaho, State of	Illinois, State of	Indiana Finance Authority
Indiana, State of	Iowa, State of	Ishikawa, Prefecture of
Iwate, Prefecture of	Junta de Extremadura	Jura, Canton of
Kagawa, Prefecture of	Kagoshima, Prefecture of	Kanagawa, Prefecture of
Kansas Development Finance Authority	Kansas, State of	Kentucky, Commonwealth of
Kochi, Prefecture of	Kumamoto, Prefecture of	Kyoto, Prefecture of
La Rioja, Autonomous Community of	Louisiana, State of	Lower Saxony, State of
Lucerne, Canton of	Madrid, Community of	Maine, State of
Manitoba, Province of	Maryland, State of	Massachusetts, State Of
Mecklenburg-Vorpommern, State of	Michigan, State of	Mie, Prefecture of
Minnesota, State of	Mississippi, State of	Missouri, State of
Miyagi, Prefecture of	Miyazaki, Prefecture of	Montana, State of

Nagano, Prefecture of	Nagasaki, Prefecture of	Nara, Prefecture of
Navarre, Chartered Community of	Nebraska, State of	Neuchatel, Canton of
Nevada, State of	New Brunswick, Province of	New Hampshire, State of
New Mexico, State of	New South Wales Treasury Corp	New South Wales, State of
New York, State of	Newfoundland and Labrador, Province of	Nidwalden, Canton of
Niigata, Prefecture of	North Carolina, State of	North Dakota Public Finance Authority
North Dakota, State of	North-Rhine Westphalia, State of	Northern Territory Treasury Corp
Nouvelle Aquitaine, Region of	Nova Scotia, Province of	Obwalden, Canton of
Occitanie, Region of	Ohio, State of	Oita, Prefecture of
Okayama, Prefecture of	Okinawa, Prefecture of	Oklahoma Development Finance Authority
Oklahoma, State of	Ontario, Province of	Oregon, State of
Osaka, Prefecture of	Pays de la Loire, Region of	Prince Edward Island, Province of
Principality of Asturias, Autonomous Community of	Provence-Alpes-Cote d'Azur, Region of	Quebec, Province of
Queensland Treasury Corp	Queensland, State of	Region of Ile de France
Region of Murcia, Autonomous Community of	Rhode Island, State of	Saarland, State of
Saga, Prefecture of	Saitama, Prefecture of	Saskatchewan, Province of
Saxony, State of	Saxony-Anhalt, State of	Schaffhausen, Canton of
Schleswig-Holstein, State of	Schwyz, Canton of	Shiga, Prefecture of
Shimane, Prefecture of	Shizuoka, Prefecture of	Solothurn, Canton of
South Australia, State of	South Australian Government Financing Authority	South Carolina, State of
South Dakota Housing Development Authority	South Dakota, State of	St Gallen, Canton of

State of Colorado	State of New Jersey	State of Rhineland Palatinate
Tasmania, State of	Tennessee, State of	Texas, State of
Thurgau, Canton of	Thuringia, State of	Ticino, Canton of
Tochigi, Prefecture of	Tokushima, Prefecture of	Tokyo Metropolitan Government
Tottori, Prefecture of	Toyama, Prefecture of	Uri, Canton of
Utah, State of	Val De Loire, Region of	Valais, Canton of
Valencia, Autonomous Community of	Vaud, Canton of	Vermont, State of
Victoria, State of	Virginia, Commonwealth of	Wakayama, Prefecture of
Washington, State of	West Virginia, State of	Western Australia, State of
Western Australian Treasury Corp	Wisconsin, State of	Wyoming Community Development Authority
Wyoming, State of	Yamagata, Prefecture of	Yamaguchi, Prefecture of
Yamanashi, Prefecture of	Zug, Canton of	Zurich, Canton of

Appendix B: Data Sources

The table below lists the data source(s) for each of the 93 quantitative metrics used in the Sovereign ESG Ratings. Where more than one source is listed for a metric, this is because subnational and national governments are covered by different providers, or, for the two emissions intensity metrics, because emissions data is combined with GDP data from a separate source.

Metric	Pillar	Data source(s)
Energy Imports	Environmental	World Bank – World Development Indicators; National statistical offices ¹¹

¹¹ National statistics offices are used for sub-national metrics only. This refers to a combination of public sources from different national entities to cover the underlying metrics for their subnationals such as: Statistics Canada, Canada Energy Regulator and Transport Canada; Federal Statistical Office of Germany (Destatis) and the German federal states' energy balances; Instituto Nacional de Estadística, Banco de España, Ministerio para la Transición Ecológica, Ministerio de Sanidad and Red Eléctrica de España (Spain); Statistics Bureau of Japan, Ministry of Agriculture, Forestry and Fisheries, Ministry of Economy, Trade and Industry, Ministry of Land, Infrastructure, Transport and Tourism, and Ministry of the Environment (Japan); Swiss Federal Statistical Office, Swiss Federal Finance Administration and Swiss Health Observatory; Australian Bureau of Statistics, Department of Climate Change, Energy, the Environment and Water, and Bureau of Infrastructure and Transport Research Economics (Australia); US Census Bureau, US Bureau of Labor Statistics, US Geological Survey and Centers for Disease Control and Prevention; Direction Générale des Finances Publiques (France); and Eurostat.

Fossil Fuel Proved Reserves	Environmental	US Energy Information Administration (EIA); CIA World Factbook; Statistics Canada; National statistical offices (for sub-nationals)
Energy Intensity	Environmental	World Bank – World Development Indicators; National statistical offices
Electricity Consumption	Environmental	World Bank – World Development Indicators; US Energy Information Administration (EIA); National statistical offices
Water Stress	Environmental	World Resources Institute – Aqueduct
Water Productivity	Environmental	World Bank – World Development Indicators; Statistics Canada; US Bureau of Economic Analysis; National statistical offices
Arable Land	Environmental	World Bank – World Development Indicators; US Department of Agriculture; National statistical offices
Value Added of the Agricultural, Forestry and Fishing Sector	Environmental	World Bank – World Development Indicators; OECD; National statistical offices
Agricultural Land	Environmental	World Bank – World Development Indicators
Food Production	Environmental	World Bank – World Development Indicators
Ocean Health Index	Environmental	Conservation International – Ocean Health Index
Fish Exports	Environmental	International Trade Centre – Trade Map
Resource Governance Index	Environmental	Natural Resource Governance Institute (NRGI)
Total Natural Resources Rent	Environmental	World Bank – World Development Indicators
Adjusted Savings: Natural Resources Depletion	Environmental	World Bank – World Development Indicators
Forest Area	Environmental	World Bank – World Development Indicators
Particulate Matter Exposure	Environmental	World Bank – World Development Indicators
Particulate Emission Damage	Environmental	World Bank – World Development Indicators
CO2 Emissions per Capita	Environmental	Global Carbon Project; US Energy Information Administration (EIA); UNFCCC; National statistical offices
Percentage of Global CO2 Emissions	Environmental	Global Carbon Project
Renewable Energy Consumption	Environmental	World Bank – World Development Indicators; US Energy Information Administration (EIA); National statistical offices
Methane Emissions	Environmental	World Bank – World Development Indicators
Nitrous Oxide Emissions	Environmental	World Bank – World Development Indicators
Scope 1 Emissions Intensity, excluding LULUCF	Environmental	European Commission JRC – EDGAR (emissions); World Bank – World Development Indicators (GDP, PPP)

