

- Portfolio growth rate per sector in target year .

When direct disclosure of scope 1 and 2 emissions (and scope 3 emissions where relevant) is not available, emissions can be calculated via two approaches (PCAF 2020):

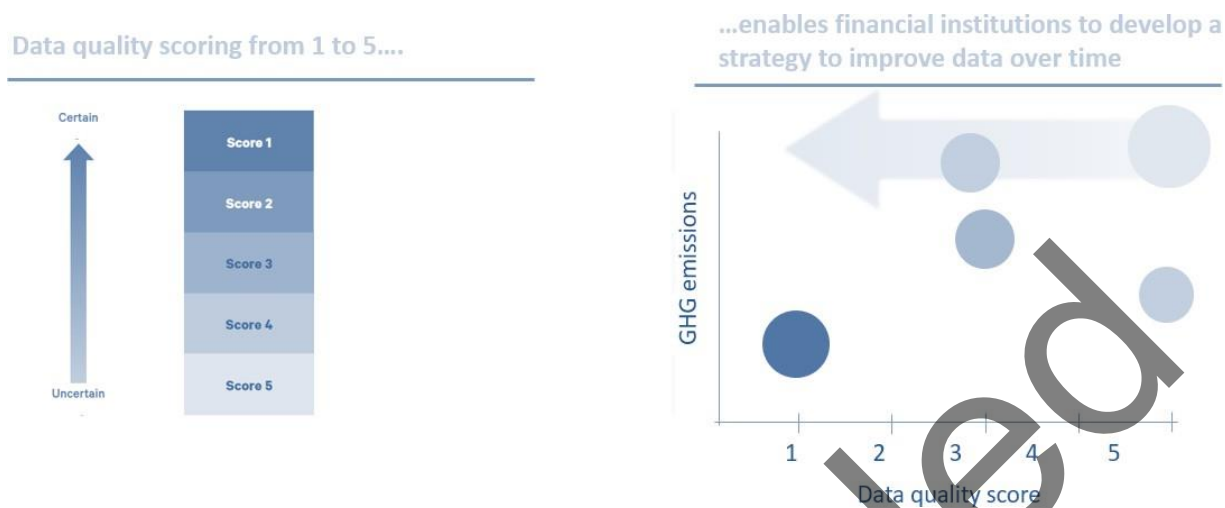
- **Approach 1: Physical activity-based emissions:** Primary physical activity data of the investee or borrower (e.g., MWh of natural gas consumed or tonne of steel produced) are converted to emissions, using verified emission factors expressed per physical activity (e.g., tCO₂e/MWh or tCO₂e/t of steel), issued or approved by a credible independent body.
- **Approach 2: Economic activity-based emissions:** Economic activity data of the investee or borrower (e.g., EUR of turnover or EUR of asset) are converted to emissions, using official statistical data and/or acknowledged environmentally extended input-output (EEIO) tables providing region-/sector-specific average emission factors expressed per economic activity (e.g., tCO₂e/EUR of revenue or tCO₂e/EUR of asset).⁸⁰

It is important to note, that from a data quality perspective, approach 2 is preferred when emissions disclosure is not available to the financial institution.

While data availability varies across regions, financial institutions can assess the specificity and accuracy of the available data using a data hierarchy (see Figure D1 as an example) and explore ways to improve data quality over time.

⁸⁰ Sampling tests based on actual data on company level, which is extrapolated to portfolio level, can help test the accuracy of calculations based on this data from statistics and/or EEIO tables. This may also be used to refine the data for specific sectors or regions, if the reporting financial institution has a strong presence in and specific knowledge of the respective sector and/or region. National agencies and regional data providers or statistical offices in individual regions may assist reporting financial institutions and investee companies in various regions in finding regional and more relevant financial and/or emissions data information.

Figure D1. Generic Data Quality Scorecard for Portfolio Emissions⁸¹



Sources: PCAF 2019b, 2019c, and PCAF 2020.

Decarbonization Pathway

By applying the SDA, the final emissions targets expressed in emissions intensity (e.g., CO₂ per kWh, tonne of product, etc.) shall be consistent with keeping global warming well-below 2°C at a minimum.

The SDA uses the B2DS scenarios developed by the IEA (2017), which are compatible with the Representative Concentration Pathway (RCP) 2.6 scenario from IPCC Fifth Assessment Report (AR5).⁸² The SDA assumes global convergence of key sectors' emissions intensity by 2050. For example, the emissions intensity of steel production in China, the United States, and Brazil is assumed to reach the same level in 2050, regardless of its current diversity.⁸³ Regional pathways have not been incorporated into the SDA method.

Currently, the SDA provides sector-specific pathways for the following homogenous and energy-intensive sectors:⁸⁴

- Power generation
- Iron and steel

⁸¹ For corporate debt and equity specific score cards, refer to the PCAF's Global GHG Accounting and Reporting Standard (PCAF, 2020).

⁸² The B2DS scenarios are emissions scenarios modeled by IEA. Based on this scenario data, sectoral emissions intensity pathways are derived.

⁸³ For specific values and background, see Krabbe et al. 2015.

