



**Climate Change
Taxonomy and the EU
Regulatory Response:
EU Taxonomy-Aligning
Benchmarks (TABs)
Report**

**Platform on
Sustainable Finance**

EU Taxonomy-Aligning Benchmarks (TABs) Report EU Platform on Sustainable Finance

12 December 2023

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This report represents the overall view of the members of the Platform on Sustainable Finance.¹ However, although it represents such a consensus, it may not necessarily, on all details, represent the individual views of member institutions or experts. The views reflected in this report are the views of the experts only. This report does not reflect the views of the European Commission or its services.

The considerations below are compiled under the aegis of the Platform on Sustainable Finance and cannot be construed as official guidance by the European Supervisory Authorities (ESAs). As a result, the views and recommendations do not purport to represent or anticipate any future official guidance and views issued by the ESAs which may differ from the contents of this report.

¹ See Appendix B for Lead Authors, Platform Members and Observers.

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Executive Summary

With the introduction of these voluntary benchmarks, the Platform on Sustainable Finance (PSF) aims to initiate a discourse on the pivotal role the Taxonomy could assume in shaping climate and environmental benchmarks. The suggested benchmarks do not discard alternative approaches to leveraging the Taxonomy in the development of benchmarks. Innovation in this domain is imperative for effectively channelling capital towards sustainable investments and realising our goals in mobilising financial resources for financing the transition to a net zero, resilient, circular, and environmentally sustainable future.

The EU Taxonomy-Aligning Benchmarks without and with exclusions (EU TAB and EU TABex) are inspired by the success of EU Paris-Aligned Benchmarks (EU PABs), which grew to €116bn in assets under management in less than three years.² Since 2019, Paris Aligned Benchmarks (PABs) have played a significant role in financial markets, aiming to facilitate the shift towards a low-carbon economy. They achieve this by directing capital towards sustainable options, selecting and weighting companies within PAB indices to collectively adhere to a decarbonisation trajectory aligned with the Paris Agreement's goal of limiting global temperature rise to 1.5°C above pre-industrial level.

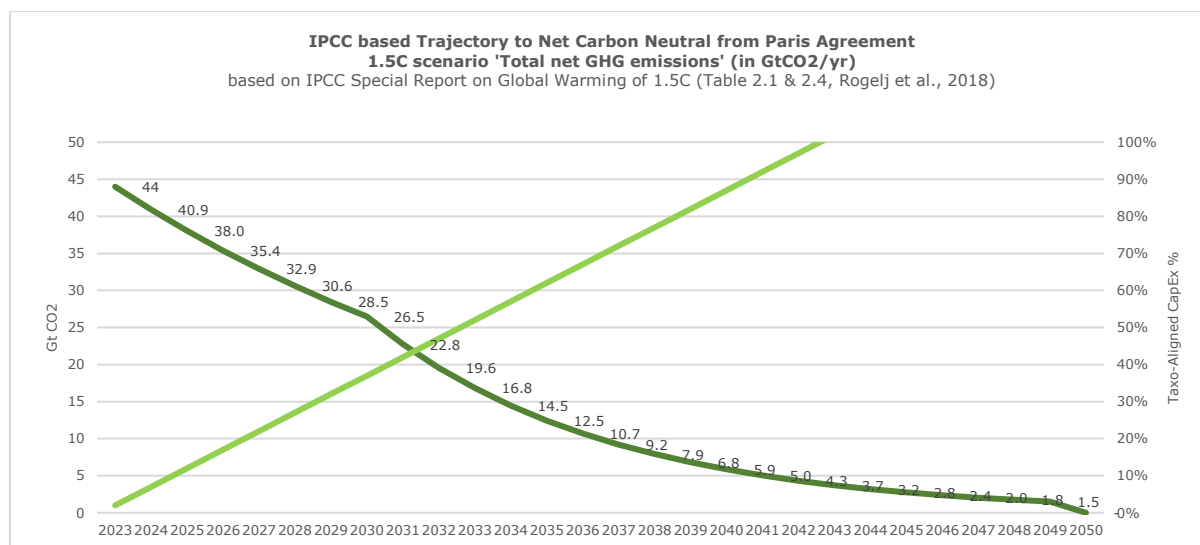
The main objectives of the proposed benchmarks are to (a) show how a significant level of comparability of Taxonomy-aligning benchmarks methodologies could be achieved while leaving benchmarks' administrators with an important level of flexibility in designing their methodology; (b) provide investors with an appropriate tool to align the Taxonomy with their investment strategy; (c) increase transparency on investors' impact, specifically with regard to climate change and the environmentally sustainable Capital Expenditures (CapEx) required for the energy transition; and (d) disincentivise greenwashing. Ultimately, the Platform on Sustainable Finance aims at supporting the development of innovative tools that contribute to the decarbonisation and greening of investment portfolios.

Context. While conceptually the two types of Taxonomy-aligning benchmarks are closely linked to the PSF objectives of the Paris Agreement and build on the success of the EU PABs, the PSF acknowledges the fact that the current state of methodologies and available issuer and issuance-level data on Taxonomy-alignment does not allow for an evident and irrefutable conversion of climate scenarios and Taxonomy objectives into detailed and informed portfolio construction methodologies at the time of writing this report. Consequently, the PSF stresses that a review of all minimum standards after a three-year period would be needed to ensure the highest level of ambition for climate benchmarks and Taxonomy-alignment in accordance with potential future enhancements in the state of data availability, research insights and investment practices. The PSF also recognises the intrinsic difficulties of lacking the necessary historical data. A hurdle that all first comers ought to overcome.

EU Taxonomy-Aligning Benchmarks are defined as benchmarks where the underlying assets are selected, weighted or excluded in such a manner that (i) the resulting benchmark portfolio is on a scaling environmentally sustainable CapEx trajectory, (ii) while the non-environmentally sustainable CapEx proportion is on a decarbonisation trajectory and is also constructed in accordance with the minimum standards laid down in the delegated acts of EU PABs. EU TABs with exclusions also include specific activity exclusion thresholds for fossil fuel related activities.

² https://ec.europa.eu/commission/presscorner/detail/en/qanda_23_3194

Figure 1: Illustration of double objectives of Greening CapEx and decarbonising economy



Definition and use cases. A Taxonomy-aligning benchmark is defined as an investment benchmark that incorporates – next to financial investment objectives – specific objectives related to greening of CapEx, greenhouse gas (GHG) emission reductions in line with IPCC’s scientific evidence and the transition to a low-carbon economy through the selection and weighting of underlying constituents.

A Taxonomy-aligning benchmark can serve as:

- The underlying for passive investment strategies.
- An investment performance benchmark for GHG emission-related strategies which aim to scale environmentally sustainable CapEx and can tolerate a substantially slower decarbonisation than EU PABs.
- An engagement tool.
- A policy benchmark to help guide strategic asset allocation (SAA).

While benchmarks incorporating constraints or objectives related to GHG emissions have primarily been built around a climate tail risk³ reduction objectives, EU Taxonomy-Aligning Benchmarks have broader ambitions. Investors using these new types of benchmarks not only intend to hedge against climate transition risks (risk objective) but also have the ambition to direct their investments towards opportunities related to the energy transition (transition opportunity objective), specifically by increasing capital flow into Taxonomy-aligned capital expenditure.

Users. The main users of EU Taxonomy-Aligning Benchmarks are institutional investors such as pension funds, foundations and (re)insurance companies with the objective of protecting a significant share of their assets against various investment risks related to climate change and the transition to a low-carbon economy, labelled as transition risks.

³ Climate transition risks as defined by the Task Force on Climate-related Financial Disclosure (TCFD). See <https://www.fsb-tcfd.org/wp-content/uploads/2017/06/FINAL-2017-TCFD-Report-11052018.pdf> for further details.

Differentiation. The two types of Taxonomy benchmarks are pursuing a similar objective but differentiate themselves in terms of their level of restrictiveness and ambition. EU TABs with exclusions are designed for more ambitious climate-related investment strategies and are characterised by stricter activity exclusion requirements (TABex hereafter), while EU TABs without exclusions allow for greater diversification and serve the needs of institutional investors with reciprocal business relationship to fossil fuel issuers (TAB hereafter).

Minimum Standards. An executive summary of the minimum standards can be found in Table 1 below.

Table 1: Summary of minimum standards of EU TAB and EU TABex

The following table summarises all minimum technical standards for EU TAB and EU TABex:

Minimum standards	EU TAB	EU TABex
Risk oriented minimum standards:		
Year-on-year self-decarbonisation of the benchmark	At least 7% on average per annum reduction in CO2e intensity until 2050 commencing from a 2023 notional launch except to the extent that CapEx securities received an environmentally sustainable CapEx decarbonisation holiday.	
Investable Universe Pre-Filters	Controversial Weapons UNGP+ social violators Tobacco	Controversial Weapons UNGP+ social violators Tobacco
Activity Exclusions	None	Coal (1%+ revenues and CapEx) Oil (10%+ revenues and CapEx) Gas (50%+ revenues and CapEx)
Opportunity oriented minimum standards:		
Scaling Environmentally Sustainable Taxonomy CapEx	At least 5 percentage points increase in Taxonomy-aligned CapEx per annum commencing from a value 5 percentage points above the weighted average Taxonomy-aligned CapEx of the underlying investable universe (applicable to all CapEx securities).	
Environmentally Sustainable CapEx Decarbonisation Holiday	Benchmark administrators may at their discretion reduce the 7% decarbonisation target of the proportion of CapEx securities in the benchmark at the end of year 'n' by multiplying it with one minus the weighted average percentage of Taxonomy-aligned CapEx of all CapEx security constituents at the end of year 'n'.	
Exposure constraints	Minimum exposure to 'CapEx Securities' is at least equal to equity market benchmark exposure.	
Relevance oriented minimum standards:		
Disqualification from label if 2 consecutive years of misalignments with CapEx or CO2e trajectory, or any 3 years of misalignments with CapEx or CO2e trajectory within a consecutive 10-year period:	Immediate	Immediate
Review Frequency:	Minimum requirements shall be reviewed every three years to recognise market development as well as technological and methodological progress.	