Imported Emissions Intensity	Environmental	Clarity AI estimates; OECD; World Bank – World Development Indicators (GDP, PPP)
Terrestrial Area Protected Important to Biodiversity	Environmental	UNEP-WCMC
Red List Index of Species Survival	Environmental	UNEP-WCMC
Red List Index of Species Survival, Change	Environmental	UNEP-WCMC
Forest Area Change	Environmental	World Bank – World Development Indicators
Threatened Mammal Species	Environmental	World Bank – World Development Indicators
World Risk Index	Environmental	Integrated Research on Disaster Risk (IRDR)
Population Affected by Natural Disasters	Environmental	CRED – EM-DAT; Canadian Disaster Database
Economic Damage Caused by Natural Disasters	Environmental	CRED – EM-DAT; Canadian Disaster Database
Population Density	Environmental	World Bank – World Development Indicators
Total Age Dependency Ratio	Social	World Bank – World Development Indicators; OECD
Population Ages 65 and Above	Social	World Bank – World Development Indicators
Adult Literacy Rate	Social	World Bank – World Development Indicators
Education Index	Social	UNDP – Human Development Reports; Global Data Lab – Subnational Human Development Database
Government Expenditure on Education	Social	World Bank – World Development Indicators
Life Expectancy	Social	World Bank – World Development Indicators; Global Data Lab – Subnational Human Development Database
Infant Mortality Rate	Social	World Bank – World Development Indicators; OECD
Prevalence of Undernourishment	Social	World Bank – World Development Indicators
Prevalence of Obesity Among Adults	Social	World Bank – World Development Indicators; National statistical offices
Gender Development Index	Social	UNDP – Human Development Reports
Gender Gap in Labor Force Participation	Social	World Bank – Gender Data Portal; OECD; National statistical offices
Seats Held by Women in National Parliaments	Social	World Bank – World Development Indicators
Unmet Need for Contraception	Social	World Bank – World Development Indicators
Gini Index	Social	World Bank – World Development Indicators; OECD

Poverty Headcount Ratio at National Poverty Lines	Social	World Bank – World Development Indicators
Mean Nominal Hourly Earnings	Social	International Labour Organization – ILOSTAT
Global Rights Index	Social	ITUC – Global Rights Index
Unemployment Rate	Social	World Bank – World Development Indicators; OECD; National statistical offices
Youth Unemployment Rate	Social	World Bank – World Development Indicators; OECD
Labor Force Participation Rate	Social	World Bank – World Development Indicators
GNI per Capita	Social	World Bank – World Development Indicators; Global Data Lab – Subnational Human Development Database
GDP Growth	Social	World Bank – World Development Indicators
Annualized Average Growth Rate per Capita	Social	World Bank – World Development Indicators
Access to Clean Fuels and Technologies for Cooking	Social	World Bank – World Development Indicators
Access to Electricity	Social	World Bank – World Development Indicators
People Using Safely Managed Water Services	Social	World Bank – World Development Indicators
People Using Safely Managed Sanitation Services	Social	World Bank – World Development Indicators
Logistics Performance Index	Social	World Bank – World Development Indicators
Railway Density	Social	World Bank – World Development Indicators; Eurostat; National statistical offices
Roadway Density	Social	CIA World Factbook; National statistical offices
Fixed Broadband Subscriptions	Social	World Bank – World Development Indicators
Population Using the Internet	Social	World Bank – World Development Indicators
Households with Internet	Social	OECD
Mobile Cellular Subscriptions	Social	World Bank – World Development Indicators
Research and Development Expenditure	Social	World Bank – World Development Indicators; OECD; National statistical offices
Number of Scientific and Technical Journal Articles	Social	World Bank – World Development Indicators
Patent Applications	Social	World Bank – World Development Indicators
Regulatory Quality	Governance	World Bank – Worldwide Governance Indicators
Ease of Doing Business	Governance	World Bank – Doing Business

Public Debt	Governance	IMF – World Economic Outlook; National statistical offices
Budget Deficit	Governance	CIA World Factbook; National statistical offices
Net International Investment Position	Governance	IMF – World Economic Outlook
Rule of Law	Governance	World Bank – Worldwide Governance Indicators
Judicial Independence	Governance	International IDEA
Strength of Legal Rights	Governance	World Bank – Doing Business
Political Participation	Governance	Bertelsmann Stiftung – BTI
General Elections Turnout	Governance	International IDEA; OECD
Representative Government	Governance	International IDEA
Government Effectiveness	Governance	World Bank – Worldwide Governance Indicators
Control of Corruption	Governance	World Bank – Worldwide Governance Indicators
Voice and Accountability	Governance	World Bank – Worldwide Governance Indicators
Social Capital	Governance	Legatum Institute – Prosperity Index
Social Network Support	Governance	OECD
Freedom House Index Score	Governance	Freedom House – Freedom in the World
Press Freedom	Governance	Reporters Without Borders (RSF)
Political Stability and Absence of Violence	Governance	World Bank – Worldwide Governance Indicators
Global Peace Index	Governance	Institute for Economics and Peace (IEP)
Intentional Homicide Rate	Governance	World Bank – World Development Indicators; OECD
Net Migration	Governance	World Bank – World Development Indicators

Appendix C: Materiality Matrix

The table below sets out the weight of each metric in Clarity AI's sovereign materiality matrix, by type of rated item. Weights are rounded to one decimal and may not sum exactly to 100%. "n/a" indicates that a metric does not apply to that type of rated item. The European Union uses the weights for national governments with access to the sea.

