DRIVING ENHANCEMENT, CONVERGENCE, AND ADOPTION

Measuring Portfolio Alignment

GFANZ
Glasgow Financial Alliance for Net Zero

Acknowledgments

The GFANZ Secretariat has published this report on behalf of the GFANZ workstream on Portfolio Alignment Measurement. GFANZ's Leadership believes this work product to be the result of a consensus on the major issues presented in this report among the organizations represented on the workstream. This report was developed by the workstream on Portfolio Alignment Measurement, and reviewed before publication by the GFANZ Principals Group and Steering Group, with input from the Advisory Panel, as outlined in the GFANZ Terms of Reference. This does not imply that every finding included herein is endorsed by every GFANZ sector-specific alliance member firm, including the firms represented on the Principals Group. The workstream was supported by the GFANZ Secretariat. Oliver Wyman provided knowledge and advisory support.

Workstream participants include representatives of the following organizations:

Allianz
Bank of America
BlackRock
Bloomberg
Cambridge Associates
CDP (Advisor)
Deutsche Bank
EY
Fulcrum Asset Management
Generation IM (Workstream Chair)
HSBC
Institutional Investors Group on Climate Change (IIGCC) (Advisor)
Lombard Odier
McKinsey (Advisor)
Mirova
Mitsubishi UFJ Financial Group, Inc.
MSCI
Ninety One
Rocky Mountain Institute (Advisor)
Shinhan Financial
Singapore Exchange Group
S&P Global
UBS
UNEP-FI (Advisor)
Wells Fargo
WTW

GFANZ would like to thank all those who have contributed to our work and development of this report in support of a net-zero climate transition.

Important notice

*This report was produced by a workstream of the Glasgow Financial Alliance for Net Zero (**"GFANZ"**). This report aims to provide voluntary guidance on using and measuring portfolio alignment for financial institutions. For the avoidance of doubt, nothing express or implied in the report is intended to prescribe a specific course of action. This report does not create legal relations or legally enforceable obligations of any kind. In addition, this report does not represent the views or practices of any specific GFANZ sector-specific alliance member. Each GFANZ sector-specific alliance member unilaterally determines whether, and the extent to which, it will adopt any of the potential courses of action described in this report.*

The information in this report does not purport to be comprehensive and does not render any form of legal, tax, investment, accounting, financial, or other advice. This report is made available by a workstream of GFANZ and has not been independently verified by any person.

Nothing in this report constitutes an offer or a solicitation of an offer to buy or sell any securities or financial instruments and does not constitute investment advice or a recommendation by any person of an investment or divestment strategy or whether or not to "buy," "sell" or "hold" any security or other financial instrument.

The report is for informational purposes only and the information contained herein was prepared as of the date of publication.

No representation, warranty, assurance, or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by any member of GFANZ, its secretariat or by any of their respective affiliates or any of their respective officers, employees, agents, or advisors including without limitation in relation to the adequacy, accuracy, completeness, or reasonableness of this report, or of any other information (whether written or oral), notice, or document supplied or otherwise made available to any interested party or its advisors in connection with this report.

Members of the seven financial sector-specific net-zero alliances comprising GFANZ have signed up to the ambitious commitments of their respective sector-specific alliances and are not automatically expected to adopt the principles and frameworks communicated within this report, although we expect all members to increase their ambition over time, so long as it is consistent with members' fiduciary and contractual duties and applicable laws and regulations, including securities, banking and antitrust laws.

How to Read This Report

This document is a report produced by a workstream of the Glasgow Financial Alliance for Net Zero ("GFANZ"), which aims to provide a technical practitioner perspective for measuring the alignment of investment, lending, and underwriting activities with the goals of the Paris Agreement and 2050 global net-zero objectives. Practitioner-useful case studies outline how portfolio alignment methods and metrics are used today. The Key Design Judgement Framework for measuring portfolio alignment that had been developed by the Portfolio Alignment Team in prior years has been refined further to provide voluntary guidance on Key Design Judgements that are part of developing portfolio alignment metrics. With the enhancements proposed, the workstream seeks to address current gaps in portfolio alignment measurement and accelerate progress toward the wider adoption of portfolio alignment metrics among net zero-committed financial institutions. The report does not prescribe a specific course of action but offers technical information and options to support financial practitioners' independent decisions around the use of portfolio alignment metrics.

The purpose of this report is to provide information that may inform financial institutions' independent investment decision-making process in accordance with their contractual duties and the regulatory environment in which they operate. Sector-specific alliance member firms include many different types of financial institutions, including banks, insurers, asset owners, asset managers, financial service providers, and investment consultants. The report recognizes that financial institutions operate in different contractual and regulatory environments that may impact their approaches to the net-zero transition, including whether or how they use voluntary/non-binding guidance outlined in this report. GFANZ acknowledges that, as with net-zero transition planning more broadly, approaches to portfolio alignment measurement and metric use will vary by institution and will depend on the individual characteristics of financial institutions, including size, business model, sector coverage, fiduciary duty toward their clients, and other factors.

For the purposes of this report, the term "GFANZ" refers to the GFANZ Principals Group.

Voluntary guidance: For those financial institutions considering whether or how to use portfolio alignment metrics, this report presents a voluntary framework to reference. Financial institutions using portfolio alignment metrics are encouraged to consider the technical and implementation guidance across nine Key Design Judgements, but may choose to focus on a subset the Judgements, guidance and/or metric use cases that they determine most appropriate for their purposes. This voluntary guidance does not supersede jurisdictional requirements on transition planning or climate-related financial disclosure where such requirements exist, or contractual requirements, including mandates with clients. Some types of financial institutions may also have unique legal or regulatory constraints that may differ by jurisdiction, and that may impact the extent to which individual elements of this guidance should be considered.

Pan-sector approach: This guidance presents a broadly pan-sector approach to portfolio alignment measurement and metric selection. The principle behind each Key Design Judgement or piece of guidance aims to be applicable to institutions across the financial sector (supplemented with use cases for different institution types where possible) and to act as a reference for regulators and policymakers. Specific methodological approaches or considerations for individual components may differ by type of financial institution, and the relevance of different approaches or considerations may vary for different types of institutions. Financial institutions are encouraged to use this resource alongside the guidance produced by sector-specific net-zero alliances and other organizations (where applicable).

Unique roles for different financial institutions: Because this guidance is broadly pan-sector, it does not reflect the different roles and constraints of different types of financial institutions. Thus, as they develop their approach to portfolio alignment measurement and their selection and use of relevant metrics, financial institutions are encouraged to consider their individual characteristics, adapting this framework and guidance as needed to their individual use cases. Each financial institution is encouraged to use elements of the guidance based on considerations such as its target audience for disclosures and the contractual and regulatory environment within which it operates. The analysis, case studies, and guidance herein should be considered by financial institutions as resources and considerations that may be consulted as part of their approach to portfolio alignment measurement and selection and use of relevant metrics, not as recommendations on a specific course of action.

Focus on enhancement, convergence on methodological approaches and adoption: This framework aims to drive enhancement to approaches to portfolio alignment measurement, rather than provide prescriptive guidance on individual use of portfolio alignment metrics. While GFANZ encourages convergence on common, transparent portfolio alignment methods by financial institutions and metric providers, this report does not intend to provide prescriptive guidance on specific methods. Each financial institution should determine their own approach to portfolio alignment measurement and metric use, consistent with the requirements of business confidentiality and jurisdictional requirements, if any. When preparing disclosures, institutions should consider the TCFD's Principles for Effective Disclosures, alongside jurisdictional requirements, if any.[1]

Living guidance: GFANZ acknowledges that supporting pathways, tools, and methodologies may not yet be available for all situations and that policy, regulation, technology, and science are evolving, often at a rapid pace. As financial institutions develop and execute net-zero transition plans more widely, we expect the necessary tools, methodologies, and datasets to further develop — including as regards portfolio alignment measurement.

1 TCFD. Recommendations of the Task Force on Climate-related Financial Disclosures, 2017.

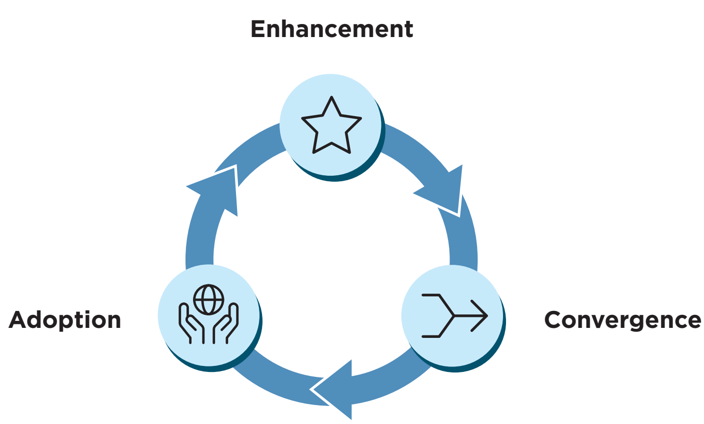
Executive Summary

To help financial institutions understand how aligned their investment, lending, and underwriting activities are with their individual net-zero emissions goals, a common, forward-looking framework for measuring portfolio alignment is desired. This report builds on the work of the Portfolio Alignment Team (PAT) that had issued reports in 2020 and 2021, commissioned by the TCFD. To support financial institutions with the selection of portfolio alignment metrics for relevant use cases, this report outlines practitioner perspectives. Moreover, building on the framework developed by PAT, enhanced and more detailed technical and implementation guidance is provided across nine key decisions that practitioners should consider when measuring alignment.

The guidance provided aims to support comparability, accountability, and transparency of portfolio alignment metrics, and drive convergence on best practice portfolio alignment methods by financial institutions and metric providers.

This report has been developed in collaboration with members and advisors of the GFANZ Portfolio Alignment Measurement workstream as well as through an open public consultation and engagement with a broader set of financial institutions, metric providers, and civil society organizations. Overall, the GFANZ workstream on Portfolio Alignment Measurement incorporated input from over 100 individual institutions across the public and private sectors, academia, and civil society.

Figure 1: The GFANZ Workstream on Portfolio Alignment Measurement aims to drive enhancement on best practice guidance, thus encouraging greater levels of convergence on portfolio alignment methods and, as a result, driving greater levels of adoption by financial institutions.



Measuring portfolio alignment helps to support GFANZ's mission to mobilize the financial sector to support the transition to net zero in the real economy and to help unlock the potential of transition finance. The concept of transition finance as laid out in GFANZ's voluntary guidance on financial institution net-zero transition planning[2] is underpinned by four key financing strategies:

2 GFANZ. Financial Institution Net-zero Transition Plans, 2022.

1. Financing or enabling the development and scaling of **climate solutions;**
2. Financing or enabling entities that are already **aligned** to a 1.5 degrees C pathway;
3. Financing or enabling entities that are **aligning** to a 1.5 degrees C pathway; and
4. Financing or enabling the accelerated, **managed phaseout of high-emitting physical assets**

The use of portfolio alignment metrics can support financial institutions in understanding how aligned their portfolios are with the goal of net zero and in efforts to redirect capital to transition finance strategies over time.

While it is crucial for financial institutions to understand their financed emissions, an exclusive focus on financed emissions could encourage financial institutions to decarbonize their portfolios by simply divesting from high-emitting assets or withdrawing from sectors that need to transition, rather than supporting this transition. Divestment poses a systemic risk of driving ownership and financing of these sectors to those with less climate ambition, disclosure, or scrutiny. To help unlock the full potential of transition finance, a forward-looking approach that considers the transition planning efforts of the underlying clients and portfolio companies is required.

One key decision that financial practitioners must make when measuring alignment is how to reflect the net-zero commitments of underlying companies when forecasting future emissions. Our voluntary guidance points to the importance of combining backward- and forward-looking data. Rather than accepting net-zero commitments at face value, practitioners are encouraged to evaluate their credibility. An illustrative credibility assessment framework has been proposed to support practitioners.

The framework is based on guidance laid out in the GFANZ report on real-economy transition planning[3] and synthesizes insights from a number of existing transition plan assessment tools.

Section 3.6 (p. 51) provides guidance on forecasting emissions

More work needs to be done to drive best practices on projecting emissions in a forward-looking way. However, our illustrative credibility framework can be a starting point for encouraging common approaches for use by financial institutions.

Four categories of alignment metrics are being used by financial institutions today. On a spectrum of increasing complexity, they are: binary target measurement, maturity scale alignment metrics, benchmark divergence metrics, and implied temperature rise (ITR) metrics:

Table 2 (p. 3) in Section 1 provides decision usefulness criteria for selecting alignment metrics

- At the more basic end of the spectrum, **binary target measurement** provides insight on the percentage of portfolio companies with science-validated 1.5 degrees C-aligned emissions reduction targets. This approach is easiest to use but provides limited insight at the portfolio level.
- **Maturity scale alignment metrics** group portfolio companies into alignment categories, e.g., aligned, aligning, and not aligned to a 1.5 degrees C pathway. To do this, practitioners typically employ a range of qualitative and quantitative indicators, not unlike the considerations discussed in the credibility assessment above. As such, this approach provides a more holistic understanding of the trajectory of portfolio companies to become net-zero aligned. However, there is no commonly accepted approach used across the sector for grouping companies into specific categories.

3 GFANZ. Expectations for Real-Economy Transition Plans, September 2022.

- Measuring **benchmark divergence** aims to evaluate the distance from a net-zero aligned pathway. This approach is more complex to use and interpret but is based on the latest science and can provide an absolute view of carbon budget overshoot or undershoot if measured based on cumulative emissions.
- **Implied temperature rise (ITR)** translates the distance from a pathway measured in a benchmark divergence model into a likely projected end-of-century global warming outcome. Practitioners often shy away from using this approach due to the perceived opaqueness of the underlying assumptions. However, if climate data, pathways, and construction methods improve, ITR could become the most intuitive metric with potential to be decision-useful for determining net-zero alignment of financing and investment decisions.

A case study in Section 3.8 (p. 62) illustrates how disclosure based on an ITR range might be useful, given the remaining uncertainties associated with the approach

Six distinct use cases for measuring portfolio alignment have been identified and can be split across two key dimensions:

- **Decision-making** refers to a financial institution's net-zero implementation strategy across its business lines. For example, the use of portfolio alignment metrics could be relevant for researching and constructing net-zero aligned financial products and services[4] or to engage with portfolio companies.
- **Communication** refers to the use of portfolio alignment metrics for disclosure, for example disclosing progress against net-zero goals or to satisfy government or regulatory-driven disclosures.

Use cases for portfolio alignment metrics include:

- **Disclosure of net-zero progress**
- **Engagement**
- **Investment research and selection**
- **Portfolio construction**
- **Manager selection and monitoring**
- **Calibration and monitoring of net-zero targets**

Table 3 (p. 8) in Section 2 outlines possible use cases for different financial institution types

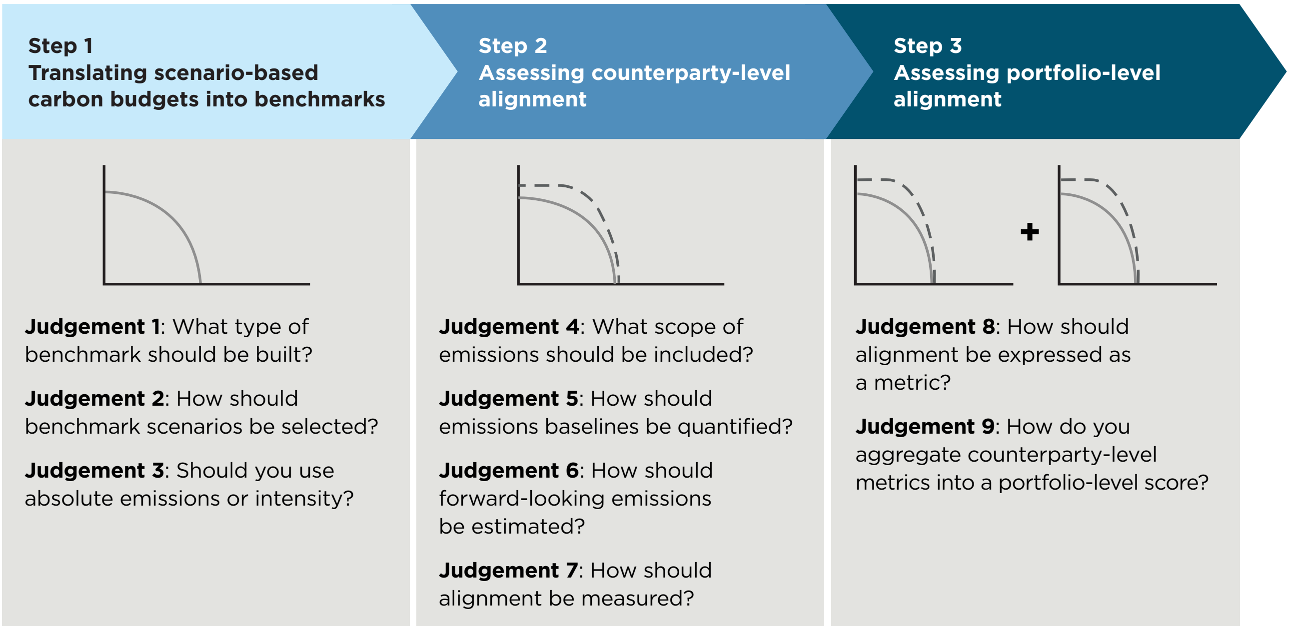
Practitioners should select those metrics that are most decision-useful for their relevant use case based on a number of selection criteria, for example, ease-of-use, transparency with regard to underlying assumptions, and how suitable the metric is to incentivize transition finance.

When selecting an appropriate metric for a use case it is also important to consider specific institutional factors. For example, when launching net-zero aligned products and services, it would be important to consider which alignment metric fits best with existing decision-making processes at the financial institution, and which metric might be best suited for the needs of specific users. These institutional differences may mean that different financial institutions select different metrics for the same use case.

This report lays out nine key decisions (Key Design Judgements) for measuring portfolio alignment. To help overcome remaining challenges identified for each of these Judgements, this report helps to clarify what best practice approaches might look like and proposes a number of key measures.

4 GFANZ. Financial Institution Net-zero Transition Plans, 2022.

Figure 2: Some, or all, of the nine Key Design Judgements are required to build portfolio alignment metrics



When measuring alignment, practitioners can follow nine Key Design Judgements across three steps. Step 1 is about building the benchmark; step 2 is about comparing company-level alignment against this benchmark, and step 3 is about aggregating alignment at the portfolio level.

Consensus on favorable approaches is already beginning to form around some Judgements. For example, practitioners generally agreed on the use of **single scenario benchmark** construction approaches (Judgement 1) and measuring alignment based on **cumulative emissions** to observe the remaining 1.5-degree C carbon budget (Judgement 7). To help drive greater levels of convergence, this report provides more detailed Judgement guidance in the following respects:

- The **time horizon** for measuring alignment (Judgement 7): Our guidance points to the importance of measuring alignment over shorter time horizons to more adequately reflect the required real-economy emissions reductions to enable net-zero emissions by 2050, complemented by long-term horizons.
- The **inclusion of Scope 3 value chain emissions** (Judgement 4): Despite the fact that disclosures are relatively limited for Scope 3 emissions, they make up a large share of most companies' total footprint.[5] To guide practitioners, an analysis on value chain emissions zooms in on material value chain categories for high-impact sectors such as utilities and steel. Our guidance points to the importance of including Scope 3 emissions where they exceed a threshold of 40% of total company emissions and the absolute magnitude of emissions is large.
- The **choice of emission unit** (Judgement 3): To steer away from excessive levels of volatility, physical intensities are preferable over economic intensities for companies operating in homogenous sectors (i.e., steel, cement). To help measure alignment for oil and gas companies more holistically, our guidance proposes the use of multiple metrics in combination.

5 MSCI, Scope 3 Carbon Emissions: Seeing the Full Picture, 2020.

- **Forecasting emissions** (Judgement 6): Backward and forward-looking data should be combined and weighted based on a credibility assessment of portfolio companies' emissions reduction commitments.

Table 1 provides a high-level summary of the entire best practice voluntary guidance outlined for each of the nine Key Design Judgements.

Section 3 (p. 28) provides greater detail, underlying analysis, and implementation case studies to assist more technical readers

Table 1: High-level summary of voluntary guidance by Key Design Judgement

KEY DESIGN JUDGEMENT	GFANZ PORTFOLIO ALIGNMENT MEASUREMENT WORKSTREAM GUIDANCE
1. What type of benchmark should be built?	• Practitioners should use single-scenario benchmark approaches. • For homogenous sectors, practitioners should apply a fair-share carbon budget approach using physical emissions intensity and absolute emissions, or the convergence benchmark. • For heterogenous sectors, practitioners should apply the fair-share carbon budget approach using economic emissions intensity and absolute emissions. Where economic intensity is not preferred, a rate-of-reduction benchmark can be used.
2. How should benchmark scenarios be selected?	• When selecting a 1.5 degrees C-aligned benchmark scenario, practitioners are encouraged to use the GFANZ guidance on use of sectoral pathways for financial institutions[6] and prioritize benchmark scenarios with higher regional and sectoral granularity.
3. Should absolute emissions, production or emission intensity units be used?	• The use of physical intensities is preferred to economic intensities for companies in homogenous sectors. • For most sectors, the fair-share carbon budget approach should be used. This approach translates physical or economic emissions intensities into absolute emissions (following Judgement 1). • For the oil and gas sector, practitioners should use multiple metrics in combination, to reflect different decarbonization levers and their relevant benchmarks.
4. What scope of emissions should be included?	• Scope 3 emissions should, at a minimum, be included in portfolio alignment measurement if they exceed 40% of a company's total emissions and if the absolute magnitude of the company's Scope 3 emissions is large. Sector-level category guidance detailed in Section 3.4 should be considered. Given the scarcity of Scope 3 disclosures, the use of Scope 3 estimates might be useful, especially when bottom-up production and activity data are available.
5. How should emission baselines be quantified?	• Practitioners should consider the PCAF standard, which prioritizes reported over estimated emissions, for at least Scope 1 and Scope 2. Estimation methods based on activity levels as close as possible to the emissions drivers should be preferred over top-down methods, especially for Scope 3 emissions.
6. How should forward-looking emissions be estimated?	• For companies that have set emissions reduction targets, practitioners should calculate a company's alignment based on a credibility-weighted combination of two distinct emission forecasts: 1) a forward-looking approach based on stated emissions reduction targets, and 2) a backward-looking approach based on historical emissions. Practitioners should perform a credibility assessment to reflect the likelihood of a company achieving its stated emissions reduction targets. • For companies without emissions reduction targets, practitioners should implement a "waterfall" approach of four methods and a lower bound score on the alignment metric, detailed in Section 3.6.

6 GFANZ. Guidance on the Use of Sectoral Pathways for Financial Institutions, 2022.

KEY DESIGN JUDGEMENT	GFANZ PORTFOLIO ALIGNMENT MEASUREMENT WORKSTREAM GUIDANCE
7. How should alignment be measured?	• Practitioners should calculate alignment on a cumulative-emissions basis to reflect the remaining carbon budget. • Practitioners should compute alignment over short- and medium-term time horizons, which could be supplemented by longer-term time horizons. When computing alignment using an ITR metric, practitioners should consider the technical guidance in Section 3.7 and Appendix O.
8. How should alignment be expressed as a metric?	• When selecting a portfolio alignment metric, practitioners should consider its suitability for the specific use case(s). For technical guidance on the calculation approaches for ITR metrics, see Appendix O.
9. How do you aggregate counterparty-level metrics into a portfolio-level score?	• An aggregated-budget approach should be used as this allows financial institutions to compute the overall carbon budget overshoot or undershoot at the portfolio-level. • When calculating an ITR metric using an aggregated budget approach, practitioners should convert the total carbon budget overshoot or undershoot into an ITR using an approach consistent with the methodology selected in Judgements 7 and 8.

A common criticism of portfolio alignment metrics is the significant variation in alignment results across metric providers, and the lack of transparency of underlying methodologies and assumptions. This can lead to practitioners being hesitant to use portfolio alignment metrics. We encourage metric providers systematically disclose their methodologies publicly across the nine Key Design Judgements. This will help end users to develop a greater level of understanding about the underlying assumptions of alignment approaches and could drive further adoption of forward-looking alignment metrics.

The themes featured in this report emerged as a high priority during workstream discussions throughout 2022, but additional challenges remain to broaden adoption and meet wide-ranging end-user needs.

For example, financing or enabling climate solutions and the managed phaseout of high-emitting assets — two key financing strategies that are part of transition finance — are not yet adequately reflected in portfolio alignment measurement. Providers of climate solutions are often helping other companies reduce emissions over the life cycle of the solution being deployed. As the current framework only includes operational and value chain emissions, a climate solution provider could therefore appear misaligned with net zero, especially if the company has carbon-intensive operations or supply chains. As such, it would be beneficial for portfolio alignment methodologies to evolve to accurately assess companies' true contribution to the net-zero transition.

Similarly, the Key Design Judgements could be useful to begin to measure alignment for managed phaseout of high-emitting assets, as well as for other asset classes like sovereign debt and real assets, but best practice approaches still need to evolve.

Beyond methodological refinements, practitioners also voiced the need for an increased focus on implementation guidance. For example, this may include developing a "how-to" guide on constructing a net-zero aligned portfolio (see Section 2) that will enable practitioners to operationalize the guidance provided in this report.

Lastly, the construction of portfolio alignment metrics will benefit from standardized climate transition-related data points that are key inputs to the measurement framework. Practitioners are encouraged to utilize the relevant data that will become available via the openly accessible Net-Zero Data Public Utility (NZDPU) upon its launch.

While measuring progress and alignment of transition finance strategies will likely require the development of new metrics, the existing portfolio alignment measurement framework is already highly useful for measuring alignment of the majority of aligned, aligning, and non-aligned companies in financial portfolios today. We look forward to seeing continued progress on convergence, transparency, and adoption of portfolio alignment measurement across the financial sector.

Background and purpose of this report

HOW SPECIFIC TERMS ARE USED IN THIS REPORT

This report uses the following simplified — or shortened — phrases throughout:

- **"Based on feedback received"** or **"engagement"** refers to the outreach activities undertaken in 2022 by the GFANZ Portfolio Alignment Measurement workstream, including discussions with over 50 financial institutions and reviewing 90 public consultation responses to the draft Portfolio Alignment Measurement report.
- **"Real-economy companies"** are referred to as **"companies"**, unless otherwise noted.
- **"GHG emissions"** are referred to as **"emissions"**, unless otherwise noted.
- A company's stated GHG emissions or physical GHG emissions intensity reduction targets are referred to as "emissions reduction targets", unless otherwise noted.
- **"Physical GHG emissions intensity"** is referred to as **"physical intensity"**, unless otherwise noted.
- **"Scenario"** and **"pathway"** are used interchangeably (i.e., a benchmark pathway is equivalent to a benchmark scenario).
- **"Trajectory"** and **"projection"** are used interchangeably in the following context: "a company's projection based on emissions reduction targets" is equivalent to "a company's trajectory based on emissions reduction targets".
- **"Guidance"** refers to voluntary considerations suggested by the GFANZ Portfolio Alignment Measurement workstream to support financial institutions in implementation and encourage adoption of best practices.

THE FOUR CASE STUDIES TYPES PROVIDED IN THIS REPORT

Use case

These are examples of how portfolio alignment metrics are used in practice by financial institutions and other organizations, sourced by the GFANZ Workstream on Portfolio Alignment Measurement as a part of broader, public consultative work.

Implementation

These are examples of how Key Design Judgements have been implemented by financial institutions, sourced by the GFANZ Workstream on Portfolio Alignment Measurement as a part of broader, public consultative work.

Quantitative

These are illustrative, analytical studies of companies in high-impact sectors that have been created by the GFANZ Workstream on Portfolio Alignment Measurement.

Climate solutions

These are perspectives on approaches that could be leveraged to measure the alignment of climate solutions companies, sourced by the GFANZ workstream on Portfolio Alignment Measurement as a part of broader, public consultative work.

How financial institutions could navigate this report

For readers who would like to understand how portfolio alignment metrics and use cases relate, please refer to the practitioner guidance outlined in **Sections 1 and 2**.

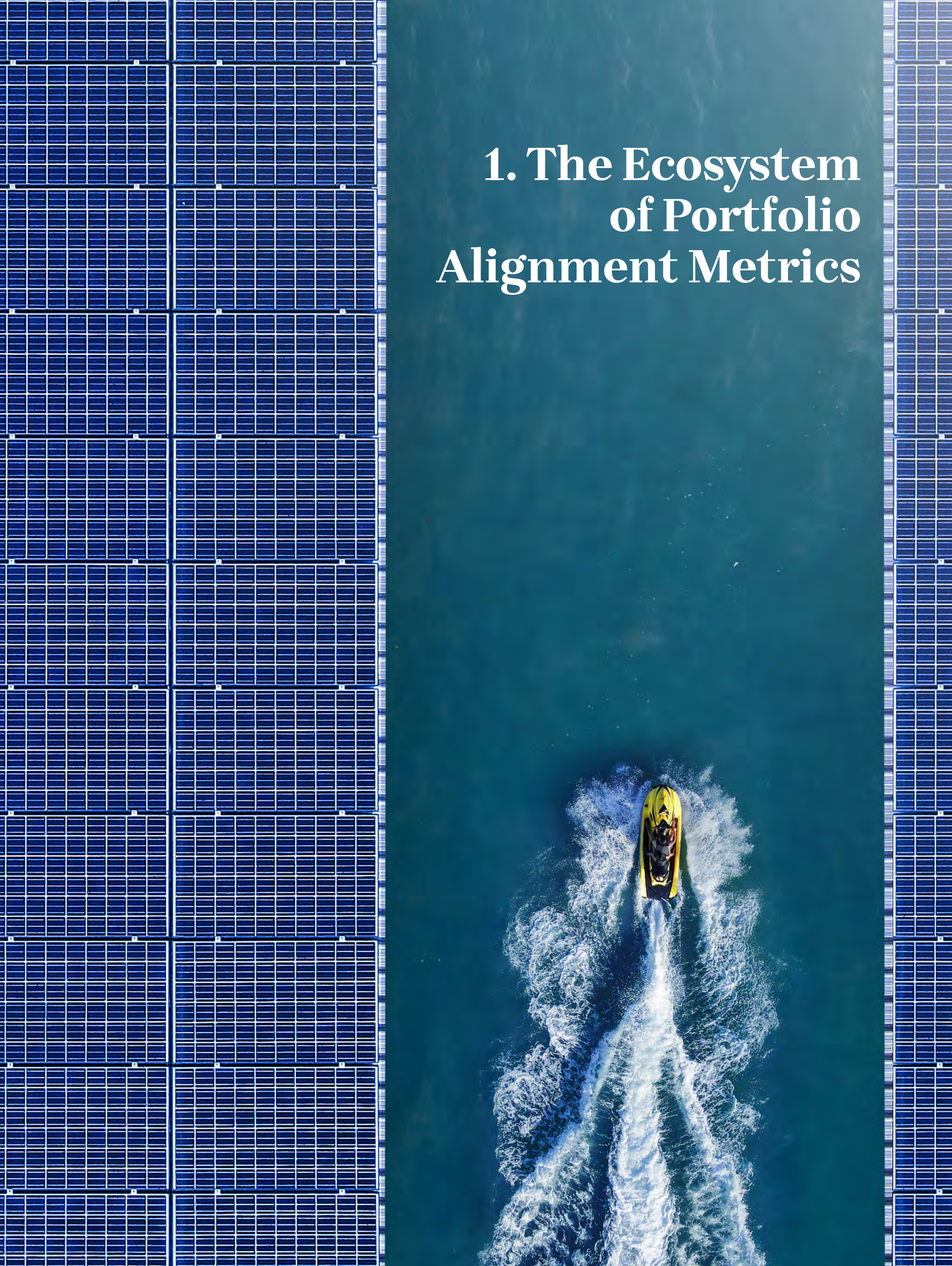
For readers with an interest in methodology, please refer to the technical guidance outlined in **Section 3.**

For readers who would like to understand how metric provider methodologies compare and converge, please refer to **Section 4.**

Contents

List of Appendices

1. The Ecosystem of Portfolio Alignment Metrics



Portfolio alignment metrics are useful tools for financial institutions to measure and track how aligned their investment, lending, and underwriting activities are with a 1.5 degrees C-aligned pathway to a net-zero economy. Although the Portfolio Alignment Team (PAT) has been laying the foundations for portfolio alignment metrics since 2020 and made progress in defining methodological best practices, key challenges remain. At the time of writing, a number of different portfolio alignment metrics are used, often based on different underlying methodological assumptions. This introductory section surveys the current landscape of portfolio alignment metrics and provides voluntary guidance on the relevant evaluation criteria for selecting alignment metrics (Section 1.1). Moreover, the relevance of portfolio alignment metrics to support financial institutions in their net-zero transition planning and in driving real-economy impact is discussed (Section 1.2).

1.1 TYPES OF PORTFOLIO ALIGNMENT METRICS

The 2021 PAT Report identified three broad categories of alignment metrics that range in complexity:[7]

1. **Binary target measurement metrics** express the percentage of portfolio companies with validated science-based emissions reduction targets.
2. **Benchmark divergence metrics** assess alignment at the individual company level by comparing projected cumulative company emissions to a 1.5 degrees C-aligned benchmark. The resulting metric is expressed as a percentage, indicating how far the projected company emissions are overshooting or undershooting this benchmark.
3. **Implied temperature rise (ITR) metrics** build on the benchmark-divergence model in that they translate an assessment of overshoot or undershoot into the most likely projected global warming outcome. When engaging with practitioners, it became apparent that a fourth type of alignment metric is frequently used by practitioners.
4. **Maturity scale alignment metrics** assign an alignment outcome to companies using a scale based on qualitative and quantitative assessment criteria that might include, but are not limited to: stated targets, past performance, disclosure, and governance. A categorical scale is used to express the alignment outcome and might include buckets of “aligned”, “aligning”, “committed to aligning”, or “not aligned” to categorize companies.[8]

1.2 EVALUATION CRITERIA OF DIFFERENT PORTFOLIO ALIGNMENT METRICS

In choosing between different alignment metrics, GFANZ suggests that financial institutions evaluate the metrics’ decision-usefulness based on their:

- **Ease-of-use:** the metric is simple to use regardless of institution size.
- **Transparency:** the underlying assumptions feeding into the construction of the metric should be clear to end users.
- **Scientific robustness:** the metric has been constructed based on the latest science, for example the most up-to-date sectoral scenario pathways.
- **Aggregability:** the metrics can be easily and meaningfully aggregated at the portfolio level.
- **Suitability for directing capital:** the metric is useful to incentivize capital or financing reallocation to those sectors and regions of the economy that need to transition[9] (Table 2).

The criteria chosen will help to gauge how suitable metrics are for integrating into financial institutions’ existing decision-making processes and to understand their relevance for particular use cases (Table 2).

7 Portfolio Alignment Team. Measuring Portfolio Alignment: Technical Considerations, 2021, p. 17.

8 The approach is outlined in more detail in the Net Zero Investment implementation guide.

9 Portfolio Alignment Team. Measuring Portfolio Alignment: Technical Considerations, 2021, p. 18.

Table 2: Decision-usefulness criteria for end users when selecting alignment metrics

CRITERIA Description of metric	**BINARY TARGET MEASUREMENT** Expresses alignment based on the share of portfolio companies with science-based validated targets.	**BENCHMARK DIVERGENCE** Expresses alignment based on the percentage overshoot/undershoot to a scenario pathway.	**ITR** Alignment is expressed by translating overshoot/undershoot into global warming outcome.	**MATURITY SCALE ALIGNMENT** Expresses alignment on a scale, for example from aligned, aligning to not aligned.
Ease-of-use	• Easy to use and interpret, no technical skills required.	• The output is technical and challenging to interpret.	• The output is easy to interpret and intuitive to understand.	• Easy to use and interpret, some technical skills required.
Transparency (underlying assumptions)	• Number of companies with reduction commitments is known. • Portfolio decarbonization trajectory is unknown.	• Portfolio decarbonization trajectory is known. • Requires some climate scenario expertise to understand assumptions. • Assumptions taken by the metric provider are numerous and complex.	• Highest levels of complexity. • Portfolio decarbonization trajectory is known. • Requires some climate scenario expertise to understand assumptions. • ITR assumptions are additive to Benchmark divergence, increases uncertainty.	• Portfolio decarbonization trajectory is somewhat known. • Lack of standards on grouping companies across a scale of ligned, aligning, not aligned.
Scientific robustness	• Can be scientifically robust if all targets considered are 1.5 degrees C-aligned and have been third-party validated.	• The metric can be scientifically robust, depending on quantitative design choices.	• The metric can be scientifically robust, depending on design choices. • Conversion from Benchmark divergence into ITR increases assumptions and underlying uncertainties.	• The metric can be scientifically robust, depending on qualitative and quantitative design choices that allocate maturity scale categories.
Aggregable (interpretability of aggregated metric)	• Limited insight at portfolio level as only the share of companies with third-party validated targets is known.	• Limited usefulness at the portfolio level. • Computes total portfolio level overshoot or undershoot compared to benchmark.	• Meaningful to aggregate at the portfolio level due to the interpretability and comparability of the metric.	• Some insight about the portion of aligned, aligning and non-aligned companies at portfolio-level.
Suitability to direct capital	• Approach is lacking assessment of reduction targets' feasibility.[10] • In isolation, the approach is too simplistic to adequately incentivize the redirection of capital and lending.	• If design choices are robust and interpreted correctly, can be useful to steer sector and region-specific capital allocation or lending decisions.	• If design choices are robust, can be most incentive optimal to steer sector and region-specific capital allocation or lending decisions due to intuitiveness.	• Can be useful to steer sector and region-specific capital allocation or lending decisions provided a forward-looking perspective is applied to group companies into aligned/misaligned categories.

10 GFANZ notes that the SBTi Measurement, Reporting and Verification (MRV) protocol is planned for publication in 2024, which will mitigate this drawback to some extent.

Table 2 highlights the tradeoffs between ease-of-use, available data, and the levels of complexity underlying each metric. While the binary approach is easiest to use, it provides limited insights at the portfolio level because the overall extent of a portfolio's alignment is not known. Benchmark divergence metrics are more complex to use and interpret, but provide the benefit of evaluating alignment based on the latest science and can provide an absolute sense of carbon budget overshoot or undershoot compared to a net-zero benchmark. ITR translates the carbon budget overshoot or undershoot into an associated level of warming, thereby taking the benchmark divergence approach one step further. Depending on the conversion method chosen, this could increase the level of uncertainty but at the same time yields a more compelling metric that bears a direct relationship to the climate goals and is intuitive to understand for a large range of stakeholders. Finally, maturity scale alignment metrics are a more sophisticated version of binary target measurement and provide more insight into the overall portfolio trajectory. To bucket portfolio companies into alignment categories, practitioners could choose a number of key indicators, thus helping to assess the alignment of portfolio companies more holistically.

The usefulness of a climate dashboard

Given the multifaceted nature of climate change, practitioners pointed to the usefulness of a portfolio alignment climate dashboard approach. In this approach, portfolio alignment metrics are used alongside other relevant carbon and sustainability indicators,[11] combining a range of forward- and backward-looking indicators to determine overall alignment at the portfolio level. This approach is further outlined in Section 3.8 of this report.

Ultimately, the overarching consideration should be whether the alignment metric chosen is suitable to support the real-economy impact that the financial institution aims to achieve, as set out in its net-zero transition plan.

1.3 HOW PORTFOLIO ALIGNMENT METRICS CAN SUPPORT TRANSITION FINANCE AND REAL-ECONOMY EMISSIONS REDUCTIONS

If transition finance investments, lending, and underwriting strategies align with the net-zero transformation in the real economy, the result could be both more favorable market conditions for financial institutions [12] and a positive outcome for the real economy. To support a transition compatible with a 1.5 degrees C world, it is crucial that approaches to alignment measurement focus on the future and take transition planning into account.

Measuring portfolio alignment means considering the rate of change in future emissions

The forward-looking dimension of the PAT's Portfolio Alignment framework seeks to understand the transition-readiness of companies compared to net-zero aligned scenario pathways, thus helping financial institutions identify those portfolio companies that are actively transitioning to a net-zero aligned world. Rather than focusing on current emissions, the framework considers companies' future decarbonization rates, and in this way supports financial institutions with directing finance to companies that are most actively pushing the transition to a net-zero economy, regardless of their current carbon intensity.

How portfolio alignment can support the four key financing strategies

GFANZ's November 2022 report "Financial Institution Net-zero Transition Plans" outlines four

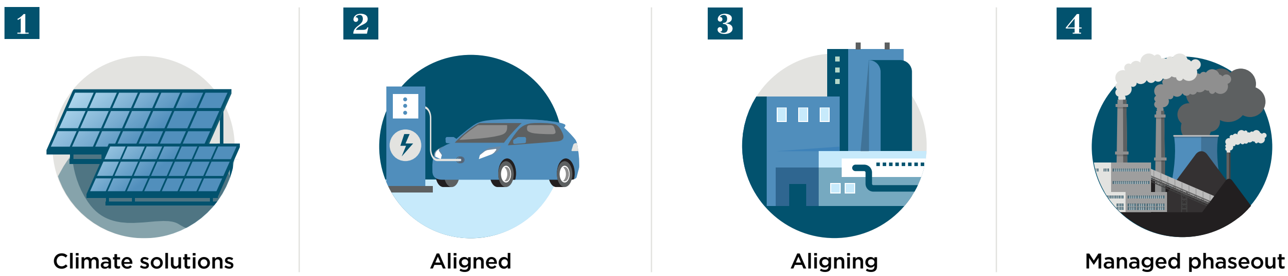
11 The Climate Financial Risk Forum. Climate Data And Metrics, 2021.

12 MSCI. Net-Zero Alignment: Objectives and Strategic Approaches for Investors, 2021.

key financing strategies to support the transition to net zero in the real economy. For the purpose of portfolio alignment, these are companies that develop and scale climate solutions, are already aligned to 1.5 degrees C, are in the process of aligning to 1.5 degrees C, and phase out high-emitting assets early (Figure 3.)[13]

At the time of writing, portfolio alignment metrics are not yet useful to adequately measure the pathway for those companies that develop climate solutions and phase out high-emitting assets early. However, the metrics are already useful for assessing aligned and aligning companies, which likely represent a large portion of financial institutions' portfolios today.[14]

Figure 3: Enabling real-economy reductions with the four key financing strategies



Measuring alignment for net-zero aligned and aligning companies

Companies that are already aligned with a 1.5 degrees C pathway can be considered as climate leaders. To identify these companies, one could compare a forward-looking projection of historical emissions to an appropriate 1.5 degrees C-aligned sectoral pathway.

An example of a 1.5 degrees C-aligned company could be an electric utility that has started to transition into wind energy over the past decade by gradually dismantling its traditional coal-based generation business. As a result, the utility has become a large green energy company with a large majority of its power generation coming from offshore wind.

As the example in Figure 4 demonstrates, the company's historical and forward-looking emission trajectory is clearly aligned with the IEA's Net Zero by 2050 scenario, confirming that it is aligned with 1.5 degrees C today.

