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INSTITUTE FOR CLIMATE ECONOMICS
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Further transforming business models in the private sector

Methodologies for target-setting and climate alignment assessment: Current status and future prospects for taking further account of nature and resilience

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EXECUTIVE SUMMARY

Economic players must face climate change and sustainability issues by transforming economic models, while strengthening their competitiveness and resilience.

The Paris Agreement sets commitments to limit the rise in the global average temperature, adapt to the adverse impacts of climate change, cap greenhouse gas (GHG) emissions as soon as possible, and achieve net zero residual emissions in the second half of century. Recent studies indicate that the remaining carbon budget to keep within the limit of 1.5°C could be consumed in less than 6 years at the current rate of emissions (MCC Berlin 2024, Rockström 2024). **The Paris Agreement sets the objective of "making finance flows consistent with a pathway towards low GHG emissions and climate-resilient development", which is generally referred to as the "alignment" of investments and financing** (UNFCCC 2015, OECD 2024). In Europe, the additional annual investment required is estimated at €620 billion per year up to 2030 to meet the objectives of the Green Deal and Fit for 55 – more than €400 billion per year for energy, buildings and transport systems (Platform for Sustainable Finance 2024, I4CE 2024 [1]). The largest share should come from private finance (banking, institutional investors). This implies redirecting the assets of financial players and creating a capital markets union; in accounting terms, 2% of around €33 trillion of European savings should be redirected each year.

To achieve a sustainable economy, non-financial and financial companies must accelerate the transformation of their business models. This major transformation relies on science-based frameworks to assess the risks and the opportunities; the objective is to elaborate policies that both increase innovation and strengthen the competitiveness and resilience of business models in the various possible futures[1]. Collective efforts have so far mainly focused on climate change mitigation.

Private and public players have mobilised to develop various methodologies that offer complementary perspectives of climate alignment assessments. Methodologies contribute to guide capital allocation, financing and investment decisions within the economy and incentivise company and sectoral transition. They provide general guidance on how to assess climate performance and/or are more practical since they are based on qualitative or quantitative data. They derive pathways distributing the reduction of the carbon budget over time, from climate change mitigation scenarios consistent with the Paris Agreement goals, to define targets, measure progress, and design strategic plans accordingly.

This paper provides decision-makers with an overview of the current state of thinking on alignment methodologies, avenues for improvement and targeted actions towards achieving a sustainable. It recommends that economic players and methodology providers explore the wider opportunities that arise from having greater consistency between their approaches to climate and nature to define consistent and resilient strategies. The broad transition of nature[2] and adaptation are not the focus of this paper that examines how nature is considered in the earlier climate frameworks and tools.

The main findings and recommendations of this paper are set out below.

1. Alignment methodologies have broadened their approach from assessing the alignment of emissions and activities to that of transition plans, with an emphasis on financing emissions reduction rather than financed emissions reductions:

a) With respect to inputs, methodologies have extended their focus centred on emissions or activity alignment (climate solutions, fossil fuels) to a multidimensional transition plan assessment (UNEP FI *et al.* 2023, Institut Louis Bachelier *et al.* 2024 [1]). Methodologies i) focusing on activity alignment finance (*e.g.* on the taxonomy) measure the financing of green assets (covering a small proportion of activity) and extend to capture technological transformations as well; ii) measuring the alignment of emissions with pathways follow a science-based approach, more directly linked to the carbon budget; however, they are likely to work as a disincentive to finance the transition of emitting and/or strategic assets; iii) assessing transition plans consider up to the means and strategies implemented.

In this perspective, the Banque de France has developed a climate indicator as a national indicator mechanism, in partnership with ACT methodology[3] (Banque de France 2023); ACT supports companies in their transition through concrete actions and assesses the credibility of their transition plan (ACT 2024).

b) With respect to outcomes, methodologies reflect a wide range of financing strategies and play a role in directing financing; they are expected to provide key information in terms of climate performance (GFANZ 2022 [2], Institut Louis Bachelier *et al.* 2024 [1]): i) Few methodologies

1 Competitiveness should be based on a broader approach, including competitive sustainability (CISL 2024 [1]). In addition, analyses of competitiveness should encompass the ability to remain competitive in different future scenarios. To this end, elements such as the impact of possible limiting factors (*e.g.* water stress) or the sustainability of transformations (new production tools or long-lasting infrastructures, land use planning), etc., should be taken into account.

2 Beyond climate change, nature frameworks are focused on other drivers (land use, pollution, exploitation of natural resources, and invasive species).

3 ACT analyses incorporate past, present and future trends.

classify financial assets or economic players in the various categories of alignment according to their degree of maturity (climate solutions, aligned, aligning, managing phase-out). **This classification is key to reflecting capital allocation within the economy (*e.g.* to European climate solutions and scale up compared to other regions)** (IEA 2023 [1], Cleantech for Europe 2023, CISL 2024). However, the same maturity-scale category does not appear to be homogeneous across methodologies[4]. ii) Some methodologies deliver an aggregated indicator with insufficient granularity to reclassify the financial asset or economic player according to their alignment with a maturity scale. iii) Most methodologies assess the alignment of a portfolio's projected performance, mainly through targets against a net-zero scenario; very few use transition plans to project future trajectories (Institut Louis Bachelier 2024 [1]).

2. This evolution of alignment methodologies towards the assessment of transition plans enables a multidimensional approach, which represents an opportunity to take greater account of nature in its contribution to mitigation, adaptation and resilience[5]. Economic players must apply science-based frameworks to their risk and opportunity analyses of how to reach the goals of the Paris Agreement and later, in 2022, the Global Biodiversity Framework (GBF)[6], which added biodiversity commitments to the existing climate ones. The Paris Agreement and the GBF should not be considered separately as their effectiveness depends on the other's success (Streck 2024).

Climate, nature and adaptation rely on a respective set of dedicated methodologies to each field. Further research is needed to: i) clarify the way in which each set of methodologies takes account of the others' priorities (notably, nature and adaptation in the earlier net-zero alignment methodologies); ii) ensure interoperability across these fields; iii) examine how the different sets of methodologies can work together to contribute to consistent, resilient and optimal transition strategies.

a) **Nature should be considered in the net-zero transition and earlier related methodologies**. Nature is both a source and a sink of GHG emissions; it can achieve an estimated 37% of the 2030 net-zero emissions reduction goals (IPCC 2023 [1], Griscom 2017 from GFANZ 2024).

   Economic players and methodology providers should clarify how they bridge the gap between climate and nature for the net-zero transition. Climate alignment methodologies could ensure consistency with the "do not significant harm" (DNSH) principle[7]. Further synergies and positive actions should be considered. The scientific community has already indicated considering the climate-biodiversity nexus: "Policies that simultaneously address synergies between mitigating biodiversity loss and climate change […] offer the possibility to maximise co-benefits" (IPCC IPBES 2021).

   Further considering nature in the net-zero transition would allow wider opportunities of synergies between climate and nature. It would enable defining global (consistent and integrated) strategies, and in addition, beyond energy levers, using nature-related levers, which are critical, cost-effective and scalable (GFANZ 2024); given that climate mitigation actions affect nature (through synergies or possible negative impacts), science-based choices have to be made, where trade-offs; this requires considering the risks of crossing the planetary boundaries and tipping points (GFANZ 2024), which is an area for further research.

   The question could arise of the relevance of more holistic frameworks (*e.g.* the integration of climate and nature transition planning) (see **7**).

b) **Adaptation should also be considered in the net-zero transition and earlier related methodologies to develop resilient strategies**. Adaptation requires action and financing at scale (I4CE 2022, I4CE 2024 [2]). As an immediate step, alignment strategies and related methodologies could incorporate dedicated indicators to ensure that the conclusions of adaptation-related analyses (carried out in dedicated frameworks extending to supply chains) have been considered, with the objective of making the alignment strategy more resilient[8]. In addition, adaptation is starting to benefit from dedicated frameworks (*e.g.* ACT Adaptation) and most providers have developed methodologies relating to physical risks. However, comparable methodologies still need to be developed considering the wide range of results for a same financial asset or entity (OECD 2024).

3. Sectoral transformation should be further incentivised in the net-zero transition and related methodologies with a view of greater competitiveness within the planetary boundaries.

a) **Sectoral transformation should be further incentivised for a broader number of sectors, which requires in-depth work, also with a view of the wider national or regional competitiveness objectives**. The Paris Agreement sets goals for economic players without providing a clear framework

4 "Aligned", for example, can refer to the alignment of past, current or future emissions against a net-zero scenario.
5 In its Global Risk Report 2025, the World Economic Forum ranks the risks by severity in 10 years time : 1° Extreme weather events 2° Biodiversity loss and ecosystem collapse 3° Critical change to Earth systems 4° Natural resource shortages (WEF 2025).
6 Adopted in 2022 at the 15th conference of the parties (COP15), the Global Biodiversity Framework (GBF) is a UN decision to halt and reverse nature loss. The GBF sets 4 overarching goals to be achieved by 2050 and 23 targets by 2030.
7 In the taxonomy, any activity that does not significantly harm i) contributes substantially to one or more of the six environmental objectives (climate change mitigation, adaptation, water and marine resources, circular economy, pollution prevention and control, biodiversity and ecosystems), and 2° does not significantly harm any of these six environmental objectives.
8 This requires considering limiting factors in the analyses (*e.g.* water stress).

that translates global goals into policy milestones and interim targets (Streck 2024)[9]. Methodologies have to make several assumptions and require some expert judgement to disaggregate the carbon budget at the sector, firm or financial asset level (Noels *et al.* 2023). **Differences between and consistencies in approaches to sectoral transformation across climate change mitigation scenarios and methodologies should be examined to: i) pinpoint the most relevant transformations; ii) identify indicators incentivising sector transformation, résilience and competitiveness; iii) and strengthen methodology efficiency** (Oxford Sustainable Finance Group 2024, TPT 2024). This work would call for consortiums (research institutions, think tanks, industrial organisations, etc.) to make further progress around interim policy milestones at the sector and cross-sector level, based on cross-sectional literature reviews, and interviews with the industry (Streck 2024).

Methodology providers should continue to extend their sectoral coverage; they could prioritise key sectors for nature land- and ocean-related sectors (*e.g.* food and beverage manufacturing and also green infrastructures, etc.) (WEF 2020, GFANZ 2024).

b) Transformation towards new circular business models at the cross-roads of climate, nature, competitiveness, further strategic autonomy and resilience, needs to be incentivised. Methodologies should clarify the way in which natural capital is embedded. Further incentives towards a circular economy (across scenario selection, indicators, weightings) could make a significant impact in terms of GHG reduction, notably for six sectors and value chains (construction, transport, food, plastics, textiles and electronics) (EC 2020, WEF 2020, McKinsey 2022, WRI *et al.* 2022, CISL 2024, WEF 2024). Circularity and relocating supply chains are levers for value creation, greater competitiveness and resilience (Wei 2018). The relative share of recycled materials worldwide has fallen, from 9.1% in 2018 to 7.2% in 2023, a drop of 21% in 5 years (Circle Economy Foundation 2024), although half of all GHG emissions come from the extraction and transformation of resources (International Resource Panel 2020).

4. Progress in better capturing decarbonisation efforts and real-world impacts should also be monitored. Decarbonisation efforts revolve around: i) reintegrating effective impacts in the real economy in the context of Paris Agreement alignment frameworks and tools (*e.g.* impact generation under the pillars of the Task Force on Climate- related Financial Disclosures) (Caledecott B *et al.* 2022, 2° Initiative Investing 2022); ii) following the ongoing developments of a two-level approach to assess progress at the financial institution level and the economic player level (real decarbonisation or divestment of possible strategic players whose transition should be financed) (2° Investing Initiative 2022); iii) calculating forward-looking metrics (expected emissions reduction or potential emissions reduction) against a baseline if the financial asset or economic player had not been financed (GFANZ 2023 [1]); these metrics are sensitive to issues such as the robustness of the baseline scenario, additionality and aggregation issues at the portfolio level.

5. A range of complex methodological choices and assumptions influences the alignment results for a financial asset or economic player. Choices and methodologies have been widely compared across studies. Some choices and assumptions will improve over time; others are rather conceptual and permanent. i) Scope, coverage and temporal perspective: partial coverage in terms of asset classes could undermine the climate assessment of underlying real-economy assets responsible for GHG emissions at the global level (OECD 2024). Methodologies recommend including all GHGs and Scope 3[10] (where material), though in various ways (Institut Louis Bachelier *et al*. [1]). Scope 3 represents around 70% of total GHG emissions (on average with all sectors considered) and should be further incorporated alongside progress on data availability, quality and double-counting. Methodologies should be more explicit on the inclusion of offsets and avoided emissions as accounting rules progress (Noels *et al.* 2022, GHG Protocol 2024). The reliability and comparability of input data needs improvement (NGFS 2024 [1], OECD 2024). **ii) Scenario selection**: the choice of a pathway reflects the choice of a decarbonisation burden for a sector that needs to be shared by users and will affect alignment results (Institut Louis Bachelier *et al.* [1]). Though pathways differ for the same sector, there is little debate across methodologies about whether one or more scenarios is preferable and also a lack of geographical granularity (Noels *et al.* 2022, Institut Louis Bachelier *et al.* [1]) **iii) Disaggregating the carbon budget from the global to the financial asset or economic player level** still suffers from a lack of a commonly accepted and scientifically validated approach, which calls for further work (Noels *et al.* 2022, Institut Louis Bachelier *et al.* [1]) **iv) Aggregation approaches** for target-setting and alignment assessment within each asset class require further methodological work, as different options may lead to diverging results (PAT 2020, GFANZ 2022 [2], Noels *et al.* 2022, Institut Louis Bachelier *et al.* [1]).

6. Methodology designers should provide greater transparency, comparability, interoperability and relative convergence on best practice: this would help limit the time and resources allocated to comparing alignment methodologies and refocus the action of economic players on an effective environmental transition (Noels *et al.* 2022, GFANZ 2022 [2]). Methodology providers should facilitate comparison by presenting essential information in a more harmonised way

9 The Global Biodiversity Framework (GBF) sets 4 overarching goals to be achieved by 2050 and 23 targets by 2030.
10 Relating to GHG emissions in the value chain.

(Noels *et al.* 2022). Research work is moving in this direction (IIGCC 2022, GFANZ 2022 [2], WBA 2024). Methodology providers would benefit from publicly sharing their methodological choices in full and with regular updates. They should offer multidimensional data extending to transition plans and improve the data quality and granularity (IIGCC 2023). In addition, companies would benefit from having more information shared in a more transparent way (input data considered, evaluation results on the various dimensions, etc.).

7. Economic players and methodology providers should consider the latest scientific developments to guide strategies and increase synergies for greater co-benefits and resilience, key issues for future competitiveness. **The report[11] by the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) (known as the Nexus report) broadens the analysis to the Interlinkages among Biodiversity, Water, Food and Health and Climate Change (IPBES 2024)**. This report, to be fully published in 2025, is the product of three years of work by 165 leading international experts from 57 countries. It "provides the science and evidence needed to support achievement of the Sustainable Development Goals (SDGs), Kunming-Montreal Global Biodiversity Framework and the Paris Agreement on climate change". This Nexus report examines different future scenarios and focuses on identifying a wide range of responses for decision-makers and synergies to maximise co-benefits (IPBES 2024).

"The future scenarios with the widest nexus benefits are those with actions that focus on sustainable production and consumption in combination with conserving and restoring ecosystems, reducing pollution, and mitigating and adapting to climate change" (IPBES 2024). This will involve further developments to be considered.