Pillar	Category	Subcategory	Metric	National, access to sea	National, landlocked	Sub-national
Environmental	Resource Use	Energy Self Sufficiency	Energy Imports	1.4%	1.6%	2.2%
Environmental	Resource Use	Energy Self Sufficiency	Fossil Fuel Proved Reserves	1.4%	1.6%	2.2%

Environmental	Resource Use	Energy Management	Energy Intensity	1.0%	1.2%	2.2%
Environmental	Resource Use	Energy Management	Electricity Consumption	1.0%	1.2%	2.2%
Environmental	Resource Use	Water	Water Stress	1.0%	1.2%	4.4%
Environmental	Resource Use	Water	Water Productivity	1.0%	1.2%	n/a
Environmental	Resource Use	Land	Arable Land	0.5%	0.6%	2.2%
Environmental	Resource Use	Land	Value Added of the Agricultural, Forestry and Fishing Sector	0.5%	0.6%	2.2%
Environmental	Resource Use	Land	Agricultural Land	0.5%	0.6%	n/a
Environmental	Resource Use	Land	Food Production	0.5%	0.6%	n/a
Environmental	Resource Use	Oceans	Ocean Health Index	1.0%	n/a	n/a
Environmental	Resource Use	Oceans	Fish Exports	1.0%	n/a	n/a
Environmental	Resource Use	Other Natural Resources	Resource Governance Index	0.8%	0.9%	n/a
Environmental	Resource Use	Other Natural Resources	Total Natural Resources Rent	0.7%	0.8%	n/a
Environmental	Resource Use	Other Natural Resources	Adjusted Savings: Natural Resources Depletion	0.6%	0.7%	n/a
Environmental	Resource Use	Other Natural Resources	Forest Area	0.6%	0.7%	n/a
Environmental	Emissions	Air Pollutant Emissions	Particulate Matter Exposure	0.9%	0.9%	2.2%
Environmental	Emissions	Air Pollutant Emissions	Particulate Emission Damage	0.9%	0.9%	n/a
Environmental	Emissions	GHG Emissions	CO2 Emissions per Capita	n/a	n/a	2.6%

Environmental	Emissions	GHG Emissions	Percentage of Global CO2 Emissions	0.9%	0.9%	n/a
Environmental	Emissions	GHG Emissions	Renewable Energy Consumption	0.9%	0.9%	2.6%
Environmental	Emissions	GHG Emissions	Methane Emissions	0.7%	0.7%	n/a
Environmental	Emissions	GHG Emissions	Nitrous Oxide Emissions	0.7%	0.7%	n/a
Environmental	Emissions	GHG Emissions	Scope 1 Emissions Intensity, excluding LULUCF	0.7%	0.7%	n/a
Environmental	Emissions	GHG Emissions	Imported Emissions Intensity	0.7%	0.7%	n/a
Environmental	Environmental Externalities	Biodiversity	Terrestrial Area Protected Important to Biodiversity	0.4%	0.4%	n/a
Environmental	Environmental Externalities	Biodiversity	Red List Index of Species Survival	0.4%	0.4%	n/a
Environmental	Environmental Externalities	Biodiversity	Red List Index of Species Survival, Change	0.4%	0.4%	n/a
Environmental	Environmental Externalities	Biodiversity	Forest Area Change	0.4%	0.4%	n/a
Environmental	Environmental Externalities	Biodiversity	Threatened Mammal Species	0.4%	0.4%	n/a
Environmental	Environmental Externalities	Natural Disasters	World Risk Index	0.9%	0.9%	n/a
Environmental	Environmental Externalities	Natural Disasters	Population Affected by Natural Disasters	0.8%	0.8%	n/a

Environmental	Environmental Externalities	Natural Disasters	Economic Damage Caused by Natural Disasters	0.8%	0.8%	n/a
Environmental	Environmental Externalities	Natural Disasters	Population Density	0.6%	0.6%	n/a
Social	Human Capital	Demographic Transition	Total Age Dependency Ratio	0.9%	0.9%	1.8%
Social	Human Capital	Demographic Transition	Population Ages 65 and Above	0.9%	0.9%	n/a
Social	Human Capital	Education	Adult Literacy Rate	0.6%	0.6%	n/a
Social	Human Capital	Education	Education Index	1.0%	1.0%	3.2%
Social	Human Capital	Education	Government Expenditure on Education	0.9%	0.9%	n/a
Social	Human Capital	Health	Life Expectancy	0.6%	0.6%	0.9%
Social	Human Capital	Health	Infant Mortality Rate	0.4%	0.4%	0.9%
Social	Human Capital	Health	Prevalence of Undernourishment	0.4%	0.4%	n/a
Social	Human Capital	Health	Prevalence of Obesity Among Adults	n/a	n/a	0.9%
Social	Human Capital	Gender Inequality	Gender Development Index	0.3%	0.3%	n/a
Social	Human Capital	Gender Inequality	Gender Gap in Labor Force Participation	0.3%	0.3%	3.2%
Social	Human Capital	Gender Inequality	Seats Held by Women in National Parliaments	0.3%	0.3%	n/a

Social	Human Capital	Gender Inequality	Unmet Need for Contraception	0.3%	0.3%	n/a
Social	Human Capital	Wealth Inequality	Gini Index	0.9%	0.9%	n/a
Social	Human Capital	Wealth Inequality	Poverty Headcount Ratio at National Poverty Lines	0.9%	0.9%	n/a
Social	Human Capital	Working Conditions	Mean Nominal Hourly Earnings	0.7%	0.7%	n/a
Social	Human Capital	Working Conditions	Global Rights Index	0.7%	0.7%	n/a
Social	Human Capital	Employment	Unemployment Rate	0.8%	0.8%	1.8%
Social	Human Capital	Employment	Youth Unemployment Rate	0.8%	0.8%	1.8%
Social	Human Capital	Employment	Labor Force Participation Rate	0.8%	0.8%	n/a
Social	Human Capital	Economic Environment	GNI per Capita	1.2%	1.2%	3.6%
Social	Human Capital	Economic Environment	GDP Growth	1.2%	1.2%	n/a
Social	Human Capital	Economic Environment	Annualized Average Growth Rate per Capita	1.2%	1.2%	n/a
Social	Human Capital	Access to Services	Access to Clean Fuels and Technologies for Cooking	0.3%	0.3%	n/a
Social	Human Capital	Access to Services	Access to Electricity	0.3%	0.3%	n/a
Social	Human Capital	Access to Services	People Using Safely Managed Water Services	0.3%	0.3%	n/a