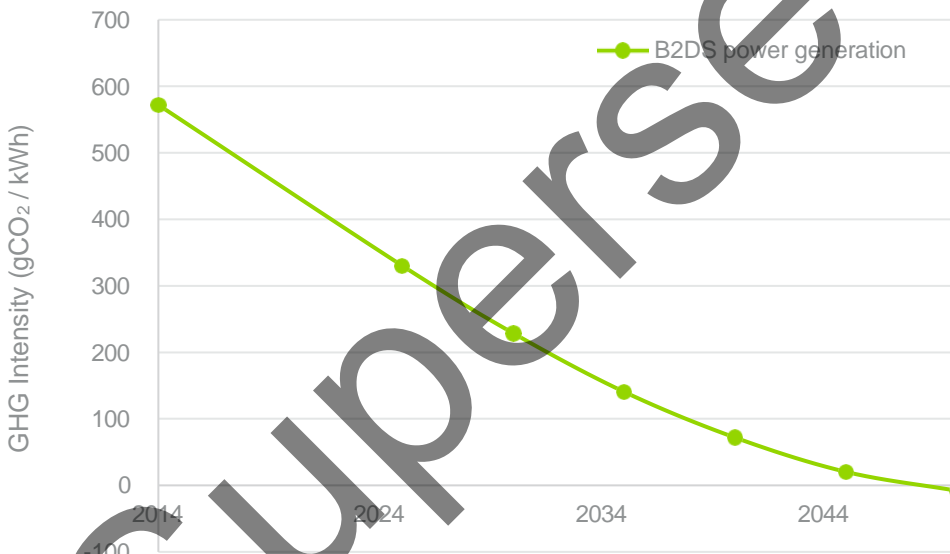
⁸⁴ The SDA sectors are drawn from the International Energy Agency (IEA). An appendix of the SDA user guidance maps the IEA sectors against common industrial classification systems: <http://sciencebasedtargets.org/wp-content/uploads/2015/05/Sectoral-Decarbonization-Approach-Report.pdf>.

- Cement
- Aluminum
- Pulp and paper
- Services/Commercial buildings
- Passenger and freight transport

The IEA models these sectors based on sectoral growth and technology development trajectories. The emissions and sector activity growth projections from the B2DS will serve as the basis to derive the relevant targets for each sector under the selected asset class. Figure D2 illustrates the emission intensity pathways for the power sector in the B2DS.

In this example, the emissions intensity trajectory of the power utilities in the portfolio shall continuously decline from the base year toward the target level, even if the emissions are below the pathway benchmark. Note that IEA only provides pathways in a five-year interval, financial institutions may derive the pathway data through interpolation if the target year falls in between these five-year intervals.

Figure D2. Global Decarbonization Emission Pathway for the Power Sector



Source: IEA 2017.

Attribution approach

Setting the emissions baseline requires the allocation of companies’ (i.e., investees or borrowers) emissions and activity data to the financial institutions. In line with GHG Protocol and the Partnership for

Carbon Accounting Financials (PCAF), emissions should be allocated to financial institutions based on their proportional share of investment in the investee.⁸⁵

For listed companies, the attribution is calculated by the ratio of outstanding investment versus the Enterprise Value Including Cash (EVIC).

- **Outstanding investment (numerator):** The actual outstanding investment (if listed equity or bonds) or loan amount (if corporate loan).
- **Company value (denominator):** The Enterprise Value Including Cash (EVIC) of the respective company. In case elements of the enterprise value are not available, for example, due to data issues, the total balance sheet value expressed as the sum of total company equity and debt is used.

For private companies, the attribution is the ratio of outstanding investment or outstanding loan versus the total balance sheet (equity + debt):

- **Outstanding investment (numerator):** The actual outstanding investment (if private equity) or loan amount (if corporate loan).
- **Company value (denominator):** The total balance sheet value expressed as the sum of total company equity and debt.

The Global GHG Accounting and Reporting Standard for the financial industry (PCAF 2020) aligns the definition of EVIC with the definition provided by the following:

1. The Technical Expert Group on sustainable finance set up by the European Commission (EU TEG) in its [“Handbook of Climate Transition Benchmarks, Paris-aligned Benchmark and Benchmarks’ ESG Disclosure”](#) (December 2019) (Hoepner et al. 2019).
2. The (draft) “Supplementing Regulation (EU) 2016/1011 of the European Parliament and of the Council as regards minimum standards for EU Climate Transition Benchmarks and EU Paris-aligned Benchmarks,” which has defined that the EVIC should be used to determine the GHG intensities for the benchmarks.

After applying the attribution factor to both absolute emissions, the same attribution factor should be applied to calculate the total activity or output of the portfolio companies in a specific sector. These total activity or output data are needed as input into the SBTi tools to calculate the emissions intensity in the base year (i.e., the ratio of absolute emissions to activity data, for example, tonne CO₂e/kWh, tonne CO₂e/tonne of steel, etc.).

⁸⁵ This differs from a portfolio weight approach that works by applying the portfolio weight of each investment to the emissions intensity of the underlying company. For example, if 10 percent of the total equity portfolio in assets under management (AUM) is invested in Company A, the emissions intensity of the portfolio is calculated by applying the 10 percent to the emissions intensity of Company A, etc., and summing up all allocated emission intensities of the companies in the portfolio. This approach is often used for (ESG-) benchmarking of funds. However, this approach deviates from accounting principles in the GHG Protocol and the Partnership for Carbon Accounting Financials (PCAF).

Method output

The output will be a percentage reduction in emissions intensity relative to a specific activity or production output of the companies in the portfolio (e.g., tonne CO₂e per MWh, per tonne of steel, etc.).

Sample target outputs could be, as follows:

- Financial Institution A commits to reduce CO₂e emissions from the power sector in its loan portfolio with 30 percent per kWh by 2025 from a 2019 base year.
- Financial Institution B commits to reduce CO₂e emissions from the steel sector in its equity portfolio with 20 percent per tonne of steel by 2025 from a 2019 base year.

E. Temperature Rating Method

This method is an open-source framework to enable the translation of corporate GHG emissions reduction targets into temperature scores at a target, company, and a portfolio level. The method can be used to generate temperature scores for individual targets to translate target ambition to a common intuitive metric.

