

Task Force on Climate-related Financial Disclosures

Forward-Looking Financial
Sector Metrics

Consultation

TCFD

TASK FORCE ON
CLIMATE-RELATED
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DISCLOSURES

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A. Background and Purpose

In its 2019 status report, the Task Force on Climate-related Financial Disclosures (Task Force or TCFD) identified specific areas it intended to explore to support implementation of its disclosure recommendations, issued in June 2017.¹ One of the areas was related to clarifying elements of the Task Force’s supplemental guidance, which was issued at the same time as its final recommendations in 2017.² In reviewing financial institutions’ disclosure practices — especially as they relate to metrics and targets — and in consideration of market and industry developments, the Task Force determined that insights gained through a public consultation on current options would be useful in better understanding the evolution of metrics and targets reporting by asset owners, asset managers, banks, and insurance companies.

The Task Force’s supplemental guidance for the financial sector encouraged asset managers and asset owners to disclose to their clients or beneficiaries, respectively, the metrics they use to assess climate-related risks and opportunities as well as other metrics they believe are useful for decision-making.³ In addition, the Task Force recommended asset managers and asset owners disclose a specific carbon footprint metric — the weighted average carbon intensity.⁴ Importantly, when the Task Force issued its supplemental guidance in 2017, it was aware of limitations of carbon footprinting and intensity metrics and viewed them as a first step in the development of metrics for disclosure by financial sector companies.⁵

As anticipated, disclosure practices and the use of disclosures by financial market participants have continued to evolve since 2017. In the context of a growing frequency of physical climate-related impacts and the availability of new research, tools, and resources for assessing climate-related risks and opportunities, there is increasing interest in forward-looking climate-related information to inform financial decision-making.^{6, 7} Additionally, 120 countries plus the European Union have announced that they are working toward achieving net-zero greenhouse gas (GHG) emissions by 2050 — an indication of potential shifts in business models and capital flows that the financial sector seeks to understand.^{8, 9}

From October 29, 2020, to January 27, 2021, the Task Force will hold a [public consultation](#) on decision-useful, forward-looking metrics to be disclosed by financial institutions. Several considerations for such metrics are described in [Section C. Forward-Looking Financial Sector Metrics](#), as context for the consultation. In particular, a metric that has gained interest from the financial sector since the Task Force issued its supplemental guidance — referred to as “implied temperature rise associated with investments” (ITR) — is described at a high level in [Section D. Metric for Consideration: Implied Temperature Rise](#) for consideration in the consultation. The Task Force also seeks to understand alternative forward-looking metrics that could be disclosed by financial institutions in line with the TCFD recommendations.

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¹ TCFD, *2019 status report*, June 5, 2019.

² TCFD, *Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures*, June 29, 2017.

³ The supplemental guidance also notes that asset managers and asset owners should provide a description of the methodology used for the metrics disclosed.

⁴ The Task Force recommended this metric be disclosed, where data are available or can be reasonably estimated, for each fund, product, or investment strategy.

⁵ The 2017 TCFD [supplemental guidance](#) for asset owners and asset managers stated: “The Task Force views the reporting of weighted average carbon intensity as a first step and expects disclosure of this information to prompt important advancements in the development of decision-useful, climate-related metrics.” It also noted that “Such [weighted average carbon intensity] metrics should not necessarily be interpreted as risk metrics.”

⁶ Intergovernmental Panel on Climate Change, *Global Warming of 1.5°C: Summary for Policymakers*, World Meteorological Organization, October 2018.

⁷ Boyd, Emma Howard, “Climate Change: Is Your Equities Portfolio Too Hot to Touch?,” *Financial Times*, July 16, 2019.

⁸ COP25 Chile UN Climate Change Conference, *Climate Ambition Alliance: Nations Renew their Push to Upscale Action by 2020 and Achieve Net Zero CO₂ Emissions by 2050*, December 11, 2019.

⁹ NewClimate Institute, Germanwatch, and 2° Investing Initiative, *Developing Criteria to Align Investments with 2°C Compatible Pathways*, May 2015.

B. Scope and Approach

In response to growing interest and new disclosure from several large institutional investors, the Task Force formed a working group to consider the benefits and challenges of disclosure of implied temperature rise and other forward-looking climate-related metrics. The Task Force members participating in the working group contributed expertise from asset management firms, pension funds, banks, and credit rating agencies.

Working-group members spoke to several methodology providers and institutional

investors that disclose forward-looking climate-related metrics to better understand available metrics and the potential benefits and challenges of disclosure. Finally, the working group developed a set of questions for [public consultation](#), to ensure that a broad range of perspectives inform the Task Force's future work. The Task Force will take consultation responses into consideration to determine whether further TCFD financial sector guidance on forward-looking metrics is needed.

Box B1 TCFD Public Consultation

The Task Force's 90-day public consultation solicits input on forward-looking climate-related metrics for the financial sector. The consultation asks questions about the usefulness and challenges of such metrics and what may be necessary to enhance their comparability, transparency, and rigor. The Task Force encourages the public to respond to the [consultation](#) at fsb-tcdf.org between October 29, 2020, and January 27, 2021.

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C. Forward-Looking Financial Sector Metrics

Through public consultation, the Task Force aims to better understand the evolution of metrics used and disclosed by companies in the four financial groups that were identified in its 2017 supplemental guidance: asset owners, asset managers, banks, and insurance companies. Such metrics may focus on carbon and other emissions or other financially relevant factors. [Figure C1](#) provides excerpts of the Task Force’s guidance for asset owners on metrics used to assess climate-related issues and how they consider forward-looking information on a lower-carbon transition.

Investors and other users of disclosure rely on climate-related metrics to better understand risk and evaluate progress toward established targets and objectives.¹⁰ They may also use select metrics for discussion and engagement with portfolio companies. The absence of widely available, high-quality historical climate-related information contributes to the need for better forward-looking approaches. In addition to private sector innovation for metrics to better understand climate-related financial impacts, there are increasing regulatory

Figure C1
Excerpt of TCFD Guidance for Asset Owners

Risk Management	
Disclose how the organization identifies, assesses, and manages climate-related risks.	
Recommended Disclosure b) Describe the organization’s processes for managing climate-related risks.	[...] Supplemental Guidance for Asset Owners Asset owners should describe how they consider the positioning of their total portfolio with respect to the transition to a lower-carbon energy supply, production, and use. This could include explaining how asset owners actively manage their portfolios’ positioning in relation to this transition.
[...]	
Metrics and Targets	
Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.	
Recommended Disclosure a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.	[...] Supplemental Guidance for Asset Owners Asset owners should describe metrics used to assess climate-related risks and opportunities in each fund or investment strategy. Where relevant, asset owners should also describe how these metrics have changed over time. Where appropriate, asset owners should provide metrics considered in investment decisions and monitoring.