Social	Human Capital	Access to Services	People Using Safely Managed Sanitation Services	0.3%	0.3%	n/a
Social	Physical Capital	Infrastructure	Logistics Performance Index	0.8%	0.8%	n/a
Social	Physical Capital	Infrastructure	Railway Density	0.8%	0.8%	1.2%
Social	Physical Capital	Infrastructure	Roadway Density	0.8%	0.8%	1.2%
Social	Technology	ICT Adoption	Fixed Broadband Subscriptions	0.9%	0.9%	n/a
Social	Technology	ICT Adoption	Population Using the Internet	0.9%	0.9%	n/a
Social	Technology	ICT Adoption	Households with Internet	0.8%	0.8%	3.0%
Social	Technology	ICT Adoption	Mobile Cellular Subscriptions	0.9%	0.9%	n/a
Social	Technology	Innovation	Research and Development Expenditure	0.5%	0.5%	1.3%
Social	Technology	Innovation	Number of Scientific and Technical Journal Articles	0.5%	0.5%	n/a
Social	Technology	Innovation	Patent Applications	0.5%	0.5%	n/a
Governance	Formal Institutions	Economic Rules	Regulatory Quality	3.1%	3.1%	3.5%
Governance	Formal Institutions	Economic Rules	Ease of Doing Business	3.1%	3.1%	3.5%
Governance	Formal Institutions	Financial Rules	Public Debt	2.3%	2.3%	3.5%
Governance	Formal Institutions	Financial Rules	Budget Deficit	2.4%	2.4%	3.5%

Governance	Formal Institutions	Financial Rules	Net International Investment Position	2.3%	2.3%	n/a
Governance	Formal Institutions	Judicial Rules	Rule of Law	2.0%	2.0%	3.5%
Governance	Formal Institutions	Judicial Rules	Judicial Independence	2.0%	2.0%	3.5%
Governance	Formal Institutions	Judicial Rules	Strength of Legal Rights	2.1%	2.1%	n/a
Governance	Formal Institutions	Political Rules	Political Participation	1.7%	1.7%	n/a
Governance	Formal Institutions	Political Rules	General Elections Turnout	1.7%	1.7%	7.0%
Governance	Formal Institutions	Political Rules	Representative Government	1.8%	1.8%	n/a
Governance	Formal Institutions	Government Effectiveness	Government Effectiveness	5.2%	5.2%	n/a
Governance	Formal Institutions	Corruption	Control of Corruption	5.2%	5.2%	7.0%
Governance	Informal Institutions	Social Capital	Voice and Accountability	2.2%	2.2%	n/a
Governance	Informal Institutions	Social Capital	Social Capital	1.8%	1.8%	n/a
Governance	Informal Institutions	Social Capital	Social Network Support	1.3%	1.3%	4.0%
Governance	Informal Institutions	Social Capital	Freedom House Index Score	2.2%	2.2%	3.0%
Governance	Informal Institutions	Social Capital	Press Freedom	1.3%	1.3%	3.0%
Governance	Stability	Safety & Security	Political Stability and Absence of Violence	1.9%	1.9%	n/a
Governance	Stability	Safety & Security	Global Peace Index	1.4%	1.4%	n/a

Governance	Stability	Safety & Security	Intentional Homicide Rate	1.4%	1.4%	5.0%
Governance	Stability	Migration	Net Migration	1.6%	1.6%	n/a

Appendix D: Key Performance Indicators (KPIs)

The table below lists the quantitative metrics used in the Sovereign ESG Ratings, organised by pillar and subcategory. For each metric, the table states the metric definition and the categories of rated items to which the metric is applied: 91 metrics apply to national governments with access to the sea, 89 to landlocked national governments and 35 to sub-national governments, as set out in Section 4.3. The weight of each metric is set out in Appendix C.

Environmental Pillar

Subcategory	Metric	Description	Applicable rated items
E1.1 Energy Self Sufficiency	Energy Imports	Net energy imports, estimated as energy use minus production, both measured in oil equivalents, and expressed as a percentage of total energy use. Negative values, which indicate net energy exporters, are assigned the maximum score, so that all net exporters are treated as fully self-sufficient rather than ranked by the size of their exports.	National and sub-national governments ¹²
E1.1 Energy Self Sufficiency	Fossil Fuel Proved Reserves	Quantities of petroleum, natural gas or coal that can be estimated with a high degree of confidence to be commercially recoverable from known reservoirs under current economic conditions. Expressed in terajoules per capita.	National and sub-national governments
E1.2 Energy Management	Energy Intensity	Ratio between energy supply, measured in megajoules, and gross domestic product at 2011 international prices. Indicates how much energy is used to produce one unit of economic output.	National and sub-national governments

¹² The European Union uses the weights for national governments with access to the sea

E1.2 Energy Management	Electricity Consumption	Production of power plants and combined heat and power plants, less transmission, distribution and transformation losses and own use by heat and power plants. Expressed in kWh per capita.	National and sub-national governments
E1.3 Water	Water Stress	Ratio of total annual water withdrawals to total available annual renewable supply, accounting for upstream consumptive use.	National and sub-national governments
E1.3 Water	Water Productivity	Ratio between gross domestic product, at constant 2010 US dollars, and annual total water withdrawal in cubic metres.	National governments
E1.4 Land	Arable Land	Land under temporary crops, temporary meadows for mowing or pasture, market or kitchen gardens, and land temporarily fallow. Expressed in hectares per person.	National and sub-national governments
E1.4 Land	Value Added of the Agricultural, Forestry and Fishing Sector	Net output of the sector after adding all outputs and subtracting intermediate inputs. Covers forestry, hunting and fishing, as well as cultivation of crops and livestock production. Expressed as a percentage of GDP.	National and sub-national governments
E1.4 Land	Agricultural Land	Share of land area that is arable, under permanent crops or under permanent pastures. Expressed as a percentage of land area.	National governments
E1.4 Land	Food Production	Index of the aggregate volume of production of food crops considered edible and containing nutrients, shown relative to the 2004-2006 base period.	National governments
E1.5 Oceans	Ocean Health Index	Scientific framework measuring the health of oceans by combining key biological, physical, economic, cultural and social elements. Reflects how well coastal regions optimise their potential ocean benefits and services in a sustainable way relative to a target.	Coastal national governments only
E1.5 Oceans	Fish Exports	Exports of fish, crustaceans, molluscs and other aquatic invertebrates as a share of total exports. Expressed as a percentage of total exports.	Coastal national governments only