11 The summary for policy makers was approved on December 16th by the 11th session of the IPBES plenary, composed of representatives of 147 governments that are member of the IPBES. The report will be published in January 2025 after the release of the summary for policymakers in December 2024.

INTRODUCTION

The Paris Agreement sets commitments to limit the rise in the global average temperature, adapt to the adverse impacts of climate change, cap greenhouse gas (GHG) emissions as soon as possible, and achieve net-zero emissions in the second half of the century. In 2020, the Intergovernmental Panel on Climate Change (IPCC) estimated the remaining carbon budget at around 400 gigatons to achieve the 1.5°C target with 66% probability[12] (IPCC 2020). **Recent studies indicate that this carbon budget as of June 2024 could be consumed in less than 6 years at the current rate of emissions** (42.2 gigatons of CO_2e) (MCC-Berlin 2024, Rockström 2024).

The Paris Agreement also sets the objective of "making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development", which is generally referred to as the "alignment" of investments and financing (UNFCCC 2015, OECD 2024). In Europe, the additional annual investment required is estimated at €620 billion per year up to 2030 to meet the objectives of the Green Deal and Fit for 55– more than € 400 billion per year for energy, buildings and transport systems (Platform for Sustainable Finance 2024, I4CE 2024 [1]). The largest share should come from private finance (banking, institutional investors). This implies redirecting the assets of financial players, deeply intertwined with those of the companies financed, and creating a capital markets union; in accounting terms, 2% of around €33 trillion of European savings should be redirected each year.

To achieve a low-carbon and sustainable economy, economic players (non-financial and financial) must accelerate the transformation of their business models. **This major transformation relies on science-based frameworks to assess the risks and the opportunities in order to elaborate strategies and policies that increase innovation and strengthen the competitiveness and resilience of business models in the various possible futures[13]**. Collective efforts have so far mainly focused on climate change mitigation.

Private and public players have mobilised to develop various methodologies to apply sectoral climate change mitigation scenarios consistent with the Paris Agreement goals at the financial asset or economic player level[14]. Methodologies define pathways to distribute the carbon budget over time, set targets and measure progress. They provide general guidance on how to assess climate alignment and/or are more practical since they are based on qualitative or quantitative data. They are expected to help guide capital allocation, financing and investment decisions within the economy and to incentivise company and sectoral transformation.

This paper provides decision-makers with an overview of the current state of thinking on alignment methodologies, avenues for improvement and targeted actions towards achieving a sustainable economy. It recommends that economic players and methodology providers explore the wider opportunities that arise from having greater consistency between climate change and nature[15] to define consistent and resilient strategies. The broad transition of nature[16] and adaptation are not the focus of this paper that examines how nature is considered in the earlier climate frameworks and tools.

12 The relationship between cumulative anthropogenic CO_2 emissions and temperature warming is almost linear: every 1,000 $GtCO_2$ of cumulative CO_2 emissions leads to an increase in global average surface temperature of around 0.45°C. This quantity corresponds to the transient climate response to cumulative CO_2 emissions (TRCE) (IPCC 2921).

13 Competitiveness should be based on a broader approach, including competitive sustainability (CISL 2024 [1]). In addition, analyses of competitiveness should encompass the ability to remain competitive in different future scenarios. To this end, elements such as the impact of possible limiting factors (*e.g.* water stress) or the sustainability of transformations (new production tools or long-lasting infrastructures, land use planning, etc.), etc., should be taken into account.

14 See also for public development banks, beyond the Scope of this paper (I4CE 2024 [3]).

15 All existing systems on earth including biodiversity, its living element.

16 Beyond climate change, nature frameworks are focused on other drivers (*e.g.* land use, pollution, exploitation of natural resources and invasive species).

1. OVERVIEW OF METHODOLOGIES TO ENSURE THE COMPATIBILITY OF BUSINESS MODELS WITH THE PARIS AGREEMENT, TO CONSIDER IN RELATION WITH THE GLOBAL BIODIVERSITY FRAMEWORK

1.1. Overarching science-based intergovernmental frameworks for methodologies

Methodologies refer to the science-based Paris Agreement. This legally binding United Nation (UN) treaty sets goals but does not offer a clear framework of interim targets and measures to convert temperatures into policy milestones (Streck, 2024).

Article 2 of the Agreement sets a goal of limiting the temperature increase to 2°C/1.5°C in the long term, which means stabilising the concentration of CO_2 in the atmosphere.

Article 4 sets a net-zero objective, which corresponds to a state in about 25 years where anthropogenic emissions (emissions from fossil fuels, industry, and agriculture, forestry and other land use (AFOLU) change) are balanced by anthropogenic elimination (anthropogenic carbon removals through afforestation[17]/reforestation[18] and technological removals[19]). Carbon neutrality is a planetary and collective objective, not an individual one[20] (ADEME 2021, Carbone 4 2020).

Economic players should ensure that their business model and strategy are compatible with pathways consistent with the net-zero objective. A company contributes to this goal by: reducing its GHG emissions; reducing others' emissions; and increasing carbon sinks leading to negative emissions – in its own operations, in and/or outside its value chain, as relevant (see **Figure 1**) (Carbone 4 2021, WBCSD 2023).

FIGURE 1. A COMPANY'S POTENTIAL CONTRIBUTIONS TO THE DECARBONIZATION OF THE ECONOMY

The two levers for reaching global Net Zero		Global decrease in emissions		Global increase of carbon removals
Actions at the scale of companies →		**Pillar A:** A company's emissions reduction (decarbonization)	**Pillar B:** A company's contribution to global decarbonization efforts	**Pillar C:** A company's contribution to carbon sinks development
Related to a company's value chain	A company's own operations	… through reduction of direct emissions (Scope 1)	–	… through direct removals (company's own removals)
	Upstream and downstream	… through reduction of indirect emissions (Scopes 2+3)	... through the introduction of solutions	… through indirect removals (removals inside the value chain)
Outside a company's value chain		–	… through financing and otherwise enabling climate mitigation projects	… through financing and otherwise enabling removal projects

Source: WBCSD 2023 adapted from the Net Zero Initiative.

Methodologies can refer to different types of targets that are not equivalent, such as alignment with the Paris Agreement; alignment with scenarios limiting temperature rise to 1.5°C; and net zero alignment (Institut Louis Bachelier *et al.* 2020). They tend to focus on emissions reductions; some incorporate avoided and negative emissions, with the need to clarify concepts as standards are being set (at this stage for land, with further research needed for the ocean) (Noels *et al.* 2022, GHG Protocol 2024, SBTI 2024). When aiming at net zero, methodologies are built on the share of the global effort to reach net zero allocated at the region or state,

17 Afforestation: the establishment of a forest in an area where there was no previous tree (NZI 2020)
18 Reforestation: natural or intentional restocking of existing forests and woodlands that have previously been depleted (NZI 2020).
19 Bio-energy carbon capture storage, Carbon dioxide removal, Direct air capture.
20 Some economic players will have residual emissions while others will have net-negative emissions. Moreover, conceptually, any company can achieve carbon neutrality by offsetting its emissions (assuming it can offset them in full), which would not obligatorily lead to carbon neutrality at the global level (omitting the question of the relative relevance of the sector in a sustainable world and the territorial offset capacity) (Carbone 4 2020).

sector and entity levels, assuming that all financial assets and economic players reach net-zero emissions by 2050 (Institut Louis Bachelier *et al.* 2024 [1]).

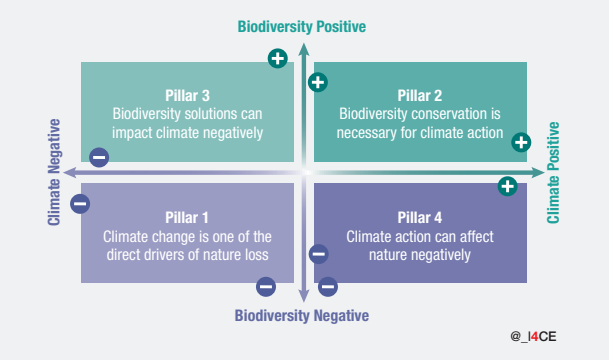
Economic players and methodologies must also consider the contribution of nature to mitigation, and also the role it can play in adaptation[21] **and resilience**[22]. Nature can be a source and a sink for GHG emissions: of total emissions, the AFOLU sector accounts for 22% and deforestation 50% (IPCC 2023 [1]); land sequesters 31% and ocean 26% (Global Carbon Budget 2023). Natural ecosystems can achieve an estimated 37% of the 2030 net-zero emissions-reduction goals (IPCC 2023 [1], Griscom 2017 from GFANZ 2024). (see also **Appendix 1**).

The Global Biodiversity Framework (GBF) sets 4 overarching goals to be achieved by 2050 and 23 targets by 2030. The different status between the Paris Agreement and the GBF in terms of timetable and legal status[23] (Streck 2024) raise questions about the way in which nature is considered in the earlier alignment methodologies in terms of overlapping areas. From a resilience perspective, the planetary boundaries (key processes and thresholds for the resilience of the planet and future generations[24]) have introduced "essential environment variables", coupled with a measurement tool to prioritise companies' actions (Röchstrom 2024, Stockholm Resilience Centre 2024).

Regarding the biodiversity-climate nexus, the scientific community has indicated "policies that simultaneously address synergies between mitigating biodiversity loss and climate change [...] offer the opportunity to maximise co benefits" (IPBES IPCC 2021).

An early framework for a climate-nature nexus (see **Figure 2** opposite) shows a climate-only focus (Pillars 2 and 4), a biodiversity-only focus (Pillars 3 and 4) and maximisation of synergies between climate and nature (Pillar 2).

FIGURE 2. POSSIBLE FRAMEWORK FOR THE CLIMATE BIODIVERSITY NEXUS



Source: GFANZ 2024, adapted from Finance for Biodiversity Foundation.

Methodology providers could clarify how they intend to bridge the gap between climate and nature in the net-zero transition. Climate alignment methodologies could ensure consistency with the "do not significant harm" (DNSH) principle[25].

Synergies and further positive actions should also be considered in the net-zero transition to strengthen resilience and future competitiveness by defining global (consistent and integrated) strategies. In addition to energy levers, nature-related levers, which are critical, cost-effective and scalable, could be used to support the net-zero transition (GFANZ 2024[26]).

The question could arise of the relevance of more holistic frameworks (*e.g.* the integration of climate and nature transition planning). The Nexus report should involve further developments (see **Box 1**).

Economic players and methodology providers shoud consider the latest scientific developments to guide strategies and increase synergies for greater co-benefits. Decision-makers would benefit from more interoperable tools and methodologies to further develop, consistent, resilient and adapted strategy options and alignments.

BOX 1. THE INTERGOVERNMENTAL PLATFORM ON BIODIVERSITY AND ECOSYSTEM SERVICES (IPBES) THEMATIC ASSESSMENT REPORT ON INTERLINKAGES AMONG BIODIVERSITY, WATER, FOOD AND HEALTH (DECEMBER 2024)[27] (known as the Nexus report)

The Nexus report on the Interlinkages among Biodiversity, Water, Food, Health and also climate change is the product of three years of work by 165 leading international experts from 57 countries. It "provides the science and evidence needed to support achievement of the Sustainable Development Goals (SDGs), Kunming-Montreal Global Biodiversity Framework and the Paris Agreement on climate change". This Nexus report examines different future scenarios and focuses on identifying a wide range of responses for decision-makers and synergies to maximise co-benefits (IPBES 2024).

"The future scenarios with the widest nexus benefits are those with actions that focus on sustainable production and consumption in combination with conserving and restoring ecosystems, reducing pollution, and mitigating and adapting to climate change" (IPCC IPBES 2021, IPBES 2024).

21 According to the IPCC's definition, adaptation is any adjustment in response to actual or expected climatic stimuli (NGFS 2024 [2]).
22 According to the IPCC's definition, resilience is the ability to anticipate, absorb, accommodate or recover from a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration or improvement of the environment (NGFS 2024 [2]).
23 The GBF, which was a UN decision at 15th Conference of the Parties (COP15), has a weaker form. The States has not endowed the Convention on Biological Diversity (CBD) with legal powers to adopt legally binding decisions. The GBF depends notably on its incorporation into national laws, and on international cooperation and private finance (Streck 2024).
24 Climate change, biosphere integrity, biogeochemical cycles of nitrogen and phosphorus, land-system use, freshwater use, ocean acidification, stratospheric ozone depletion, novel entities that are put into the environment, atmospheric aerosols loading.
25 In the taxonomy, an activity that does not significantly harm 1° contributes substantially to one or more of the six environmental objectives (climate change mitigation, adaptation, water and marine resources, circular economy, pollution prevention and control, biodiversity and ecosystems) and 2° does not significantly harm any of these six environmental objectives.
26 This guidance is currently under consultation.
27 The summary for policy makers was approved on December 16th by the 11th session of the IPBES plenary, composed of representatives of 147 governments that are member of the IPBES.

1.2. Categorising the methodologies

Categories: methodologies can be classified depending on whether they set general guidance only and/or more practical rules, benchmarks and metrics. Where practical, methodologies can be qualitative (has a financial institution set net-zero targets?) and/or quantitative, where they provide a detailed approach to measuring the degree of climate alignment with a scenario consistent with the Paris Agreement and/or assess transition plans (Noels *et al.* 2022).

Methodology providers and public players: methodologies have been developed by private providers, driven by coalitions of international investors, in conjunction with research institutes, stakeholders in financial markets, but also by corporates supported by foundations. Some methodologies originated from public institutions such as ACT developed by ADEME in partnership with the World Benchmarking Alliance (WBA) and the Carbon Disclosure Project (CDP). ACT enables targets to be set, support the company in their transition through concrete actions and provides an assessment of the credibility of the transition plan[28], including how the company will achieve the objectives (ACT 2024). In partnership with ADEME, the Banque de France is developing a climate indicator with more than 500 companies before developing it into a national indicator mechanism (Banque de France, 2023).

Single or multi-financial asset(s) or economic player(s): methodologies can apply at the financial asset level (*e.g.* a corporate) and/or might extend to several levels (*e.g.* financial assets, asset classes, sector(s), business lines such as lending, investment, insurance, the financial firm, or the consolidated financial sector).

Asset classes: methodologies for assessing alignment at the portfolio level (where several financial assets are held) were initially developed for listed equities and have been then extended to other asset classes such as corporate bonds and sovereign bonds. Some asset classes are still insufficiently represented (notably, private equity and loans) (OECD 2024). (see **Figure 3**).

FIGURE 3. FINANCIAL ASSET CLASSES COVERED BY CLIMATE-ALIGNMENT ASSESSMENT METHODOLOGIES

Paris Agreement Article	Listed equity	Private equity	Corporate debt	Sovereign bonds	Real estate	Infra-structure
2DII PACTA	Covered	Developing	Covered	Not covered	Developing	Not covered
ESG Book Temperature Score	Covered	Not covered	Not covered	Not covered	Not covered	Not covered
Carbone 4 Finance Carbon Impact Analytics (CIA)	Covered	Not covered	Covered	Covered	Not covered	Covered
Carbon Risk Real Estate Monitor (CRREM)	Not covered	Not covered	Not covered	Not covered	Covered	Not covered
CDP-WWF Temperature Ratings	Covered	Not covered	Not covered	Not covered	Not covered	Not covered
EcoAct ClimFIT temperature	Covered	Not covered	Covered	Not covered	Not covered	Not covered
I Care & Consult SB2A/SBAM	Covered	Not covered	Not covered	Not covered	Not covered	Not covered
LO Portfolio Temperature Alignment Tool (LOPTA)	Covered	Not covered	Not covered	Not covered	Not covered	Not covered
LSEG Beyond Ratings' method	Not covered	Not covered	Not covered	Covered	Not covered	Not covered
Mirova Alignment Method	Covered	Not covered	Covered	Not covered	Not covered	Not covered
MSCI's Implied Temp Rating	Covered	Developing	Developing	Not covered	Not covered	Not covered
Ninety One Net Zero Sovereign Index	Not covered	Not covered	Not covered	Covered	Not covered	Not covered
Ortec Finance Climate ALIGN	Covered	Covered	Covered	Covered	Covered	Not covered
Right. based on science XDC model	Covered	Developing	Developing	Covered	Covered	Not covered
S&P Sustainable1 Paris Alignment	Covered	Developing	Covered	Not covered	Developing	Not covered
TPI (Carbon Performance)	Covered	Not covered	Covered	Covered	Not covered	Not covered

Covered Developing Not covered

Note: Last updated in August 2024. LSEG was formerly included as FTSE, S&P Sustainable1 was formerly Trucost. ESG Book was formerly Arabesque.