The method provides a protocol to enable the aggregation of target-level scores to generate a temperature rating for a company based on the ambition of its GHG emissions reduction targets. Finally, the method defines a series of weighting options that can enable financial institutions and others to produce portfolio-level temperature ratings.

Codeveloped by CDP and WWF, in collaboration with the SBTi, the methodology is, as follows:

- Transparent,
- Public/Open source, and
- Science-based.

The methodology:

- Enables assessment of corporate emissions reduction targets;
- Enables comparison of relative ambition of corporate emissions–reduction targets;
- Provides a framework for building engagement strategies; and
- Helps with strategic security selection and allocation decisions.

The target protocol represents the first step of the process, which is to convert individual targets of various formats into temperature scores. This is achieved by generating simple regression models for estimated warming in 2100 from climate scenarios with short-, medium-, and long-term trends in metrics like absolute emissions or emissions intensities. Regression models are generated based on scenarios in the IPCC special report on 1.5°C scenario database (CDP and WWF 2020). In addition to

defining methods for disclosed targets, this step outlines the methodology used to define a default score to be applied to all companies that do not disclose any emissions reduction targets publicly.

Since many companies have multiple climate targets, covering different scopes and time frames, a protocol is then used to aggregate all target data into scores at a company level. This protocol defines the minimum quality criteria for determining the acceptability of a target to be scored and the steps required to identify and aggregate multiple targets to produce an overall company score.

The final step is used to weight company scores when assessing an index or portfolio of companies, such as in the context of financial portfolios.

Seven potential options for aggregating individual company temperature scores at the index/portfolio are currently available. These include the following:

- Option 1: Weighted average temperature score (WATS);
- Option 2: Total emissions weighted temperature score (TETS);
- Option 3: Market owned emissions weighted temperature score (MOTS);
- Option 4: Enterprise owned emissions weighted temperature score (EOTS);
- Option 5: EV + Cash emissions weighted temperature score (ECOTS);
- Option 6: Total Assets emissions weighted temperature score (AOTS); and
- Option 7: Revenue owned emissions weighted temperature score (ROTS).

Table E1 below provides a description and formula for calculating the portfolio temperature scores using each of these options.

Table E1. Portfolio Weighting Options

Option	Method	Temperature score formula (where TS = Company temperature score)
Weighted average temperature score (WATS)	Temperature scores are allocated based on portfolio weights.	$\sum_n^i (\text{Portfolio weight}_i \times TS_i)$
Total emissions weighted temperature score (TETS)	Temperature scores are allocated based on historical emission weights using total company emissions.	$\sum_n^i \left(\frac{\text{Company emissions}_i}{\text{Portfolio emissions}} \times TS_i \right)$
Market Owned emissions weighted temperature score (MOTS)	Temperature scores are allocated based on an equity ownership approach.	$\sum_n^i \left(\left(\frac{\text{Investment value}_i}{\text{Company market cap}} \times \text{Company emissions}_i \right) \times TS_i \right)$
Enterprise Owned emissions weighted temperature score (EOTS)	Temperature scores are allocated based on an enterprise ownership approach	$\sum_n^i \left(\left(\frac{\text{Investment value}_i}{\text{Company enterprise value}} \times \text{Company emissions}_i \right) \times TS_i \right)$
Enterprise Value + Cash emissions weighted temperature score (ECOTS)	Temperature scores are allocated based on an enterprise value (EV) plus cash & equivalents ownership approach	$\sum_n^i \left(\left(\frac{\text{Investment value}_i}{\text{Company EV + Cash}} \times \text{Company emissions}_i \right) \times TS_i \right)$
Total Assets emissions weighted temperature score (AOTS)	Temperature scores are allocated based on a total assets ownership approach	$\sum_n^i \left(\left(\frac{\text{Investment value}_i}{\text{Company Total Assets}} \times \text{Company emissions}_i \right) \times TS_i \right)$