E1.6 Other Natural Resources	Resource Governance Index	Measures the quality of resource governance through three components: value realisation, such as extraction rights and revenue collection; revenue management, such as national budgeting and sovereign wealth funds; and the enabling environment, such as rule of law and corruption.	National governments
E1.6 Other Natural Resources	Total Natural Resources Rent	Sum of oil rents, natural gas rents, coal rents, both hard and soft, mineral rents and forest rents. Where growth exceeds harvest the figure is zero. Expressed as a percentage of GDP.	National governments
E1.6 Other Natural Resources	Adjusted Savings: Natural Resources Depletion	Sum of net forest depletion, being unit resource rents times the excess of roundwood harvest over natural growth; energy depletion, covering coal, crude oil and natural gas; and mineral depletion, covering tin, gold, lead, zinc, iron, copper, nickel, silver, bauxite and phosphate. Depletion is measured as the ratio of the value of the resource stock to the remaining reserve lifetime and expressed as a percentage of gross national income.	National governments
E1.6 Other Natural Resources	Forest Area	Land under natural or planted stands of trees of at least five metres in situ, whether productive or not, excluding tree stands in agricultural production systems and trees in urban parks and gardens. Expressed as a percentage of land area.	National governments
E2.1 Air Pollutant Emissions	Particulate Matter Exposure	Average level of exposure to concentrations of suspended particles below 2.5 microns in aerodynamic diameter, calculated by weighting PM2.5 mean annual concentrations by urban and rural population. Exposure levels above the WHO Interim Target 1 of 35 $\mu\text{g}/\text{m}^3$ are assigned the minimum score due to their health risk.	National and sub-national governments
E2.1 Air Pollutant Emissions	Particulate Emission Damage	Damage due to population exposure to ambient concentrations of PM2.5, ambient ozone pollution and indoor concentrations of PM2.5 in households cooking with solid fuels. Damages are calculated as foregone labour income due to premature death and	National governments

		expressed as a percentage of gross national income.	
E2.2 GHG Emissions	CO2 Emissions per Capita	Carbon dioxide emissions from fossil fuel combustion and oxidation and cement production, excluding emissions from international aviation and maritime transport. Expressed in metric tons per capita.	Sub-national governments only
E2.2 GHG Emissions	Percentage of Global CO2 Emissions	Territorial CO2 emissions of the rated item, including fossil fuel combustion and oxidation and cement production, as a percentage of global CO2 emissions.	National governments
E2.2 GHG Emissions	Renewable Energy Consumption	Share of renewable energy in total final energy consumption.	National and sub-national governments
E2.2 GHG Emissions	Methane Emissions	Methane emissions stemming from human activities such as agriculture and from industrial methane production. Expressed in metric tons of CO2 equivalent per capita.	National governments
E2.2 GHG Emissions	Nitrous Oxide Emissions	Nitrous oxide emissions stemming from agricultural biomass burning, industrial activities and livestock management. Expressed in metric tons of CO2 equivalent per capita.	National governments
E2.2 GHG Emissions	Scope 1 Emissions Intensity, excluding LULUCF	Intensity of domestic GHG emissions from sources located within the rated item's territory, including emissions for exported goods and services and excluding land use, land-use change and forestry, sized by GDP adjusted for purchasing power parity.	National governments
E2.2 GHG Emissions	Imported Emissions Intensity	Intensity of imported GHG emissions, sized by GDP adjusted for purchasing power parity. Includes emissions occurring as a consequence of the domestic use of grid-supplied electricity, heat, steam or cooling imported from another territory, and emissions attributable to non-energy imports resulting from activities taking place within the territory.	National governments
E3.1 Biodiversity	Terrestrial Area	Mean percentage area of terrestrial Key Biodiversity Areas, being sites	National governments

	Protected Important to Biodiversity	important for the global persistence of biodiversity, that is covered by protected areas.	
E3.1 Biodiversity	Red List Index of Species Survival	Index showing how well species are conserved in the rated item's territory, given its potential contribution to global species conservation. Ranges from 0 to 1, with higher scores indicating a positive contribution.	National governments
E3.1 Biodiversity	Red List Index of Species Survival, Change	Compound annual growth rate of the Red List Index of Species Survival from 2007 to 2019.	National governments
E3.1 Biodiversity	Forest Area Change	Compound annual growth rate of forest area over three years. Forest area includes land under natural or planted stands of trees of at least five metres in situ, whether productive or not, excluding tree stands in agricultural production systems and trees in urban parks and gardens.	National governments
E3.1 Biodiversity	Threatened Mammal Species	Number of mammal species, excluding whales and porpoises, classified by the IUCN as endangered, vulnerable, rare, indeterminate, out of danger or insufficiently known.	National governments
E3.2 Natural Disasters	World Risk Index	Evaluates exposure to natural hazards and assesses inherent vulnerability towards suffering impacts when facing these hazards, covering the likelihood of suffering harm, capacities to reduce negative consequences and capacities for long-term strategies for societal change.	National governments
E3.2 Natural Disasters	Population Affected by Natural Disasters	Percentage of the population affected by natural disasters, which include animal accidents, epidemics, insect infestations, droughts, wildfires, impacts, earthquakes, mass movements, volcanic activity, floods, landslides, extreme temperatures, fog and storms.	National governments
E3.2 Natural Disasters	Economic Damage Caused by	Economic damage caused by natural disasters, as defined above, expressed as a percentage of GDP.	National governments

	Natural Disasters		
E3.2 Natural Disasters	Population Density	Midyear population divided by land area in square kilometres.	National governments

Social Pillar

Subcategory	Metric	Description	Applicable rated items
S1.1 Demographic Transition	Total Age Dependency Ratio	Ratio of dependents, being people younger than 15 or older than 64, to the working-age population aged 15 to 64. Shown as the proportion of dependents per 100 working-age population.	National and sub-national governments
S1.1 Demographic Transition	Population Ages 65 and Above	Percentage of the population aged 65 and above.	National governments
S1.2 Education	Adult Literacy Rate	Percentage of people aged 15 and above who can both read and write, and who show an understanding of a short, simple statement about their everyday life.	National governments
S1.2 Education	Education Index	Average of the Mean Years of Schooling Index, based on the number of years of education received by people aged 25 and older in their lifetime, and the Expected Years of Schooling Index, based on the number of years a child is expected to attend school and university.	National and sub-national governments
S1.2 Education	Government Expenditure on Education	Current, capital and transfer expenditure on education, including expenditure funded by transfers from international sources to the government, and covering local, regional and central governments. Expressed as a percentage of total general government expenditure on all sectors.	National governments
S1.3 Health	Life Expectancy	Number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.	National and sub-national governments