TCFD, [Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures](#), p. 36

Note: Some content has been removed, denoted by [...].

¹⁰ The Task Force recommends that organizations disclose metrics used to assess climate-related risks and opportunities in line with their strategy and risk management processes, under *Metrics and Targets a)*, as well as the targets used to manage climate-related risks and opportunities, under *Metrics and Targets c)*, where material, historical, and forward-looking metrics can serve as key inputs for an organization’s target setting and for evaluating progress against those targets over time.

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expectations for firms to demonstrate a forward-looking understanding of climate-related risk.¹¹

It is important to note that, similar to the use of multiple traditional financial valuation metrics in mainstream financial decision-making, no single climate-related metric can fully describe the position of a company, product, fund, or investment strategy in relation to climate. The metrics explored in the consultation would be intended to complement, not replace, existing disclosures in alignment with the TCFD recommendations. The Task Force welcomes input on all forward-looking metrics that could help to better inform capital allocation decisions.

with international climate agreements and national policy goals. For example, in December 2019, 120 countries and the European Union announced that they are working to achieve net-zero emissions by 2050 — an early indication of potential future policy and regulatory changes for companies in those jurisdictions.¹²

Even today’s highest-emitting companies could take actions to significantly alter their future emissions trajectories, and consequently the relevant climate-related risks and opportunities they face. Many investors and other users of disclosure therefore seek to better evaluate how carbon exposures associated with their investments could evolve over time.

1. CARBON AND EMISSIONS METRICS

Weighted average carbon intensity and other carbon footprinting metrics provide some visibility into the carbon exposure of certain assets at a fixed point in time. Although still useful for decision-making, past carbon exposures provide little insight into potential future exposure. This is particularly the case as a growing number of companies are announcing planned changes to products, strategies, and future emissions targets in line

As described in [Section D. Metric for Consideration: Implied Temperature Rise](#), a few large financial institutions have started to calculate and disclose an “implied temperature rise” associated with investments. This is one approach to considering the position of their assets in relation to the transition to a lower-carbon economy. Other financially focused approaches may relate to potential costs associated with carbon emissions, such as unpriced carbon cost or carbon earnings at risk.¹⁴

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“Emissions are a prime driver of rising global temperatures and, as such, are a key focal point of policy, regulatory, market, and technology responses to limit climate change. As a result, organizations with significant emissions are likely to be impacted more significantly by transition risk than other organizations. In addition, current or future constraints on emissions, either directly by emission restrictions or indirectly through carbon budgets, may impact organizations financially.”¹³

¹¹ For example, the Monetary Authority of Singapore released consultation papers for banks, asset managers, and insurance companies in June 2020, which included proposed requirements on forward-looking climate-related tools and metrics. An excerpt from the consultation for banks is as follows: “4.5 At the portfolio level, MAS proposes for the bank to develop tools and metrics to monitor and assess its exposures to environmental risk. For example, these metrics may be used to assess the bank’s portfolio exposures to geographical areas and sectors with higher environmental risk, measure the carbon intensity of customers in high-risk sectors, or consider the impact of environmental risk on its collateral valuations. MAS also proposes for the bank to develop capabilities in scenario analysis and stress testing to assess the impact of environmental risk on its risk profile and business strategies, and explore its resilience to financial losses. These scenarios should incorporate forward-looking information to complement historical data, as the latter might systematically underestimate potential risks, in view of the uncertainties and long-term horizon associated with changes in the environment.” Monetary Authority of Singapore, *Proposed Guidelines on Environmental Risk Management (Banks)*, 2020.

¹² COP25 Chile UN Climate Change Conference, *Climate Ambition Alliance: Nations Renew their Push to Upscale Action by 2020 and Achieve Net Zero CO₂ Emissions by 2050*, December 11, 2019.

¹³ TCFD, *Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures*, 2017, p. 17.

¹⁴ S&P Global, *Trucost Carbon Earnings at Risk: Forward-looking Estimates of Financial Risk*, 2019.

2. OTHER METRICS

Financial sector organizations may also use forward-looking metrics to assess climate-related risk and opportunity outside of carbon exposure. Other forward-looking metrics could focus on physical climate-related risk, future valuations of specific assets, and applications of climate within more traditional financial valuation metrics.

One example of a forward-looking financial metric is climate Value-at-Risk (climate VaR). Value-at-Risk metrics are estimates of the risk of loss for investments and have become standard for measuring financial risk.¹⁵ VaR is calculated by assessing the amount of a potential loss, the probability of occurrence for the amount of loss, and the relevant timeframe. Climate VaR aims to assess potential financial sensitivity to climate-related risks and opportunities, with an output expressed as a numeric value or range in a selected currency. For example, in 2016, one study used integrated assessment models to estimate that the “expected [climate VaR] of global financial assets today is 1.8% [or US\$2.5 trillion] along a business-as-usual emissions path. However, the 99th percentile climate VaR is 16.9%, or US\$24.2 trillion.”¹⁶ Additional information on Climate VaR and examples of disclosure are provided in [Appendix 2: Examples of Climate Value-at-Risk Disclosure](#).

Public sector efforts to better understand climate-related risks within the financial system may also lead to greater disclosure of forward-looking metrics. The European Union’s Taxonomy Regulation for environmentally sustainable activities (Taxonomy) requires “financial market participants offering financial products in the EU” to disclose a metric on “the proportion of underlying investments that are Taxonomy-aligned, expressed as a percentage of the investment, fund or portfolio.”¹⁷ Under the regulation, the determination of “taxonomy-

aligned” products includes forward-looking assessments of “transition” activities as defined by the Taxonomy.