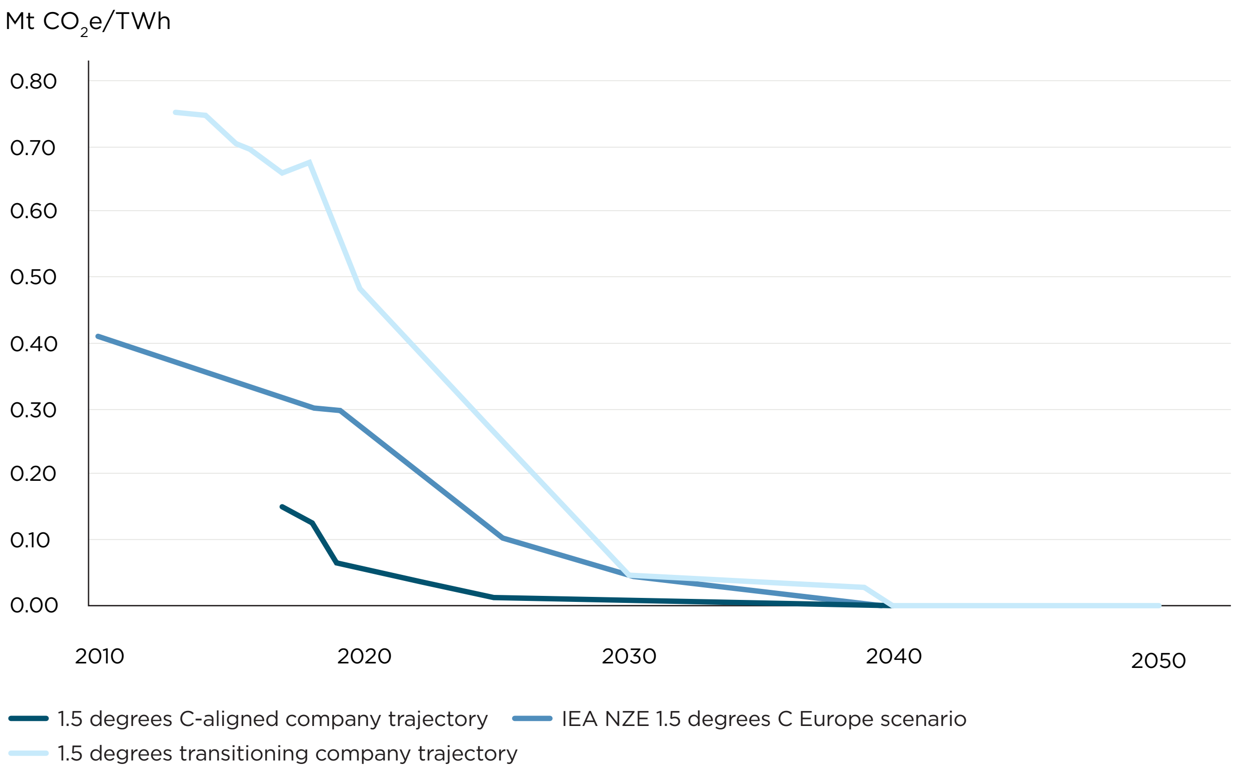
Aligning companies, on the other hand, may not yet have a record of emissions reductions in line with a 1.5 degrees C pathway. These companies have started to implement changes in their business to deliver on the target. To measure the alignment of these companies, a financial institution might want to compare the forward-looking ambition incorporated in the company's transition plan with an appropriate 1.5 degrees C-aligned pathway and assess the credibility of the reduction commitment made.

13 GFANZ. Financial Institution Net-zero Transition Plans, 2022.

14 McKinsey. The net-zero transition, what it would cost, what it could bring, 2022.

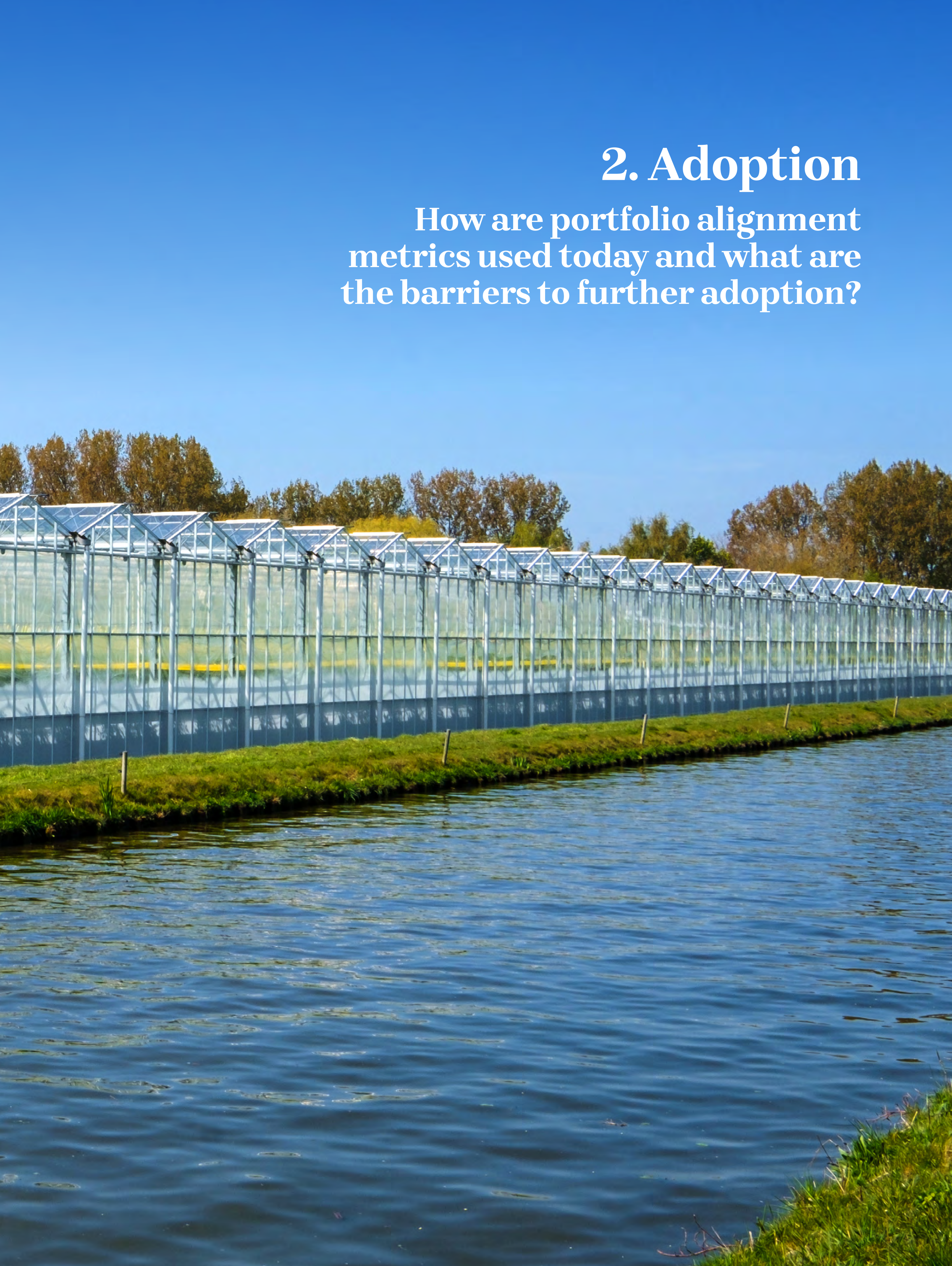
An example of a transitioning company could be an electric utility that recently announced a plan to become net-zero by 2050 and reduce emissions by 40% by 2030. To reach this target, the company has started a process of strategic transformation into renewable energy capacity with plans to construct large solar farms and has dedicated capital investments to further building out this renewable capacity. As a result, the company's absolute emissions have already reduced by 10% between 2018 and 2020.

Figure 4: Physical emissions intensity trajectories of a 1.5 degrees C-aligned company and a 1.5 degrees C transitioning company, based on their stated emissions reduction targets



2. Adoption

How are portfolio alignment metrics used today and what are the barriers to further adoption?



Following the introduction of the different types of portfolio alignment metrics in Section 1, this section explores potential use cases and how they might relate to key activities across different types of institutions in the financial sector. Questions for decision-makers highlight key considerations for practitioners when selecting a metric for a particular use case. Moreover, to help guide the discussion, each use case highlights potential approaches for incorporating portfolio alignment metrics into a range of processes at financial institutions.

2.1 HIGH-LEVEL OVERVIEW OF USE CASES

Based on feedback received, the GFANZ Portfolio Alignment Measurement workstream identified six distinct portfolio alignment use cases across two purpose-related dimensions: decision-making and communication. The decision-making dimension refers to a financial institution's net-zero implementation strategy. The communication dimension refers to the use of portfolio alignment metrics for disclosure. Table 3 provides a high-level overview of the dimensions; potential use cases; institution types; currently employed portfolio alignment metrics; and other suitable metrics.

When selecting an appropriate metric for a use case, it is also important to consider specific institutional factors. These institutional differences may mean that different institutions select different metrics for the same use case.

Table 3: Use cases and relevant metrics

FUNDAMENTAL PURPOSE	USE CASE	END USER TYPE(S)	CURRENT MOST ADOPTED METRIC(S)	OTHER SUITABLE METRIC(S)
Communication	Disclosure of net-zero progress 1. Disclosing progress against net-zero goals 2. Government and regulatory-driven disclosure 3. Disclosing the effect of policies on portfolio alignment	Asset Managers/ Asset Owners/ Banks/ Investment Consultants/ Insurers/Central banks and governments	• Binary target measurement • Maturity scale alignment	• Implied temperature rise
Decision-making	Engagement with clients or portfolio companies	Asset Managers/Asset Owners/Banks/Investment Consultants/ Insurers	• Binary target measurement • Maturity scale alignment	• Benchmark divergence • Implied temperature rise
	Investment research and selection	Asset Managers/ Asset Owners/Banks/ Investment Consultants	• Binary target measurement • Maturity scale alignment	• Implied temperature rise
	Communication portfolio construction	Asset Managers/Asset Owners/Investment Consultants	• Benchmark divergence • Maturity scale alignment	• Implied temperature rise • Binary target measurement
	Manager selection and monitoring	Asset Owners/ Investment Consultants	• Benchmark divergence • Maturity scale alignment	• Implied temperature rise
	Calibration and monitoring of net-zero targets	Asset Managers/ Asset Owners/Banks/ Investment Consultants/ Insurers	• Alignment metrics are not used for this purpose, at present	**Practitioners might find the following alignment metrics useful:** • Binary target measurement • Maturity scale alignment • Benchmark divergence • Implied temperature rise

2.2 USE CASES

2.2.1 Disclosure of net-zero progress

An increasing number of financial institutions have been communicating the alignment of their investment, lending, and underwriting activities with a 1.5 degrees C-aligned benchmark scenario to both internal and external stakeholders. Portfolio alignment metrics are typically just one of a range of metrics disclosed by financial institutions, alongside exposures to climate-related risks and opportunities[15], as outlined in the supplemental guidance of the Task Force on Climate-related Financial Disclosures (TCFD). For example, TCFD guidance recommends that financial institutions describe the extent to which their lending and other financial business activities are aligned with a benchmark scenario that is, itself, aligned to global warming of below 2 degrees C. TCFD recommends using those metrics best suited to a financial institution's organizational capabilities.[16]

The use of binary measurement is a frequently used approach by financial institutions to disclose progress. A more sophisticated method may be to disclose net-zero progress based on maturity scale buckets. This could help stakeholders understand how "aligned" and "aligning" assets in the portfolio are increasing over time. Finally, temperature metrics such as ITR bear a direct link to the climate goals and are therefore most intuitive to understand for a large range of stakeholders. For this reason, they are ideally suited for communicating progress of an investment, lending, or underwriting portfolio to net zero, and could address the TCFD's recommendation on disclosing alignment with a below 2 degrees C scenario, which is a temperature benchmark. However, practitioners should pay particular attention to the underlying assumptions that went into constructing the chosen temperature metric.

Potential considerations for decision-makers when selecting a portfolio alignment metric to disclose progress:

- What is my target audience and what metric would most resonate with this target audience?
- Which metric is best suited to help measure and communicate my climate-related impact on financial assets?
- Are there specific regulatory guidelines or standards to be followed?
- What might be the most appropriate approach to communicate changes in policies and how they impact my overall investment/lending/insurance book?

The following case studies feature three sub-categories to highlight how portfolio alignment metrics might be used for disclosure purposes: 1) Disclosing progress against net-zero goals, 2) Government-driven disclosure, and 3) Disclosing the effect of policies on portfolio alignment.

15 Financial Stability Board. Proposal for a disclosure task force on climate-related risks, 2015.

16 Task Force on Climate-related Financial Disclosures. Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures, 2021.

Disclosing progress against net-zero goals

Use case

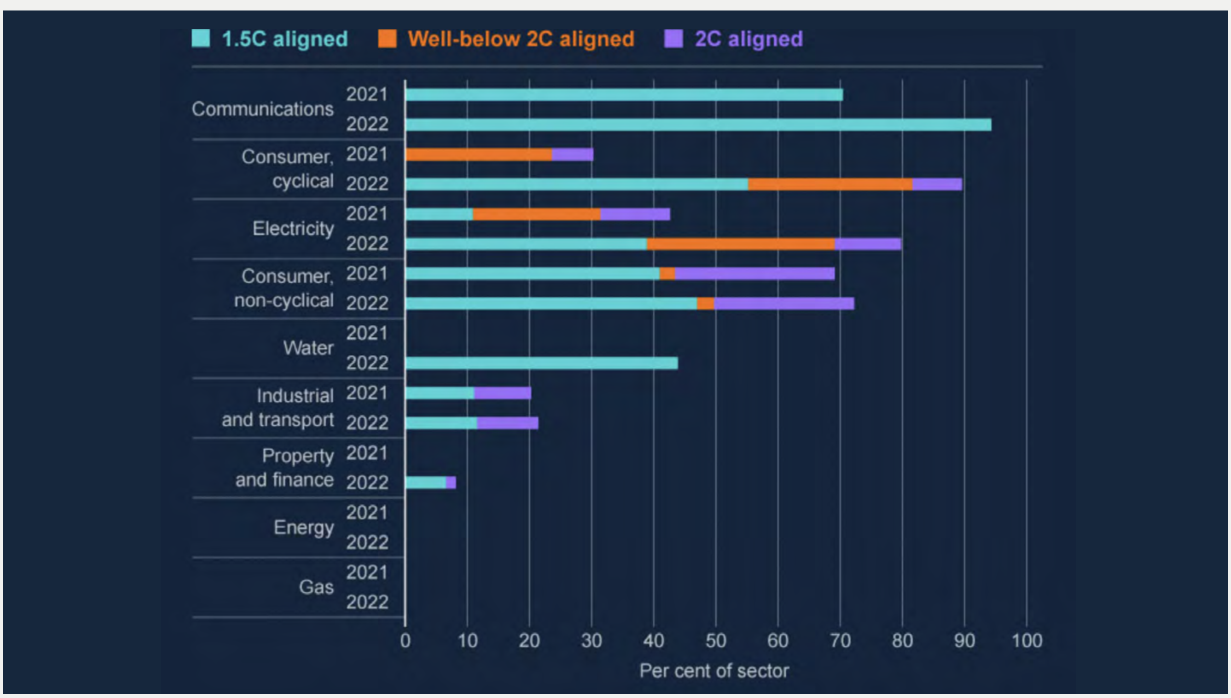
EXAMPLE 1: CASE STUDY ON DISCLOSURE OF PROGRESS AGAINST NET-ZERO GOALS FROM THE BANK OF ENGLAND[17]

Sub-sector of institution: Central banking

The Bank of England (the Bank) uses portfolio alignment metrics to disclose the progress of its Corporate Bond Purchase Scheme (CBPS), a monetary policy tool. In its 2022 TCFD disclosure, the Bank reported an implied temperature rise (ITR) of 2.4 degrees C for its CBPS in 2022. The methodology used by the Bank to calculate this ITR is in line with the methodological best practices outlined in the 2021 PAT Report.

When assessing the forward-looking performance of the CBPS, the Bank supplements the ITR metric with additional measures, such as a binary target measurement metric. This evaluates how many emissions reduction targets set by companies in the portfolio are subject to third party verification. Figure 5 highlights the proportion of companies within each sector of the CBPS that has a SBTi verified emissions reduction target, sub-divided by sector. The Bank records that the proportion of companies whose assets are held in the CBPS with SBTi verified targets has significantly increased from 2021 to 2022 from 38% to 59%.

Figure 5: Proportion of each CBPS sector with verified science-based target



17 The information discussed in this case study has been sourced from the Bank of England and their publicly available disclosure: Bank of England. The Bank of England's Climate-related financial disclosure, 2022.

Government-driven disclosures

Use case

EXAMPLE 2: CASE STUDY ON GOVERNMENT-DRIVEN DISCLOSURE BEST PRACTICES FROM SWITZERLAND'S STATE SECRETARIAT FOR INTERNATIONAL FINANCE (SIF)[18]

Sub-sector of institution: Government

Switzerland's State Secretariat for International Finance (SIF) is an administrative unit of the Swiss Confederation under the Federal Department of Finance, responsible for the implementation of the financial market policy of the Federal Council. SIF has recently introduced voluntary climate scores that establish what Switzerland currently views as best practice transparency on the climate alignment of investment products and financial institution portfolios. The scores provide investors and other market participants with decision-useful, climate-related indicators that may help them shape their preferred investment strategy. The scores also intend to drive convergence on methodological best practices, promote comparability, and create forward-looking transparency on the alignment of investment products sold in Switzerland with the 1.5 degrees C goal of the Paris Agreement.

Comparability is promoted by setting concrete minimum requirements on how each of the required indicators is derived. In contrast to the EU taxonomy, the climate scores have a greater focus on forward-looking transparency and capture how portfolio companies are positioned with respect to the transition to net zero. Switzerland is engaging with international bodies such as the G20, the Organization for Economic Co-operation and Development (OECD), and the International Platform for Sustainable Finance (IPSF) to present its climate scores as a useful forward-looking transparency tool to support the transition.

There are six elements that make up the SIF's climate scores:

- The share of portfolio companies with verified commitments to net zero and credible interim targets.
- The climate stewardship strategy, including the share of portfolio companies currently actively engaged in climate initiatives, or the membership of the financial institution in a climate engagement initiative.
- The investment strategy of the portfolio with the goal to reduce the carbon emissions of the underlying investments.
- The current share of portfolio companies with activities in coal and other fossil fuel-intensive sectors.
- The portfolio's current greenhouse gas emissions intensity and footprint.
- The global warming potential of the portfolio, based on implied temperature rise models (remains optional as further methodological convergence might be required).

18 The information discussed in this case study has been sourced from SIF and their publicly available document: Switzerland's State Secretariat for International Finance. Swiss Climate Scores, 2022.

Disclosing the effect of policies on portfolio alignment

An increasing number of financial institutions have established climate-related policies governing their business with high-emitting activities. These include coal policies covering mining and power generation, as well as oil and gas policies that are consistent with a transition to renewable energy sources. Portfolio alignment metrics can help to communicate to stakeholders the impact of these climate-related policies and conditions.

Maturity scale alignment metrics might be useful to showcase how policies on thermal coal producing companies have resulted in an increasing percentage of "aligned" portfolio assets. Equally, ITR could be used to communicate the temperature impact of divested coal and oil sand companies and how this has contributed to improving the overall alignment to net zero of the financial institution.

2.2.2 Engagement

A number of financial institutions currently use portfolio alignment metrics in conjunction with other key indicators (e.g., carbon performance data, target accreditation, governance data, etc.) to identify engagement targets. For example, for asset owners, an engagement trigger might be those portfolio companies that have not made a commitment to set science-based net-zero targets and are operating in a high-impact sector. Similarly, those portfolio companies that have been bucketed as "not aligned" or "aligning"[19] across a maturity scale might warrant a closer due diligence inspection. Engagement strategies can then be crafted based on what the metrics reveal.

Potential considerations for decision-makers when selecting a portfolio alignment metric for engagement:

- What are climate-related criteria for engaging with portfolio companies?
- Which alignment metric(s) is/are best suited to help me identify climate laggards and leaders in one of my portfolios?
- Which alignment metric(s) would best integrate into my overall engagement framework?
- Which alignment metric(s) would effectively support a dialogue with my portfolio company?
- Which alignment metric(s) would incentivize a behavior change in my portfolio company?

Portfolio alignment metrics can be a useful instrument during the engagement process to identify portfolio companies with activities misaligned to a financial institution's climate goals. As noted above, maturity scale alignment metrics are also effective for this use case. The binary target measurement approach is suited to track how the level of commitment of underlying portfolio companies increases over time, as the following case study on engagement from Generation Investment highlights. Moreover, benchmark divergence approaches can be complementary to the binary approach, as they help practitioners understand the distance of portfolio companies from a chosen benchmark based on current levels of emission intensity.

19 As defined in the Net Zero Investment Framework Implementation guide, 2021.

Use case

EXAMPLE 3: CASE STUDY ON ENGAGEMENT FROM GENERATION IM[20]

Sub-sector of institution: Asset management

Generation IM (Generation) is an investment manager focusing on sustainable investments. The firm uses portfolio alignment metrics (in particular, binary target measurement to track SBTi coverage) to inform the level of engagement required with the companies in its portfolios. This engagement includes where remedial action needs to be taken to resolve portfolio misalignment to both the 1.5 degrees C goal set by the Paris Agreement and Generation's goal to achieve net-zero emissions portfolios by 2040.[21] Where necessary, the engagement may include sustainability-linked requirements to secure Generation's vote for chair re-election. Two of the possible criteria for the chair of portfolio companies to secure Generation's vote for re-election include:

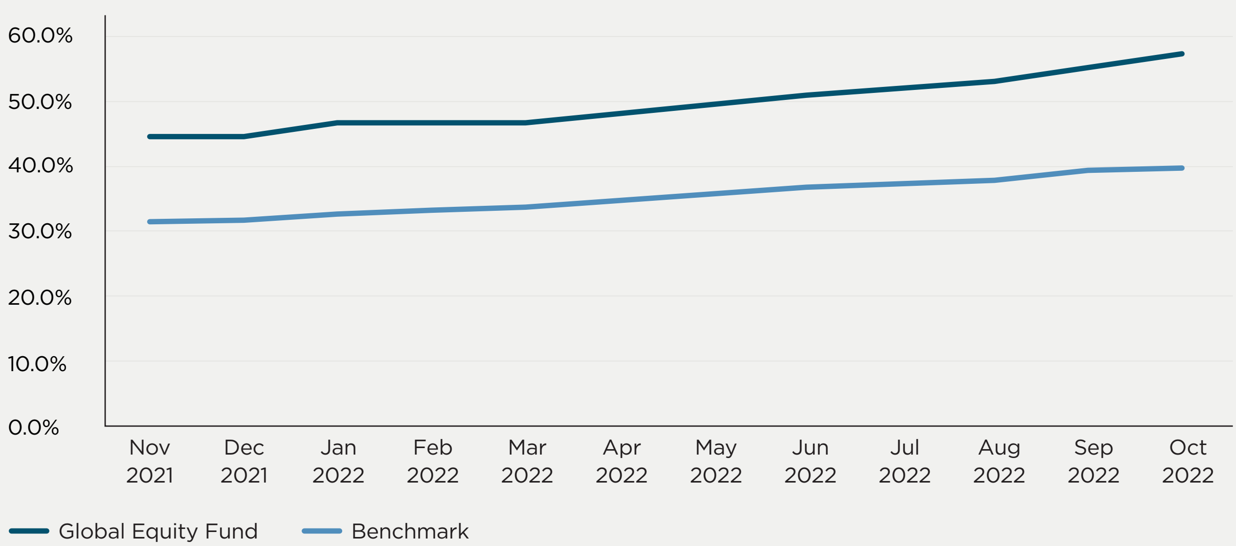
- A requirement that the company disclose its emissions, either in company reporting or via CDP
- The company formally commits to setting science-based targets with the SBTi (this will come into effect from 2023)

Figure 6 compares Generation's Global Equity Fund with the benchmark.[22] It shows the percentage of companies in its Global Equity Fund that participate in the SBTi.

Generation has stated publicly that its engagement is an important step in its efforts to steward its Global Equity Fund to net-zero emissions by 2040.

Figure 6: Comparing the share of companies that participate in SBTi within Generation's Global Equity Fund against the benchmark

Percentage of fund/benchmark containing companies with SBTi verified emissions reduction targets



20 Some of the information discussed in this case study has been sourced from a member of the GFANZ workstream on Portfolio Alignment Measurement, as part of the broader, public consultative work undertaken. More publicly available information can be found by following the links at the next two references.

21 Generation IM. Q1 2021 Global Equity Investor Letter, 2021.

22 Ibid.

2.2.3 Investment research and selection

Portfolio alignment metrics could be used in combination with traditional financial indicators to help financial institutions incorporate an environmental impact lens into their investment strategy. For example, portfolio alignment metrics could be used to identify portfolio companies that are already aligned with a 1.5 degrees C-aligned benchmark scenario in particular sectors. Attributing a more favorable investment research rating to these portfolio companies could help to tilt the investment universe in each sector to a higher percentage of companies that are 1.5 degrees C-aligned. This approach could help to ensure that investment funds are not divesting from carbon-intensive sectors of the economy but targeting those companies within sectors that are most committed to net zero.

The use of binary target measurement, for example to set selection rules for a minimum proportion of portfolio companies in each sector attributed to companies with SBTi-accredited targets, might be a useful way to get started. More sophisticated approaches could include the use of benchmark divergence to help tilt the investment universe in particular sectors to those companies that are more aligned on a relative basis, in combination with traditional investment indicators. The case study on investment research and selection from Lombard Odier illustrates how ITR metrics might also be a useful tool to tilt the investment universe to low temperature companies that stand out thanks to an innovative low carbon product offering and credible transition plans.

Potential considerations for decision-makers when selecting a portfolio alignment metric for investment research and selection:

- How can we incorporate climate-related impact considerations into our research process?
- Which alignment metric(s) is/are most easily or most effectively integrated into our existing investment research process?
- Which alignment metric(s) represents our climate commitment and do our processes need to be modified to incorporate this metric?

Use case

EXAMPLE 4: CASE STUDY ON INVESTMENT RESEARCH AND SELECTION FROM LOMBARD ODIER[23]

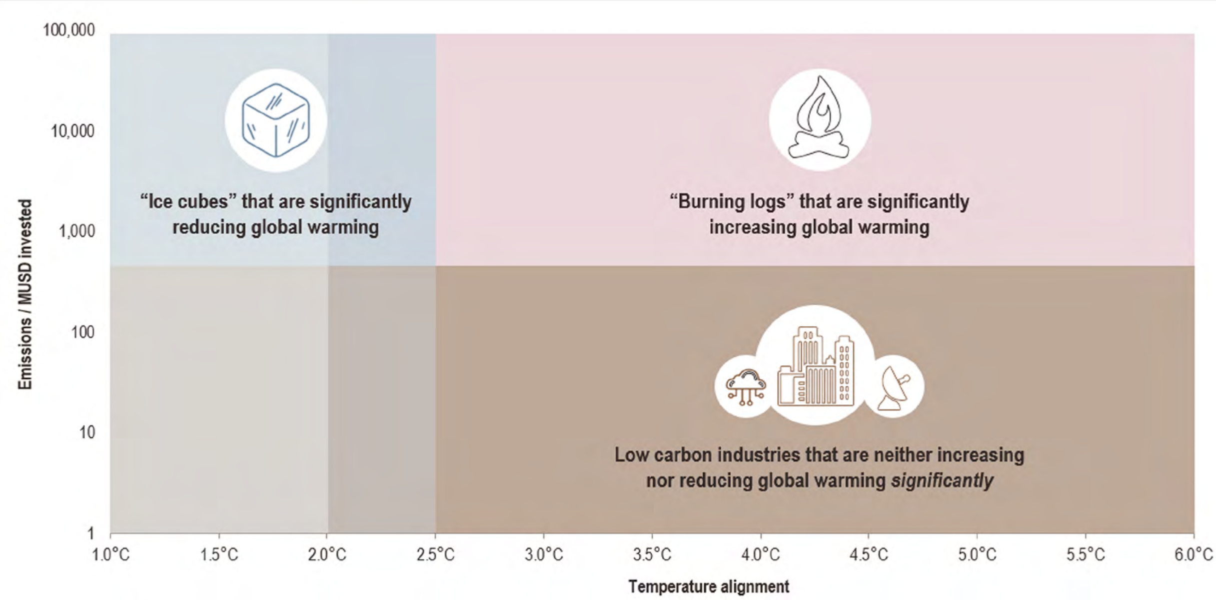
Sub-sector of institution: Asset Management

Lombard Odier is a Swiss private bank with an asset management division. Lombard Odier offers a series of “Target Net Zero” (TNZ) funds that operate under the constraint of maintaining an ITR of no more than 2 degrees C, with the goal of progressively accelerating the rate of decarbonization of the portfolio constituents to target net-zero emissions by 2050, so as to limit global warming to 1.5 degrees C.

Its TNZ funds achieve this goal by tilting capital towards “ice cubes”, or companies in high-emitting sectors, like auto manufacturing, steel, and cement, that are rapidly decarbonizing by having implemented innovative low carbon technology or that have robust and credible transition plans. At the same time, TNZ funds tilt capital away from “burning logs”, or high-carbon companies that are misaligned on a forward-looking basis. This tilting is illustrated in Figure 7. It is Lombard Odier’s conviction that burning logs will be particularly negatively exposed to the transition to net zero.

23 The information discussed in this case study has been sourced from a member of the GFANZ workstream on Portfolio Alignment Measurement, as part of the broader, public consultative work undertaken.

Figure 7: Example categorization of companies using emissions and temperature alignment for use in portfolio tilting



Lombard Odier relies on portfolio alignment metrics in its TNZ funds to maintain diversification, minimize tracking errors, and ultimately reduce the temperature of its investment funds.

2.2.4 Portfolio construction

To construct a diversified investment portfolio that is aligned with a 1.5 degrees C pathway, an asset manager might use portfolio alignment metrics to compare and trade off changes in sustainability characteristics of a given portfolio against resulting changes in other key characteristics, such as trading costs and liquidity. Some portfolio alignment metrics might also be suited to feed into quantitative portfolio optimization processes to help tilt the portfolio to companies in each sector that are most aligned to 1.5 degrees C while maintaining sector neutrality.

Potential considerations for decision-makers when selecting a portfolio alignment metric for portfolio construction:

- What changes do I need to consider in my current investment decision-making process to introduce climate-related impact considerations into the portfolio construction process?
- What data might be best suited for getting buy-in from our portfolio managers to integrate these climate-related impact considerations into existing portfolio construction processes?
- Which alignment metric(s) is/are most easily or most effectively integrated into our existing analytics process?
- What metrics has the most relevance to our climate commitment?
- How much weight should portfolio alignment metrics carry in the portfolio construction process?
- At what point in the portfolio construction process should portfolio alignment be integrated?

Maturity scale alignment metrics might be valuable tools in the portfolio construction process for setting investment thresholds according to clearly defined alignment buckets, with the goal to increase exposure to "aligning" categories over time. At the same time, a benchmark divergence metric might be well suited for feeding into existing portfolio optimization processes, alongside more traditional investment factors. The following case study on portfolio construction from Fulcrum Asset Management illustrates how an ITR metric might be used to integrate climate considerations into the portfolio construction process. A second case study illustrates how UBS have also used a forward-looking portfolio construction approach.

Use case

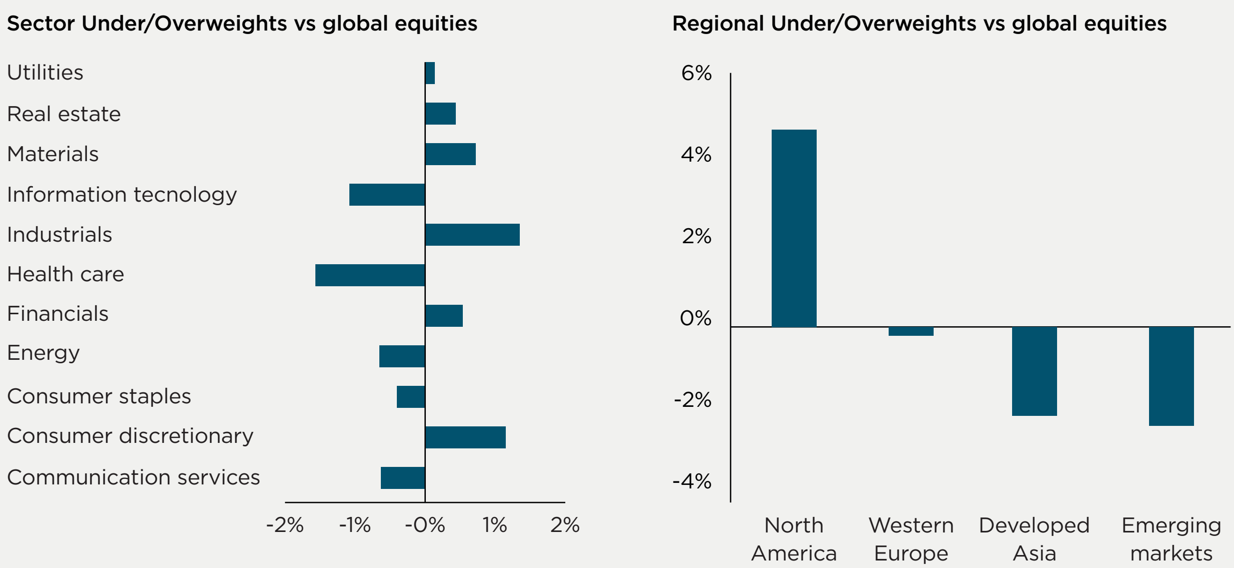
EXAMPLE 5: CASE STUDY ON PORTFOLIO CONSTRUCTION FROM FULCRUM ASSET MANAGEMENT[24]

Sub-sector of institution: Asset management

Fulcrum Asset Management (Fulcrum) is a global asset manager. The firm has used implied temperature rise metrics to construct a highly diversified global equity portfolio that only invests in companies aligned with the below 2 degrees C goal of the Paris Agreement, i.e., companies already demonstrating higher levels of ambition, in terms of emissions reductions, compared to the global economy.

Developed in partnership with Arvella Investments, the strategy places climate considerations in the portfolio construction process, whilst maintaining similar regional, sectoral and factor exposure to global listed markets.

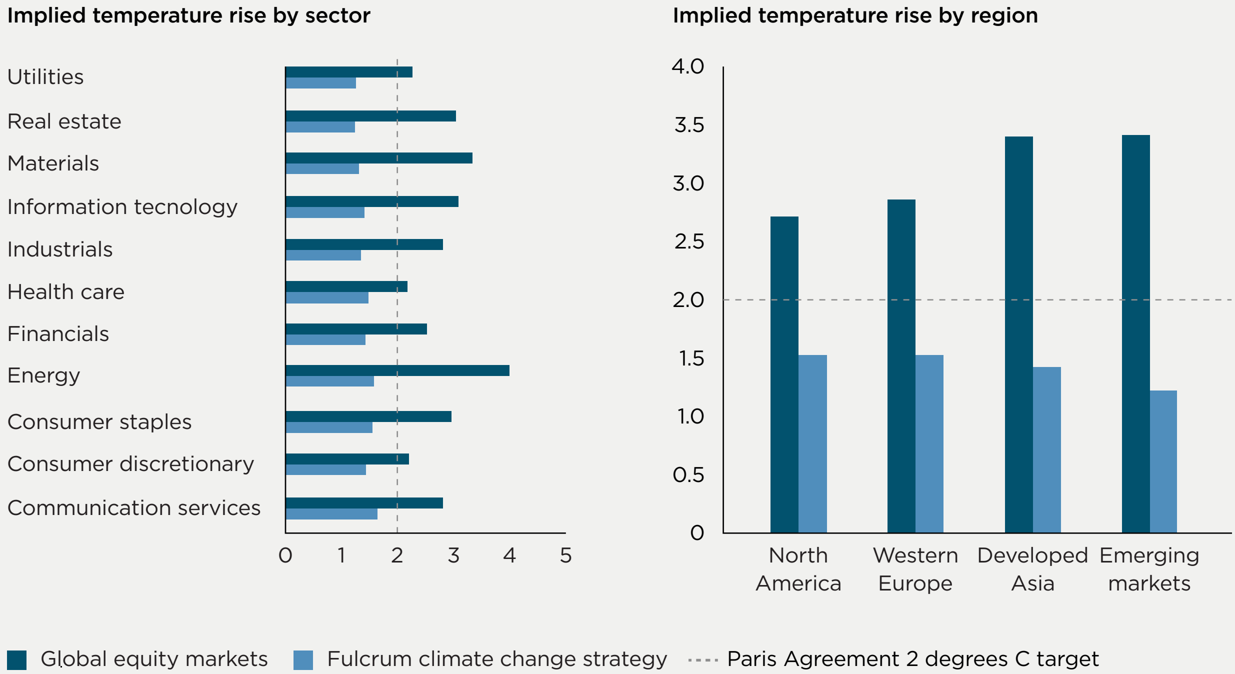
Figure 8: Sector and regional under/overweights vs. the MSCI all country world index[25]



24 The information discussed in this case study has been sourced from a member of the GFANZ workstream on Portfolio Alignment Measurement, as part of the broader, public consultative work undertaken.

25 The GFANZ workstream on Portfolio Alignment Measurement received this graphic from Fulcrum Asset Management LLP, who created it using data from MSCI, Bloomberg LLP, S&P Global Trucost and Fulcrum Asset Management (accurate as of 30 June 2022).

Figure 9: A comparison of the implied temperature rise by sector and by region of Fulcrum's climate change strategy and the MSCI all country world index[26]



The strategy is designed to serve as a core component of investors' equity allocation, helping to finance demand- and supply-side climate solutions, whilst having the potential to capture 'transition alpha' as markets begin to price in climate alignment. Fulcrum suggests that this approach addresses the challenge of aggregation (Judgement 9) by requiring all counterparties to be aligned, rather than relying on metrics at the average portfolio level. It also involves an engagement component, backed by voting sanctions, to encourage the adoption of independently verified science-based targets across markets.

The strategy was developed in the belief that its wide-scale adoption could significantly increase the probability of transitioning to a net-zero world.

26 Ibid.

Use case

EXAMPLE 6: CASE STUDY ON PORTFOLIO CONSTRUCTION FROM UBS[27]

Sub-sector of institution: Banking and asset management
UBS is a multinational diversified financial services company. In 2016 UBS partnered with the United Kingdom's National Employment Savings Trust (NEST) to devise a climate strategy addressing NEST's specific goal of managing climate change risks in its passive strategies, while maintaining a risk-return profile similar to the market capitalization-based benchmark.

UBS's strategy seeks to generate positive exposures to three types of companies: 1) companies that mitigate climate change risk, 2) companies that drive the adaptation of low carbon alternatives, and 3) companies that are crucial to the transition to a low-carbon economy.

In applying these selection criteria, UBS considers four perspectives when constructing a portfolio: 1) forward-looking climate-related characteristics; 2) index-like characteristics of the portfolio to achieve close tracking of the benchmark; 3) coverage of Scope 1, 2, 3 emissions; and 4) an engagement and voting approach.

To incorporate a forward-looking dimension into the portfolio construction process, UBS uses "Net Zero Emissions (NZE) Glide Path Probability" metrics. They can be considered an example of portfolio alignment metrics as they assess the probability that a company is aligned with a net-zero emissions scenario for its sector. Specifically, the glide path tool draws on a quantitative model that considers a company's trajectory of emissions over the last seven years. It compares this profile relative to its peers, as well as the relevant sectoral pathway implied by the net-zero scenario used.

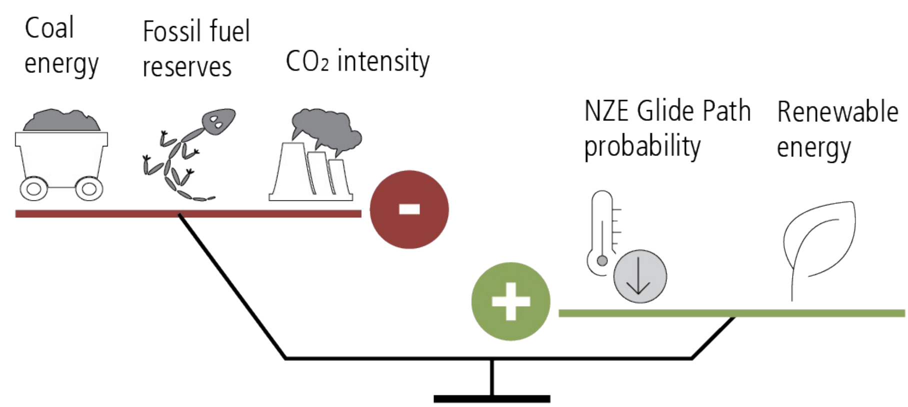
The three primary data inputs for the glide path tool are:

- Historical Scope 1, 2, and 3 emissions of the underlying portfolio companies.
- Company emissions disclosures (as opposed to estimates from data vendors).
- Company targets, policies, and/or initiatives to reduce the company's carbon emissions.

UBS uses companies' Glide Path Probabilities in portfolio construction to apply a "positive tilt" to companies that perform in line with globally agreed climate change goals, one of five factor tilts that UBS leverages for its Climate Aware model portfolio. Figure 10 illustrates the five factor tilts applied to the Climate Aware model portfolio.

27 The information discussed in this case study has been sourced from a member of the GFANZ workstream on Portfolio Alignment Measurement, as part of the broader, public consultative work undertaken. Related publicly available information can be found at this link.

Figure 10: Factor tilts applied to the Climate Aware model portfolio



2.2.5 Manager selection and monitoring

Investment consultants increasingly support asset owners with the integration of climate-related considerations in their overall asset allocation process, for example, when evaluating and monitoring investment mandates across asset managers.

Measuring the alignment of different managers across a maturity scale might help to provide insight on the percentage of aligned and misaligned assets across different managers and thus inform asset allocation decisions. When using ITR for this purpose, a user may set temperature thresholds to define the percentage of aligned and misaligned companies (e.g., 1.5 degrees C or 2 degrees C). Such a classification might include fewer criteria than maturity scale alignment metrics.

Potential considerations for decision-makers when selecting a portfolio alignment metric for manager selection and monitoring:

- What available data do I have for my individual managers?
- How can the data help inform climate-related considerations?
- How would the use of a specific portfolio alignment metric integrate with existing considerations in the asset manager selection process and in the ongoing monitoring?
- Which portfolio alignment metric(s) most closely represent my climate commitment and can be used to convey this to my managers?

Use case

EXAMPLE 7: CASE STUDY ON MANAGER SELECTION AND MONITORING FROM WILLIS TOWERS WATSON (WTW)[28]

Sub-sector of institution: Investment Consultant

Willis Towers Watson (WTW) is a major global advisory firm to asset owners. WTW measures progress against climate goals using multiple metrics in the form of climate dashboards that considers the multiple dimensions of "success". The metrics for one such dashboard, illustrated below, include a maturity scale alignment metric, contribution of a portfolio to misaligned emissions metric, transition risk exposure metric, and a climate solutions contribution metric. WTW believes that the use and interpretation of portfolio alignment metrics can be enhanced by considering other metrics, for example, transition risk and climate solution financing, and must also be considered in the context of investors' overall financial and other goals.

One of the use cases for portfolio alignment metrics for WTW is the evaluation and monitoring of external asset managers. In order to calculate the maturity scale alignment metric, a "decision tree" based on a proprietary methodology developed by WTW is used to implement the Net Zero Investment Framework's alignment maturity scale approach. Each security is then determined to be either "not aligned", "committed to aligning", "aligning", "aligned" or "net-zero".[29] The approach provides insight into the current degree of (mis)alignment in portfolios and identifies those asset managers and underlying assets with whom the portfolio manager should engage to ensure that at least 70% of emissions in each asset class are aligned, aligning, or subject to engagement/stewardship activities.

The next step is then to assess the likely timeframe over which engagement activities should result in improvements in the alignment of individual strategies, to set out an engagement — and escalation — plan and conduct the engagement. This is also used to as inform the pathway via which alignment targets should be increased over time. A typical timeframe for engagement could be ~12 months, after which alternative portfolio management actions (e.g., mandate or asset allocation changes) could be considered. Table 4 below shows an illustrative heatmap assessment of individual strategies and the resulting suggested management actions that will be considered.

28 The information discussed in this case study was sourced from a member of the GFANZ workstream on Portfolio Alignment Measurement, as part of the broader, public consultative work undertaken.

29 WTW's methodology uses a combination of Climate Action 100+, TPI and SBTi indicators, supported by broader ESG data sources to fill gaps in coverage, to derive the indicators recommended by the NZIF to categorizing companies along the alignment maturity scale.

