

A framework to assess sovereign bond issuers on climate change

Consultation Report

February 2023



ASCOR partners

The Assessing Sovereign Climate-related Opportunities and Risks (ASCOR) Project is led by asset owners, asset managers and investor networks. ASCOR is co-chaired by Victoria Barron, BT Pension Scheme Management, and Adam Matthews, Church of England Pensions Board. ASCOR was established with the UN-convened Net-Zero Asset Owner Alliance (AOA), Ceres, the Institutional Investors Group on Climate Change (IIGCC), the Principles for Responsible Investment (PRI), and Sura Asset Management, who are all part of ASCOR's Steering Committee. The project is supported by Chronos Sustainability. ASCOR's academic partner is the Transition Pathway Initiative (TPI) Global Climate Transition Centre, based at the Grantham Research Institute on Climate Change and the Environment, London School of Economics and Political Science.

The ASCOR Advisory Committee, who are among the funders of the current stage of the project, is composed of the Steering Committee members and representatives from Aktia Bank, Allspring Global Investments, Amundi Asset Management, Colchester Global Investors, Franklin Templeton, MFS Investment Management, and Ninety One.

Additional partners to the project include the investor networks Investor Group on Climate Change (IGCC) and Asia Investor Group on Climate Change (AIGCC).

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Foreword

The impacts of climate change become more severe and the pressure on governments to act increases as each year passes. As part of their strategic responses to the risks and opportunities presented by climate change, investors are making overarching commitments to contribute to the transition towards net zero greenhouse gas emissions by significantly reducing the emissions associated with their investment portfolios. These commitments are spreading across portfolios. However, unlike other asset classes such as equities or corporate credit, there is currently no internationally agreed framework for assessing the climate-related risks and opportunities associated with sovereign debt instruments. Additionally, while there is a variety of sovereign data available, they can be incomplete, inconsistent or outdated. This limits investors' ability to conduct appropriate climate-related financial analysis and to engage in an informed way with governments on climate change. Subsequently, the climate-related investment case remains unclear.

To remedy this, a global coalition of asset owners and managers with over US\$5 trillion in assets under management, supported by international investor networks, came together in 2021 to create the Assessing Sovereign Climate-related Opportunities and Risks (ASCOR) Project. The aim is for every sovereign-debt-issuing country eventually to be assessed against a framework that will analyse emission pathways, climate policy action and opportunities to finance the transition. To promote transparency and build trust, the framework and assessments will be made freely available in an open-source online tool. The ASCOR framework will also focus on fairness, recognising the principle of common but differentiated responsibilities that underpins the United Nations Framework Convention on Climate Change (UNFCCC).

The benefits of this framework for sovereign issuers and investors are numerous. For issuers, this tool will open communication channels and facilitate greater dialogue with private investors. Through ASCOR's independent and transparent assessments, issuers may more easily demonstrate their climate change progress to investors over time. The ASCOR Project will help build investor confidence in governments' climate change goals and thereby encourage capitals flows that will support job creation, infrastructure improvement, and pollution reduction.

The framework has been created with investors for investors, but unlike many other approaches, it will be shaped in consultation with sovereign issuers. With a clearer picture of how governments are positioned, investors will have relevant information to integrate into decision-making to reduce their exposure to climate risk and increase their financing of climate opportunities. The ASCOR framework and country assessments will also help prioritise issuer engagement efforts to support increased ambition and help investors meet their net zero and just transition commitments.

The public consultation process we are undertaking will contribute to developing the framework further and ensuring it is fit for purpose. We welcome feedback from all stakeholders on the framework and look forward to seeing you at the webinar and regional roundtables which will be run during 2023.

Victoria Barron, Head of Sustainable Investment, BT Pension Scheme Management

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ASCOR Co-chairs

Part I: Introducing the ASCOR Project

ASCOR's purpose

Assessing Sovereign Climate-related Opportunities and Risks (ASCOR) is a project led by asset owners, asset managers and investor networks to develop a free, publicly available, independent tool that assesses countries on climate change.

The ASCOR tool will be a framework of indicators and a database of country assessments transparently presenting the progress made by governments on managing the low-carbon transition and the impacts of climate change. ASCOR aims to support, facilitate and clarify investors' decision-making on sovereign bond purchasing and engagement, without directly providing investment advice. By encouraging continued engagement from asset owners and managers, the ASCOR Project hopes to facilitate dialogue between issuers and investors and drive the financing of mitigation, adaptation and the just transition. The ASCOR Project has woven the principles of fairness and common but differentiated responsibilities into the framework with the aim of encouraging financial flows to support a resilient and just low-carbon transition, especially in countries that are least able to finance it themselves.

While providing helpful information to asset owners and managers, the ASCOR Project also hopes to facilitate the debt issuance process for countries. By developing a comprehensive and freely available framework and data tool in partnership with investors and in consultation with issuers and international finance organisations, ASCOR aims to avoid an unnecessary proliferation of different sovereign climate frameworks. In providing an industry standard for net zero-aligned sovereign investing, ASCOR can streamline investor engagement with issuers, which could help optimise limited time and resources for both. ASCOR will also enable countries to showcase their improvements on the transition to a low-carbon and resilient future by providing transparent and open-source assessments of their targets and policies.

We see the potential for the framework to be adopted for a variety of innovative applications. For example, as the framework's indicators will be understood by the investment community, they could be adopted by issuing countries as key performance indicators for sustainability-linked bonds.

ASCOR's development process

In 2022, ASCOR's academic partner, the Transition Pathway Initiative (TPI) Global Climate Transition Centre, developed an initial framework of indicators drawing on working group sessions with asset owners, asset managers and investor networks. These indicators were created using desk-based research and interviews with climate policy experts.

As part of the research process, the indicators were tested on 25 pilot countries, representing a cross-section of geographies, income groups, climate risk levels and policymaking systems. The pilot countries (see Table 1 below) were estimated to cover nearly 70% of global greenhouse gas (GHG) emissions. They represent over 80% of both the FTSE World Government Bond Index and the Bloomberg Global Treasury Index, 50% of the FTSE Frontier Emerging Markets Government Bond Index, and over 60% of the J.P. Morgan Government Bond Index for Emerging Markets Global Diversified.

Table 1. Countries included in the piloting of the ASCOR framework

Australia	Chile	India	Kyrgyzstan	South Africa
Bangladesh	China	Indonesia	Mexico	Thailand
Barbados	Egypt	Italy	Morocco	United Kingdom
Brazil	France	Japan	Poland	United States
Canada	Germany	Kenya	Saudi Arabia	Uruguay

ASCOR's consultation phase

Having developed the framework, we are now consulting and seeking feedback from the full range of relevant stakeholders – including sovereign bond issuers, development finance institutions, investors, civil society and the wider public. We welcome feedback on the principles that have underpinned the design of the framework, on the proposed indicators, and on the methodological details described in this report.

As part of the consultation process, a global public webinar and regional roundtables will be held in February and March 2023 to ensure in-depth engagement with stakeholders. We will also collect written feedback through an online survey composed of the consultation questions included in this report.



To share your feedback, please complete [this survey](#) and share your response by 31 March 2023.

We will publish analysis to summarise the results of the consultation and explain how feedback will be incorporated to update the ASCOR framework. We will then use the new framework to reassess the 25 countries listed above. Before any assessment results are published, we will share draft assessments with each country so they can provide comments on the data, sources and our interpretations of their targets and policies. We will launch the free online ASCOR tool and publish the assessments of these 25 countries by the end of 2023.

From 2024 onwards, the ASCOR Project aims to annually update the tool with assessments of sovereign-debt-issuing countries, expand the country coverage, and make the assessments publicly available online.

Part II: Outlining the ASCOR framework approach

What design principles were followed?

The initial ASCOR framework was developed in collaboration with members of the ASCOR Advisory Committee, who are all sovereign debt investors with experience in both industrialised countries and emerging economies.