EU Taxonomy-Aligning Benchmarks

With the introduction of these voluntary benchmarks, the Platform on Sustainable Finance (PSF) aims to initiate a discourse on the pivotal role the Taxonomy could assume in shaping climate and environmental benchmarks. The suggested benchmarks do not discard alternative approaches to leveraging the Taxonomy in the development of benchmarks. Innovation in this domain is imperative for effectively channelling capital towards sustainable investments and realising our goals in mobilising financial resources for financing the transition to a net zero, resilient, circular, and environmentally sustainable future.

1. DESCRIPTION OF TAXONOMY-ALIGNING BENCHMARKS AND RELATIONSHIP WITH EU PABs

Definition of EU Taxonomy-Aligning Benchmarks (With or Without Exclusions)

The EU Taxonomy-Aligning Benchmarks, both with and without exclusions (EU TAB and EU TABex), draw inspiration from the achievement of the EU Paris-Aligned Benchmarks (EU PABs), which amassed €116 billion in assets under management in less than three years.⁴ The proposal is for a benchmark to be labelled as an EU Taxonomy-Aligning Benchmark where the underlying assets are selected, weighted or excluded in such a manner that the resulting benchmark portfolio is on an upwards environmentally sustainable capital expenditure trajectory, while the non-environmentally sustainable capital expenditure proportion is on a decarbonisation trajectory.

Users of EU TABexs are investors that have as their objective the idea of a significant impact on climate change mitigation through a shift of investment allocation from GHG intensive activities – notably fossil fuels – to renewable energy and energy efficiency with a specific emphasis on greening CapEx. Users of TABs focus on the latter ambition of greening CapEx while recognising that in the absence of environmentally sustainable CapEx, standard 7% year-on-year decarbonisation rates are necessary.

Issuers and asset classes in scope of climate benchmarks minimum requirements

The scope of climate benchmarks is corporate issuance-based indices (e.g., listed equity, corporate fixed income securities, syndicated bank loans, cash, private equity, private markets, private debt). Essentially, any asset class which is in scope for EU PABs or EU Green Bond Standards is in scope for EU TABs. With respect to SFDR, the Level 1 review may want to reflect on adding an article for TABs in an equivalent manner that Article 9(3) covers PABs.

Relationships with EU PABs

The notable success of EU Paris-Aligned Benchmarks (PABs) and EU Climate Transition Benchmarks (CTBs) might lead some to question whether EU TAB and TABex could potentially compete with or overlap with these existing benchmarks. The authors of this proposal, which include original developers of EU PABs, are not concerned for the following reasons: First, PABs and CTBs decarbonise much faster since they possess initial decarbonisation requirements of 50% and 30% respectively, while the TABs do not have an initial decarbonisation requirement of more than 0% vis-à-vis the

⁴ https://ec.europa.eu/commission/presscorner/detail/en/qanda_23_3194

investable universe.⁵ This means that anyone decarbonising at PAB or even CTB speed would reduce their decarbonisation level considerably in the case that they switched to a TAB or TABex decarbonisation trajectory. Specifically, after year 1, a PAB will have decarbonised at least 57%, a CTB will have decarbonised at least 37%, while a TAB would have decarbonised at least 7%, illustrating that PAB and CTB users would drop their decarbonisation by more than 85% and 80% respectively. In other words, while PABs or CTBs are aligned with a 1.5° scenario with no or limited overshoot, the EU TAB aims to be aligned with a 1.5° scenario. The level of overshoot (i.e., no, limited or high), however, will depend on the pace at which the CO₂e thresholds in the Taxonomy itself for transitional activities will decline, that is, the extent to which these might compensate for the much lower initial decarbonisation.

Second, among those institutional investors which did not feel ready to commence on a PAB or CTB trajectory, two concerns were most noteworthy. On one hand, they admitted that PABs and even CTBs were simply requiring too great an initial decarbonisation, which is dealt with in the previous point. On the other hand, they wondered how they could do more to scale the technologies needed for the green transition such as solar farms or wind parks. This aspect is explicitly addressed via the TAB's and TABex's ambition to scale environmentally sustainable Capex. Hence, while it is perfectly feasible and desirable that some very advanced investors will develop a version of PABs which includes the greening CapEx feature of the TABex, it is unlikely that one concept cannibalises the other.

⁵ In other words, TABs are not allowed to commence their decarbonisation from a value higher than the mean of the investable universe, but they can entirely forgo the initial decarbonisations of PAB and CTB.

2. OBJECTIVES

The objectives pursued by users of Taxonomy-aligning benchmarks can be split into two main categories.

Risk objective

The risk reduction objective has historically been the main driver for the creation of benchmarks incorporating carbon or climate-related data. Literature around climate-related financial risks for investors has widely documented the need to decarbonise as seen by the success of Paris-Aligned Benchmarks as well as the notion of *stranded assets*.⁶ The rationale behind the willingness of investors to reduce their exposure to business models that rely on high levels of proven or probable fossil fuel reserves is that a potentially significant share of these reserves will not be burned or used if the world economy has to stay within a limited carbon budget, in line with the global objective to keep the rise in average temperature well below +2°C. The contribution of these reserves to companies' financial valuation can therefore be considered as overestimated, leading to significant risks for investors (i.e., extreme losses).⁷ The debate around stranded assets, initially centred on coal and tar sands, has been the basis for several *divestment campaigns*, where large institutional investors have divested to limit their risk exposure or where universities' endowments have pledged to cut partly or entirely their investments in fossil fuels.

Opportunity objective

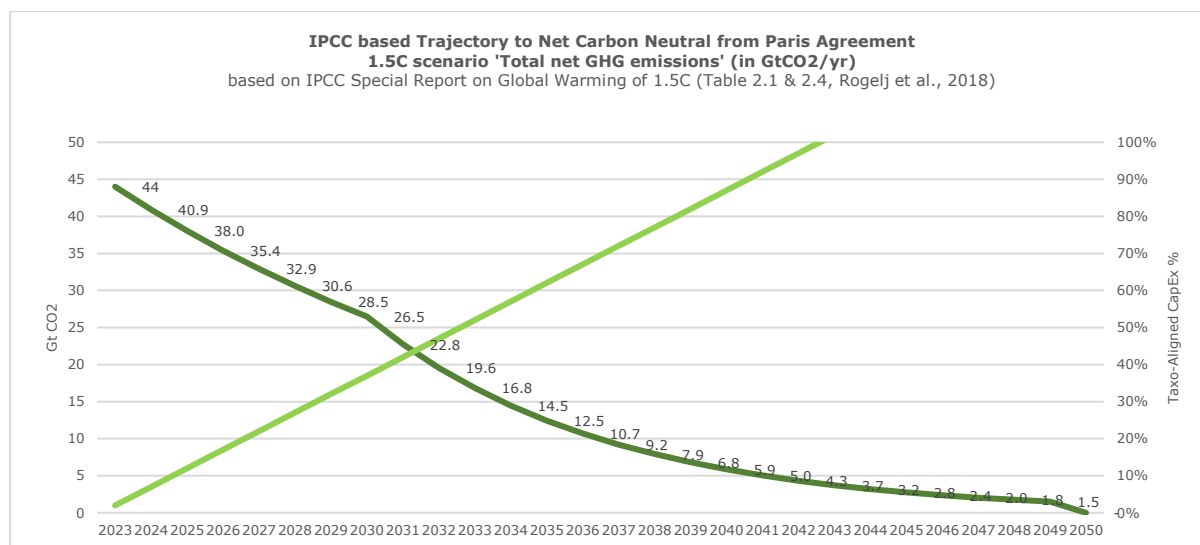
Taxonomy-aligning benchmarks are not only designed to progressively decarbonise portfolios in line with the 1.5°C trajectory (with limited to high overshoot) and reduce the exposure to climate-related financial risks, but also to increase the share of investments in environmentally sustainable CapEx. These include inter alia products and services related to renewable energy, low-carbon technologies and energy efficiency among others which are necessary to the energy transition. The core reason for the focus on capital expenditure in EU TABs and EU TABexs is for the long-term and forward-looking nature of capital expenditure. Conceptually, corporates could approach 100% Taxonomy-alignment of their capital expenditure over time.⁸

⁶ See <https://www.sciencedirect.com/journal/energy-economics/vol/52/part/PA>

⁷ See <https://www.sciencedirect.com/science/article/pii/S0301421515301907> or https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3317570

⁸ Please note that for CapEx to become 100% environmentally sustainable, the current Taxonomy will have to be further extended to cover all activities of CapEx securities. Furthermore, negligible amounts of residual CapEx in non-CapEx securities are omitted from the 100% environmentally sustainable CapEx ambition.