Table 4: Illustrative heatmap assessment of managers and suggested management action[30]

ASSET CLASS	MANAGER	LEVEL OF MISALIGNMENT	CONTRIBUTION TO MISALIGNED EMISSIONS	TRANSITION RISK EXPOSURE	CLIMATE SOLUTIONS CONTRIBUTION	DATA QUALITY	SUGGESTED MANAGEMENT ACTION
Equities	Manager 1					High	No near-term action
Equities	Manager 2					High	No near-term action
Real assets	Manager 3					High	High priority engagement target
Credit	Manager 4					High	Medium priority engagement target
Credit	Manager 5					High	High priority engagement target
Diversifying strategies	Manager 6					Low	Prioritize data quality improvements

Use case

EXAMPLE 8: CASE STUDY ON MANAGER SELECTION AND MONITORING FROM CAMBRIDGE ASSOCIATES[31]

Sub-sector of institution: Investment consultant

Cambridge Associates is a global investment consultant. As a part of its asset manager oversight process on behalf of its asset owner clients, Cambridge Associates uses a variety of metrics to assess asset managers' performance on climate considerations. The list of metrics includes the binary measurement of alignment by portfolio (assessed as the proportion of aligned versus non-aligned companies as identified by TPI and SBTi datasets), current and recent trend emissions on an absolute and intensity basis, an ITR model (at the security and portfolio level), and finally the level of exposure to climate solutions. Cambridge Associates uses the same ITR model for all asset managers, such that it provides one way of ranking asset managers on portfolio alignment in a comparable manner. At least as important as each of these quantitative inputs is the discussion with the manager, and review of their individual decisions, in order to understand the extent of their understanding of each portfolio position from a climate perspective and how this knowledge is incorporated into the manager's investment process, driving buy/sell decisions as well as engagement and voting.

30 The GFANZ workstream on Portfolio Alignment Measurement received this graphic from WTW, who created it using data from WTW, Climate Action 100+, Factset, Germanwatch, MSCI, TPI, SBTi.

31 The information discussed in this case study was sourced from a member of the GFANZ workstream on Portfolio Alignment Measurement, as part of the broader, public consultative work undertaken by this workstream.

Cambridge Associates seeks to avoid over-quantification of alignment judgements, especially the use of single aggregate metrics. Rather, it synthesizes the above range of inputs to build a holistic picture of an asset manager's approach and uses this as an input for conversations to understand their climate-related strategy and identify any weaknesses/areas for improvement as well as their appropriateness for different client types.

In the spirit of the NZICI commitment to driving real world change, Cambridge Associates looks for managers that focus on companies that need to transform and how, as much as those constructing a portfolio of companies already on a pathway aligned with net-zero.

2.2.6 Calibration and monitoring of net-zero targets

The forward-looking nature of portfolio alignment metrics, and the enhanced guidance offered in this report could help net-zero alliance members calibrate and monitor their current target setting process.

For example, an investor or a bank could project the future emissions of its investment/lending book by scrutinizing the emissions reduction targets of the underlying counterparties compared to a 1.5 degree C-aligned pathway. Credibility checking the emissions reduction targets of counterparties with the help of an illustrative credibility framework[32] could feed into an ongoing internal target calibration or monitoring process.

Many financial institutions use the portfolio coverage method to set targets[33] and track progress of the number of portfolio companies with net-zero commitments, in line with the binary target measurement approach. Maturity scale alignment metrics can also track progress in the same way, but with greater granularity through the use of alignment categories. Benchmark divergence and ITR metrics, on the other hand, incorporate forward-looking commitments and provide insight about the total overshoot or undershoot to a net-zero aligned pathway. Computing the overshoot or undershoot based on both reported (historical) emissions and future net-zero commitments of portfolio companies could therefore help to project future emissions for target setting purposes and be complementary to target setting approaches based on financed emissions.

Potential considerations for decision-makers when selecting a portfolio alignment metric to calibrate and monitor net-zero targets:

- Which alignment metrics can best support and direct our target setting process?
- Which metrics can best support enabling real-economy reductions with the set reduction commitment?
- How might investment, lending and underwriting policies need to be revised to help me achieve the set target?
- How can I optimally track progress of my target(s)?

32 Introduced in section 3.6 of this report, for example, when cross-checking counterparties' targets against their forward-looking CapEx plans and a supporting policy environment in underlying operations.

33 SBTi, Financial Institutions Tools.

2.3 STARTING THE JOURNEY: PORTFOLIO ALIGNMENT MEASUREMENT FOR TRANSITION FINANCE IN PRIVATE EQUITY

Private Equity (PE) firms are well placed to actively drive net-zero transformations of small and medium enterprises (SMEs), as they often sit on the boards of their SME portfolio companies and can empower them to focus on the benefits of net-zero transition planning.

When PE firms consider the acquisition of carbon-intensive companies, with the intention of achieving long-term emissions reductions, the use of forward-looking considerations and the credibility assessment of prospective portfolio company transition plans is crucial. Therefore, portfolio alignment measurement will play an increasingly important role for PE firms and their transition financing activities.

Implementation

EXAMPLE 9: BROOKFIELD GLOBAL TRANSITION FUND[34]

The Brookfield Global Transition Fund (BGTF) is a fund dedicated to accelerating the transition to net zero, launched by Brookfield Asset Management, a multinational investment management company.[35]

BGTF has begun making early investments within the business transformation theme. To illustrate how the process works, the following hypothetical case study has been constructed, drawing on the real-life learnings from the BGTF experience so far. This hypothetical case centers on UtilityCo, a large-scale electric utility, predominantly operating thermal power assets alongside some renewables. BGTF will fund UtilityCo's decarbonization plan by decommissioning its coal assets early and developing a significant renewable portfolio to replace it.

At the screen stage, BGTF deploys four measures to ensure the investment meets the impact criteria for the Fund. For BGTF to invest, it must be able to align the investment to a sectoral emissions pathway consistent with the goals of the Paris Agreement; the investment (either through capital or operations) must provide additionality to what would otherwise occur; there must be accountability in emissions reporting enabling BGTF to track process against the plan; and the investment must be able to avoid or mitigate other related ESG risks.

BGTF will analyze UtilityCo's emissions forecast and project their emissions intensity against a benchmark sectoral pathway to assess Paris-Alignment and set targets for the business on an interim and long-term basis. The emissions forecast is designed to take into account both the credibility and execution feasibility of the plan. These forecasts are reviewed against the relevant benchmark sectoral pathway to assess Paris-alignment on a short-, medium- and long-term basis. Emissions

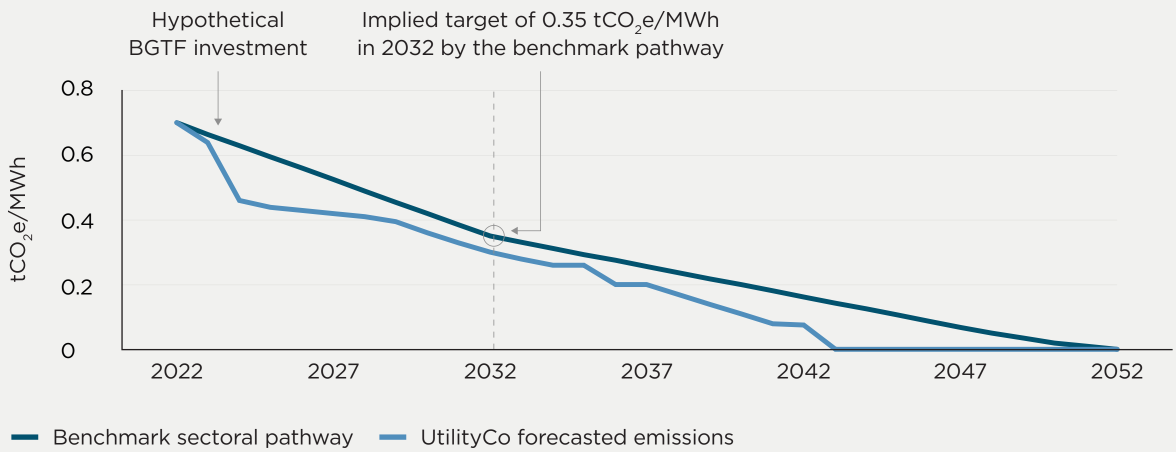
34 The information discussed in this case study has been sourced from direct engagement by the GFANZ workstream on Portfolio Alignment Measurement, as part of the broader, public consultative work undertaken by this workstream.

35 Disclaimer: This document is being provided as a high-level overview of Brookfield's views on making "business transformation" investments and the case study discussed herein is hypothetical and for illustrative purposes only. Nothing herein should be constructed as being an offer, invitation or recommendation of any kind and this document is not to be construed as a prospectus, product disclosure statement or advertisement. This document may not be used or reproduced.

reduction targets are set both on an interim and a long-term basis based on what is required by the selected sector pathway, with interim targets in this hypothetical case setting a 50% cut in emissions intensity (tCO2e/MWh) by 2032 from the baseline year of 2022.

Figure 11: UtilityCo's emissions intensity forecast after hypothetical BGTF investment

tCO_2e/MWh



BGTF's financial underwriting is aligned to incorporate any financial investments or early retirements required for the investment to meet this clear emissions reduction target. In this case, the phase-out of emitting assets will be crucial steps along the way to meeting the interim target, and as part of the due diligence, BGTF will prepare an analysis to confirm the viability of these phase-outs, while considering factors such as "just transition" with respect to employees and stability of the power sector.

Post-acquisition, BGTF will require UtilityCo to track emissions in accordance with the GHG Protocol and will look to align with TCFD recommended disclosures. This data will be reported to investors in BGTF on a regular basis to ensure transparency and accountability for the business and Fund.

2.4 BARRIERS TO ADOPTION

Though progress has been made regarding the adoption of portfolio alignment metrics, as reflected by the range of use cases presented, barriers to wider adoption remain.

Based on feedback received during the consultation, the barriers identified broadly fall into two categories: methodological and implementation-based barriers. The first category relates to design choices when constructing the metric and where they would benefit from further elaboration and clearer guidance. The second category relates to implementation challenges that limit the broader adoption of alignment metrics.

Table 5 summarizes the barriers and illustrates how and where this report addresses each challenge that a barrier introduces.[36]

36 GFANZ. 2022 Concept Note on Portfolio Alignment Measurement, 2022.

Table 5: Summary of barriers to adoption

KEY DESIGN JUDGEMENT (WHERE APPLICABLE)	BARRIER CATEGORY	BARRIER	CHALLENGE(S)	HOW THIS REPORT IS ADDRESSING THE CHALLENGE
All	Methodological and Implementation	Uncertainty and lack of transparency.	There is a lack of understanding of the quality of underlying data feeding into the model, for example corporate reported emissions data. There is a lack of transparency regarding underlying model complexities; the relevance of assumptions; and the appropriateness of modelling. Transparency varies depending on metric provider.	Enhancements to the Key Design Judgements are provided throughout Section 3 to drive convergence on methodological best practices.
1	Methodological	How should alignment be measured?	There is a lack of clarity regarding how to implement the fair-share carbon budget approach.	Section 3.1 features quantitative analytics examples and a practitioner case study to greater illustrate the fair-share carbon budget approach.
2	Methodological	What is the appropriate benchmark scenario?	There is a lack of clarity about how to select appropriate 1.5 degrees C-aligned benchmark scenarios for specific portfolio alignment use cases.	Section 3.2 features the outputs from the GFANZ workstream on Sectoral Pathways, including a framework that outlines the considerations that financial institutions should understand about benchmark scenarios to support selection and decision-making.
3	Methodological	The use of different emissions units.	There is a lack of clarity about which emissions unit is the most suitable to get representative company alignment outcomes in high-impact sectors (e.g., oil and gas).	Section 3.3 features guidance on the most suitable measurement unit for different sectors, including specific guidance for the oil and gas sector.
4	Implementation	Shortcomings in required data.	There is a lack of corporate emissions disclosure, in particular Scope 3 value chain emissions. There is insufficient convergence on methodological best practices for reporting of Scope 3 emissions. Finally, there is a lack of clarity on the materiality of Scope 3 emissions by sector and category.	Section 3.4 features analysis on the materiality of Scope 3 emissions by sector and category.

KEY DESIGN JUDGEMENT (WHERE APPLICABLE)	BARRIER CATEGORY	BARRIER	CHALLENGE(S)	HOW THIS REPORT IS ADDRESSING THE CHALLENGE
6	Methodological	Lack of guidance on how to forecast issuer-level emissions	There is a lack of guidance for forecasting emissions and assessing the credibility of companies stated emissions reduction targets.	Section 3.6 provides guidance for forecasting emissions and includes a framework for assessing the credibility of companies' stated emissions reduction targets.
7	Methodological	What is the correct time horizon for measuring alignment?	There is a lack of clarity about how to select a time horizon that will appropriately capture the alignment of companies.	Section 3.7 provides guidance on the appropriate time horizons to use when assessing alignment.
8	Implementation	What are the appropriate metrics for expressing alignment for specific use cases?	There is a lack of agreement about which portfolio alignment metric to use. The variety currently used makes it hard to compare.	Section 3.8 provides guidance on the appropriate portfolio alignment metrics for particular use cases.
-	Implementation	The impact of climate solutions financing is not reflected in portfolio alignment benchmarks.	Within current portfolio alignment metrics there is a lack of consideration for the role of climate solutions in avoiding emissions.	Appendix S features practitioner case studies illustrating possible approaches to account for climate solutions financing in alignment measurement. See Section 5 for more details on how this challenge will be addressed by future GFANZ work.
-	Implementation	Lack of availability of portfolio alignment metrics across the full range of asset classes.	A lack of portfolio alignment metrics that are applicable to all asset classes limits full portfolio coverage.	Challenge to be addressed in future GFANZ work. (See Section 5 for more details)

3. Enhancement

Progressing portfolio alignment measurement

To address the methodological barriers to adoption outlined in Section 2, this section builds on the analysis and considerations of the 2021 Portfolio Alignment Team (PAT) report. Based on feedback received during the consultation and engagement with practitioners, refined best practice recommendations have been provided for Key Design Judgements 1, 3, 4, 6, 7, 8, and 9.

HIGH-LEVEL SUMMARY OF ENHANCEMENTS TO KEY DESIGN JUDGEMENTS

Guidance for each Key Design Judgement is summarized in Table 6. Supporting analysis and discussion for this guidance is provided throughout Section 3.

Table 6: Summary of guidance by Key Design Judgement

KEY DESIGN JUDGEMENT	APPLICABLE PORTFOLIO ALIGNMENT METRIC	GUIDANCE
1. What type of benchmark should be built?	Benchmark divergence ITR	**All sectors** • Practitioners should use single-scenario benchmark approaches. **Benchmark construction approaches for homogenous sectors:** • Practitioners should apply a fair-share carbon budget approach converting physical emissions intensity into absolute emissions. • Where such an approach is not feasible, the convergence approach should be used. • Where technology pathways are used to complement emissions-based metrics (under Judgement 3), the “sector market share” approach could be applied. **Benchmark construction approaches for heterogenous sectors:** • Practitioners should apply a fair-share carbon budget approach converting economic emissions intensity into absolute emissions. • If practitioners prefer not to use economic intensity units, a rate-of-reduction benchmark should be applied.
2. How should benchmark scenarios be selected?	Benchmark divergence ITR Maturity scale alignment	• When considering the selection of a 1.5 degrees C-aligned benchmark scenario, practitioners could follow the GFANZ guidance on use of sectoral pathways for financial institutions.[37] • Practitioners should regularly update benchmark scenarios used for portfolio alignment measurement and provide transparency on the impact of this update to end users. • Practitioners should prioritize benchmark scenarios with regional and sectoral granularity that capture the specific differences in emissions reduction feasibility.

37 GFANZ. Guidance on the Use of Sectoral Pathways for Financial Institutions, 2022.

KEY DESIGN JUDGEMENT	APPLICABLE PORTFOLIO ALIGNMENT METRIC	GUIDANCE
3. Should absolute emissions, production capacity, or emissions intensity units be used?	● Benchmark divergence ● ITR ● Maturity scale alignment	**Oil and gas sector guidance:** • Practitioners should use multiple metrics in combination to measure the alignment of oil and gas companies, so as to reflect different decarbonization levers and their relevant benchmarks, for example: – An absolute emissions unit to reflect the overall reduction in output necessary to meet emissions-based net-zero scenarios. – A unit of physical-emissions intensity — specifically, one that measures emissions per unit of production — to reflect improvements in operational efficiency. – An additional unit of physical emissions intensity — specifically, one that measures emissions per unit of total energy — to reflect transition activities into renewable energy and biofuels. **Guidance for homogenous sectors:** • The use of physical intensity units is preferred to economic intensity units. • Where possible, the fair-share carbon budget approach should be applied, converting physical emissions intensities into absolute emissions. **Guidance for heterogenous sectors:** • Where possible, the fair-share carbon budget approach should be applied, converting economic emissions intensities into absolute emissions. • Alternatively, where practitioners prefer not to use economic intensity units, the use of absolute emissions in conjunction with a rate-of-reduction approach is recommended.
4. What scope of emissions should be included?	● Benchmark divergence ● ITR ● Maturity scale alignment	• Practitioners should consider prioritizing the inclusion of Scope 3 emissions where: – A company's Scope 3 emissions exceed 40% of its total emissions, and the company is in sectors identified in Section 3.4. – A company's Scope 3 emissions are considerably large in absolute magnitude. • At a minimum, the following material Scope 3 emissions categories for high-impact sectors should be included: categories 1 and 11 for Oil and Gas, categories 3 and 11 for Electric Utilities, categories 1 and 11 for Automotive, Consumer Staples, and Chemicals.[38] • Practitioners can use reported Scope 3 data where the reported data include material categories, or estimated data, when reported data do not include the most material categories or where the use of activity-based estimates would yield more comparable results.

38 GHG protocol list of Scope 3 emissions categories.

KEY DESIGN JUDGEMENT	APPLICABLE PORTFOLIO ALIGNMENT METRIC	GUIDANCE
5. How should emissions baselines be quantified?	Benchmark divergence ITR Maturity scale alignment	• To set adequate baselines, practitioners should quantify all seven greenhouse gases (GHGs) mandated by the Kyoto Protocol and consider methane separately for sectors in which methane forms a substantial proportion of total emissions. • Practitioners should consider the PCAF Standard's suggestion to prioritize reported emissions over estimated emissions data, at least for Scope 1 and Scope 2 emissions. • For Scope 3 emissions, because of incomplete disclosures, practitioners could utilize estimated data, ideally based on activity levels as close as possible to the emissions drivers. • Practitioners should consider ranking the quality of their emissions data sources (for example using PCAF's standard data-quality scoring framework or comparable approaches).
6. How should forward-looking emissions be estimated?	Binary target measurement Benchmark divergence ITR Maturity scale alignment	**For companies with emissions reduction targets:** • Practitioners should project a company's future emissions trajectory using a combination of two distinct emission forecasts: – A forward-looking approach based on the company's stated emissions reduction target. – A backward-looking approach based on the company's historical emissions data. • Practitioners should perform a credibility assessment of companies' emissions reduction targets to reflect the likelihood that the target will be achieved, considering the key indicators outlined in this section. The output of this assessment should be used to determine the weighting between the forward- and backward-looking emissions projections, with higher weightings attributed to companies with more credible targets. **For companies without emissions reduction targets:** • Practitioners should implement a "waterfall" approach that uses four types of data, in the following order of priority: 1) production forecasts, 2) historical emissions or activity-trend forecasts, 3) neutral emissions intensity, and 4) a benchmark emissions growth rate. • Practitioners should consider implementing a lower bound score on the alignment metric for companies with no stated emissions reductions targets.

KEY DESIGN JUDGEMENT	APPLICABLE PORTFOLIO ALIGNMENT METRIC	GUIDANCE
7. How should alignment be measured?	● Benchmark divergence ● ITR	• Practitioners should compute alignment on a cumulative emissions basis to reflect that there is a finite carbon budget remaining. • Practitioners should prioritize computing alignment over short- or medium-term time horizons. This could be optionally supplemented with computations over long-term time horizons. • When computing ITR over short- and medium-term time horizons, multiple benchmark interpolation approaches are preferred. When computing ITR over long-term time horizons, a TCRE (transient climate response to cumulative emissions of carbon dioxide) multiplier approach could be used.
8. How should alignment be expressed as a metric?	● Binary target measurement ● Benchmark divergence ● ITR ● Maturity scale alignment	• When selecting a portfolio alignment metric, practitioners should consider its suitability for the specific use case(s).
9. How should counterparty-level scores be aggregated?	● Benchmark divergence ● ITR	• Practitioners should use an aggregated-budget approach, as this allows to compute the portfolio-level carbon budget overshoot or undershoot. • When calculating ITR using an aggregated budget approach, practitioners should convert the total carbon budget overshoot or undershoot into a temperature, consistent with the methodology they selected in Judgement 7 and 8.

Deep Dive: Key Design Judgements

3.1 KEY DESIGN JUDGEMENT 1: WHAT TYPE OF BENCHMARK SHOULD BE BUILT?

Benchmark divergence   ITR

The first decision when calculating portfolio alignment metrics is how to construct the benchmark. This decision comprises two steps: 1) choosing between a single-scenario benchmark approach or a warming function; and 2) if using a single-scenario benchmark approach, choosing between convergence, rate-of-reduction, or fair-share carbon budget approaches. A choice between different single-scenario benchmark approaches is particularly important, because it impacts a variety of other Judgements, such as the choice of unit,[39] as well as compatibility with forward-looking pathways. If production capacity units are chosen as a complement to emissions metrics, the "sector market share" approach can be used (See further details in Example 32, Appendix S). More broadly, the benchmark construction approach has implications for how companies' decarbonization trajectories compare to the constructed benchmark. This comparison will, in turn, affect the final alignment result.

Current state of practices for Judgement 1

Single-scenario benchmarks benefit from their simplicity: They are easy to implement, easy to explain, and easy to understand. Furthermore, if all the benchmarks used by a portfolio alignment tool are drawn from a single scenario, the method is guaranteed to be internally consistent. The single-scenario benchmark approach also provides flexibility in the construction process, allowing for the use of either emissions-intensity units or absolute-emissions units, as well as technology or production capacities. However, the main drawback of using a single-scenario benchmark is the risk of selection bias through the choice of scenario. This can potentially anchor portfolio alignment approaches to a less ambitious pathway.

Warming functions, on the other hand, have the benefit of reducing (though not eliminating) selection bias by drawing on a wider range of scenarios. However, this approach has several drawbacks. First, it is usually based on intensity rather than absolute emissions. It can also be much more complex to implement, harder to explain and interpret, and more opaque in its assumptions and its sensitivities to those assumptions.[40]

Both single-scenario and warming functions have merit. However, based on broad feedback received, the single-scenario benchmark approach is generally preferred due to its simplicity and relative ease of implementation. In addition, multiple benchmark scenarios can be combined in a single scenario to help reduce the selection bias. As a result, the remainder of this section focuses on the challenges and potential solutions for constructing and using single-scenario benchmarks.

There are three possible approaches to constructing a single-scenario benchmark:

1. **Convergence-based** approaches assume that all companies in a sector are expected to converge to a required sector average level of emissions intensity, considering the starting position of each company in a sector compared to this average.

39 For example, absolute emissions (tons of CO_2e), production capacity (e.g., barrels of oil, number of vehicles sold), or emissions intensity (e.g., tons of CO_2 per tons of steel).

40 See Portfolio Alignment Team. Measuring Portfolio Alignment: Technical Considerations, 2021, p. 26-27 for further details on warming functions vs. single-scenario benchmark approaches.

2. **Rate-of-reduction** approaches assume that all companies reduce emissions at the same annual rate.
3. **Fair-share carbon budget** approaches create company-specific benchmarks for the rate of reduction of absolute emissions. The starting point for a company is based on a comparison of its emissions intensity with the sector average. This approach defines an average rate of reduction in emissions for a sector as a whole but recognizes that individual companies will perform better or worse than the sector average.[41]

Table 7 outlines how the key challenges of using convergence and rate-of-reduction approaches could be addressed with the use of a fair-share carbon budget approach.

Table 7: Challenges with convergence and rate-of-reduction approaches

APPROACH	CHALLENGES	HOW THE FAIR-SHARE CARBON BUDGET APPROACH RESOLVES THIS ISSUE
Convergence	Due to the use of emissions intensity, this approach does not have a direct link to the global carbon budget. As such, a convergence approach can result in positive alignment outcomes in the absence of reductions in emissions in the real economy.	The fair-share carbon budget approach bases its assessments on company-specific, rate-of-reduction benchmarks. These convert emission intensities into absolute emissions, thereby preserving a direct link to the carbon budget.
Rate-of-reduction	This approach has the potential to penalize better performing companies. Companies that have already taken economically efficient decarbonization measures will be expected to achieve the same year-over-year reduction rates as companies that have not so far reduced emissions.	A fair-share carbon budget approach does not penalize better performing companies (as measured by their carbon intensity). It accounts for the relative performance of companies' physical intensities at the starting point of the alignment calculation.

Where practitioners are using production metrics, an equivalent to the fair-share carbon budget approach, referred to as the "sector market share" approach, could be used (see Appendix S for more information). This approach compares a production trajectory pathway on a five-year, forward-looking basis against a company´s planned production. Production capacity changes are derived from a chosen scenario, thereby linking the technology transitions required to the scenario's carbon budget.

Challenges with the fair-share carbon budget approach

Despite the advantages of the fair-share carbon budget approach, it also has inherent complexities that have limited broader adoption. To implement this approach, a number of assumptions need to be made, which can increase uncertainty in the resulting portfolio alignment outcome. For example, to account for organic or inorganic growth, assumptions about companies' market shares may need to be introduced.

41 For the rate-of-reduction and fair-share carbon budget approaches, a company's absolute emissions can also be adjusted for changes in market share when compared to the benchmark. This will ensure that companies are not penalized for organic or inorganic growth. Under the convergence approach, it is also possible to adjust a company's physical emissions intensity for changes in market share, when compared to the benchmark, using activity-based market share parameters (SBTi, Sectoral Decarbonization Approach (SDA): A method for setting corporate emissions reduction targets in line with climate science, 2015).

In addition, there are challenges with adjusting the starting point based on units of economic intensity. Comparing a company's economic intensity to the sector average with all else held constant could lead to more-favorable alignment results for companies with higher revenues. In these cases, the difference in alignment between companies doesn't necessarily reflect underlying differences in their operational emissions efficiency. As a result, for sectors where homogenous production data exist, it is preferable to use physical emissions intensities to adjust the starting point.

Some of these challenges also apply to production-based metrics in the "sector market share" approach described above.

Implementation

EXAMPLE 10: MSCI'S FAIR-SHARE CARBON BUDGET APPROACH[42]

MSCI is a global financial services company and a provider of ESG and climate metrics. It applies a fair-share carbon budget approach to calculate portfolio alignment metrics for a range of sectors and companies, implemented according to the following three steps:

Step 1: Define a single global carbon budget and trajectory based on a 2 degrees C-aligned benchmark scenario from the IPCC.

Step 2: Calculate a company's specific benchmark scenario by adjusting global carbon intensity scenario assumptions to the company's sector and country composition, broken out by emission scopes (Table 8, Figure 12). MSCI's approach considers country and sector exposure because it is unrealistic to hold hard-to-decarbonize sectors and emerging economies to the exact same standard as less carbon-intensive sectors and developed economies.

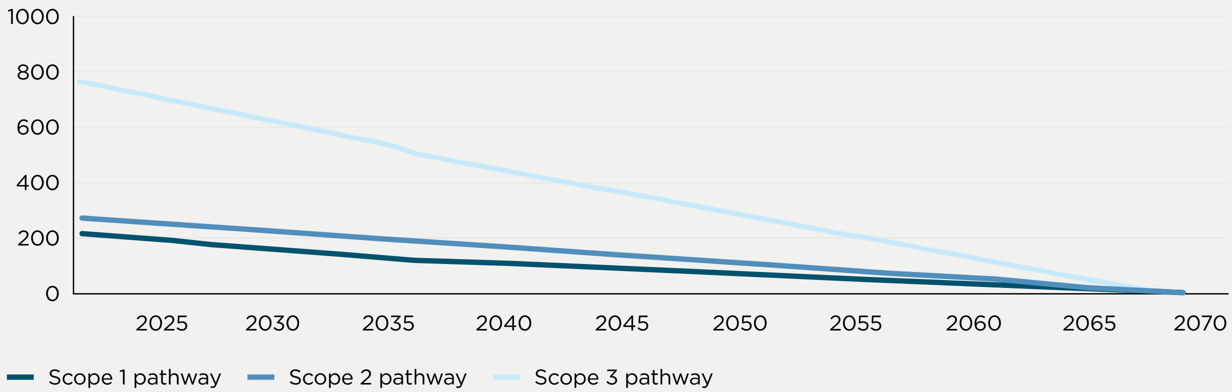
Table 8: Example showing a carbon intensity benchmark scenario breakdown across two countries and two sectors based on Scope 1 emissions

	COUNTRY A		COUNTRY B	
	SECTOR 1	SECTOR 2	SECTOR 1	SECTOR 2
Country/sector emissions intensity reduction needed based on NDCs (Nationally Determined Contributions) at a 2035 time horizon	40%	99%	12%	8%
End carbon intensity at 2070 time horizon	0 CO_2/$	0 CO_2/$	0 CO_2/$	0 CO_2/$

42 The implementation process, including stated advantages and challenges, in Example 10 has been sourced from direct engagement with a workstream member of the GFANZ workstream on Portfolio Alignment Measurement, as part of the broader, public consultative work undertaken by this workstream. Related publicly available information can be found at this link.

Figure 12: Illustrative example of a company-specific carbon intensity benchmark scenario for Scope 1, 2, and 3

Carbon intensity (tCO_2e/$ million)



Step 3: Translate company-specific intensity pathways into company-level, absolute carbon budgets (CO_2) by multiplying intensity pathways (CO_2/$) by company revenues ($, assumed to grow by 1% until 2070). This yields carbon budgets proportionate to company size, proxied by volume of revenue.

MSCI notes the following advantages with the fair-share carbon budget approach:

- Maintains a connection to the global carbon budget by benchmarking company absolute emissions on a cumulative basis.
- Does not penalize companies that have already made significant emissions reductions, unlike the rate-of-reduction approach, which requires reductions at the same rate for all companies.
- Reflects a benchmark with sectoral and geographical granularity for diversified companies.

However, MSCI noted several challenges on the fair-share carbon budget approach:

- Rests on a number of assumptions, such as revenue growth over time.
- Increases in companies' revenues translate into increases in companies' carbon budgets. Thus, growing revenues faster than emissions results in more favorable alignment outcomes. This current design choice accommodates company growth but may be at odds with the concept of a stable global carbon budget.

JUDGEMENT 1 GUIDANCE

Practitioners should consider using a single-scenario benchmark approach because it is simpler to implement and its assumptions are easier to understand.

For benchmark construction, guidance depends on the sector.

Benchmark construction approach for homogenous sectors:

- Practitioners should apply a fair-share carbon budget approach, converting physical emissions intensity into absolute emissions.
- Where such an approach is not feasible, the convergence approach should be used.
- Where technology pathways are used to complement emissions-based metrics (under Judgement 3), the "sector market share" approach could be applied.

Benchmark construction approach for heterogenous sectors:

- Practitioners should apply a fair-share carbon budget approach, converting economic emissions intensity into absolute emissions.
- If practitioners prefer not to use economic intensity units, a rate-of-reduction benchmark should be applied.

3.2 KEY DESIGN JUDGEMENT 2: HOW SHOULD BENCHMARK SCENARIOS BE SELECTED?

● Benchmark divergence ● ITR
● Maturity scale alignment

The choice of benchmark scenario is important, as the selection will influence alignment results at the company and portfolio levels. When considering a 1.5 degrees C-aligned benchmark scenario, the GFANZ workstream on Portfolio Alignment Measurement suggests that financial institutions select one that meets the following definition:[43]

The benchmark scenario provides an approximately 50% or 66% chance, given current knowledge of the climate response, of global warming either remaining below 1.5 degrees C or returning to 1.5 degrees C by around 2100 following an overshoot. Pathways giving at least 50% probability based on current knowledge of limiting global warming to below 1.5 degrees C are classified as "no overshoot" while those limiting warming to below 1.6 degrees C and returning to 1.5 degrees C by 2100 are classified as 1.5 degrees C "low-overshoot".

In addition, practitioners should seek to regularly update benchmark scenarios used for portfolio alignment measurement to reduce the risk that the benchmarks underestimate the actions needed to achieve a given warming outcome.[44]

43 GFANZ. Guidance on Use of Sectoral Pathways for Financial Institutions, 2022.

44 Portfolio Alignment Team. "Consideration 9", Measuring Portfolio Alignment: Technical Considerations, 2021, p. 33.

The availability of regional and sectoral benchmark scenarios for portfolio alignment measurement

Practitioners should prioritize benchmark scenarios that reflect differences in decarbonization feasibility between sectors and regions and between developed and emerging economies. The GFANZ workstream on sectoral pathways has analyzed the sectoral and regional coverage provided by benchmark scenario providers. This is summarized in Table 25 and Table 26 in Appendix D. The use of regionally granular scenarios can more meaningfully measure the delayed peaking of emissions in emerging markets and thus help to yield more appropriate alignment results for companies operating in emerging market regions. This is explored further in Example 11.

Quantitative

EXAMPLE 11: THE IMPACT OF BENCHMARK GRANULARITY ON CAPITAL FLOWS TO EMERGING MARKETS

Company A, which operates in India, and Company B, which operates in Europe, are electric utilities. Each has a primary electricity source corresponding to the most prevalent source in their respective market.[45] Their alignment has been computed based on two approaches: Approach 1 uses a global, utilities-specific benchmark scenario; and Approach 2 uses a region-specific, utilities-specific benchmark scenario.[46]

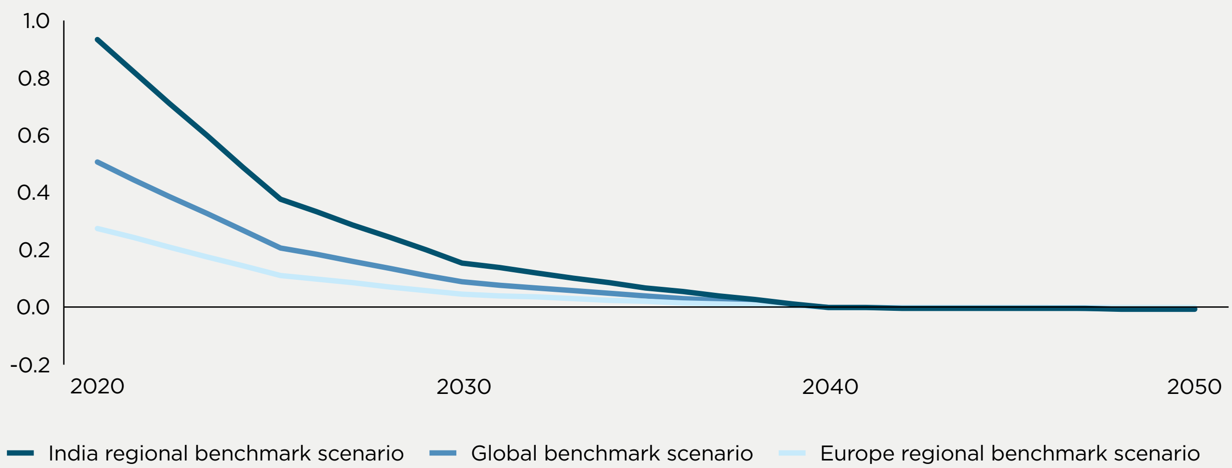
Table 9: ITR for Company A and B

ELECTRIC UTILITY COMPANY	REGION	COMPANY'S PRIMARY ELECTRICITY SOURCE	APPROACH 1: 2050 ITR USING A GLOBAL UTILITIES BENCHMARK	APPROACH 2: 2050 ITR USING REGION-SPECIFIC UTILITIES BENCHMARKS
Company A	India	Coal	4.3 degrees C	3.5 degrees C
Company B	Europe	Natural Gas	1.6 degrees C	2.5 degrees C

45 Our World in Data. Electricity mix, 2022.

46 Note: both approaches assume companies meet their stated emissions reduction targets and have the same utilities-specific sectoral granularity.

Figure 13: Utilities benchmark scenarios[47]



Regardless of benchmark granularity, Company A scores less favorably because its primary electricity source is unabated coal and its stated emissions reduction targets are not ambitious. However, when employing a regional benchmark scenario for calculating alignment (Approach 2), the difference in alignment is significantly less compared to using Approach 1. This is because Approach 2 employs an Indian power generation benchmark scenario for Company A, which allows for a slower transition and a delay of peak emissions in this emerging market. This example underscores the importance of using granular, regional benchmark scenarios in addition to granular, sectoral coverage when calculating alignment.

3.3 KEY DESIGN JUDGEMENT 3: SHOULD ABSOLUTE EMISSIONS, PRODUCTION CAPACITY, OR EMISSIONS INTENSITY UNITS BE USED?

- Benchmark divergence
- ITR
- Maturity scale alignment

This Key Design Judgement is related to the measurement unit (hereafter referred to as "unit") used for computing portfolio alignment.[48]

Due to the inherent interdependencies between Judgements, the choice can significantly impact final alignment results. Therefore, when determining which unit to use, practitioners should be aware of the impacts on their other Key Design Judgements.

Current state of Judgement 3

For all sectors, there are four potential unit types. These have various advantages and drawbacks, and they capture different aspects of a company's activity, as detailed in Table 10 below:

47 The three benchmark scenarios have been generated using the IEA's Net-Zero by 2050 scenario (IEA NZE), assuming that the regional breakdowns of the utilities sector follow the IEA Stated Policies and Announced Pledges scenarios.

48 Prior to Judgement 9, this framework is agnostic of the level of (non-zero) financing or investment from the financial institution to the company. Judgement 3 evaluates all emissions or production activity of the whole company that is being measured.

Table 10: Analysis of alignment metric units

UNIT TYPE	TYPICAL MEASUREMENT UNIT	ADVANTAGES	DRAWBACKS
Production (or production capacity)	Units of production (e.g., number of vehicles sold)	• Reinforces the link between the transition towards net zero and the technology shifts essential to drive emissions reductions in the real economy.	• Use is limited to homogenous sectors with available production benchmarks.[49,] • Does not necessarily reflect the efficiency of different firms' production processes.[50]
Absolute emissions	Tons of CO_2e	• Preserves a direct link to the carbon budget, therefore providing the most direct measurement of climate impact.	• Penalizes important net-zero transition activities, such as inorganic growth or expansion into climate solutions, that might increase emissions in the short-term.[51]
Physical emissions intensity	Quantity of CO_2e per unit of production (e.g., kg CO_2e per ton of cement)	• Net-zero transition activities are not disincentivized. • Provides a strong link to company production decisions, which are typically less volatile than economic indicators based on company revenues. • More accurately reflects improvements in operational efficiency.	• Relies implicitly on falling demand for products and services that produce emissions. This weakens the link to the carbon budget.[52] • Use is limited to homogenous sectors with available production benchmarks — for example, automotive, chemicals, cement, and others.
Economic emissions intensity	Quantity of CO_2e per economic unit (e.g., kg CO_2e per $ million revenue)	• Net-zero transition strategies are not disincentivized. • Economic data are available for all sectors.	• Relies implicitly on falling demand for products and services that produce emissions. This weakens the link to the carbon budget. • Subject to volatility, as intensities and the resulting alignment can fluctuate substantially without real changes in emissions.[53]

In Table 10, the first unit type — production — is distinct from the other three, as it uses company production or activity forecasts to compare a company to a benchmark scenario, rather than emissions-based units at the company-level.

Example 12 outlines how this might be a complementary approach to measuring alignment in high-impact and homogenous sectors.

49 For example, automotive, chemicals, cement, steel.

50 For example, two auto manufacturers may produce similar volumes of cars but have different emissions profiles.

51 This can occur unless the portfolio alignment method includes specific adjustment mechanisms to compensate for these factors.

52 This is of particular relevance for the oil and gas sector, where the primary emissions reduction mechanism is assumed to be decreases in production and demand. As a result, a company could exceed its 1.5 degrees C carbon budget, even while intensity terms made it appear aligned.

53 For example, if a company's alignment is measured in tCO_2e/$ revenue, a spike in revenue will lower the company's economic intensity and improve its alignment, even if there is no fundamental change in its emissions profile.

Implementation

EXAMPLE 12: THE VALUES AND USE CASES FOR PRODUCTION CAPACITY METRICS, ACCORDING TO RMI[54]

Meeting the goals of the Paris Agreements requires technological shifts within industries. Alignment approaches will ultimately need to measure company alignment with these technology shifts, as they capture the phasing out of high CO_2 emitting technologies and the ramping up of low carbon technologies, as well as the development of pre-commercial technologies that require the injection of risk capital to bring them to market.

It is these technology shifts within a sector that will be the focus of attention for financial institutions, who will support these changes and provide the necessary capital. Production capacity-based alignment metrics have a number of advantages in this respect:

- They measure technology shifts: They allow financial institutions to assess whether their counterparties and their own overall portfolios are aligned with technology shifts.
- They are decision-useful: They position alignment measurement closer to the point where decisions are made by companies and financial institutions on the allocation of capital. As a result, they are more decision-useful and more directly integrate into the work of credit and investment analysts.
- They lend themselves to forward-looking alignment measurements: This is an important step if financial institutions are to move beyond backward and static disclosures towards tracking companies' anticipation of the pace and scale of change that is needed.
- They run on available data: The granular data they are built on is available with good coverage for different sectors from existing business intelligence providers.

Whilst CO_2 emissions metrics are useful where information is needed to steer the likely outcomes from climate action, technology and production based metrics can be useful where information is then needed on the scale and pace of capital commitments required to achieve those same outcomes. This type of metric is currently provided for the power, automotive and fossil fuels sectors, where clear transitions can be measured. Steel and aviation could also utilize this type of metric.

54 The summary showcased in Example 12 has been sourced from direct engagement with a workstream member of the GFANZ workstream on Portfolio Alignment Measurement, as part of the broader, public consultative work undertaken by this workstream. Related information on the PACTA tool can be found at this link.

According to feedback received during the development of this report, practitioners generally acknowledge the importance of using absolute emissions to reflect the carbon budget. They also favor the use of physical intensities over economic intensities. However, there is a lack of guidance on the appropriate measurement unit for oil and gas companies, upon which the remainder of this section will focus.

Deep dive on the choice of unit for oil and gas companies

During the public consultation, 44% of respondents said that absolute emissions were the most important measure. At the same time, they pointed to the importance of using multiple units to reflect different transition activities of oil and gas companies. For this reason, this section reviews relevant measurement units and how they link to different net-zero transition strategies for companies in the oil and gas sector.

Decarbonization levers for oil and gas companies and possible measurement units

Oil and gas companies can pursue a number of decarbonization levers to transition to net zero. Some of these focus directly on their operations, while others concern their products and therefore link to demand:[55]

1. Reducing Scope 3 emissions from the use of unabated oil and gas products, which can be achieved by:
   a. **Reducing output:** Scaling down the production of oil and gas.
   b. **Transitioning to clean energy:** Transition to a low-emissions energy system, by developing, commercializing, and scaling energy climate solutions — for example, non-fossil-fuel energy sources such as biofuels; more efficient electricity distribution; battery charging and storage; and carbon capture, utilization and storage (CCUS).
2. Reducing Scope 1 and 2 emissions from the direct production of oil and gas products, which can be achieved by:
   a. **Improving operational efficiency:** Reducing emissions by improving the efficiency of production — for example, by reducing methane leaks.
   b. **Capturing outstanding Scope 1 emissions:** Scaling the use of carbon capture, utilization, and storage (CCUS) technologies in oil and gas fields, processing plants, and refineries.

Each of these decarbonization levers can be assessed using different units to measure alignment. Each of these units has advantages and drawbacks, which are explored further in Table 11.[56]

55 A number of common levers have been identified in 1.5 degrees C-aligned pathways. The pathways analyzed include the International Energy Agency Net-zero Emissions (IEA NZE), the One Earth Climate Model (OECM), two pathways from the Network for Greening the Financial System (REMIND-MAgPIE 3.0-4.4 and MESSAGEix-GLOBIOM 1.1-M-R12), and the Inevitable Policy Response (IPR) pathway. Details of the analysis will be publicly available in 2023 through the GFANZ report, Oil and gas: Net-zero Pathways Analysis and Expectations for Transition Plans.