S1.3 Health	Infant Mortality Rate	Number of infants dying before reaching one year of age, per 1,000 live births in a given year.	National and sub-national governments
S1.3 Health	Prevalence of Undernourishment	Percentage of the population below the minimum level of dietary energy consumption, where food intake is continuously insufficient to meet dietary energy requirements.	National governments
S1.3 Health	Prevalence of Obesity Among Adults	Percentage of the adult population with a body mass index of 30 kg/m ² or higher, based on measured height and weight.	Sub-national governments only
S1.4 Gender Inequality	Gender Development Index	Measures gender inequalities in three basic dimensions of human development: health, being female and male life expectancy at birth; education, being female and male expected years of schooling; and command over economic resources, being female and male estimated earned income. Rated items with an index larger than 1 are assigned the maximum score.	National governments
S1.4 Gender Inequality	Gender Gap in Labor Force Participation	Difference between female and male labour force participation rates, where the participation rate is the proportion of the population aged 15 and older that is economically active. Rated items in which female labour force participation exceeds male participation are assigned the maximum score.	National and sub-national governments
S1.4 Gender Inequality	Seats Held by Women in National Parliaments	Percentage of parliamentary seats in a single or lower chamber held by women.	National governments
S1.4 Gender Inequality	Unmet Need for Contraception	Percentage of fertile, married women of reproductive age who do not want to become pregnant and are not using contraception. Expressed as a percentage of married women aged 15 to 49.	National governments
S1.5 Wealth Inequality	Gini Index	Measures the extent to which the distribution of income, or in some cases consumption expenditure, among individuals or households	National governments

		within an economy deviates from a perfectly equal distribution.	
S1.5 Wealth Inequality	Poverty Headcount Ratio at National Poverty Lines	Percentage of the population living below the national poverty lines. National estimates are based on population-weighted subgroup estimates from household surveys.	National governments
S1.6 Working Conditions	Mean Nominal Hourly Earnings	Mean gross remuneration in cash and in kind paid to employees for time worked or work done, together with remuneration for time not worked. Nominal values are converted to a common currency using 2017 purchasing power parity (PPP) conversion factors.	National governments
S1.6 Working Conditions	Global Rights Index	Measure of the degree of respect for workers' rights across five domains: civil liberties, the right to establish or join unions, trade union activities, the right to collective bargaining and the right to strike.	National governments
S1.7 Employment	Unemployment Rate	Percentage of the labour force that is without work but available for and seeking employment.	National and sub-national governments
S1.7 Employment	Youth Unemployment Rate	Percentage of the labour force aged 15 to 24 that is without work but available for and seeking employment.	National and sub-national governments
S1.7 Employment	Labor Force Participation Rate	Percentage of the population aged 15 to 64 that is economically active, being all people who supply labour for the production of goods and services during a specified period.	National governments
S1.8 Economic Environment	GNI per Capita	Gross national income, being the sum of value added by all resident producers plus any product taxes not included in the valuation of output plus net receipts of primary income from abroad, per capita. Expressed at constant 2017 international dollars.	National and sub-national governments
S1.8 Economic Environment	GDP Growth	Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates	National governments

		are based on constant 2010 US dollars.	
S1.8 Economic Environment	Annualized Average Growth Rate per Capita	Annualized average growth rate in per capita real consumption or income of the total population in the income distribution, drawn from household surveys over a period of approximately five years.	National governments
S1.9 Access to Services	Access to Clean Fuels and Technologies for Cooking	Percentage of the population primarily using clean cooking fuels and technologies. Under WHO guidelines, kerosene is excluded from clean cooking fuels.	National governments
S1.9 Access to Services	Access to Electricity	Percentage of the population with access to electricity. Electrification data are collected from industry, national surveys and international sources.	National governments
S1.9 Access to Services	People Using Safely Managed Water Services	Percentage of people using drinking water from an improved source that is accessible on premises, available when needed and free from faecal and priority chemical contamination. Improved water sources include piped water, boreholes or tubewells, protected dug wells, protected springs, and packaged or delivered water.	National governments
S1.9 Access to Services	People Using Safely Managed Sanitation Services	Percentage of people using improved sanitation facilities that are not shared with other households and where excreta are safely disposed of in situ or transported and treated offsite. Improved sanitation facilities include flush or pour-flush to piped sewer systems, septic tanks or pit latrines.	National governments
S2.1 Infrastructure	Logistics Performance Index	Survey-based average assessment of the quality of trade and transport-related infrastructure, such as ports, roads, railroads and information technology.	National governments
S2.1 Infrastructure	Railway Density	Length of the railway network divided by the total area of the rated item.	National and sub-national governments

S2.1 Infrastructure	Roadway Density	Length of the road network divided by the total area of the rated item.	National and sub-national governments
S3.1 ICT Adoption	Fixed Broadband Subscriptions	Fixed subscriptions to high-speed access to the public internet at downstream speeds equal to or greater than 256 kbit/s. Expressed in subscriptions per 100 people.	National governments
S3.1 ICT Adoption	Population Using the Internet	Percentage of the population who used the internet from any location in the last three months. Access can be via a fixed or mobile network.	National governments
S3.1 ICT Adoption	Households with Internet	Percentage of households which use a broadband connection. Broadband access refers to technologies that provide access to the internet at download speeds of 256 kbit/s or greater, including both fixed and wireless broadband technologies.	National and sub-national governments
S3.1 ICT Adoption	Mobile Cellular Subscriptions	Subscriptions to a public mobile telephone service that provides access to the public network using cellular technology, expressed in subscriptions per 100 people. Rated items with more than one subscription per person are assigned the maximum score.	National governments
S3.2 Innovation	Research and Development Expenditure	Expenditure on scientific research and experimental development, expressed as a percentage of GDP.	National and sub-national governments
S3.2 Innovation	Number of Scientific and Technical Journal Articles	Number of scientific and technical journal articles published that are covered by the Science Citation Index or the Social Sciences Citation Index. Articles are assigned to a rated item based on the address listed. Expressed as the number of articles per 1,000 inhabitants.	National governments
S3.2 Innovation	Patent Applications	Worldwide patent applications filed through the Patent Cooperation Treaty procedure or with a national patent office for exclusive rights for an invention. Expressed as the number of patent applications per capita.	National governments