Similarly, the 2020 consultation on the European Central Bank’s Guide on climate-related and environmental risks notes that financial institutions are expected to disclose “the amount or percentage of carbon-related assets in each portfolio in € millions or as a percentage of the current portfolio value and, to the extent possible, a forward-looking best estimate of this amount or percentage over the course of their planning horizon [emphasis added].”¹⁸ Other Metrics may emerge as outputs from climate-related scenario analysis and stress testing that are integrated into financial stability monitoring and supervision.¹⁹

3. CHALLENGES OF FORWARD-LOOKING INFORMATION

Certain challenges might limit the extent to which current forward-looking metrics are useful for financial decision-making — and necessitate further innovations or refinements to make such metrics more suitable and robust. In particular:

- **Lack of Reliable Emissions Data.** Poor quality and availability of historical emissions data is currently a significant obstacle to the calculation of carbon-related metrics. For example, the share of MSCI world index companies — collectively around 60% of world market capitalization — that disclose their GHG emissions has stalled at around 50% in recent years.²⁰ CDP currently provides estimated data for around a third of the Scope 1 GHG emissions and slightly more than half of Scope 2 GHG emissions from the over 5,000 companies it covers.²¹ In particular, few companies report Scope 3 GHG emissions, although they could account for more than

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¹⁵ Jorion, Phillipe, *How Informative Are Value-at-Risk Disclosures?*, The Accounting Review, October 2002.

¹⁶ Dietz, Simon; Bowen, Alex; Dixon, Charlie; and Gradwell, Phillip, ‘*Climate Value at Risk*’ of Global Financial Assets, *Nature Climate Change*, 676–679, 2016.

¹⁷ European Parliament and the Council of the European Union, “Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088,” Official Journal of the European Union, June 18, 2020.

¹⁸ European Central Bank, *Guide on climate-related and environmental risks: Supervisory expectations relating to risk management and disclosure*, May 2020.

¹⁹ See, for example, the Bank of England’s Discussion Paper on a biennial exploratory scenario for climate-related risk and the [climate scenarios](#) produced by the Central Banks and Supervisors’ Network for Greening the Financial System.

²⁰ Climate Finance Leadership Initiative, *Financing the Low-Carbon Future*, 2019.

²¹ CDP, *CDP Full GHG Emissions Dataset 2019 Summary*, 2019.

50% of the carbon footprint for companies in many industries.^{22,23} Many forward-looking carbon and emissions metrics rely on past GHG emissions data to estimate future trends and, therefore, a lack of historical data can exacerbate uncertainty in future assumptions. Conversely, when including all scopes of GHG emissions in calculations related to a range of companies across a portfolio, investors and others must often take precautions to avoid double or triple counting of emissions, which could overstate potential climate-related risk.²⁴

- **Lack of Transparency and Comparability.** Many forward-looking methodologies are new and evolving, and there is little transparency from methodology providers on how they are calculated or compare to each other. Where methodologies are publicly described, differences across data providers can still make resulting disclosures difficult to compare for investors and others evaluating climate exposure across their holdings. For forward-looking metrics to be more useful in financial decision-making, disclosure must be based on transparent and comparable methodologies.

- **Reliance on Assumptions and Future Uncertainty.** Calculations of forward-looking metrics are complex and require many methodological choices and assumptions. Some assumptions attempt to compensate for existing data gaps, such as past emissions trends or comparable and reliable company-specific targets. Other assumptions rely on climate scenarios and transition pathway models, the details of which can vary widely despite representing similar outcomes. In particular, uncertainty around future climate-related policy can contribute to greater variation in transition pathway models.

Even with perfect historical information and mature, widely accepted, and transparent methodologies, assessing potential future outcomes remains an uncertain exercise. It is important to note that forward-looking disclosures are not intended to be exact predictions or forecasts that would expose an organization to litigation risk. In fact, a number

of jurisdictions offer safe-harbor protections for forward-looking disclosures made in good faith using the best information reasonably available at the time.²⁵

- **Complexity of Calculation.** Until other challenges are addressed, there may be a large resource burden associated with calculating and disclosing forward-looking metrics, which often require the assistance of one or more external data and methodology providers.
- **Suitability for Public Disclosure.** Financial sector organizations may use several forward-looking metrics in various states of maturity as inputs to capital allocation decisions. However, while useful internally, those metrics may be considered proprietary or may not meet an organization's quality standard for public disclosure.

Similar challenges are relevant to forward-looking climate assessments outside of metrics. However, the disclosures resulting from those assessments can still be useful. For example, in its recommended disclosure *Strategy c)* the Task Force recommends that organizations describe the resilience of their strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario. Climate-related scenario analysis has become more widely used and robust since the Task Force released its recommendations in 2017. In a 2019 TCFD survey on effective disclosure aligned with the TCFD recommendations, a select group of expert users most often rated disclosure aligned with *Strategy c)* "Very Useful."²⁶

Greater availability of high-quality emissions data, future climate-related targets and strategies, and convergence around business-relevant climate-related scenarios or transition pathways are needed to serve as a foundation for developing more forward-looking metrics that are useful for financial decision-making. The Task Force encourages further work in these areas and welcomes insights on how challenges related to forward-looking financial sector metrics could be addressed.

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²² According to data available through the Bloomberg Professional Service, only 8% of the nearly 11,500 companies in the BESGPRO Index report Scope 3 GHG emissions.

²³ Kepler Cheuvreux, *Carbon Compass: Investor Guide to Carbon Footprinting*, November 23, 2015, pp. 20–23.

²⁴ In addition, emissions-focused metrics may lead to emphasis from clients or other stakeholders on near-term reductions in the metrics and, consequently, incentivize divestment over engagement to achieve those reductions quickly.

²⁵ Staker, Alexia; Garton, Alice; and Barker, Sarah, *Concerns misplaced: Will compliance with the TCFD recommendations really expose companies and directors to liability risk?*, Commonwealth Climate and Law Institute, September 2017, pp. 10–11.

²⁶ TCFD, *2020 status report*, November 2020.

D. Metric for Consideration: Implied Temperature Rise

A new climate-related metric that several institutional investors have begun to use and disclose is implied temperature rise (ITR).²⁷ Implied temperature rise metrics aim to provide a forward-looking view of carbon exposure that can be applied to a wide range of industries, companies, and asset classes.

In its consultation, the Task Force seeks broad input on whether, and how, ITR disclosure would be useful in financial decision-making. It also seeks input on which types of organizations might disclose ITR, which types of investments an ITR disclosure could address, as well as its limitations, potential challenges, and what might be needed to improve its usefulness.

degree rating, ITR incorporates current GHG emissions or other data and assumptions to estimate expected future emissions associated with the selected entities. Then, the estimate is translated into a projected increase in global average temperature (in °C) above preindustrial levels that would occur if all companies in corresponding sectors had the same carbon intensity as the selected asset(s).