Figure 2: Illustration of double objectives of Greening CapEx and decarbonising economy



The Platform defines ‘CapEx Securities’ as those securities with a proportional nominal CapEx-to-Price⁹ ratio exceeding 1%. EU TABs shall have the target of increasing within the CapEx Securities portion of holdings the Taxonomy-aligned CapEx by 5 percentage points per annum¹⁰, commencing from a value 5 percentage points above the weighted average Taxonomy-aligned CapEx of the underlying investable universe. The 5 percentage points rate derives from the need to achieve 100% environmentally sustainable CapEx prior to 2045 to support global Net Zero 2050 ambitions as well as the current low levels of weighted average environmentally sustainable CapEx in the global economy (i.e., <5%).¹¹

⁹ The price is secondary market value where available and otherwise book value. Since total CapEx figures tend to be rather persistent, we do not expect too much time series variation in terms of passing or failing the 1% threshold. To provide a few examples obtained at the time of writing, MSCI World constituent securities Alexandria Real Estate (USA), Volkswagen (GER) and Tokyo Electric Power (JAP) all have values which exceed the minimum threshold more than *tenfold*; whereas Austria’s OMV, Luxembourg-based ArcelorMittal or Spain’s Acciona simultaneously exceed the minimum threshold more than *eightfold*.

¹⁰ On the one hand, some stakeholders fear that 5 percentage points increase per annum is too fast a growth in environmentally sustainable CapEx and thus may lead to concentration risk within EU TABs. Given that the securities with the high global valuation are not usually those with the highest Taxonomy-alignment, we do not see any substantial concentration risk resulting from this percentage points rate. On the other hand, another group of stakeholders point to the five-fold annual climate finance growth rates (i.e. 400%) demanded by the Climate Policy Institute in their November 2023 Global Landscape report. While 400% growth rates each year are very hard to practically achieve on a minimum standard for a scalable financial product, global TABs will commence, depending on investable universe, from about 2.5% weighted average environmentally sustainable CapEx, which means that in year 1 the (i) 5 percentage points above the weighted average Taxonomy-aligned CapEx of the underlying investable universe combined with the (ii) 5 percentage points per annum growth rate will lead to a five-fold increase to about 12.5%. Subsequently, the TAB’s minimum standard will commence with 5 percentage points instead of five-fold per annum, but obviously any benchmark administrator could exceed upon this initial rate.

¹¹ Taxonomy-aligned CapEx has the advantage that it represents resources spent with a forward-looking purpose in the last fiscal year. Therefore, it measures (i) resources already committed instead of future promises which may be withdrawn later (ii) while being forward looking in nature. Due to such desirable features and given that

This minimum threshold of 1% CapEx-to-Price ratio at security level serves to negate any potential greenwashing effects the TABs could have by allowing issuers of securities with minimal investments in CapEx to report alignment to EU TABs. The anchoring of the CapEx-to-Price ratio at security level furthermore allows for purpose of proceeds debt (e.g. bonds, loans) of issuers to potentially be treated differently from general purpose bonds of the same issuers.¹²

Under EU TABs, only non-CapEx securities and the non-environmentally sustainable CapEx proportion of securities is required to decarbonise by the minimum 7% year-on-year in CO₂e intensity until 2050. This conditional self-decarbonisation rewards the scaling of environmentally sustainable Taxonomy CapEx and thus facilitates increased and accelerated capital flows into Taxonomy-aligned capital expenditure. For securities with an environmentally sustainable CapEx proportion, however, benchmark administrators may at their discretion reduce the 7% decarbonisation target of the proportion of CapEx securities in the benchmark at the end of year 'n' by multiplying it with one minus the weighted average percentage of Taxonomy-aligned CapEx of all CapEx security constituents at the end of year 'n'.

Please note that a notional launch year of no later than 2023 should be applied as per recommendation of the usability report of the First Platform for Sustainable Finance.¹³ This notional launch year ensures that the 7% decarbonisation rate can be consistently used.

TAB and TABex will be an EU minimum standard that anyone can extend beyond, it seems easily conceivable that some TABs or TABexs will invest in CapEx securities aligned with the EU Taxonomy as well as other jurisdiction's taxonomies.

¹² Similarly, sustainability linked debt which contractually assured certain outcomes including the CapEx spending itself could be treated different from the parent issuer. Such security specific issuance of purpose of proceeds or sustainability linked debt could be particularly attractive to financial issuers.

¹³ See: [Platform recommendations on Data and Usability as part of Taxonomy reporting](#) pg 158, Oct. 2022.

3. DATA

State of the art on carbon footprint

Although Greenhouse Gases (GHG) are not the only source of environmental impact, limiting – and decreasing – the emissions is the most important challenge in the short term to tackle climate change and contain the rise in average global temperature as close as possible to 1.5°C relative to preindustrial averages.¹⁴ Thus, emissions are the key indicator to assess a company’s exposure to climate risks. In a life-cycle approach, the exposure of a company to climate risks is not only a function of its internal manufacturing processes but also of the raw materials it uses, the quantity and nature of the energy it consumes (inputs) and finally the products and services it sells to its customers (outputs). The measure of GHG emissions is called ‘carbon footprint.’

The GHG Protocol¹⁵ identifies three types of GHG emissions:

1. Scope 1 emissions: All direct GHG emissions.
2. Scope 2 emissions: Indirect GHG emissions from consumption of purchased electricity, heat, or steam.
3. Scope 3 emissions: Other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g., transmission and distribution losses) not covered in Scope 2, outsourced activities, use of sold products, waste disposal, etc.

Technical advice on CapEx¹⁶

Administrators of EU Taxonomy-Aligned Benchmarks (with and without exclusions) should ensure the consistency, the comparability, and the quality of both capital expenditure and EU Taxonomy-aligned capital expenditure data.

The Platform defines ‘environmentally sustainable CapEx’ as EU Taxonomy-aligned capital expenditure, and defines ‘CapEx Securities’ as securities with a CapEx-to-Price ratio exceeding 1%, where the CapEx-to-Price ratio can be defined as follows:

$$\text{CapEx-Price Ratio} = \frac{(\text{Total CapEx}) * (\text{Proportional Book Value of Asset Class})}{\text{Market Value of Asset Class}}$$

Where ‘Proportional Book Value of Asset Class’ is defined by the following:

$$\text{Proportional Book Value of Asset Class} = \frac{\text{Book Value of Asset Class}}{\text{Book Value of Total Assets}}$$

The scaling environmentally sustainable Taxonomy CapEx trajectory includes at minimum 5 percentage point increases per annum (commencing from a value 5 percentage points above the

¹⁴ See [United Nations Framework Convention on Climate Change \(UNFCCC\), 2015](#)

¹⁵ See Greenhouse Gas Protocol at <https://ghgprotocol.org>

¹⁶ CapEx is defined as per IFRS.

weighted average Taxonomy-aligned CapEx of the underlying investable universe) to the security ratio of environmentally sustainable CapEx to total CapEx for CapEx Securities only.

The Platform focuses on CapEx rather than operating expenditure (OpEx) or revenue for four reasons: First, CapEx is forward looking while OpEx and revenue are both backward looking. Second, because CapEx is forward looking, issuers can integrate the demands of the 700+ DNSH criteria thresholds included in the EU Taxonomy into new processes instead of having to gradually retrofit the revenue generated from business units which grew over decades to criteria which were defined much later. Consequently, issuers can grow their proportion of Taxonomy-aligned CapEx much faster than their proportion of Taxonomy-aligned revenues. Third, Taxonomy-aligned CapEx can realistically target a 100% environmentally sustainable threshold by 2045, while it is unrealistic that the hundred percent of revenues or OpEx would become environmentally sustainable too soon.¹⁷ Fourth, from a benchmark construction perspective, optimising for more than one metric upwards (i.e., environmentally sustainable CapEx) and one metric downwards (i.e., CO2e) massively increases the costs of index development and especially execution.¹⁸

Two further aspects are noteworthy with respect to CapEx. Given the current state of Taxonomy development, the first TABs or TABexs developed will very likely focus on the climate Taxonomy only, although other objectives may enter the scene in due course thereafter. Furthermore, while historical data on Taxonomy-alignment is obviously limited, backward looking estimations can be made where necessary based on the characteristics of Taxonomy-aligned issuers and issuances such as for total CapEx, green bond issuances or other corporate commitments to the climate transition. While backwards estimation is permitted, contemporaneous data should (unless explicitly stated otherwise) be focused on issuer reported Taxonomy-aligned CapEx or equivalent information as characterized in the Usability report of the 1st Platform of Sustainable Finance.

Technical advice on carbon footprint and necessary estimations¹⁹

EU TABex and EU TAB follow EU PABs and CTBs with respect to CO2e emissions and related measures. Consequently, readers may want to consider the EU PAB regulation itself²⁰, the Handbook of Paris-Aligned Benchmarks²¹ and section 5.2.3 of the PSF Usability Report²² as guidance. Nevertheless, it is worth recapping some high-level principles.

First, administrators of EU Taxonomy-Aligning Benchmarks (with and without exclusions) should ensure the consistency, the comparability, and the quality of GHG emissions data. Second,

¹⁷ Please note that for CapEx to become 100% environmentally sustainable, the current Taxonomy will have to further extended to cover all activities of CapEx securities. Furthermore, tiny amounts of residual CapEx in non-CapEx securities are obviously omitted from the 100% environmentally sustainable CapEx ambition.

¹⁸ Please note that the Platform is suggesting minimum standards here as in the case of EU PABs, and any benchmark administrator who is willing to face the costs of a third metric is of course very welcome to add revenue or OpEx considerations on top of the minimum standards.

¹⁹ Please note that issuer level estimations can be broken down to activity level (i.e., more fine-grained units of analysis are allowed). Issuer level estimations, however, cannot be made at investment fund (e.g., UCITS) level as this would be a gross violation of the precautionary principle (i.e., more coarse units of analysis are not permitted).