The framework was developed according to six primary design principles:

1. Indicators are assessable using **publicly available data**, like government documents or reliable, publicly available databases. While data availability remains a limitation for some indicators, we aim to evolve the framework as disclosure and data availability improve, and through engagement with sovereign issuers. Country assessments will be undertaken using existing databases or through dedicated data collection and policy analysis based on information in public government documents.
2. Indicators are **objectively assessable**. For clarity, comparability and ease of interpretation, the framework prioritises 'Yes' or 'No' indicators. Where relevant, these are complemented by quantitative metrics.
3. Indicators are **clear, useful and accessible** to asset owners and asset managers, including to those with limited resources to assess climate change. To create an easily usable framework, efforts have also been taken to minimise the number of topics and focus on the most important aspects of climate risks and opportunities.
4. Indicators are chosen to **avoid unnecessarily adding to the reporting burden** of sovereigns. This principle is balanced against driving improvements in disclosure: for example, of national consumption-based emissions.
5. Indicators are pitched at the **national level**, so that metrics of climate opportunities and risks are relevant for sovereign bond purchasing decisions and country analysis. The framework therefore would not consider characteristics of individual sovereign green bonds' use of proceeds, for example.
6. Lastly, the framework was developed in line with the principle of **common but differentiated responsibilities**, which posits that countries' contributions to climate change mitigation should consider their differing responsibilities for climate change and abilities to act. For example, to address concerns that some indicators may not be relevant or appropriate for middle- and low-income countries, selected countries are exempt from some indicators¹ (see [Appendix 1](#) for detailed exemptions). In addition, fairness was incorporated into the framework through the topics of just transition and international climate finance.

Consultation questions

Do these design principles establish a reasonable set of criteria for assessing sovereign bond issuers on their climate change risks and opportunities? If not, what changes would you suggest?

¹ We group countries primarily based on the [World Bank country and lending groups](#) as follows: i) high-income (HI) countries: World Bank group 'high income'; ii) middle-income (MI) countries: World Bank group 'upper-middle income'; iii) low-income (LI) countries: World Bank groups 'lower-middle income' and 'low income'.

How will ASCOR assess countries?

The framework is composed of three pillars organised under nine themes, each of which includes ‘Yes’ or ‘No’ indicators and, where relevant, complementary quantitative metrics. These indicators were carefully selected based on materiality, availability and comparability.

Figure 1. Overview of the ASCOR framework

Performance of countries on managing climate change		Financing countries’ climate risks and opportunities
Pillar 1: Emission pathways (EP)	Pillar 2: Climate policies (CP)	Pillar 3: Opportunities to finance the transition (OFT)
EP 1: Emission trends	CP 1: Mitigation	OFT 1: Financing to mitigate
EP 2: 2030 targets	CP 2: Adaptation	OFT 2: Financing to adapt
EP 3: Net zero targets	CP 3: Just transition	OFT 3: Financing to harness opportunities

- 1. Emission pathways:** This pillar considers historical emission trends and the alignment of forward-looking national emission reduction targets with international climate goals. These indicators provide an understanding of mitigation ambition.
- 2. Climate policies:** This pillar considers national policymaking efforts to mitigate emissions, adapt to climate change, and ensure a just transition. These indicators provide a deepened understanding of the credibility and implementation of emission targets and richer qualitative and quantitative data on priority climate policy areas.
- 3. Opportunities to finance the transition:** This pillar considers the financing countries may need to implement climate goals. These indicators are critical given that many countries facing the greatest climate-related risks currently have insufficient access to financing. These indicators will highlight to investors potential investment opportunities and dialogue priorities with issuers.

While the first two pillars inform investors about the effectiveness and performance of sovereigns in managing climate change, the third pillar, in contrast, sets out the landscape of climate risks and opportunities that a country faces. The ASCOR tool will provide a comprehensive framework and rigorous country assessments, but it will be for individual investors to decide how to use this information.

Consultation questions

Do the three pillars of the ASCOR framework address the most important dimensions of countries’ climate change risks and opportunities from an investment perspective? What additional topics would be essential to include?

Figure 2. Example of one pillar, theme, indicator and quantitative metric

PILLAR	Climate policies
THEME	Mitigation
SUB-THEME	Carbon pricing
INDICATOR	Do the carbon pricing mechanisms applied in the country together cover at least 50% of national GHG emissions?
QUANTITATIVE METRIC	What percentage of national GHG emissions is covered by a carbon pricing mechanism?

How will country assessment outcomes be presented?

The presentation of country assessment outcomes has important implications for how the ASCOR tool is used by investors and how a sovereign is viewed.

The proposed approach is as follows. Firstly, countries’ assessment outcomes on each indicator and metric will be made publicly available on the online ASCOR tool. Secondly, for each of the six themes in the framework’s first two pillars, an overarching outcome of ‘Yes’, ‘No’ or ‘Partial’ will be provided, based on whether a country has achieved all, none or some indicators within that theme, respectively. This structure is comparable to the Climate Action 100+ Benchmark, widely used by investors, which presents corporate climate performance in this way for a set of 10 thematic indicators (Climate Action 100+, 2022). For the pillar on opportunities to finance the transition, a distinct approach is needed, one that presents indicators of countries’ funding needs contextualised by their own funding capabilities. This is discussed further in Part III.

While this approach was selected as the most appropriate for ASCOR’s aims, alternative options were considered. For example, a single aggregated country-level ‘score’ could facilitate decisions about sovereign bond purchasing. This could be done by adopting the staircase model of the Transition Pathway Initiative’s Management Quality methodology, which ranks companies on levels based on which indicators they achieve (TPI, 2021). However, this approach was not adopted because aggregating the framework into one metric could present a misleading or uninformative picture of a country’s climate risks and opportunities. An aggregated country-level score could also distort financial flows by disincentivising investment in countries with a lower score that are at the earlier phases of their climate change journey.

Consultation questions

Is the proposed method of presenting countries’ assessment outcomes reasonable and fair, while also being useful to investors? If not, what changes would you suggest?

Part III: Presenting the ASCOR framework indicators

This section describes the proposed indicators in detail and is structured according to the three pillars of the ASCOR framework. We present the reasoning behind each indicator and, where relevant, include commentary on open methodological questions. This consultation process aims to collect feedback on these indicators and on the methodological issues raised.

Pillar 1: Emission pathways

Performance of countries on managing climate change		Financing countries' climate risks and opportunities
Pillar 1: Emission pathways (EP)	Pillar 2: Climate policies (CP)	Pillar 3: Opportunities to finance the transition (OFT)
EP 1: Emission trends	CP 1: Mitigation	OFT 1: Financing mitigation
EP 2: 2030 targets	CP 2: Adaptation	OFT 2: Financing adaptation
EP 3: Net zero targets	CP 3: Just transition	OFT 3: Financing transition opportunities

The first pillar sets out a methodology to quantitatively evaluate the historical and targeted mitigation efforts of countries. This involves assessing a country's emission pathway, which includes their historical emission trends and their medium- and long-term emission targets. In each section below, we describe and justify the indicators under these themes.

Emission trends

Historical emission trends provide information about the recent and current mitigation actions of countries, which can suggest the level of commitment to future action. Unless otherwise specified, the analysis of national emissions throughout this report includes all Kyoto GHGs ([United Nations Framework Convention on Climate Change \[UNFCCC\], n.d. a](#)). We consider five-year trends in absolute emissions and assess the annual rate of this trend against the emission reduction rate needed for the county to meet its 2030 target (see [Appendix 2](#) for associated calculations).