Source: OECD 2024.

28 ACT analyses incorporate past, present and future trends.

1.3. Objectives of methodologies and their users

Methodologies are used by corporates and the financial sector (banks, institutional investors), which may also carry out their own analysis, in which case they provide benchmarks to test internal analyses in the event of significant deviations. Economic players that lack the critical mass to develop their own systems due to the complexity and volume of data needed might choose to outsource these alignment assessments to external providers. Investment funds, for example, may come up against a lack of available data for SMEs (for which some methodologies have developed simplified formats).

Methodologies must be robust as they serve the following objectives at the financial asset, economic player, portfolio, sector, or financial institution levels (GFANZ 2022 [2], Institut Louis Bachelier *et al.* 2024 [1], GFANZ 2024) (see **Appendix 2** for a detailed themed mapping of the methodologies):

1. Contribute to defining strategy options and capital allocation;
2. Incentivise sector transformation;
3. Assess the degree of alignment with a climate change mitigation scenario consistent with the Paris Agreement (quantitative assessment) and the compatibility of a company's transition plan (qualitative and/or quantitative assessment) and ultimately the reduction of GHG emissions;
4. Define engagement strategies;
5. Monitor progress against targets (and publish related information).

The added value of each category towards a sustainable economy stems from, for the corporates, the transformation of their business model, with a mechanical impact in turn on the transformation of the firms that finance them[29]. **The financial sector's added value stems from reallocating financial flows to the Paris Agreement goals, increasing the impact of a company[30], financing the transition of carbon-intensive companies in line with the Paris Agreement goals, disseminating and scaling up innovation, and engaging at the sector and public authority levels** (2° Investing Initiative 2020 and 2022, McKinsey 2024).

1.4. Further key questions regarding methodologies

The various recent cross-sectional studies comparing methodologies raise several key questions. Reading across comparative studies shows a focus on choices and assumptions that particularly impact alignment assessment. Some questions in the list below appear to have received less attention and may require further research.

- **Nature in the net-zero transition**
  - To what extent should climate alignment methodologies take account of nature (through DNSH or wider synergies)?
  - To what extent do methodologies clarify their nature coverage in the net-zero transition?
  - Moreover, should methodologies adopt a global approach in nexus taking into account interlinkages (climate change, biodiversity, etc.)?
  - When seeking alignment that considers climate (global) and nature (local) issues, which science-based framework should methodologies refer to?
- **Resilience and adaptation**
  - To what extent should alignment methodologies take account of adaptation dimensions to ensure that the alignment strategies are resilient?
  - Moreover, which science-based framework dedicated to resilience and adaptation should methodologies refer to (OECD 2024)?
- **Capital allocation within the economy**
  - Which set of targets is best suited to direct capital allocation within the economy consistently with the Paris Agreement (Institut Louis Bachelier *et al.* 2024 [1])?
  - Which complementary targets should be set to take account of nature within a climate perspective (GFANZ 2024 under consultation)?
- **Objectives and impact in the real economy**
  - Are the methodologies fully relevant when assessing progress against the Paris Agreement goals (Noels *et al.* 2022)?
  - Do they ensure consistency with national and European sectoral transition plans (conceptually, considering corporate cross-border activities)?
  - Do they incentivise effective emissions reductions at the planetary level (I4CE 2021, 2° Investing Initiative 2020 and 2022, Caledecott *et al.* 2022, Institut Louis Bachelier *et al.* 2024 [1])?. (see **Box 2**).
- **Indicators that are most relevant at the financial asset, economic player and sector levels**
  - What are the most relevant indicators to assess alignment against the ambition, and the credibility and feasibility of transition plans (covering internal and external dependencies, and nature-related issues) (GFANZ 2022 [1] and [3], WBA *et al.* 2024, GFANZ 2024)?

29 Financed emissions can represent up to 97% of total emissions (Carbon Disclosure Project in 2021, New Climate Institute 2020).
30 The impact on public markets presupposes a critical mass of shareholders (2° Investing Initiative).

- What are the most relevant indicators to provide maximum leverage to achieve sectoral transformation (Oxford Sustainable Finance Group 2023), while considering competitiveness and resiience?
- What indicators are most likely to accelerate GHG reductions through synergies between climate and nature (GFANZ 2024)?

- **Differences across methodologies affecting alignment assessments**
  - Which choices and assumptions matter most when assessing alignment at the financial asset, economic player or consolidated levels (PAT 2020, PAT 2021, GFANZ 2022 [2], Noels *et al.* 2022, Institut Louis Bachelier *et al.* 2024 [1] and [2])?
  - Does the consolidation of individual alignments ultimately ensure compliance with the carbon budget (which needs to extend beyond the financial sector) (Noels *et al.* 2022, Institut Louis Bachelier *et al.* 2024 [1])?
  - What is the scientific robustness of the methodology and what biases might aggregation introduce when assessing alignment with the Paris Agreement (Noels *et al.* 2022, Institut Louis Bachelier *et al.* 2024 [1])?
  - What is best practice when it comes to convergence of methods (PAT 2021, GFANZ 2022 [2])?
- **Net zero**
  - How are residual emissions and negative emissions dealt with across the methodologies (Noels *et al.* 2022)?
- **Data**
  - What further work is needed to strengthen data quality (NGFS 2024 [1])?
  - How can the specificities of data relating to nature be considered?

BOX 2. ALIGNMENT–CAPTURING DECARBONISATION EFFORTS, REAL-WORLD DECARBONISATION AND IMPACT

Alignment can lead to the sale of carbon financial assets or economic players to other economic players, instead of financing the transition of potentially strategic financial assets or economic players (2° Initiative Investing 2022, Institut Louis Bachelier *et al.* 2024 [1]). Ways to better capture decarbonisation efforts revolve around: reintegrating the real-economy impact in the alignment frameworks and tools (*e.g.* the impact generation under the Task Force on Climate-related Financial Disclosure (TCFD) pillars) (Caledecott B *et al.* 2022); defining targets for the effective reduction of GHGs in the economy (2° Initiative Investing 2022); relying on a two-level approach to assess at the financial institution level (real action or divestment instead of financing the transition) and the financial asset or economic player level (real decarbonisation or virtual changes), which is currently being implemented (2° Investing Initiative 2022); defining sector-wide targets based on the work of the University of Technology Sydney's Institute for Sustainable Futures using its One Earth Climate Model (UTS 2022) and macro-scale monitoring of highly emitting financial assets or economic players (2° Investing Initiative 2022); calculating forward-looking metrics (the expected emissions reduction or potential emissions reduction) against a baseline (GFANZ 2023 [1]), although these metrics are sensitive to issues such as the robustness of the baseline scenario, additionality and aggregation issues at the portfolio level.

2. COMPARISON OF ALIGNMENT METHODOLOGIES (INCLUDING NATURE-RELATED CONSIDERATIONS) (AT THE FINANCIAL ASSET, ECONOMIC PLAYER, PORTFOLIO AND/OR FINANCIAL INSTITUTION LEVEL)

2.1. Brief overview of financing strategies reflected in methodologies

Schematically, financing of the net-zero transition has evolved towards enlarged complementary strategies (UNEP FI *et al.* 2023, Institut Louis Bachelier 2024) that need to be further broadened, while considering competitiveness and sustainability within the planetary boundaries:

1. **Green finance** (based for example on a taxonomy) measures the financing of already green financial assets or economic players; this approach is rather static and cannot ensure that efforts are sufficient to align with the Paris Agreement.
2. **Alignment to pathways** extends to all bank financing from a science-based scenario consistent with the Paris Agreement; however, this approach may work as a disincentive to finance the transition of strategic high-emitting companies, It may lead to divestment and no effective GHG emissions reductions at the planetary level (2° Investing 2022, Caldecott *et al.* 2022). Portfolio alignment to pathways reflects the reduction of GHG emissions that are financed, rather than financing of emissions reduction (UNEP FI *et al.* 2023).
3. **Transition finance** extends the assessment to a more holistic approach to transition plan assessments and clarifies the types of transition strategy and related outcomes (binary, alignment maturity ranking, divergence, implied temperature rise – see **Box 3** for definitions) (GFANZ 2022 [2]). The alignment maturity ranking (climate solutions, aligned, aligning and managed phaseout) shows capital allocation across the various categories, which some studies propose to refine (GFANZ 2022 [2], GFANZ 2023 [2], Institut Louis Bachelier *et al.* 2024). This classification is key for guiding capital allocation to climate solutions and scale-up, in view of European competitiveness (IEA 2023 [1], Cleantech for Europe 2023, CISL 2024). (see **Appendix 3**).
4. **Strategy financing of net zero needs to be broadened to**:
   - **Nature**: taking account of nature would allow global strategy, wider opportunities to capitalise on synergies and safeguard against negative impacts. Focus could be put on priority issues for climate change and also for nature (*e.g.* land-based and ocean-related sectors, etc.) (see also WEF 2020). Policies can be extended from those centred on energy levers to include nature levers as well, which are most scalable, cost-effective and increase resilience (GFANZ 2024). Nature levers rely on various actions (*e.g.* carbon sequestration in agriculture; reduced conversion of forests and other ecosystems; ecosystem restoration, afforestation, reforestation) (IPCC 2023 [1] [2]). The broad transition of nature also needs to be financed (although this is beyond the scope of this paper).
   - **Adaptation and resilience**: strategy financing should ensure the climate resilience of alignment (I4CE 2022, I4CE 2024 [2]). Broad adaptation also needs action at scale and financing[31] (although this is beyond the scope of this paper) (IPCC 2023 [1], I4CE 2022, OEDC 2024, I4CE 2024 [2]).

Financial institutions can play a key role to embed nature-related levers and adaptation considerations in alignment strategies at the company, portfolio, value chain, sector or financial institution levels; for example, they can offer technologies, services, nature-related solutions[32] to a set of clients, and roll out nature and adaptation-related thematic levers at the sector and organisation-wide scale, while engaging with governments (GFANZ 2024).

31 Adaptation- and resilience-dedicated frameworks remain an area for research to develop comparable methodologies for companies, using data, metrics, and national and subnational analyses at the financial asset or economic player level, aggregation, action and strategies, policy goals, and measures of progress with milestones. Different physical climate risk assessments for the same entity can lead to a wide range of results (OECD 2024).

32 Industry guidance suggests distinguishing between i) natural climate mitigation (place-based activities such as reducing or avoiding GHG emissions or increasing carbon storage); and ii) natural climate enablers (non-place-based solutions) (GFANZ 2024).

2.2. Comparisons of alignment methodologies by objective, in relation to financing strategies

With regard to financing strategies, one study examines the relevance of alignment methodologies in relation to their objectives, based on some 50 methodologies[33] (Institut Louis Bachelier *et al.* 2024 [1], **Appendix 2**).

2.2.1. Comparisons of methodologies for target-setting purposes

Target-setting methodologies have broadened their focus, centred on financing targets (climate solutions, fossil fuels) to a wider range of portfolio alignment targets that reflect transition financing. Targets reflect capital allocation strategies and are grouped into categories by the industry (see **Box 3**).

BOX 3. TARGETS IN THE NET ZERO TRANSITION CLASSIFIED BY THE INDUSTRY AT PORTFOLIO LEVEL

1. Climate targets (GFANZ 2022 [2], GFANZ 2023 [2], UN and Wyman 2023, Institut Louis Bachelier *et al.* 2024 [1]):

- Means-related targets relating to the capital deployed to implement the transition plan (strategy, governance, commitment, etc.);
- Performance-related targets:
  - **Portfolio emissions targets** focus on emissions associated with financial flows; they reflect the institution's long-term strategy (scenario-based), *e.g.* reducing emissions by 30% by a given date compared with a reference year;
  - **Portfolio alignment targets**: focus on increasing the share of financial flows towards financial assets or economic players with a common set of characteristics:
    - ~ **Financing targets** focus on the financing of specific activities or sectors considered as being (in)compatible with net-zero. They can be technology-based (*e.g.* transport by type of technology), or outcomes-based depending on the pathway (*e.g.* financing of climate solutions; reducing/ceasing financing for fossil fuels). These targets would require further research on the dedicated pathways;
    - ~ **Input targets/metrics** (ex ante), measure the capital used (in stock or flow) for financial assets or economic players with common transition characteristics (*e.g.* increasing by 100% the financial share allocated to aligned financial assets or economic players by 2030);
    - ~ **Output targets/metrics** (ex post), focus on the alignment outcome (*e.g.* reducing the implied temperature rise (ITR) of the portfolio to 1.5°C by 2030):
      - › Binary: the percentage of financial assets or economic players with targets validated by a third party or not;
      - › Ranking in the alignment maturity scale (climate solutions, aligned, aligning, not-aligned, stranded assets);
      - › Deviation from a reference scenario (without calculating an exact temperature level);
      - › ITR (assuming the whole economy behaves as the portfolio does).

Most institutional investors set portfolio emissions and alignments targets. The banking sector tends to set sector-level decarbonisation targets supplemented by financing targets.

2. Complementary nature-related targets in the net-zero efforts: the objective is not to rely on net-zero emissions targets alone, which could result in deterioration of nature. Setting complementary nature-related targets/metrics could cover, e.g: i) priority issues and sectors, with the greatest opportunies and synergies between climate and nature; ii) ensuring that climate mitigation targets that deliver GHG emissions reductions in the short term do not impair nature's ability to act as a carbon sink; iii) supporting expected GHG emission reductions (or removal) by measuring improvement in ecosystems; iv) monitoring the expected impacts of synergies and trade-offs (GFANZ 2024).

These complementary targets could be set at different levels (*e.g.* at the client, portfolio company, activity location, biome, jurisdictional, landscape or ecosystem levels, and across a financial institution's portfolio for strategic, institution-wide impact) (GFANZ 2024).

33 Alignment of financial institutions: ACT Fi (Bank and Investing); Influence Map Climate Change Methodology; TPI Carbon Performance score (banks).
Target-setting: NZAO; NZBA; PAII NZIF, SBTINZ for FINZ, SBTI updated Draft Near-Term Criteria FINT.
Portfolio alignment assessment: C4 Fi Ciara Climate Impact Analytics for Real Assets Alignment Assessment, C4 FI CIA Corp, C4 FI CIA Sov; CDP NZ Alignment Dataset; Clarity AI NZ Alignment; ESG Book; Ethi FI science-based temperature trajectory Corp, Ethi Fi science based temperature trajectory Sovereign; Ethos Temperature score; FTSE Russell Implied Temperature Rise Scores; ICE Climate transition analytics platform; Iceberg DataLab SB2A dataset, Iceberg DataLab SB2A Sov; Impact Cubed ITR; ISS ESG NZAlignment; Moody's Temperature alignment data; MSCI ESG Research; Ortec Fi Climate Align Corp, Ortec Finance Climate alignment Sov, Ortec Finance ClimateAlign Real Estate; Pacta Banks and Investors; Planetrics Pathways temperature score, Planetrics Budget temperature score, Planetrics Sov; S&P Sustainable1 Paris Alignment Assessment; Sustainable Platform.
Assessment of the alignment of a single asset: ACT Corp; Climate Action 100+; CRREM; FTSE Russel Claim-Based Sov Temperature Scores; German Watch & New Climate Institute; Moody's NZ Assessments; NEC Initiative; TPI Carbon performance score; Ascor Project - TPI Initiative Centre LSE.