The ITR metric is expressed in a single temperature unit or range that is comparable to widely understood potential climate outcomes (e.g., 1.5°C, 2°C, 3.5°C). As summarized in [Appendix 1: Examples of Implied Temperature Rise Disclosure](#), a few large asset owners and asset managers currently disclose the implied temperature rise of their portfolios. The extent to which ITR is forward-looking depends on whether the calculation methodology uses only historical emissions data or if it also takes projected GHG emissions into account. An example of disclosure on implied temperature rise over two years is provided in [Figure D1](#).

1. OVERVIEW

An implied temperature rise metric attempts to estimate a global temperature rise associated with the greenhouse gas emissions of a single entity (e.g., a company) or a selection of entities (e.g., those in a given investment portfolio, fund, or investment strategy). Expressed as a numeric

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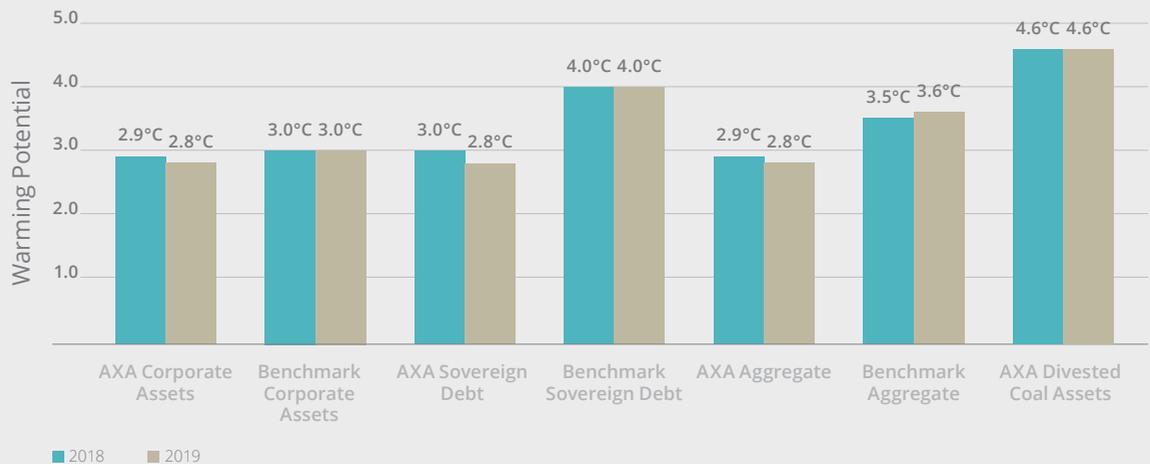
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Figure D1
Example of Implied Temperature Rise Disclosure



AXA, 2020 Climate Report: renewed action in a time of crisis, p. 2

²⁷ The ITR metric may be referred to by other names including portfolio warming, warming potential, degree warming, portfolio alignment, portfolio temperature, and temperature score.

While ITR can be used as an impact metric or communication and engagement tool, its disclosure could also provide insight on climate-related risks and opportunities associated with select assets to better inform capital allocation decisions. In alignment with the Task Force's supplemental guidance, a few asset owners that currently consider ITR "in investment decisions and monitoring" or "the positioning of their total portfolio with respect to the transition to a lower-carbon energy supply, production, and use," including how they "actively manage their portfolios' positioning in relation to this transition," have begun to disclose ITR.^{28, 29}

However, the ITR metric is new and still evolving. There are several technical and methodological challenges related to calculating ITR, no commonly agreed terminology to refer to the metric, and little understanding of advancements that would be needed to improve the usefulness of ITR disclosures.

2. POTENTIAL BENEFITS

Based on input from several institutional investors that use and disclose implied temperature rise, as well as data and methodology providers, the Task Force understands that ITR disclosure has the potential to be useful in several ways. [Appendix 1: Examples of Implied Temperature Rise Disclosure](#) describes perspectives on the ITR metric from an asset owner and two insurance companies that disclose ITR metrics.

Proponents of ITR disclosure note that it could represent a proxy for climate-related transition risks or opportunities associated with a selected portfolio, fund, or investment strategy. For example, ITR disclosure could inform the position of an investment in relation to 1.5–2°C legislation and targets, or assist users with identifying investment opportunities in line with their own objectives. ITR disclosure could help the clients and beneficiaries of financial institutions assess strategic resilience and inform investment strategies and portfolio allocation. ITR ratings provided over time could also provide insight into progress against strategic objectives or targets. Although the underlying calculations can be complex, the output could be used as a directional indicator when compared to national emissions policies or commitments.

Disclosure by different types of organizations within the financial sector may align with different user needs as follows:

- **Disclosure by Asset Owners.** Whether asset owners invest directly or through asset managers, they bear the outcomes of climate-related transition and physical risks to which their investments are exposed. Similarly, asset owners can benefit from the potential returns on the investment opportunities associated with a low-carbon transition. Climate-related disclosure by asset owners allows beneficiaries and other audiences to assess the asset owners' investment strategies and approaches to managing their portfolios.

ITR disclosure could help asset owners' beneficiaries make a forward-looking assessment of an asset owner portfolios' exposure to climate-related risks, their ability to capitalize on opportunities in the low-carbon transition over time, and overall investment strategy. Moreover, asset owners sit at the top of the investment chain and therefore their disclosure of ITR may encourage better forward-looking disclosure across the investment chain, from other asset owners, asset managers, and underlying companies. An example of an asset owner's perspective on its ITR disclosure is described in [Figure A1-1](#) (p. 13) in [Appendix 1: Examples of Implied Temperature Rise Disclosure](#).

- **Disclosure by Asset Managers.** Asset managers' clients, as owners of the underlying assets within a portfolio, bear the potential transition and physical risks to which their investments are exposed. Similarly, they enjoy the potential returns on opportunities associated with the transition to a lower-carbon economy. Clients and shareholders of asset managers may use ITR disclosures as a proxy to evaluate potential climate-related risks and opportunities within portfolio allocation decisions or as a key performance indicator within an investment mandate.

As major clients of asset managers, asset owners may depend on information from asset managers to calculate and disclose their own ITR assessment. An example of disclosure on the implied temperature rise of a shareholder equity portfolio is described in [Figure A1-2](#) (p. 14) in [Appendix 1: Examples of Implied Temperature Rise Disclosure](#).