²⁰ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020R1818&rid=1>

²¹ https://finance.ec.europa.eu/system/files/2019-12/192020-sustainable-finance-teg-benchmarks-handbook_en_0.pdf

²² https://finance.ec.europa.eu/system/files/2022-10/221011-sustainable-finance-platform-finance-report-usability_en_1.pdf

administrators of Taxonomy-Aligning Benchmarks should ensure that data on all three scopes of emissions is obtained prudentially and is accurate according to the GHG Protocol or ISO 14064 and ISO 14069. Third, administrators should apply the Precautionary Principle in any estimation process and, if in doubt, err on the side of the planet. Figure 3 below outlines conceptually, how CO2e data which is either not reported or underreported can be estimated using the precautionary principle.

Figure 3: Precautionary Principle based CO2e estimation.

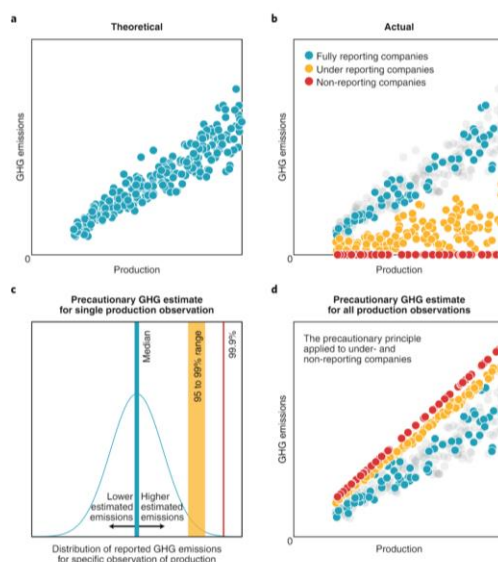


Fig. 1 | Application of the precautionary principle to estimation of under- and non-reporting companies.
a. Theoretical distribution of company GHG emissions as a function of production. **b.** Illustrative actual distribution of company GHG emissions under full (blue), underreporting (yellow) and non-reporting (red) scenarios. **c.** Proposed application of the precautionary principle to estimate the GHG emissions for an under- or non-reporting company with a specific production level. **d.** Outcome of the application of the precautionary principle to estimating under- and non-reporting emissions, providing incentives for improvement.

Fourth, it is important that administrators of EU TABs and TABexs consider Scope 3 emissions in line with EU PABs for sectors with especially high exposure to the risks of climate change and its mitigation (e.g., oil & gas, mining, transportation and buildings, agribusiness, banking). Where an administrator of Taxonomy-Aligning Benchmarks (with and without exclusions) uses estimations, it should disclose the precautionary principle based methodology upon which the administrator has based its estimates (i.e. whether it has used a bottom-up or a top-down approach to calculate GHG emissions, the main assumptions and the precautionary principles underlying them, the research methodology to estimate missing, unreported, and underreported GHG emissions, and, the external data sets used in the estimation of missing, unreported or underreported GHG emissions). However, in case the benchmark administrator uses an external GHG data provider for estimated data, it should be exempted from this requirement, but the equivalent transparency is still required from the third-party provider.

Fifth, when considering potential offsets to the decarbonisation trajectory, the PSF follows the recommendation of the Handbook of Paris-Aligned Benchmarks which considers residual “emission reduction certificates only a viable option for companies at later stages of their ... trajectory, once they have reduced the majority of their GHG emissions themselves and exhausted technically feasible options for further reductions in sectors with inevitable GHG emissions (e.g., cement).” (p.10).

For further context and advice on measuring investment risk in the age of climate change, please see Appendix A.

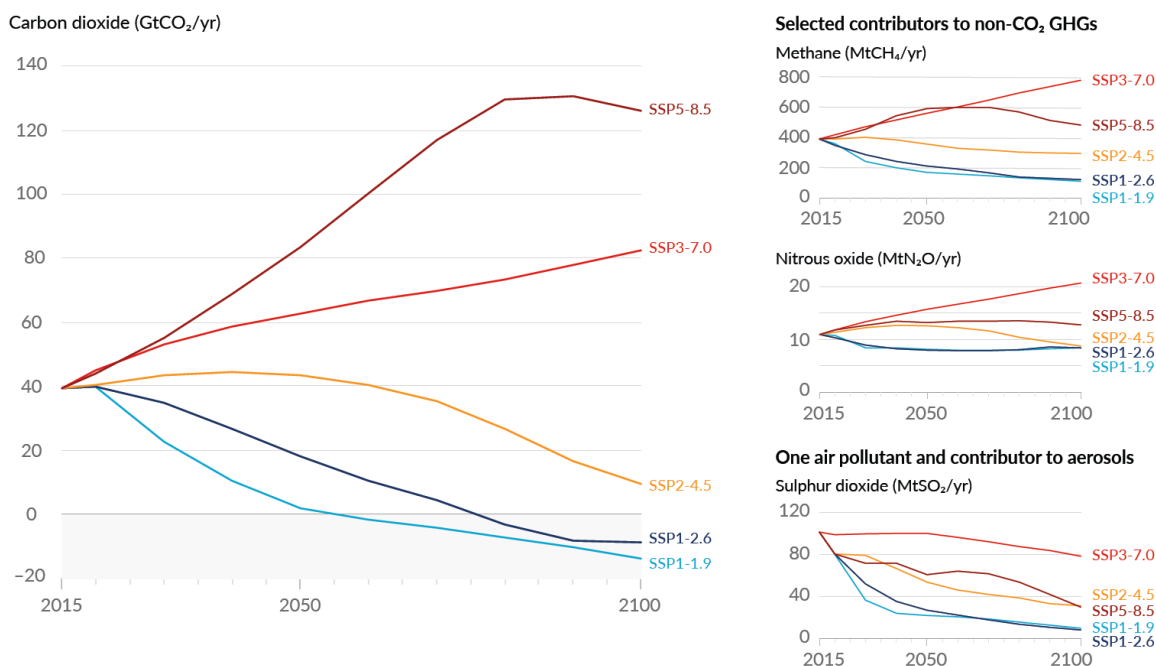
4. CARBON BUDGETS AND CLIMATE TRAJECTORIES

Overview of scenarios and trajectories

As of 2022, the climate has warmed by approximately 1.25°C relative to preindustrial averages.²³ Going forward, the best-case scenario to avoid irreversible, severe negative impacts is to stabilize long-term, global temperature rise as close as possible to 1.5°C relative to preindustrial averages.²⁴ This would require immediate and severe emissions cuts.²⁵

Figure 4: Climate scenarios and long-term stabilization

(a) Future annual emissions of CO₂ (left) and of a subset of key non-CO₂ drivers (right), across five illustrative scenarios



²³ Indicators of Global Climate Change: <https://essd.copernicus.org/articles/15/2295/2023/>

²⁴ Hoegh-Guldberg, O., Jacob, D., Taylor, M., Bindi, M., Brown, S., Camilloni, I., Diedhiou, A., Djalante, R., Ebi, K.L., Engelbrecht, F., Guangsheng, Z., Guiot, J., Hijikata, Y., Mehrotra, S., Payne, A., Seneviratne, S.I., Thomas, A., Warren, R., 2018. Impacts of 1.5°C of Global Warming on Natural and Human Systems, in: Marengo, J.A., Pereira, J., Sherstyukov, B. (Eds.), *Global Warming of 1.5 °C: An IPCC Special Report on the Impacts of Global Warming of 1.5 °C above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty*. World Meteorological Organisation, Geneva, Switzerland. <https://www.ipcc.ch/sr15/chapter/chapter-3/>
 IPCC, 2022: Summary for Policymakers [H.-O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegria, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem (eds.)]. In: *Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegria, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 3-33, doi:10.1017/9781009325844.001.

²⁵ Rogelj, J., Shindell, D., Jiang, K., Ffifita, S., Forster, P., Ginzburg, V., Handa, C., Kheshgi, H., Kobayashi, S., Kriegler, E., Mundaca, L., Séférian, R., Vilariño, M.V., 2018. Mitigation pathways compatible with 1.5°C in the context of sustainable development, in: Flato, G., Fuglestedt, J., Mrabet, R., Schaeffer, R. (Eds.), *Global Warming of 1.5 °C: An IPCC Special Report on the Impacts of Global Warming of 1.5 °C above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty*. IPCC/WMO, Geneva, Switzerland, pp. 93–174. <https://www.ipcc.ch/sr15/chapter/chapter-2/>

Riahi, K., Schaeffer, R., Arango, J., Calvin, K., Guivarch, C., Hasegawa, T., Jiang, K., Kriegler, E., Matthews, R., Peters, G.P., Rao, A., Robertson, S., Sebbit, A.M., Steinberger, J., Tavoni, M., Van Vuuren, D.P., 2022. Mitigation pathways compatible with long-term goals, in: Shukla, P.R., Skea, J., Slade, R., Kouradajie, A.A., van Diemen, R., McCollum, D., Pathak, M., Some, S., Vyas, P., Fradera, R., Belkacemi, M., Hasija, A., Lisboa, G., Luz, S., Malley, J. (Eds.), *IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, UK and New York, NY, USA. <https://doi.org/10.1017/9781009157926.005>