56 See Appendix E for further examination of the connection between the choice of unit and the oil and gas company's underlying transition strategy.

Table 11: Advantages and drawbacks of units for measuring the alignment of oil and gas companies

EMISSIONS REDUCTION AREA	DECARBONIZATION LEVER	UNIT(S) OF CHOICE	COMPANY ACTIVITY ASSESSED FOR THIS LEVER	BENCHMARK	MOST APPLICABLE TYPE OF OIL AND GAS COMPANY	ADVANTAGES	DRAWBACKS
Reducing Scope 3 emissions	**Reducing output**	Absolute emissions (Mt CO_2)	Only oil and gas-related activities	Oil and gas sector-specific	Integrated, upstream	• Preserves a more direct link to the carbon budget • Directly incentivizes the reduction of fossil fuel output • Applicable to all types of oil and gas companies	• Does not directly consider transition activities and inorganic growth outside fossil fuels, such as oil and gas companies transforming into renewable energy companies • May increase the risk of stranded assets
	Transitioning to clean energy	Combined energy sector physical emissions intensity (Mt CO_2/EJ)	All energy sector activities, including oil and gas, power generation, biofuels, and CCUS	Combined energy sector benchmark (including oil and gas and power generation)	Integrated	• Considers transition activities outside fossil fuels, such as oil and gas companies transforming into renewable energy companies • Accounts for inorganic growth	• Indirect assumption of falling absolute demand for fossil fuels, does not directly incentivize the reduction of fossil fuel output • Limitations of available benchmark scenarios • Not applicable to all types of oil and gas companies
Reducing Scope 1 and 2 emissions	**Improving operational efficiency** **Capturing outstanding Scope 1 emissions**[57]	Oil and gas specific physical emissions intensity (Mt CO_2/bbl)	Only oil and gas-related activities	Oil and gas-sector specific	Integrated, upstream, midstream, downstream	• Accounts for inorganic growth • Applicable to all types of oil and gas companies	• Indirect assumption of falling absolute demand for fossil fuels in order to protect the carbon budget. Therefore, this does not directly incentivize the reduction of fossil fuel output • Does not account for demand-side management

57 The use of carbon capture, utilization, and storage (CCUS) technologies to remove Scope 1 emissions will be captured within the numerator (i.e., the total emissions) of the oil and gas specific physical emissions intensity unit.

As described in Table 11, each of the possible units for assessing the decarbonization levers of oil and gas companies, when used in isolation, has advantages and drawbacks. Appendix F explores via illustrative case studies the key drawbacks for some of these units when using them in isolation for measuring alignment of oil and gas companies.

Therefore, to capture all decarbonization levers available to oil and gas companies it may be more appropriate to measure alignment using a combination of units. This might require the use of multiple scenario benchmarks. Practitioners should follow the guidance provided in Judgement 1 to decide which benchmark construction methods are most relevant to the decarbonization levers outlined in Table 7.

An approach to capturing multiple decarbonization levers for oil and gas companies is to use two (or more) fair-share carbon budget approaches. An example of this potential solution is highlighted in Appendix G.

JUDGEMENT 3 GUIDANCE

Employing the appropriate measurement unit for oil and gas companies:
Practitioners should consider using combinations of several metrics to measure alignment for oil and gas companies. This will reflect different decarbonization levers and their relevant benchmarks, such as the following:

- The use of an absolute emissions unit to reflect the overall **reduction in output** necessary to achieve net-zero emissions.
- The use of a physical emissions intensity unit, specifically a measure of emissions per unit of production, to reflect improvements in **operational efficiency.**
- The use of an additional physical emissions intensity unit, specifically a measure of emissions per unit of energy, to reflect activities that involve a transition into **renewable energy and biofuels.**

Employing the appropriate measurement unit for other homogenous sectors:

- The use of physical intensities is preferred to economic intensities.
- Where possible, the fair-share carbon budget approach should be applied, converting physical emissions intensities into absolute emissions.

Employing the appropriate measurement unit for heterogenous sectors:

- Where possible, the fair-share carbon budget approach should be applied, converting economic emissions intensities into absolute emissions.
- Alternatively, where practitioners prefer not to use economic intensity units, absolute emissions could be used in conjunction with a rate-of-reduction benchmark approach.

3.4 KEY DESIGN JUDGEMENT 4: WHAT SCOPE OF EMISSIONS SHOULD BE INCLUDED?

● Benchmark divergence ● ITR
● Maturity scale alignment

Current state of Judgement 4

When measuring portfolio-level alignment, financial institutions typically include Scope 1 operational direct emissions, and Scope 2 indirect emissions associated with the generation of purchased energy.[58] However, despite the fact that Scope 3 value chain emissions constitute more than 90% of total emissions in many sectors,[59] they are not systematically included in Portfolio Alignment Measurement methods. Moreover, the Global GHG Accounting and Reporting Standard for the Financial Industry (PCAF Standard)[60] recommends that financial institutions report borrowers' and investees' absolute Scope 1 and 2 emissions in all sectors and include Scope 3 emissions for companies in sectors in which Scope 3 emissions are most material. This recommendation is in line with the Securities and Exchange Commission's (SEC)[61] proposed new rule on climate risk disclosures. Therefore, financial institutions should consider including Scope 3 emissions when measuring alignment with net zero by 2050.

The challenges with including Scope 3 emissions stem from sparse and inconsistent disclosure of total Scope 3 emissions and their underlying 15 categories.[62] Therefore, practitioners often have to rely on estimates.[63] In this section, the materiality of Scope 3 emissions across high-impact sectors is reviewed and areas for prioritization are recommended. Relatedly, Appendix H outlines the challenges associated with Scope 3 emissions data and suggests how to address data limitations and make use of estimation methods.

Considerations for including Scope 3 emissions

A deep dive on the materiality of Scope 3 emissions

To guide practitioners on best practices for including Scope 3 emissions in the measurement of portfolio alignment, the analysis highlights those Scope 3 emission categories and activities that are most relevant for specific high-impact sectors. The sectors chosen align with the high-impact sectors outlined in the target-setting guidance published by a number of net-zero alliances, such as NZBA and NZAOA.[64]

To understand the materiality of Scope 3 emissions in these high-impact sectors (Table 12), the percentage contribution of each Scope to a sector's total emissions based on reported and estimated data was computed. Table 12 shows that Scope 3 emissions account for between 20% and 95% of sector-average emissions in these sectors. To identify the sectors in which Scope 3 emissions are most material, two criteria were applied:

1. **The 40% threshold criterion:** Sector average Scope 3 emissions are more than 40% of total sector average emissions (based on guidance by the Science-Based Targets initiative).[65]
2. **The absolute magnitude criterion:** Absolute Scope 3 emissions are high (here we use 10 Mt CO_2e as a suggested threshold, above which they count as high).[66]

58 For data challenges on Scope 1 and Scope 2 emissions, please refer to Recommendations for the Development of the Net-Zero Data Public Utility, 2022.

59 Portfolio Alignment Team. Measuring Portfolio Alignment: Technical Considerations, 2021.

60 PCAF. The Global GHG Accounting and Reporting Standard for the Financial Industry, 2020.

61 SEC. SEC Proposes Rules to Enhance and Standardize Climate-Related Disclosures for Investors, 2022.

62 As defined in the GHG Protocol Corporate Value Chain Standard, hereafter Scope 3 Standard.

63 Bokern, David. Reported Emission Footprints: The Challenge is Real, 2022.

64 Guidelines for Climate Target Setting for Banks, p. 7, 2021; NZAOA Target Setting Protocol, p. 57, 2022.

65 CDP. How can companies address their scope 3 greenhouse gas emissions?, 2018.

66 For reference, Switzerland's total GHGs emissions in 2019 were 38 million metric tons.

Applying the first criterion, sectors where Scope 3 emissions exceed the 40% threshold are identified in Table 12: oil and gas; electric utilities; automotive; steel; chemicals; transportation and logistics; engineering and construction; and consumer staple products. **Highlighted** are sectors that exceed the 40% threshold, and are outlined in the guidance of a number of net-zero alliances:

Table 12: GHGs emissions percentage (%) by Scope 1, 2, and 3 in high-impact sectors

SECTORS	SCOPE 1		SCOPE 2		SCOPE 3		SAMPLE SIZE
Energy[1]	8.4	9.5	0.5	0.7	89.8	91.0	30
Oil and gas[2]	8.4	9.5	0.5	0.7	89.8	91.1	26
Utilities[1]	35.0	47.8	1.6	1.7	50.6	63.3	57
Electric utilities[3]	38.7	51.9	1.6	1.8	46.5	59.5	44
Consumer Discretionary[1]	1.2	1.4	1.8	1.9	96.7	97.1	82
Automotive[2]	0.7	0.9	1.2	1.3	97.8	98.1	21
Materials[1]	12.0	13.7	4.0	4.2	82.1	84.0	66
Steel[3]	26.3	33.8	1.7	3.3	62.9	72.0	4
Cement[4]	72.9	73.9	5.3	5.8	20.8	21.3	1
Chemicals[3]	18.3	18.9	7.5	9.8	71.3	74.2	34
Industrials[1]	5.8	15.4	0.5	1.8	82.8	93.7	101
Transportation and logistics[2]	52.9	55.0	1.3	1.4	43.7	45.7	23
Airlines[4]	61.2	69.5	0.5	0.6	29.9	38.3	5
Marine shipping[4]	61.7	67.6	0.5	0.6	31.8	37.8	4
Engineering and construction[2]	4.3	12.0	1.1	2.7	85.3	94.6	21
Consumer staple products[2]	4.8	8.0	3.3	4.7	87.2	91.9	34

Reported values   Estimated values

Bold fonts highlight where the materiality threshold of 40% has been exceeded for Scope 3.

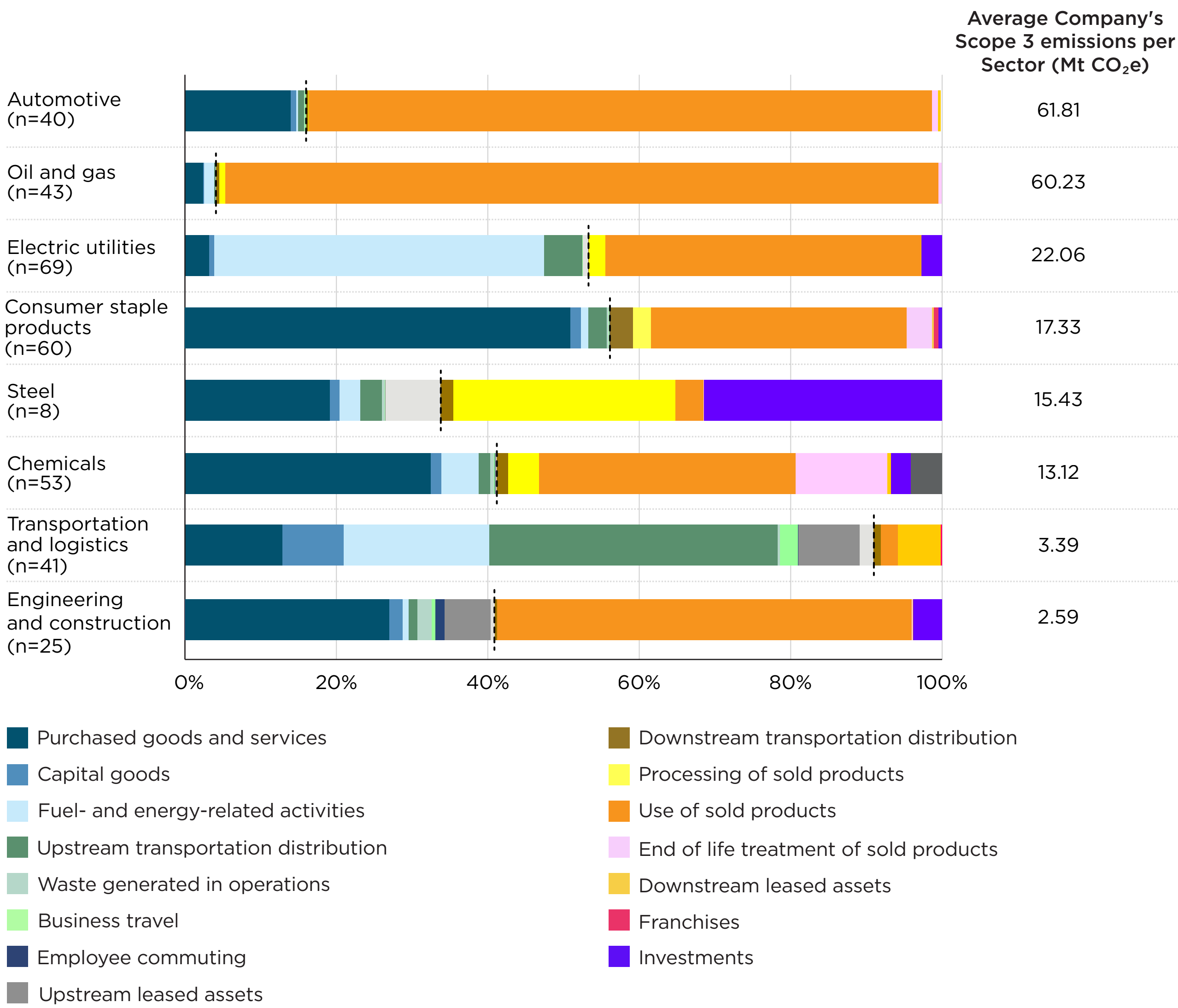
Superscripts denote the sector classification: 1 for sector, 2 for industry group, 3 for industry, 4 for sub-industry, as per the Bloomberg Industry Classification Standard (BICS).

Method employed for reported data: Calculation based on companies that reported emissions in all three scopes in fiscal year 2020

Data sources: Bloomberg for reported (blue) and MSCI for estimated (gray) emissions data

Figure 14: Percentages of Scope 3 emissions for 15 value-chain categories in high-impact sectors — dashed line separates upstream from downstream

Million metric tons, n=number of companies analyzed in each sector



Method: Calculated using data from companies that reported at least two categories within Scope 3 emissions. The values are averaged across companies in each sector using the Bloomberg Industrial Classification Standard (BICS).

Source: Bloomberg BESGPRO Index, FY2020.

Figure 14 breaks down the percentages of the 15 value-chain categories[67] for those sectors in Table 12 where Scope 3 emissions exceed the 40% threshold. When considering the second criterion (absolute magnitudes being larger than 10 million metric tons of CO2 equivalent), the analysis shows that sector-average Scope 3 emissions are considerably high in the following sectors: oil and gas; automotive; electric utilities; consumer staple products; steel;[68] and chemicals.

67 As defined in the Corporate Value Chain (Scope 3) Accounting and Reporting Standard, hereafter "Scope 3 Standard".

68 Although the steel sector exceeds both the 40% and total magnitude thresholds, we have chosen not to include it in our analysis because different studies show different degrees of materiality. Further complicating the analysis, some steel companies report the emissions from their joint ventures and subsidiary companies as part of their Scope 3 Category 15 emissions. This may contribute to the sector's relatively high Scope 3 emissions.

Based on both the 40% threshold and the absolute magnitude criteria, these sectors should — at a minimum — be prioritized for Scope 3 inclusion in portfolio alignment measurement. For a deeper assessment, it is necessary to understand the most material value chain activities in each sector.

Table 13 shows, for five sectors, the most material value chain activities and the top two emission categories. It shall serve as a starting point for identifying the key drivers of value-chain emissions in different sectors.

Table 13: Prioritized high-impact sectors and their material value chain classifications and emission categories

SECTOR	MORE MATERIAL PART OF VALUE CHAIN (>40%)	MOST-MATERIAL CATEGORIES
Oil and gas[69]	Downstream	• Category 1 — Purchased goods and services (2.5%) – Emissions from the purchase of oil, gas, hydrogen, and/or petroleum products used as feedstock. Outsourcing of activities such as drilling by companies that do not operate at all stages of the value chain. • Category 11 — Use of sold products (91.7%) – Emissions from the use of oil and gas goods and services.
Automotive[70]	Downstream	• Category 1 — Purchased goods and services (15.6%) – Emissions from upstream material extraction. • Category 11 — Use of sold products (80.1%) – Emissions from products sold to end customers, for example combustion-engine cars.
Electric utilities[71]	Upstream and downstream	• Category 3 — Fuel- and energy-related activities (not included in Scopes 1 or 2) (42%) – Upstream generation and transmission. Distribution losses of electricity that is traded or purchased and sold to customers, for example emissions from mining coal. • Category 11 — Use of sold products (45.8%) – When utilities have a gas retail business, the downstream use of the natural gas they sell typically accounts for a substantial share of their Scope 3 emissions. This includes the combustion emissions of natural gas sold to customers.
Consumer staple products[72]	Upstream and downstream	• Category 1 — Purchased goods and services (50.9%) – Emissions from upstream land use change. Emissions from agricultural production. • Category 11 — Use of sold products (33.7%) – For example, emissions from cooking and refrigerating food products.
Chemicals[73]	Upstream and downstream	• Category 1 — Purchased goods and services (34.1%) – Emissions from machining and processing services, engineering services, industrial cleaning, and raw materials (for example, ethylene, sodium carbonate, methanol). • Category 11 — Use of sold products (35.2%) – Emissions from fuels combusted during use phase. Products that contain or form greenhouse gases that are emitted during use.

69 Ipieca. Estimating petroleum industry value chain (Scope 3) greenhouse gas emissions. Overview of methodologies, 2016.

70 Climate Action 100+. Net Zero Company Benchmark, 2021, p. 5.

71 WBCSD. Setting science-based targets: A guide for electric utilities, 2020, p. 13, 15.

72 SBTi Corporate Manual, p. 15.

73 Climate Action 100+. Net Zero Company Benchmark, 2021, p. 5.

Understanding the materiality of the Scope 3 categories can help financial institutions determine whether the emissions disclosed by a company capture its most material carbon-intensive value chain activities. For example, a utility that distributes gas should disclose Category 11 emissions while one that generates coal-based electricity should disclose Category 3 emissions. Financial institutions can also leverage the Scope 3 emissions materiality analysis in their engagement activities to encourage portfolio companies to reduce their value chain emissions. Besides the high-impact sectors above, Figure 37 in Appendix I outlines material categories for all industry groups under the Global Industry Classification Standard (GICS).

The current sparsity and differences in corporate data collection methods of Scope 3 disclosures could impact the quantification of material categories and means that estimation techniques are an important consideration for practitioners. In some cases, especially when Scope 3 data can be estimated based on bottom-up activity data, this might yield more comparable results for financial institutions. But, as more Scope 3 emissions are disclosed, materiality considerations should be dynamically updated.

Appendix H features a review of these techniques and compares reported data with estimated data for a selection of high-priority sectors.

The issue of double counting emissions when measuring portfolio alignment

When including Scope 3 emissions in portfolio alignment measurement at the company level, double counting might matter, for example if the benchmark does not include Scope 3 emissions. A more rigorous analysis would be required to assess this in detail but it is beyond the scope of this report. The 2021 PAT report concluded that double counting should not be a barrier to effective portfolio alignment measurement in the near term. What matters is that all economic activities and their resultant emissions are accounted for and tracked.

PROPOSED GUIDANCE FOR JUDGEMENT 4

Practitioners should consider prioritizing the inclusion of Scope 3 emissions where:

- A company's Scope 3 emissions exceed 40% of its total emissions, and the company is in sectors identified in Section 3.4
- A company's Scope 3 emissions are considerably large in absolute magnitude (for example, > 10Mt CO2e)

Practitioners ought to verify whether the most material Scope 3 categories are included in their portfolio alignment measurement for companies in relevant sectors. They can use reported data where the reported data include material categories, or estimated data when reported data do not include the most material categories or where the use of bottom-up estimates would yield more comparable results (see Appendix H). At a minimum, the following key categories in high-impact sectors should be included in portfolio alignment measurement:

- Oil and gas — Category 1 (purchased goods and services) and Category 11 (use of sold products)
- Automotive — Categories 1 and 11
- Electric utilities — Categories 3 (fuel- and energy-related activities) and Category 11
- Consumer staple products — Categories 1 and 11[74]
- Chemicals — Categories 1 and 11

In addition to the sectors and categories above, financial institutions are encouraged to include Scope 3 emissions for all sectors where the 40% threshold in absolute emissions is exceeded. Appendix I outlines material categories for all industry groups under the Global Industrial Classification Standard (GICS).

3.5 KEY DESIGN JUDGEMENT 5: HOW SHOULD EMISSIONS BASELINES BE QUANTIFIED?

● Benchmark divergence ● ITR
● Maturity scale alignment

Based on feedback received, practitioners agreed with the recommendations provided for Key Design Judgement 5 in the 2021 PAT Report. In this section, key points are reiterated, while noting new developments and feedback.

Which greenhouse gases should be included?

To set adequate baselines, all seven greenhouse gases (GHGs) mandated by the Kyoto Protocol should be quantified.[75] In the short-term, gases may be aggregated using the Global Warming Potential (GWP) framework detailed by the GHG Protocol Corporate Accounting and Reporting Standard (“GHG Protocol”).[76] Carbon dioxide (CO_2) and methane (CH_4) make up around 90% of the emissions of the seven GHGs.[77] Methane emissions are substantial in sectors such as energy and industry, as well as in agriculture and land use, but they have a shorter lifetime than CO_2 and other GHGs.[78]

74 While Category 1 and 11 are material in Consumer Staple Products based on the analysis, we acknowledge that companies in this sector are diverse. Therefore, materiality should be measured at the individual company-level where possible.

75 Portfolio Alignment Team. Measuring Portfolio Alignment: Technical Considerations, 2021, p.43.

76 The Greenhouse Gas Protocol. A Corporate Accounting and Reporting Standard, 2004.

77 IPCC. Summary for Policymakers, 2014.

78 EPA. Overview of Greenhouse Gases, n.d.

Hence, for warming estimates to be more scientifically accurate in the medium term, the PAT highlighted the need for separate methane scenario benchmarks to be developed. These will allow for more accurate alignment measurement of methane emissions in relevant sectors.[79] For example, the United States Securities Exchange Commission (SEC) requires its registrants to disclose emissions both disaggregated by GHG type and in the aggregate, in which case they are expressed in terms of carbon dioxide equivalent (CO_2e).[80] Practitioners suggested that methane should be considered separately for sectors in which it forms a substantial proportion of total emissions — that is, agriculture, fossil fuels, mining, and waste management.

What are the GHGs included in net-zero scenarios?

This year, the GFANZ workstream on Sectoral Pathways has highlighted the GHGs modeled by three different pathway developers: IEA, UTS, and NGFS.[81] At present, all seven GHGs are considered by different pathway providers, except the IEA NZE pathway, which considers carbon dioxide (CO_2) for all sectors and methane (CH_4) and nitrous oxide (N_2O) only for the energy sector.[82] See Table 14 for the full breakdown.

Table 14: Greenhouse gases included by pathway developer

GREENHOUSE GASES	IEA NZE	UTS OECM	NGFS NET ZERO 2050 (GCAM)	NGFS NET ZERO 2050 (REMIND)	NGFS NET ZERO 2050 (MG)
Carbon dioxide (CO_2)	✓	✓	✓	✓	✓
Methane (CH_4)	~	✓	✓	✓	✓
Nitrous oxide (N_2O)	~	✓	✓	✓	✓
Hydrofluorocarbons (HFCs)		✓	✓	✓	✓
Perfluorocarbons (PFCs)		✓	✓	✓	✓
Sulphur hexafluoride (SF_6)		✓	✓	✓	✓

Sources of emissions data

When deciding whether to use data based on disclosures or estimates, the 2021 PAT Report suggested[83] that the PCAF Standard could be followed when prioritizing sources for emissions data and that practitioners should consider disclosing the data sources and methodologies used to estimate emissions. Practitioners should consider PCAF's suggestions to prioritize reported emissions over estimated emissions data for at least Scope 1 and Scope 2 emissions, and, for estimated data, to prioritize those based on activity levels as close as possible to the emissions drivers. Generally, the accuracy of emissions numbers increases with proximity to the source, as it is then possible to take account of factors such as location, efficiency, and yield. However, when selecting data sources, practitioners should also consider that the reliability of data may vary between sectors and emissions types. For example, there may be issues with the accuracy and availability of Scope 3 emissions disclosures (see Section 3.4). As a result, estimated emissions may need to be used. Practitioners should therefore consider ranking the quality of their emissions data sources, for example by using PCAF's standard data-quality scoring framework or another comparable approach. This may incentivize

79 Portfolio Alignment Team. Measuring Portfolio Alignment: Technical Considerations, 2021, p. 40.

80 SEC. SEC Proposes Rules to Enhance and Standardize Climate-Related Disclosures for Investors, 2022.

81 GFANZ. Guidance on Use of Sectoral Pathways for Financial Institutions, 2022.

82 Ibid.

83 Portfolio Alignment Team. Measuring Portfolio Alignment: Technical Considerations, 2021, p. 44.

company disclosures and ensure that data gaps and quality concerns do not block the development of portfolio alignment methodologies.

GFANZ recognizes a number of alternative approaches used by practitioners to develop emissions baselines for portfolio alignment measurement. One example is to base alignment measures on the sums that banks have committed to lending rather than the amounts they have already lent.

3.6 KEY DESIGN JUDGEMENT 6: HOW SHOULD FORWARD-LOOKING EMISSIONS BE ESTIMATED?

● Binary target measurement ● Benchmark divergence
● ITR ● Maturity scale alignment

To successfully direct capital flows compatible with a transition to a 1.5 degrees C-aligned world, portfolio alignment metrics need to be forward-looking and incorporate portfolio companies' emissions reduction commitments. This will enable understanding of companies' transition-readiness compared to net-zero aligned pathways. Well-formulated emissions reduction targets allow an organization's long-term decarbonization strategy to be assessed, as well as allowing an understanding of its interim activities and results.[84] Such targets therefore provide useful inputs to portfolio alignment measurement.

However, a forward-looking metric may not be fully credible if a practitioner simply projects emissions based on a company's stated emissions reduction targets without having checked the credibility of this target. Therefore, a framework that helps assess the soundness and integrity of corporate emissions reduction targets — and that aids investment decision-making — is a useful tool for projecting emissions forward.

In this section, key qualitative and quantitative indicators are highlighted that might be considered when assessing the credibility of targets and the pathways used to set these (1.5 degrees C, 2 degrees C, etc.). An illustrative framework provides guidance on using the indicators to perform a credibility assessment of a company's stated emissions reduction targets. It is outlined how a credibility assessment might be incorporated into measuring portfolio alignment. Finally, guidance is set out for projecting emissions for companies without stated emissions reduction targets.

Current approaches to emissions forecasting

Financial institutions and metric providers use various approaches and underlying data to forecast emissions. For example, for companies without emissions reduction targets, practitioners project future emissions by holding current emissions constant, applying a growth rate, or by extrapolating emissions from past trends. For companies with emissions reduction targets, practitioners often project emissions based on a pathway that mirrors the target commitment.[85]

Production plans

Another, less explored, approach is to extrapolate emissions from a company's short-term production and capacity plans. This can help to understand the company's overall capital commitment to transition to a low-carbon business model. Provided disclosure is sufficient, emissions can be recalculated by applying emissions factors to production forecasts.

84 GFANZ. Financial Institution Net-zero Transition Plans, 2022.

85 For example, by considering the emissions reduction target's final emissions, the target's end date, the baseline emissions, and the baseline year.

Challenges with the current approaches

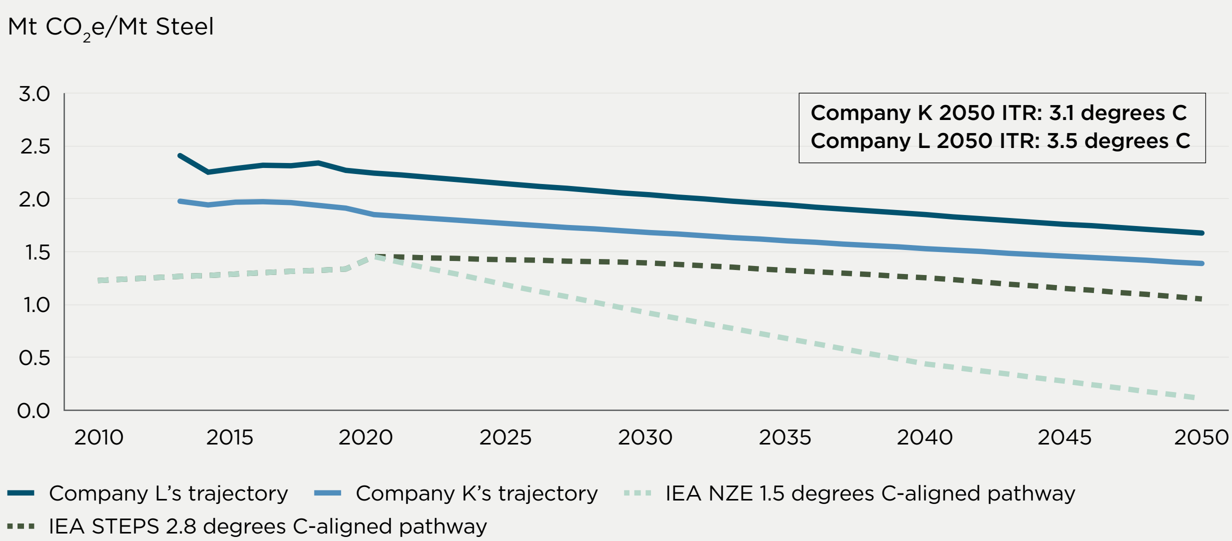
Combining multiple emissions forecasting approaches helps to ensure that alignment results reflect the company's current business model and future transition planning. For example, a company with a highly ambitious long-term target could have a poor track record of meeting historical emissions reductions targets. If the company's alignment is measured exclusively based on the target, the company might look well-aligned, even though its target may not be credible, given this past performance. Therefore, an assessment of the company's alignment may be more realistic if past performance and forward-looking information is combined. Practitioners should derive the weighting between backward and forward-looking indicators from a credibility assessment of the company's reduction target, where a higher weighting is attributed to more credible targets.

Quantitative

EXAMPLE 13: ITR METRICS BASED ON TARGETS VERSUS HISTORICAL EMISSIONS[86]

To illustrate how alignment metrics might differ based on the choice of emissions forecasting approaches, Figure 15 and Figure 16 compare the intensity forecasts for two steel manufacturers (in Mt CO_2e/megatons of steel). Forecasts were based on reduction target pathways and a linear trend projection of historical emissions intensity.[87]

Figure 15: Comparison of sample steel companies' intensity forecasts based on the historical emissions trend

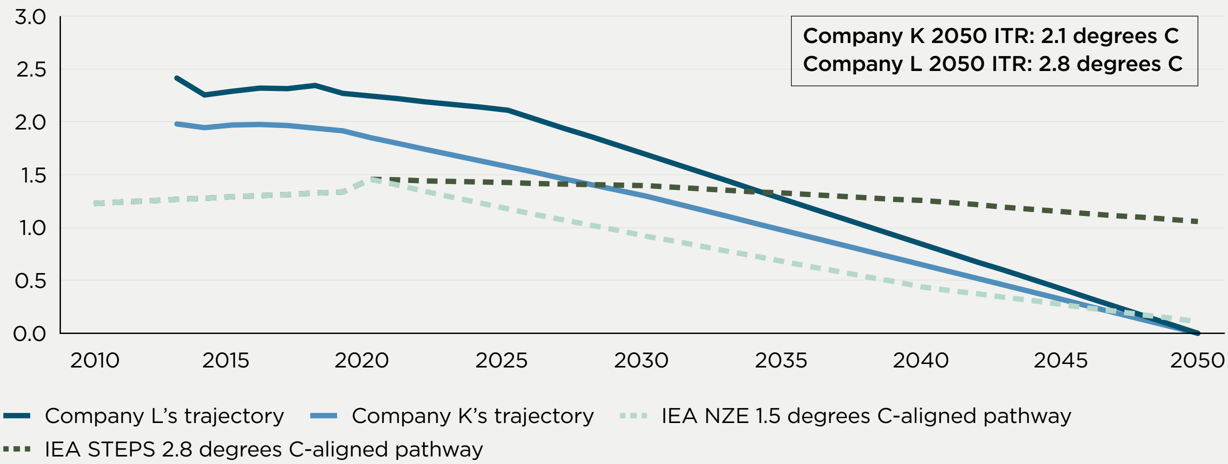


86 ITRs have been calculated using a multiple benchmark interpolation approach over a 2050 time horizon to account for the latest year of targets provided by the companies (i.e., 2050 in this case).

87 The intensity forecasts are compared to two IEA benchmark scenarios: a 1.5 degrees C-aligned Net Zero Emissions by 2050 (NZE) scenario and a 2.8 degrees C-aligned Stated Policies Scenario (STEPS) scenario.

Figure 16: Comparison of sample steel companies' intensity forecasts based on the stated emissions reduction targets

Mt CO_2e/Mt Steel



When forecasting physical intensities based on historical trends, the projected pathways of Company K and Company L demonstrate strong misalignment with a pathway to net zero by 2050. (see Figure 15.) On the other hand, the projected alignment pathways based on the companies' stated reduction targets are significantly closer to the 1.5 degrees C-aligned benchmark. (see Figure 16.)

To determine the most accurate alignment outcome for Company K or Company L, weights need to be attributed to the companies' stated targets and to historical intensity trends. A credibility assessment of the reduction targets could help to determine the appropriate weighting scheme.

Deep Dive: Conducting credibility assessments

There are a variety of possible approaches to assessing the credibility of a company's emissions reduction targets. A case study from Lombard Odier demonstrates how this could be done by combining historical trends and forward-looking indicators (See Example 14 below).

Implementation

EXAMPLE 14: LOMBARD ODIER'S TARGET CREDIBILITY FRAMEWORK[88]

Lombard Odier is an independent Swiss banking group with an investment management arm. When evaluating a company's emissions reduction targets, Lombard Odier uses a Target Credibility Framework, focusing on a credibility assessment of the company's transition plan. It uses the outcome of this assessment to determine the target weighting (w-value). Lombard Odier calculates one ITR metric based on the company's target emissions forecast and one ITR metric based on the company's historical emissions forecast. It then combines the two ITR metrics using the target weighting (w-value). Companies assessed to have the "most credible" plans can achieve up to 80% weighting toward the ITR metric based on targets.

Lombard Odier determines the credibility of a company's transition plan using a scorecard with various indicators including, for example, the following components:

- Does the company have an executive responsible for climate action?
- Is executive compensation tied to climate outcomes?
- Have decarbonization projects already been (or are currently being) implemented?
- Is an internal carbon price used to guide CapEx decisions?
- Does the company disclose its own emissions across all relevant scopes?
- Does the company's trade association membership align to the net zero transition?
- Are the company's targets SBTi approved?

A key challenge that Lombard Odier has encountered is the tension between the precision of various indicators and the data coverage available for issuers. To avoid manual extraction of the data while ensuring a high level of coverage of companies, for certain criteria Lombard Odier has chosen to take a binary (i.e., "Yes" or "No") approach to assess a company's fulfilment of the criteria. Lombard Odier notes that while this approach is effective, it does increase the risk of false positives. For example, a false positive might occur where a company fulfils the criteria for a "Yes" but has low ambition regarding achieving the target that it set. An additional challenge Lombard Odier notes is the lack of historic data to back-test the validity of this framework.

88 The implementation process showcased in Example 14 has been sourced from direct engagement with a workstream member of the GFANZ workstream on Portfolio Alignment Measurement, as part of the broader, public consultative work undertaken by this workstream.

Example 14 outlines supporting indicators that might help practitioners assess the likelihood that reduction targets might be achieved.

In compiling the illustrative credibility framework set out in Table 15, this workstream has drawn on the 10 key components of a credible real-economy transition plan.[89] See Appendix J for a full list of key themes, components, and indicators. Qualitative and quantitative indicators from existing transition plan assessment tools were leveraged such as TPI, ACT, and Climate Action 100+.[90, 91] When assessing credibility, there are several important considerations: whether the company's stated emissions reduction targets have been assessed and validated by a third party; the timespan and frequency of the targets; whether adequate governance measures are in place; and whether planned production forecasts and accompanying business strategies are aligned with the targets.

In addition, when applying this framework, and assessing the indicators that drive the credibility weighting (w-value), practitioners should be cognizant of the pathway used to set the target (1.5 degrees C, 2 degrees C, etc).

The list of indicators in Table 15 is not exhaustive. Rather, it aims to highlight and synthesize the most important insights from these tools. Practitioners should consider leveraging the indicators they believe to be most predictive when estimating the likelihood that a company will achieve its stated targets. They should recognize that there may be difficulties in sourcing the required data for some indicators and that widespread measurement standards for these indicators may not yet exist. Practitioners should consider the predictive accuracy of indicators based on a comparison of their application to short and medium-term targets versus long-term targets.

89 As described in the GFANZ publication Expectations for Real-economy Transition Plans.

90 Drawing on guidance from the GFANZ publication Expectations for Real-economy Transition Plans.

91 Please see Appendix K for an analysis of the ADEME/CDP/WBA ACT assessment framework and how this influenced this report.

Table 15: The illustrative target credibility framework for portfolio alignment measurement

DESCRIPTION	ILLUSTRATIVE DETAILED ASSESSMENT USING EXAMPLES OF QUANTITATIVE AND QUALITATIVE INDICATORS	WEIGHTING USED TO CALCULATE A FORECAST OF FUTURE EMISSIONS	TARGET WEIGHTING (W-VALUE)
The company does not have published emissions reduction targets		Apply guidance (Table 17) for companies without emissions reduction targets	N/A
The company has a long-term emissions reduction target that is not third-party verified.	• Long-term targets exist but are not validated by a third party • Some executive oversight/incentives linked to target	• 25% emissions reduction targets • 75% historical emissions trends	25%
The company has ambitious, but not third-party verified, short- and long-term targets.	• Short- and long-term targets exist but are not validated by a third party • Some executive oversight and incentives are linked to the target	• 50% emissions reduction targets • 50% historical emissions trends	50%
The company has third-party validated short- and long-term targets, supported by a transition plan.	• The reduction target has been validated by a third party (such as SBTi) and includes both short- and long-term components • Executive oversight and incentives are linked to the target • A transition plan has been disclosed • Low carbon CapEx plans are dedicated to activities required to meet the reduction target • Historical trends in production and capacity indicate progress towards alignment (where applicable to the sector)	• 75% emissions reduction targets • 25% historical emissions trends	75%
The company has validated short- and long-term targets, supported by a clear funding channel and a transition plan that lays out the pathway to achieving these. The company also has successfully met past targets.	• The reduction target has been validated by a third party (such as SBTi) and includes both short- and long-term components • Executive oversight and incentives are linked to the target • A transition plan has been disclosed • Low carbon CapEx plans are aligned with the reduction target • Planned production forecasts and accompanying business strategies are in line with the capital commitments required to achieve the reduction target • The company has a successful history of meeting past emissions reduction targets that are aligned with 1.5 degrees C and verified by third parties • There is an enabling policy environment	• 100% emissions reduction targets	100%

Deriving the target weighting

By way of example, the target credibility framework can be used to derive the target weighting for two companies, M and N. Based on the analysis set out in Table 16, the resulting target weighting is 25% for Company M and 75% for Company N.

Table 16: Assessment of credibility indicators

CREDIBILITY INDICATORS	COMPANY M	COMPANY N
Short-term targets		✓
Long-term targets	✓	✓
Target validated by external body		✓
Executive oversight/incentives linked to target	✓	✓
Transition plan		✓
CapEx dedicated to activities		✓
Historical productions/capacity trends indicate progress		✓
Company has successful history of meeting past targets		
Resulting target weighting	25%	75%

✓ Indicates the company meets the criteria

Incorporating a credibility assessment into an alignment metric calculation

There are two primary methods for incorporating a credibility assessment into an alignment metric calculation:

1. **Calculate a company's final alignment score** by weighting two intermediary alignment scores for the company using the target weighting.[92] One alignment score is derived from stated emissions reduction targets. The other is based on a forecasting approach that broadly reflects a continuation of current emissions, such as historical emissions trends.
2. **Calculate a company's final emissions forecast** by weighting two intermediary emissions forecasts for the company using the target weighting. In this case, one emissions forecast is derived from stated emissions reduction targets. The other is based on an approach that broadly reflects a continuation of current emissions, such as historical emissions trends. A final company-level alignment score is then derived by following Key Design Judgements 7 and 8.

See Appendix M for a case study of how the approach described in Judgement 6 could be applied to a portfolio of companies.

Deep Dive: Companies without emissions reduction targets

For companies without emissions reduction targets practitioners should choose alternative approaches to forecasting emissions. This choice is of particular importance as, at the time of writing, only one-third of the world's largest publicly traded companies have made net-zero commitments.[93]

Practitioners currently apply a range of methods to project emissions for companies without targets. The four main methods used are: production forecasts; historical emissions or activity trends; neutral emissions intensity; and benchmark growth rates. Table 17 suggests a waterfall approach for applying the four methods using an order of prioritization.

92 The calculation mechanics for this approach are further outlined in Appendix L.

93 Additionally, of these companies, 65% of targets do not yet "meet minimum procedural reporting standards" as tracked by the Net Zero Tracker's Net Zero Stocktake 2022.

Table 17: Emissions forecasting methods for companies without emissions reduction targets

PRIORITY	FORECASTING METHOD	TYPE	DESCRIPTION	ADVANTAGES	DRAWBACKS	IMPLEMENTATION EFFORT	WHEN SHOULD THIS METHOD BE USED?
1st	1: Production forecasts	Forward looking non-linear forecast	Production is projected based on a variety of factors (e.g., production plans, capacity expansion plans, technology road maps). Emissions factors could be applied to production to project emissions	Clearly links to a company's capital commitment towards a net-zero transition and directly comparable to climate scenarios in some sectors	Standardized emissions factors and production forecasts are not available for many sectors	High	For companies in homogenous sectors with readily available historical production forecasts, production-based climate scenarios, and emissions factors
2nd	2: Historical emissions or activity trend forecast	Backward-looking linear forecast	Median historic year-on-year emissions/ activity trend is assumed to continue throughout the forecasting period	Rewards tangible past actions	Past emissions or activity levels may not accurately reflect the future,[94] particularly for companies in jurisdictions with evolving regulations and where pressure to transition is mounting	Medium	Data for method 1 is not available and at least three years of historical data are available
3rd	3: Neutral emissions intensity	Backward-looking linear forecast	Current emissions intensity held constant throughout the forecasting period	Simple to implement and communicate	Does not reflect the likely dynamics of the transition	Low	Data for methods 1 and 2 are not available, and current emissions intensity data are available
4th	4: Benchmark emissions growth rate	Forward-looking non-linear forecast	Use "stated policies" benchmark growth rates for the relevant sector/region as a proxy growth rate for future company-level emissions	Forecast is consistent with that of a company in a business-as-usual world	Potentially overestimates the ambition of the decarbonization pathway when compared to a forecast based on method 2	Medium	Data for methods 1, 2, and 3 are not available or the resulting emissions forecast is more conservative than method 3 (that is, it results in higher cumulative emissions)

94 For example, using historical emissions trends may over-extrapolate initial emissions reductions, which may be difficult to replicate in the future.

JUDGEMENT 6 GUIDANCE

Judgement 6 guidance for companies with emissions reduction targets.
Practitioners should consider calculating a company's alignment based on a credibility-weighted combination of two distinct emission forecasts:

1. A forward-looking approach based on the company's stated emissions reduction targets
2. A backward-looking approach based on historical emissions levels (for example, historical emissions trends or neutral emissions intensities held constant)

Practitioners should perform a credibility assessment to reflect the likelihood that a company is achieving its stated emissions reduction targets, considering the key indicators outlined in this section.