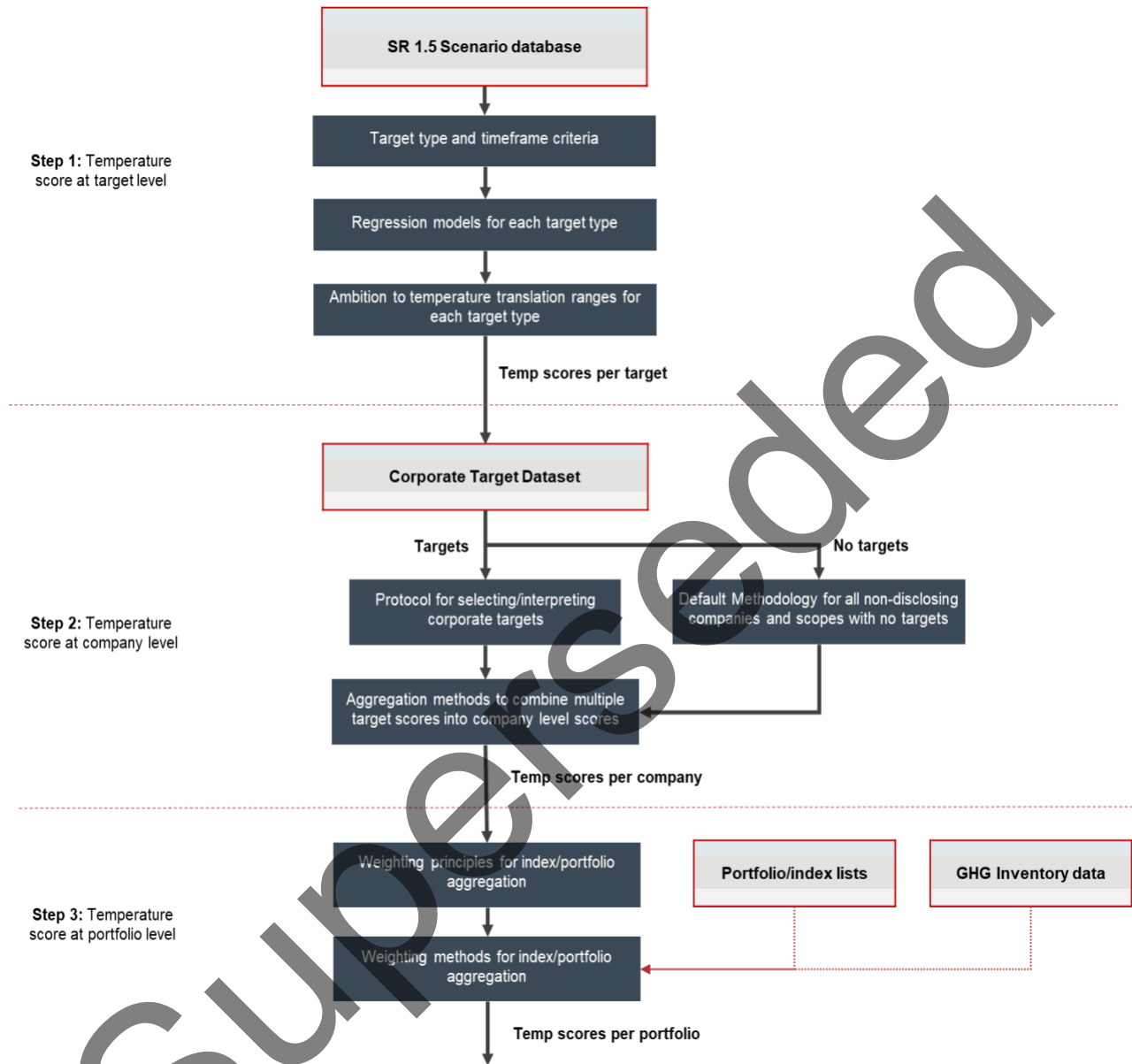
Revenue owned emissions weighted temperature score (ROTS)	Temperature scores are allocated based on the share of revenue	$\sum_n^i \left(\left(\frac{\text{Investment value}_i \times \text{Company emissions}_i}{\text{Company Revenue}} \right) \times \frac{\text{Company emissions}_i}{\text{Total Revenue owned emissions}} \right) \times TS_i$
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Sources: Temperature Rating Methodology, CDP Worldwide and WWF International 2020.

Figure E1 presents an overview of how the three protocols fit together to form the temperature rating methodology.

Superseded

Figure E1. Temperature Rating Methodology Overview



Sources: Temperature Rating Methodology, CDP Worldwide and WWF International 2020

The full methodology can be found [here](#).

F. SBTi Finance Temperature Rating and Portfolio Coverage Tool

Based on the [Temperature Rating method](#), developed by CDP and WWF, this tool helps companies and financial institutions to assess the temperature alignment of current emissions reduction targets, commitments, and investment and lending portfolios. They can for instance use this information to develop their own GHG emissions reduction targets for official validation by the SBTi, develop engagement strategies, and help with strategic security selection and allocation decisions.

This chapter provides a nontechnical introduction and overview of what the tool is for, the types of outputs it delivers, what data are required, how it works, and where you can find more information and documentation to start using the tool.

Why has the SBTi Built this Tool?

There has been a growing interest in methods to measure the alignment of companies and investment portfolios with the Paris Agreement. The success of the Science Based Targets initiative has seen a rapid growth in the number of companies with emissions reduction targets approved by the SBTi, and therefore, a growing number of companies claiming alignment to the long-term temperature goals set out in the Paris Agreement.

The SBTi has developed a codebase to function as a calculator for the Portfolio Coverage and Temperature Rating methods. This tool is fed with the necessary data to generate temperature scores at the company and portfolio level, in addition to providing analytics on target setting and company emissions reduction ambitions. It also gives users access to what-if analysis, to aid their decision-making process. The code reflects the logical steps that are outlined in the publicly available [temperature rating methodology](#), developed by [CDP](#) and [WWF](#).

The tool was created to enable the widespread implementation of the method by data providers and financial institutions, to work with any data source and in most IT environments. For each method, the tool provides the following outputs:

- Portfolio coverage: Generate the percentage of the portfolio currently covered by SBTi-approved targets; and
- Temperature rating: Generate the current temperature score of the portfolio (in addition to the individual temperature scores of the portfolio companies). It also enables the generation of a series of what-if scenarios to showcase how this temperature score could be reduced.

Why have We Built the SBTi Finance Tool in this Way?

To help financial institutions fight climate change, the SBTi wants the tool to be accessible, useful, and widely used by finance professionals and other users. If it is easy to access, not seen as a compliance tool only used once a year, but a tool to support the investment process, it will more likely be utilized widely. Therefore, when the SBTi started the development process, we set up a list of requirements for the tool. Some of the high-level requirements were, as follows:

- Distribution—most investment professionals should have easy access to the tool;
- Transparent—with full output audit trail and open methodology;

- Data agnostic—to be used with any data provider or an institution’s own data lake;
- Any infrastructure—to be integrated with service providers’ or homegrown decision support solutions;
- Workflow tool—to be integrated in investment professionals’ daily workflow;
- Data security—to make sure financial portfolio data are not compromised;
- Scale—to be able to use the tool at scale for many portfolios and aggregated on financial institution level; and
- Continued development—ensure enhancement of the method and tool for future requirements.