Table SPM.1 | Changes in global surface temperature, which are assessed based on multiple lines of evidence, for selected 20-year time periods and the five illustrative emissions scenarios considered. Temperature differences relative to the average global surface temperature of the period 1850–1900 are reported in °C. This includes the revised assessment of observed historical warming for the AR5 reference period 1986–2005, which in AR6 is higher by 0.08 [–0.01 to +0.12] °C than in AR5 (see footnote 10). Changes relative to the recent reference period 1995–2014 may be calculated approximately by subtracting 0.85°C, the best estimate of the observed warming from 1850–1900 to 1995–2014. [Cross-Chapter Box 2.3, 4.3, 4.4, Cross-Section Box TS.1]

Scenario	Near term, 2021–2040		Mid-term, 2041–2060		Long term, 2081–2100	
	Best estimate (°C)	Very likely range (°C)	Best estimate (°C)	Very likely range (°C)	Best estimate (°C)	Very likely range (°C)
SSP1-1.9	1.5	1.2 to 1.7	1.6	1.2 to 2.0	1.4	1.0 to 1.8
SSP1-2.6	1.5	1.2 to 1.8	1.7	1.3 to 2.2	1.8	1.3 to 2.4
SSP2-4.5	1.5	1.2 to 1.8	2.0	1.6 to 2.5	2.7	2.1 to 3.5
SSP3-7.0	1.5	1.2 to 1.8	2.1	1.7 to 2.6	3.6	2.8 to 4.6
SSP5-8.5	1.6	1.3 to 1.9	2.4	1.9 to 3.0	4.4	3.3 to 5.7

Notes: Global greenhouse gas emission scenarios and projected global surface temperature rise over the 21st century. Temperatures are relative to pre-industrial averages (1850-1900). This means that some areas will experience greater warming than others: the Arctic, land areas warm typically faster than the global average, while ocean areas less. The ‘very likely’ ranges represent the greater than 90% confidence interval. Visual and data from IPCC (2021).

The Paris Agreement states that signatories agree to follow emission pathways consistent with holding the change in global average temperature to well below +2 °C above pre-industrial levels and pursuing efforts to limit the temperature change to +1.5 °C above pre-industrial levels (UNFCCC, 2015).

The last IPCC report²⁶ provides several categories of emissions pathways that can inform emissions reductions in line with the long-term temperature goal of the Paris Agreement; where differences depend on the allowance of temporary exceeding specified limits²⁷ (also called “overshoot”) and different probabilities of keeping warming below temperature limits. If a pathway allows for a temporary overshoot of the carbon budget, it means it relies on large-scale deployment of carbon dioxide removal (CDR) measures to achieve net negative CO₂ emissions in the second half of the century, which are uncertain and entail clear risks (Babiker et al, 2022, Table 12.6). For the alignment with the Paris Agreement, the PSF recommends using a pathway that has a chance of limiting warming to 1.5°C and a very high likelihood of limiting it below 2°C. Based on the Precautionary Principle (UN Rio Earth Summit, 1992, Paragraph 15), the following pathway is proposed as consistent with the Paris Agreement:

²⁶ Riahi, K., Schaeffer, R., Arango, J., Calvin, K., Guivarch, C., Hasegawa, T., Jiang, K., Kriegler, E., Matthews, R., Peters, G.P., Rao, A., Robertson, S., Sebbit, A.M., Steinberger, J., Tavoni, M., Van Vuuren, D.P., 2022. Mitigation pathways compatible with long-term goals., in: Shukla, P.R., Skea, J., Slade, R., Khourdajie, A.A., van Diemen, R., McCollum, D., Pathak, M., Some, S., Vyas, P., Fradera, R., Belkacemi, M., Hasija, A., Lisboa, G., Luz, S., Malley, J. (Eds.), *IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, UK and New York, NY, USA. <https://doi.org/10.1017/9781009157926.005>

²⁷ Note that the wording of the Paris Agreement long-term temperature goal as defined its Article 2.1.a (“*Holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change;*”) indicates that temperature at any time should be kept “well below 2°C” and an overshoot of 2°C or warming that is very close to or at 2°C is therefore not compatible with this goal.

- “1.5°C with no or limited overshoot” – this is consistent with the scenarios assessed and presented in the IPCC Special Report on Global Warming of 1.5°C (Table 2.1, Rogelj et al., 2018) and the C1 scenario category of the Working Group 3 Contribution to the IPCC Sixth Assessment Report (Riahi et al., 2022). This scenario has at least 33% probability of limiting warming to 1.5°C over the course of the century and simultaneously a likelihood of close to and more than 90% to limit peak global warming throughout the 21st century to 2°C (IPCC, 2022).

There is no consensual methodology on the market apart from EU PABs to ensure the alignment of benchmark with a climate scenario. There are mainly two categories of methodologies:

- Technological alignment methodologies that will refer to a technical scenario and assess if the technological solutions are represented in a satisfying proportion. For examples, the share of electric cars manufacturing has to be in line with a scenario.
- Emissions dynamic assessment, measuring if the direct emissions, indirect emissions, and emissions savings lead to pathways compatible with climate trajectories.

In order to leave space for innovation in this field, the PSF recommends a minimum requirement that will, year after year, imply the reduction of the investments’ CO₂e intensity. Thus, this report defines “alignment” in the context of benchmarks and climate scenarios using the following rationale: a benchmark is considered aligned with a given climate scenario if its own decarbonization pathway, meaning the on average per year reduction of its CO₂e intensity since inception, is in line with the scenario.

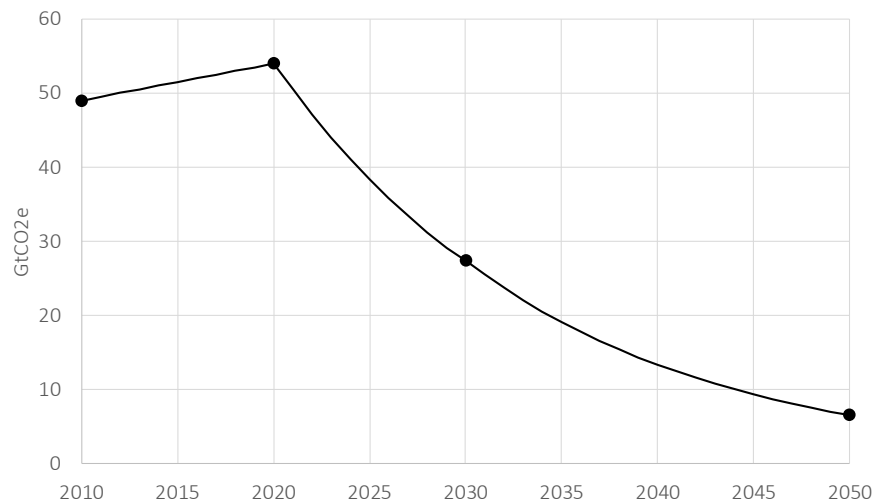
The IPCC “1.5°C with no or limited overshoot” scenario targeted by EU PABs provides the total worldwide emissions, and the approach could potentially be refined by sectors/geography. However, as corporates eligible to the inclusion in climate benchmarks often operate worldwide, the use of local scenarios becomes irrelevant in most cases. Not every sector can be subject to an emission pathway, which leads to gaps when assessing the climate performance of diversified investments. Considering that a diversified benchmark represents a proxy of the listed economy, the global decarbonisation objective of IPCC’s most ambitious scenario can be used to drive the emissions reduction of the benchmark as a first approximation.

The continuous integration of Scope 3 GHG emissions into benchmarks’ CO₂e intensity calculations allows for emission reductions of Scopes 1+2 of unlisted corporates and non-corporate actors, like households, who are – by definition – not included as constituent of climate benchmarks. One example is internal combustion engine (ICE) cars owned by households, whose emissions related to usage are accounted in the scope 1 of households but also in the scope 3 of car manufacturers.

Carbon footprinting applies to CO₂ emissions, but also for other Kyoto-Protocol GHG emissions. The word “carbon” is used for “carbon equivalent” or GHG equivalently across this report. CO₂e emissions are to be calculated with global warming potentials over a 100-year time horizon (GWP-100) of the latest IPCC assessment report (Forster et al, 2021).²⁸ Thus, the IPCC’s most ambitious GHG emissions pathway, which is the next figure, will be used as the reference pathway to determine the yearly decarbonisation.

²⁸ The IPCC AR6 GWP-100 values are Carbon dioxide (CO₂) = 1, Fossil methane (CH₄) = 29.8, non-fossil methane (CH₄) = 27.0, Nitrous oxide (N₂O) = 273, with additional values for fluorinated gases provided in Forster et al. (2021), Table 7.15 and Table 7.SM.7.

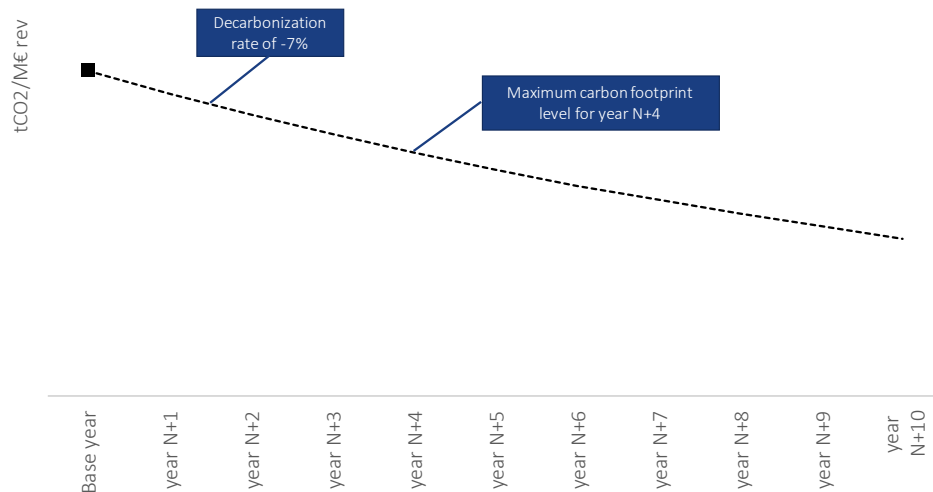
Figure 5: Worldwide emissions trajectory, based on data from IPCC AR5 Climate Change 2014 Synthesis Report, IPCC SR15 report Chapter 2 and Global Carbon Budget, 2018



The resulting yearly geometric average decarbonisation rate is at least 7%. The points are calculated with scientific data (IPCC and IEA for past and current emissions, IPCC for future emissions), and the trajectory uses a simple geometric progression, justified by the fact that no technological breakthrough is likely to reduce worldwide emissions at a point in time, but a sum of several actions leading to the reduction of emissions will occur continuously in time, and the fact that the first reductions are easier and cheaper than the last ones, thus an annual constant decrease rate applies.