Target-setting methodologies make various recommendations, while leaving latitude for the various business lines (banks, investors, institutional investors). They recommend a plurality of targets (see **Box 4**) to capture the strategies and dimensions of a portfolio that a single target cannot achieve (GFANZ 2022 [2]). This raises the question of finding the right balance between having a plurality of targets within a business line[34] and applying some standardisation to allow comparability. Further research is needed to ensure that achieving targets at the individual level would lead to i) alignment across methodologies (Institut Louis Bachelier *et al.* 2024 [1]), ii) sustainability.

BOX 4. TARGET-SETTING RECOMMENDATIONS IN METHODOLOGIES (Institut Louis Bachelier *et al.* 2024 [1])

Portfolio emissions targets, which focus on the long-term outcome of a financial institution's strategy, are recommended for all business lines. **Financing targets** are also recommended for all business lines; they include climate solutions and, with less consensus, fossil-fuel targets (though SBTI is prescriptive). **Portfolio alignment targets** are mainly used by institutional investors and remain optional within Net Zero Banking Alliance (NZBA). Methodologies that assess transition plans cover the different targets but take them into account in varying ways.

2.2.2. Comparisons of methodologies for alignment assessment purposes

a) **With respect to inputs, methodologies have extended their focus centred on emissions or activity alignment (climate solutions, fossil fuels) to a multidimensional transition plan assessment** (UNEP FI *et al.* 2023, Institut Louis Bachelier *et al.* 2024 [1]):

1. **Activity alignment methodologies** give greater prominence to technological transformation, the financing of climate solutions, divestments in fossil fuels, and alignment of capital expenditure (CAPEX). For example, the PACTA methodology[35] seeks to provide a consolidated view at the financial institutions' activity and financial sector levels. It also develops scenarios for public authorities[36] and assesses climate alignment of financial institutions[37] (PACTA 2024).
2. **Emission alignment methodologies** focus on results and are linked more directly to the carbon budget.
3. **Transition plan alignment methodologies** are a step forward as they can support and assess companies in their transition and reduce carbon footprint through concrete actions. They offer a more holistic approach to climate performance (than GHG-based alignment assessment) and add further criteria (including CAPEX analysis) about the means and strategy implemented to achieve the objectives.

This evolution of alignment methodologies towards the assessment of transition plans enables a multidimensional approach, which represents an opportunity to take greater account of nature in its contribution to mitigation, but also in terms of adaptation and resilience. Climate, nature and adaptation rely on a respective set of dedicated methodologies to each field. **Further research is needed to: i) clarify the way in which each set of methodologies takes account of others' priorities (notably nature and adaptation in the earlier net-zero alignment methodologies); ii) ensure interoperability across these fields; iii) examine how the different sets of methodologies can work together to contribute to consistent, resilient and optimal transition strategies** (see also **Box 5**).

BOX 5. FURTHER TAKING ACCOUNT OF NATURE AND ADAPTATION IN THE NET ZERO TRANSITION

- **Further considering nature in the net zero transition**[38] would allow greater integrated strategy and transition planning[39] (GFANZ 2024): nature related issues should be incorporated along the various TCFD pillars[40] (**Appendix 4**); this would lead to measures of nature-related GHG emissions in support of the net zero transition (within a company's operations, in and/or outside its value chain, as relevant); considering nature would ensure that climate mitigation policies do not impair nature in the long run; where negative impacts between climate and nature, trade-offs would require quantifying costs and benefits, strategies to mitigate and safeguard ecosystems, while considering the risks of crossing tipping points. Science needs to further progress in these fields.

  Some alignment methodologies start to incorporate nature-related targets, though in various ways (*e.g.* halting deforestation).

- **Further considering adaptation in the net zero transition** would allow: i) strengthening the climate resilience of alignment; and/or ii) that economic players contribute to reduce those risks through their strategies of alignment (including supply chains).

  Methodologies could consider bridging issues through dedicated indicators (*e.g.* does your company have an action plan relating to adaptation that is taken account of when defining alignment policies?).

34 In practice, banks set dedicated targets by activity; within each activity, targets are not standardised depending on strategies (ECB, 2023).
35 PACTA is based on an approach in terms of relative shares of low-carbon technologies versus fossil fuels, in both production and in the production process (PACTA 2024, BCE 2024). With a 5-year horizon, it is based on the portfolio to date.
36 *e.g.* France, Switzerland, Bank of England, and European Insurance and Occupational Pensions Authority (EIOPA).
37 *e.g.* in Switzerland, Norway, Sweden and, more recently, the European Central Bank (ECB).
38 Some methodologies are starting to integrate nature considerations (*e.g.* Transition Pathway Initiative (TPI) or SBTI for banks (in terms of deforestation policy).
39 The UK Transition Plan Taskforce (TPT) is also contemplating creating a holistic framework that integrates climate and nature transition planning guidance.
40 For example, foundation strategies (using nature-related levers articulated with the net-zero transition plan and key financing strategies -climate solutions, aligned/aligning, managed phaseout); implementation strategies (existing or new products and services to support nature-related levers that address emissions reduction or removal); inclusion in the decision-making process (regarding nature-related leverage opportunities, and the identification of synergies and trade-offs); engagement strategies for companies (clients, value chain and connected groups), industries and public sector in relation to nature levers (GFANZ 2024), etc.

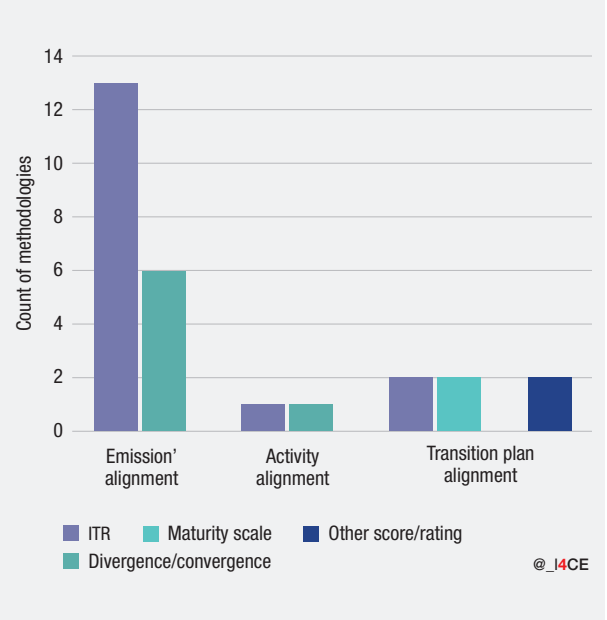
b) **With respect to outcomes, methodologies reflect a wide range of financing strategies and play a role in directing financing; they are also expected to provide key information in terms of alignment assessment** (GFANZ 2022 [2], Institut Louis Bachelier *et al.* 2024 [1]). These outcomes can be linked to the ranking in the alignment maturity scale (*e.g.* SBTI 2023, GFANZ 2022 [2], Institut Louis Bachelier *et al.* 1) (see **Figure 4**):

Few methodologies applicable to corporates at the financial asset or portfolio levels rank financial assets or companies according to their alignment maturity (Institut Louis Bachelier et al 2024 [1]): few include the category of "climate solutions", key for future competitiveness. When considering that an asset or economic player is "aligned", the definitions of the same maturity scale ranking[41] do not appear homogeneous across methodologies, and/or the criteria used for this ranking can be insufficiently transparent such that each category is likely to cover financial assets or economic players at different stages of alignment[42] (see also IIGCC 2022). The industry has launched a consultation to standardise definitions (GFANZ 2023 [2]), as well as an assessment of how methodologies consider the maturity scale (IIGCC 2022). Some methodologies also consider other criteria related to the transition process (management, strategy, CAPEX, etc.) which could also be used for this alignment maturity ranking.

Some methodologies are not designed for this purpose. Those that deliver an aggregate indicator (score, ITR) are not sufficiently granular to reclassify the financial asset or economic player (Institut Louis Bachelier *et al.* [1]).

Most methodologies assess the alignment of a portfolio's projected performance, mainly through targets, against a net-zero scenario. Very few of these methodologies use transition plans to project future trajectories beyond targets (Noels *et al.* 2022, Institut Louis Bachelier *et al.* 2024 [1]).

FIGURE 4. NUMBER OF METHODS PER FOCUS AND TYPES OF RESULTS



Source: : Institut Louis Bachelier et al 2024 [1].

BOX 6. FURTHER CONSIDERING NATURE IN THE ALIGNMENT MATURITY SCALE (GFANZ 2024)

The various categories could be supplemented as follows: i) climate solutions: financing or enabling a nature-related lever (*e.g.* a green roof); ii) aligned-aligning: using nature-related levers within a broader strategy of net-zero alignments (*e.g.* regenerative agriculture); and iii) managed phaseout: considering potential synergies of nature-related levers with other GHG-reducing strategies (*e.g.* eliminating deforestation in value chains).

2.3. Focus - Comparison of methodologies assessing transition plan

2.3.1. Corporates' transition plans

Methodologies applicable to corporates for target-setting and transition plan assessment have been compared in relation to the pillars of the TCFD pillars (foundation, strategy implementation, strategy commitment, metrics and targets, and governance)[43] (TCFD 2021 [1] [2], GFANZ 2022 [1]) (see **Figure 5**): the ACT methodology appears to be the most comprehensive.

Some indicators are not considered by any of the methodologies examined (incorporation of the transition in financial planning, engagement with peer industries). Nature-related indicators also appear to be under-represented (nature-based impact). Progress should also be made in defining what is considered low-carbon and green for each product/service (GFANZ 2022).

41 "Net zero emissions in 2050", "Aligned with a 1.5°C trajectory", "With targets aligned with 1.5°C", "In the process of alignment".
42 For example, the "Aligned" category may require the alignment of targets, past, current and/or future emissions against a net-zero scenario,
43 Since then, the World Benchmarking Alliance (WBA) has published a study on the credibility of a transition plan, in collaboration with public institutions (EU Joint Research Centre and Banque de France), academics and other stakeholders. The objective is to pave the way for future standards, practices and regulations, including nature-related issues (WBA *et al.* 2024).

FIGURE 5. SUMMARY MAP OF THE COMPONENTS OF TRANSITION PLANS FOR COMPANIES IN THE REAL ECONOMY ACCORDING TO THE DIFFERENT INITIATIVES (see Appendix 5 for detailed mapping)

			DISCLOSURE AND DATA COLLECTION			TARGET-SETTING & VALIDATION		ASSESSMENT TOOLS		
THEME	COMPONENT	SUB-COMPONENT	TCFD	ISSB	CDP	SBTI	TPI-CP	ACT	CA 100+	TPI-MQ
Foundations	Objectives and priorities	• Objectives and over-arching strategy	■	■	■	■	■	■	■	■
		• Governing principles[44]			■				■	
Implementation Strategy	Activities and decision-making	• Business planning and operations	■	■	■			■	■	■
		• Financial planning	■	■	■			■	■	■
		• Sensitivity analysis	■	■	■			■	■	
	Policies and conditions	• Transition-related policies			■			■		
		• Nature-based impact			■					
	Products	• Products and services 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[45]	■	■	■	■			■	
		• Business and operational metrics	■	■	■			■	■	
		• Financial metrics	■	■	■			■	■	■
		• Nature-based metrics	■		■					
		• Governance metrics	■	■	■					
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	■	■	■			■		

Source: GFANZ 2022 [1].

2.3.2. Non-financial or financial company's transition plans

A wider panorama of indicators to assess a company's transition plan has been identified in one study, based on 28 methodologies[46], supplemented by experts[47]. The aim of the study was to assess integrity, external consistency (ambition and feasibility), and internal consistency (credibility to achieve the transition) (Bingler *et al.* 2023). Counting the number of times an indicator appears in the sustainability reports by carbon-intensive climate Action 100+ companies shows that companies tend to disclose more information related to target-setting and less about strategy implementation (Bingler *et al.* 2023). Some key indicators appear to be under-represented, including nature-related indicators to address climate change (*e.g.* reducing water consumption and pollution. or halting biodiversity loss by 2030).

44 Just transition and a nature-positive economy.
45 Also known as carbon offsets or VERs.
46 Corporates: ACT, TCFD (corporate), WBA, CPI, GFANZ RETP, New Climate *et al.*, R2Z, TPI, TPT, UN HLEG, WWF, CA100+, CBI CBS4, CDP, IIGCC, OxSFG, PwC *et al.*, SBTI Net Zero, WWF ptp but also NGFS and regulatory considerations (ESRS, IFRS ISSB). Financial institutions: UNEP-FI, GFANZ NSTP, SBTI FINZ, NGFS, NZAO, RI.
47 Supervisors, industries, NGOs, etc.

3. FOCUS - METHODOLOGIES' CHOICES AND ASSUMPTIONS IMPACTING ALIGNMENT RESULTS
(AT THE SINGLE, ECONOMIC PLAYER, OR MULTIPLE FINANCIAL ASSET LEVELS)

3.1. Overview of research papers

Several recent cross-sectional studies have focused on the relevance of methodologies' choices and assumptions that particularly impact alignment results and matter in respect of the carbon budget from a scientific robustness perspective (see **Figure 6**). While there is considerable overlap in the studies' conclusions, they pursue distinct objectives:

- Convergence of "key design choices" on best practice, based on a comparative analysis of some 15 methodologies[48] (PCAF 2022, PAT 2020, PAT 2021, GFANZ 2022 [2]). (**Appendix 6** provides a detailed comparison by GFANZ of the key design choices across methodologies);
- Relevance of these choices in terms of consistency with the Paris Agreement goals, based on some 15 methodologies[49] (Noels *et al.* 2022);
- Scientific robustness of these choices from a consolidated alignment perspective, based on nearly 50 methodologies[50] (Institut Louis Bachelier *et al.* 2024 [1]).

FIGURE 6. DIMENSIONS FOR ANALYSING CLIMATE ALIGNMENT ASSESSMENT METHODOLOGIES

Financial asset class coverage	Selection of climate mitigation scenario(s)	Choice of climate performance metric(s)	Aggregate alignment analysis
Listed equity	Consistency with Paris Agreement goals	Type of climate performance metric	Metric at aggregate levels: financial portfolios, institutions and jurisdictions
Private equity	Scope and granularity (sectoral, geographic, temporal, emissions)	Temporal perspective	Aggregation approach
Corporate debt	Mitigation strategies and assumptions	Types and Scopes of emissions in metric	Double counting
Sovereign bonds	Techniques to allocate scenarios to entities	Treatment of carbon offsets and avoided emissions	
Real estate			
Infrastructure			
Other			

Source OECD 2024.

For the developments below, the incorporation of nature for the net-zero transition should requires further developments along the various dimensions: scope and coverage (*e.g.* nature-related GHG emissions, priority sectors for nature issues, data sources); scenario selection (*e.g.* assumptions and modelling regarding nature); time dimension (longer timeline); and aggregation along nature dimensions (GFANZ 2024, GHG 2024).