Judgement 6 guidance for companies without emissions reduction targets.
Practitioners should consider the waterfall approach to the four methods described in Table 17 in the order of priority presented. Regardless of the forecasting method employed, they should consider implementing a lower bound score on the alignment metric for companies with no stated emissions reductions targets — for example, by limiting companies without stated emissions reduction targets to, at best, a 2.0 degrees C temperature alignment or equivalent.

Regardless of the forecasting methods applied, practitioners are encouraged to be transparent about the forecasting approach used.

3.7 KEY DESIGN JUDGEMENT 7: HOW SHOULD ALIGNMENT BE MEASURED?

● Benchmark divergence ● ITR

Once a benchmark scenario has been constructed and a company's emissions forecasted, the next Key Design Judgement focuses on whether alignment should be calculated on a cumulative or point-in-time basis. Cumulative assessments quantify alignment in terms of emissions relative to the applicable benchmark scenario throughout the measurement period in question. For example, based on a cumulative assessment from now to 2030, a company's cumulative emissions might be 50% higher than the benchmark scenario over that period. Point-in-time assessments quantify a company's alignment in terms of its emissions relative to the applicable benchmark scenario at a given point in time. For example, a point-in-time assessment for 2030 could show that a company's emissions will be 20% higher than the respective benchmark scenario in 2030. However, in terms of the impact on global warming, what matters are cumulative emissions between the present day and the point at which net-zero emissions are reached. This relationship is not captured by point-in-time assessments. Therefore, based on feedback received, it is recommended to measure portfolio alignment cumulatively.

Equally important is the time horizon over which alignment is calculated. This choice can impact a company's final alignment result, most notably for companies that have set emissions reduction targets over multiple time horizons. The remainder of this section analyzes and develops guidance on the most appropriate time horizons for measuring alignment.

Current state of Judgement 7

Each horizon has distinct advantages and tradeoffs, which are summarized in Table 18.

Table 18: Advantages and drawbacks of short-, medium-, and long-term time horizons

<table>
<tr><th>TIME HORIZON</th><th>DESCRIPTION</th><th>ADVANTAGES</th><th>DRAWBACKS</th></tr>
<tr><td>Short-term</td><td>Time horizons up to 2025</td><td rowspan="2">• More accurately reflects likely action
• Incentivizes companies to set realistic, short-term reduction targets
• More likely to be accompanied by strategic transition planning with a focus on near-term actions to successfully meet the target</td><td rowspan="2">• Cannot capture the alignment of companies that aim to achieve net-zero at, or beyond, 2050
• May unfairly punish companies in hard-to-abate sectors[95]</td></tr>
<tr><td>Medium-term</td><td>Time horizons between 2025 and 2035</td></tr>
<tr><td>Long-term</td><td>Time horizons between 2035 and 2050</td><td>• Better captures the full scope of companies' long-term ambitions
• Does not punish companies in hard-to-abate sectors
• Complements short-term targets and is aligned with SBTi's corporate target-setting protocol[96]</td><td>• Uncertainty of the emissions trajectory is higher
• Leads to increases in prediction errors
• Does not incentivize near-term actions to reduce emissions</td></tr>
</table>

Technical note on the use of ITR metrics over short- and medium-term time horizons: As noted in Judgement 8 (Section 3.8), ITR can be calculated over any time horizon. However, when computing ITR based on a single-scenario approach over short- or medium-term time horizons, multiple benchmark interpolation approaches are preferable (See Appendix P for more information). TCRE multiplier approaches are better suited for long-term time horizons.

As discussed in Section 3.6 (Judgement 6), the time horizon is directly related to the choice of emissions forecasting approach. With all else held constant, the projection of emissions based exclusively on emissions reduction targets is more likely to lead to diverging alignment results as the time horizon extends. This is explored in the following quantitative case study.

95 Emissions reductions in hard-to-abate sectors are dependent on technological advances that may not be available within a short- or medium-term time horizon. As a result, companies may end up with inferior alignment outcomes.

96 The SBTi corporate target-setting protocol recommends setting both near-term (five to 10 year) and long-term, science-based targets (net zero by 2050 or sooner), per the SBTI Corporate Net-Zero Standard (2021).

Quantitative

EXAMPLE 15: QUANTITATIVE ANALYSIS — THE IMPACT OF TIME HORIZON ON THE ALIGNMENT OF THREE STEEL COMPANIES

Table 19: Historical emissions trends and emissions reduction targets for three steel companies

STEEL COMPANY	MEDIAN ANNUAL HISTORICAL EMISSIONS INTENSITY REDUCTION RATE (2015-2020, IN %)	EMISSIONS REDUCTION IN TARGETS (IN %) FROM BASELINE YEAR (2020)
Company P	0%	2030: -12% 2050: -100%
Company Q	-0.5%	2025: -7% 2050: -100%
Company R	-3.3%	2030: -30% 2045: -100%

Figure 17: Emissions projections based on historical emissions trends
Implied temperature rise (ITR)

Company emissions projected based on historical emissions trends

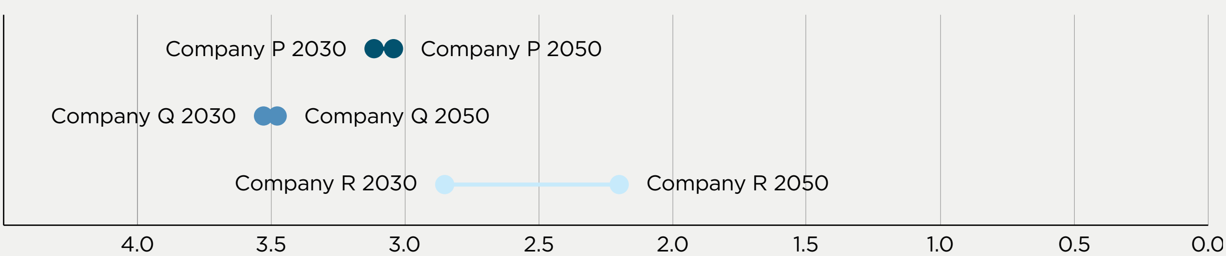
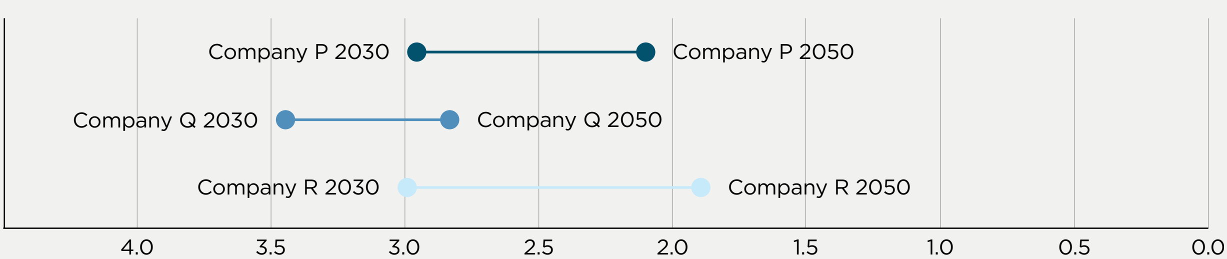


Figure 18: Emissions projections based on stated emissions reduction targets
Implied temperature rise (ITR)



The analysis shows that when calculating ITRs for the same companies based on their stated reduction targets, the 2030 ITRs based on targets almost precisely match the ITRs based on historical emissions. However, the 2050 ITRs based on targets are lower, reflecting the companies' long-term ambition to achieve net zero by 2050. Moreover, the ITRs based on historical emissions are almost identical (Figure 17), except for company R which has already reduced past emissions.

For company R, this results in a lower 2050, compared to its 2030 ITR. For a further exploration of how the chosen time horizon impacts a company's alignment, see Appendix N for a deep dive into Company R.

Companies in hard-to-abate sectors, such as steel, often do not have decreasing historical emissions trajectories because a lack of past reduction opportunities translates into poor historical emissions performance. For these companies, one should consider whether their long-term, net-zero targets are credible, and whether a potential mismatch with historical emissions trends is realistic. (Refer to Section 3.6, Judgement 6, for more details on conducting credibility assessments.)

PROPOSED GUIDANCE FOR JUDGEMENT 7

- Practitioners should consider calculating alignment on a cumulative-emissions basis to reflect the remaining carbon budget.
- Practitioners should compute alignment over short- or medium-term time horizons, optionally supplemented with computations over a long-term time horizon.
- When measuring alignment, practitioners and metric providers should be transparent about the choice of time horizons and note any potential associated uncertainties.

3.8 KEY DESIGN JUDGEMENT 8: HOW SHOULD ALIGNMENT BE EXPRESSED AS A METRIC?

● Binary target measurement ● Benchmark divergence
● ITR ● Maturity scale alignment

The choice of a specific portfolio alignment metric depends on the specific use case. Therefore, the reflections outlined in this section are pertinent for end users and providers seeking to understand the range of different alignment metrics being used. It should enable more robust comparisons between alignment metrics.

A technical annex (in Appendix O) features detailed analysis related to the application and suitability of the TCRE multiplier approach for ITR calculations.

Overview of current portfolio alignment metrics

Binary target measurement

Binary target measurement approaches seek to understand the percentage of portfolio companies with declared net-zero targets.[97] Such an assessment can be made more robust by assessing the coverage of companies in the portfolio with third-party verified targets. In addition, considering the enhancements laid out in Section 3.6 (Judgement 6), a practitioner could apply the target credibility framework to compute a credibility-weighted binary target measurement.

97 Portfolio Alignment Team. Measuring Portfolio Alignment: Technical Considerations, 2021, p. 2.

Implementation

EXAMPLE 16: GENERATION INVESTMENT MANAGEMENT'S (GENERATION IM) APPLICATION OF BINARY TARGET MEASUREMENT[98]

Generation IM, an asset management firm, uses a binary target measurement approach, along with an ITR metric as an additional forward-looking data point for investors.

Generation IM tracks portfolio companies that have made commitments to set science-based targets (SBTs) with SBTi, as well as portfolio companies with SBTs that are actually validated by SBTi. In addition, Generation IM notes whether the SBTs are focused on 1.5 degrees C or not. In its regular quarterly reporting to investors for its listed equity strategies,[99] Generation IM discloses the percentage of portfolio companies in SBTi (i.e., both companies that have formally committed to set a SBT to be validated by SBTi and companies with SBTs validated by SBTi) and how these companies compare to the fund benchmark.

Generation IM believes the advantage of binary target measurement is that commitments to SBTi are tangible and, through engagement, can be influenced by an investor.

Generation IM reports the following drawbacks with this approach:

1. While SBTi research indicates that companies with SBTs have achieved emissions reductions consistent with a 1.5 degrees C trajectory, setting a target is not the same as implementing the target and companies' performance must be carefully monitored. This difference must be kept in mind and carefully monitored.
2. The SBTi methodology can be challenging for some companies. For example, for high growth companies, achieving absolute emissions reductions while increasing their company's size can be challenging. It can also be challenging for companies that have already reduced their emissions using all existing technologies as they may find it difficult to further reduce emissions unless and until new technologies are developed.
3. And finally, SBTs can be a challenge for companies in high carbon sectors for which a sectoral methodology does not yet exist. In such situations, verification requirements are based on the requirements of the economy at large, which may not be applicable to the company's sector or region.

Benchmark divergence models

Benchmark divergence models assess portfolio alignment at an individual company level by constructing emissions benchmark scenarios from forward-looking climate scenarios and comparing company emissions against them.[100] These metrics are typically constructed by calculating the cumulative company-level emissions and the cumulative 1.5 degrees C benchmark scenario emissions. The company's cumulative overshoot or undershoot is then used to calculate the benchmark divergence, which is why benchmark divergence models can also be referred to as percentage misalignment metrics.

98 The information discussed in this case study has been sourced from direct engagement by the GFANZ workstream on Portfolio Alignment Measurement, as part of the broader, public consultative work undertaken by this workstream. Related publicly available information can be found in the next footnote.

99 Generation IM. Q1 2021 Global Equity Quarterly Investor Letter, 2021.

100 Portfolio Alignment Team. Measuring Portfolio Alignment: Technical Considerations, 2021, p. 2.

Implied temperature rise (ITR)

ITR models build on the benchmark divergence model and translate an assessment of overshoot or undershoot into a global warming impact. This impact represents the expected increase in temperature in 2100 versus pre-industrial levels if actors throughout the global economy were to overshoot or undershoot their respective benchmarks by the same proportion.

ITR models therefore provide a direct link between the company's alignment and future climate-warming outcomes, and they allow for a common language when comparing the alignment of companies in different sectors. ITR metrics are often criticized due to their perceived lack of transparency of underlying assumptions, which could lead to a sense of false precision. For further details of the limitations and advantages of ITR models, see Appendix O.

Implementation

EXAMPLE 17: BLACKROCK'S APPLICATION OF THE MSCI IMPLIED TEMPERATURE RISE (ITR) METRIC[101]

BlackRock, a global asset manager, uses MSCI-calculated ITR figures to express its funds' alignment to the Paris Agreement temperature goal.[102]

MSCI's ITR is a forward-looking metric calculated by looking at the current emissions intensity of companies within the fund's portfolio as well as the potential for those companies to reduce their emissions over time. Because the ITR metric is calculated in part by considering the potential for a company within the fund's portfolio to reduce its emissions over time, it is forward-looking and prone to limitations. As it is a new metric, BlackRock expects that it will evolve over time and believes the factors that will impact ITR calculations could include:

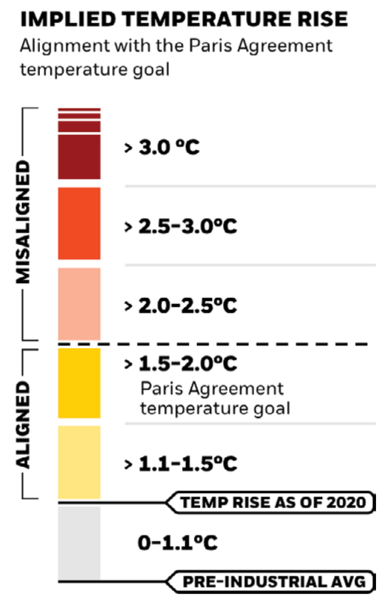
- Companies making net zero commitments and demonstrating progress toward achieving those commitments
- MSCI evolving its methodology
- The economy increasingly reflecting the transition to net zero

BlackRock has disclosed the MSCI-calculated ITR at fund level for its Exchange Traded Funds (ETFs) and Index Mutual Funds (IMFs). It uses bands (as opposed to absolute, continuous numbers) to account for uncertainty and variability of the metric, as shown in Figure 19.

101 The information discussed in this case study has been sourced from direct engagement by the GFANZ workstream on Portfolio Alignment Measurement, as part of the broader, public consultative work undertaken by this workstream. Related publicly available information can be found in the next footnote.

102 Blackrock. Implied Temperature Rise Brochure, 2021.

Figure 19: Illustration of BlackRock's application of the MSCI implied temperature rise (ITR) metric



Maturity scale alignment

Companies are bucketed into alignment categories on a scale of aligned, aligning, and non-aligned. This is done based on qualitative and quantitative indicators. These might include, but are not limited to, stated emissions reduction targets, past emissions performance, climate disclosures, and governance. Indicators with varying levels of complexity can be used to assess companies. The use of maturity scale alignment avoids the issue of false precision faced by benchmark divergence and ITR approaches. However, the link to specific future climate warming outcomes is not known.

Implementation

EXAMPLE 18: INSTITUTIONAL INVESTORS GROUP ON CLIMATE CHANGE (IIGCC) AND THE PARIS ALIGNED INVESTMENT INITIATIVE'S (PAII) NET ZERO INVESTMENT FRAMEWORK (NZIF) MATURITY SCALE ALIGNMENT METRICS[103]

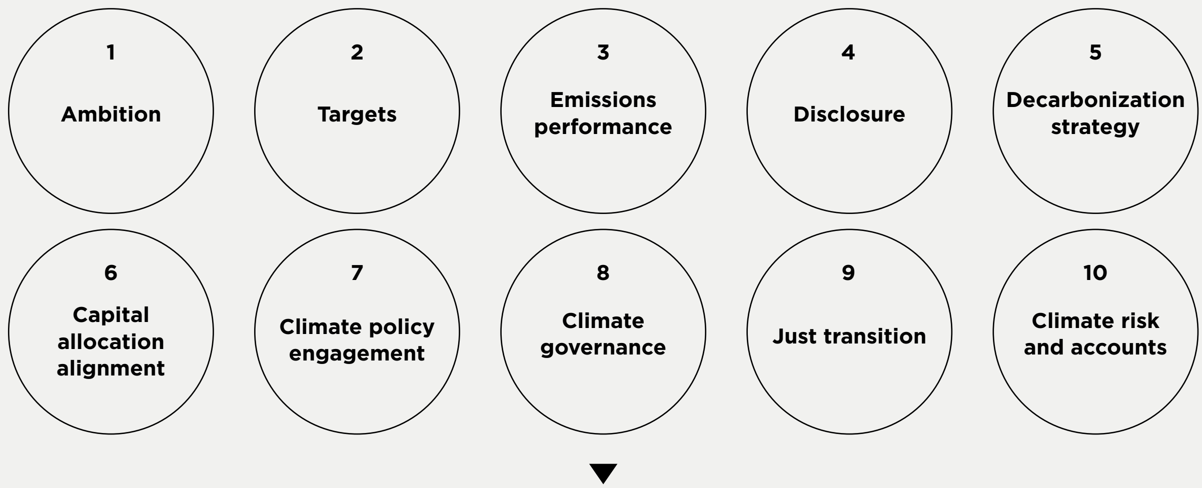
One framework for assigning companies on a maturity alignment scale is the approach outlined in the Net Zero Investment Framework (NZIF).[104] The NZIF recommends grouping companies into one of five categories on an "alignment maturity scale" based on an assessment that takes into account 10 key criteria (see Figure 20).

103 Some of the information discussed in this case study has been sourced from direct engagement by the GFANZ workstream on Portfolio Alignment Measurement, as part of the broader, public consultative work undertaken by this workstream. Related publicly available information can be found in the next footnote.

104 IIGCC and PAII. Net Zero Investment Framework, 2021.

Figure 20: NZIF approach

Alignment criteria



Alignment maturity scale

Net zero	Aligned	Aligning	Committed to aligning	Not aligned
• Companies that have current emissions intensity performance at, or close to, net-zero emissions with an investment plan or business model to continue that goal over time	• Meeting criteria 1-6 (or 2, 3 and 4 for lower impact companies) • Adequate performance over time in relation to criterion 3, in line with targets set	• Have set a short- or medium-term target (crietria 2) • Disclosure of Scope 1, 2 and (material) 3 emissions data (criteria 4) • A plan relating to how the company will achieve these targets (partial criteria 5)	• A company that has complied with criteria 1 by setting a clear goal to achieve net-zero emissions by 2050	• All other companies

The NZIF notes that this assessment of categories enables financial institutions to set and measure performance against targets and inform the strategy for alignment actions. NZIF also suggests that assets that are not aligning nor showing progress towards meeting the criteria to be considered as "aligning" should be the immediate and urgent priority for engagement or reweighting in portfolio construction.[105] Further, the framework states that consideration for selective divestment or exclusions should be given to assets that do not meet any of the criteria that indicate they have the potential to transition within a specified timeframe that is consistent with remaining on a global net-zero pathway. Finally, NZIF suggests that financial institutions should engage with companies that do not continue to improve performance against the criteria over the longer term.[106]

105 Ibid, p. 16.

106 Ibid, p. 16.

Challenges with Judgement 8

The 2021 PAT Report noted that financial institutions could select whichever alignment metric is most informative for their specific institution and use case. Each metric has advantages and drawbacks that should be weighed by the end user when considering the suitability for a specific use case. However, it can be challenging for an end user to select from the four categories of portfolio alignment metrics.[107] Example 19 analyzes whether different metrics convey the same signal for the end user.

Quantitative

EXAMPLE 19: ALIGNMENT RESULTS USING DIFFERENT METRICS APPLIED TO UTILITY COMPANIES

Table 20: ITR metric and rank ordering for utilities companies

Utilities Company	Alignment Metric: Binary Target Measurement	Alignment Metric: Benchmark Divergence		Alignment Metric: ITR		Alignment Metric: Maturity Scale Alignment
	Does the company have declared net-zero/Paris-alignment targets?	2050 benchmark divergence using emissions reduction targets	Absolute difference in misalignment score (compared to subsequent company)	2050 ITR using emissions reduction targets	Absolute difference in ITR (compared to subsequent company)	Maturity scale alignment score (Net zero 2050)
Company S	No	578%	+276%	4.3 degrees C	+1.0 degrees C	Not Aligned
Company T	No	302%	+44%	3.3 degrees C	+0.1 degrees C	Not Aligned
Company U	Yes	258%	+131%	3.2 degrees C	+0.9 degrees C	Not Aligned
Company V	No	127%	+123%	2.3 degrees C	+0.7 degrees C	National Pledges
Company W	Yes	4%	+16%	1.6 degrees C	+0.1 degrees C	Below 2 degrees
Company X	Yes	-12%	+7%	1.5 degrees C	0.0 degrees C	1.5 degrees
Company Y	Yes	-19%	-	1.5 degrees C	-	1.5 degrees

Table 20 illustrates that the level of alignment is typically signaled in a consistent manner by all four types of metrics. Also, the relative magnitude in difference between benchmark divergence and ITR is minor. This illustrates that translating benchmark divergence into ITR might not necessarily increase uncertainty with regards to the signal provided. To conclude, when selecting a metric, the suitability of the metric for a particular use case should be considered.

107 See Portfolio Alignment Team, Measuring Portfolio Alignment: Technical Considerations, 2021, p. 51 for considerations relevant to metric selection.

GUIDANCE FOR JUDGEMENT 8

When selecting a portfolio alignment metric, practitioners should consider its suitability for the specific use case(s). Table 3 in Section 2 illustrates the appropriateness of alignment metrics for specific use cases.

3.9 KEY DESIGN JUDGEMENT 9: HOW SHOULD COMPANY-LEVEL ALIGNMENT OUTCOMES BE AGGREGATED?

● Benchmark divergence ● ITR

This section reiterates key considerations from the 2021 PAT report, while noting new developments and feedback received during the 2022 public consultation. The focus is on aggregation methodologies applicable to benchmark divergence and ITR metrics. Practitioners concerned with aggregation approaches for binary target measurement and maturity scale alignment metrics should consider SBTi guidance, ensuring that one of the weighting approaches listed in the SBTi Finance Tool is used consistently.[108]

A key condition for building a portfolio alignment tool is that it facilitates aggregation at multiple levels, for example at the sector or portfolio-level. However, there are some challenges to aggregating beyond the sector-level because the sector level pathways chosen might not aggregate appropriately at the portfolio level. With regard to the issue of double counting during aggregation, especially when Scope 1, 2 and 3 emissions are included, this does not necessarily have to matter so long as double counting occurs at both the benchmark and company level.[109]

The aggregated budget approach, the portfolio-owned approach, and the portfolio-weighted approach[110] outlined below provide different insights:

The aggregated budget approach

The aggregated budget approach uses a weighting based on financed emissions to determine a portfolio's owned cumulative emissions compared to an owned carbon budget. This is done using a PCAF attribution factor. For example, if a financial institution owns 10% of a company, then the institution will be allocated 10% of the company's emissions and carbon budget over time. The institution then combines the portions of the various company emissions that it owns to get an overall, cumulative total of owned emissions for the portfolio or sub-portfolio. Similarly, the owned carbon budgets for each company are also combined into an overall owned carbon budget. The overall owned emissions are then compared to the overall owned carbon budget to estimate the total overshoot or undershoot of the portfolio. This total can then be expressed as a percentage and hence a portfolio level benchmark divergence metric.

As a next step, an aggregated ITR metric can be derived based on the total carbon budget overshoot or undershoot. The primary benefit of the aggregated budget approach is that it is based on the same physical science principles

108 SBTi, Financial Sector Science-Based Targets Guidance, 2022.

109 In this case the computation would cancel out double counting, as both the numerator (company-level emissions) and denominator (benchmark-level emissions) would include double counting of emissions.

110 All relevant considerations for Judgement 9 can be found in Portfolio Alignment Team, Measuring Portfolio Alignment: Technical Considerations, 2021, p. 52-57.

as the climate system: The warming caused by a given portfolio is a direct function of the overall, cumulative overshoot or undershoot of its unique proportion of the global carbon budget. Therefore, the aggregated budget approach results in a more scientifically robust result at the portfolio level.[111] In addition, the aggregated budget approach is compatible with multiple benchmark interpolation and the TCRE multiplier approach. This is explored further in Appendix P.

Quantitative

EXAMPLE 20: AN ILLUSTRATIVE EXAMPLE OF THE AGGREGATED BUDGET APPROACH FOR TWO PORTFOLIO COMPANIES

Table 21 and Table 22 highlight how the aggregated budget approach could apply to a hypothetical portfolio of two companies, Z and AA.

Table 21: Illustrative example of the aggregated budget approach for two companies

COMPANY	FINANCIAL INSTITUTION'S OWNERSHIP STAKE (%)	COMPANY'S EMISSIONS (MT)	COMPANY'S ALLOTTED CARBON BUDGET (MT)	FINANCIAL INSTITUTION'S "OWNED" EMISSIONS (MT)	FINANCIAL INSTITUTION'S "OWNED" BUDGET (MT)
Company Z	30%	100	20	30	6
Company AA	10%	200	80	20	8

Table 22: Illustrative example of the aggregated budget approach for two companies

STEP NUMBER	CALCULATION STEP	CALCULATION STEP OUTCOME
1	Portfolio's combined "owned" emissions	30 + 20 = 50 Mt
2	Portfolio's combined "owned" carbon budget	6 + 8 = 14 Mt
3	Portfolio's total carbon budget under/overshoot	50/14 = 3.57x overshoot
4	Portfolio's resulting ITR (application of multiple benchmark interpolation or TCRE multiplier approach)[112]	2.7 degrees C

The portfolio-owned approach

The portfolio-owned approach is similar to the aggregated budget approach. But, instead of combining owned emissions into a single emissions trajectory and owned carbon budgets into a single carbon budget, this approach simply assigns a weight to the final alignment metric (ITR, for example) of each investment or company. This weight is based on the proportion of total portfolio-owned emissions represented by the company's emissions.[113] The example outlined in Table 23 demonstrates the portfolio-owned approach for Companies Z and AA.

111 Ibid, p. 52-57.

112 See Appendix O for more details on the approaches for converting total carbon budget overshoot into an ITR.

113 Portfolio Alignment Team, Measuring Portfolio Alignment: Technical Considerations, 2021, p. 52-57 .

Table 23: Illustrative example of portfolio-owned approach

CALCULATION STEP	CALCULATION STEP OUTCOME
Company Z ITR	3.7 degrees C
Company AA ITR	2.2 degrees C
Company Z proportion of total owned emissions	30/50 = 0.6
Company AA proportion of total owned emissions	20/50 = 0.4
Portfolio's resulting ITR	(0.6 x 3.7) + (0.4 x 2.2) = 3.1 degrees C

The portfolio-weight approach

The portfolio-weight approach calculates the portfolio level score by weighting individual company alignment metrics (such as ITR) according to the holding weights in the portfolio. The approach provides insight into the impact of capital-allocation decisions (through the respective values of each investment) rather than focusing on each investment's contribution to emissions.[114] Table 24 illustrates the impact of the portfolio-weight approach on the resulting ITR, in a case where 20% of the portfolio is invested in Company Z and 80% in Company AA.

Table 24: Illustrative example of portfolio-weight approach

CALCULATION STEP	CALCULATION STEP OUTCOME
Company Z ITR	3.7 degrees C
Company AA ITR	2.2 degrees C
Company Z proportion of portfolio investment	0.2
Company AA proportion of portfolio investment	0.8
Portfolio's resulting ITR	(0.2 x 3.7) + (0.8 x 2.2) = 2.5 degrees C

Challenges with aggregation

The aggregation methods suggested fail to provide insight into the dispersion of alignment scores across the underlying portfolio companies. Although two different portfolios may be rated as 2 degrees C-aligned (using an ITR metric), one may be comprised of only 2 degrees C companies, while the other could be comprised of companies that span between 1.5 degrees C and 4.5 degrees C. Therefore, rather than disclosing one single portfolio level alignment result, it might be useful to break down the results further, for example by sector or region.

Based on feedback received, the aggregated budget approach has been flagged as a preferred approach. However, the method requires both company emissions and sufficiently granular benchmark scenario data for all portfolio companies. This can limit its usefulness for portfolios with incomplete data. This data challenge also applies to the portfolio-owned approach, though to a lesser extent, as the approach does not rely on benchmark scenarios.

114 Ibid, p. 52-57.

On the other hand, portfolio-weight approaches might underestimate the climate impact of portfolios. For example, a portfolio could include a high-emitting company with a small allocation to total portfolio value (e.g., 5%) but a large proportion of the portfolio's total carbon budget overshoot (e.g., 80%). The portfolio-weight approach would underestimate the portfolio's contribution to global warming while the aggregated budget approach would not.

PROPOSED GUIDANCE FOR JUDGEMENT 9

- For benchmark divergence and ITR metrics, practitioners should use an aggregated budget approach in order to maximize the scientific robustness of their disclosures.
- When calculating ITR using an aggregated budget approach, practitioners should convert the total carbon budget overshoot or undershoot into ITR using an approach consistent with their methodology selected in Judgements 7 and 8.
- Practitioners should also disclose the proportion of their portfolio holdings with data coverage, and transparently label the aggregation methods applied.

4. Convergence

Encouraging common approaches and transparency for portfolio alignment methodologies

4.1 DRIVING TRANSPARENCY WITH PORTFOLIO ALIGNMENT METRIC PROVIDERS

The transparency challenge

Assessments comparing the alignment scores from different metric providers in recent years have indicated that company-level alignment results diverge substantially, with no systematic pattern for the differences found.[115] This low level of consistency can be explained by differences in a variety of assumptions, such as: benchmark construction approaches, scenario choice, the choice between using underlying estimated data and reported emissions data, the decision to use a cumulative emissions or a point-in-time approach, as well as emissions forecasting methods. A low convergence around best practice methodological approaches, coupled with the opacity of underlying key assumptions for end users, has hindered the wider adoption of portfolio alignment metrics to date.

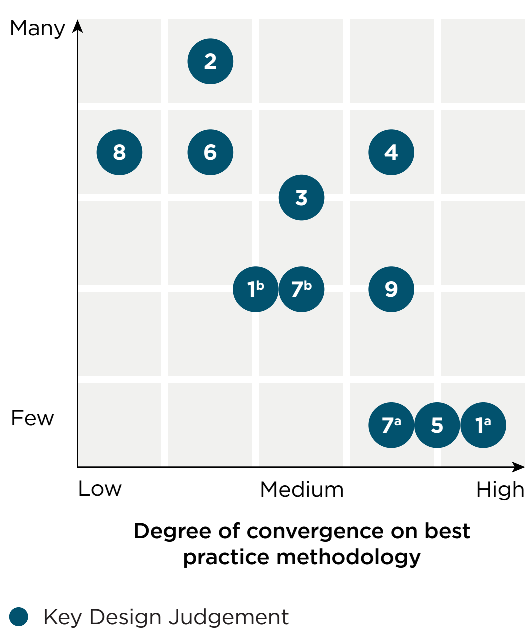
An evaluation of current portfolio alignment metric provider practices

To further drive convergence in best practice portfolio alignment methods, GFANZ has reviewed the methodologies of a broad number of metric providers.[116] A condensed summary of these providers' latest methodologies has been collated in a standardized format to help end users access, compare, and review them. A comparison of the methodologies covered has been carried out based on the Key Design Judgement framework. This can be found in Appendix Q.

Underpinned by this methodological comparison and direct engagement with metric providers, Figure 21 maps each Key Design Judgement's degree of convergence against the number of potential approaches available. Our findings indicate that there might be an inverse correlation between the number of potential approaches to a Key Design Judgement and the estimated current level of convergence on best practice.

Figure 21: Analysis of portfolio alignment metric provider convergence on best practice methodology

Number of potential methodological approaches to the Key Design Judgement



JUDGEMENT	DESCRIPTION
1^a	What type of benchmark should be built? — Single scenario benchmark or warming function?
1^b	Which construction method should be used ? — Fair-share carbon budget approach, convergence or rate-of-reduction?
2	What benchmark scenarios should be selected?
3	Should absolute emissions, production capacity, or emissions intensity units be used?
4	What scope of emissions should be included?
5	How should emissions baselines be quantified?
6	How should forward-looking emissions be estimated?
7^a	How should alignment be measured? — Cumulative or point in time?
7^b	How should alignment be measured? — What is the appropriate time horizon?
8	How should alignment be expressed as a metric?
9	How should company-level alignment outcomes be aggregated?

115 Institut Louis Bachelier. The Alignment Cookbook: A Technical review of Methodologies Assessing a Portfolio's Alignment with Low-Carbon Trajectories or Temperature Goal, 2021.

116 This review sought to include as many providers as practically feasible. Metric providers included reflect those who confirmed to GFANZ their desire to be included. The detail provided reflects both information from publicly available methodologies and direct engagement with the metric providers themselves.

A comparison with portfolio alignment methodologies presented in the 2020 PAT report[117] reveals that the number of portfolio alignment metric providers is growing, the level of methodological sophistication is increasing, and the supply of portfolio alignment metric types is diversifying. Similarly, there are areas where convergence on best practice methodology has evolved in the last two years. Notably, methodological differences with regards to Key Design Judgements 1[(b)], 2, 3, 6, 7[(b)], and 8 still prevail, underscoring the importance of driving a higher level of prescription for best practice approaches on these Key Design Judgements.

At present, Key Design Judgements 2, 6, and 8 have the most significant divergence in the approaches employed. As stated in Section 3.2, practitioners should consider the regional and sectoral granularity of benchmark scenarios. As more granular benchmark scenarios become available this should result in greater convergence on best practice approaches for Judgement 2. In addition, as noted in Section 2, the selection of an alignment metric should be tailored to the individual use case. Accordingly, levels of convergence on best practice are likely to remain low for Judgement 8, but this should have minimal bearing on practitioner methodologies and key input assumptions or parameters. Finally, the enhanced Judgement 6 guidance and accompanying analysis provided in Section 3.6 should help to increase convergence on best practices for projecting emissions forward.

A call to action for portfolio alignment metric providers (supply-side measures)

To drive convergence on best practice approaches, it is recommended that metric providers publicly disclose their methodological assumptions (to at least the level of precision provided in Appendix Q) within the framework of the nine Key Design Judgements. A more uniform disclosure of methodologies would help end users of portfolio alignment metrics to better understand the underlying assumptions. This, in turn, would help to build trust in the use of portfolio alignment methods, ultimately driving greater levels of adoption.

Empowering end user access to key assumptions (demand-side measures)

Based on feedback received, end users of portfolio alignment metrics would welcome best practice recommendations on performing due diligence with regard to the underlying assumptions of portfolio alignment methodologies, so that they can either assess data providers' alignment metrics directly or — in the case of asset owners — assess the alignment metrics being deployed by asset managers.

A due diligence questionnaire could therefore positively influence communication between end users and metric providers. It could help to reassure end users that best practice alignment measurement approaches have been employed. Alternatively, the provider could directly justify why a different approach was taken with regard to a particular Key Design Judgement and demonstrate how this influenced the final alignment result.

Appendix R contains an illustrative questionnaire that end users of portfolio alignment metrics could build upon, and leverage in their communication with metric providers.

117 Portfolio Alignment Team. Measuring Portfolio Alignment: Assessing the position of companies and portfolios on the path to net zero, 2020, p. 46.

4.2 ADDRESSING DATA CHALLENGES FOR PORTFOLIO ALIGNMENT MEASUREMENT

Emissions and target data are key inputs for measuring portfolio alignment. For this reason, the following represent significant barriers to adoption: a lack of disclosure of corporate emissions (in Scopes 1, 2,[118] and 3), inconsistent standards on emissions disclosure, and inconsistent target data.[119] Greater convergence on portfolio alignment methods therefore needs standards to be created on underlying data that feed into the measurement framework.

To address these issues, the Climate Data Steering Committee (CDSC) proposed recommendations for the development of an open data utility for climate transition-related data: the Net-Zero Data Public Utility (NZDPU). The NZDPU will become a trusted central source that focuses on providing standardized and verifiable direct (Scope 1) and indirect (Scopes 2 and 3) emissions data for both gross[120] and net entity-level GHGs. The utility will also focus on the collection of transition plan metrics and targets.

Practitioners are encouraged to utilize the reported standardized GHG emissions data feeding into the utility as a baseline to help overcome various challenges related to emissions data. These challenges include incomplete disclosures (for Scope 3 in particular),[121] disparate corporate data collection methods and discrepancies between different providers.[122] Although Scope 3 Category 15 (Financed Emissions) contributes a substantial proportion of total value-chain emissions in a number of sectors, particularly for financial institutions,[123] reporting is lacking.[124] The NZDPU proposes to collect financed emissions data disclosures for a given entity at the levels of asset class and sector. In addition, the CDSC recommends the disclosure of PCAF data quality scores and the percentage of data incorporated in the disclosure.

A challenge with regards to target data is the lack of a fixed structure. Unlike emissions data, there are many fields in a target that can be reported in various ways. For example, an emissions reduction commitment can be based on absolute emissions or emissions intensity. While a normalization of targets is possible in theory, inconsistencies in field types make targets hard to compare. These fields are crucial for accurately measuring alignment and they include target coverage (such as scope, sector, and regions); units (absolute or intensity); target year and goal; base year and baseline emissions; and progress against the target in each reporting year. To help overcome the challenge and make target data more comparable, the NZDPU proposes to collect them in a more standardized fashion. Conveniently, the CDSC's recommendation to set short- and long-term targets is in line with our guidance in Judgements 6 and 7.

Lastly, data quality issues with reported emissions data will likely persist in the near term. Estimates are therefore needed to fill the gaps in some cases. It is recommended that practitioners prioritize estimation methods based on activity levels and generated by bottom-up models. Further, practitioners are recommended to report the underlying methods and uncertainties associated with the estimation methods.[125]

---

118 Mind the gaps: Clarifying corporate carbon, FTSE, May 2022.

119 Recommendations for the Development of the Net-Zero Data Public Utility, p. 5-6.

120 A firm's total GHG emissions minus their emissions abated through carbon credits.

121 Kishan, Saijel. Corporate Greenhouse Gas Data Doesn't Always Add Up, January 12, 2022.

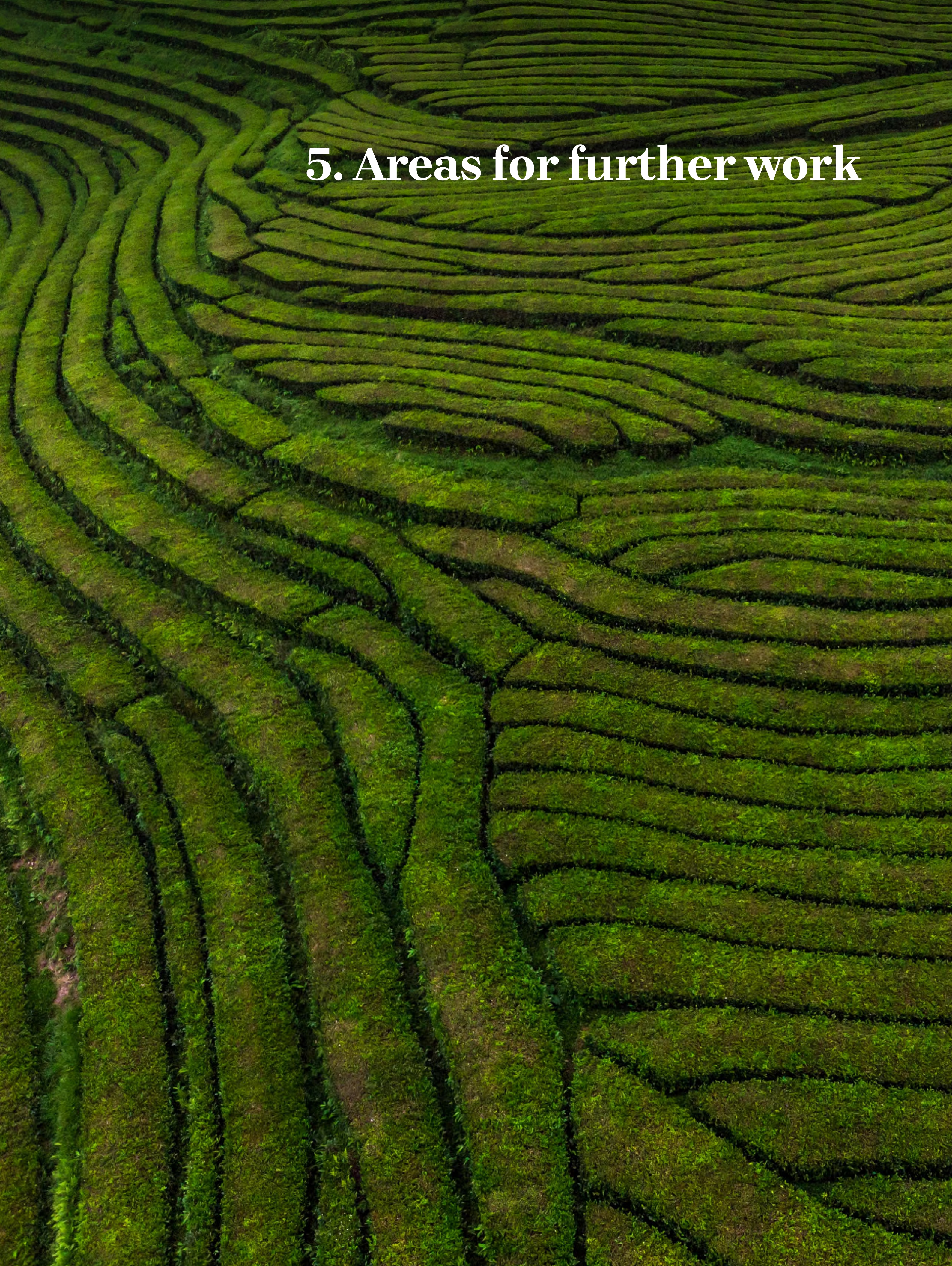
122 MSCI. Reported Emission Footprints: The Challenge Is Real, March 9, 2022.

123 Which Scope 3 Emissions Will the SEC Deem 'Material'?, April 28, 2022.

124 CDP. Finance sector's funded emissions over 700 times greater than its own, 2021.

125 Portfolio Alignment Team. Measuring Portfolio Alignment: Technical Considerations, 2021. p. 43.

5. Areas for further work



This section reflects on themes that were raised during the public consultation and workstream discussions, in particular on challenging areas that require further work to develop more comprehensive approaches. The themes include measuring portfolio alignment for climate solutions, managed phaseout, and additional asset classes. The section also considers a proposal for a practical implementation guide. Industry guidance and expertise in some of these areas is quickly evolving, and certain expert groups are working on the topics already. For each theme, the key considerations and challenges are summarized, and initial approaches to further work are discussed.

5.1 CLIMATE SOLUTIONS

Climate solutions: Low-emitting technologies and services, including nature-based solutions, to replace high-emitting technologies or services, and to remove greenhouse gases from the atmosphere, or otherwise accelerate the net-zero transition in a just manner.

An example may be a company that produces green hydrogen or a project on regenerative agriculture.

Why is further work necessary?

The portfolio alignment framework discussed in this report does not yet adequately reflect alignment measurement for providers of climate solutions. These providers often generate substantial emissions when sourcing raw materials and during the manufacturing process. However, the crucial consideration should be that providers of climate solutions help other real-economy actors to scale up low-carbon technologies and services that are essential to reach net-zero emissions by 2050. The important consideration is therefore a reduction in emissions over the lifecycle of the climate solution being deployed.[126]

While the framework discussed in this report would capture Scope 1, 2, and 3 emissions for providers of climate solutions, it fails to capture their emissions mitigation impacts. As a result, the alignment results for providers of climate solutions often show a significant distance from the chosen net-zero pathway, making these companies appear "Not Aligned".