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²⁸ TCFD, *Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures*, 2017, p. 17.

²⁹ Novethic, *173 Shades of Reporting: Climate Spin-Off Season III*, 2019.

• **Disclosure by Banks and Insurance Companies.** Banks and insurers serve a variety of beneficiaries and stakeholders, some of whom could use disclosure of ITR as a directional proxy for exposure to climate-related risks. As such, disclosure of ITR by banks and insurers could also indicate how well positioned these institutions are to capture opportunities for the transition to a low-carbon economy. Users of disclosure must be able to distinguish among banks’ and insurance companies’ exposures and risk profiles to make informed financial decisions.³⁰ However, current disclosures from banks and insurance companies often omit key parts of the business, for example capital market financing for banks and underwriting portfolios for insurers. In part, this is due to a lack of consistent ITR methodologies for lending and insurance portfolios.

- Some methodologies use company-specific historical emissions data while others take a “top-down” approach to allocate emissions based on sectoral or geographical data.
 - Methodologies vary in their use of Scope 1, Scope 2, and/or Scope 3 GHG emissions. Some use only Scope 1 data, while others use Scope 1 and 2, and yet others take Scope 1, 2, and 3 GHG emissions into account.
 - Certain methodologies take cumulative historical GHG emissions into account while others incorporate point-in-time assessments of emissions intensity.
 - Some methodologies incorporate company-specific future emissions targets, while others take a “top-down” approach to estimate future emissions based on sector or geography. Of those that incorporate emissions targets, there are different criteria for the types of targets that can and cannot be used.
 - Methodologies may incorporate different climate-related scenarios or emissions pathways, or even utilize internal proprietary future emissions pathways.
 - Certain methodologies may be better suited to assessing certain asset classes and may vary in whether some asset classes are able to be assessed at all.
- Different methodologies will lead to different ITR estimates that are not directly comparable. Variations in methodologies may also lead to under- or overestimates of implied temperature rise, and consequently an exaggerated indication of climate-related risk.

3. CURRENT CHALLENGES

While ITR may have potential to be an informative metric, its calculation, disclosure, and use are currently subject to several significant challenges. Implied temperature rise is a newly developed metric and therefore methodologies and approaches are still evolving. Further work and input from preparers and users of disclosure will likely be needed to improve its quality and availability. In addition to challenges generally applicable to forward-looking metrics described in [Section C.3. Challenges of Forward-Looking Information](#), ITR disclosure is currently subject to the following:

• **Variation in Approaches and Outcomes.** In response to recent interest in ITR, several NGOs and companies — including 2° Investing Initiative, Arabesque, Carbon Delta, CDP, MSCI, Science Based Targets Initiative, and Trucost — are developing a range of ITR calculation methodologies. The methodologies vary widely in their approaches, for example:

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³⁰ TCFD, *Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures*, 2017, p. 23.

- **Coverage Limitations.** Currently, calculation of ITR seems to be feasible only for certain carbon-intensive sectors (e.g., utilities, oil and gas, and road transport) or specific asset classes rather than for a fully diversified portfolio. For example, of the ITR disclosure examples provided in [Table A1-1](#) (p. 13) of [Appendix 1: Examples of Implied Temperature Rise Disclosure](#) none specify 100% portfolio coverage. Moreover, some available methodologies may only include a limited number of technologies and indicators, while other important levers/indicators that are needed to understand transition risks and opportunities in certain sectors may not be included. Assessing other factors, such as the company's business model, historical performance, and management actions, may also be relevant but not taken into account in today's methodologies.

Challenges are to be expected in the development of new forward-looking metrics. The Task Force recognizes that multiple initiatives, comprised of investors and others, are working to encourage more consistent ITR disclosure and address its challenges.^{31, 32, 33}

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³¹ For example, the [Net-Zero Asset Owners Alliance](#), an international group of 27 institutional investors, has formed a working group that is exploring methodologies related to the low-carbon transition including implied temperature rise metrics.

³² In December 2019, the Bank of England published a [discussion paper](#) proposing that, as part of a climate stress test, banks and insurers submit to the Bank the implied temperature rise associated with their exposures. The stress test would not be prescriptive about how to calculate ITR and would not require firm-level public disclosure.

³³ As background to support public input to the TCFD consultation, an external team of analysts from several financial institutions have prepared an [analytical report](#) on ITR and other forward-looking climate assessment methodologies for the financial sector. Their report will be released on November 9, 2020 and sets out common building blocks across different methodologies, key judgments along which methods differ, and initial views on best practices.

Appendix 1: Examples of Implied Temperature Rise Disclosure

Certain financial institutions have begun to disclose implied temperature rise (ITR) estimates over the past two years, including the nine organizations listed in [Table A1-1](#). As shown in the comparison, the estimates address various portions of the organizations' portfolios and were developed in collaboration with several methodology providers.

Table A1-1
Comparison of Select ITR Disclosures³⁴

Organization	Disclosed ITR	Coverage	Emissions	Methodology Provider	Location of Disclosure
Aviva	2.9°C (all)	80% of aggregate (incl. equities, corporate credit, sovereign, real estate, infrastructure)	Scope 1 only	Carbon Delta	Aviva, Aviva Climate-Related Financial Disclosure 2019, Metrics and Targets Summary, p. 3
AXA	3.2°C (equity)	95% coverage	Scope 1 only	Carbon Delta	AXA, 2020 Climate Report, p. 19
	2.8°C (corporate debt)	70% coverage			
	2.8°C (sovereign debt)	99.7% coverage		Beyond Ratings	
Banque de France	>3°C	>70% of equity portfolios	Not specified	Trucost, 2° Investing Initiative	Banque de France, Responsible Investment Report 2020, p. 18
BNP Paribas Cardif	2.3–4.3°C (equity)	Not specified	Not specified	Science-Based 2°C Alignment (lower bound), Carbon Impact Analytics (upper bound)	BNP Paribas, 2019 TCFD Report, p. 41
	2.2–3.1°C (bonds)	Not specified	Not specified		

Continued on next page

³⁴ Underlying methodologies for calculating implied temperature rise vary from vendor to vendor. Example disclosures listed in Table A2-1 did not specify targets used within the ITR calculations.