48 Blackrock (Aladin Climate), Carbone 4 Ciara, EMMI, ESG Book, ISS ESG, Lombard Odier, Moody's ESG solutions, MSCI, OS-Climate, PACTA/RMI, Right Based on science, S&P Global Sustainable, SBTI, TPI.

49 2DB PACTA, Arabesque S-Ray Temperature Score, TFBE * Beyond Ratings method, Carbone 4 Finance Carbon Impact Analytics (CIA), Carbon Risk Real Estate Monitor (CRREM), CDP-WWF Temperature ratings, EcoAct Clim FIT temperature, I Care &Consult SB2A/SBAM, LO Portfolio Temperature Alignment Tool (LOPTA), Mirova alignment Method, MSCI's Implied Temp Rating, Ninety One Net Zero Sovereign Indic, Ortec Finance Climate Align, right. based on science XDC model, S&P Sustainable1 (ex Trucost) Paris Alignment, TPI (Carbon Performance).

50 - Alignment of financial institutions: ACT Fi (Bank and Investing); Influence Map Climate Change Methodology; TPI Carbon Performance score (banks).
- Target-setting: NZAO; NZBA; PAII NZIF, SBTINZ for FINZ, SBTI updated Draft Near-Term Criteria FINT.
- Portfolio alignment assessment: C4 Fi Ciara Climate Impact Analytics for Real Assets Alignment Assessment, C4 FI CIA Corp, C4 FI CIA Sov; CDP NZ Alignment Dataset; Clarity AI NZ Alignment; ESG Book; Ethi FI science-based temperature trajectory Corp, Ethi Fi science based temperature trajectory Sovereign; Ethos Temperature score; FTSE Russel Implied temperature Rise scores; ICE Climate transition analytics platform; Iceberg DataLab SB2A dataset, Iceberg Datalab SB2A Sov; Impact Cubed ITR; ISS ESG NZAlignment; Moody's Temperature alignment data; MSCI ESG Research; Ortec Fi Climate Align Corp, Ortec Finance Climate alignment Sov, Ortec Finance ClimateAlign Real Estate; Pacta Banks and Investors; Planetrics Pathways temperature score, Planetrics Budget temperature score, Planetrics Sov; S&P Sustainable1 Paris Alignment Assessment; Sustainable Platform.
- Assessment of the "alignment" of a single asset: ACT Corp; Climate Action 100+; CRREM; FTSE Russel Claim-Based Sov Temperature Scores; German Watch & New Climate Institute; Moody's NZ Assessments; NEC Initiative; TPI Carbon performance score; Ascor Project - TPI Initiative Centre LSE.

3.2. Scope and coverage

Methodologies may differ on their coverage of asset class, type of GHG emissions, Scope and data sources (which requires the availability of sufficient and good-quality data) (GFANZ 2022 [2]). (see **Box 7**.)

BOX 7. SCOPE AND COVERAGE

- **Financial assets or economic players**: i) Coverage (the proportion of financial assets covered): target-setting methodologies recommend that business lines[51] and asset classes be considered in a differentiated way in terms of their coverage or recommendations (Institut Louis Bachelier *et al.* 2024 [1]). Alignment assessment methodologies cover asset classes to varying degrees (**Figure 3**), which may lead to significant GHG pools not being captured (Noels *et al.* 2022, Institut Louis Bachelier *et al.* 2024 [1]). Most methodologies cover several sectors, while the correspondence between the economic classification of sectors and geographical area and those retained by the scenarios relies on expert judgement specific to each methodology (Noels *et al.* 2022); and ii) Group boundaries can differ: they can rely on the distinction between operational, financial and ownership control (GHG protocol) (Noels *et al.* 2022) or between direct influence (control) and indirect influence (engagement, pricing or covenants) (SBTI) (Institut Louis Bachelier *et al.* 2024 [1]).
- **GHG types**: nearly all methodologies recommend including all GHGs, with dedicated targets for certain gases in particular sectors[52]; very few methodologies include only CO_2 (Noels *et al.* 2022).
- **Scopes** (see Appendices 7, 8 and 9 for a detailed breakdown per Scope and sector[53]): methodologies mainly include scopes 1 and 2 (Noels *et al.* 2022). Most recommend including Scope 3 where material in relation to total emissions and in absolute terms (PAT 2021, GFANZ 2022 [2], SBTI 2020). Scope 3 represents on average across all sectors considered around 70% of total GHG emissions and is particularly significant for sectors such as cars or real estate (CDO 2022). The coverage should extend along data availability and progress relating to double-counting (GFANZ 2022 [2], Noels *et al.* 2022). The main differences across methodologies relate to Scope 3 (*e.g.* systematic inclusion or for certain sectors only; incorporation for target-setting and/or alignment assessment; estimation depending on materiality varying across sectors) (Institut Louis Bachelier *et al.* 2024 [1]).
- **Data sources** (also PAT 2021, GFANZ 2022 [2]): methodologies recommend using reported and projected data; these latter tend to be based on targets rather than on transition plans and CAPEX (Noels *et al.* 2022, Institut Louis Bachelier *et al.* 2024 [1]). The relative share of estimated data should be made more explicit (Noels *et al.* 2022). Data quality and harmonisation need to be improved (NGFS 2024 [1]).
- **Offsets and avoided emissions**: methodologies should be more explicit regarding how they deal with carbon offsets and avoided emissions, which affects the alignment results (Noels *et al.* 2022). For corporates, avoided emissions[54], which generally refer to the amount of emissions that will be avoided due to financing, are still an area where progress is needed (including, in particular, to address the absence of a common agreed methodology to count the counterfactual business-as-usual scenario, etc.) (GFANZ 2023 [1]).

51 Lending, investment, capital markets, and insurance.
52 For example, methane for agriculture, fossil fuels, mining and waste activities (PAT 2021).
53 The importance of Scope 3 depends on the sector and the company's position in the value chain.
54 Expected emission reduction metrics or potential emissions reduction for climate solutions, aligned, aligning, and managed phaseout.

3.3. Building single or multiple financial asset or economic player benchmarks for target-setting and alignment assessment

Benchmarks at the micro level of a company are derived from pathway(s)/scenario(s). A single or multiple benchmark(s) determine the target for a financial asset / economic player. Building benchmarks for target-setting and alignment assessment relies on the following.

3.3.1. Selecting climate change mitigation scenarios that allocate the carbon budget at the sectoral and/or geographical level (carried out at the level of the scenarios)

The choice of a pathway[55] **and associated scenario(s)** reflects the choice of a decarbonisation burden for a sector, which needs to be shared by the users and impacts alignment results (Noels *et al.* 2022). Methodologies recommend selecting one or more scenarios at the sector (to a slighter extent geographic) level with a set of characteristics (below 1.5°, well below 2° temperature rise, probability levels, etc.). For a given sector, sectoral pathways differ across scenarios, but there tends to be little discussion as to whether it is preferable to have one or more scenarios; where no specific-pathway is available, methodologies use sector-agnostic pathways (Institut Louis Bachelier *et al.* 2024). (see **Box 8**).

BOX 8. METHODOLOGIES AND SCENARIO SELECTION (Institut Louis Bachelier et al. 2024 [1])

- **Target-setting methodologies** often rely on a unique benchmark from a single sector-specific pathway to derive targets, or multiple benchmarks from different pathways corresponding to a single temperature outcome to determine a range for the target.
- **Alignment assessment methodologies** rely on a unique benchmark corresponding to the temperature outcome or multiple benchmarks (where possible from a unique scenario) corresponding to different temperature outcomes. Most methodologies rely on scenarios developed by the same provider (mainly IEA ETP NZE 2050, IPCC RCPs and NGFS) without systematically referring to the probability of limiting the temperature rise below 1.5°C (Noels *et al.* 2022). The sectoral and geographic granularity of benchmarks can vary across asset classes. Corporate alignment assessment relies on sector-specific pathways, and on sector-agnostic pathways where sectors are not specifically covered by the scenario providers (*e.g.* agri-food, textiles, etc.). Few methodologies use geographical scenarios as well[56] (also Noels *et al.* 2022). Whether a global or national scenario is chosen impacts the alignment results (also Noels *et al.* 2022). A small number of methodologies use pathways at the sub-sector or technology level (TPI or PACTA, for example).

3.3.2. Disaggregating the carbon budget and deriving micro-level benchmarks at the single (or economic player) or multiple financial asset levels (carried out at the methodology level)

Benchmarks to set targets can be derived from a single or, more rarely, several pathways (then based on a warming function)[57] (Institut Louis Bachelier *et al.* 2024 [1]). Where a single pathway is used, methodologies disaggregate the carbon budget at the financial asset, economic player or portfolio levels through various allocation approaches. These require value judgements to be made about the absolute or relative share and speed of emissions reductions assigned to an entity over time (see **Box 9**) (Noels *et al.* 2022, Institut Louis Bachelier *et al.* 2024 [1]).

Target-setting methodologies are not prescriptive about which approach to adopt. Alignment assessment methodologies rely on different allocation approaches: the most common combination relies on the convergence approach for homogeneous sectors (*i.e.* the convergence of the carbon intensity of a company on that of the sector), which requires greater effort from higher-emitting financial assets or economic players, and the absolute/economic intensity; the contraction approach (a fixed rate of reduction applied to emissions) is used for other sectors (Noels *et al.* 2022, Institut Louis Bachelier 2024).

The lack of a commonly accepted and scientifically validated approach to disaggregate the global temperature target and scale the carbon budget at the entity level is a major source of uncertainty. Different choices result in different climate performance assessment (Noels *et al.* 2022).

55 A pathway is a normative scenario where the temperature outcome is defined (no more than a 1.5°C under a given likelihood increase by 2050). Various scenarios can achieve this outcome.
56 These global scenarios are better suited to large companies than to smaller companies with national coverage.
57 A linear regression models used to project the impact of GHG emissions reduction rates on global warming by the end of the century.

BOX 9. MAIN ALLOCATION APPROACHES USED BY THE METHODOLOGIES TO DISAGGREGATE THE CARBON BUDGET

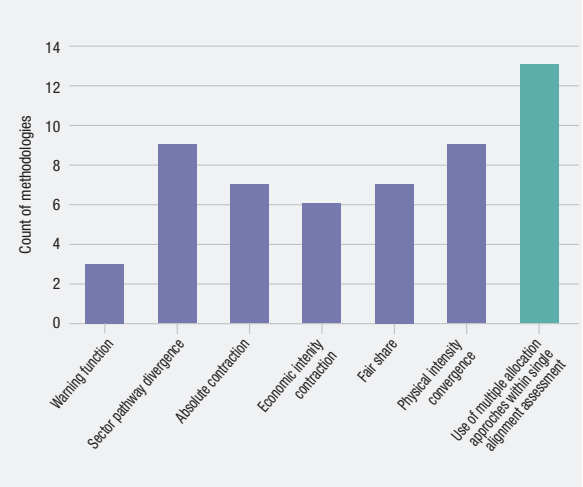
Disaggregating GHG emissions at the company level relies on a distribution key (the production level or forecast growth) and the following approaches (SBTI 2015, SBTI 2019).

1. **The sectoral convergence or decarbonisation approach** (convergence in physical intensity): the company's carbon intensity must converge on that of the sector, but the speed of convergence takes account of the company's performance (a company with high GHG emissions will need to make greater effort). The sectoral decarbonisation approach applies to homogeneous sectors (*e.g.* emissions-intensive industrial sectors).
2. **The contraction approach**: this assumes that all entities decarbonise at the same speed as the sectoral scenario regardless of their past efforts and current climate performance. A fixed rate is applied to absolute emissions (*e.g.* a 10% reduction in absolute emissions between two dates) or a carbon intensity per unit of production or monetary value (*e.g.* a 10% reduction in the ratio of tCO_2/unit of production or value between two dates). This approach is applied to heterogeneous sectors.
3. **The fair share approach** combines the above two approaches, by allocating a carbon budget to each company based on several criteria (current and projected share of economic contribution, historical contribution, or economic efficiency). This method takes into account the company's market share (market share evolution) and historical responsibility (starting level).

Targets can be expressed in various units: absolute (*e.g.* $tCOO_2$), physical intensity (per unit of production, *e.g.* $tCOO_2$/kWh) or economic intensity (per monetary unit, *e.g.* $tCOO_2$/income or added value) (intensities can be converted into absolute values). The industry makes recommendations between these different categories of metrics, depending on the allocation approach and the business sector (PAT 2021; GFANZ 2022 [2]).

Absolute approaches, applicable to all asset classes, relate to the remaining carbon budget but can mask insufficient performance improvement[58]. Intensity-based approaches offer better comparability but can mask absolute emissions growth. Approaches based on intensity per monetary unit are simple and enable heterogeneous sectors to be compared, but are subject to the volatility of economic quantities (PAT 2021). The choice of absolute value or intensity metrics can lead to different results in terms of alignment (Noels *et al.* 2022).

FIGURE 7. BREAKDOWN OF METHODOLOGIES BY CARBON BUDGET ALLOCATION APPROACH



Source: Institut Louis Bachelier et al 2024 [1].

3.3.3. Time dimension

Cumulative emissions: both target-setting and alignment methodologies use either a given date (which is likely to overestimate alignment) or a cumulative approach over a period (which is recommended as it relates more closely to GHG accumulation in the atmosphere and global warming) (GFANZ 2022 [2], Noels *et al.* 2022). However, little discussion of this is found in the methodologies (Institut Louis Bachelier *et al.* 2024 [1]).

Short timeframe: methodologies generally emphasise the need to set short-term targets to reach the Paris Agreement goals and that they need to be re-set every five years, which allows scenario updates to be incorporated (Institut Louis Bachelier *et al.* 2024 [1]). Most methodologies applying to corporates use a mix of short-, medium- and long-term targets, although some use only short-term targets and others only long-term targets. For several methodologies, the choice of short- or long-term targets is unclear. (Noels *et al.* 2022).

58 For a growing or declining company.

3.4. Portfolio aggregation for setting targets and assessing alignment

3.4.1. Selecting the level of aggregation: portfolio (including a business sector) up to the level of financial institutions (Institut Louis Bachelier, 2024 [1])

A higher level of aggregation covers a wide scope but can also give rise to shifting financial flows between activities to meet the objectives. Possible levels of aggregation are: i) business lines (investment, lending, etc.); ii) activity covering several asset classes within a business line (*e.g.* listed equities, etc.); iii) a portfolio (an asset class and cross-sectors); and iv) a portfolio (a sector). (see **Box 10**).

BOX 10. LEVEL OF AGGREGATION (Institut Louis Bachelier *ET AL.* 2024 [1])

Some target-setting methodologies, such as SBTI for financial institutions, question the appropriate level at which to define targets. SBTI recommends global targets that cover all asset classes within a single business line, and in parallel, short-term targets at the level of climate-impacting activities or asset classes, to avoid potential trade-offs. Some methodologies recommend aggregating targets across all the asset classes. Several methodologies recommend setting targets at the sector level. None of the methodologies details the aggregation methods to be used.

All alignment methodologies recommend using the asset class level; very few alignment assessment methodologies aggregate asset classes beyond listed corporate bonds and equities.

3.4.2. Aggregating data for target-setting and alignment assessment

Methodologies are not prescriptive regarding aggregation methods (see Box 11). The financial industry recommends transparency (PAT 2021, Institut Louis Bachelier *et al.* 2024 [1]). Aggregation within each asset class requires methodological work, as different options may lead to diverging result. The inclusion of Scope 3 can lead to double-counting where value chains overlap (Noels *et al.* 2022). Aggregation across asset class or at the financial institution level relying on different methodologies and assumptions would add further complexity and mask activities that may be misaligned (Noels *et al.* 2022) (*e.g.* the relative weight of sovereign emissions exceeds those of corporates). Aggregated results give no indication of portfolio dispersion, nor of decomposition by sector or region[59] (GFANZ 2022 [2]). Further work would be required to ensure that the carbon budget is respected at the global level at a conceptual and scientific level (Institut Louis Bachelier 2024 [1]).