Given the importance of financing and enabling solutions to replace high-emitting technologies and services, the lack of work on the alignment of these solutions represents a key limitation of the current framework.

What could further work entail?

Three potential approaches to measuring the alignment of climate solutions providers have been identified. Appendix S provides more detailed information on each of the three approaches, including practitioner case studies. The potential approaches include, but are not limited to:

1. **The use of avoided emissions:** The Key Design Judgements could be a helpful framework for integrating or separately assessing avoided emissions and emissions savings.
2. **The use of production-based technology pathways:** The Key Design Judgements could be a helpful framework for integrating or separately assessing the scaling up of production-based technology pathways, for example in the power and auto sectors.

126 For example, the induced emissions generated to manufacture a solar panel are significant. However, when considering the relevance of these induced emissions over the total lifetime of the panel (estimated at 25 years) they are minor. Research has shown that the panel's induced emissions can be paid back within one to three years (depending on where the panel was manufactured), while for the remainder of the panel's lifetime it is contributing to significant real economy emission reductions. Source: The Renewable Energy Hub, Solar Photovoltaics — Cradle-to-grave analysis and environmental cost, 2018.

3. **The use of taxonomy-based approaches:** The Key Design Judgements could be a helpful framework for integrating or separately assessing the scaling up of green revenues or capital investments as required to achieve net-zero emissions by 2050. Alternatively, separate metrics might be considered.

Further work would seek to understand these and other possible approaches to achieve agreement on best practice methods for measuring the alignment of climate solution providers.

5.2 MANAGED PHASEOUT

Managed phaseout projects: This strategy facilitates significant emissions reduction by the identification and planned early retirement of high-emitting assets while managing critical issues of service continuity and community interests.

An example may be an identified fossil fuel power plant with a plan in place for early decommissioning on a timeframe consistent with the broader net-zero trajectory.

Why is further work necessary?

Specific metrics and targets will be needed to measure the alignment of a managed phaseout plan with the goal of net-zero.[127] At the time of writing, best practice approaches are still emerging.

There are a number of potential considerations that need to be made when looking at extending the portfolio alignment framework to managed phaseout. For example:

- How applicable are the nine Key Design Judgements at the asset- rather than company-level?
- Given that the phaseout plan relies on a single binary event in the future, i.e., early asset closure, how could the credibility and feasibility of this plan be checked?
- What are the challenges of gathering detailed historical emissions data at the asset level, as well as the availability of appropriate 1.5 degrees C-aligned benchmark scenarios that are sufficiently granular and can reflect asset-level considerations such as carbon efficiency, age, and design life?
- How could the cumulative emissions of an asset with and without a managed phaseout plan be projected into the future?

What could further work entail?

As a first step, GFANZ plans to engage with a range of experts in the field to understand evolving leading thinking on measuring portfolio alignment for managed phaseout activities. Subsequently, GFANZ may kick-off or commission further methodological work where a need is identified.

5.3 EXPANSION TO ADDITIONAL ASSET CLASSES

Why is further work necessary?

At present, the Key Design Judgements are applied to companies. As such, these Judgements are a useful framework to measure alignment for equity or corporate bond portfolios. However, many more asset classes are of importance, especially for global investors such as pension funds and insurers. There is therefore a clear need to establish best-practice approaches centered on the Key Design Judgements for measuring the alignment of assets other than corporations.

127 RMI, "Guidance for Metrics and Targets Specific to the Managed Phaseout of Coal Power Generation", 2022.

What could further work entail?

Sovereign bonds and real assets might be priority asset classes for further work. The nine Key Design Judgements might be useful, but they would need to be applied at the country and property levels, and some assumptions might have to be adapted. GFANZ will continue to engage with a range of stakeholders to understand their priorities and the methodological challenges involved in measuring alignment across a broader range of asset classes. In future, methodological approaches could be developed with the support of workstream members and other stakeholders.

5.4 IMPLEMENTATION GUIDES

Why is further work necessary?

Based on feedback received, best practice considerations are not just a requirement for the construction of alignment metrics but also for their operationalization.

What could further work entail?

A step-by-step practical implementation guide that outlines:

- In-depth practical guidance on the implementation of portfolio alignment metrics
- Financial institution case studies on operationalizing portfolio alignment measurement, for example best practice approaches for capital allocation strategies to sectors and regions that need to transition
- How to embed portfolio alignment measurement into financial decision-making
- Guidance on net-zero disclosure, for example across each of the four key financing strategies
- Lessons learned on addressing key implementation barriers

GFANZ will continue to engage with a range of stakeholders to understand the most useful approaches and the best-placed organization to undertake this type of work.

6. Conclusion

With this report, the GFANZ workstream on Portfolio Alignment Measurement aims to drive enhancement on best practice considerations for Key Design Judgements important for measuring portfolio alignment, to achieve greater levels of convergence on portfolio alignment methods, and in turn, increase best practice adoption of portfolio alignment metrics by financial institutions.

Looking ahead, GFANZ acknowledges that there is scope for further developing and enhancing guidance for best practice portfolio alignment methodologies, especially with regard to climate solutions and managed phaseout. Practitioners have also expressed the need for guidance on how to implement and operationalize portfolio alignment metrics.

While the journey on measuring portfolio alignment needs to continue, we hope that the guidance and accompanying case studies provided in this report will support practitioners in their construction and use of transparent and decision-useful portfolio alignment metrics. This in turn should help financial institutions to understand how aligned their investment, lending, and underwriting activities are with critical net-zero goals, while simultaneously supporting capital allocation decisions to the net-zero economy.

7. Appendices

LIST OF FIGURES

LIST OF CASE STUDY EXAMPLES

LIST OF TABLES

Glossary

1.5 degrees C-aligned	A pathway of greenhouse gas emissions and other climate forces that provides an approximately one-in-two to two-in-three chance, given current knowledge of the climate response, of global warming either remaining below 1.5 degrees C or returning to 1.5 degrees C by around 2100, following an overshoot. Pathways giving at least 50% probability based on current knowledge of limiting global warming to below 1.5 degrees C are classified as "no overshoot" while those limiting warming to below 1.6 degrees C and returning to 1.5 degrees C by 2100 are classified as 1.5 degrees C "low overshoot."
Alignment outcome	The resulting output when a portfolio alignment metric is calculated at the portfolio- or company-level.
Carbon budget overshoot or undershoot	The cumulative emissions of a company (or portfolio) compared to the cumulative emissions that the company (or portfolio) is allotted based on the benchmark scenario.
Climate solutions	Technologies, services, tools, or social and behavioral changes that directly contribute to the elimination, removal, or reduction of real-economy GHG emissions or that directly support the expansion of these solutions. These solutions include scaling up zero-carbon alternatives to high-emitting activities — a prerequisite to phasing out high-emitting assets — as well as nature-based solutions and carbon removal technologies. In this report, "climate solutions" is used to refer to solutions that support mitigation of climate change and emissions reduction. GFANZ acknowledges that a broader use of the term may include solutions that are aimed at developing adaptation.
Emissions reduction targets	A company's stated pledge to reduce its absolute GHG emissions and/or physical GHG emissions intensity by a set figure within a defined time period.
End user	A financial institution that does not calculate its own portfolio alignment metrics, but uses portfolio alignment metrics provided by others.
Financed emissions	Scope 3 emissions associated with the reporting company's investments, according to the GHG Inventory Protocol (Category 15). GFANZ encourages the use of the PCAF Standard, built on and accepted by the GHG Inventory Protocol, and acknowledges their ongoing work to further develop and refine methodological guidance to measure and disclose GHG emissions associated with different asset classes and categories of financial activity and for financial institutions to utilize these standards, as appropriate, as they are released (e.g., at the time of writing, PCAF is working on insured emissions and capital market instruments methodologies).
Hard-to-abate sectors	Economic sectors with relatively higher abatement costs than the rest of the economy. These include, for example, heavy industry sectors (cement, steel, chemicals) and heavy-duty transport (heavy-duty road transport, shipping, aviation).[128]
ITR	Implied temperature rise.
Managed phaseout projects	Targeted efforts to reduce GHG emissions through accelerated retirement of high-emitting physical assets (shortening their operating life). Financial institutions can finance or enable strategies for managed phaseout of these assets within a defined science-aligned time horizon, thereby limiting the likelihood that these assets will be stranded in a low-carbon future. These projects require appropriate scrutiny and governance to ensure that emissions reduction occurs as planned. The GFANZ Secretariat has published a framework for the managed phaseout of high-emitting assets, which outlines the challenges and opportunities for financial institutions in these transactions, as well as details on how financial institutions can develop strategies for managed phaseout projects.
Net zero	A state when anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals. Organizations are considered to have reached a state of net zero when they reduce their GHG emissions following science-based pathways, with any remaining GHG emissions attributable to that organization being fully neutralized, either within the value chain or through purchase of valid offset credits.

128 Energy Transitions Commission. Mission Possible: Reaching Net-Zero Carbon Emissions from Harder-to-Abate Sectors by Mid Century, 2018.

Net-zero transition plans	A set of goals, actions, and accountability mechanisms to align an organization's business activities with a pathway to net-zero GHG emissions that delivers real economy emissions reduction in line with achieving global net zero. For GFANZ members, a transition plan should be consistent with achieving net zero by 2050, at the latest, in line with commitments and global efforts to limit warming to 1.5 degrees C, above pre-industrial levels, with low or no overshoot.[129, 130, 131]
Overshoot	The temporary exceedance of a specified level of global warming, such as 1.5° degrees C. Overshoot implies peak followed by a decline in global warming, achieved through anthropogenic removal of CO_2 exceeding remaining CO_2 emissions globally.[132]
Paris Agreement	Also known as the Paris Accords or the Paris Climate Accords; refers to an international treaty on climate change adopted in 2015. It covers climate change mitigation, adaptation, and finance.
Pathway	A goal-oriented scenario or combination of scenarios answering the question, "What needs to happen?", to accomplish a specific objective (e.g., what are the steps needed to reach net zero by 2050; to limit global warming to 1.5 degrees C, with low or no overshoot).
Portfolio alignment metric	A metric that measures the alignment of a portfolio with a selected benchmark scenario.
Portfolio alignment metric provider	An institution (other than a financial institution) that provides portfolio alignment metrics.
Practitioner	A financial institution or portfolio alignment metric provider that provides their own portfolio alignment metrics.
Real economy	This refers to economic activity outside of the financial sector.
Real-economy companies	Companies primarily operating in the real economy.
Scenario	Projections of what can happen by creating plausible, coherent, and internally consistent descriptions of possible climate change futures. Scenarios are not predictions of the future.[133]
Scope 1 emissions	Direct emissions from owned or controlled sources.
Scope 2 emissions	Indirect emissions from the generation of purchased energy.
Scope 3 emissions	All indirect emissions (not included in Scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions. Scope 3 financed emissions consistent with the net-zero, sector-specific alliance commitments include those emissions associated with a financial institution's investment, lending, and underwriting portfolios, or from clients of investment consultants or financial service providers, whereas Scope 3 emissions from a financial institution's own operations pertain to business travel, supply chain, etc. Note that this report uses "financed emissions" and "portfolio emissions" interchangeably.
Task Force on Climate-related Financial Disclosures (TCFD)	A framework created by the Financial Stability Board (FSB) to help public companies and other organizations disclose climate-related financial risks and opportunities.
Time horizon	The time period over which a portfolio alignment metric is calculated (e.g., a 2030 time horizon means that the portfolio alignment metric is calculated from the present day until 2030).[134] • Short-term time horizon: time horizons up to 2025. • Medium-term time horizon: time horizons between 2026 and 2035. • Long-term time horizon: time horizons between 2036 and 2050.

129 Pathways giving at least 50% probability based on current knowledge of limiting global warming to below 1.5 degrees C are classified as "no overshoot," while those limiting warming to below 1.6 degrees C and returning to 1.5 degrees C by 2100 are classified as "1.5 degrees C limited overshoot".

130 These requirements reflect sector-specific alliance member commitments.

131 GFANZ members have also committed to setting an interim target (by 2030 or sooner).

132 IPCC. "Global Warming of 1.5 degrees C, An IPCC Special Report on the impacts of global warming of 1.5 degrees C above pre industrial levels and related global greenhouse emission pathways, in the context of strengthening global response to the threat of climate change, sustainable development, and efforts to eradicate poverty", 2018.

133 Climatescenarios. Primer, n.d.

134 Climate Action 100+. Net Zero Company Benchmark: Structure and Methodologies, 2021.

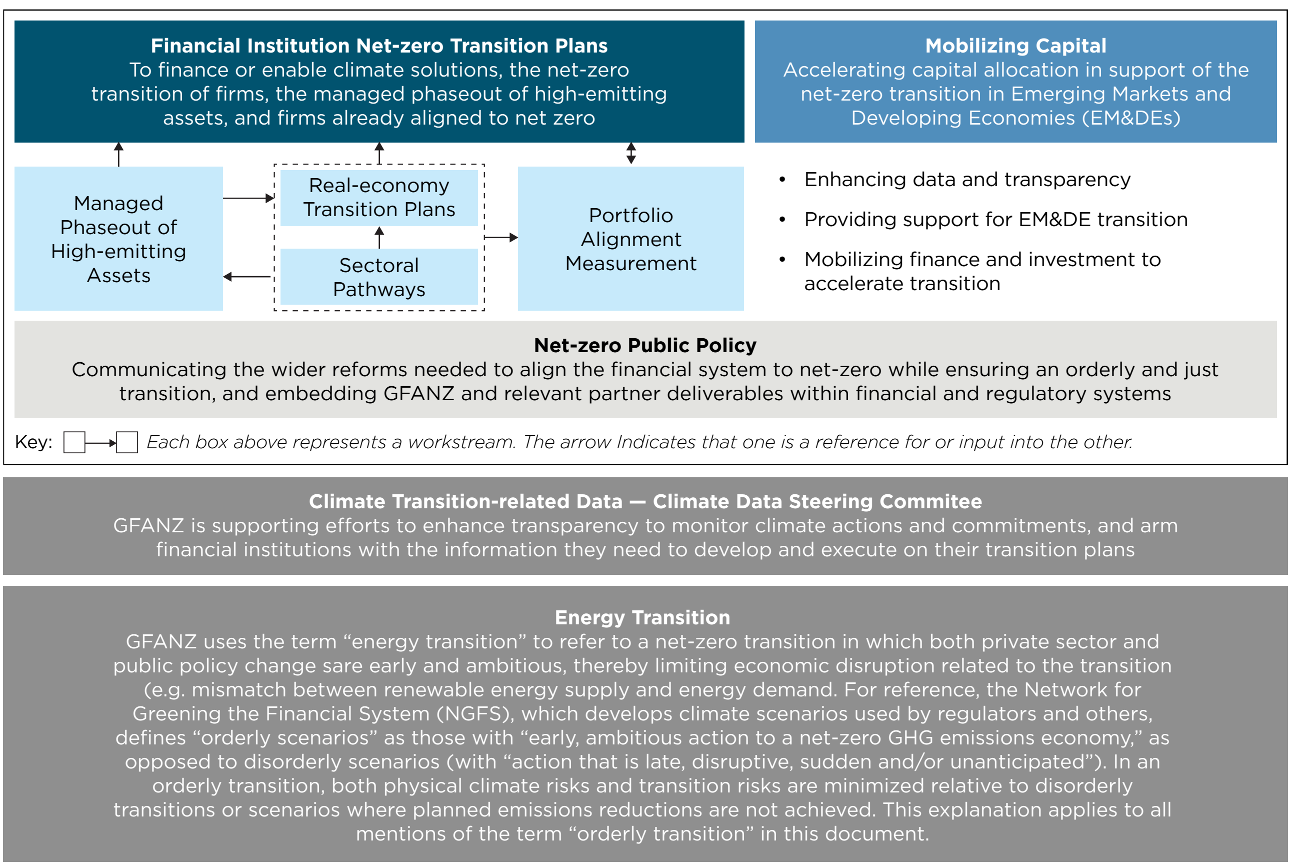
APPENDIX A

Background on GFANZ work program

The GFANZ Principals Group established an ambitious program of work in 2021 to drive the commitment, engagement, investment, and alignment required to transition the financial system and global economy to net zero based on credible, science-aligned, pan-sector standards and guidance.

The ambition is to keep pushing for upward convergence, refining our practitioner-led work program in collaboration with NGOs, industry bodies, and governments to transform the global financial system to meet the greatest challenge of our age. To that effect, at the start of 2022, GFANZ further refined the program of work to deliver on our priorities, organized around three core pillars and two additional initiatives:

Figure 22: GFANZ 2022 work program[135]



135 GFANZ uses the term "orderly transition" to refer to a net-zero transition in which both private sector action and public policy changes are early and ambitious, thereby limiting economic disruption related to the transition (e.g., mismatch between renewable energy supply and energy demand). For reference, the Network for Greening the Financial System (NGFS), which develops climate scenarios used by regulators and others, defines "orderly scenarios" as those with "early, ambitious action to a net-zero GHG emissions economy," as opposed to disorderly scenarios (with "action that is late, disruptive, sudden and/or unanticipated"). In an orderly transition, both physical climate risks and transition risks are minimized relative to disorderly transitions or scenarios where planned emissions reductions are not achieved. This explanation applies to all mentions of the term "orderly transition" in this document.

The recommendations and guidance provided by the GFANZ work program are voluntary and take into account related efforts from the sector-specific net-zero alliances and their associated networks. GFANZ hopes that its work will assist policymakers, regulators, and standard-setters as they produce rules and guidance around net-zero transition plans, establish economy-wide targets, and align financial architecture to enable delivery of net zero across the globe.

APPENDIX B

The 1.5 degrees C carbon budget benchmark for passive investors

Since large pension funds are predominantly passive investors that control about half of capital markets,[136] net-zero benchmark construction approaches, in addition to bottom-up portfolio alignment methods, are important. In this context, a benchmark aligned with a carbon budget[137] for limiting warming to 1.5 degrees C might be useful to help shift capital to the net-zero economy.

The net-zero benchmark proposal outlined here is based on an IPCC-conforming 1.5 degrees C carbon budget that is updated annually and distributed to the underlying benchmark companies based on the prevailing corporate emissions in each year. A simulation[138] applying the approach to a European portfolio of $1 trillion shows that it is possible to construct a 1.5 degrees C carbon budget-adjusted benchmark that maintains a low tracking error and minimal turnover. The simulated benchmark maintains exposure to all benchmark sectors with slight over- and under-weight tilts and behaves like the parent benchmark but within the assigned 1.5 degrees C carbon budget.

In short, an index provider could have a carbon budget that is allocated among the benchmark companies based on prevailing emissions. The following year, there would be a new and decreasing carbon budget and the portfolio would be reshuffled again and so on. The sum of the yearly carbon budgets would mirror the trajectory necessary to be carbon neutral (-10% per year in volume in 2021 in order to achieve 1.5 degrees C increase with 83% probability). Companies would know in advance when they would drop out of the index. The approach would thus create a competition amongst companies to reduce emissions in order to remain in the index.

The carbon budget benchmark approach highlights the importance of the carbon budget, which keeps shrinking. If an investor were to start the strategy five years from today, the required annual reductions would increase from 12% to 18%.[139]

Moreover, the carbon budget approach could be applied with a forward-looking lens. Rather than allocating a yearly budget based on the prevailing

136 WWF. Pathway to Net-Zero: A New Benchmark for Universal Asset Owners, 2022.

137 300GtCO, including CO_2, excluding other GHG emissions such as methane, nitrous oxide, etc.

138 Bolton, Kacperczyk, Samama, Net-Zero Carbon Portfolio Alignment, 2022.

139 Ibid.

GHG emissions of the benchmark companies, a three-year carbon budget is allocated based on an estimate of corporate emissions over the next three years.[140] Every three years, the next three years of carbon budget would be determined based on the most up-to-date forward-looking emission pathways. A more sophisticated forward-looking approach could be applied if listed companies had to provide guidance on future emissions, as is common with earnings. In both cases, data could then be used by investors to allocate the carbon budget of portfolios over a given period with the weighting of individual companies based on future emissions.

APPENDIX C

Judgement 1 Case Study — How the fair share carbon budget approach can help to overcome challenges with the rate-of-reduction approach

Quantitative

EXAMPLE 21: CHALLENGES WITH RATE-OF-REDUCTION APPROACHES

Consider two companies, Company C and D. Company C is a poor performer which has made minimal emissions reduction efforts to date while Company D has already made significant progress on decarbonization. This results in a physical intensity metric for Company C which is far higher than Company D. However, if both companies reduce emissions at the same annual rate and a practitioner uses a rate-of-reduction approach, then the companies will appear similarly aligned despite their carbon intensity differences. The fair-share carbon budget approach solves for challenges that arise with rate-of-reduction approaches by accounting for the relative performance of companies' physical intensities at the starting point of the alignment calculation to meet its benchmark, which is slightly above D's current emissions. The convergence approach also has this advantage, though the fair-share carbon budget approach is also able to maintain the use of absolute emissions in the forecast.

Figure 23 and Figure 24 graphically demonstrate Company C and Company D's respective fair-share benchmarks. The fair-share approach (dotted lines in the graphs) adjusts the starting point of the benchmark to reflect the relative intensity performance of Company C and D. As a result, Company C will need to reduce absolute emissions at a faster-than-average rate to meet its benchmark, which is far below C's current emissions. Overperforming companies, such as Company D, will need to reduce at a lower-than-average rate to meet its benchmark, which is slightly above D's current emissions.

140 Ibid.

Figure 23: Company C's fair-share benchmark

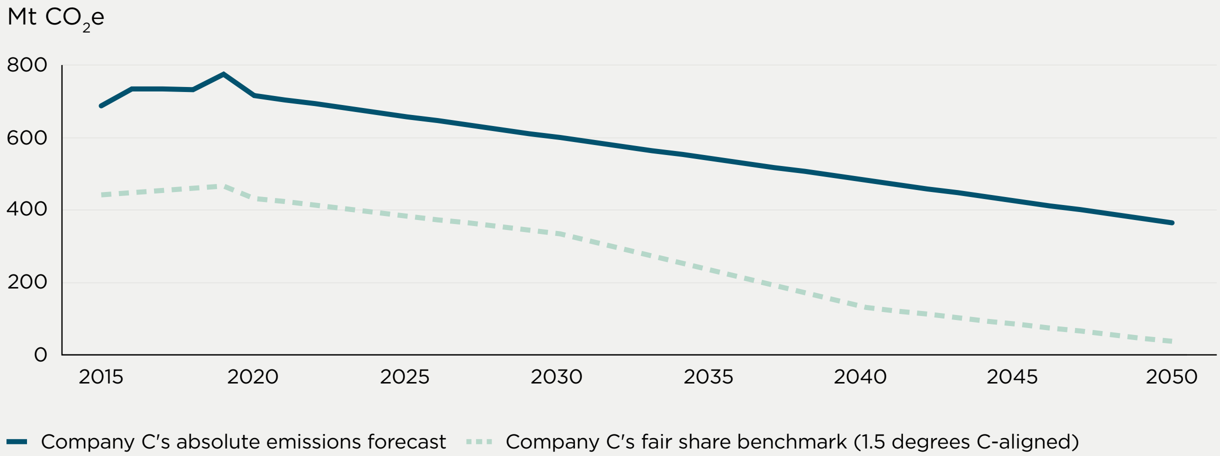
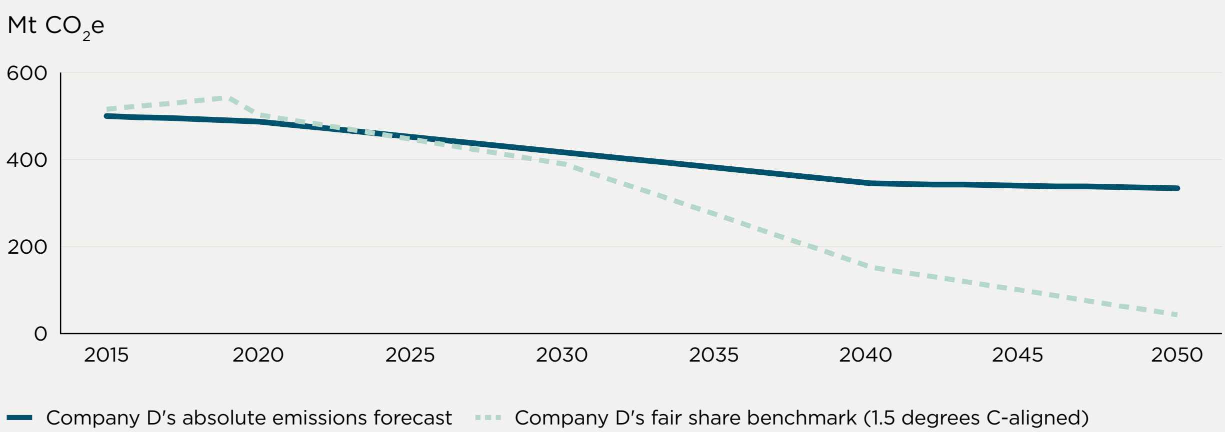


Figure 24: Company D's fair-share benchmark



APPENDIX D

Judgement 2 - Regional and sectoral scenario pathways

Table 25: Sectoral granularity provided by various benchmark providers

SECTOR		IEA NZE	UTS OECM	NGFS GCAM	NGFS REMIND	NGFS MG
Industry		✓	✓	✓	✓	✓
Sub-sectors	Iron/Steel	✓	✓	✓	✓	X
	Chemicals	✓	✓	✓	✓	X
	Cement	✓	✓	✓	✓	X
	Aluminum	X	✓	✓	✓	X
Transport		✓	✓	✓	✓	✓
Sub-sectors	Autos	✓	✓	✓	✓	✓
	Trucks	✓	✓	X	X	X
	Aviation	✓	✓	X	X	X
	Shipping	✓	✓	X	X	X
Buildings		✓	✓	✓	✓	✓
Sub-sectors	Residential	✓	✓	✓	X	X
	Services	✓	✓	✓	X	X
Energy		✓	✓	✓	✓	✓
Sub-sectors	Power	✓	✓	✓	✓	✓
	Oil and gas	✓	✓	X	X	X
	Coal	✓	✓	X	X	X
Other	Agriculture	X	✓	✓	✓	✓

Table 26: Regional granularity provided by various benchmark providers[141, 142]

SCENARIO	NUMBER OF MODELED REGIONS (INPUT)	MODELED REGIONS	REGIONAL GRANULARITY
IEA NZE	26 regions on the demand-side; on supply-side, all countries modeled individually	Asia Pacific is split into 8 regions; Europe into 6; North America into 3; Central and South America into 3; Africa into 3; Eurasia into 2; and the Middle East is a single region	Global
UTS OECM	10 regions	OECD North America, OECD Pacific, OECD Europe, Eastern Europe/Eurasia, Middle East, Latin America, China, Africa, India, Non-OECD Asia	Global, OECD Europe, OECD North America
NGFS GCAM	32 regions	Africa (Eastern), Africa (Northern), Africa (Southern), Africa (Western), Argentina, Australia & New Zealand, Brazil, Canada, Central America and the Caribbean, Central Asia, China, Columbia, EU-12, EU-15, European Free Trade Association, Europe (Non-EU), India, Indonesia, Japan, Mexico, Middle East, Pakistan, Russia, South Africa, South America (Northern), South America (Southern), South Asia, Southeast Asia, South Korea, Taiwan, USA	180 countries
NGFS REMIND	12 regions	CAZ (Canada, Australia and New Zealand); China; European Union; India; Japan; Latin America; Middle East and North Africa; non-EU member states; other Asia; reforming countries; Sub-Saharan Africa; United States	180 countries
NGFS MG	11 regions	Sub-Saharan Africa; Centrally Planned Asia; Central and Eastern Europe; Former Soviet Union; Latin America and the Caribbean; Middle East and North Africa; North America; Pacific OECD; Other Pacific Asia; South Asia; Western Europe	180 countries

141 International Energy Agency's Net Zero Emission by 2050 (IEA NZE), University of Technology Sydney's One Earth Climate Model (UTS OECM), and Network for Greening the Financial System's (NGFS) Global Change Analysis Model (GCAM), Regional Model of Investment and Development (RM), MESSAGEix-GLOBIOM (MG).

142 See GFANZ. Guidance on Use of Sectoral Pathways for Financial Institutions, 2022, p. 48 for a breakdown of the overshoot for each of these scenarios.

APPENDIX E

Judgement 3 Case Study – Differences in alignment score based on unit choice for oil and gas companies

Quantitative

EXAMPLE 22: IMPACT OF THE CHOICE OF MEASUREMENT UNIT

This quantitative example illustrates that the choice of unit has a tangible impact on the resulting alignment outcomes. This in turn drives the companies' underlying transition strategies and decarbonization trajectories that are rewarded — or punished — to different extents by the choice of unit.

Table 27 shows the portfolio alignment results for Company E and Company F, two oil and gas companies that are assumed to meet their stated emissions reduction targets.

Table 27: ITR for Company E and F

COMPANY (OIL AND GAS)	2050 ITR — USING ABSOLUTE EMISSIONS	2050 ITR — USING PHYSICAL EMISSIONS INTENSITY	DIFFERENCE BETWEEN THE TWO APPROACHES
Company E	2.1 degrees C	3.5 degrees C	-1.4 degrees C
Company F	1.9 degrees C	1.5 degrees C	+0.4 degrees C

Company E analysis

Company E's emissions reduction target in 2025 reflects its plans to transition some of its heavy crude oil assets to renewables (e.g., developing operational power generation in hydropower and wind). This results in an absolute emissions trajectory (see Figure 25) that compares more favorably to the 1.5 degrees C benchmark scenario until 2030. However, Company E's lack of a long-term emissions reduction target prevents it from continuing a favorable trajectory past 2030, assuming emissions are held constant.

Company E's physical intensity (90 Mt CO_2e/EJ) is much higher than the benchmark scenario (61 Mt CO_2e/EJ) in the baseline year of 2020. This occurs because Company E primarily relies on inefficient oil extraction methods and has a low proportion of natural gas production. As a result, even though physical intensity decreases compared to historical intensity levels, the physical intensity trajectory (see Figure 26) remains far above the 1.5 degrees C benchmark scenario. Company E's resulting alignment outcome is thus comparatively higher using physical intensity than when using absolute emissions.

Figure 25: Company E's absolute emissions forecast

Mt CO_2e

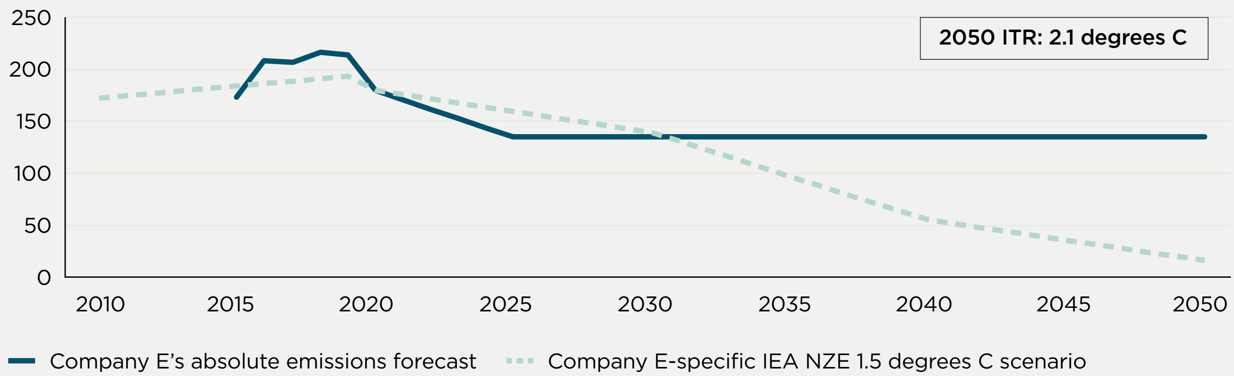
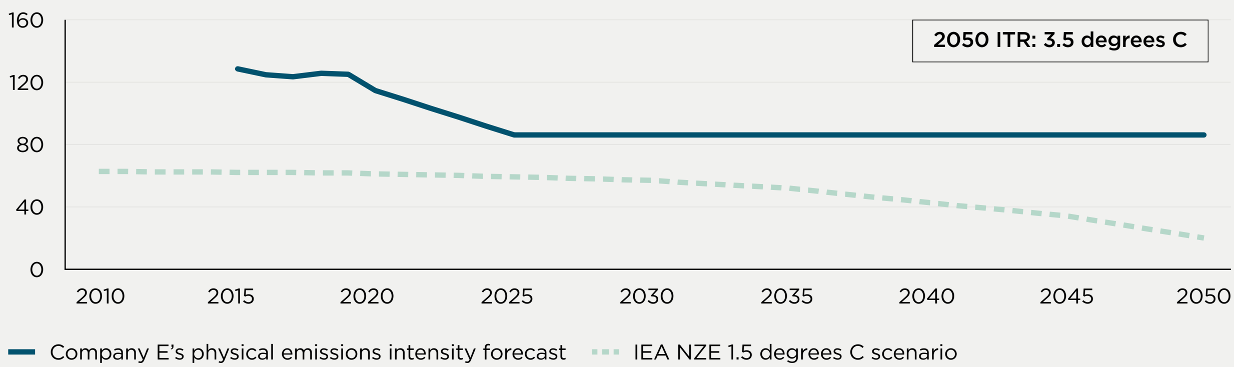


Figure 26: Company E's physical intensity forecast

Mt CO_2e/EJ



Company F analysis

On the other hand, Company F leverages some best-in-class oil and gas extraction technologies, such as carbon capture and storage, and zero routine venting and flaring. Application of these technologies leads to a physical intensity (46 Mt CO_2e/EJ) that is below the corresponding 1.5 degrees C benchmark scenario intensity (61 Mt CO_2e/EJ). Given this favorable starting point, Company F's alignment outcome when using physical intensity is roughly aligned with the 1.5 degrees C benchmark scenario (see Figure 27). However, there is a point at which technological advances to reduce the emissions per barrel of oil plateau, which translates into a constant physical intensity for Company F to 2050. At some point, for Company F to continue reducing its intensity in line with the benchmark, it will need to reduce its oil and gas extraction and/or transition to renewable or low-carbon power generation.

Though Company F intends to use best-in-class technology while transitioning away from some of its more energy-intensive assets, the company plans to continue operating a core business unit that carries out oil and gas extraction. This results in an absolute emissions trajectory that decreases until 2040 and then levels off (see Figure 28). Using absolute emissions units thus results in an alignment outcome that is less favorably aligned with 1.5 degrees C scenario benchmarks than when using physical intensity units.

Figure 27: Company F's physical intensity forecast

Mt CO_2e/EJ

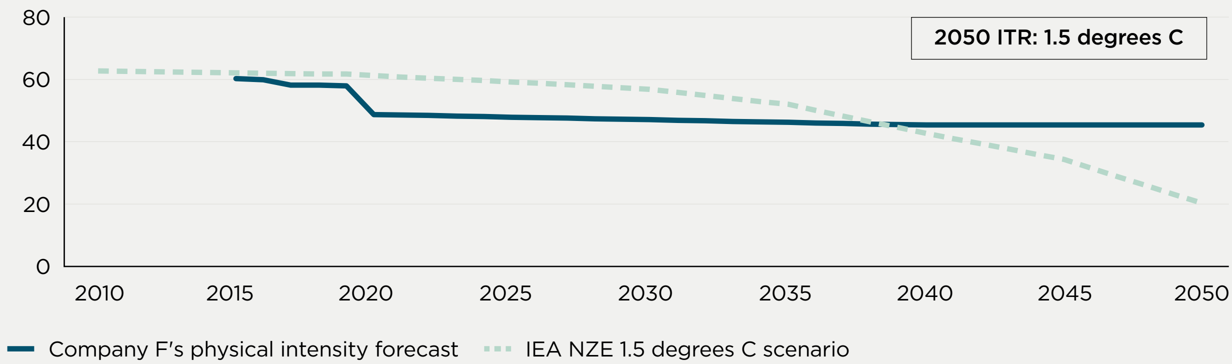
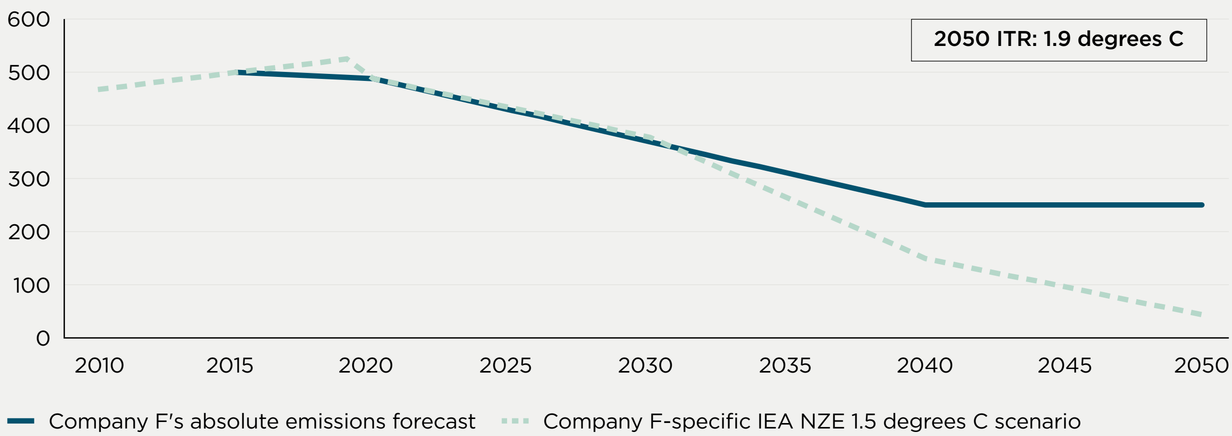


Figure 28: Company F's absolute emissions forecast

Mt CO_2e



APPENDIX F

Judgement 3 Case Study – The drawback of measuring alignment for oil and gas companies based on a single emission unit

Quantitative

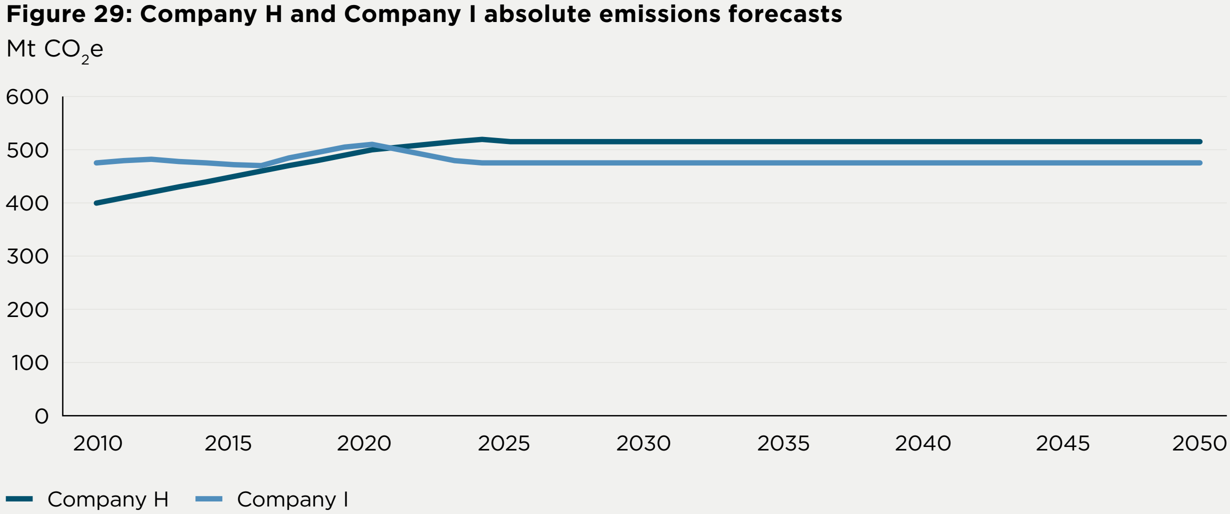
EXAMPLE 23: ILLUSTRATING THE DRAWBACKS OF MEASURING THE ALIGNMENT OF OIL AND GAS COMPANIES BASED ON A SINGLE DECARBONIZATION LEVER

If a financial institution only measures the alignment of an oil and gas company based on a single decarbonization lever, they may not capture the full scope of activities associated with the oil and gas company's transition.

Case 1: Using absolute emissions (Mt CO_2e) in isolation in order to measure progress against the *"Reducing output"* lever.

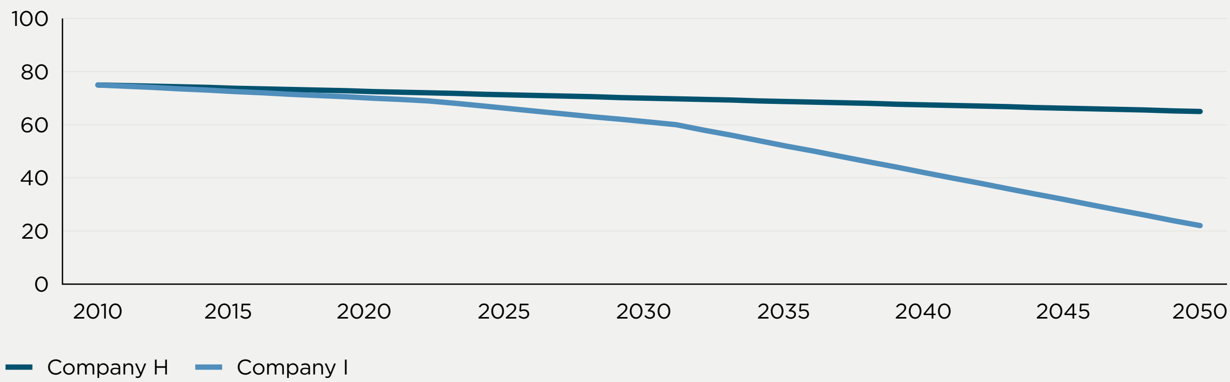
Consider Company H and I, which are expected to produce roughly equivalent amounts of absolute emissions as depicted in Figure 29. Company I has devoted a significant proportion of their CapEx to developing low-carbon and renewable power generation divisions, while reducing the intensity of its oil and gas operations by methane leakage prevention. Meanwhile, Company H does not plan to diversify out of its core oil and gas production business, in the mid-term.

Figure 29: Company H and Company I absolute emissions forecasts



When measuring alignment using absolute emissions, Company H and Company I will appear similarly aligned. Therefore, measuring alignment using absolute emissions in isolation will not capture the differences in the two companies' approaches. To resolve this challenge, a practitioner could consider measuring alignment using a combined energy physical emissions intensity unit to measure how oil and gas companies are transitioning to renewable energy, as outlined in Figure 30.

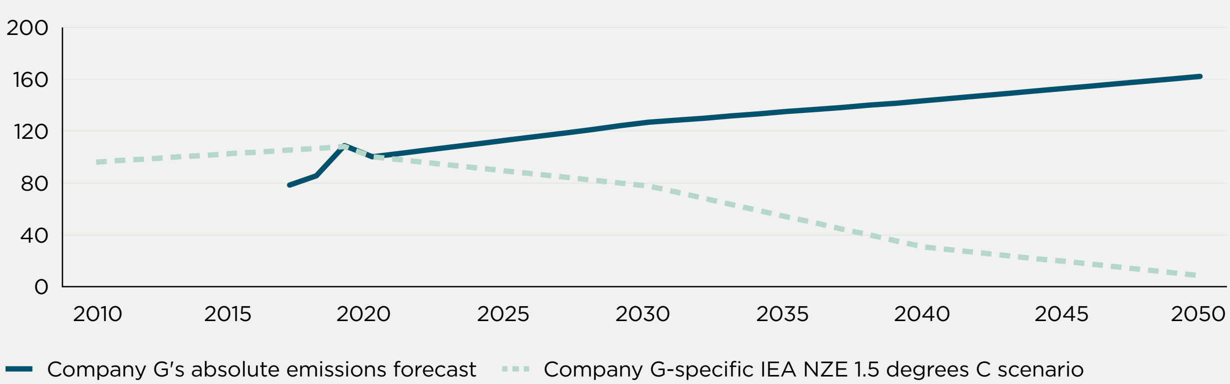
Figure 30: Company H and Company I combined energy sector physical intensity forecasts
Mt CO_2e/EJ



Case 2: Using oil and gas-specific physical intensity (Mt CO_2/bbl) in isolation in order to measure progress on operational efficiency.