Given these requirements, the SBTi determined an open-source Python-based solution to be most appropriate. Such a tool can be integrated into existing solutions, in many cases making use of the same secure infrastructure as inhouse or commercial applications. As the tool pulls data from existing integration of data providers and/or internal data lakes, there is no need to go outside this infrastructure to access or deliver necessary data. Hence, no data that are not already within the institution’s domain need to enter or exit the institution to use the tool. The approach brings the model to the data, rather than the other way around.

SBTi Finance launched a request for proposal (RfP) for building the codebase to turn the methodology into a calculation engine in early 2020. The selected SBTi Finance Tool development project partners are Ortec Finance and the OS-Climate.

To make sure we built a tool that from the outset could work in as many different environments and for as many different users as possible, we reached out to users and data and service providers and invited them to work with us in our project team. This gave both users and data providers the opportunity to influence the development process and to prepare and develop their own solutions, data, and processes to work with the tool. This has been very helpful in getting their perspectives, to make sure the tool work with as many data providers’ data as possible, and that it fits with many users’ existing workflow.

A strong confirmation of the various tool use cases is the fact that a number of data/service providers have developed or are in the process of developing various solutions based on the tool and the methodology, to offer their clients. This collaboration also gives the SBTi Finance Tool a wider reach than what the SBTi could have achieved otherwise, and the tool should be available natively in their existing infrastructure for a significant proportion of the financial institutions globally. This integration should also ensure that the tool can be used at scale, to help large and small financial institutions alike to quickly analyze all their portfolios’ and constituents’ temperature scores.

The open-source nature of the codebase means that any user, data or service provider can use the code to build their own applications around the SBTi Finance Tool. It also means that it is available for all users to integrate into their own infrastructure, without any licensing cost. This should also ensure that the code continues to be developed both by the SBTi, data and service providers, and the open source community.

The tool also provides full transparency with regard to how the tool and methodology fit together through the open-source nature of both the codebase and the methodology. We have also provided easy to use functionality to extract every single data point generated by the tool, to provide a full audit trail, and transparency into how the temperature score is calculated.

During Summer 2020 we ran a public beta-testing phase, open to any organization or individual. The beta-testing phase included more than 110 registered beta testers. Users provided feedback on the

tool's functionality, documentation requirements, performance, and usability. This feedback has been incorporated in the final release version.

Altogether, our conversations with users and data providers and the feedback from 110 beta testers indicates that the development process and the structure of the SBTi Finance Tool has the potential to become an integrated experience and that it could become as natural for a portfolio manager or analysts to use as their discounted cash flow model or attribution report. In turn, this should ensure that portfolio and company temperature scores stay top-of-mind for finance professionals and that this ultimately leads to more efficient engagement processes and GHG emissions reductions in the real economy.

What Can You Use the SBTi Finance Tool For?

The SBTi Finance Temperature Rating and Portfolio Coverage Tool enables analysis of companies, sectors, countries, investment strategies, and portfolios to understand how they contribute to climate change. You can, for example:

- Measure your portfolio's current temperature score;
- Identify the biggest contributors on an individual company, country, and sector basis;
- Use the tool as an aid for strategic allocation and securities selection decisions;
- Analyze what effect changes in your portfolio might have on the portfolio temperature score;
- Model impact of engagement on your temperature score; that is, how your score can improve if you are able to convince an investee company to set or improve GHG emissions reduction targets;
- Identify which company engagements would have the biggest impact on your portfolio's temperature score;
- Plan engagement strategies based on your modeling;
- Fulfill regulatory reporting criteria, for example, Article 173 in France and the EU Disclosure regulation, regarding current portfolio alignment with the Paris Agreement; and
- Help you to create an action plan for reaching your emissions reduction target.

Given these possible insights, as confirmed by our beta-testing survey, the tool is relevant for a wide range of stakeholders, for instance:

- Portfolio managers—to support strategic allocation decisions and input into ESG discussions with corporate management;
- Financial analysts—to use the temperature score as an input into the cost of capital for valuation modeling;
- ESG analysts—to plan and execute corporate engagement strategies;
- Risk managers—for input into climate-related risk models;
- Compliance officers—for EU Disclosure Regulation and Article 173 reporting;
- Data and service providers—to provide company temperature scores and portfolio analytics for their users;
- Chief investment officers (CIOs)—to help to understand the portfolios' ESG position; and
- Nongovernmental organizations (NGOs)—for further research to enhance climate-related methodologies.

What Outputs Does the Tool Generates?

The temperature score can be calculated for all time frames (short-, medium-, long-term) and scope (scope 1, 2, 3) combinations covered by the SBTi methodology. Table F1 provides an overview of the six temperature ratings that can be generated.

Table F1. Six Categories for Each Company Based on GHG Emission Scope Coverage and Target Time Frame

	Short-term 2021-2024	Mid-term 2025-2035	Long-term 2035-2050
Scope 1+2	Temp score	Temp score	Temp score
Scope 3	Temp score	Temp score	Temp score