We also consider five-year trends in the emission intensities of both population and GDP adjusted by purchasing power parity (PPP). We adopt PPP-adjusted GDP to improve the comparison between actual economy sizes and to align with the Partnership for Carbon Accounting Financials ([PCAF, 2022](#)). Recent trends in emissions per unit of PPP-adjusted GDP indicate if the country is decoupling economic growth from emissions, which is necessary to meet climate and development goals. This indicator provides a fairer picture than relying solely on absolute and per capita emissions, since lower- and middle-income countries might reasonably increase their absolute and per capita emissions to meet development priorities. Therefore, the progress on mitigation of these countries can be more accurately and fairly assessed by examining the trends in their emission intensities of PPP-adjusted GDP.

We use production-based emissions, meaning those emitted within a country’s territory, due to a lack of data on consumption-based emissions, which include the emissions embedded in imported goods. However, given the importance of considering both production and consumption-based emissions to understand countries’ contributions to climate change, we aim to incorporate an evaluation of consumption-based emissions as soon as is practicable. Note that an indicator on the disclosure of consumption-based emissions is included in the climate policies pillar presented in the next section.

Regarding the scope of emissions considered in this trend analysis, the inclusion of emissions from land use, land use change and forestry (LULUCF) is a key methodological question. In general, data on land use emissions suffer from greater uncertainty than data on emissions from fossil fuels and industrial processes. In the initial testing of the indicators on the selected 25 pilot countries, we examined the trends in national emissions both including and excluding land use emissions. Because many countries’ emission trends are highly sensitive to their inclusion, it may be most appropriate to exclude them from the trend indicators in future iterations of the ASCOR framework and to assess trends in land use emissions separately.

EMISSION PATHWAYS 1.1. ABSOLUTE EMISSIONS
a. Have the country’s absolute GHG emissions decreased over the past 5 years? i) What is the average annual percentage change over the past 5 years? ii) What is the annual percentage change over the past year?
b. Is the average annual percentage change over the past five years aligned with the reductions needed to meet the country’s 2030 target?
EMISSION PATHWAYS 1.2. EMISSION INTENSITIES
a. Has the country’s PPP-adjusted GDP emission intensity decreased over the past 5 years? i) What is the average annual percentage change over the past 5 years?
b. Has the country’s per capita emission intensity decreased over the past 5 years? i) What is the average annual percentage change over the past 5 years?
Consultation questions Do you agree with the proposed indicators? If not, what changes would you suggest?

2030 targets

The central outcome of the Paris Agreement is the requirement to disclose Nationally Determined Contributions (NDCs) for 2030, in which countries elaborate on efforts to reduce national emissions and adapt to the impacts of climate change (UNFCCC, n.d. b). NDCs set emission reduction targets for 2030, which need to be assessed both on the quality of the targets and on whether they are ambitious enough to align with a 1.5°C future. We evaluate specific characteristics of targets to inform investors on their coverage, detail, dependability and rigour. Sectoral coverage is evaluated based on whether targets cover all high-emitting sectors, as defined by the Intergovernmental Panel on Climate Change (IPCC) guidelines for national GHG inventories: energy (including end uses like transport and buildings), industrial processes and product use, agriculture, forestry and other land use, and waste (IPCC, 2006).

EMISSION PATHWAYS 2.1. TRANSPARENCY OF 2030 TARGETS

- a. Has the country set a 2030 emission reduction target?
 - i) What is the target reduction relative to absolute emissions in 2020?
- b. Is the 2030 target enshrined in a national framework climate law?
- c. Does the target cover CO₂ and methane, and all high-emitting sectors?
 - i) What percentage of national GHG emissions is covered?
- d. Does the country specify whether the target will rely on carbon offsetting?
 - i) What percentage of the target will be met using carbon offsets?

Consultation questions

Do you agree with the proposed indicators? If not, what changes would you suggest?

We then assess the ambition of a country's target by measuring its alignment with limiting global warming to 1.5°C, the more ambitious end of the Paris Agreement goals. Each target is compared with a country-specific 1.5°C-aligned benchmark pathway based on mitigation scenarios drawn from the IPCC.

We aim to use the national 1.5°C-aligned benchmarks developed by Climate Analytics in its 1.5°C National Pathway Explorer, an open-source online tool covering over 60 countries (Climate Analytics, 2022). Climate Analytics undertakes a rigorous process to make scenario data consistent with the most recent historical emissions data, a process known as harmonisation, and then breaks down regional 1.5°C pathways to the country level, a process known as downscaling. Climate Analytics' resulting country-specific 1.5°C-aligned pathway can then be used as a benchmark to evaluate whether a country's NDC is sufficiently ambitious to limit warming to 1.5°C.

Alternative sources for country benchmarks were also considered, including the Network for Greening the Financial System (NGFS) country scenarios, and further sources may be explored in future iterations of the framework.

Focusing on the principle of common but differentiated responsibilities, we also evaluate 2030 NDC targets against a fair share 1.5°C-aligned GHG emission allowance for 2030. The fair share allowance for each country is calculated by dividing a global 1.5°C-compatible carbon budget in 2030 into country-specific budgets. This subdivision is done by calculating a country's share of the global budget based on three equally weighted variables: population, PPP-adjusted GDP per capita, and historical emissions (see Appendix 2 for associated calculations). These three variables respectively represent equality, capability and responsibility, the primary factors to consider when developing a fair share approach to climate mitigation (Mattoo and Subramanian, 2012). This calculation would result, for example, in a relatively higher emissions budget in 2030 for countries with higher populations, lower GDP per capita, and/or lower historical emissions.

EMISSION PATHWAYS 2.2. ALIGNMENT WITH NATIONAL BENCHMARK

- a. Is the country's target aligned with its national 1.5°C-aligned GHG benchmark?
 - i) What is the degree of alignment (percentage above/below the benchmark)?

EMISSION PATHWAYS 2.3. ALIGNMENT WITH NATIONAL FAIR SHARE

- a. Is the country's target aligned with its fair share 1.5°C-aligned GHG allocation?
 - i) What is the degree of alignment (percentage above/below the allocation)?

Consultation questions

Do you agree with the proposed indicators? If not, what changes would you suggest?

Net zero targets

Limiting warming to 1.5°C requires “reaching net zero CO₂ emissions globally around 2050 and concurrent deep reductions in emissions of non-CO₂ forcers, particularly methane” (Rogelj et al., 2018). Long-term net zero targets have proliferated among national, sub-national, and corporate entities in recent years. We evaluate the rigour of net zero targets by adopting the same transparency indicators used to assess 2030 targets. Because the global net zero deadline of 2050 applies to CO₂ emissions specifically, we limit our evaluation of net zero targets to CO₂ emissions. However, given the need also to mitigate non-CO₂ emissions, other GHGs are included in our evaluation of emission trends and 2030 targets.

EMISSION PATHWAYS 3.1. TRANSPARENCY OF NET ZERO TARGETS

- a. Has the country set a net zero target?
 - i) In what year is the net zero target set?
- b. Is the net zero target enshrined in a national framework climate law?
- c. Does the target cover CO₂ and all high-emitting sectors?
 - i) What percentage of national CO₂ emissions are covered by the target?
- d. Does the country specify whether the target will rely on offsetting?
 - i) What percentage of the target will be met using offsets?

Consultation questions

Do you agree with the proposed indicators? If not, what changes would you suggest?

As explained in the preceding section, we assess 2030 targets against country-specific 1.5°C benchmarks. Unfortunately, evaluating the alignment of long-term net zero targets using the same approach was deemed to be methodologically infeasible at this time.² In the absence of further modelling data, we set aside the challenge of establishing country-specific net zero deadlines. Instead, we adopt a simplified approach of assessing countries against a single global net zero deadline of 2050. Acknowledging that some middle- and low-income countries may only achieve net zero in the years after 2050, in order to create

² The 1.5°C scenarios modelled in the IPCC database set widely varying regional net zero deadlines. In some models, net zero deadlines for regions like Latin America are as early as 2040. This is because the IPCC models assume harmonised global carbon prices accompanied by large international transfers to finance emission removals through nature-based solutions. Given this significant assumption about international financial transfers leading to negative emissions in some locations (usually those with large potential forest cover), these models may not be appropriate in evaluating national net zero targets, which address territorial emissions.

space in the global carbon budget, we also evaluate high-income countries against an accelerated net zero deadline of 2045.