The choice of weighting (CDP WWF 2020) should: ensure consistency with the remaining carbon budget; reflect the importance of the asset class in terms of transition; and induce the right incentives at the financial sector level (PAT 2021, GFANZ 2022 [2], Institut Louis Bachelier *et al.* 2024 [1]).

BOX 11. AGGREGATION APPROACHES (INSTITUT LOUIS BACHELIER *ET AL.* 2024, GFANZ 2022 [2])

Possible aggregation approaches

- **Portfolio emissions target**: financial asset-level emissions data are aggregated at the portfolio level, and the target is obtained by aggregating individual benchmarks or by directly using a sectoral and/or geographic scenario.
- **Portfolio alignment (target-setting and alignment assessment)** is based on aggregating (also PAT 2021): option 1° the financial asset-level alignment results at the portfolio level (ITR, divergence, etc.) by assigning them a weighting; or option 2° financial asset-level climate performance data (*e.g.* GHG emissions) and assessing alignment at the portfolio level (which is scientifically more robust but depends on the availability of emissions data).
- **Weighting options**: weighting emissions can be based on financed emissions (the responsibility approach). Weightings are applied to alignment metrics based on the proportion of total portfolio-owned emissions represented by the company's emissions (the portfolio-owned approach), or according to the holding weights in the portfolio, which gives insight into the impact of capital allocation decisions (GFANZ 2022 [2]).

Methodologies approaches

- **For target-setting**, most portfolio emissions target methodologies aggregate financial asset-level emissions data following the responsibility approach (weighting according to the share of emissions financed or ownership). Portfolio alignment target methodologies recommend assessing alignment at the financial asset level before weighting and aggregating results (option 1° above). SBTI recommends a weighting based on total emissions (irrespective of exposure) to encourage financial institutions to focus on emissions-intensive financial assets, and where appropriate, a weighting based on financed emissions (also SBTI).
- **For alignment assessment**, most methodologies assess alignment at the financial asset level, and then weight these assessments at the portfolio level (option 1 above).

59 A portfolio may include a small proportion of a emissions-intensive financial asset / economic player, which could be imperfectly analysed, depending on the aggregation approach chosen (GFANZ 2022 [2]).

3.5. Impacts of key choices and assumptions in terms of alignment

The various methodologies offer complementary visions of climate alignment assessments. However, their differences (alignment definitions, input data, conceptual choices, output data, selected indicators, weightings) explain the different results in terms of degree of alignment for the same financial asset or economic player (Noels *et al.* 2022) (for example, for eight companies in emitting sectors in seven macro-regions across six suppliers – see **Appendix 10**). Other studies focus on the sensitivity of choices and assumptions for a specific approach, (see **Box 12** for the sensitivity of choices for the ITR approach).

Conceptually, whatever their specific focus, which widens the analysis, all methodologies should present aligned results in terms of the alignment performance for the same financial asset or economic player (all other things being equal and subject to the correct weighting of criteria) (Institut Louis Bachelier *et al.* 2024 [1]).

BOX 12. KEY DESIGN CHOICE SENSITIVITY FOR THE IMPLIED TEMPERATURE RISE (ITR) APPROACH
(Institut Louis Bachelier 2024 [2])

The sensitivity of 13 portfolio alignment methodologies using the ITR method has been tested against 15 key design choices. These choices cover the three methodological steps: i.) the construction of a pathway; ii.) the projection of companies' expected GHG emissions; and iii.) the measurement of the implied temperature from the overshoot (projected emissions / reference emissions). If carbon intensity is high relative to the sector, the contraction approach is the least restrictive in terms of carbon budget, followed by the convergence approach and then the fair share approach.

Continuing the analysis based on 3 steel companies, the overshoot analysis appears more robust than the ITR, given the uncertainties surrounding the transient climate response to CO_2 accumulation[60] and the horizon considered[61]. Finally, the parameters used to normalise (production, revenues or gross margin), to project carbon intensities (constant, past or based on the company's targets), and the horizon selected (2030 or 2050) have the most significant impact on the measurement of overshoot.

60 The relationship between cumulative anthropogenic CO_2 emissions and temperature warming is almost linear: every 1,000 $GtCO_2$ of cumulative CO_2 emissions leads to an increase in global average surface temperature of around 0.45°C. This quantity is the climatic response to emissions (IPCC 2021).
61 Assuming different calculation methods for the short term (using TCRE) and medium term (interpolation).

4. FOCUS - CONSIDERATIONS FOR FURTHER WORK AT THE SECTOR LEVEL (WHILE TAKING FURTHER ACCOUNT OF NATURE)

Business sectoral coverage varies across methodologies (see **Figure 8**). The sectoral dimension is key to ensure the transformation of the economy, at the company level (in relation to the sectoral objectives), at the financial institution level (to reach its sectoral targets); and at the state level (to reach the national and European goals). Rapid and deep GHG emissions reductions across all sectors are needed to limit global warming to 1.5°C (IPCC 2023 [1]).

FIGURE 8. SECTOR COVERAGE BY A SET OF METHODOLOGIES

Methodology	Sectors covered by methodology	Sectors under development	Aspects
SBTI	Aluminium, Air transport, Buildings, Cement, Financial institutions, Forest land and agriculture (FLA), Information and communication technology (ICT), Land transport, Maritime, Steel	Oil & gas, Power, Chemicals, Apparel & footwear	Mitigation Adaptation (cross-sector) [62]
ACT	Auto manufacturers, Electric utilities, Retail, Cement, Transport, Oil & Gas, Construction, Real estate, Property developers, Iron & Steel, Aluminium, Pulp & Paper, Glass, Chemicals, Finance- Investors, Finance-Banks, Fashion, Agriculture and Agrifood		
TPI	Airlines, Aluminium, Autos, Basic materials, Cement, Chemicals, Coal mining, Consumer goods, Consumer services, Diversified mining, Electricity utilities, Financials, Food producers, Health care, Industrials, Oil & Gas, Paper, Shipping, Steel, Technology, Telecommunications, Utilities		Mitigation

Source: I4CE from SBTI, ACT, and TPI website.

Methodologies incentivise sectoral transformation: sectoral transformation is incorporated in methodologies at two levels: i) the selection of a sectoral climate change mitigation pathway reflecting the choice of a decarbonisation burden for a sector which needs to be shared by the users; ii) the choices made by the methodologies for a sector for target-setting and alignment/transition plan assessment (through indicators and weightings).

Studies have questioned the differences between and consistencies in approaches to sectoral transformations across climate change mitigation scenarios and methodologies for emitting sectors [63] based on cross-sectional literature reviews, and interviews with industry and professional associations. **The objective was to identify the most consistent avenues for sectoral transformation, pinpoint the most relevant related indicators to incentivise sector transformation and make methodologies more efficient** (Oxford Sustainable Finance Group 2023). In this respect, other studies could also be considered as they provide an overview of decarbonisation levers, metrics and targets for 30 sectors, with indicators broken down by sector (TPT 2024).

Methodologies should consider nature-related issues in the net-zero transition at sector level by:

1. **Identifying priorities** for nature (*i.e.* the risks of crossing planetary boundaries and tipping points) and priority sectors for nature (*e.g.* for sectors: the green economy related to AFOLU and the blue economy relating to the ocean, which represents a significant part of GHG absorption) and the most relevant indicator to preserve resource consumption.
2. **Further incorporating circular models at the crossroads of climate, nature, competitiveness and further strategic autonomy**. Methodologies should further incentivise the circular economy (across scenario selection, indicators, and weightings). Half of GHGs come from the extraction and transformation of resources (Internation Resource Panel 2020, WRI *et al.* 2022, EEA 2023), with significant GHG emissions reduction potential for six sectors and value chains (construction, transport, food, plastics, textiles and electronics) (EC 2020, McKinsey 2022, WRI *et al.* 2022, CISL 2024 [2], WEF 2024). Among the various circular models [64] (*e.g.* Geissdoerfer *et al.* 2020), circularity of the service and reuse, coupled with

62 ACT develops a Biodiversity methodology.
63 Aviation, steel, oil & gas and electricity.
64 Circularity scale (Potting *et al.* 2017):
i.) Intelligent use and production: making a product redundant by abandoning its functions and offering a radically different product; making use more intensive; increasing efficiency by using fewer resources and materials.
ii.) Extending the life of the product and its components: reuse, repair and restore the product; put parts of the product back into production; reuse the product or its components for other purposes.
iii.) Useful use of materials: recycling or incinerating materials, and reusing energy.

eco-design, deserves greater attention (Stahel WR, 2010, IEA 2023 [2] et [3]). Circularity of the service substitutes volume-based revenues with recurring revenues for services where the seller retains ownership of the product throughout its lifecycle and offers use with a long-term contract (Stahel WR 2010). Some studies have already provided a roadmap of relevant indicators towards a progressive approach to target-setting (UNEP FI 2023, WBCSD 2023 [1]).

Circularity and relocating supply chains are levers for economic value and resilience (Wei 2018). **The relative share of recycled materials worldwide has fallen, from 9.1% in 2018 to 7.2% in 2023, a drop of 21% in 5 years** (Circle Economy Foundation 2024), although **half of all GHG emissions come from the extraction and transformation of resources** (International Resource Panel 2020). (see **Box 13**).

BOX 13. EXAMPLES OF CIRCULAR MODELS FOR HIGH-EMITTING SECTORS

Construction sector (Bonnifet 2022): this sector is a major contributor to GDP and employment on a European scale. It is responsible for around 40% of GHG emissions in Europe, uses over 50% of the raw materials extracted from the earth, and produces the most waste of any sector. Circular models rely on eco-design coupled with material reuse and intelligent tracing (i.e. applied deconstruction enabling remanufacturing of materials), convertibility and reversibility of building use (offices vs. housing), increased daily-use rates, and valuing physical flows (rainwater recovery, renewable energy, and exchanges with other buildings) (Bonnifet, 2022, see also Debaker W *et al.* 2016).

Electricity sector (CISL 2020): the adoption of LED bulbs and circular LED lighting rental service, in place of established incandescent lamps, has represented a disruptive innovation at a sector-wide scale that relied on engagement with both peers and the public sector. This strategic shift led to environmental benefits, cost reduction, and regulatory changes.

Furthermore, bridging gaps considering sectoral transformation incentivised by methodologies should require:

1. **Ensuring convergence of aggregated individual results at the sector level with national and European sectoral transition plans, and the wider competitiveness and innovation objectives** (at least conceptually, considering companies' cross-border activities).
2. **Ensuring a credible path resulting from aggregation of individual alignments** (*e.g.* consistent aggregation of individual use of green hydrogen with effective production) (Oxford Sustainable Finance Group 2023) and within the planetary boundaries.

APPENDIX 1. OPTIONS AVAILABLE TO REDUCE NET EMISSIONS BY 2030 AND RELATIVE COSTS

Many options available now in all sectors are estimated to offer substantial potential to reduce net emissions by 2030. Relative potentials and costs will vary across countries and in the longer term compared to 2030.

Source: IPCC 2023 [1].

APPENDIX 2. A DETAILED CARTOGRAPHY OF ALIGNMENT METHODOLOGIES

(the cartography is developed part of the ILB review and does not reflect the view of the mentioned methodology developers)

Alignment methodology type	Alignment methodology sub-type	Examples (non-exhaustive)
FI-level transition plan alignment[65] Assess a financial institution's progress along its alignment journey, its global approach to net zero and the quality of its transition plan as a whole, including the presence and adequacy of net zero targets and the strategic and organisational means put in place to achieve them.	**Qualitative evaluation of FI alignment approach:** rate how transparent complete and adequate financial institutions' transition plans and broader disclosures are, across a number of required dimensions, such as governance, targets, strategy, actions taken.	• Observatoire de la Finance Durable Net Zero Analysis (OFD). • CDP assessments of Climate Transition Plans (CDP, 2023). • WWF Red Flag indicators' framework (WWF, 2023). • Climate Policy Initiative Net Zero Finance Tracker (CPI). • TPI Banking Tool Management Quality module (TPI). • Reclaim Finance Red Flag indicators (Reclaim Finance, 2024).
	Qualitative evaluation of FI alignment approach that includes (a) quantitative portfolio alignment assessment(s) (current, projected and/or targeted): in addition to the above, includes an evaluation of financial institutions' alignment of targets' and/or portfolio climate performance with trajectories commensurate with the net zero objective, beyond what is being disclosed.	• **CDP NZAD dataset** (including CDP assessments of Climate Transition Plans) (CDP, CDP, 2023). • **ACT Finance** (ACT). • **FinanceMap (by InfluenceMap)** (InfluenceMap, 2022). • **TPI Banking Tool Carbon performance** (quantitative) and Management Quality (qualitative) module (TPI). ACT Finance is the only approach that results in an aggregated assessment at FI-level taking into account both qualitative and quantitative considerations in an overarching rating scheme.
Portfolio target-setting methodologies[66] Used by financial institutions to set their targets and/or third-parties to derive normative alignment benchmarks to assess financial institutions' targets.	**Portfolio emissions target-setting** focuses primarily on the emissions associated with financial flows. They can focus on emissions reduction or carbon removals, be based on a range of metrics (absolute, intensity), apply at different level of aggregation (sector, asset class, activity, portfolio) and leverage different financial asset-to-aggregated level aggregation methodologies (ownership-based, weighted averages).	• **PAII NZIF, NZAOA, NZBA** emissions reduction targets (portfolio-wide, sub-portfolio-wide and/or sector-level) (PAII 2021/2024); NZAOA, 2024; NZBA, 2024). • **SBTi FINZ** long term emissions reduction, maintenance, and portfolio neutralisation targets (SBTi). • Emissions targets as detailed/recommended in GFANZ and other alignment frameworks such as the HLEG (GFANZ, 2022; HLEG, 2022).
	Portfolio alignment target-setting[67] relates to increasing the share of financial flows towards financial assets that share a common set of characteristics, usually denoting the alignment status of the financial asset. *These are built on portfolio- and/or financial asset-level alignment assessments (see below).*	• PAII asset-level targets based on the **NZIF** or other maturity scale approach (PAII, 2021/2024). • **SBTi FINZ** alignment-based targets (SBTi). • **SBTi portfolio** coverage and temperature targets (SBTi). • Targets and metrics on GZANZ aligned, aligning and managed phase-out transition strategies to support real-economy transition (GFANZ, 2022).
	Financing target-setting[68] focuses on the activities directly financed through project finance and other asset classes with known use of proceeds, *i.e.* the individual projects of business activities, or indirectly financed through general purpose investments. Financing targets usually focus on ceasing or decreasing fossil fuel finance, and increasing financial flows to climate solutions.	• Climate solutions & fossil fuel exposure targets that are mentioned/recommended/mentioned in **NZAOA**, **NZBA**, **PAII NZIF** and **SBTi FI** (NZAOA, 2024; NZBA, 2024; PAII, 2021/2024; SBTi). • Targets and metrics on GFANZ climate solutions (GFANZ, 2022). • Financing-based targets, notably on climate solutions and fossil fuels, are also mentioned in multiple alignment frameworks.

65 These methodologies are called FI Transition Plan Alignment assessments as usually presented in the literature but refer to Fi's approach to net zero as a whole, rather than their specific transition plans.
66 Focus on climate performance targets – other types of targets, such as engagement, lobbying or product introduction targets are excluded from the detailed review.
67 Also called portfolio allocation or portfolio composition targets.
68 Can be seen as a sub-type of portfolio alignment targets.