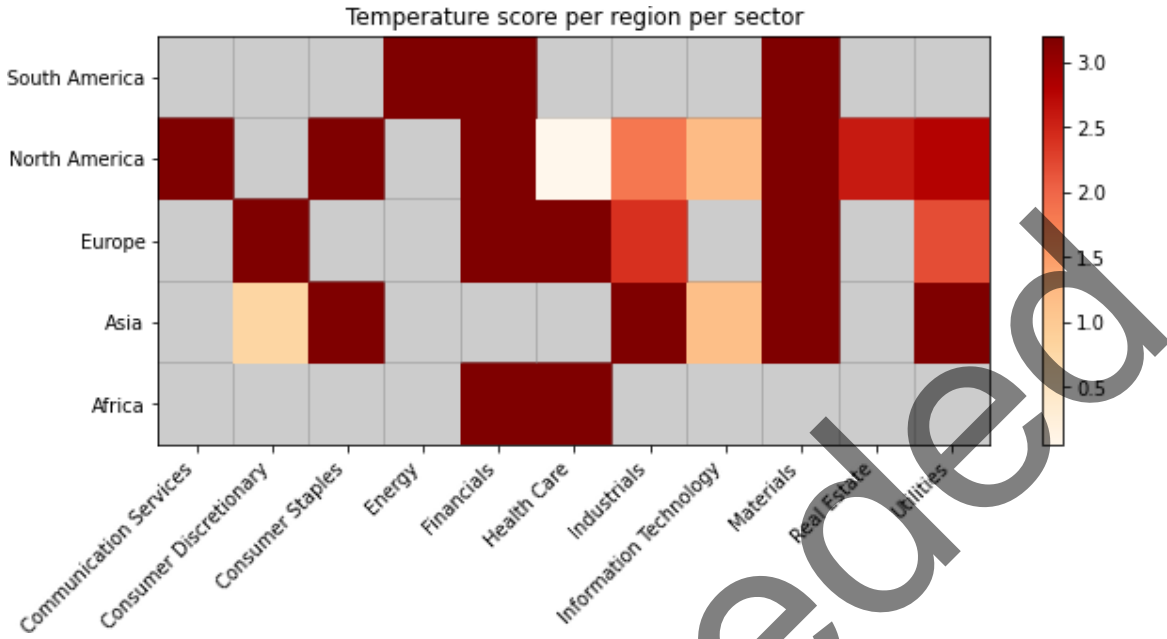
Source: Authors.

The temperature score calculation is available for the following levels:

- Portfolio temperature score: The aggregated score over all companies in the portfolio;
- Grouped temperature score: Using the “group by” option, the user can get the aggregated temperature score per category in a chosen field (e.g., per region or per sector); and
- Company temperature score: The temperature score of an individual company.

Figure F1 below provides illustrative outputs for grouped temperature scores by region and sector. These insights help inform use cases such as more targeted engagement strategies, aiding securities selection decisions, etc.

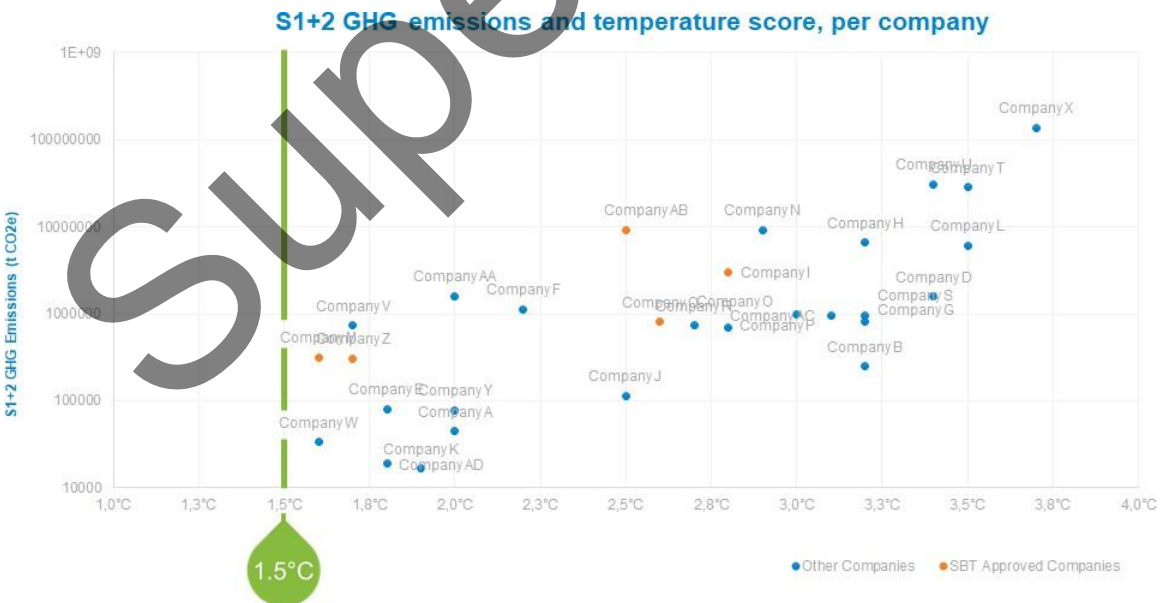
Figure F1. Illustrative Output of the Temperature Score on Portfolio Level, Grouped by Region and Sector



Source: Authors.

Figure F2 provides a visualization of the outputs when looking at the temperature score per company. This level of granularity of the tool enables users to zoom in on individual scores, for example, for informing engagement and/or monitoring temperature score progress of investees.

Figure F2. Illustrative Visualization of the Temperature Score Outputs per Company



Source: Authors.

For the portfolio temperature score and the grouped temperature score, additional more granular information is reported about the composition of the score:

- Contributions: The level to which each company contributes to the total temperature score based on the chosen aggregation method. This value is split up into company temperature score and relative contribution (e.g., the weight of the investment in the company relative to the total portfolio when using the WATS aggregation method).
- The percentage of the score that is based on targets vs. the percentage based on the default score.
- For the grouped temperature scores: The percentage each group contributes to the portfolio temperature score. For example: how much each region or sector contributes to the total score.

Table F2, taken from a Jupyter Notebook implementation of the tool (see, <https://sciencebasedtargets.github.io/SBTi-finance-tool/index.html> for executing your own rungs of the Jupyter Notebook) highlights the companies with the highest contribution to the portfolio temperature score and at the same time displays ownership and portfolio weight to give the user an indication of where an engagement may be more successful, purely from a quantitative perspective.