EMISSION PATHWAYS 3.2. ALIGNMENT WITH GLOBAL NET ZERO
a. Is the country’s net zero CO ₂ target set for 2050 or earlier? i) If not, by how many years is the target lagging?
EMISSION PATHWAYS 3.3. ALIGNMENT WITH ACCELERATED NET ZERO
a. Is the country’s net zero CO ₂ target set for 2045 or earlier? i) If not, by how many years is the target lagging?
Consultation questions Do you agree with the proposed indicators? If not, what changes would you suggest?

Pillar 2: Climate policies

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EP 1: Emission trends	CP 1: Mitigation	OFT 1: Financing mitigation
EP 2: 2030 targets	CP 2: Adaptation	OFT 2: Financing adaptation
EP 3: Net zero targets	CP 3: Just transition	OFT 3: Financing transition opportunities

Building on the analysis of sovereign emission pathways above, we evaluate key national climate policy instruments. Policy indicators relating to mitigation provide more detail, enabling investors to better understand whether a particular country’s emission reduction target is credible and underpinned by meaningful implementation measures. Policy indicators relating to adaptation and the just transition expand the analysis of the framework to account for physical climate risks as well as social issues relating to the low-carbon transition.

Mitigation policy

As a first step in climate governance, sovereigns’ disclosure of emission data and relevant planning documents represents the foundation of understanding and managing their climate risks. We include these indicators to encourage greater transparency in climate data and planning. Within the disclosure theme, we also consider the reporting requirements that countries put in place to drive climate-related disclosures in the private sector.

CLIMATE POLICIES 1.1. DISCLOSURE OF DATA AND DOCUMENTS

- a. Has the country submitted national emissions data to the UNFCCC?
- b. Has the country submitted a second NDC that is more ambitious than its first?
- c. Has the country published a Long-Term Climate Strategy?
- d. Has the country estimated and published its consumption-based emissions?
- e. Does the country require corporate climate-related disclosures (e.g. TCFD)?

Consultation questions:

Do you agree with the proposed indicators? If not, what changes would you suggest?

We include indicators on framework climate laws to assess whether the government has created a long-term, overarching national regulatory instrument that sets out the institutional framework for climate policy and implementation (World Bank, 2020). We also assess whether climate laws specify key accountability elements, which contribute to ensuring the implementation of core obligations defined in a climate law (Higham et al., 2021).

We consider a climate framework law as having key accountability elements in place if it meets the following three criteria. Firstly, the law must specify who is accountable to whom in its fulfilment. For example, in some climate laws, private companies can be held accountable to the executive branch of the national government, which is responsible for the enforcement and implementation of laws developed in the legislative branch of government. In other climate laws, the executive branch itself is held accountable to parliament, citizens or the judiciary. Secondly, the law must specify how compliance is assessed, for example through transparency or reporting frameworks. And thirdly, the law must specify what happens in the case of non-compliance. For example, fines may be imposed by regulators in the case where corporates are held accountable for implementing the climate law.

A variety of complex arrangements are possible, and they may differ by political system. In the interest of avoiding an overly prescriptive approach, these indicators were designed to assess *whether* accountability elements are specified but do not require specified accountability arrangements. This may be revised in future iterations of the framework if the state of play on climate laws evolves, and if clearer accountability guidance emerges.

CLIMATE POLICIES 1.2. FRAMEWORK LEGISLATION

- a. Does the country have a framework climate law or equivalent?
- b. Does the framework climate law specify key accountability elements?

Consultation questions

Do you agree with the proposed indicators? If not, what changes would you suggest?

We also consider carbon pricing, which incentivises economy-wide emission reductions either through carbon taxes or cap-and-trade systems. In assessing this topic, we consider both national and supra-national carbon pricing systems, like the European Union's Emissions Trading System. Effective carbon pricing systems must have an appropriate price level and coverage of high-emitting activities. We estimate a threshold for 2022 of US\$67

per tonne of CO₂ by interpolating between the carbon price corridor floors of the High-Level Commission on Carbon Prices for 2017 and the IPCC for 2030 (see Rogelj et al., 2018 on the latter). Note that we use *international* US dollars as the threshold, so that countries' carbon price levels are adjusted based on purchasing power parity to more fairly and accurately reflect the local price signal of the carbon pricing mechanism.

On the topic of economy-wide taxation policies, tax credits and direct government spending on low-carbon infrastructure, as exemplified in the United States' Inflation Reduction Act (The White House, 2022), would be a potential area in which to develop additional indicators. This could be done through an examination of how governments identify, measure and monitor climate-relevant public expenditure, also known as climate change budget tagging (World Bank, 2021). A relevant methodology is not yet readily available, but we will consider incorporating indicators for this topic in future iterations of the framework.

CLIMATE POLICIES 1.3. CARBON PRICING
a. Does the country have one or more carbon pricing systems?
b. Do the carbon pricing mechanisms together cover at least 50% of national GHG emissions? i) What percentage of national GHG emissions is covered?
c. Is the price of the carbon pricing mechanism with the highest GHG coverage at least US\$67/tCO ₂ ? i) What has been the average annual carbon price of this mechanism in the last year?
Consultation questions Do you agree with the proposed indicators? If not, what changes would you suggest?

Beyond these economy-wide indicators, we consider selected policies and commitments that target high-priority emission sources. These were selected by considering their respective contributions to global GHG emissions as well as the potential to create relevant objectively assessable indicators. In addition to the income-based exemptions described in Part I of this report (and outlined in detail in Appendix 1), certain countries are exempt from indicators that are not relevant to them. For example, countries without operating coal mines are not evaluated against the coal mine moratorium indicator.

There are various additional policy spheres that can contribute to mitigation: for example, agriculture, public transport, waste and central banking. Indicators for these were not included in the current framework either due to the intention to prioritise a smaller number of topics or due to a lack of clear, precise metrics that can be applied universally. However, these topics may be considered in upcoming iterations of the framework, depending on the feedback received during this consultation phase.

Energy security, another crucial topic, is addressed in part by the quantitative metric on the percentage of the country's electricity that is generated from fossil fuels. This metric firstly suggests how far a country is from its net zero power sector target. In addition, because this metric considers the entire range of low-carbon electricity generation technologies, rather than just variable renewable sources, it favours electricity capacity

diversity, which is one facet of energy security. Additional indicators on energy security for future iterations of the framework might include grid infrastructure stability, electricity storage capacity and certain power sector regulations.

CLIMATE POLICIES 1.4. SELECTED EMISSION SOURCES	
a. FOSSIL FUELS: Has the country committed to phase out fossil fuel subsidies?	i) How much is spent on direct fossil fuel subsidies as a percentage of GDP?
b. COAL: Has the country committed not to approve new thermal coal mines?	
c. ELECTRICITY: Has the country set a net zero target for the electricity sector?	
d. ELECTRICITY: Is the net zero electricity target set for 2035 (high-income countries)/ 2040 (middle-income countries)?	i) What percentage of the country’s electricity is from fossil fuels?
e. TRANSPORT: Has the country set a combustion-engine vehicle phase-out by 2035?	i) What percentage of vehicle sales are currently low-carbon vehicles?
f. BUILDINGS: Has the country set a national mandatory building energy code?	
g. LAND USE: Has the percentage of forested land increased in the past 5 years?	i) What is the change in percentage of forested land in the past 5 years?
<p>Consultation questions Do you agree with the proposed indicators? If not, what changes would you suggest?</p>	

Adaptation policy

Adaptation and disaster risk reduction policies demonstrate the preparedness of countries to deal with the physical impacts of climate change like heat waves and hurricanes. For investors, this has implications for the long-term risk profiles of sovereign issuers. National Adaptation Plans (NAPs) are the primary unit of analysis for adaptation policy (Leiter, 2021). Specific characteristics related to adaptation planning are considered, including whether countries regularly engage in assessments to identify climate risks and take stock of their adaptation actions. Despite the large number of countries with a NAP or equivalent strategy, very few countries undertake regular risk assessments to identify key priority needs for adaptation or publish Monitoring & Evaluation reports to assess the progress or effectiveness of their adaptation actions.