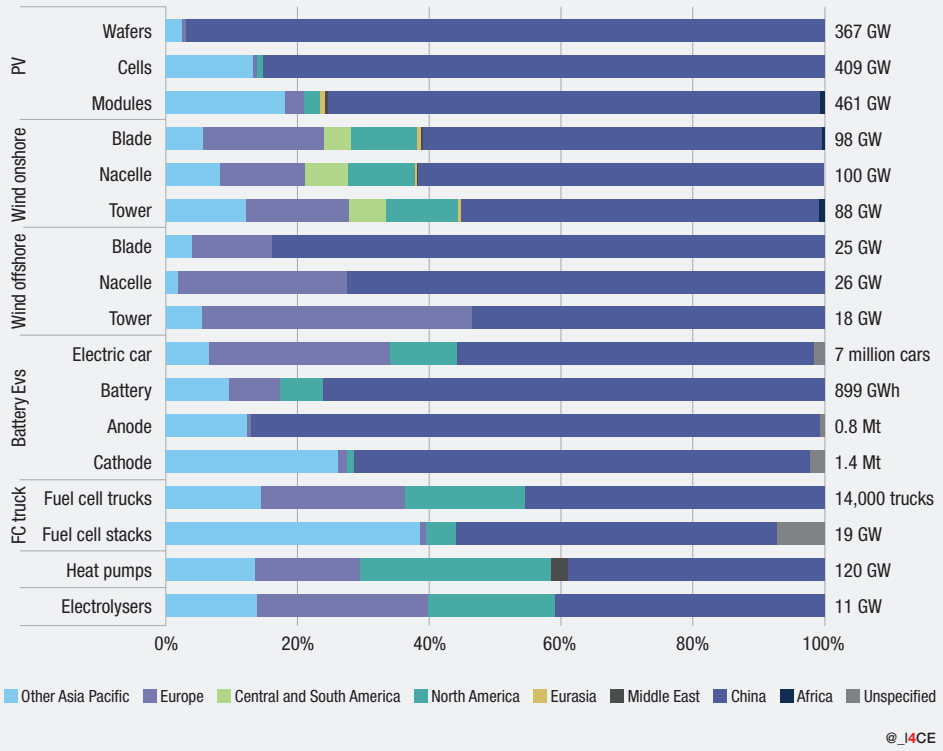
APPENDIX 2 (following)

Portfolio alignment assessment methods Build on financial asset- level data and comprise an asset to portfolio aggregation method. **Results feed into target-setting, monitoring or decision-making.**	**Emissions-alignment methodologies** focus on past, current and/or projected emissions alignment.	**Portfolio & financial asset-level** • **Corporate**: CDP-WWF NZAD/Temperature Rating, Ethos Temperature Score, FTSE Russell Implied Temperature Rise Score (Corporates), ICE Climate Transition Analytics (formerly Urgentem Element6 Platform), Iceberg Datalab SB2A - Corporates, Impact Cubed Temperature score, Moody's Temperature Alignment Data, MSCI Corporate ITR (new release, 2024), Ortec Finance ClimateALIGN Corporates, Planetrics Pathways temperature score, Planetrics Budget temperature score, S&P Global Trucost Paris Alignment Assessment. • **Sovereign**: Iceberg Datalab SB2A - Sovereigns, Ortec Finance ClimateALIGN Sovereigns, Planetrics Sovereign. • **Infrastructure**: C4F CIARA. • **Real estate**: Ortec Finance ClimateALIGN Real estate. **Financial asset-level only** • **Corporate**: CDP NZAD/SDA supplement, CDP NZAD/Trend score[69], TPI Carbon performance score (corporates)[70]. • **Sovereign**: FTSE Russell Sovereign CLAIM-based Temperature scores (Net zero target, NDC and current scenario). • **Real estate:** Carbon Risk Real Estate Monitor[71].
	Activity-alignment methodologies focus on past, current and/or projected activity alignment, using for example such as green brown or taxonomic shares, captured through revenue, production, or other metrics. This is the equivalent of GFANZ transition-based metrics. Technology-alignment is a special form of activity-alignment.	**Portfolio & financial asset-level** • **Corporate**: PACTA (RMI) for Banks and Investors, Sustainable Platform Funds Alignment with Climate scenarios. **Financial asset-level only** • **Corporate**: Carbon Risk Real Estate Monitor energy intensity alignment, NEC Score. • **Sovereign**: NEC Score.
	Transition-plan alignment methodologies[72] focus on the quality of a financial asset's transition plan and global approach to net zero. These methodologies usually rely on a range of criteria, at least one of which is often assessed using emissions-alignment *(e.g.* assessing decarbonization target's alignment) or activity-alignment methodologies[73] *(e.g.* assessing CAPEX alignment).	**Portfolio & financial asset-level** • **Corporate**: C4F CIA (corporates), Clarity AI Net Zero Alignment. • **Sovereign**: C4F CIA (sovereigns). **Financial asset-level only** • **Corporate**: ACT sector methodologies, CA100+ Benchmark, Moody's Net Zero Assessments. • **Sovereign**: ASCOR, Germanwatch & NewClimate Institute Climate Change Performance Index. ISS ESG Net Zero Alignment Status can be seen as a transition-plan alignment methodology but does not integrate (yet) an alignment assessment component. Ethos Temperature Score and MSCI Corporate ITR (new release, 2024) integrate transition plan elements into emissions' projections.

Source: Institut Louis Bachelier.

69 When used together with the CDP-WWF NZAD/Temperature Rating, can be seen as a transition-plan alignment assessment methodology.
70 When used together with the TPI Management Quality score, can be seen as a transition-plan alignment assessment methodology.
71 The CRREM tool includes both an emissions-based and "activity-based" (energy intensity) component.
72 These methodologies are called Transition Plan Alignment assessments as usually presented in the literature but refer to entities' approach to net zero as a whole, rather than their specific transition plans.
73 All transition plan alignment methodologies do not include emissions- or activity-alignment sub-criteria. By definition, the review includes only those who do.

APPENDIX 3. REGIONAL SHARES OF MANUFACTURING CAPACITY FOR SELECTED MASS-MANUFACTURED CLEAN ENERGY TEHCNOLOGIES COMPONENTS, 2021



Around 90% of mass-manufacturing capacity for several key clean energy technologies is concentrated in China and the Asia Pacific region.

Notes: FC = fuel cell. Heat pumps capacity refers to thermal output.

Sources: IEA analysis based on InfoLink (2022); BNEF (2022); BNEF (2021b); Benchmark Mineral Intelligence (2022); GRV (2022); UN (2022a); Wood Mackenzie (2022).

APPENDIX 4. SUMMARY OF NET ZERO TRANSITION PLAN VOLUNTARY RECOMMENDATIONS AND PROPOSED NATURE-RELATED GUIDANCE

Foundations

Objectives and priorities

Define the organization's objectives to reach net zero including targets, financing strategies, and real-economy impacts.

Use of nature-related levers, where relevant to the individual financial institution, should be articulated in an institution's NZTP objectives and priorities, its corporate statement, and embedded in its application of the four key transition financing strategies.

Implementation Strategy

Products and services

Support clients' and portfolio companies' transition with existing and new products and services.

Existing and new products and services should be assessed as to whether and how they can support nature-related levers through the key aspects of product design.

Activities and decision-making

Enable net-zero objectives with evaluation and decision-making tools and processes.

Financial institutions should consider adjusting analysis and decision-making processes to account for the distinct characteristics of nature-related levers. This may be helped by a portfolio review for nature-related lever opportunities. The processes should include identification of synergies and trade-offs, and consider and document mitigation strategies.

Engagement Strategy

Clients and portfolio companies

Provide feedback and support to clients and portfolio companies to encourage transition strategies.

Engagement should be augmented to include two-way flow of information, advising and supporting clients, portfolio companies, the value chain and connected groups about nature-related levers, contribution to transition plans, and synergies and trade-offs.

Industry

Engage with peers to exchange expertise on common challenges and represent the financial sector's views.

Engagement with relevant groups may include industry peers, industry-related bodies, academia, non-governmental organizations, and local groups and may be on an individual, landscape, or jurisdictional basis in order to collaborate, gather, or develop pertinent data, tools, or methodologies.

Governance

Roles, responsibilities, and remuneration

Define roles and responsibilities for strategic body, senior management, and throughout the institution with remuneration incentives.

Roles and responsibilities for nature-related levers should be clearly defined. Structuring includes considering interim milestones to support biological timelines, and how to support identification of synergies and trade-offs.

Skills and culture

Provide training and development and a change management program to support staf executing the NZTP.

Financial institution teams should have access to ongoing, relevant, nature-related training and experts, including interdisciplinary knowledge, that should be reviewed regularly and as key developments occur.

Metrics and Targets

Metrics and targets

Use a suite of metrics and targets including on aligning financing for real-economy transition, NZTP execution, and GHG emissions.

Financial institutions should consider measuring and monitoring complementary nature-related metrics and targets alongside climate ones. This includes monitoring where nature-related credits are used. A number of tools and methodologies are noted.

Policies and conditions

Establish policies and conditions for priority and/or high-emitting, harmful to the climate sectors and activities.

Financial institutions should consider setting their own policies, using the six elements of a net-zero policy, where there are opportunities to implement nature-related levers.

Government and public sector

Lobbying and public sector engagement to support an orderly* transition net zero.

Engagement should consider regional and local governments, including governing structures of IP&LC, and proactively include nature-related topics in support of net-zero commitments.

Text in grey is a summary of the voluntary recommendations in the 2022 GFANZ Net-zero Transition Plans (NZTP) report.

Please refer to the report for exact wording.

*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). This explanation applies to all mentions of the term "orderly transition" in this document.

Source: GFANZ 2024,

APPENDIX 5. MAPPING OF DISCLOSURES RELEVANT FOR FINANCIAL INSTITUTIONS ACROSS METHODOLOGIES

THEME	COMPONENT	SUB-COMPONENT	RELEVANT DISCLOSURES FOR FINANCIAL INSTITUTIONS	TCP	ISSB	CDP	SBTi	TPI-CP	ACT	CA100+	TPI-MQ
Foundations	**Objectives and priorities**	Objectives and overarching strategy	Disclose the company's climate objectives, including interim goals, that form the basis for the transition plan (*i.e.*, short-, medium-, and long-term ambition, commitments, and strategy to achieve the objectives). This includes how the company will decarbonize over time, changes to business models and activities, and what role the company will play, if any, in supporting the economy-wide transition.	■		■			■	■	■
			Disclose the rational for the selected level of ambition (*e.g.* net-zero 2050 and 1.5 degrees C warming).	■		■	■	■		■	■
			Articulate how the transition strategy will be embedded within the company's overall business strategy.	■	■	■			■	■	■
		Governing principles[74]	Disclose the company's objective to ensure a just transition and a nature-positive economy and how these principles are embedded throughout each component of the transition plan, if applicable.			■				■	
Implementation Strategy	**Activities and decision-making**	Business planning and operations	Disclose how the company is integrating emissions reduction actions in business planning and operations: • The roadmap of actions the company intends to take, or is taking, to implement its transition plan strategy and to achieve its GHG reduction targets (including actions affecting products/services, suppliers, and/ or internal operations and production); describe short-, medium-, and long-term actions. • The impact of each business and operational action toward achieving the company's GHG emissions targets (including impact to guiding principles of just transition and nature-positive economy).	■	■	■			■	■	■
			Quantify the impact of each business and operational action toward achieving the company's GHG emissions targets (including impact to guiding principles of just transition and nature-based solutions).	■		■				■	
			Disclose plans in place and timelines to phase out GHG- or energy-intensive assets; justify if the company has any GHG- or energy-intensive assets not subject to a managed phaseout plan. Companies can refer to the GFANZ Workstream on Managed Phaseout of High-emitting Assets for additional guidance as well as Appendix D for suggested disclosures across transition plans.[75]		■	■			■		
		Financial planning	Disclose how the company is integrating emissions reduction actions in financial planning: • The company's financial plans, budgets, and related financial targets that support the company's transition plan objectives and the actions identified in the business planning and operations component (*e.g.* plan for low-carbon R&D, plan for low-carbon CapEx, plan for energy spent, plan for decommissioning of high-carbon assets). • The financial impact of the transition plan and planned business actions and how they are able to be resourced.	■	■	■			■	■	■
			Disclose how the company's financial plans that support the transition are reflected in the company's financial statements and audit reports.		■	■					
			Disclose details regarding the use of internal carbon price(s) (*e.g.* activities or CapEx covered by the carbon price, levels of pricing).	■	■	■				■	
	Activities and decision-making	Sensitivity analysis	Describe the key assumptions underlying the company's transition-related business, financial, and operational plans (*e.g.* reliance on technologies the company is currently not deploying at scale; reliance on actions of its value chain; reliance on specific regulatory policies).	■	■				■	■	
			Disclose how these assumptions are reflected in the company's financial statements and audit reports.							■	
			Articulate the impact on the transition plan if certain assumptions prove incorrect (*e.g.* low, medium, high impact to achieving net zero).			■					

(following)

74 Just transition and a nature-positive economy.
75 GFANZ. The Managed Phaseout of High-emitting Assets, June 2022.

APPENDIX 5 (following)

Implementation Strategy	**Policies and conditions**	Transition-related policies	Disclose policies (or describe the policies in place) that are used to guide business, financial, and operational planning, and actions (*e.g.* climate-related requirements for suppliers; restrictions or requirements on location or technology for fossil fuel production).								
		Nature-based impact	Disclose any relevant policies that the company has in place or plans to implement to mitigate any negative impact – or promote any positive impact – on ecological systems (*e.g.* land conversion, deforestation, biodiversity loss, pollution); disclose the impact on GHG reduction targets and transition plan objectives.								
			Disclose any relevant policies that the company has in place or plans to implement to create nature-based solutions (*e.g.* reforestation); disclose the impact on GHG reduction targets and transition plan objectives.								
			Disclose any relevant policies that the company has in place or plans to implement to mitigate any negative impact on ecological systems that its decarbonization strategy may have.								
	Products and services	Products and services	Describe the company's plan to provide low-carbon products/services and/or to reduce high-carbon products/services.								
			Quantify the impact of each low-carbon product or service on achieving the company's short-, medium-, and long-term GHG emissions targets.								
			Disclose the commercial viability of low-carbon products and services.								
			Provide a definition of what is considered low carbon/green for each product/ service (referencing an appropriate taxonomy where available).								
Engagement Strategy	**Value chain**	Clients/portfolio companies and suppliers	Disclose current and planned engagement and activities conducted with the company's value chain (both downstream and upstream suppliers and/or customers) to drive reductions of GHG emissions.								
	Industry	Industry peers	Disclose membership in trade organizations, as well as current and planned engagement with trade organization(s) to influence the trade organization(s)' adoption of climate policies that support the company's transition plan.								
			Disclose how the company's transition plan strategy and objectives compare to the commitments and actions of the company's trade organization(s).								
			Disclose current and planned engagement with other companies (including peers and other relevant companies).								
			Disclose current and planned engagement with industry climate initiatives *(e.g.* Responsible Steel, Oil and Gas Climate Initiative); include requirements the company has chosen to comply with because of these initiatives.								
	Government and public sector	Government and public sector	Disclose current and planned engagement with the public sector to drive climate policies that support the company's transition plan; disclose both direct and indirect engagement *(e.g.* via industry trade organizations).								
			Disclose how the company's transition plan strategy and objectives are aligned with all policy activities *(e.g.* no conflicting policy activities).								
Metrics and Targets	**Metrics and Targets**	GHG emissions metrics[76]	**Base year:** Disclose a GHG emissions base year (avoid anomalous years, *e.g.* 2020 due to COVID-19).								
			Target dates: Disclose target GHG emissions for the short, medium, and long term; at a minimum, disclose interim targets (2030 and earlier) and 2050 targets.								
			Scope 1 and 2: Disclose GHG emissions targets for Scope 1 and 2 emissions.								
			Scope 3: Disclose GHG emissions targets for Scope 3 emissions if Scope 3 emissions are material; justify the exclusion of Scope 3 GHG emissions if omitted, and provide your definition of materiality (*i.e.* estimated % of total emissions).								
			Absolute: Disclose targets for absolute GHG emissions for Scope 1, 2, & 3.								
			Intensity: Disclose intensity GHG emissions targets for Scope 1, 2, & 3 in revenue intensity and/or physical intensity *(e.g.* GHG/kWh) specific to the company's industry and in line with how financial institutions compare companies against sectoral pathways such as sector decarbonization approach (SDA): • Justify selection of revenue and/or physical intensity metrics. • Provide forecasts of expected physical output to complement GHG targets.								