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Table A1-1: Comparison of Select ITR Disclosures
(Continued)

Organization	Disclosed ITR	Coverage	Emissions	Methodology Provider	Location of Disclosure
CNP	2.8°C	ca 78% coverage	Scope 1, 2, and 3	Carbone 4	CNP Assurances, 2018 CSR Report, p. 41
Government Pension Investment Fund (GPIF)	>3°C	ca 50%–60% of each asset class	Scope 1 and 2	Trucost	GPIF, GPIF Climate Related Risk Assessment 2019, p. 28
Ircantec	2.1°C (equity)	Not specified	Not specified	I Care & Consult, Beyond Ratings, Carbone 4	Ircantec, Climate Actions and ESG Report, p. 35
	3°C (bonds)	Not specified	Not specified		
Legal & General	2.9°C (equity)	ca 43% coverage	Not specified	Baringa	Legal & General, TCFD Report 2019, p. 12
	3.1°C (bonds)				
SCOR	3.7–3.8°C	85% of portfolio	Not specified	Carbone 4	Scor, 2018 Climate Report, p. 37

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Excerpts from an asset owner’s disclosure of ITR are provided in [Figure A1-1](#).

Figure A1-1 Asset Owner Perspective on ITR Disclosure

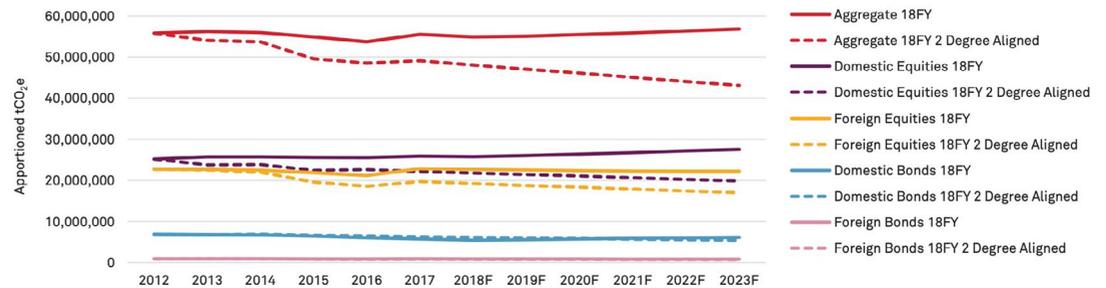
In 2019, the Japanese Government Pension Investment Fund (GPIF), the world’s largest pension fund, undertook and disclosed the results of a climate-related portfolio risk assessment. The resulting report includes a variety of disclosures such as carbon footprint metrics, fossil fuel and stranded asset exposure metrics, and implied temperature rise metrics, referred to as “temperature trajectory” in the report.

GPIF worked with the data provider Trucost to provide ITR ratings at an aggregate level for all assets under management as well as for various asset classes and sectors within its portfolio. The disclosure covers a ten-year period (2012–2023) to show current information, historical changes, and future projections.

Temperature Trajectory for Latest Portfolio Holdings:



Portfolio apportioned emissions versus 2°C aligned levels, 2012-2023



GPIF’s report describes the relevance of the ITR metrics as follows: “Companies with emissions significantly above what is required to be in line with a low-carbon transition pathway, are likely to be impacted more by current or future constraints on GHG emissions. The [disclosure] presented aims to highlight leaders and laggards at the company level, as well as overall portfolio performance and performance by sector.”

However, GPIF also notes that current data gaps limit the usefulness of ITR in decision-making. A lack of emissions data on some asset classes allows GPIF to estimate ITR only for about 50%–60% of their assets.

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Excerpts from an insurance company’s disclosure of ITR are provided in [Figure A1-2](#).

Figure A1-2 Insurance Company Perspective on ITR Disclosure

Aviva Group, a diversified fund manager and general insurance and pension provider, has included an ITR rating since 2018 in its annual climate-related disclosures. Aviva’s reports include a wide range of metrics for climate transition and physical risk, including levels of investment in green assets, carbon foot printing, climate Value-at-Risk, and weather-related losses.

Aviva worked with Carbon Delta to derive its ITR rating for its shareholders funds’ credit, equities, and real estate as a weighted average of individual issuers’ warming potential. As shown below, Aviva reports its 2019 rating alongside its 2018 rating to show Aviva’s year-to-year progress.

Portfolio Warming Potential

Aviva uses the MSCI (Carbon Delta)² warming potential metric to assess alignment of our shareholders funds’ credit, equities, real estate with the Paris Agreement target. This is calculated as a weighted average of individual issuers’ warming potential, which is based on the alignment of each company within the portfolio to the sectoral greenhouse gas emission intensity needed for each sector to make its contribution to reach the Paris Agreement target.

Warming potential (in °C) for Aviva’s shareholder funds as at 30/11/2019. Source: Aviva/ MSCI (Carbon Delta).

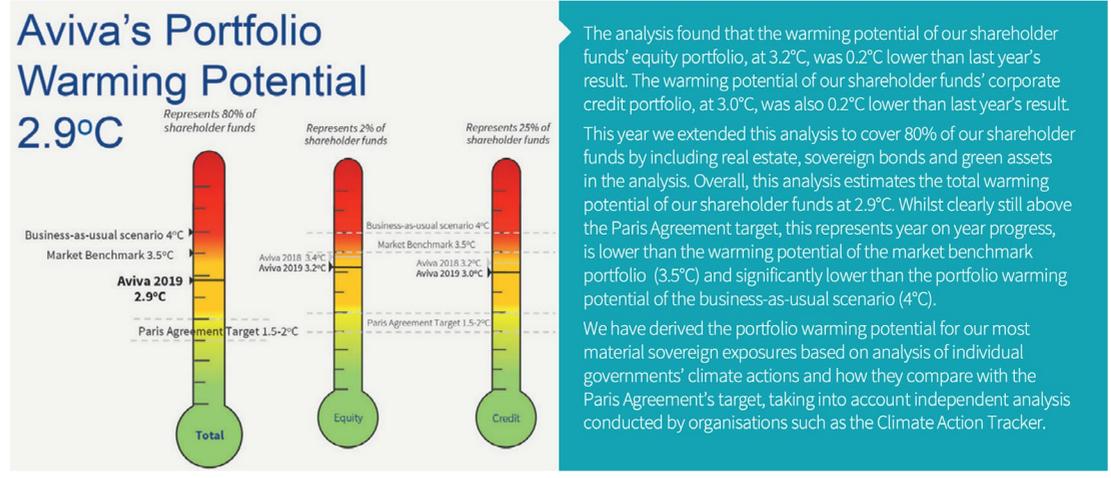


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Aviva describes its use of ITR ratings as exploratory, noting that Aviva “is exploring the uses of a number of different emerging metrics designed to help analyse the alignment of investment portfolio to the Paris Agreement’s target of limiting the global temperature rise to well below 2°C. However, we fully anticipate that these approaches will evolve over time and be improved in the light of new research, data and emerging best practice. We have fed this analysis into investment strategy reviews of our business.”