CLIMATE POLICIES 2.1. ADAPTATION PLANNING	
a. Has the country published a National Adaptation Plan (NAP) or equivalent?	
b. Does the country publish national climate risk assessments at least every 5–6 years?	
c. Does the country have a framework climate law that includes specific provisions on adaptation or a dedicated national adaptation law?	
d. Has the country published a Monitoring & Evaluation report on the progress of its NAP implementation?	
<p>Consultation questions Do you agree with the proposed indicators? If not, what changes would you suggest?</p>	

We also consider disaster risk reduction policies, as these indicate how well a country can reduce the economic and social impact of acute climate hazards. These indicators draw on the Sendai Framework, the internationally agreed approach to disaster risk reduction developed and monitored by the United Nations ([UN Office for Disaster Risk Reduction \[UNDRR\], n.d.](#)). One aspect considered is whether a country has a multi-hazard early warning system. Countries with limited early warning coverage have a disaster mortality rate eight times higher than countries with substantial to comprehensive coverage ([UNDRR and World Meteorological Organization, 2022](#)).

We include an indicator that identifies member countries of catastrophe risk pools, which include the Caribbean Catastrophe Risk Insurance Facility ([CCRIF-SPC](#)), the Pacific Catastrophe Risk Insurance Company ([PCRIC](#)), the African Risk Capacity ([ARC](#)), and the Southeast Asia Disaster Risk Insurance Facility ([SEADRIF](#)). These risk pools provide their member countries with insurance solutions against disasters and climate shocks and manage joint reserve funds that retain first losses. In future iterations of the ASCOR framework, we may tighten this indicator to require members of risk pools to purchase insurance packages rather than only sign on as a member state. However, appropriate disclosure of insurance arrangements may not be available. Note that high-income countries are exempt from this indicator because applicable risk pools generally do not yet exist.

CLIMATE POLICIES 2.2. DISASTER RISK REDUCTION (DRR)	
a.	Does the country adopt and implement DRR strategies (UNDRR E1 score >0.5)?
i)	What has been the country’s highest UNDRR E1 score over the past 5 years?
b.	Does the country have a multi-hazard early warning system?
c.	Is the country part of a sovereign catastrophe risk pool?
Consultation questions	
Do you agree with the proposed indicators? If not, what changes would you suggest?	

Just transition policy

Ensuring a just transition means reducing the social costs and distributional impacts of a country’s low-carbon transition while harnessing its welfare and employment opportunities. This theme is a unique feature of the ASCOR framework that currently few if any other sovereign climate assessment tools consider. A just transition is essential to ensure the social acceptance of climate policies and prevent delays in the low-carbon transition. For example, carbon prices imposed by governments will more easily gain political legitimacy if the revenues are perceived to be well spent and if regressive impacts of carbon pricing systems are addressed. The International Labour Organization (ILO) guidelines for a just transition lay out the relevant policy priorities ([ILO, 2015](#)). Key among these is social dialogue, whereby trade unions and worker organisations are part of the just transition planning process. The first legislative steps towards ensuring a just transition can involve creating a commission or equivalent body whose role is to provide expert advice and monitor the effects of existing laws and policies to ensure they contribute to the delivery of a just transition ([Heffron, 2021](#)).

CLIMATE POLICIES 3.1. JUST TRANSITION LENS ON CLIMATE POLICY

a. Does the country have a just transition strategy that involves social dialogue with workers and engagement with affected communities?

b. Does the country have a national Just Transition Commission or equivalent?

c. Does the country assess and, if necessary, plan to address the regressive effects of carbon pricing or fossil fuel subsidy reform?

Consultation questions

Do you agree with the proposed indicators? If not, what changes would you suggest?

As well as national just transition policies to reduce the domestic social impacts of the transition, we include indicators that evaluate countries on their financial contributions to support a just transition internationally. There is a strong fairness argument for climate finance, particularly for adaptation, given that countries affected most by climate change have contributed the least to it. In addition, there is a robust efficiency argument for mitigation finance, because it supports emission reductions in countries with lower-cost abatement options. These indicators are applied only to Annex II countries of the UNFCCC, because in 2009 these countries together committed to provide at least US\$100 billion in annual climate finance to developing countries by 2020 (UNFCCC, n.d. c). The coverage of this indicator could be expanded to include other high-income countries that can reasonably be expected to contribute to international climate finance too, but a specific threshold for the sufficiency of such contributions would have to be developed separately from the US\$100 billion commitment applied to Annex II countries.

We follow the approach developed by the World Resources Institute in measuring the sufficiency of Annex II countries' contributions to international climate finance (Bos and Thwaites, 2021). For the US\$100 billion goal to be reached, we estimate that each Annex II country would need to contribute 0.22% of their own GDP. This percentage is therefore used as the indicator's threshold. We consider the average of 2016, 2017 and 2018 contributions as these are the most recent data available. In general, climate finance for adaptation is lagging behind finance for mitigation, so we include a quantitative metric on the percentage of total climate finance dedicated to adaptation.

CLIMATE POLICIES 3.2. INTERNATIONAL CLIMATE FINANCE

a. Does the country contribute 0.22% of its GDP to international climate finance?

i) What is the country's 3-year average climate finance contribution?

ii) What percentage of the country's climate finance contribution is dedicated to adaptation?

Consultation questions

Do you agree with the proposed indicators? If not, what changes would you suggest?

Pillar 3: Opportunities to finance the transition

Performance of countries on managing climate change		Financing countries' climate risks and opportunities
Pillar 1: Emission pathways (EP)	Pillar 2: Climate policies (CP)	Pillar 3: Opportunities to finance the transition (OFT)
EP 1: Emission trends	CP 1: Mitigation	OFT 1: Financing mitigation
EP 2: 2030 targets	CP 2: Adaptation	OFT 2: Financing adaptation
EP 3: Net zero targets	CP 3: Just transition	OFT 3: Financing transition opportunities

The final pillar of the ASCOR framework provides information on the opportunities for investors to finance the transition towards a low-carbon and resilient future by assisting countries to mitigate emissions, adapt to climate change, and harness transition-relevant opportunities. This pillar aims to support investors in unlocking climate-aligned financial flows to all countries, but especially to emerging markets. The indicators and metrics in this pillar outline sovereign-level characteristics of climate risks and opportunities rather than defining proposals for project-specific use of proceeds.

We define 'opportunities to finance the transition' as the financing required for a country to:

- Mitigate emissions and progress away from fossil fuels to reduce transition risk;
- Improve adaptive capacity to reduce physical risk; and
- Harness potential low-carbon transition opportunities.

To contextualise these three sources of financing opportunities, the ASCOR tool will display each country's own funding capability, proxied by national income per capita.

Financing mitigation

Countries will require financing to mitigate climate change, to achieve their emission reduction targets, and to reduce their exposure to transition risk. Transition risk can be defined as the risk of negative economic and social impacts that result from a global low-carbon transition. Transition risk affects countries that are most intertwined with emission-intensive activities like fossil fuel production and consumption. Middle- and low-income countries will be least able to internally finance the domestic solutions to address transition risk. Integrating these considerations brings into the ASCOR framework the concept of 'phase-down finance' (Tyler et al., 2021), which is aimed at enabling just transitions away from fossil fuel dependence and is exemplified in the Just Energy Transition Partnerships to support South Africa and more recently Indonesia (European Commission, 2021).