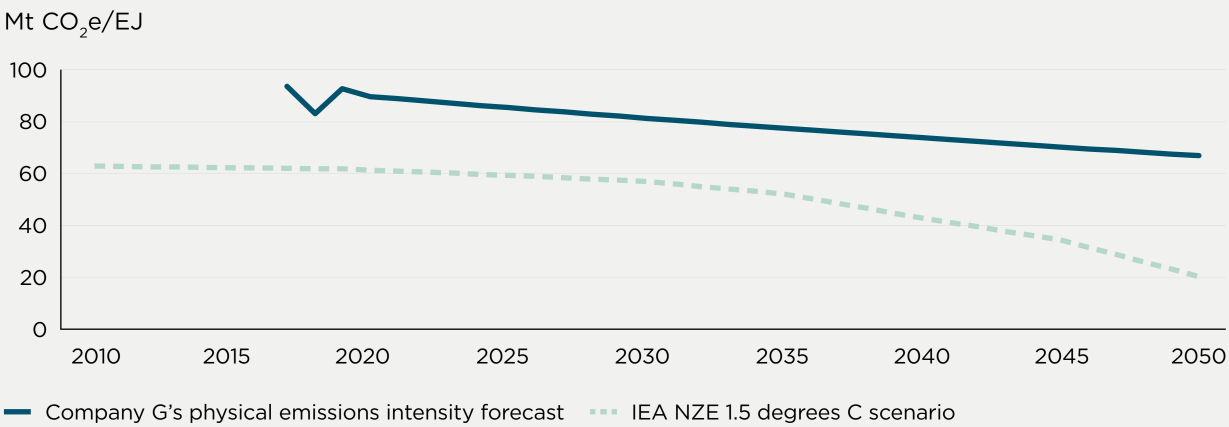
The use of oil and gas-specific physical intensity units to measure alignment may not incentivize real emissions reductions if the oil and gas company demonstrates only a limited ambition to transition to renewables and other energy sources. For example, a sophisticated national oil company (NOC) (Company G), which plans to expand its oil production through organic growth, may have an increasing absolute emissions trajectory to meet demand (Figure 31).

Figure 31: Company G's absolute emissions trajectory against a benchmark scenario
Mt CO_2e



This results in a 138% cumulative benchmark divergence with the underlying 1.5 degrees C-aligned benchmark scenario. However, Company G might plan to simultaneously improve the efficiency of its operations and reduce Scope 1 and 2 emissions by utilizing lower-carbon technology (e.g., enhanced oil recovery using CO_2 from carbon capture) and focusing on higher-efficiency fossil fuel products (e.g., natural gas rather than oil sands). This improvement in efficiency will lower Company G's oil and gas-specific physical intensity (see Figure 32). This will result only in a 63% cumulative benchmark divergence from the 1.5 degrees C-aligned benchmark scenario.

Figure 32: Company G's physical intensity trajectory against a benchmark scenario



The disparity in alignment outcome (i.e., 138% divergence using absolute emissions but only 63% using physical intensity) demonstrates that measuring alignment using oil and gas-specific physical intensity units in isolation overstates the level of alignment. Company G's technological enhancements allow it to abate the "low-hanging fruit" emissions associated with the operational Scope 1 and 2 emissions. However, because they fail to scale down production, their total emissions increase. As a result, practitioners that use only oil and gas-specific physical intensity units to measure alignment may risk underestimating the contributions to global warming of oil and gas companies with increasing absolute emissions.

APPENDIX G

Judgement 3 – Measuring the alignment of oil and gas companies using the fair-share carbon budget approach

One approach to capturing multiple decarbonization levers for oil and gas companies is to use two (or more) fair-share carbon budget approaches and to combine the alignment outcome at the company level. Example 24 details how this could work in practice.

Quantitative

EXAMPLE 24: MEASURING THE ALIGNMENT OF OIL AND GAS COMPANIES USING THE FAIR-SHARE CARBON BUDGET APPROACH

Consider Company DD — an integrated oil and gas company (IOC) — that plans to reduce its core oil and gas production business and expand its renewable power generation business.

In order to measure Company DD's progress on all three available decarbonization levers:

1. Reducing output
2. Transitioning away from fossil fuels
3. Improving operational efficiency

A practitioner could construct two separate fair-share carbon budget benchmarks. One fair-share benchmark that measures Company DD's oil and gas activities (see Figure 33) against an oil and gas sector-specific benchmark, while the other fair-share benchmark measures Company DD's renewable power generation activities against a separate power generation-specific benchmark (see Figure 34).

Figure 33: Company DD's oil and gas activity fair-share carbon budget benchmark

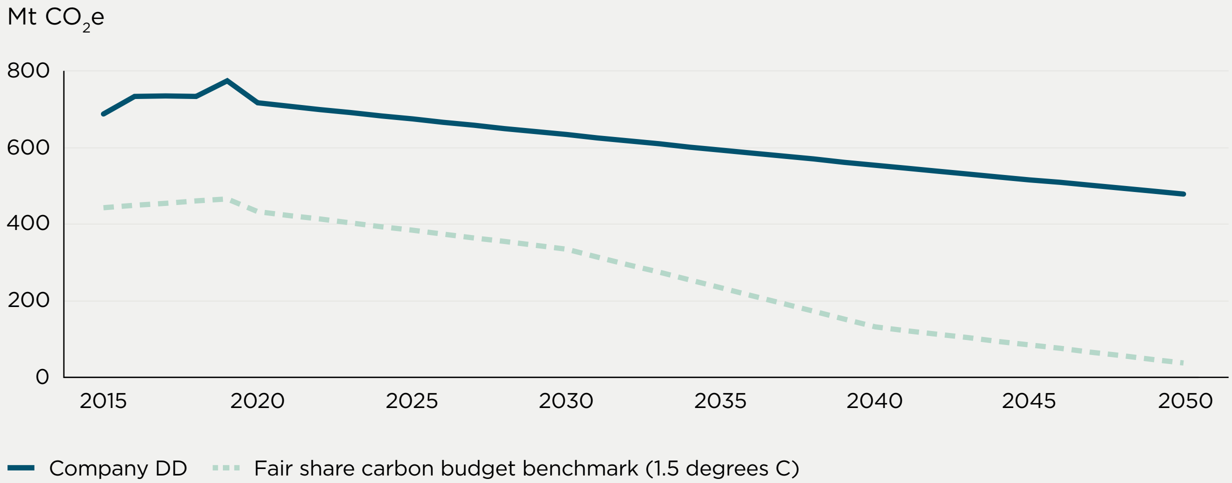
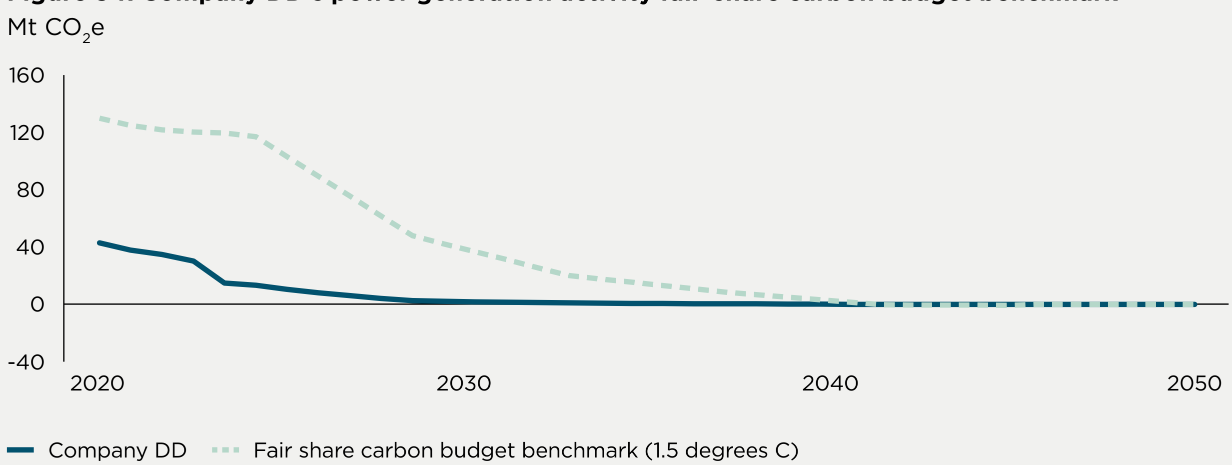


Figure 34: Company DD's power generation activity fair-share carbon budget benchmark



The oil and gas fair-share benchmark measures Company DD's reduction in output (i.e., decarbonization lever one) by assessing absolute emissions reductions. This benchmark also considers Company DD's operational efficiency (i.e., decarbonization lever three) by adjusting the starting point of the benchmark based on DD's relative efficiency compared to the benchmark scenario intensity. The power generation fair-share benchmark approach measures how Company DD is transitioning away from fossil fuels (i.e., decarbonization lever two) by comparing its renewable energy activities to a power sector benchmark.

A practitioner could then follow the methodological approaches for Judgements 7 and 8 to calculate an ITR metric for Company DD's oil and gas business and an ITR metric for Company DD's power generation business.

APPENDIX H

Judgement 4 – Scope 3 emissions estimation approaches

Among the challenges when including Scope 3 emissions in portfolio alignment measurement is incomplete disclosure from companies, data quality issues, and a need for convergence on best practice reporting approaches. Therefore, estimation is often used to fill the data gaps. Generally, Scope 3 estimation models can be classified into:

- **Bottom-up models:** Physical activity-based models that estimate emissions based on company-specific production data and associated emission factors. They are generally applied to homogenous sectors, such as oil and gas, power generation, and steel, etc.
- **Top-down models:** Revenue intensity-based regression (emissions per unit of revenue or other economic measure) models that usually construct a large set of statistical relationships using revenues. These models are frequently applied to heterogenous sectors, such as consumer staples.

Determining the appropriate estimation models depends on the sector and activities in question. We review detailed approaches by different providers[143, 144] and summarize the applications and in Table 28.

Table 28: Summary of application of estimation models

	BOTTOM-UP MODELS	TOP-DOWN MODELS
Sector type	Homogenous	Heterogenous
Sectors included	Coal mining, oil and gas, petroleum refining, electric power generation, cement, steel	Communications, consumer staples, financial, health care, real estate, technology, etc.
Estimation approach	• Based on physical activity indicators and associated emission factors • Directly relate to emitting activity, overall better accuracy	• Based on revenue, CapEx, or FTE (full time employees) • Rely heavily on sector average emission intensities
Scope 3 categories	3, 11	1, 4, 5, 6, 9 2, 7 use CapEx or FTE as proxy

143 CDP. CDP Full GHG Emissions Dataset Technical Annex IV: Scope 3 Overview and Modelling, 2020.

144 Scope 3 Carbon Emissions Estimation Methodology, MSCI ESG Research LLC, 2022.

	BOTTOM-UP MODELS	TOP-DOWN MODELS
Example[145]	Q: Company A is a power generation company that generates electricity from coal and gas individually. Assuming its coal and gas branches each generate 1000 MWh, and the emission factors are 0.09 tCO_2e/MWh and 0.07 tCO_2e/MWh, respectively. What is Company A's total Category 3 — Fuel- and Energy-Related Activities emissions? A: Category 3 emissions (Em_{cat3}) can be calculated as: $Em_{cat3} = Em_{coal_{cat3}} + Em_{gas_{cat3}}$ $= \sum Energy_{sector} * Emfactor_{sector}$ $= 1000 * 0.09 + 1000*0.07$ $= 160\ MtCO_2e$	Q: Company B is a consumer staples products company that has revenue from food sales. How to estimate Company A's total Category 1 — Purchased Goods and Services emissions? A: The Comprehensive Environmental Data Archive (CEDA) input-output table is often used to determine sectors that need to deliver products and services to Company B. The revenue coming from the delivering sectors are multiplied with average emission intensities for these sectors. For Company B, assume the delivering sectors include farm revenue (100m USD, emission intensity 20 $tCO_2e/mUSD$), food manufacturing (500m USD, 10 $tCO_2e/mUSD$), and logistics (100m USD, 50 $tCO_2e/mUSD$). Aggregating them leads to the estimate of Company B's total Scope 3 emissions from Category 1 (purchased goods and services): $Em_{cat1} = Em_{farm} + Em_{manufacturing} + Em_{logistics}$ $= \sum Revenue_{sector} * Intensity_{sector}$ $= 100 * 20 + 500 * 10 + 100 * 50 = 12000\ tCO_2e$

The estimated emissions from top-down models could deviate substantially from the company's actual emissions. On the other hand, bottom-up estimation approaches bear a direct link to the company's production and are therefore likely much closer to the company's actual Scope 3 emissions. Bottom-up approaches are consistent with PCAF's recommendations on prioritizing physical activity-based estimates.[146] Therefore, the use of bottom-up estimation models based on production and activity data is recommended, especially for Categories 3 and 11 in the homogenous sectors outlined in section 3.4 where this type of data is more widely available.

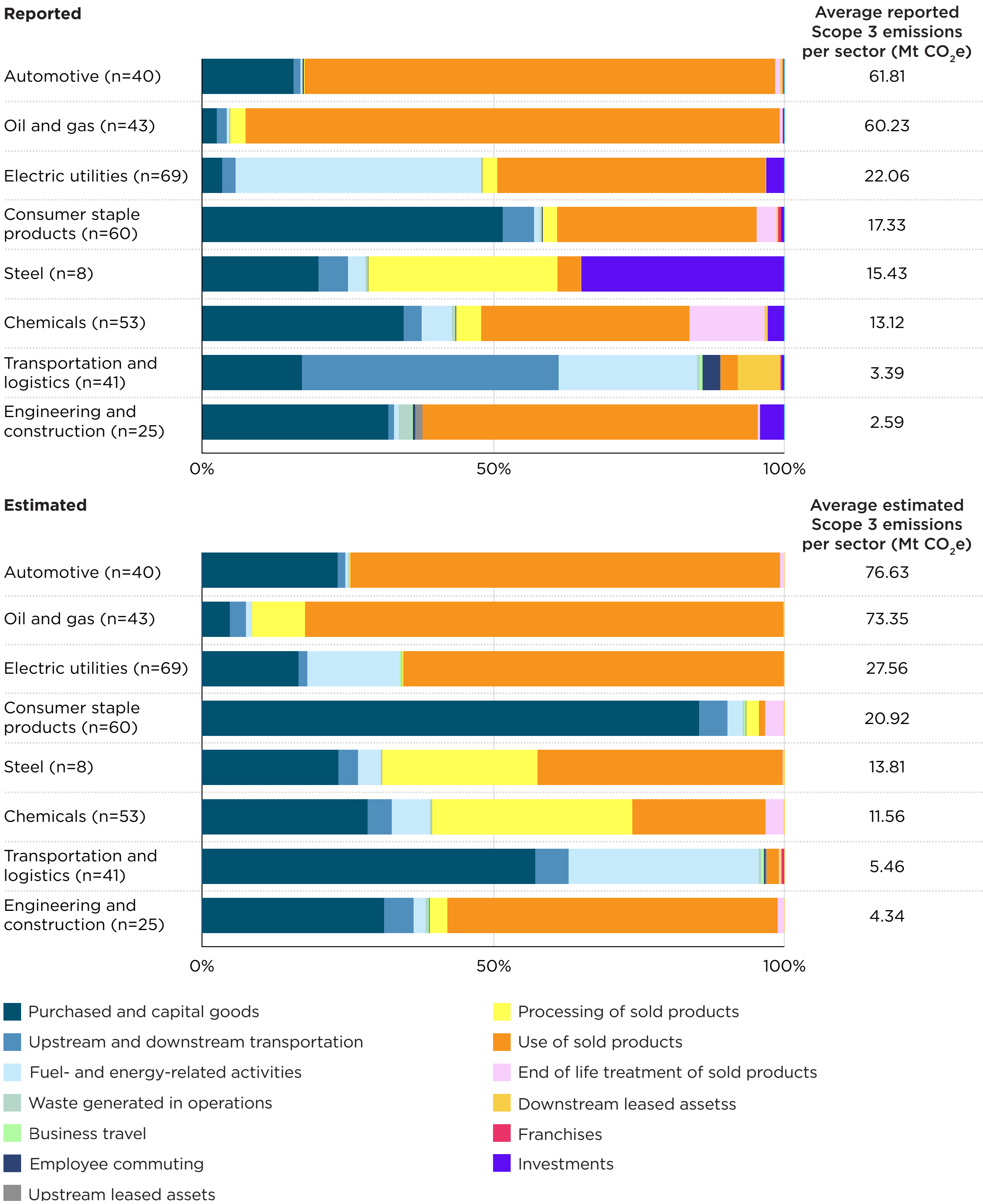
Compare estimated with reported Scope 3 emissions

The next question asks: Do estimated Scope 3 emissions align with reported emissions across different sectors and categories? Figure 35 compares the share of the 15 Scope 3 emissions categories based on reported and estimated emissions for the same set of companies.

145 Note the numbers in the examples are for demonstration purpose only.

146 PCAF, The Global GHG Accounting and Reporting Standard for the Financial Industry, 2020.

Figure 35: Comparison of reported and estimated Scope 3 emissions by 15 categories in high impact sectors[147]



147 Methods: Estimated Scope 3 emissions from MSCI are averaged across companies within each of the sector under Bloomberg Industrial Classification Standard (BICS). The reported emissions are grouped together in a few categories. Unit: million metric tons. Source: MSCI FY2020 & FY2021 estimated Scope 3 emissions.

Comparing estimated and reported emissions Figure 35 shows a number of characteristics:

- When considering the percentage contribution across the 15 categories, estimated emissions are broadly in line with reported emissions in the Automotive, Oil and Gas, and Engineering and Construction sectors. On the other hand, some sector estimates deviate substantially for upstream and downstream activities. For example, the estimated Category 3 emissions in Electric Utilities sectors are notably smaller than reported Category 3 emissions. The estimated Categories 1 and 2 emissions in the Consumer Staple Products sector are 30% higher than the reported.
- With regard to absolute emissions magnitudes, the estimated emissions are broadly in line with reported emissions in Electric Utilities, Chemicals and Transportation and Logistics sectors. Emissions estimates are higher than reported emissions in Automotive, Oil and Gas, Steel, and Engineering and Construction, but lower in Consumer Staples Products sector.

Where estimated and reported emissions align, bottom-up approaches may have been used. Where estimated and reported emissions misalign, top-down approaches may have been used.

Moreover, practitioners should be aware that the estimated emissions from different providers can have large variations, driven by the use of different underlying models and input data. Overall, when using estimated Scope 3 emissions, practitioners should consider:

- Sector fit — Assessing whether the estimates are generated by models that fit the underlying sector output type (i.e., homogenous vs. heterogenous)
- Coverage — Ensuring the estimates sufficiently cover the company's key value chain activities/ categories.
- Robustness — Combining multiple sources of data for more robust estimations

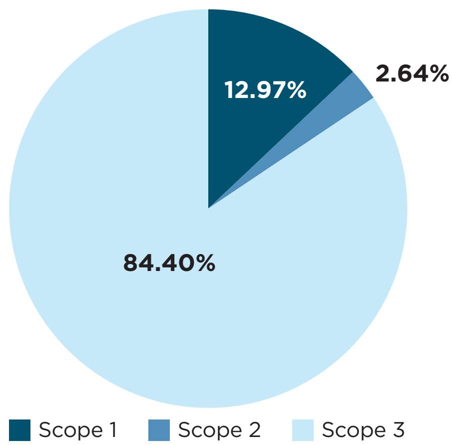
The 2021 PAT Report suggests that financial institutions and data providers disclose the assumptions and approaches behind their estimations.[148] In addition, high-quality disclosures of Scope 3 emissions data by companies are fundamental for developing and validating estimation methods.

148 Ibid.

APPENDIX I

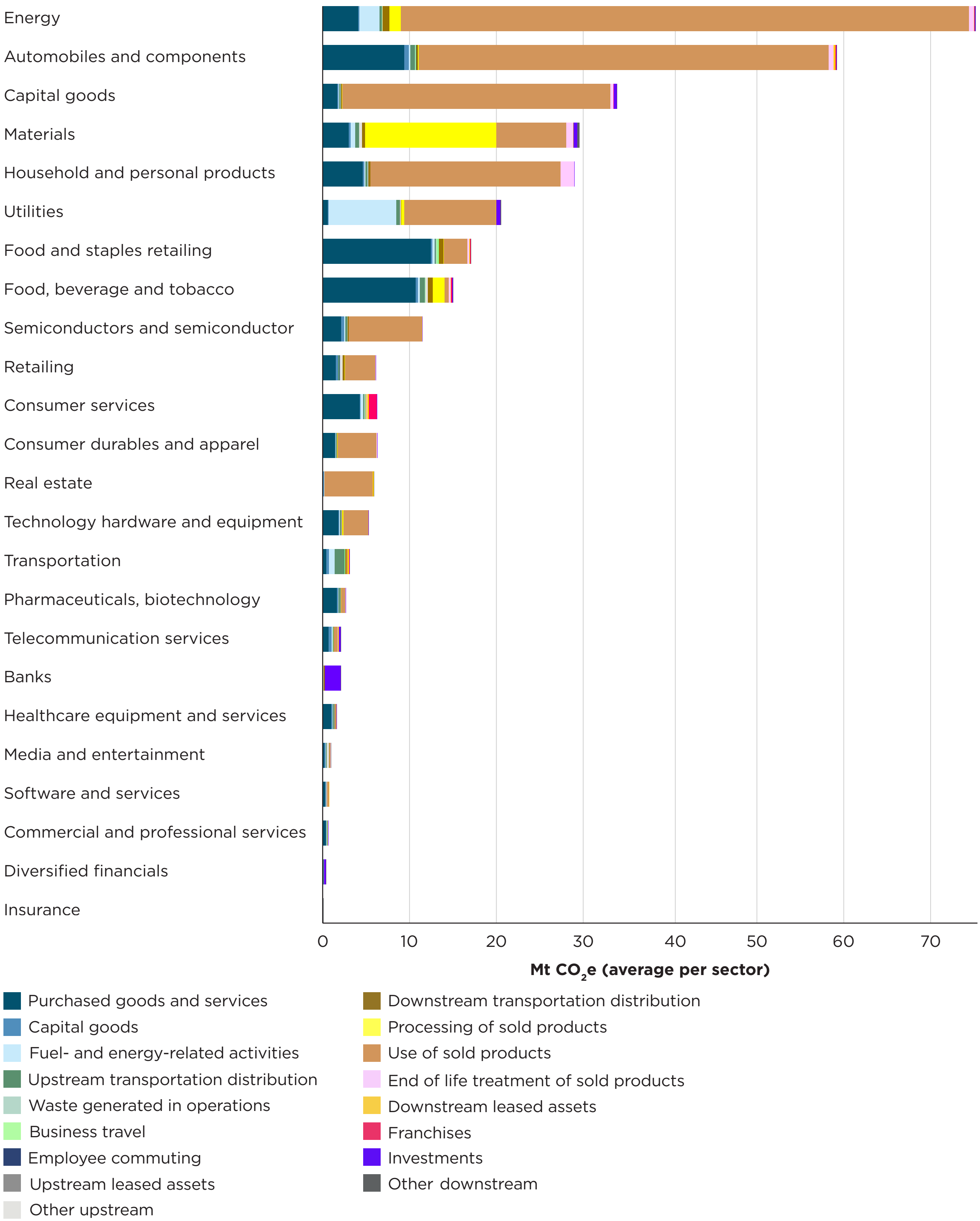
Judgement 4 – Expanded Scope 3 sector analysis

Figure 36: Emissions breakdown by Scope 1,2,3[149]



149 Methods: the percentage is calculated using ~2000 companies that reported all three scopes in fiscal year 2020. Source: Bloomberg BESGPRO Index.

Figure 37: Scope 3 emissions distribution by 15 categories in GICS industry groups



Methods: Calculated using ~1300 companies that reported at least 2 categories within Scope 3 emissions. Unit: million metric tons.
Source: Bloomberg BESGPRO Index, fiscal year 2020.

APPENDIX J

Judgement 6 – The list of key credibility indicators[150]

Table 29: Key credibility indicators from the GFANZ publication: "Expectations for Real-economy Transition Plans"

			DISCLOSURE AND DATA COLLECTION			TARGET-SETTING & VALIDATION		ASSESSMENT TOOLS		
			TCFD	ISSB	CDP	SBTI	TPI-CP	ACT	CA 100+	TPI-MQ
Foundations	Objectives and priorities	• Objectives and over-arching strategy	■	■	■	■	■	■	■	■
		• Just transition							■	
Implementation strategy	Activities and decision-making	• Business planning and operations	■	■	■			■	■	■
		• Financial planning	■	■	■			■	■	■
		• Sensitivity analysis	■	■	■			■	■	
	Policies and conditions	• Transition-related policies			■					
		• Nature-based impact			■					
	Products and services	• Products and services	■	■	■			■	■	■
Engagement strategy	Value chain	• Clients/portfolio companies and suppliers		■	■	■		■		
	Industry	• Industry peers			■			■	■	■
	Government and public sector	• Government and public sector			■			■	■	
Metrics and targets	Metrics and targets	• GHG emissions metrics	■	■	■	■	■	■	■	■
		• Sectoral pathways	■	■	■	■	■	■	■	
		• Carbon credits	■	■	■	■			■	
		• Business and operational metrics	■	■	■			■	■	
		• Financial metrics	■	■	■			■	■	■
		• Nature-based metrics	■		■					
		• Governance metrics	■	■	■			■	■	■

150 GFANZ. Expectations for Real-Economy Transition Plans, September 2022.

			DISCLOSURE AND DATA COLLECTION			TARGET-SETTING & VALIDATION		ASSESSMENT TOOLS		
			TCFD	ISSB	CDP	SBTI	TPI-CP	ACT	CA 100+	TPI-MQ
Governance	Roles, responsibilities, and remuneration	• Board oversight and reporting								
		• Roles and responsibilities								
		• Incentives and remuneration								
	Skills and culture	• Skills and trainings								
		• Change management and culture								

APPENDIX K

Judgement 6 Case Study – The ACT Assessment Framework

Implementation

EXAMPLE 25: ADEME/CDP/WBA ACT ASSESSMENT FRAMEWORK

The World Benchmarking Alliance (WBA) is a multi-stakeholder global alliance focused on shaping the private sector's contributions to achieving the United Nation's Sustainable Development Goals. The WBA, in partnership with ADEME and CDP, developed a performance score that sits within the broader ACT assessment framework. This measures a company's degree of alignment with the transition to a low-carbon world for key sectors (i.e., automotive, electric utilities, oil and gas, and transport).[151] The performance score is "a broad view of company performance across core elements for low-carbon transition" and could be used as a stand-in for the credibility weighting feeding into the alignment outcome. Table 30 shows the performance scores for three electric utilities, along with the qualitative indicators (performance modules) that drive the performance score.

Note: The "Performance Score" has been derived by summing the individual performance module scores in each performance module.

151 World Benchmarking Alliance. Electric Utilities Methodology, n.d.

Table 30: ADEME/CDP/WBA ACT assessment framework

PERFORMANCE MODULE (% PERFORMANCE SCORE)	PERFORMANCE MODULE DESCRIPTION	EXAMPLE WBA/CDP ASSESSED COMPANIES[152] ORSTED	RWE	NTPC
1. Targets (20% of performance score)	Alignment, time horizon, and past performance/ ambition of targets	4.0/4	3.1/4	0.8/4
2. Material investment (35% of performance score)	The trend in past and future emissions as well as locked-in emissions	7.0/7	3.0/7	0.3/7
3. Intangible investment (10% of performance score)	R&D in mitigation technologies related to energy generation, transmission, or distribution	1.0/2	0.1/2	0.0/2
4. Management (20% of performance score)	Oversight of climate change, the existence of a transition plan, and management incentives	3.7/4	2.5/4	0.7/4
5. Policy engagement (5% of performance score)	Engagement policy with trade associations and on significant climate policies	0.8/1	0.3/1	0.5/1
6. Business model (10% of performance score)	Integration of the low-carbon economy in current and future business model	2.0/2	1.8/2	0.5/2
Performance score	**A weighted average of the six performance modules**	**18.5 /20**	**10.8 /20**	**2.7/ 20**

APPENDIX L

Judgement 6 – Example of incorporating a credibility assessment of targets into a combination of multiple emissions forecasting approaches

A practitioner could incorporate a credibility assessment into a post-calculation score aggregation using the following approach.

$$\textbf{Final Company Alignment Outcome} = w * A_t + (1-w) * A_h$$

Where:

w = Target weighting (w-value)

A_t = Alignment outcome based on targets

A_h = Alignment outcome based on historical emissions

152 Orsted is a Danish electric utilities companies and the world's largest developer of offshore wind; RWE is a German electric utilities company with mixed energy sources; and NTPC is an Indian electric utilities company operating primarily using coal based energy sources.

Using such an approach, one would calculate alignment based on the projection underpinned by a company's emissions reduction commitment and based on the company's historical emissions trends. As a next step, the results are combined using the target weighting (w-value) as outlined in Section 3.6.

The target weighting represents the likelihood that the company will achieve its emissions reductions targets and a practitioner could use either the simple or advanced assessment frameworks to determine the target weighting (w-value).

APPENDIX M

Judgement 6 Case Study – Credibility weighting

Example 26 illustrates a hypothetical credibility assessment for Companies M and N at 25% and 75%, respectively.

Quantitative

EXAMPLE 26: INCORPORATING A CREDIBILITY ASSESSMENT INTO AN ALIGNMENT MEASUREMENT CALCULATION

Applying approach 1 from Section 3.6 (weighting two intermediary alignment scores), the credibility assessment would be incorporated into the calculation of the companies' final alignment scores. Considering Company M, a 25% target weighting means that the final ITR metric would be a weighted combination of two ITR scores, with 25% weighted towards an ITR based on emissions reduction targets and 75% weighted towards an ITR based on historical trends. For Company N, it would be the inverse. Based on this approach, Company M has an ITR of 2.75 degrees C and Company N 2.0 degrees C.

Table 31: Impact of the credibility assessment on the resulting alignment metric (i.e., ITR)

2050 ITR METRIC WITH TARGET WEIGHTING = X	COMPANY M	COMPANY N
Target weighting = 100%	2.0 degrees C	1.5 degrees C
Target weighting = 75%	2.25 degrees C	2.0 degrees C
Target weighting = 50%	2.5 degrees C	2.5 degrees C
Target weighting = 25%	2.75 degrees C	3.0 degrees C
Target weighting = 0	3.0 degrees C	3.5 degrees C

Applying approach 2 from Section 3.6 (weighting two intermediary emissions forecasts) incorporates the credibility assessment to calculate a company's final emissions forecast. Here, a 25% target weighting for Company M means that the final emissions forecast will be a weighted combination of two intermediary forecasts, with 25% weighted toward a forecast based on emissions reduction targets and 75% weighted toward a forecast based on the historical emissions trend (see Figure 38). The inverse will be true for Company N (see Figure 39).

A final ITR can then be calculated for Company M and N based on the final weighted emissions forecast, resulting in an ITR of 2.8 degrees C for Company M and 1.9 degrees C for Company N.

Figure 38: Company M's forecast with a target weighting of 25%
Mt CO_2e/MWh

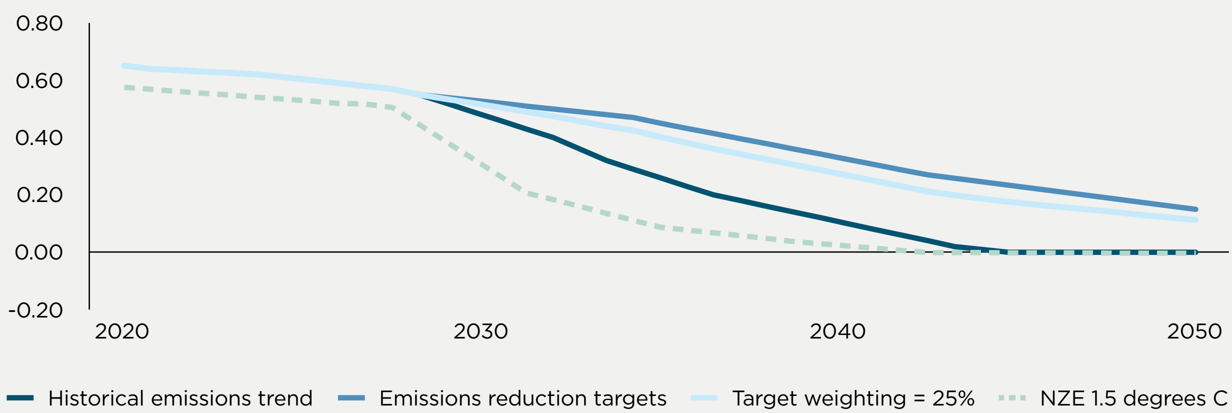
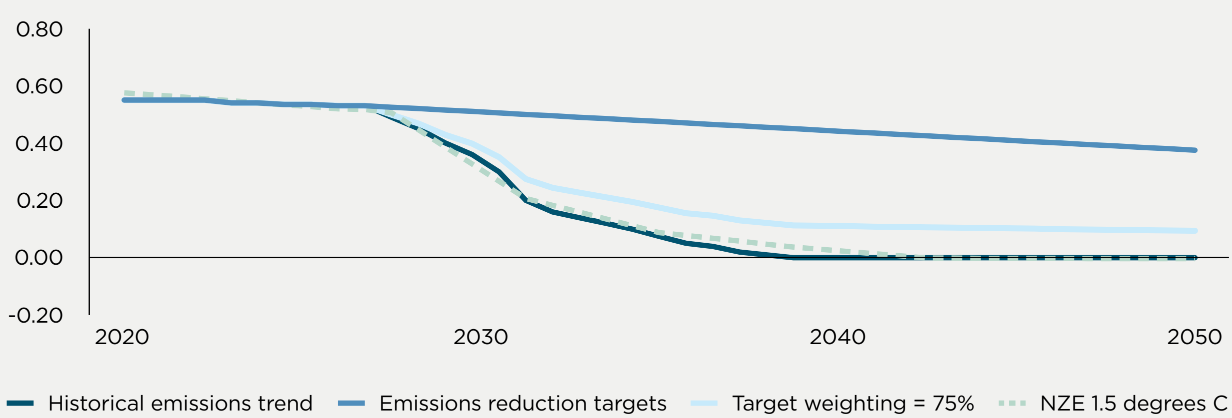


Figure 39: Company N's forecast with a target weighting of 75%
Mt CO_2e/MWh



APPENDIX N

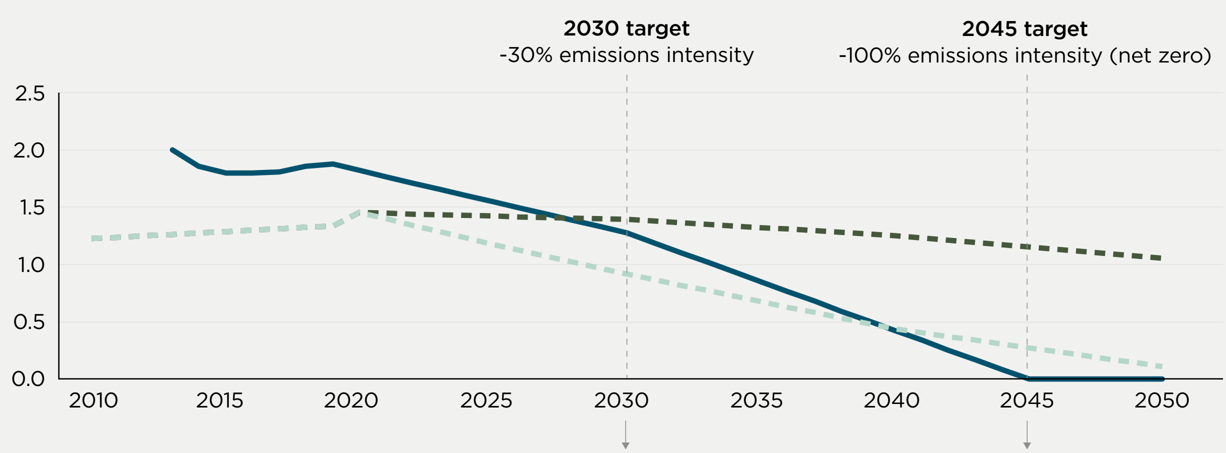
Judgement 7 Case Study — Measuring alignment over different time horizons

Quantitative

EXAMPLE 27: THE EFFECT OF TIME HORIZON ON ALIGNMENT MEASUREMENT FOR A STEEL COMPANY

Steel company R (discussed in Section 3.7) has set ambitious long-term targets. A closer look at the company demonstrates how — from an alignment perspective — it might be punished when assessed based on a short-term time horizon. The solid line in Figure 40 shows Company R's emissions intensity trajectory over time, assuming it meets its stated reduction targets.

Figure 40: Company R's physical intensity forecast based on stated emissions reduction targets
Mt CO2e/Mt Steel



	2030	2045
Company R Implied Temperature Rise (ITR) score across different time horizons	3.0 degrees C	1.9 degrees C

Company R's trajectory · IEA NZE 1.5 degrees C-aligned pathway · IEA STEPS 2.8 degrees C-aligned pathway

When comparing Company R's emissions trajectory to the benchmark scenarios (STEPS and NZE), the resulting alignment metric (i.e., ITR) will be less favorable over a shorter time horizon. Only the longer-term time horizon reflects the full ambition of the net-zero target when performing a cumulative undershoot or overshoot calculation. For Company R, a short-term time horizon may be unfairly punitive, given that steel is one of several hard-to-abate sectors. On the other hand, the lack of ambition of the shorter-term target could indicate that the company is not fully committed to the net-zero goal, given that some low-carbon technology advances in steel have recently become available to companies. For this reason, practitioners are advised to assess the credibility of long-term targets carefully (see Section 3.6 for more details on conducting credibility assessments).

APPENDIX O

Judgement 8 — ITR calculation methodology and guidance

Background

This appendix explores two alternative approaches for calculating an ITR metric:

1. **The TCRE Approach:** For each company, a carbon budget undershoot or overshoot based on a single benchmark scenario is translated into a level of warming by applying a TCRE multiplier. This approach makes the explicit assumption that the rest of the world will exceed its carbon budget by the same proportion.
2. **The Benchmark Interpolation Approach:** The carbon budget undershoot or overshoot is computed based on cumulative carbon budgets for multiple benchmarks — e.g., a carbon budget for a 1.5 degrees C-aligned benchmark, a 3 degrees C-aligned benchmark, and a 4 degrees C-aligned benchmark. An ITR can then be interpolated based on the proportional relationship between a given company's cumulative emissions and the various provided industry-specific carbon budgets.

Selecting the preferred approach

When computing ITR, the chosen time horizon over which a cumulative undershoot or overshoot is computed is a crucial decision that practitioners have to make. Based on guidance issued in Sections 3.7 and 3.8, the interpolation approach is the preferable calculation methodology for short- and medium-term time horizons because the use of a TCRE multiplier might underestimate the level of warming. This is because TCRE multipliers are derived based on 2100 global carbon budgets and temperatures. For this reason, the TCRE approach could lead to distorted alignment results if computed over shorter time horizons (e.g., 2030).

Another issue with the use of a TCRE multiplier is that it's set at an economy-wide level, thereby reducing the relevance of sector- and industry-specific benchmarks. The TCRE multiplier assumes that the percentage gaps between global warming outcomes (e.g., between 2 and 3 degrees C) are the same across all sectors, which is incorrect. For example, a 20% overshoot of the carbon budget for a 1.5 degrees C benchmark scenario in the steel sector does not imply the same warming as a 20% overshoot of the carbon budget for a 1.5 degrees C benchmark scenario in the utilities sector, where decarbonization is comparatively easier.

On the other hand, multiple benchmark interpolation approaches are highly dependent on the availability of sector-specific benchmarks. Additionally, the scenarios selected to generate the benchmarks need to be internally consistent. If, for example, the 1.5 degrees C scenario assumes Europe will lead the world in decarbonization, but the 3 degrees C scenario assumes that a different region will lead the world, the division of carbon budgets across industries and geographies will be inconsistent across scenarios, hence interpolating alignment based on a given company's position between the two scenarios should be avoided.

Example 28 has been sourced from a member of GFANZ as part of the broader, public consultative work undertaken by this workstream.

Implementation

EXAMPLE 28: MOODY'S ITR CALCULATION CONSIDERATIONS[153]

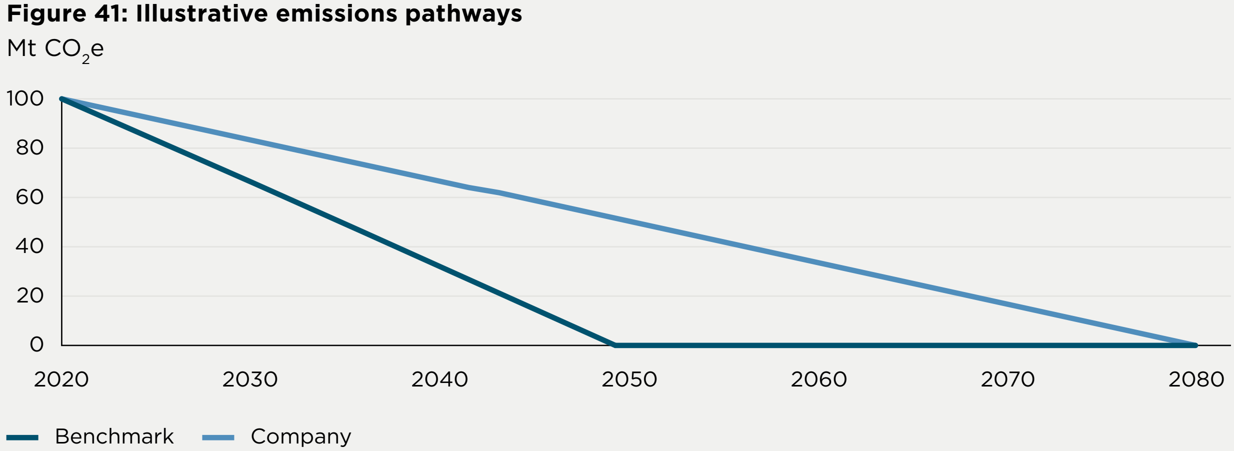
Moody's Corporation, a global financial services provider, is an integrated risk assessment firm. Moody's Temperature Alignment Data assesses how individual companies' emissions targets align with global temperature benchmarks.

The proportionality issues with the TCRE multiplier approach are illustrated in Moody's Temperature Alignment Data, which primarily measures companies' alignment using a 2030 time horizon and a multiple benchmark interpolation approach. Moody's selected this time horizon for two reasons: 1) "the approach encourages a focus on the crucial next decade, giving credit for near-term action rather than that which is deferred over a multi-decade period", and 2) "the closer to the present day, the greater reliability around the assumptions used to build up an emissions projection for a company".

However, Moody's notes that using the 2030 time horizon may preclude the use of the TCRE multiplier approach, as it requires an assessment of the total overshoot or undershoot of the global carbon budget.

The overshoot or undershoot of the company to the benchmark when calculated from the present day to 2030 will not accurately capture the overshoot or undershoot for the same company to the benchmark when calculated using a longer time frame out to 2100. To illustrate this, consider an emissions benchmark and a company emissions projection, both of which start in 2021 and progress in straight lines to reach net zero in 2050 and 2080 respectively, remaining at zero emissions thereafter (Figure 41).