Aviva notes that the level of coverage of its ITR rating continues to evolve. Aviva discloses that only 80% of shareholder funds were analyzed, which nonetheless represents an increase in coverage from 2018 due to the inclusion of real estate, sovereign bonds, and green assets.

Excerpts from an insurance company’s disclosure of ITR are provided in [Figure A1-3](#).

Figure A1-3 Insurance Company Perspective on ITR Disclosure

BNP Paribas Cardif, the international insurance company associated with BNP Paribas Group, has published information on the temperature alignment of its directly owned equity and bond portfolios since 2017.

Due to a lack of methodological consensus, BNP reports results from two different providers: Carbon Impact Analytics and the Science-Based 2°C Alignment. While both methodologies are largely based on the International Energy Agency’s 2°C scenario (2DS), they yield significantly different results. These differences are largely due to how Carbon Impact Analytics’ method reflects current carbon performance of companies, without adjusting for potential or promised reduction efforts.

BNP notes that it “presents the results of both methods to foster discussion in the marketplace. By researching and assimilating new appropriate metrics, climate-related goals can be incorporated in long-term investment decisions.”

Temperatures of the equity and corporate bond portfolios held by BNP Paribas Cardif:

Equity portfolio		Bond portfolio	
Science-Based 2°C Alignment	Carbon Impact Analytics	Science-Based 2°C Alignment	Carbon Impact Analytics
2.3°C	4.3°C	2.2°C	3.1°C

Temperature comparison of BNP Paribas Cardif equity and bond portfolios according to SB2A and CIA methods (source: I Care & Consult / Mirova / Carbone 4)

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Appendix 2: Examples of Climate Value-at-Risk Disclosure

Value-at-Risk (VaR) measures the size of the loss a portfolio may experience, within a given time horizon, at a particular probability. Climate VaR quantifies the size of loss attributable to climate-related financial risks by comparing the value of assets in a world with climate change relative to the same world without climate change.³⁵

Given that Climate VaR is a relatively new metric, there are few available methodologies and those that are available are not yet fully transparent or comparable. Generally, estimates of climate VaR could take a bottom-up or top-down approach:

- A bottom-up approach would be built around a relatively detailed portfolio analysis model, which takes as its input various macroeconomic variables and goes on to model the returns to different asset classes in different countries or regions. It is model- and data-intensive, and it is unclear whether the uncertainty inherent in providing this high level of detail would provide particularly accurate estimates.
- A top-down approach uses a simple macro-economic model that has been integrated with emissions and climate modules. A small number of integrated assessment models of climate change exist, which have been built in order to estimate the economic cost of climate change. However, these can be conservative in their estimates as they can fail to fully account for the full range and deep uncertainty of climate impacts.

Figure A2-1

Excerpt from an Asset Manager's Climate VaR Disclosure

Forward looking metrics: Investments' temperature and Climate Value at Risk [...]

Focus on Equities and Corporates bonds			
AXA IM	2018	2019	Evolution
Transition cost VaR (1,5°C scenario) [%]	-5,4	-5,1	0,3
Transition cost VaR (2°C scenario) [%]	-3,4	-3,1	0,2
Transition cost VaR (3°C scenario) [%]	-0,5	-0,5	0,0
Cost of climate VaR (1,5°C scenario) [%]	-6,8	-6,4	0,4
Cost of climate VaR (2°C scenario) [%]	-4,7	-4,4	0,3
Cost of climate VaR (3°C scenario) [%]	-1,8	-1,7	0,1
Technology opportunity VaR (1,5°C scenario) [%]	2,6	2,5	-0,1
Technology opportunity VaR (2°C scenario) [%]	1,6	1,5	-0,1
Technology opportunity VaR (3°C scenario) [%]	0,4	0,3	0,0

Source: AXA IM, Carbon Delta

Cost of Climate VaR (Transition risks + Physical risks VaR) represents a portfolio value loss of nearly 7% if the world went to a 1.5°C scenario, due to regulation costs and extreme weather events losses. It is already representing a portfolio value loss of nearly 5% in a 2°C scenario and of 2% in the Paris Pledges scenario (3°C).

In terms of new opportunities, Green VaR represents a portfolio value gain of nearly 3% in a 1.5°C scenario and nearly 2% in a 2°C scenario, companies being all the more incentivised to develop green technologies.

AXA Investment Managers, Article 173 – TCFD combined report, p. 35

³⁵ Economist Intelligence Unit, *The Cost of Inaction: Recognising the Value at Risk from Climate Change*, 2015.

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A few financial institutions have disclosed information on their use of climate VaR and climate VaR estimates related to their portfolios. [Figure A2-1](#) (p. 16) and [Figure A2-2](#)

include examples of climate VaR disclosures from an asset manager and an insurance company, respectively.

Figure A2-2

Excerpt from an Insurance Company's Climate VaR Disclosure

Aviva's Climate VaR measure

Climate-related risks and opportunities have the potential to affect insurers' balance sheets as well as the long-term business model. Traditional approaches based largely on backward looking analysis may need to be refined or enhanced to capture these risks going forward. In order to address this challenge, Aviva has developed a Climate VaR measure, in conjunction with the UNEP FI investor pilot project and Carbon Delta as well as Elseware (a risk management and quantification expert consultancy). This measure enables the potential business impacts of future climate-related risks and opportunities to be assessed in each of the IPCC scenarios and in aggregate (see Appendix for more details of our Climate VaR methodology) as well as providing an indication of the resilience of our strategy...

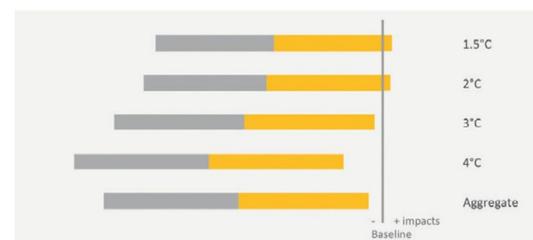
Calculated on a like for like basis the YE18 and YE19 Climate VaRs are similar, indicating that Aviva's overall exposure to climate-related risks and opportunities remains broadly unchanged.