At the country level, financing to mitigate emissions and address transition risk can be compared in two main ways. First, this can be done using countries' own reported costing of their targeted mitigation efforts. Several countries, largely middle- and low-income countries, have set both conditional and unconditional NDCs. Of the two, conditional NDCs are the more ambitious emission targets, which depend on access to enhanced financial resources, technology transfer and capacity-building support from wealthier countries (COP26 Secretariat, 2021). Many countries with conditional NDCs provide estimates of the financing they would need to receive in order to achieve them. This is a disclosure-based way to compare the level of financing required by a country but would

only include estimates for countries that have conditional NDCs. The ASCOR tool would present this cost estimate in absolute terms and normalised as a percentage of the country's GDP.

Second, financing for mitigation could be analysed using an overarching metric of transition risk that considers the emission intensity of an economy and the reliance of government revenue on fossil fuel exports. With this aim, a methodology using principal component analysis was developed by the World Bank to measure the exposure of countries to the low-carbon transition (Peszko et al., 2020). This methodology was adopted by the International Monetary Fund (IMF) to create a public index on which countries are regularly assessed (IMF, 2020). It is a robust methodology that can be used to compare the estimated financing that a country would require based on how much transition risk it faces.

OPPORTUNITIES TO FINANCE 1. FINANCING MITIGATION
a. What is the funding required to meet the country's conditional NDC?
b. What is the country's exposure to the low-carbon transition as measured by the IMF?
Consultation questions Do you agree with the proposed indicators? If not, what changes would you suggest?

Financing adaptation

Countries will also require financing to adapt to climate change and reduce their level of physical risk. Physical risk can be defined as the acute and chronic climate impacts on human societies and ecosystems that result from increased global temperatures. Physical risk is strongly correlated with income per capita, due to a variety of geographical and climatic factors. Adding to this, middle- and low-income countries will be least able to internally finance the solutions that reduce physical risk.

As with mitigation, countries' levels of financing required for adaptation can be compared in two main ways. First, this can be done using countries' own reported costing of adaptation. Given the complexity of adaptation, few countries have reported overarching cost estimates to accompany their National Adaptation Plans or equivalent documents. However, in principle, this could be a useful, disclosure-based way to compare countries' levels of financing required for adaptation. The ASCOR tool would present this cost estimate in both absolute terms and as a percentage of the country's GDP.

Second, a country's financing required for adaptation could be analysed using an overarching metric of physical risk based on probabilistic projections of future climate change impacts. Rather than considering the probabilities of specific types of extreme events, like droughts or hurricanes, a general metric of physical risk would consider overall damages from future climate hazards. Several academic papers have estimated, over specified time scales and warming scenarios, the average annual projected percentage of GDP lost due to climate hazards for each country (Kompas et al., 2018; Burke et al., 2015). Countries' physical risk levels can also be compared using the World Risk Index, which evaluates countries' disaster risk considering exposure to climate impacts (i.e. the share of the population in at-risk areas) as well as vulnerability to these impacts (i.e. the socioeconomic susceptibility and lack of coping and adaptive capacities) (Atwii et al., 2022).

OPPORTUNITIES TO FINANCE 2. FINANCING ADAPTATION

- a. What is the funding required to implement adaptation plans?
- b. What is the impact of climate change on the country as measured by economic estimates of future GDP loss due to climate change?
- c. What is the country's World Risk Index score?

Consultation questions

Do you agree with the proposed indicators? If not, what changes would you suggest?

Financing transition opportunities

Countries will require financing to harness domestic transition opportunities. We define these opportunities to be resources with strategic importance in a global low-carbon economy. We propose measuring countries' transition opportunities by considering their potential to engage in transition-relevant activities, including renewable energy development, mining for energy transition minerals, and nature-based solutions.

Renewable energy: The potential for electricity from wind and solar resources can be compared using the World Bank's [Wind](#) and [Solar Atlases](#). A focus on solar and wind in particular is justified by the importance of these energy sources: wind and solar power represent the two largest energy sources for electricity generation in 2050, at 24% and 23% respectively, in the International Energy Agency (IEA) Net Zero by 2050 scenario ([IEA, 2021a](#)). However, as the share of wind and solar will differ widely at the country level, and because of the need for a diversity of electricity sources to ensure energy security, we consider further types of renewable energy. Estimates of country-level potential for hydropower, specifically exploitable potential, which excludes protected areas, can be drawn from Zhou et al. ([2015](#)). Geothermal suitability has been assessed at the global level ([Coro and Trumpy, 2020](#)), but country-level estimates would require further analysis to extract. Depending on data availability, additional indicators on the potential for other low-carbon energy sources may be included in future iterations of the framework. Harnessing variable renewable energy sources like wind and solar presents particular challenges for countries relating to energy security and grid stability. As these topics relate to government policy decisions, they may be addressed within Pillar 2 on climate policies in future iterations of the ASCOR framework.

Energy Transition Mineral (ETM) mining: Given the expected growth in demand for certain minerals needed for low-carbon technologies, transition opportunities include the potential to mine these ETMs. This transition opportunity can be compared across countries using mineral reserve data ([United States Geological Survey, 2022](#)) and the metric of 'copper equivalent', an industry standard for aggregating data on different mineral commodities ([TPI, 2022](#)). An initial selection of 11 minerals based on research from the IEA ([2021b](#)) and available reserve data includes copper, cobalt, nickel, lithium, graphite, rare earth elements, zinc, manganese, chromium, molybdenum and platinum. Countries with these mineral deposits have a potential transition opportunity. Those countries *without* such reserves may face supply chain risks if they become significant importers of these minerals for domestic manufacturing, due to expected commodity price volatility ([IEA, 2021b](#)). There is currently no clear way of measuring this risk at the country level; this is a potential area for further research in future iterations of the framework.

Nature-based solutions: Finally, nature-based solutions are considered as a type of transition opportunity, given both the need for enhanced carbon sequestration in natural ecosystems to hold the rise in global temperatures below 1.5°C, and the potential for ecosystem restoration in building climate resilience. The potential for nature-based solutions could be compared across countries using data on forest restoration opportunities ([World Resources Institute, 2014](#)) or by considering countries’ Bonn Pledges, which are specified reforestation commitments ([Bonn Challenge, n.d.](#)). Additional forms of climate-related opportunities, such as the potential for geological carbon storage, may be explored in future iterations of the framework, provided that relevant data is publicly available.

Each of the transition opportunities described above must be harnessed in ways that prevent negative social, environmental and economic impacts at the local level. Violations of human rights and Indigenous rights have been documented extensively in projects relating to renewables ([Business and Human Rights Resource Centre \[BHRRRC\], 2021a](#)), mining ([BHRRRC, 2021b](#)), and forestry ([Forest Peoples Programme, 2021](#)), with critical implications for the sustainability and social licence of the low-carbon transition. To address this concern, contextual metrics are drawn from Owen et al. ([2022](#)), who researched and selected indices to assess how responsibly a given country may undertake resource permitting and regulate processes of consultation and consent. These indices are the [Resource Governance Index](#) (from the Natural Resource Governance Institute), [Regulatory Quality](#) (World Bank), the [Education Index](#) (United Nations Development Programme), the [World Press Freedom Index](#) (Reporters Without Borders), [Freedom in the World](#) (Freedom House), and the [Corruption Perceptions Index](#) (Transparency International).