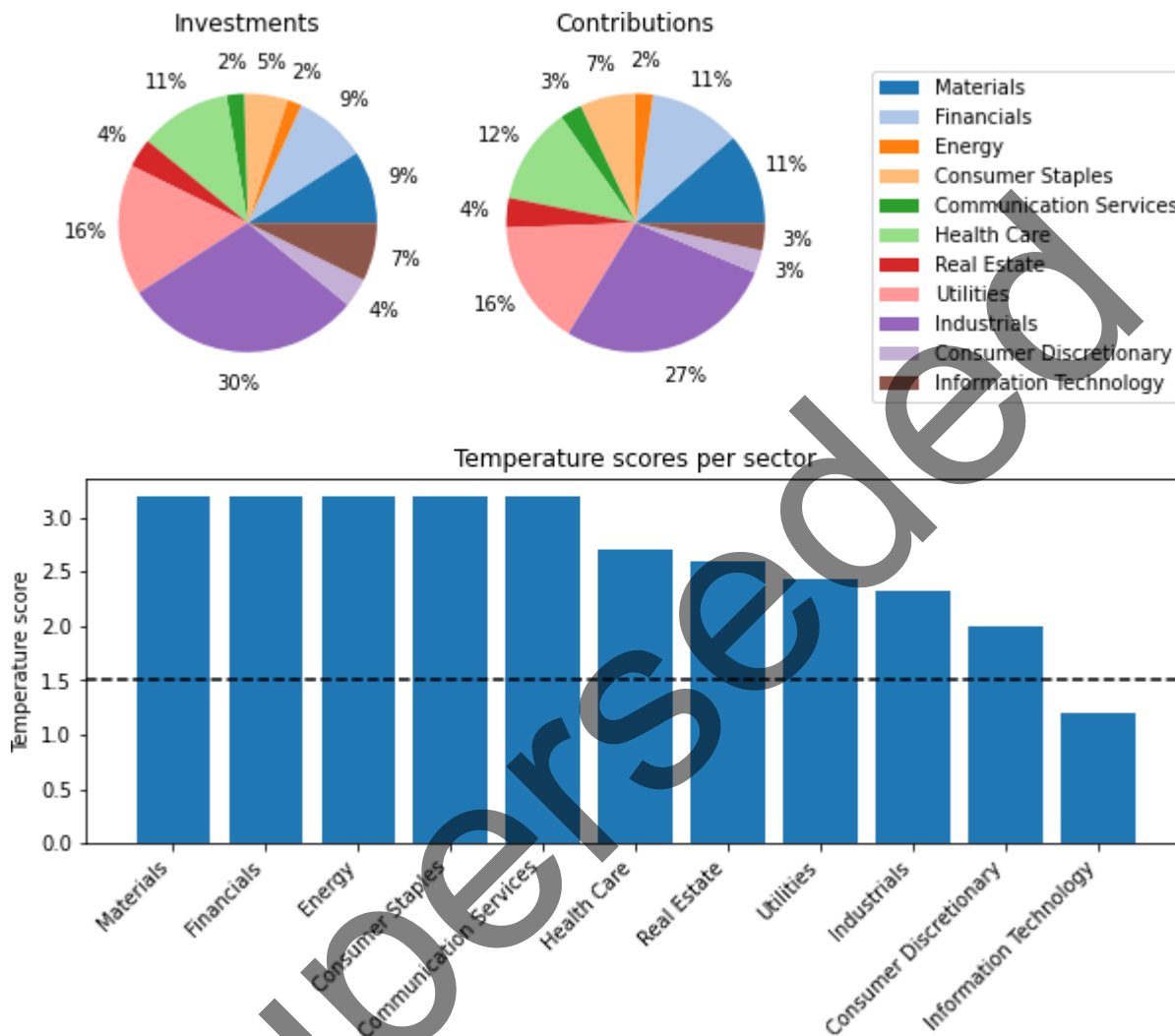
Table F2. Illustrative Output Table of the Temperature Score and Contribution Analysis on Company Level

company_name	sector	contribution	temperature_score	ownership_percentage	portfolio_percentage
Company N	Health Care	9.541310	3.20	0.189087	7.818182
Advanced Micro Devices, Inc	Industrials	4.926672	2.03	0.334454	6.363636
Company Q	Communication Services	2.662691	3.20	4.811121	2.181818
Dell Technologies	Financials	2.218909	3.20	0.290669	1.818182
Company AE	Industrials	2.218909	3.20	0.213551	1.818182
Company I	Consumer Staples	2.218909	3.20	0.328780	1.818182
Company AF	Consumer Staples	2.218909	3.20	0.974571	1.818182
Company F	Industrials	2.218909	3.20	0.109647	1.818182
Capgemini Group	Consumer Discretionary	2.218909	3.20	0.323925	1.818182
L'Oréal	Utilities	2.218909	3.20	0.400563	1.818182

Source: Authors.

Figure F3 depicts similar analysis in a more visual format. What can be seen in the figure is the relative contributions to the sector temperature scores.

Figure F3. Illustrative Visualization of the Temperature Score Outputs and Contribution Results Grouped per Sector



Source: Authors.

For the company temperature scores, you can let the tool generate all underlying data, which provides full transparency and gives the user the full audit trail for how the final temperature score has been calculated. This data output provides:

- Portfolio data;
- Financial data;
- GHG emissions;
- Used target and all its parameters; and
- Values used during calculation such as the linear annual reduction (LAR), mapped regression scenario, and parameters for the formula to calculate the temperature score.