Figure 9 compares a plausible range of outcomes (5th to 95th percentile) from our Climate VaR analysis for the different scenarios considered. Consistent with last year, Aviva is most exposed to the business-as-usual (BAU) 4°C scenario where physical risk dominates, negatively impacting long-term investment returns on equities, corporate bonds, real estate, real estate loans and sovereign exposures. The aggressive mitigation 1.5°C and 2°C scenarios are the only scenarios with potential upside. Physical risk impacts are more limited but there is still downside risk on long-term investment returns from carbon intensive sectors (for example utilities) as a result of transition policy actions. This is offset partially by revenues on new technologies from some sectors (for example automobiles).

When aggregated together to determine an overall impact of climate-related risks and opportunities across all scenarios, the plausible range is dominated by the results of the 3°C and 4°C scenarios, reflecting that neither existing nor planned policy actions are sufficiently ambitious to meet the 1.5°C Paris Agreement target. In the 1.5°C scenario transition risk is larger than physical risk (see figure 10) even after taking into account mitigating technology opportunities. In the 2°C scenario, transition and physical risks are somewhat balanced, whereas in the 3°C and 4°C scenarios physical risk dominates...

We will continue to develop and incorporate Climate VaR into our overall strategy, risk management and reporting frameworks. In particular, we will further refine and improve our Climate VaR approach in the light of new research and data as well as emerging best practice including using output from the UNEP FI Insurance TCFD pilot.

Aviva's Climate VaR output by scenario for shareholder funds as at 30/11/2019. Source: Aviva.



The grey bars represent the range of outputs between the 5th percentile and the central estimate for each scenario and the orange bars represent the range between the central estimate and the 95th percentile.

Physical versus transition risks by scenario for Aviva's shareholder funds as at 30/11/2019. Source: Aviva.

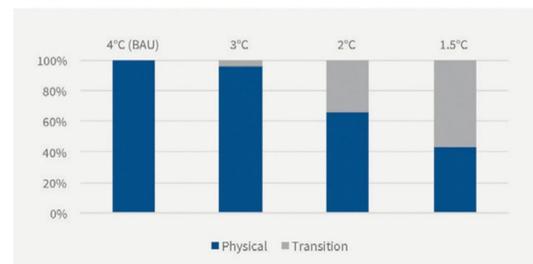


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Appendix 3: Glossary

CLIMATE-RELATED OPPORTUNITY refers to the potential positive impacts related to climate change on a company or organization. Efforts to mitigate and adapt to climate change can produce opportunities for companies, such as through resource efficiency and cost savings, the adoption and utilization of low-emission energy sources, the development of new products and services, and building resilience along the supply chain. Climate-related opportunities will vary depending on the region, market, and industry in which an organization operates.

CLIMATE-RELATED RISK refers to the potential negative impacts of climate change on a company or organization. Physical risks emanating from climate change can be event-driven (acute) such as increased severity of extreme weather events (e.g., cyclones, droughts, floods, and fires). They can also relate to longer-term shifts (chronic) in precipitation and temperature and increased variability in weather patterns (e.g., sea level rise). Climate-related risks can also be associated with the transition to a lower-carbon global economy, the most common of which relate to policy and legal actions, technology changes, market responses, and reputational considerations.

CLIMATE VALUE-AT-RISK measures the size of the loss a portfolio may experience, within a given time horizon, at a particular probability attributable to climate-related financial risks.

GOVERNANCE refers to “the system by which an organization is directed and controlled in the interests of shareholders and other stakeholders.”³⁶ “Governance involves a set of relationships between an organization’s management, its board, its shareholders, and other stakeholders. Governance provides the structure and processes through which the objectives of the organization are set, progress against performance is monitored, and results are evaluated.”³⁷

GREENHOUSE GAS (GHG) EMISSIONS SCOPE LEVELS³⁸

- Scope 1 refers to all direct GHG emissions.
- Scope 2 refers to indirect GHG emissions from consumption of purchased electricity, heat, or steam.
- Scope 3 refers to other indirect emissions not covered in Scope 2 that occur in the value chain of the reporting company, including both upstream and downstream emissions. Scope 3 emissions could include: the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g., transmission and distribution losses), outsourced activities, and waste disposal.³⁹

IMPLIED TEMPERATURE RISE (ITR) refers to an estimate of a global temperature rise associated with the greenhouse gas emissions of a single entity (e.g., a company) or a selection of entities (e.g., those in a given investment portfolio, fund, or investment strategy). Expressed as a numeric degree rating, ITR metrics incorporate current GHG emissions or other data and assumptions to estimate expected future emissions associated with the selected entity or entities. Then the estimate is translated into a projected increase in global average temperature (in °C) above preindustrial levels that would occur if all companies in corresponding sectors had the same carbon intensity as the selected asset(s).

NET-ZERO refers to achieving an equal balance between GHG emissions produced and GHG emissions removed from the atmosphere.

RISK MANAGEMENT refers to a set of processes that are carried out by a company or organization’s board and management to support the achievement of its objectives by addressing its risks and managing the combined potential impact of those risks.

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³⁶ Cadbury, A., *Report of the Committee on the Financial Aspects of Corporate Governance*, London, 1992.

³⁷ Organisation for Economic Co-operation and Development (OECD), *G20/OECD Principles of Corporate Governance*, OECD Publishing, Paris, 2015.

³⁸ World Resources Institute and World Business Council for Sustainable Development, *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)*, March 2004.

³⁹ World Resources Institute and World Business Council for Sustainable Development, *The Corporate Value Chain (Scope 3) Accounting and Reporting Standard*, April 16, 2014.

SCENARIO ANALYSIS is a process for identifying and assessing a potential range of outcomes of future events under conditions of uncertainty. In the case of climate change, for example, scenarios allow an organization to explore and develop an understanding of how the physical and transition risks of climate change may impact its businesses, strategies, and financial performance over time.

STRATEGY refers to an organization's desired future state. An organization's strategy establishes a foundation against which it can monitor and measure its progress in reaching that desired state. Strategy formulation generally involves establishing the purpose and scope of the organization's activities and the nature of its businesses, taking into account the risks and opportunities it faces and the environment in which it operates.

SECTOR refers to a segment of companies performing similar business activities in an economy. A sector generally refers to a large segment of the economy or grouping of business types, while "industry" is used to describe more specific groupings of companies within a sector.

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