Current carbon footprints assess only for gross induced emissions into the atmosphere. New practices should assess for gross induced emissions on the one hand and stored or removed emissions on the other hand to encourage the reduction of emissions and the developments of permanent removals.

Figure 6: Year-on-year decarbonisation trajectory of a climate benchmark



The CO2e intensity used for the purpose of calculating the year-on-year self-decarbonisation of the benchmark has to be calculated with enterprise value including cash (EVIC) as the financial denominator. Two aspects are noteworthy though:

- Please note that the CO2e intensity means the weighted average CO2e intensity at index level. **There is no minimum standard on the CO2e intensity of individual assets constituting the index.**
- Since TABs allow for decarbonisation holidays and Taxonomy thresholds may not be updated in line with at least 7% annual CO2e reductions, TABs have **lower chances of targeting a 1.5°C trajectory (with no or limited overshoot) than EU PABs**, as these do not allow for decarbonisation holidays and have initial baseline decarbonisations to allow for future innovation and therefore can target a 1.5°C trajectory (with no or limited overshoot) more directly.

5. MAINTAINING THE BENCHMARKS

Technical advice on dynamic decarbonisation for climate benchmarks

Considering that the Paris Agreement emissions reductions should apply to absolute GHG emissions, and that work can only be conducted on CO₂e intensity, the minimum level of decarbonisation should be increased if inflation in EVIC values occurs. Otherwise, an inflation effect could lead to a reduction of the tCO₂e/€_{EVIC} ratio without any increase in efficiency. That enterprise value inflation adjustment factor shall be calculated by dividing the average EVIC of the benchmark constituents at the end of a calendar year by the average EVIC of the benchmark constituents at the end of the previous calendar year.²⁹ If the specified inflation adjustment factor is equal to *Inf*%, then decarbonisation rate for that year should be:

$$1 - \left(\frac{1 - 7\%}{1 + Inf\%} \right)$$

An equivalent process should be established for deflation. Both processes should be computed on a per security basis in relation to launch values as recommended in the usability report of the first mandate of the Platform for Sustainable Finance.³⁰

Remediation procedure

If an index misses its trajectory target in a given year, the following remediation procedure commences:

- In the year of the target miss, the benchmark administrator must explain the reason for the miss and list all the steps that will be taken to ensure that the adjusted target for next year (i.e., the target based on the original trajectory) is achieved.
- The index would lose its credibility should any of the following occur:
 - The Taxonomy-aligning CapEx targets are not achieved in a given year and the target miss is not compensated for in the following year; or
 - The Taxonomy-aligning CapEx targets are not achieved on three occasions in any consecutive 10-year period; or
 - The decarbonisation targets are not achieved in a given year and the target miss is not compensated for in the following year; or
 - The decarbonisation targets are not achieved on three occasions in any consecutive 10-year period.

²⁹ REGULATION (EU) 2020/1818 (7)

³⁰ Adjustments for corporate actions such as stock splits, spin-offs or acquisitions beyond launch year are permissible.

6. MINIMUM REQUIREMENT ON EXCLUSIONS

Universe pre-filters for EU TAB and EU TABex³¹

The PSF recommends consideration of the potentially harmful implications of investing in securities which violate global standards such as, for instance, the UN Guiding Principles on Business and Human Rights (UNGP Principles). While some may consider such investments potentially marginal in size, they can be seen by others as setting an unfavourable precedent. Hence, the consideration of potentially harmful effects of investing in securities is recommended so as to lead by example and adhere to the UN's precautionary principle. As a result of these precautionary considerations, the PSF suggests the following universe pre-filters:

1. Exclusion of controversial weapons: a consensus has emerged over the years around the exclusion of landmines and cluster bombs driven by conventions and UN principles. European countries are signatories of the Convention on Landmines and Cluster Munitions and the vast majority prohibit investments in controversial weapons.
2. Exclusion of companies being found in violations of global norms (namely UNGP, OECD Guidelines, and ILO Conventions in line with the minimum safeguards logic of the Taxonomy). The group recommends exclusions of violators of global norms as investors are increasingly considering those companies as worst offenders and are excluding them from their sustainable (including climate) investment strategies.
3. Exclusion of companies being found or estimated to be in significant violations of the EU's six precautionary principle derived environmental objectives: 1) climate change mitigation; 2) climate change adaptation; 3) sustainable use and protection of water and marine resources; 4) transition to a circular economy, waste prevention and recycling; 5) pollution prevention and control; 6) protection and restoration of biodiversity and ecosystems.

Activity exclusions for EU TABex³²

The PSF recommends a differentiation of EU TABs and EU TABexs with regards to activity exclusions.

For EU TABs without exclusions, the PSF does not recommend any climate-related exclusion at this stage. The rationale is threefold:

1. Every company possesses the potential to transition to a net-zero economy even if it involves shifting their activities from those excluded from the Taxonomy to their respective substitutes which are included within the Taxonomy. This transformational change, if undertaken, positions them to be well-suited for a net zero future. EU Taxonomy-Aligning Benchmarks without exclusions should therefore be able to contain any type of company independently from its current and/or past impact on climate as long as it undertakes the necessary changes.
2. Investors vary in their stewardship activities. While some investors prefer to divest from poor climate performers, others prefer to engage and incentivise them to improve their climate resilience. Adding exclusions as part of the minimum requirements would close the door for engagement, while relying on a reweighting approach would allow for engagement and

³¹ The approach adopted here is based on (EU) 2020/1818, Art 12.

³² It is worth remembering that TABex represents a minimum standard and any benchmark administrator is welcome to exceed beyond these to meet additional (e.g., national standards).

encourage companies to improve. That being said, engagement shall be conducted with potentially excludable issuers by holding a security weight in the respective issuers which is either proportional or under-proportional.³³

3. There is no consensus among investors around climate exclusions in large and diversified climate related strategies. Investors have different levels of appetite when it comes to exclusions: some investors divest from thermal coal while other also exclude unconventional oil & gas and the strictest of them exclude all types of fossil fuels related activities.

For EU TABs with exclusions, the PSF recommends the exclusion of certain companies based on the following criteria³⁴:

1. Those that derive 1% or more of their revenues from and invest 1% or more of their CapEx into coal exploration or processing activities,
2. Those that derive 10% or more of their revenues from and invest 10% or more of their CapEx into oil exploration or processing activities,
3. Those that derive 50% or more of their revenues from and invest 50% or more of their CapEx into gas exploration or processing activities.

These exclusions are justified by the level of ambition of EU TABs with exclusions, which is higher than that of EU TABs without exclusions. While no company is completely unable to transition towards a low-carbon economy as explained above, certain activities such as coal tend to be *'always harmful'* and should therefore already be excluded from the most ambitious climate-related strategies.

Given that TABex is a CapEx focused concept, the exclusions would ideally be operationalised only as CapEx thresholds in comparison to the EU PABs revenue thresholds. However, since corporate CapEx activity disclosures are still lacking, both CapEx and revenue are used as metrics and issuers are only excluded if they fail on both metrics. It is worth noting that, where no CapEx data is available, the Precautionary Principle suggests that issuers should be excluded if they fail the revenue threshold.

These processes balance two considerations: First, firms with more than 1% legacy coal revenue but less than 1% coal CapEx should be able to make the more ambitious TAB version as their CapEx decisions are sufficient. Since the TABex specification is a minimum standard and any benchmark administrator can easily advance upon it, benchmarks can seamlessly be built using the above thresholds with an 'OR' instead of an 'AND' condition, which means that benchmark administrators can reuse their PAB exclusion processes.³⁵

³³ In other words, engagement excludable issuers based on an over-proportional holding faces a huge risk of representing one of the worst forms of greenwashing, if the engagement does not yield sufficient success (e.g. 7% reductions in CO₂e emissions).

³⁴ These thresholds may be adapted over time as the European Commission's Taxonomy for sustainable activities matures. These thresholds are inspired by the exclusions for EU Paris-Aligned Benchmarks as per REGULATION (EU) 2020/852 (12).

³⁵ While issuers can easily report CapEx by activity (e.g., coal, oil, gas) and several do so already, total CapEx is virtually never disaggregated by CO₂e/kWh. Hence, since TABex is CapEx focused, the PAB utility exclusion is dropped.

7. REVIEW PROCESS FOR MINIMUM STANDARDS

A continuous review process of EU TABs and especially EU TABexs is crucial to ensure that ambitions are aligned with technological and market developments, especially in terms of the trajectory and updates which the IPCC and/or IEA may undertake.