OPPORTUNITY TO FINANCE 3. FINANCING TO HARNESS OPPORTUNITIES
a. SOLAR: What is the potential of the country’s solar resources as measured by the specific photovoltaic power output of the 10% sunniest areas in the country?*
b. WIND: What is the potential of the country’s wind resources as measured by the wind mean power density of the 10% windiest areas in the country?*
c. HYDRO: What is the country’s exploitable hydropower potential, excluding potential projects in current protected areas?
d. GEOTHERMAL: What is the potential of the country’s geothermal resources? [No assessment methodology yet identified]
e. MINERALS: What is the potential of the country’s mineral resources as measured by the ‘copper equivalent’ tonnage of its reserves of 11 key energy transition minerals (ETMs)?
f. NATURE: What is the country’s potential for nature-based solutions as measured by the area of potential forested land?
Consultation questions Do you agree with the proposed indicators? If not, what changes would you suggest?

* A threshold of 10% is used for solar and wind potential estimates in the interest of showing which countries have very high potential sites for solar and wind generation. Taking the potential of a country’s entire territorial area (or even 50%) is unrealistic in terms of land use but also could fail to distinguish which countries have specific sites with especially high potential for solar or wind generation. A different threshold, of 15% or 5%, could be taken instead, but this would likely yield similar relative comparisons between countries.

Taking the ASCOR tool forward

The ASCOR tool aims to provide a transparent framework with which to assess and compare countries' emissions, targets, policies and transition financing opportunities. Enhanced transparency and a common understanding of climate-related sovereign risks and opportunities will benefit both investors and issuers. By providing a rigorous independent assessment, the ASCOR Project will help encourage financial flows to countries with robust climate planning in place, thereby contributing to aligning the global financial sector and the real economy with a 1.5°C future.

We would welcome feedback by **31 March 2023** via this [survey](#) from governments, development finance institutions, investors, civil society, academia and the wider public to help develop the ASCOR framework further and ensure it is rigorous and fit for purpose.

For updates on the ASCOR Project, visit www.ascorproject.org.

Appendix 1: ASCOR framework indicators

Pillar 1: Emission pathways (EP)			
Theme	Sub-themes, indicators and metrics	Answer type	Countries assessed ³
1. Emission trends	EP 1.1. ABSOLUTE EMISSIONS		
	a. Have the country's absolute GHG emissions decreased over the past 5 years?	Y/N	All
	i) What is the average annual percentage change over the past 5 years?	%	
	ii) What is the annual percentage change over the past year?	%	
	b. Is the average annual percentage change over the past 5 years aligned with the reductions needed to meet the country's 2030 target?	Y/N	All
	EP 1.2. EMISSION INTENSITIES		
	a. Has the country's PPP-adjusted GDP emission intensity decreased over the past 5 years?	Y/N	All
	i) What is the average annual percentage change over the past 5 years?	%	
2. 2030 targets	b. Has the country's per capita emission intensity decreased over the past 5 years?	Y/N	All
	i) What is the average annual percentage change over the past 5 years?	%	
	EP 2.1. TRANSPARENCY OF 2030 TARGETS		
	a. Has the country set a 2030 emission reduction target?	Y/N	All
	i) What is the target reduction relative to absolute 2020 emissions?	%	
	b. Is the 2030 target enshrined in a national framework climate law?	Y/N	All
	c. Does the target cover CO ₂ and methane, and all high-emitting sectors?	Y/N	All
	i) What percentage of national GHG emissions is covered by the target?	%	
2. 2030 targets	d. Does the country specify whether the target will rely on offsetting?	Y/N	All
	i) What percentage of the target will be met using offsets?	%	
	EP 2.2. ALIGNMENT WITH NATIONAL BENCHMARK		
a. Is the country's target aligned with its national 1.5°C-aligned GHG benchmark?	Y/N	All	

³ We group countries primarily based on the [World Bank country and lending groups](#) as follows: i) high-income (HI) countries: World Bank group 'high income'; ii) middle-income (MI) countries: World Bank group 'upper-middle income'; iii) low-income (LI) countries: World Bank groups 'lower-middle income' and 'low income'.

	i) What is the degree of alignment (% above/below the benchmark)?	%	
	EP 2.3. ALIGNMENT WITH NATIONAL FAIR SHARE		
	a. Is the country's target aligned with its fair share 1.5°C-aligned GHG allocation?	Y/N	All
	i) What is the degree of alignment (% above/below the allocation)?	%	
3. Net zero targets	EP 3.1. NET ZERO TARGET TRANSPARENCY		
	a. Has the country set a net zero target?	Y/N	All
	i) In what year is the net zero target set?	Year	
	b. Is the net zero target enshrined in a national framework climate law?	Y/N	All
	c. Does the target cover CO ₂ and all high-emitting sectors?	Y/N	All
	i) What percentage of national emissions is covered by the target?	%	
	d. Does the country specify whether the target will rely on offsetting?	Y/N	All
	i) What percentage of the target will be met using offsets?	%	
	EP 3.2. ALIGNMENT WITH GLOBAL NET ZERO		
	a. Is the country's net zero CO ₂ target set for 2050 or earlier?	Y/N	HI
	i) If not, by how many years is the target lagging?	No. of years	
	EP 3.3. ALIGNMENT WITH ACCELERATED NET ZERO		
a. Is the country's net zero CO ₂ target set for 2045 or earlier?	Y/N	HI	
i) If not, by how many years is the target lagging?	No. of years		

Pillar 2: Climate policies (CP)

Theme	Sub-themes, indicators and metrics	Answer type	Countries assessed	
1. Mitigation	CONTEXTUAL METRIC: Emissions per capita	tCO ₂ e/cap	All	
	CONTEXTUAL METRIC: Energy intensity of the economy	MJ/GDP	All	
	CP 1.1. DISCLOSURE OF DATA AND DOCUMENTS			
	a. Has the country submitted national emissions data to the UNFCCC?	Y/N	All	
	b. Has the country submitted a second NDC that is more ambitious than its first?	Y/N	All	
	c. Has the country published a Long-Term Climate Strategy?	Y/N	All	
	d. Has the country estimated and published its consumption-based emissions?	Y/N	HI	
	e. Does the country require corporate climate-related disclosures (e.g. TCFD)?	Y/N	HI	
	CP 1.2. FRAMEWORK LEGISLATION			
	a. Does the country have a framework climate law or equivalent?	Y/N	All	
	b. Does the framework climate law specify key accountability elements?	Y/N	All	
	CP 1.3. CARBON PRICING			
	a. Does the country have one or more carbon pricing systems?	Y/N	HI, MI	
	b. Do the carbon pricing mechanisms together cover at least 50% of national GHG emissions? i) What percentage of national GHG emissions is covered?	Y/N %	HI, MI HI, MI	
	c. Is the price of the carbon pricing mechanism with the highest GHG coverage at least 67 International (I) US\$/tCO ₂ ? i) What has been the average annual carbon price of this mechanism in the last year?	Y/N I US\$/tCO ₂	HI HI	