Governance Pillar

Subcategory	Metric	Description	Applicable rated items
G1.1 Economic Rules	Regulatory Quality	Perceptions of the ability of the government to implement policies and regulations that promote private sector development.	National and sub-national governments
G1.1 Economic Rules	Ease of Doing Business	Measures the conduciveness of the regulatory environment to the starting and operation of a local firm.	National and sub-national governments
G1.2 Financial Rules	Public Debt	Cumulative total of all government borrowings less repayments denominated in the rated item's home currency. Expressed as a percentage of GDP.	National and sub-national governments
G1.2 Financial Rules	Budget Deficit	Difference between government revenues and expenditures. Expressed as a percentage of GDP.	National and sub-national governments
G1.2 Financial Rules	Net International Investment Position	Difference between external financial assets and liabilities. Expressed as a percentage of GDP and calculated as the average of the three most recent available years.	National governments
G1.3 Judicial Rules	Rule of Law	Perceptions of the extent to which agents have confidence in and abide by the rules of society, in particular the quality of contract enforcement, property rights, the police and the courts, and the likelihood of crime and violence.	National and sub-national governments
G1.3 Judicial Rules	Judicial Independence	Perceptions of the extent to which the courts are not subject to undue influence from the other branches of government, especially the executive.	National and sub-national governments
G1.3 Judicial Rules	Strength of Legal Rights	Measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending. The index ranges from 0 to 12, with higher scores indicating that these laws are better designed to expand access to credit.	National governments
G1.4 Political Rules	Political Participation	Perceptions of the extent to which the populace decides who rules and has	National governments

		other political freedoms, including free and fair elections, effective power to govern, association and assembly rights, and freedom of expression.	
G1.4 Political Rules	General Elections Turnout	Number of people who voted in the last national election, expressed as a percentage of all people with voting rights.	National and sub-national governments
G1.4 Political Rules	Representative Government	Perceptions of the extent to which popular elections for legislative and executive offices are contested and inclusive, including clean elections, free political parties, elected government and inclusive suffrage.	National governments
G1.5 Government Effectiveness	Government Effectiveness	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.	National governments
G1.6 Corruption	Control of Corruption	Perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as capture of the state by elites and private interests.	National and sub-national governments
G2.1 Social Capital	Voice and Accountability	Perceptions of the extent to which citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association and a free media.	National governments
G2.1 Social Capital	Social Capital	Measures the strength of personal and social relationships, social norms and civic participation in the rated item's territory.	National governments
G2.1 Social Capital	Social Network Support	Percentage of people who acknowledge having relatives or friends to count on when in trouble or in need of help.	National and sub-national governments
G2.1 Social Capital	Freedom House Index Score	Composite assessment of political rights and civil liberties, scored from 0 to 100. Political rights cover the electoral process, political pluralism and participation, and the functioning	National and sub-national governments

		of government; civil liberties cover freedom of expression and belief, associational and organisational rights, rule of law, and personal autonomy and individual rights.	
G2.1 Social Capital	Press Freedom	Measures the level of press freedom enjoyed by journalists and media, taking into account legal environments, political influences, censorship, violence against journalists and other obstacles to journalistic work.	National and sub-national governments
G3.1 Safety & Security	Political Stability and Absence of Violence	Perceptions of the likelihood of political instability or politically motivated violence, including terrorism.	National governments
G3.1 Safety & Security	Global Peace Index	Measures the level of Negative Peace across three domains: domestic and international conflict, societal safety and security, and militarisation.	National governments
G3.1 Safety & Security	Intentional Homicide Rate	Estimates of unlawful homicides purposely inflicted as a result of domestic disputes, interpersonal violence, violent conflicts over land resources, intergang violence over turf or control, and predatory violence and killing by armed groups. Expressed as intentional homicides per 100,000 people.	National and sub-national governments
G3.2 Migration	Net Migration	Total number of immigrants less the annual number of emigrants, including both citizens and noncitizens, based on five-year estimates and expressed as a percentage of the population. Rated items with the highest percentage of net migration population are assigned the maximum score.	National governments

Appendix E: Categories and Subcategories

The methodology for evaluating rated items is structured around 9 ESG categories encompassing 31 ESG subcategories for national governments. Each category represents a broad area of environmental, social, or governance performance, while its subcategories capture the specific issues assessed within it. A reduced set of 22

subcategories applies to sub-national governments, reflecting the more limited availability of regional-level statistics (see the note at the end of this section).

Environmental Categories

Category E1: Resource Use

The Resource Use category assesses the financial risks arising from a rated item's limited access to, and management of, the natural resources that underpin long-term economic growth and development. It covers energy, water, land, oceans, and other natural resources such as minerals, evaluating the rated item's structural exposure to resource scarcity and its efficiency in resource use.

- Subcategory E1.1: Energy Self Sufficiency. Evaluates a government's dependence on imported energy and its exposure to external energy supply shocks. It captures the financial risks associated with high net energy import dependence and limited domestic fossil fuel reserves.
- Subcategory E1.2: Energy Management. Evaluates a government's efficiency in converting energy inputs into economic output. It captures the financial risks associated with high energy intensity and elevated electricity consumption relative to GDP.
- Subcategory E1.3: Water. Evaluates a government's exposure to water scarcity and the productivity of its water use. It captures the financial risks associated with water stress and the inefficient use of renewable water supply.
- Subcategory E1.4: Land. Evaluates a government's management of arable and agricultural land as a productive economic resource. It captures the financial risks associated with constrained agricultural output and land-based food production capacity.
- Subcategory E1.5: Oceans. Evaluates a government's reliance on, and stewardship of, marine and coastal resources. It captures the financial risks associated with the depletion of fisheries and other ocean-dependent economic activity.
- Subcategory E1.6: Other Natural Resources. Evaluates a government's dependence on, and governance of, non-renewable natural resource wealth, including forests. It captures the financial risks associated with resource depletion and weak natural resource governance.

Category E2: Emissions

The Emissions category assesses the financial risks arising from a rated item's contribution to air pollution and greenhouse gas emissions. It covers particulate matter exposure and greenhouse gas emissions (share of global CO₂, and methane and nitrous oxide per capita), evaluating the extent to which the rated item is exposed to the public

health costs of pollution and to the economic costs associated with the climate transition.

- Subcategory E2.1: Air Pollutant Emissions. Evaluates a government's exposure to air pollution and its associated public health burden. It captures the financial risks associated with high particulate matter exposure and the resulting economic damage from pollution-related illness and lost productivity.
- Subcategory E2.2: GHG Emissions. Evaluates a government's per-capita greenhouse gas footprint and reliance on renewable energy. It captures the financial risks associated with high carbon dioxide, methane, and nitrous oxide emissions, including exposure to future climate-related policy costs.

Category E3: Environmental Externalities

The Environmental Externalities category assesses the financial risks arising from a rated item's exposure to biodiversity loss and natural disasters. It covers species conservation trends and the frequency and severity of natural hazards, evaluating the rated item's structural vulnerability to environmental shocks outside its direct control.