Furthermore, the PSF expects that the quality and quantity of EU Taxonomy reporting data will improve greatly over the coming years. Over the 2022-23 period, European corporates have had to report for the first time their Taxonomy-alignment as well as the weighted average CapEx Taxonomy-alignment. Some had already done it voluntarily the previous year. The PSF is also hopeful that Scope 3 data, at least for the most crucial categories such as 1, 3, 11, 13, and 15, become of high quality within a decade.

Therefore, the PSF strongly recommends the European Commission to undertake a review of the minimum requirements every three years to recognise market development as well as technological and methodological progress. The following list includes aspects worth reviewing:

- Advancement of data availability on Taxonomy-alignment, especially with respect to the non-climate objectives.
- Progress on weighted average Taxonomy-aligned CapEx, especially of issuers outside the European Union.
- Taxonomy-alignment data availability on an issuer level instead of an ultimate parent level, which is particularly relevant to fixed income indices.
- Taxonomy-alignment data availability for privately owned issuers (expected 2026).
- Long term investments which may not be representable as CapEx in an IFRS sense or alternative enhancements to CapEx recognition within IFRS.

8. SUMMARY OF TECHNICAL STANDARDS

The following table summarizes all minimum technical standards for EU TABs and EU TABexs:

Table 2: Summary of minimum standards of EU TAB and EU TABex

Minimum standards	EU TAB	EU TABex
Risk oriented minimum standards:		
Year-on-year self-decarbonisation of the benchmark	At least 7% on average per annum reduction in CO2e intensity until 2050 commencing from a 2023 notional launch except to the extent that CapEx securities received an environmentally sustainable CapEx decarbonisation holiday.	
Investable Universe Pre-Filters	Controversial Weapons UNGP+ social violators Tobacco	Controversial Weapons UNGP+ social violators Tobacco
Activity Exclusions	None	Coal (1%+ revenues and CapEx) Oil (10%+ revenues and CapEx) Gas (50%+ revenues and CapEx)
Opportunity oriented minimum standards:		
Scaling Environmentally Sustainable Taxonomy CapEx	At least 5 percentage points increase in Taxonomy-aligned CapEx per annum commencing from a value 5 percentage points above the weighted average Taxonomy-aligned CapEx of the underlying investable universe (applicable to all CapEx securities).	
Environmentally Sustainable CapEx Decarbonisation Holiday	Benchmark administrators may at their discretion reduce the 7% decarbonisation target of the proportion of CapEx securities in the benchmark at the end of year 'n' by multiplying it with one minus the weighted average percentage of Taxonomy-aligned CapEx of all CapEx security constituents at the end of year 'n'.	
Exposure constraints	Minimum exposure to 'CapEx Securities' is at least equal to equity market benchmark exposure.	
Relevance oriented minimum standards:		
Disqualification from label if 2 consecutive years of misalignments with CapEx or CO2e trajectory, or any 3 years of misalignments with CapEx or CO2e trajectory within a consecutive 10-year period:	Immediate	Immediate
Review Frequency:	Minimum requirements shall be reviewed every three years to recognise market development as well as technological and methodological progress.	

9. TECHNICAL ADVICE ON MINIMUM REQUIREMENTS FOR EU TABs and TABexs

The section below summarises in ten articles the minimum standards for EU TABs and EU TABexs discussed in this report, using legal language.

Regulatory Guidance for EU Taxonomy-Aligning Benchmarks (With or Without Exclusions)

1. Reference temperature scenario: Administrators of EU Taxonomy-Aligning Benchmarks (with or without exclusions) shall use the 1.5 ° C scenario, with no or limited overshoot, referred to in the Special Report on Global Warming of 1.5 °C from the Intergovernmental Panel on Climate Change (IPCC) as the reference temperature scenario to design the methodology to construct those benchmarks.
2. Taxonomy: Administrators of EU Taxonomy-Aligning Benchmarks (With or Without Exclusions) shall use the Framework to facilitate Sustainable Investment (REGULATION (EU) 2020/852) as a reference Taxonomy.
3. Equity allocation constraint
 - a. EU Taxonomy-Aligning Benchmarks (With or Without Exclusions) that are based on equity securities admitted to a public market in the Union or in another jurisdiction, shall have an aggregated exposure to CapEx Securities that is at least equivalent to the aggregated exposure of the underlying investable universe to those sectors.
 - b. CapEx Securities are securities for which the ratio of the product of the nominal value of the security multiplied by the CapEx disclosure by the issuer in the cash flow statement of fiscal year 'n' to the market value of the security on the last day of fiscal year 'n' exceeds one percent.
4. Calculation of CO₂e intensity or absolute GHG emissions
 - a. Administrators of EU Taxonomy-Aligning Benchmarks (With or Without Exclusions) shall calculate the CO₂e intensity or, where applicable, the absolute GHG emissions of those benchmarks using the same currency for all their underlying assets.
 - b. Administrators of EU Taxonomy-Aligning Benchmarks (With or Without Exclusions) shall recalculate the CO₂e intensity and the absolute GHG emissions of those benchmarks on a yearly basis.
5. Phase-in of Scope 3 GHG emissions data in the benchmark methodology
 - a. The benchmark methodology for EU Taxonomy-Aligning Benchmarks (With or Without Exclusions) shall include Scope 3 GHG emissions data in the following way:
 - i. As of the effective date of the legislation, Scope 3 GHG emissions data for at least the energy, mining, transportation, construction, buildings, materials, and industrial sectors referred to in Divisions 5 to 33, 41, 42 and 43, 49 to 53 and Division 81 of Annex I to Regulation (EC) No 1893/2006
 - ii. As of 23 December 2024, Scope 3 GHG emissions data for all other sectors referred to in Annex I to Regulation (EC) No 1893/2006.
6. Setting a trajectory for Taxonomy-aligning CapEx
 - a. The Taxonomy-aligning trajectory for EU Taxonomy-Aligning Benchmarks (With or Without Exclusions) shall have the following targets:
 - i. for equity securities admitted to a public market in the Union or in another jurisdiction, where the security is classified as a CapEx security, at least 5 percentage points increase in Taxonomy-aligned CapEx per annum

- commencing from a value 5 percentage points above the weighted average Taxonomy-aligned CapEx of the underlying investable universe.
- ii. for debt securities other than those issued by a sovereign issuer, where the security is classified as a CapEx security, at least 5 percentage points increase in Taxonomy-aligned CapEx per annum commencing from a value 5 percentage points above the weighted average Taxonomy-aligned CapEx of the underlying investable universe.
 - iii. for equity securities admitted to a public market in the Union or in another jurisdiction or for debt securities other than those issued by a sovereign issuer, where the security is not classified as CapEx security, no Taxonomy-aligned CapEx trajectory is targeted.
- b. Administrators of EU Taxonomy-Aligning Benchmarks (With or Without Exclusions) shall, for each year in which the Taxonomy-aligning CapEx targets laid down in above are not achieved, compensate for those missed targets by upwardly adjusting the targets in their decarbonisation trajectory for the following year.
 - c. Benchmark administrators shall use a new base year whenever significant changes³⁶ in the calculation methodology of Taxonomy-aligned CapEx occur. For the purposes of the first subparagraph, a new base year shall mean the year against which the environmentally sustainable CapEx trajectory is calculated.
 - d. Administrators of EU Taxonomy-Aligning Benchmarks (With or Without Exclusions) shall no longer be able to label their benchmarks as such where:
 - i. The Taxonomy-aligning CapEx targets laid down in above are not achieved in a given year and the target miss is not compensated in the following year; or
 - ii. The Taxonomy-aligning CapEx laid down in above are not achieved on any three occasions in any consecutive 10-year period.
7. Percentage Point Difference in Taxonomy-aligned CapEx: The change in Taxonomy-aligned CapEx shall be calculated as the percentage point difference between, on the one hand, the weighted average percentage of Taxonomy-aligned CapEx of all CapEx security constituents of the EU Taxonomy-aligning Benchmark at the end of year 'n' and, on the other hand, the weighted average percentage of Taxonomy-aligned CapEx of all CapEx security constituents of the benchmarks at the end of year n-1.
8. Setting a decarbonisation trajectory
- a. The decarbonisation trajectory for EU Taxonomy-Aligning Benchmarks (With or Without Exclusions) shall have the following targets:
 - i. for equity securities admitted to a public market in the Union or in another jurisdiction, at least 7 % reduction of CO₂e intensity on average per annum.
 - ii. for debt securities other than those issued by a sovereign issuer, where the issuer of those debt securities has equity securities admitted to a public market in the Union or in another jurisdiction, at least 7 % reduction of CO₂e intensity on average per annum or at least 7 % reduction of absolute GHG emissions on average per annum.
 - iii. for debt securities other than those issued by a sovereign issuer, where the issuer of those debt securities does not have equity securities admitted to

³⁶ Significant changes could include the introduction of Scope 3 CO₂e emissions or advancements to the consideration of the precautionary principle in underlying estimations. Please note that any change to estimation procedures should be justifiable by the precautionary principle.