	CP 1.4. SELECTED EMISSION SOURCES		
	a. FOSSIL FUELS: Has the country committed to phase out fossil fuel subsidies? i) How much is spent on direct fossil fuel subsidies as a percentage of GDP?	Y/N %	HI, MI HI, MI
	b. COAL: Has the country committed not to approve new thermal coal mines?	Y/N	HI, MI
	c. ELECTRICITY: Has the country set a net zero target for the electricity sector?	Y/N	HI, MI
	d. ELECTRICITY: Is the net zero electricity target set for 2035 (HI)/2040 (MI)? i) What percentage of the country's electricity is from fossil fuels?	Y/N %	HI, MI HI, MI
	e. TRANSPORT: Has the country set a combustion-engine vehicle phase-out by 2035? i) What percentage of vehicle sales are currently low-carbon vehicles?	Y/N %	HI HI
	f. BUILDINGS: Has the country set a national mandatory building energy code?	Y/N	HI
	g. LAND USE: Has the percentage of forested land increased in the past 5 years? i) What is the change in percentage of forested land in the past 5 years?	Y/N %	HI, MI HI, MI
		CONTEXTUAL METRIC: ND GAIN Adaptive Capacity, Sensitivity and Readiness scores	0 to 1
2. Adaptation	CP 2.1. ADAPTATION PLANNING		
	a. Has the country published a National Adaptation Plan (NAP) or equivalent?	Y/N	All
	b. Does the country publish national climate risk assessments at least every 5 years?	Y/N	All
	c. Does the country have a framework climate law that includes specific provisions on adaptation or a dedicated national adaptation law?	Y/N	All
	d. Has the country published a Monitoring & Evaluation report on the progress of its NAP implementation?	Y/N	All
	CP 2.2. DISASTER RISK REDUCTION (DRR)		
a. Does the country adopt and implement DRR strategies (UNDRR E1 score >0.5)?	Y/N	All	

	i) What has been the country's highest UNDRR E1 score over the past 5 years?	0 to 1	All
	b. Does the country have a multi-hazard early warning system?	Y/N	All
	c. Is the country part of a sovereign catastrophe risk pool?	Y/N	MI, LI
3. Just transition	CONTEXTUAL METRIC: World Bank Voice and Accountability score	-2.5 to 2.5	HI, MI, LI
	CP 3.1. JUST TRANSITION LENS ON CLIMATE POLICY		
	a. Does the country have a just transition strategy that involves social dialogue with workers and engagement with affected communities?	Y/N	All
	b. Does the country have a national Just Transition Commission or equivalent?	Y/N	All
	c. Does the country assess and, if necessary, plan to address the regressive effects of carbon pricing/subsidy reform?	Y/N or n/a	HI, MI
	CP 3.2. INTERNATIONAL CLIMATE FINANCE		
	a. Does the country contribute 0.22% of its GDP to international climate finance? i) What is the country's 3-year average climate finance contributions? ii) What percentage of climate finance contributions are dedicated to adaptation?	Y/N % GDP %	UNFCCC Annex II Parties

Pillar 3: Opportunities to finance the transition (OFT)

Theme and metrics	Units	Countries assessed
OFT 1. Financing mitigation		
CONTEXTUAL METRIC: Funding capability	GDP/capita	All
a. What is the funding required to meet the country's conditional NDC?	Billion US\$	All countries with a conditional NDC
b. What is the country's exposure to the low-carbon transition as measured by the IMF?	0 to 1	All
OFT 2. Financing adaptation		
CONTEXTUAL METRIC: Funding capability	GDP/capita	All
a. What is the funding required to implement adaptation plans?	Billion US\$	All
b. What is the impact of climate change on the country as measured by economic estimates of future GDP loss due to climate change?	% GDP	All
c. What is the country's World Risk Index score?	0 to 100	All

OFT 3. Financing transition opportunities

CONTEXTUAL METRICS: Funding capability Resource Governance, Corruption Perceptions, Regulatory Quality, Education Index, World Press Freedom, Civil Liberties	GDP/capita Six indices	All All
a. SOLAR: What is the potential of the country's solar resources as measured by the specific photovoltaic power output of the 10% sunniest areas in the country?	KWh/kWp	All
b. WIND: What is the potential of the country's wind resources as measured by the wind mean power density of the 10% windiest areas in the country?	W/m ²	All
c. HYDRO: What is the country's exploitable hydropower potential, excluding potential projects in current protected areas?	tWh	All
d. GEOTHERMAL: What is the potential of the country's geothermal resources? [No assessment methodology yet identified]	N/A	All
e. MINERALS: What is the potential of the country's mineral resources as measured by the 'copper equivalent' tonnage of its reserves of 11 key energy transition minerals?	Tonnes of copper equivalent	All
f. NATURE: What is the country's potential for nature-based solutions as measured by the area of potential forested land?	Hectares	All

Appendix 2: Selected indicator calculations

Calculation associated with indicator EP 1.1.b:

Is the average annual % change over the past 5 years aligned with the reductions needed to meet the country's 2030 target?

$$i) \sigma_{i,t,interpolated} = \frac{1}{2030 - t} \left(\frac{Emissions_{i,2030} - Emissions_{i,t}}{|Emissions_{i,t}|} \right) * 100$$

where $Emissions$ are the absolute greenhouse gas emissions of a country i in year t .

$$ii) Alignment_{i,t} = \begin{cases} Yes, if \phi_{i,t,5} \leq \sigma_{i,t,interpolated} \\ No, if \phi_{i,t,5} > \sigma_{i,t,interpolated} \end{cases}$$

where $\phi_{i,t,5}$ is the average annual % change in the country's emissions over the last 5 years (note that this number is negative if absolute emissions are decreasing).

This indicator aims to suggest the degree of reliability of a country's 2030 NDC target by testing whether its historical emission reduction trends are lower, equal or greater than the average annual rate required to meet its NDC in 2030.

Calculation associated with indicator EP 2.3.a:

Is the country's 2030 target aligned with its fair share greenhouse gas allocation?

$$\begin{aligned} \phi_{i,t} &= \frac{1}{3} * \phi_{i,t}^{Responsibility} + \frac{1}{3} * \phi_{i,t}^{Capability} + \frac{1}{3} * \phi_{i,t}^{Population} \\ &= \frac{1}{3} * \frac{\frac{1}{e_{i,t2}}}{\sum_i^n \frac{1}{e_{i,t2}}} + \frac{1}{3} * \frac{\frac{1}{y_{i,t}}}{\sum_i^n \frac{1}{y_{i,t}}} + \frac{1}{3} * \frac{pop_{i,t}}{\sum_i^n pop_{i,t}} \end{aligned}$$

where e is historical emissions per capita (over the years 1970–2020), y is GDP per capita, and pop is population in year t of country i .

The result ϕ gives the weight (i.e. percentage share) of the global 1.5°C-aligned emissions budget that should be allocated to each country. As such, a country's fair share 1.5°C emissions allowance in 2030 is calculated by multiplying the *global* 1.5°C-aligned emissions budget by that country's estimated ϕ . As illustrated in the formula above, the emissions allowance will be higher for countries with lower historical emissions, lower GDP per capita, and/or a higher population. This approach is based on Mattoo and Subramanian (2012). Due to the demographic features of certain countries, this results in a very high emissions allowance for countries with large populations, notably China and India. As the aim of the fair share approach is to allocate emissions budgets in an equitable way, making allocations at least partly based on population is sound. However, further research and analysis on a larger set of countries' fair share allocations may lead to modifications in this initial approach.

Appendix 3: List of abbreviations

ARC: African Risk Capacity

ASCOR: Assessing Sovereign Climate-related Opportunities and Risks

CCRIF-SPC: Caribbean Catastrophe Risk Insurance Facility Segregated Portfolio Company

CP: Climate policies (second pillar of the ASCOR framework)

DRR: Disaster risk reduction

EP: Emission pathways (first pillar of the ASCOR framework)

ETM: Energy transition mineral

GHG: Greenhouse gas

IEA: International Energy Agency

ILO: International Labour Organization

IMF: International Monetary Fund

IPCC: Intergovernmental Panel on Climate Change

LI/MI/Hi: Low-/middle-/high-income [country]

LULUCF: Land use, land use change and forestry

NAP: National Adaptation Plan

NDC: Nationally Determined Contribution

NGFS: Network for Greening the Financial System

OFT: Opportunities to finance the transition (third pillar of the ASCOR framework)

PCAF: Partnership for Carbon Accounting Financials

PCRIC: Pacific Catastrophe Risk Insurance Company

PPP: Purchasing power parity

SEADRIF: Southeast Asia Disaster Risk Insurance Facility

TCFD: Task Force on Climate-related Financial Disclosures

TPI: Transition Pathway Initiative

UNDRR: United Nations Office for Disaster Risk Reduction

UNFCCC: United Nations Framework Convention on Climate Change

WMO: World Meteorological Organization

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