- Subcategory E3.1: Biodiversity. Evaluates a government's exposure to the decline of species and ecosystems within its jurisdiction. It captures the financial risks associated with biodiversity loss and the erosion of natural capital.
- Subcategory E3.2: Natural Disasters. Evaluates a government's exposure and vulnerability to natural disasters, including their economic and demographic impact. It captures the financial risks associated with disaster-related economic damage and population disruption.

Social Categories

Category S1: Human Capital

The Human Capital category assesses the financial risks arising from limitations on the quantity, quality, and allocation of a rated item's human capital. It covers demographic structure, education, health, equality of opportunity, labour conditions, and access to basic services, evaluating the rated item's capacity to sustain a productive workforce over the long term.

- Subcategory S1.1: Demographic Transition. Evaluates a government's exposure to shifting age dependency ratios and population aging. It captures the financial risks associated with a rising dependency burden on the working-age population.
- Subcategory S1.2: Education. Evaluates a government's investment in, and outcomes from, education. It captures the financial risks associated with low educational attainment and constrained human capital development.

- Subcategory S1.3: Health. Evaluates a government's public health outcomes and healthcare provision. It captures the financial risks associated with poor population health and reduced workforce productivity.
- Subcategory S1.4: Gender Inequality. Evaluates a government's progress in closing gender gaps in economic and political participation. It captures the financial risks associated with the underutilisation of human capital arising from gender inequality.
- Subcategory S1.5: Wealth Inequality. Evaluates a government's income and wealth distribution. It captures the financial risks associated with high inequality, including social instability and constrained domestic demand.
- Subcategory S1.6: Working Conditions. Evaluates a government's protection of labour rights and working conditions, including child labour safeguards. It captures the financial risks associated with weak labour protections and reduced labour productivity.
- Subcategory S1.7: Employment. Evaluates a government's labour market performance, including overall and youth unemployment. It captures the financial risks associated with high unemployment and underutilised labour capacity.
- Subcategory S1.8: Economic Environment. Evaluates a government's broader economic conditions affecting its population's welfare, including income levels and growth. It captures the financial risks associated with weak growth and unfavourable economic conditions.
- Subcategory S1.9: Access to Services. Evaluates a government's provision of basic services such as electricity, sanitation, and clean water and fuels. It captures the financial risks associated with insufficient access to basic services and its constraint on human development.

Category S2: Physical Capital

The Physical Capital category assesses the financial risks arising from the adequacy of a rated item's transport and telecommunications infrastructure, evaluating the rated item's capacity to enable the growth and expansion of the private sector.

- Subcategory S2.1: Infrastructure. Evaluates the adequacy of a government's transport and telecommunications infrastructure. It captures the financial risks associated with poor infrastructure quality constraining private sector growth and trade competitiveness.

Category S3: Technology

The Technology category assesses the financial risks arising from a rated item's technological capabilities. It covers the adoption of information and communication

technologies and the strength of innovation ecosystems, evaluating the rated item's capacity to sustain long-term economic growth through technological development.

- Subcategory S3.1: ICT Adoption. Evaluates a government's population's access to, and adoption of, information and communication technologies. It captures the financial risks associated with a digital divide constraining economic participation and productivity.
- Subcategory S3.2: Innovation. Evaluates a government's investment in research, development, and innovation capacity. It captures the financial risks associated with weak innovation ecosystems limiting long-term competitiveness.

Governance Categories

Category G1: Formal Institutions

The Formal Institutions category assesses the financial risks arising from weaknesses in a rated item's regulatory, financial, judicial, and political rules. It covers the efficiency of the business and regulatory environment, the soundness of fiscal and financial management, the strength of the rule of law, the quality of political institutions, government effectiveness, and control of corruption, evaluating the rated item's institutional capacity to support investment and long-term growth.

- Subcategory G1.1: Economic Rules. Evaluates the conduciveness of a government's regulatory environment to business activity. It captures the financial risks associated with weak regulatory quality and barriers to enterprise formation and operation.
- Subcategory G1.2: Financial Rules. Evaluates the soundness of a government's fiscal and financial management. It captures the financial risks associated with elevated public debt, budget deficits, and adverse international investment positions.
- Subcategory G1.3: Judicial Rules. Evaluates the strength of a government's rule of law, judicial independence, and legal protections. It captures the financial risks associated with weak legal enforcement and insecure property and contract rights.
- Subcategory G1.4: Political Rules. Evaluates the strength and representativeness of a government's political institutions. It captures the financial risks associated with limited political participation and weak democratic accountability.
- Subcategory G1.5: Government Effectiveness. Evaluates the quality of a government's public service delivery and policy implementation. It captures the financial risks associated with weak administrative capacity and policy execution.
- Subcategory G1.6: Corruption. Evaluates a government's control of corruption and the constraint of public power for private gain. It captures the financial risks associated with weak anti-corruption enforcement and its effect on the investment climate.

Category G2: Informal Institutions

The Informal Institutions category assesses the financial risks arising from weak social capital. It covers a society's capacity to coordinate action outside of formal governmental structures, evaluating the rated item's underlying social cohesion and trust.

- Subcategory G2.1: Social Capital. Evaluates a society's levels of social trust, civic participation, and support networks, as well as citizens' ability to participate in selecting their government. It captures the financial risks associated with weak social cohesion and its effect on a government's capacity for coordinated action.

Category G3: Stability

The Stability category assesses the financial risks arising from weak safety and security conditions and adverse migration dynamics. It covers a rated item's exposure to violence, conflict, and population instability, evaluating the rated item's structural resilience to instability that could undermine the effectiveness of its formal and informal institutions.

- Subcategory G3.1: Safety & Security. Evaluates a government's exposure to violence, conflict, and crime. It captures the financial risks associated with weak safety and security conditions undermining institutional effectiveness.
- Subcategory G3.2: Migration. Evaluates a rated item's net migration dynamics. It captures the financial risks associated with adverse migration flows and their effect on the rated item's long-term stability and labour force.

Note on sub-national coverage: Sub-national governments are assessed on a reduced set of 22 of the 31 subcategories above, reflecting the limited availability of statistics at the regional level. The following 9 subcategories are not currently assessed for sub-national governments: E1.5 (Oceans), E1.6 (Other Natural Resources), E3.1 (Biodiversity), E3.2 (Natural Disasters), S1.5 (Wealth Inequality), S1.6 (Working Conditions), S1.9 (Access to Services), G1.5 (Government Effectiveness), and G3.2 (Migration). Where a metric is retained for sub-national governments despite the absence of regional data (for example, several Formal Institutions metrics), its value is taken from the national government level rather than measured independently.

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