(following)

76 Also known as carbon offsets or VERs.

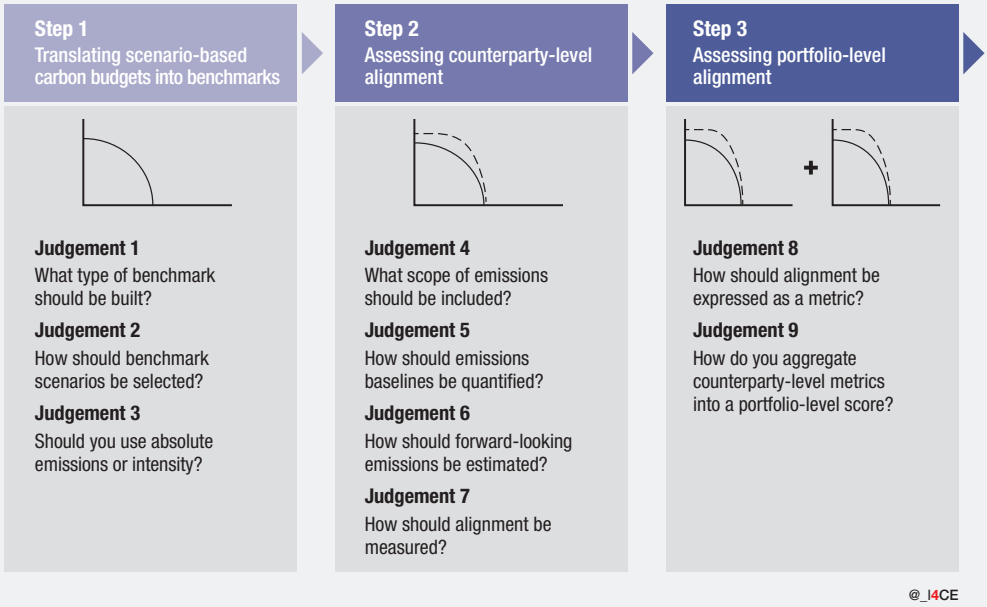
APPENDIX 5 (following)

Metrics and Targets	**Metrics and Targets**	GHG emissions metrics	**Relevant breakdowns** (if applicable): Disclose relevant breakdowns of GHG emissions. For example: • by Scope 3 upstream/downstream and/or by Scope 3 category (*e.g.* based on the GHG Protocol); • by business and operational actions; • by products and services; and • by emissions that rely on assumptions described in the activities and decision-making component (*e.g.* based on a technology not yet deployed at scale, based on the actions of the company's supply chain, contingent on a specific policy).	■	■	■		■		■	
			Coverage: Specify coverage/system boundary of GHG targets (*i.e.* specify any excluded regions, business activities) expressed in percentage by GHG Scope and/or Scope 3 category.			■	■		■		
			Methodology: Disclose details on methodology used to develop GHG targets (*e.g.* the GHG Protocol).	■	■	■	■	■	■		
			Verification: Disclose any third-party verification of targets (*e.g.* by SBTi).		■	■	■				■
			Other targets: Disclose any additional GHG targets (*e.g.* methane reduction targets).			■					
			Track record: Disclose progress and track record against GHG emissions targets on an annual basis.	■		■			■		
		Sectoral pathways	Disclose the sectoral pathway that the company has selected and how the targets are aligned to the pathway; disclose if the sectoral pathway is updated with the most up-to-date science even after a target is set.	■	■	■	■		■	■	
			Disclose the rationale for pathway choice, especially when the selected pathway does not align with limiting to 1.5 degrees C warming.			■	■				
			Specify details of the selected pathway, including: • temperature alignment; • likelihood; and • degree of potential overshoot.			■	■	■			
		Carbon credits[77]	Disclose carbon credits, offsets, and avoided emissions (*i.e.* also known as Scope 4 emissions) separately from GHG reduction targets and metrics; carbon credits should not be incorporated into reaching a transition plan's target GHG emissions.	■	■	■	■			■	
Governance	**Roles, responsibilities, and remuneration**	Board oversight and reporting	Disclose how the company's board oversees the company's transition plan and whether the transition plan is subject to board approval.	■	■	■			■	■	■
		Roles and responsibilities	Disclose the management structure in place for handling transition plan execution.	■	■	■			■		
		Incentives and remuneration	Disclose, to an appropriate extent, how compensation and other incentives for employees with responsibility for climate-related issues are aligned to the objectives of the company's transition plan.	■	■	■			■	■	
	Skills and culture	Skills and trainings	Disclose how the company ensures adequate climate expertise (*e.g.* management expertise, provided resources, trainings, skill acquisition).		■	■			■	■	
		Change management and culture	Disclose change management process for regular review of transition plan to ensure material updates are incorporated and challenges are addressed.	■	■	■					
			Disclose stakeholder's feedback/ communication mechanisms and how mitigation of implementation risks is managed.	■	■	■			■		
			Disclose how the company encourages a culture that supports its transition.						■		

Source: GFANZ 2022 [1] Transition Plan.

77 Also known as carbon offsets or VERs.

APPENDIX 6. KEY DESIGN CHOICES AND PORTFOLIO ALIGNMENT METRIC PROVIDER METHODOLOGIES



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.

A SUMMARY OF PORTFOLIO ALIGNMENT METRIC PROVIDER METHODOLOGIES

COMPANY	JUDGEMENT									ASSET CLASSES COVERED	NUMBER OF ISSUERS COVERED
	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 [78]	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

(following)

78 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.

A SUMMARY OF PORTFOLIO ALIGNMENT METRIC PROVIDER METHODOLOGIES (following)

ISS ESG	Single-scenario benchmark – fair-share carbon budget or convergence-based approach	IEA WEO scenarios'[79]	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)	Ali 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 (recom-mended)	Corporate equities and bonds	> 7,000
MSCI	Single-scenario benchmark– fair-share carbon budget approach	IPCC scenarios[80]	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 weighted approaches available	Corporate equities and bonds	N/A[81]
PACTA/ RMI	Single-scenario benchmark – convergence, rate-of-reduction or production volume[82 83]	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)	Severa! 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	Economie intensity (using GVA)[84]	Scope 1, 2, and 3 (all sectors)	Self-reported prioritized with estimated data to fill gaps	Benchmark growth rates	Cumulative (up to 2100)	ITR[85]	Aggregated budget approach	Corporate equities and bonds, loans, sovereign bonds, real estate, private equity	> 6,000
S&P Global Sustai-nablel	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
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

Source: GFANZ 2022 [2].

79 Additional scenarios to be included from 2023.
80 Sectoral and regional differentiation.
81 Users have flexibihty to input data as they see fit.
82 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.
83 Production woluther risciories owerned und he "sector market share" approach. A company production volume trajectory is calculated at technology level using a formula that.
84 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.
85 ITR is calculated using a climate model, rather than a TCRE multiplier approach.

APPENDIX 7. BREAKDOWN OF SCOPES BY BUSINESS SECTOR

ACT sector	Scope 1	Scope 2	Scope 3
Agriculture & Agrifood	7%	1%	92%
Aluminium	15%	60%	25%
Building construction	7%	1%	92%
Cement	80%	5%	15%
Chemicals	20%	10%	70%
Coal	33%	2%	65%
Elec Utilities	50%	1%	49%
Glass	30%	20%	50%
Iron & Steel	70%	5%	25%
Oil & Gas	10%	1%	89%
Pulp & Paper	30%	10%	60%
Real Estate	2%	5%	93%
Transport - Auto	1%	1%	98%
Transport - Civil aviation	75%	1%	24%
Transport - Road transport	64%	3%	33%
Transport - Shipping	70%	1%	29%
z. Other Sectors	27%	3%	70%

Sources: Act 2022, CDP.

APPENDIX 8. GHG EMISSIONS PERCENTAGE BY SCOPE 1,2 AND 3 IN HIGH-IMPACT SECTORS

Secteur	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

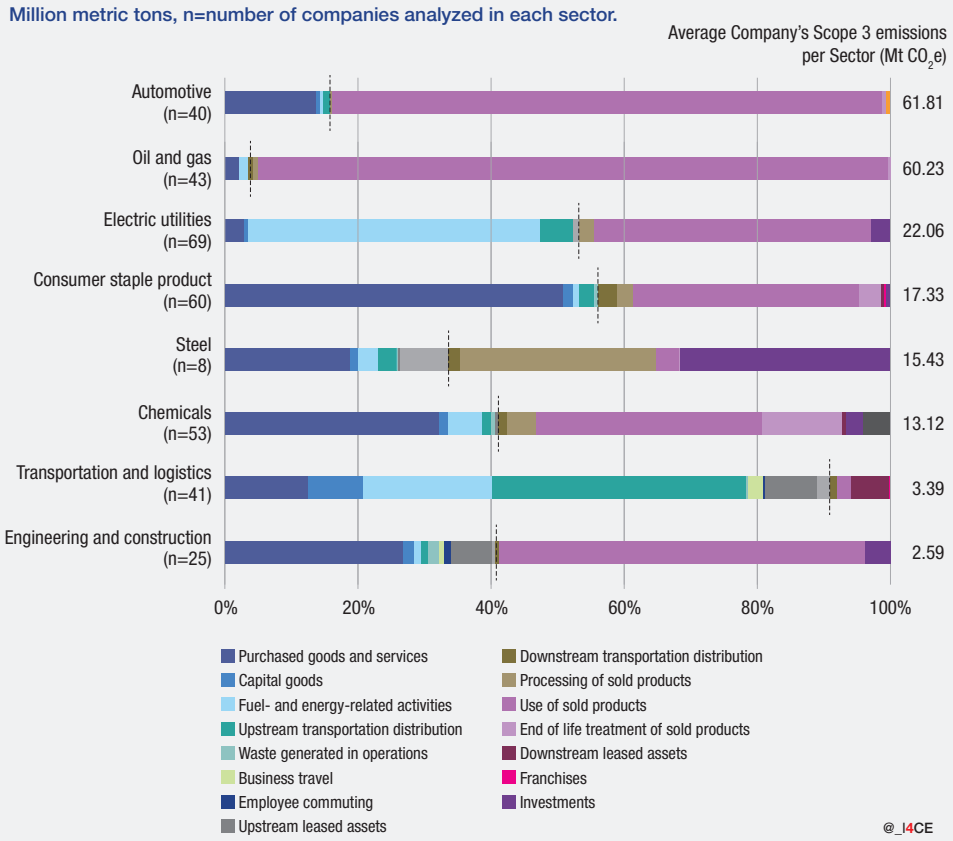
Bold fonts highlight where the materiality threshold of 40% has been exceeded for Scope 3.

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.

Source: GFANZ 2022 [2]; Bloomberg for reported (blue) and MSCI for estimated (gray) emissions data.

APPENDIX 9. PERCENTAGES OF SCOPE 3 EMISSIONS FOR 15 VALUE-CHAIN CATEGORIES IN HIGH-IMPACT SECTORS - DASHED LINES SEPARATES UPSTREAM FROM DOWNSTREAM



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: GFANZ 2022 [2], Bloomberg BESGPRO Index, FY2020

APPENDIX 10. ALIGNMENT ASSESSMENTS RESULTS ACROSS PROVIDERS FOR SELECTED NON-FINANCIAL CORPORATES

Anonymised company	Sector	Region	Provider 1	Provider 2	Provider 3	Provider 4
Company A	Airlines	Asia	Not aligned	Not aligned	Not aligned	Not aligned
Company B	Airlines	Pacific	2 Degrees	Not aligned	1.5 Degrees	Not aligned
Company C	Airlines	North America	1.5 Degrees	2 Degrees	1.5 Degrees	2 Degrees
Company D	Autos	Asia	2 Degrees	2 Degrees	1.5 Degrees	1.5 Degrees
Company E	Autos	Europe	1.5 Degrees	Not aligned	Not aligned	1.5 Degrees
Company F	Autos	North America	1.5 Degrees	2 Degrees	Not aligned	1.5 Degrees
Company G	Shipping	Europe	1.5 Degrees	2 Degrees	2 Degrees	1.5 Degrees
Company H	Shipping	Asia	Not available	Not aligned	1.5 Degrees	1.5 Degrees
Company I	Shipping	Asia	Not aligned	Not aligned	1.5 Degrees	1.5 Degrees
Company J	Steel	Latin America	1.5 Degrees	Not aligned	Not aligned	1.5 Degrees
Company K	Steel	Asia	Not aligned	Not aligned	Not aligned	Not aligned
Company L	Steel	Europe	1.5 Degrees	Not aligned	2 Degrees	2 Degrees
Company M	Chemicals	Africa	Not available	Not aligned	Not aligned	2 Degrees
Company N	Chemicals	Asia	Not available	Not aligned	Not aligned	Not aligned
Company O	Chemicals	Europe	Not available	Not aligned	Not aligned	Not aligned
Company P	Cement	Latin America	1.5 Degrees	2 Degrees	1.5 Degrees	1.5 Degrees
Company Q	Cement	Europe	1.5 Degrees	Not aligned	2 Degrees	1.5 Degrees
Company R	Cement	Africa	Not aligned	Not aligned	Not aligned	Not aligned
Company S	Aluminium	Middle East	Not aligned	Not aligned	Not available	Not available
Company T	Aluminium	Europe	1.5 Degrees	Not aligned	Not aligned	2 Degrees
Company U	Aluminium	North America	Not aligned	Not aligned	2 Degrees	Not aligned
Company V	Electric Utilities	Asia	2 Degrees	2 Degrees	1.5 Degrees	2 Degrees
Company W	Electric Utilities	North America	1.5 Degrees	Not aligned	1.5 Degrees	1.5 Degrees
Company X	Electric Utilities	Pacific	2 Degrees	Not aligned	Not aligned	2 Degrees
Dimensions of assessments	Metric type		SDA	AEC, SDA	SDA, EIC	AEC, SDA, EIC
	Time period		2050	2050	2050	2035
	Temporal perspective		Point-in-time	Cumulative	Cumulative	Cumulative
	Emissions Scopes included		1, 2, 3	1, 2, 3	1, 2, 3	1, 2
	Scenario sources		IEA	NGFS	IEA & IPCC	IPCC

Note: Results are latest available assessments for alignment in 2050, anonymised for companies and providers. ITR results are assigned to the relevant category as this illustration aims to show the level of alignment and exact temperature results come with a higher level of uncertainty. 'Not aligned' means not aligned with a 2 degrees or below scenario as assessed by the methodology provider. 'Not available' means either not enough data to apply the methodology or no methodology available for that sector by the provider.

Source: OECD 2024.

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