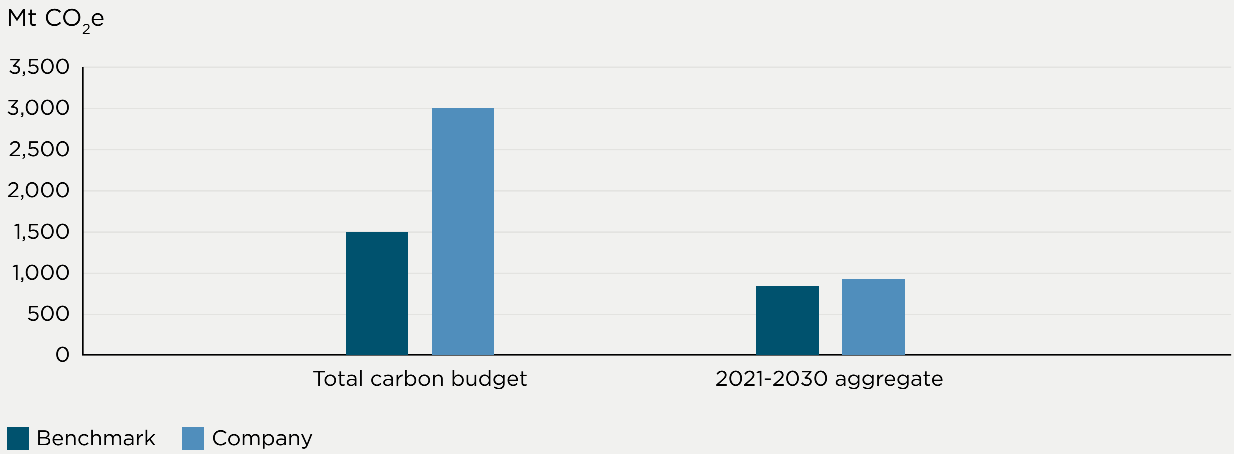
Figure 41: Illustrative emissions pathways



153 The information presented in this case study has been sourced by the GFANZ workstream on Portfolio Alignment Measurement from direct engagement with Moody's. Related publicly available information can be found at this link.

When measured using a 2080 (or later) time horizon, the total aggregate emissions for the company projection are double that of the benchmark (3,000 Mt for the company to 1,500 Mt for the benchmark), leading to a carbon budget overshoot of 100%. However, when measured using a 2030 time horizon, the company's carbon budget overshoot is just 9% (Figure 42).

Figure 42: Aggregate emissions for illustrative pathways



At the company-level, applying the TCRE approach using the 9% overshoot would underestimate the company's resulting ITR metric compared to the later time horizon.[154] At the portfolio level, assuming companies follow a similar emissions trajectory, the likely effect would be that the company-level ITR metrics would cluster near the ITR metric of the benchmark. When aggregating into a portfolio, this would misrepresent both the distribution of the results as well as the overall portfolio ITR metric.

It is possible to use the 2030 time horizon and assume that the overshoot or undershoot of the carbon budget in that time period is proportionally representative of the overshoot or undershoot over the total time period. In this example, one would assume that the 9% overshoot from 2020 to 2030 would lead to 9% overshoot in each 10-year period, leading to a cumulative 54% overshoot from 2020 to 2080. However, when comparing it to the actual overshoot of 100%, it becomes clear that this approach still has significant limitations.

As a result, Moody's determined that the TCRE multiplier approach may not be appropriate for a 2030 time horizon, and so it uses a multiple benchmark interpolation approach instead.

154 An estimate of the corresponding ITR using a TCRE multiplier approach for a 9% budget overshoot would be 1.62 degrees C whereas the ITR using a TCRE multiplier approach with a 100% budget overshoot would be 2.8 degrees C.

GUIDANCE FOR CALCULATING AN ITR

If converting a carbon budget overshoot or undershoot into an ITR metric, GFANZ suggests that a multiple benchmark interpolation approach should be considered for all sectors where multiple, internally consistent benchmark scenarios are available. If these scenarios are unavailable, then ITR metrics can be calculated by converting a total carbon budget overshoot or undershoot between today and the net-zero target date into a global warming outcome with the help of the TCRE multiplier. Where a TCRE approach is required, to minimize the technical issues associated with the use of TCRE over short- and medium-term time horizons, the ITR metric should be calculated over long-term time horizons.

Connection to guidance from other sections

Judgement 1: Both multiple benchmark interpolation and TCRE multiplier approaches are suitable for any of the three single-scenario benchmark construction approaches (i.e., fair-share, convergence, and rate-of-reduction).

Judgement 7: When calculating an ITR metric over short- and medium-term time horizons, the use of multiple benchmark interpolation approaches should be considered. Benchmark interpolation or TCRE approaches can be used over long-term time horizons.

APPENDIX P

Judgement 9 – Calculating an ITR metric using an aggregated budget approach

Practitioners who choose to use an aggregated budget approach to calculate a portfolio-level ITR metric will need to convert the total carbon budget overshoot into an ITR using one of two approaches: multiple benchmark interpolation (MBI) or a TCRE multiplier approach. As noted in Section 3.9 (i.e., Judgement 9), the choice between an MBI approach or TCRE multiplier approach at the company-level should be consistent with the practitioners' methodology choices in Judgement 7 and 8. For example, if a practitioner chooses to measure alignment using short- or medium-term time horizons (i.e., Judgement 7) and chooses to calculate an ITR metric to express alignment (i.e., Judgement 8), then the company-level ITR should be calculated using MBI. Per Judgement 9, the approach to calculating a portfolio-level ITR should also be consistent with these choices, and therefore, the portfolio-level ITR should also be calculated using MBI.

Although there are some complexities in calculation, MBI can be robustly integrated into an aggregated budget approach, as described in Example 29 on the following page.

Quantitative

EXAMPLE 29: INTEGRATING MULTIPLE BENCHMARK INTERPOLATION INTO AN AGGREGATED BUDGET APPROACH

Portfolio A contains two steel companies – Company BB and Company CC – that have set emissions reduction targets resulting in the absolute emissions forecasts depicted in Figure 43 and Figure 44. Graphically, Portfolio A's combined absolute emissions and carbon budgets are depicted in Figure 45.

Figure 43: Company BB's absolute emissions forecast

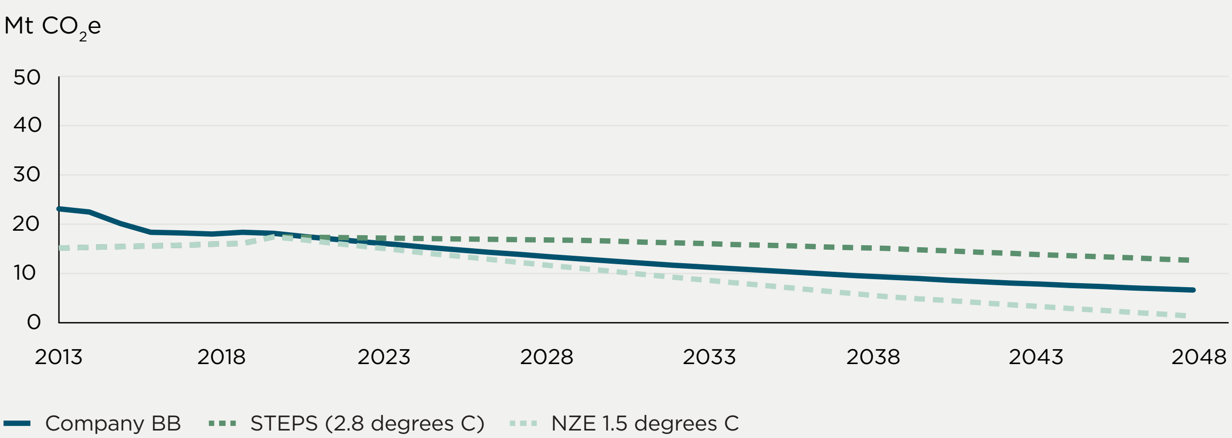


Figure 44: Company CC's absolute emissions forecast

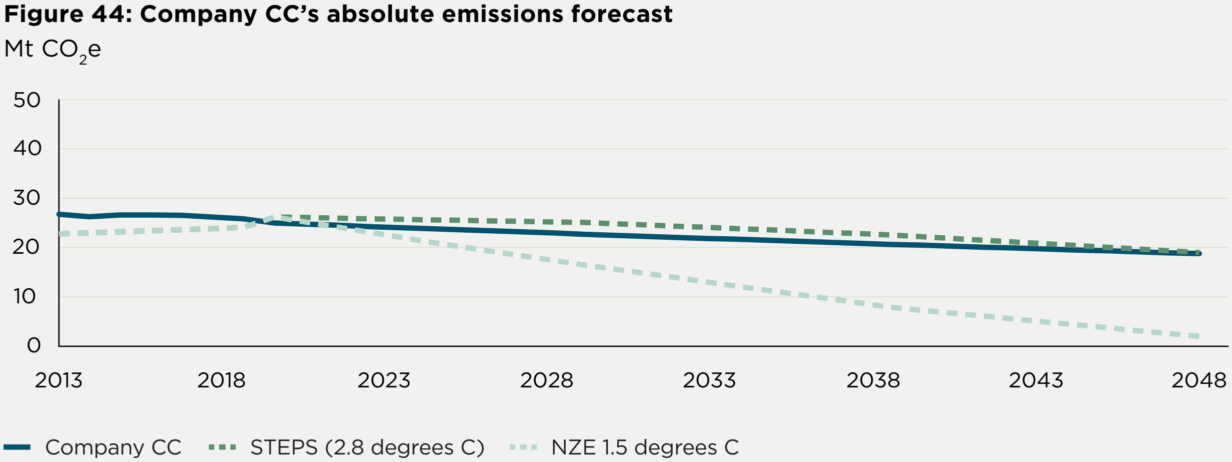
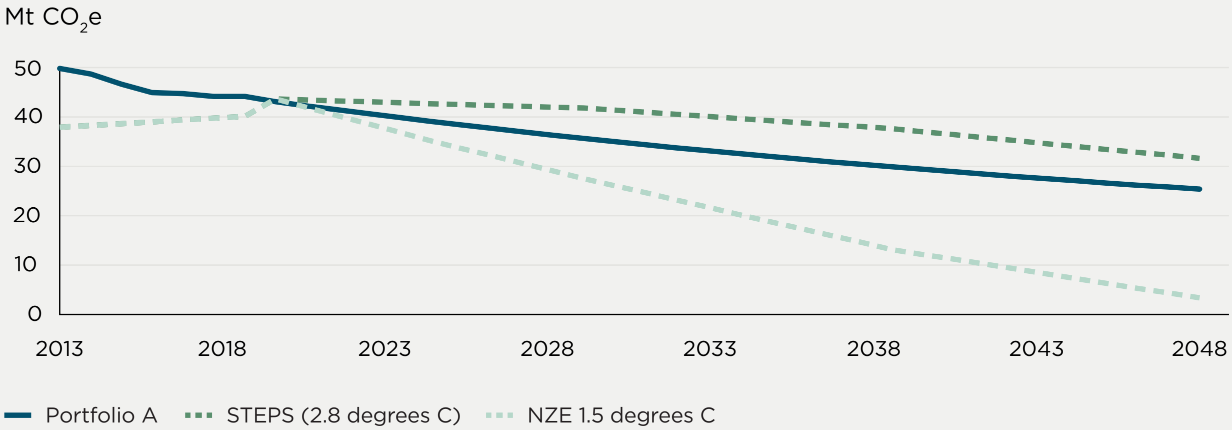


Figure 45: Portfolio A's combined absolute emissions and carbon budgets forecasts



To calculate a company-level ITR metric using MBI over a time horizon of 2050, a practitioner would compare the cumulative absolute emissions for Company BB (e.g., 493 Mt CO_2e) and Company CC (e.g., 859 Mt CO_2e) to a range of cumulative carbon budgets with associated temperature outcomes. The range of cumulative carbon budgets can be interpolated between a lower temperature scenario (e.g., IEA NZE) and a higher temperature scenario (e.g., IEA STEPS). Performing this comparison would result in an ITR of 2.3 degrees C for Company BB and 2.7 degrees C for Company CC (see Table 32).

A portfolio-level ITR metric for Portfolio A would be calculated by comparing the combined absolute emissions from Companies BB and CC (e.g., 1352 Mt CO_2e) with a range of interpolated cumulative carbon budgets derived from combining the carbon budgets of BB and CC, as shown in Table 32. The resulting ITR metric for Portfolio A using MBI and an aggregated budget approach would thus be 2.5 degrees C.

Table 32: Interpolated carbon budgets for Company BB, Company CC, and Portfolio A

TEMPERATURE	SOURCE OF CARBON BUDGET	COMPANY BB'S CARBON BUDGETS (MT CO_2E)	COMPANY CC'S CARBON BUDGETS (MT CO_2E)	PORTFOLIO A COMBINED CARBON BUDGETS (MT CO_2E)
2.8 degrees C	IEA STEPS	593	889	1481
2.7 degrees C	Interpolated	576	864	1439
2.6 degrees C	Interpolated	559	838	1397
2.5 degrees C	Interpolated	542	813	1356
2.4 degrees C	Interpolated	525	788	1314
2.3 degrees C	Interpolated	509	763	1272
2.2 degrees C	Interpolated	492	738	1230
2.1 degrees C	Interpolated	475	713	1188
2.0 degrees C	Interpolated	458	688	1146
1.9 degrees C	Interpolated	442	662	1104
1.8 degrees C	Interpolated	425	637	1062
1.7 degrees C	Interpolated	408	612	1020
1.6 degrees C	Interpolated	391	587	978
1.5 degrees C	IEA NZE	375	562	936

APPENDIX Q

A Summary of portfolio alignment metric provider methodologies

	JUDGEMENT									ASSET CLASSES COVERED	NUMBER OF ISSUERS COVERED
COMPANY	1	2	3	4	5	6	7	8	9		
BlackRock (Aladdin Climate)	Single-scenario benchmark — convergence-based approach	NGFS scenarios primarily used IEA scenarios in limited cases	Based on sector — physical intensity, production, or economic intensity	Scope 1, 2, and 3 (where material)	Self-reported prioritized with estimated data to fill gaps	Emissions targets at face value or combination of historical emissions and benchmark growth rates	Point in time (at 2030)	ITR, physical emissions intensity, economic intensity, absolute emissions	Portfolio weighting or portfolio-owned approach	Corporate equities and bonds, loans	c. 9,000 public issuers. Data provision from client required for loans/ private issuers
Carbone4 CIARA[128]	Single-scenario benchmark — fair-share carbon budget approach	IEA ETP scenarios	Based on sector — physical intensity, or absolute emissions	Scope 1, 2, and 3	Self-reported	N/A	Cumulative (up to 2050)	Several metrics — ITR and benchmark divergence	Aggregated budget approach	Infrastructure and real estate	90 asset types
EMMI	Single-scenario benchmark — convergence-based approach	IPCC	Economic intensity (using multiple financial factors)	Scope 1, 2, and 3	Multiple external estimates and internal machine learning models	User has free choice to use baseline or forecast global carbon trajectories/ footprint	Cumulative (up to 2050)	ITR	Aggregated budget approach	Corporate equities and bonds	46,000
ESG Book	Single-scenario benchmark — convergence-based approach	IEA WEO scenarios	Economic intensity (using revenues)	Scope 1, 2, and 3	Business-as-usual growth rates-incorporating historical emissions trends	Current intensity held constant	Point in time (at 2030 or 2050)	ITR	Aggregated budget approach or portfolio-weighted approach	Corporate equities and bonds	c. 6,500

128 Carbone4 also provides an additional portfolio alignment tool — Carbon Impact Analytics (CIA) — that utilizes a different methodology (available here), focusing on corporate equities and bonds, and sovereign bonds.

	JUDGEMENT									ASSET CLASSES COVERED	NUMBER OF ISSUERS COVERED
COMPANY	1	2	3	4	5	6	7	8	9		
ISS ESG	Single-scenario benchmark — fair-share carbon budget or convergence-based approach	IEA WEO scenarios[129]	Absolute emissions based on sector — physical intensity, production, or economic intensity	Scope 1, 2, and 3 (where material)	Self-reported and estimated data	Weighted combination of stated targets, historical emissions trend and scenario constraints	Cumulative (up to 2050)	All four metric type categories covered on company and portfolio level	Aggregated budget approach	Corporate equities and bonds	> 38,000
Lombard Odier	Single-scenario benchmark — fair-share carbon budget approach	IPPC IIAS, with 160 subindustry pathways	Absolute emissions (following fair share approach)	Scope 1, 2, and 3	Self-reported	Weighted combination of stated targets and historical emissions trend	Cumulative (up to 2050)	ITR	Aggregated budget approach	Corporate equities and debt	c. 20,000
Moody's ESG Solutions	Single-scenario benchmark — convergence or rate-of-reduction	IEA WEO scenarios	Based on sector — physical intensity, or absolute emissions	Scope 1, 2, and 3 (where material and possible to construct benchmarks)	Self-reported prioritized with estimated data to fill gaps	Emissions targets at face value	Cumulative (up to 2030)	ITR	Portfolio-owned approach (recommended)	Corporate equities and bonds	> 7,000
MSCI	Single-scenario benchmark — fair-share carbon budget approach	IPCC scenarios[130]	Absolute emissions (following fair share approach)	Scope 1, 2, and 3 (all sectors)	Self-reported (Scope 1 and 2) and estimated (Scope 3)	Emissions targets taken at face value	Cumulative (up to 2070)	ITR	Aggregated budget approach	Corporate equities and bonds, private equity and private debt	> 10,000
OS-Climate	Single-scenario benchmark — convergence-based approach	OECM and TPI (based on IEA WEO) scenarios	Physical emissions intensity	Scope 1, 2, and 3 for OECM benchmarks, Scope 1 and 2 for TPI benchmarks	Self-reported prioritized with estimated data to fill gaps	Weighted combination of stated targets and historical emissions trend	Cumulative (up to 2050)	Benchmark divergence and ITR	Aggregated budget, portfolio-owned, and portfolio-weighted approaches available	Corporate equities and bonds	N/A[131]

129 Additional scenarios to be included from 2023.

130 Sectoral and regional differentiation.

131 Users have flexibility to input data as they see fit.

	JUDGEMENT									ASSET CLASSES COVERED	NUMBER OF ISSUERS COVERED
COMPANY	1	2	3	4	5	6	7	8	9		
PACTA/ RMI	Single-scenario benchmark — convergence, rate-of-reduction, or production volume[132, 133]	IEA and JRC (baseline and ambitious), ISF (ambitious)	Based on sector — physical intensity, capacity, production, or fuel/ technology mix	Scope 1, 2, and 3 (where material)	External asset-based company estimates	Apply emissions factors to production forecasts from company plans and forecasts	Point in time (5 years forward looking)	Several metrics — benchmark alignment divergence compared to multiple scenario trajectories, binary alignment	Portfolio-weighted and equity ownership approaches	Corporate equities and bonds, corporate loans	> 210,000
Right. Based on science	Single-scenario benchmark — fair-share carbon budget approach	IEA, NGFS, and OECM scenarios	Economic intensity (using GVA)[134]	Scope 1, 2, and 3 (all sectors)	Self-reported prioritized with estimated data to fill gaps	Benchmark growth rates	Cumulative (up to 2100)	ITR[135]	Aggregated budget approach	Corporate equities and bonds, loans, sovereign bonds, real estate, private equity	>6,000
S&P Global Sustainable1	Single-scenario benchmark — Convergence benchmarks where practicable, rate-of-reduction benchmarks otherwise	Adapted from IEA and IPCC scenarios	Physical or economic intensity (dependent on industry)	Scope 1 and 2 (Scope 3 supplemental data for selected industries)	Self-reported	Hierarchy: Targets, Asset-level data, extrapolation of company or subindustry historical trend, holding current intensity constant	Cumulative	Cumulative absolute over/ undershoot, ITR	Aggregated budget approach	Equity, fixed income	18,000

132 For capacity and production metrics alignment is measured using multiple scenario benchmarks and climate goals. The trajectories used to measure alignment are derived from scenario developer´s modelling of sector carbon budgets.

133 Production volume trajectories are calculated using the “sector market share” approach. A company production volume trajectory is calculated at technology level using a formula that is based on whether it is high or low carbon technology.

134 Economic intensity using GVA is used for publicly listed equities and bonds, private debt, and private equity. Sovereign bonds use per capita emissions intensity and real estate uses per square meter emissions intensity.

135 ITR is calculated using a climate model, rather than a TCRE multiplier approach.

	JUDGEMENT									ASSET CLASSES COVERED	NUMBER OF ISSUERS COVERED
COMPANY	1	2	3	4	5	6	7	8	9		
SBTi	Warming function — convergence or rate-of-reduction	IPCC scenarios	Based on sector — physical intensity or absolute emissions	Scope 1, 2, and 3 (where material)	Self-reported	Emissions targets at face value	Point in time (at 2025, 2035, or 2050)	ITR	Several variations of portfolio-weighted or portfolio-owned approaches	N/A	N/A
TPI	Single-scenario benchmark — convergence	IEA and IPCC scenarios	Physical intensity	Scope 1, 2, and 3 (where material)	Self-reported	Emissions targets (if meet criteria)	Cumulative (up to 2050)	Benchmark divergence	N/A	Corporate equities and bonds	565

APPENDIX R

Portfolio alignment due diligence questionnaire

KEY DESIGN JUDGEMENT TO CLARIFY WITH METRIC PROVIDER	CONTEXT FOR END USER	ABRIDGED GUIDANCE (TO SUPPORT END USER DUE DILIGENCE)[136]
1a: Which normative benchmark should be built?	A provider could construct a warming function or a single-scenario benchmark.	A single-scenario benchmark.
1b: Which benchmark construction approach should be used?	Regardless of the choice in 1a, a provider could construct a benchmark using a fair-share carbon budget, convergence, or rate-of-reduction approach.	The fair-share carbon budget approach should be used, where possible. Convergence for homogenous sectors is also a good approach.
2: How should benchmark scenarios be selected?	A provider could choose between a number of benchmark scenarios and must also choose whether to use benchmarks with regional and/or sectoral granularity.	Prioritize the use of 1.5 degrees C-aligned scenarios with regional and sectoral granularity.
3: What unit should be used to measure alignment?	A provider could choose between absolute emissions, physical emissions intensity, economic intensity, or production capacity type units to measure alignment.	For oil and gas companies: Providers should consider using multiple approaches in combination to adequately consider all decarbonization levers available to oil and gas companies. For companies in other homogenous sectors: The use of physical intensities is preferred to economic intensities. For companies in heterogenous sectors: The fair-share carbon budget approach should be applied, converting economic emissions intensities into absolute emissions.
4: What scope of emissions should be included?	A provider could choose to include Scope 1, 2, and/or 3 company emissions for all sectors. They could include Scope 3 emissions where they are material, or not include at all.	Besides Scope 1 and 2 emissions, at a minimum, material Scope 3 emissions categories should be included, for companies in high-impact sectors.
5: How should emissions baselines be quantified?	A provider has to choose which greenhouse gases (GHGs) to include and whether self-reported or estimated data should be prioritized.	Where possible, quantify all seven GHGs as outlined by the GHG Protocol. Providers should prioritize self-reported emissions over estimated emissions data, at least for Scope 1 and 2. Providers should use bottom-up estimations for Scope 3 data where the availability of disclosed data is scarce.

136 Please refer to Section 3.0 of this report for full guidance per Key Design Judgement.

KEY DESIGN JUDGEMENT TO CLARIFY WITH METRIC PROVIDER	CONTEXT FOR END USER	ABRIDGED GUIDANCE (TO SUPPORT END USER DUE DILIGENCE)[128]
6: How should forward-looking emissions be estimated?	A provider has a variety of choices for forecasting forward-looking emissions: taking emissions reduction targets at "face value", historical emissions linear trend, current emissions intensity held constant, production forecasts, benchmark growth rates, etc.	For companies that have set emissions reduction targets: Forecast forward-looking emissions based on a credibility-weighted combination of two distinct emission forecasts: 1) a forward-looking approach using stated emissions reduction targets, and 2) a backward-looking approach based on historic emission levels. Companies which have not set emissions reduction targets should prioritize the following approaches (in order), based on the availability and applicability of data: production forecasts, historical trends, neutral emissions intensity, benchmark growth rates.
7a: Should alignment be measured cumulatively or point-in-time?	Providers could choose to measure alignment on cumulative or point-in-time terms.	Providers should measure alignment on a cumulative basis.
7b: Over which time horizon should alignment be measured?	Providers could choose any time horizon from the present onwards, typically categorized as short-term, medium-term, or long-term.	Prioritize measuring alignment over short- and medium-term time horizons, optionally supplemented with long-term time horizons.
8a: How should alignment be expressed as a metric?	Providers could choose between four metric types: binary target measurement, benchmark divergence, ITR, or maturity scale alignment.	When selecting a portfolio alignment metric from a metric provider, practitioners should consider its suitability for the specific use case(s).
8b: How should ITR be calculated?	Providers could choose between a multiple benchmark interpolation or TCRE multiplier approach.	Multiple benchmark interpolation approaches, where multiple, internally consistent benchmark scenarios are available, are preferrable.
9: How should company-level alignment outcomes be aggregated?	Providers could choose between an aggregated budget, portfolio-owned, or portfolio-weighted approach.	The aggregated budget approach for ITR and benchmark divergence metrics.

128 Please refer to Section 3.0 of this report for full guidance per Key Design Judgement.

APPENDIX S

Case studies on portfolio alignment measurement considerations for climate solutions providers

Measuring alignment of climate solutions companies as part of the nine Key Design Judgements: Case studies on the use of avoided emissions

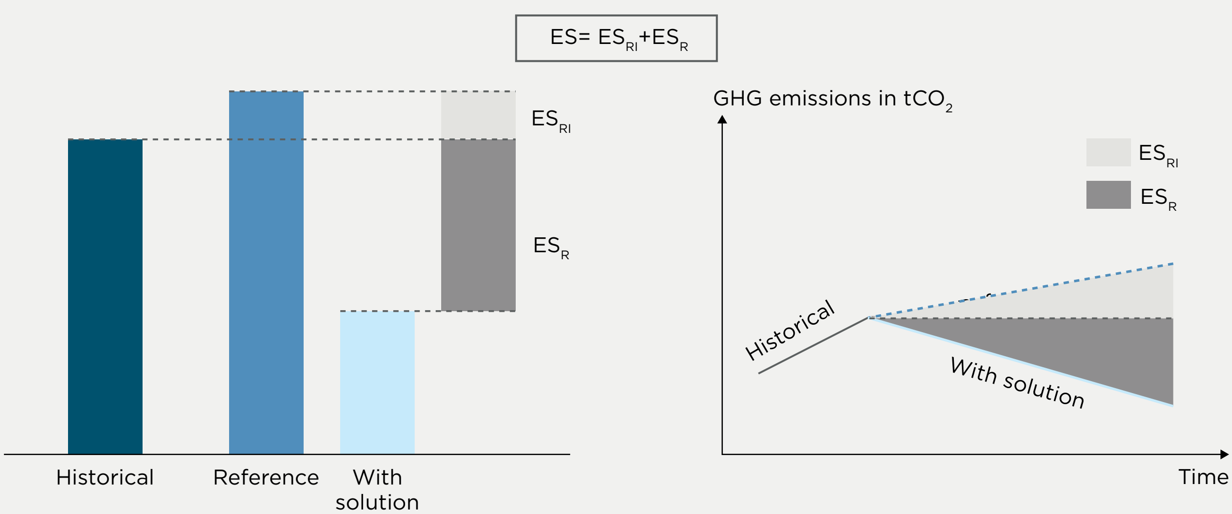
Climate solutions

EXAMPLE 30: CLIMATE SOLUTIONS CONSIDERATIONS FROM MIROVA[129]

Institution Sub-sector: Asset management

Mirova is a French Asset Manager focused on sustainable investing. They suggest that investment approaches considering only Scope 1, 2, and 3[130] emissions for providers of climate solutions do not necessarily paint a complete picture of a company's climate impacts. In order to consider a company's positive climate contributions more adequately in their sustainable investment strategies, Mirova uses estimated emissions savings[131] relative to an adaptable, net-zero aligned reference scenario alongside induced emissions. Mirova splits emissions savings into two types: "reduced increase" where the solution has enabled the avoidance of an increase in emissions compared to historical emissions, and "reduction" where the solution has enabled a reduction compared to historical emissions.

Figure 46: Representations of life-cycle emissions savings from a solution[132]



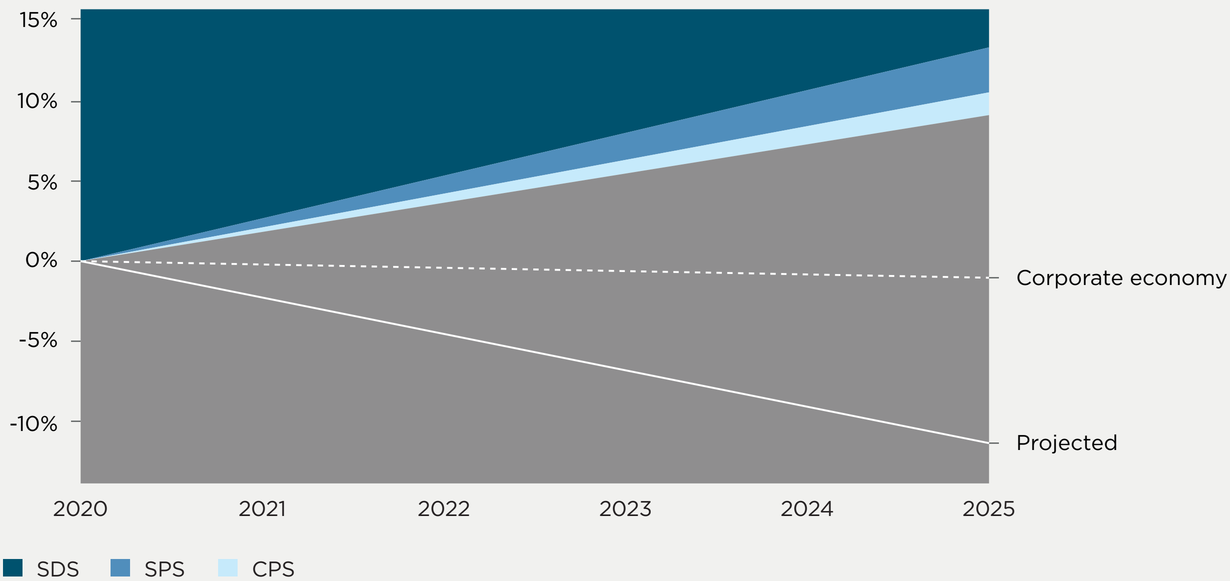
129 The information discussed in this case study has been sourced from a member of the GFANZ workstream on Portfolio Alignment Measurement, as part of the broader, public consultative work undertaken.

130 "Induced Emissions" are defined by Mirova as the company's carbon footprint.

131 "Emissions savings" are defined by Mirova as hypothetical, representing reduction in induced emissions compared to a reference scenario, over the whole life-cycle of the solution considered.

132 Aggregated static (left) and dynamic (right), differentiated into "reduced Increase" (ESRI) and "reduction" (ESR).

Figure 47: Illustration of the importance of a life-cycle approach and the measurement of both induced emissions and savings in the assessment of companies' climate performance



In the illustrative example in Figure 47, an oil and gas company has lower Scope 1 and 2 emissions from extraction and refining compared to a manufacturer of insulation products (where production emissions from glass furnace combustion are significant). However, when considering the life-cycle impact of both companies, the Oil and Gas company could be attributed significant downstream emissions from the combustion of sold products. By contrast, the insulation manufacturer aids the building sector in becoming more energy efficient and therefore contributes to an overall reduction in emissions over the life-cycle of deployment.

Nevertheless, Mirova notes several remaining challenges with regards to the use of an emissions savings approach in net-zero aligned investment strategies:

- Reference scenarios: The low availability and granularity of appropriate reference scenarios that reflect sector-specific low-carbon technologies that are required to help the sector achieve net-zero emissions.
- Computations: Emissions savings are not yet calculated in a standard fashion, with no well-defined approach akin to the GHG Protocol for induced emissions.

Climate solutions

EXAMPLE 31: CLIMATE SOLUTIONS CONSIDERATIONS FROM JUST CLIMATE BY GENERATION INVESTMENT MANAGEMENT[133]

Institution Sub-sector: Asset management

Just Climate is an investment business focused on climate-led investing, launched by Generation Investment Management. Just Climate defines climate-led investing as investing in climate solutions that can deliver highest positive climate impact and appropriate market returns.

Just Climate invests into growth stage companies (e.g., climate solutions providers), or their projects, that are deploying or are on the cusp of deploying proven technologies or innovative business models that:

- can mitigate very significant greenhouse gas emissions in the next decade;
- are consistent with the 1.5 degrees C-aligned target of the Paris Agreement, do no significant harm and enable a Just Transition;[134]
- can have transformational positive climate impact potential – in other words, accelerate the decarbonization of an industry or sector; and
- can deliver market risk-adjusted returns.

For each investment, Just Climate assesses the company or project-specific Expected GHG Mitigation,[135] using an internal methodology developed based on existing standards. The forward-looking assessment includes various inputs, including a 10-year forward-looking view of the company's business plan, a dynamic view on the baseline, and the consideration for possible negative second-order effects. Cumulative mitigated emissions will then be calculated and, post investment, tracked from this 10-year view. The business plan, inclusive of the forecasted mitigated emissions, is updated every year to reflect changes in the company's development. At portfolio level, the sum of the Expected GHG Mitigation of investee companies and projects is compared to an overall target, which drives alignment of the team's incentives with the climate goal. There is also a process to ensure that the company is System Positive[136] through a series of environmental and social factors identified and managed during the investment process.

133 The information discussed in this case study has been sourced from a member of the GFANZ workstream on Portfolio Alignment Measurement, as part of the broader, public consultative work undertaken.

134 Just Climate define "a just transition to net zero as one which pursues the necessary shift away from GHG emissions across all industries while proactively addressing the associated social and economic impacts, particularly for marginalized communities. Core to a just transition is a process in which workers and communities have understanding and agency over the decisions that affect their daily lives, as part of the shift to net zero".

135 Expected GHG Mitigation is defined by Just Climate as "the forecasted greenhouse gas emissions a specific investment or project is expected to avert, compared to a baseline scenario, or remove, based on a realistic business model, measured in metric tons of CO_2e".

136 System Positive is defined by Just Climate as "solutions that are in line with a desirable and sustainable end-state, including a pathway to limit global temperature rise to 1.5°C, that do no significant harm to, and ideally have material co-benefits for, people and planet; and which enable a Just Transition".

This approach facilitates Just Climate's investment strategy by measuring a company's potential to drive highest impact climate solutions. It guides the firm's research process and leads to a focus on solutions that can have a transformational impact on the highest-emitting hard-to-abate sectors. For example, climate solutions such as long-duration energy storage facilities, green steel facilities, and plants that produce syngas from waste all share similar investment characteristics: they have the potential to abate very significant GHG emissions in the next ten years, they are at a tipping point moment when a largely de-risked technology can now be deployed at scale, and their business models offer the potential for significant follow-on investment to roll out more plants/ facilities. In the case of green steel, the firm's preliminary estimates suggest that a specific company developing a greenfield green steel production plant can avoid circa. 90% of the GHG emissions involved in the production of steel, which are circa 1.8 tons CO_2e/ton of steel today. By applying this avoidance factor to the company's business plan, after considering all material impacts across the lifecycle of the project, Just Climate can calculate the Expected GHG Mitigation of investing in such a climate solution.

Measuring alignment of climate solutions companies as part of the nine Key Design Judgements: Climate solutions alignment based on the PACTA "sector market share" approach

Climate solutions

EXAMPLE 32: CLIMATE SOLUTIONS CONSIDERATIONS FROM ROCKY MOUNTAIN INSTITUTE (STEWARD OF PACTA)[137]

Sub-sector of institution: NGO

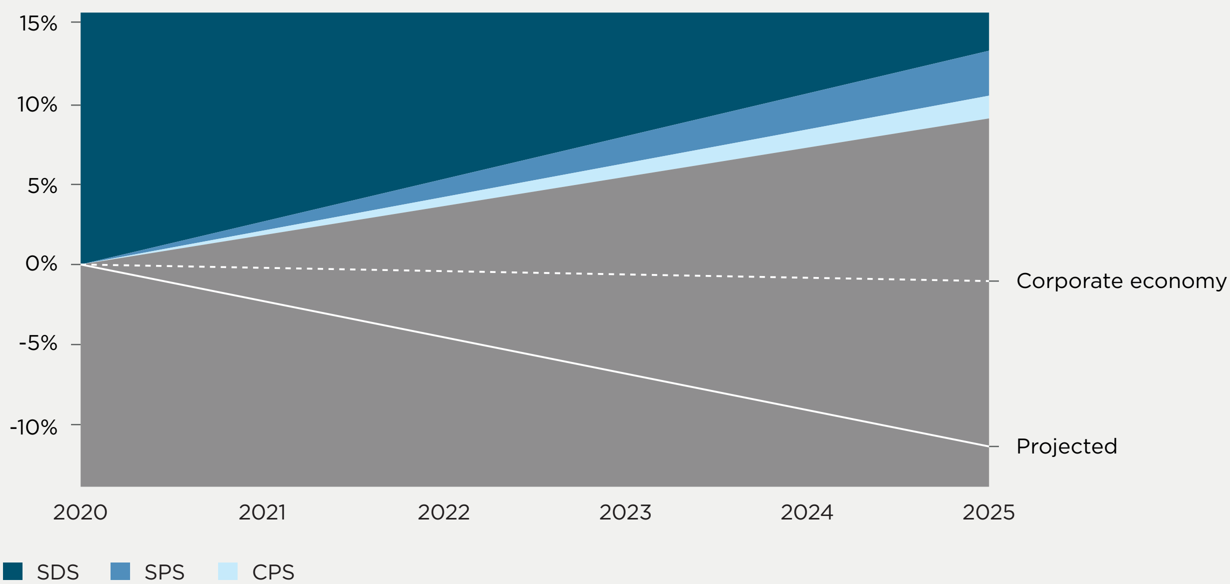
The Rocky Mountain Institute is a nonprofit organization and the steward of The Paris Agreement Capital Transition Assessment (PACTA), an open-source methodology and free set of tools for measuring the scenario alignment of financial portfolios. PACTA measures scenario alignment based on forward-looking production metrics and can be used to analyze production plans for commercially mature climate solutions, such as renewable power and electric vehicles.

The methodology compares the physical assets and production plans of portfolio companies with technology shifts — the phasing down of high carbon technology and the scaling up of low carbon technologies — that are outlined in net-zero aligned decarbonization pathways. For example in the IEA´s Net Zero scenario renewable energy capacity must increase globally by > 1.7 TW (+218%) between 2020 and 2030.

137 The information discussed in this case study has been sourced from a member of the GFANZ workstream on Portfolio Alignment Measurement, as part of the broader, public consultative work undertaken. Related information on the PACTA tool can be found at this link.

For low carbon technologies (climate solutions) that need to ramp up production capacity, a "sector market share" approach is used for Judgement 1.[138] This is one of two approaches to Judgement 1 used by PACTA for all alignment measurement calculations that use production capacity metrics. Under the "sector market share" approach, allocation is made based on a share of the sectoral requirement for an overall increase in production of a specific technology. The sector market share is calculated based on each company's total sectoral production capacity.

Figure 48: Production trajectory of renewables capacity technology in the power sector
Change in production relative to the total initial production of power section (%)



The coloured areas indicate trajectories in reference to a scenario. The gray area indicates trajectories not aligned with any sustainable scenario.

A production capacity trajectory is therefore created for each company based on the sector market share-based allocation of the scenario production change. A trajectory can also be created at portfolio level based on aggregation of the company-level exposures to each high and low carbon technology in a sector.

Additionally, the PACTA tool can quantify the need to increase production of climate solutions in the power and automotive sectors. In the automotive sector the two main technologies are plug-in hybrids and electric vehicles.[139] Figure 49 shows the normalized increase in unitproduction prescribed by two 1.5 degrees C scenarios.[140, 141]

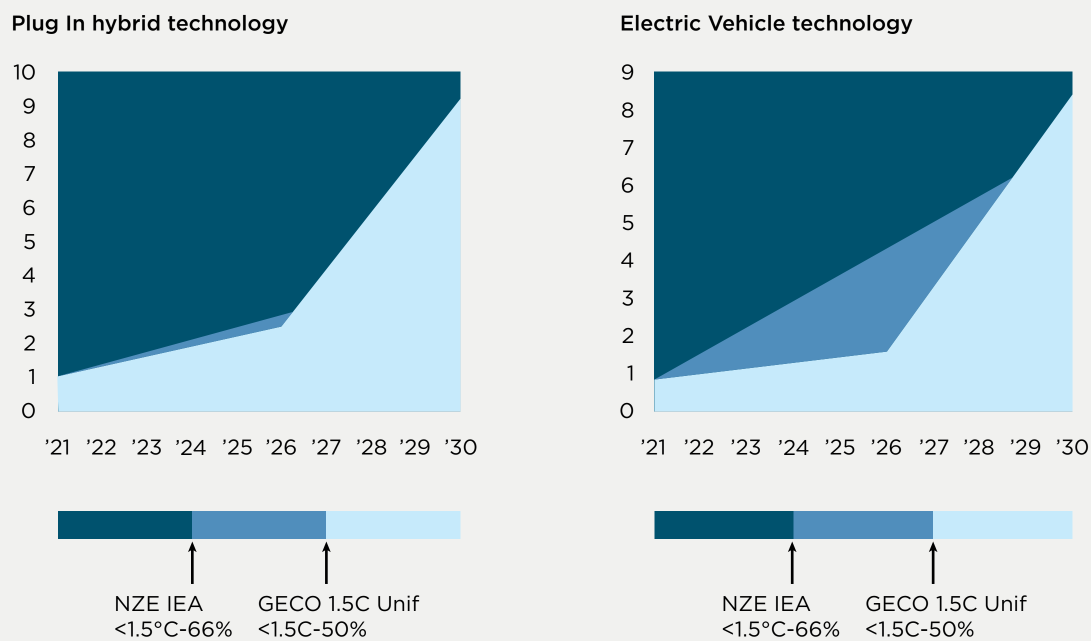
138 In this context, 'market share' is always expressed in terms of a sectors production — either a technology's share of the markets production or a company's share of the sectors production.

139 Using two scenarios, the IEA's Net Zero by 2050 and the European Commission's 1.5 degrees C GECO 2021 Unified.

140 How to interpret the numbers: The trajectories are indexed to the start value of 1. Therefore, an increase to 10 would represents a 10-fold increase in production.

141 The IEA NZE scenario is more ambitious than the GECO scenario (light blue), as reflected in the higher probability of achieving the climate goal (66%) and a faster increase in electric vehicle production up to 2028. For electric vehicle technology, this implies an eight-fold increase in production over 10 years to keep the sector in the dark blue shaded area that represents alignment with the IEA NZE scenario.

Figure 49: Automotive sector 1.5 degrees C decarbonization pathway technology production trajectories to 2030



Using the PACTA methodology, a target production trajectory for plug-in hybrids and electric vehicles can be calculated for each vehicle manufacturer. The target is therefore an allocation from the overall increase in production needed across the sector to the manufacturer, quantifying the role the respective manufacturer will need to play in decarbonizing the motor vehicle market.[142] By comparing each vehicle manufacturer’s 5 year planned technology production data[143] with this target trajectory it is possible to measure how aligned the auto companies are with the decarbonization pathway and the overall goal of net-zero.

Measuring alignment of climate solutions via alternative metrics

Several alternative metrics could be used to identify the alignment of climate solution providers, for example taxonomy-based approaches such as the Green Investment, or Green CapEx Ratio.[144] FTSE Russell recently explored approaches to projecting the 2030 and 2050 green economy exposure for global equity benchmarks, to help inform the investor discussion on how this exposure will need to grow in line with 1.5 degrees C-aligned pathways.[145]

142 See PACTA methodology note on allocation rules.

143 The planned production data used in PACTA is based on the roll-up of asset level data for production plants to company level and is collated from sectoral business intelligence sources by Asset Resolution.

144 IIGCC, Climate Investment Roadmap: A tool to help investors accelerate the energy transition through investment and engagement, 2022.

145 FTSE Russell, Green equity exposure in a 1.5 degrees C scenario, 2022.

For more information, please visit gfanzero.com