- a public market in the Union or in another jurisdiction, at least 7 % reduction of absolute GHG emissions on average per annum.
- b. The decarbonisation targets referred to in the above paragraph shall be calculated geometrically, which shall mean that the annual minimum 7 % reduction of CO₂e intensity or of absolute GHG emissions for year 'n' shall be calculated based on the CO₂e intensity or absolute GHG emissions for the year n-1, in a geometric progression from the base year.
 - c. The decarbonisation trajectory shall commence at no value higher than the weighted average CO₂e intensity or absolute GHG emissions than the investable universe.
 - d. The base year shall be set to no later than 2023.
 - e. Where the average EVIC of the constituent securities of the benchmark has increased or decreased during the last calendar year, the EVIC of each constituent shall be adjusted by dividing it by an enterprise value inflation adjustment factor. That enterprise value inflation adjustment factor shall be calculated by dividing the EVIC of the constituent at the end of a calendar year by the EVIC of the same constituent on the launch day of the benchmark.
 - f. Administrators of EU Taxonomy-Aligning Benchmarks (With or Without Exclusions) shall, for each year in which the decarbonisation targets laid down in above are not achieved, compensate for those missed targets by upwardly adjusting the targets in their decarbonisation trajectory for the following year.
 - g. Administrators of EU Taxonomy-Aligning Benchmarks (With or Without Exclusions) shall no longer be able to label their benchmarks as such where:
 - i. The decarbonisation targets laid down in above are not achieved in a given year and the target miss is not compensated in the following year; or
 - ii. The decarbonisation targets laid down in above are not achieved on three occasions in any consecutive 10-year period.
9. Change in CO₂e intensity and absolute GHG emissions.
- a. The change in CO₂e intensity or absolute GHG emissions shall be calculated as the percentage change between, on the one hand, the weighted average CO₂e intensity or absolute GHG emissions of all constituents of the EU Taxonomy-Aligning Benchmark at the end of year 'n' and, on the other hand, the weighted average CO₂e intensity or absolute GHG emissions of all constituents of the benchmarks at the end of year n-1.
 - b. Benchmark administrators shall use a new base year whenever significant changes³⁷ in the calculation methodology of CO₂e intensity or absolute GHG emissions occur. For the purposes of the first subparagraph, a new base year shall mean the year against which the decarbonisation trajectory is calculated.
10. Decarbonisation Holiday for Taxonomy-aligned CapEx: Benchmark administrators may reduce the 7% decarbonisation target of the proportion of CapEx securities in the benchmark at the end of year 'n' by multiplying it with one minus the weighted average percentage of Taxonomy-aligned CapEx of all CapEx security constituents at the end of year 'n'.
11. Exclusions for EU Taxonomy-Aligning Benchmarks with Exclusions

³⁷ Significant changes could include changes to the data availability on Taxonomy objectives, changes to the definitions of the Taxonomy or changes to the definition of CapEx.

- a. Administrators of EU Taxonomy-Aligning Benchmarks with Exclusions shall disclose in their methodology whether and how they exclude companies.
- b. Administrators of EU Taxonomy-Aligning Benchmarks with Exclusions shall exclude all of the following companies from those benchmarks and the investable universe:
 - i. companies involved in any activities related to controversial weapons.
 - ii. companies involved in the cultivation and production of tobacco.
 - iii. companies that benchmark administrators find in violation of the United Nations Global Compact (UNGC) principles or the Organisation for Economic Cooperation and Development (OECD) Guidelines for Multinational Enterprises.
 - iv. For the purposes of point (i), controversial weapons shall mean controversial weapons as referred to in international treaties and conventions, United Nations principles and, where applicable, national legislation.
- c. Administrators of EU Taxonomy-Aligning Benchmarks with Exclusions shall exclude all of the following companies from those benchmarks:
 - i. companies that derive 1 % or more of their revenues from and invest 1 % or more of their CapEx into exploration, mining, extraction, distribution or refining of hard coal and lignite.
 - ii. companies that derive 10 % or more of their revenues from and invest 10 % or more of the CapEx into the exploration, extraction, distribution or refining of oil fuels.
 - iii. companies that derive 50 % or more of their revenues from and invest 50 % or more of their CapEx into the exploration, extraction, manufacturing, or distribution of gaseous fuels.
- d. Administrators of EU Taxonomy-aligning Benchmarks shall exclude from those benchmarks any companies that are found or estimated by them or by external data providers to significantly harm one or more of the environmental objectives referred to in Article 9 of Regulation (EU) 2020/852 of the European Parliament and of the Council, in accordance with the rules on estimations laid down in the Transparency requirements for estimation article below. .
- e. Administrators of EU Taxonomy-aligning Benchmarks shall disclose in their benchmark methodology any additional exclusion criteria they use, and which are based on climate-related or other environmental, social and governance (ESG) factors.

12. Transparency requirements for estimations

- a. In addition to the requirements laid down in Annex III to Regulation (EU) 2016/1011, administrators of EU Taxonomy-aligning Benchmarks (With or Without Exclusions) shall comply with the following requirements:
 - i. Administrators of EU Taxonomy-Aligning Benchmarks With Exclusions
 - 1. need to only use Taxonomy-aligned CapEx information as disclosed by the issuer.
 - 2. need to apply precautionary principles whenever in doubt about exclusions.
 - ii. Administrators of EU Taxonomy-Aligning Benchmarks Without Exclusions may
 - 1. need to only use Taxonomy-aligned CapEx information as disclosed by the issuer for fifty percent of the Taxonomy-aligning trajectory target.

2. while, for the other half of the Taxonomy-aligning trajectory target, they or an external data provider can qualify that CapEx is Taxonomy-aligned except for a single Do No Significant Harm criteria if and only if the issuer of this CapEx has committed to net zero Scope 1, 2 and 3 GHG emissions by 2050 and Decision 17 of the UNFCCC Glasgow Climate Pact by 2030, provided that formalise, document and make public the methodology the approach that they or their external data provider used to determine the Taxonomy-aligned except for a single Do No Significant Harm criteria, and the main assumptions and the precautionary principles underlying those estimations;
- iii. Administrators of EU Taxonomy-aligning Benchmarks (With or Without Exclusions) that use GHG estimations that are not based on data provided by an external data provider, shall formalise, document, and make public the methodology upon which such estimations are based, including:
 1. the approach that they have used to calculate GHG emissions, and the main assumptions and the precautionary principles underlying those estimations.
 2. the research methodology to estimate missing, unreported, or underreported GHG emissions.
 3. the external data sets used in the estimation of missing, unreported or underreported GHG emissions.
- iv. Administrators of EU Taxonomy-aligning Benchmarks (With or Without Exclusions) that use estimations that are based on data provided by an external data provider shall formalise, document, and make public all of the following information:
 1. the name and contact details of the data provider.
 2. the methodology used including the main assumptions and precautionary principles.
 3. a hyperlink to the website of the data provider, and to the relevant methodology used, where available.

Appendix A: Investment Risk in the Age of Climate Change

In the age of the climate crisis with its significant tail risks such as extreme weather, risk needs to be defined as the probability of a negative financial outcome. This negative outcome is that the index delivers less financial return than expected by the investor. This means that an observation is considered risky if and only if it falls short of a set of financial expectations. Observations exceeding the expectations must not be considered a financial risk, since they instead represent an opportunity.

This definition is in line with the original writing of Markowitz (1959: 193-194), who explains that “[a]nalyse based on S[emi-variance] tend to produce better portfolios than those based on V[ariance]. Variance considers extremely high and extremely low returns equally undesirable. An analysis based on V[ariance] seeks to eliminate both extremes. An analysis based on S[emi-variance], on the other hand, concentrates on reducing losses.” In other words, analyses based on variance seek to eliminate extremely high returns, which is clearly not in the interest of European investors. Similarly, analyses based on tracking error seek to eliminate extremely high outperformance of the benchmark, which is likewise not in the interest of European investors. Thus, an appropriate definition of risk must be used as the probability of negative financial outcome as it is applied in measures such as semi-variance, trailing error, value at risk or lower-partial moments.³⁸

To measure the absolute financial performance of an EU TAB or EU TABex index, all relevant risks that can affect this performance need to be considered, climate induced or otherwise, and the ratio of the financial return achieved per unit of financial risk tolerated needs to be computed. This computation ensures that all risk factors including already evident climate risks are included in the financial performance calculation instead of just known financial risks such as beta (i.e., market variability) or classic investment styles³⁹. The computation can be applied separately to the EU TAB or EU TABex and the investable universe or in comparison with the investable universe⁴⁰.

To measure the relative financial performance against the investable universe, the trailing error can be ex-ante estimated or ex-post calculated for sample s as follows:

$$TrailingError_s(TAB) = \sqrt{\frac{\sum_{t=1}^N TrailingReturnDifferential_t(TAB)^2}{N - 1}}$$

whereby the “*TrailingReturnDifferential*” represents the (i) difference between return of the TAB or TABex and the return of the investable universe for any observation interval t in which the TAB or

³⁸ For examples related to ESG, see https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2874252

³⁹ While Alpha computed based on the models of Jensen or Fama-French are very common measures of financial performance, they only adjust for known financial risk factors (i.e., beta, size and value) while leaving all other risks such as climate change induced risks unaccounted for in the error term. To ensure that all risks are accounted for in the financial performance measurement, Financial Return per unit of Financial Risk is recommended.

⁴⁰ Computing Financial Return per unit of Financial Risk for the EU CTB / EU PAB and the parent separately is equivalent to a Sortino Ratio. The relative computation represents a specific version of the Risk Adjusted Performance Alternative suggested by Modigliani and Modigliani.

TABex underperforms (i.e. trails) the parent index and (ii) zero for any other observation interval. N represents the number of observation intervals t in the sample s .

In other words, the Trailing Error is identical with the Tracking Error in all aspects except the consideration of upside deviation from the universe (i.e. outperforming observations), which the Trailing Error ignores whereas the classic Tracking Error considers outperforming to be risky as it “considers extremely high and extremely low returns equally undesirable,” (Markowitz 1959: 193-194).

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