You can also anonymize the output data, which removes all names and identifiers. This is particularly useful for sharing results of your temperature score without having to reveal your holdings, for example, for submitting your temperature score to the SBTi Target Validation Team to get your own GHG emissions reduction target approved. At the same time, it provides the opportunity to audit the scores during the validation process.

For more detailed examples, please see Jupyter notebook examples found at <https://sciencebasedtargets.github.io/SBTi-finance-tool/index.html>.

What Data are Needed to Use the Tool?

The tool itself is data agnostic and has no built-in databases. This means that users need to import all needed data to perform the analysis and can use any data source with the necessary data available. These data can come from a variety of sources but must be inputted in the required formats. The data providers we have worked with during the development have built or are in the process of building solutions to help with this process. Four types of data are needed to run the tool. These are described in the Table F3.

Table F3. Overview of Data Inputs

Portfolio holdings	<ul style="list-style-type: none"> • Company name • ISIC sector classification • ISIN and/or FIGI, if available. Other company identifier can also be used together with ISINs or FIGIs and are required to match identifiers from the three data sources below. • Market value of portfolio position for each company, using one common portfolio currency
Corporate GHG targets	<p>This refers to the data required to analyse corporate GHG emissions reduction targets, including:</p> <ul style="list-style-type: none"> • Target types (absolute/intensity) • Base year • Target year • Scope coverage • Boundary coverage within scope • Percentage achieved • Intensity activity (if applicable)
Corporate GHG emissions data	Scope 1 + 2 and scope 3 emissions data, reported or modelled

Corporate financial data	<p>Seven weighting options are currently available to aggregate company scores to produce portfolio scores. Depending on the option chosen, the following data may be required:</p> <ul style="list-style-type: none"> a. Invested value (holdings) b. Market capitalization c. Enterprise value d. Cash and equivalents e. Total assets f. Revenue
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Notes: ISIC = International Standard Industrial Classification; ISIN = International Securities Identification Number; FIGI = Fiscal Instrument Global Identifier.

Source: Authors.

Refer to the data requirements section at <https://sciencebasedtargets.github.io/SBTi-finance-tool/index.html> for full documentation. Also refer to the full methodology for [temperature rating](#).

Where Can I Find the Data?

Commercial data providers such as Bloomberg, CDP, ISS, MSCI, TruCost, and Urgentem can provide some or all the data needed for the SBTi Finance Tool.

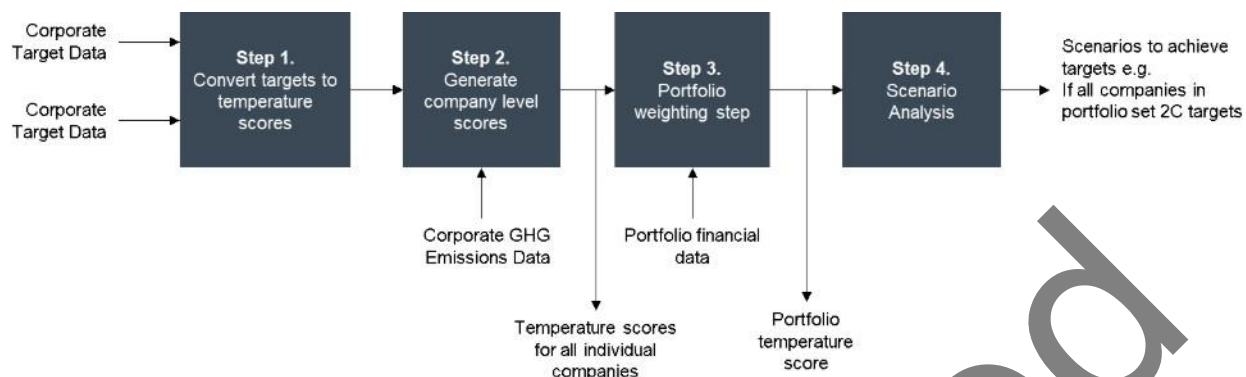
There is also a free data set available with corporate GHG targets data on the SBTi's website. This includes data of all the companies that have set emissions reduction targets that have been approved by the SBTi and is updated on a weekly basis. You can download an Excel-file with the data here: <https://sciencebasedtargets.org/companies-taking-action/>.

It is likely that your portfolio includes companies that are not in the list of companies with SBTi-approved targets, but that have publicly announced targets. Commercial data providers such as those listed above can provide target data for these companies.

Overview of How the Tool Works

The calculation methodology consists of four key steps (Figure F4), each requiring specific data points that are inputted at the beginning of the process. These data points are then used to convert the corporate GHG emissions reduction targets into temperature scores at the company and the portfolio level.

Figure F4. Data Points for the Four-Step Process



Source: Authors 2020.

Step 1: Converting publicly stated targets to temperature scores. The targets are first filtered and are—if valid—translated to a specific temperature score, based on the relevant regression model (Section 1.3 in the [methodology](#)). The sector classification of the company is used to ensure that the target is correctly mapped to the appropriate regression model; for example, a target for power generation must be mapped to the power sector pathway and corresponding regression model. This process enables the translation of target ambition over a certain target time period into a temperature score. For example, a 30 percent reduction target in absolute GHG emissions over 10 years can be converted into a temperature score of 1.76°C. It should be noted that those companies without a valid target are assigned a default temperature score (Section 1.4 in the [methodology](#)), rather than being excluded from the analysis.

Step 2: Aggregate across targets (if applicable) to a company-level temperature score. Reported corporate GHG emission data are employed to aggregate company-level temperature scores.

Step 3: Aggregate individual company temperature scores to portfolio-level scores. All the individual temperature scores per company in a portfolio are then combined with portfolio financial data to generate scores at the portfolio level.

Step 4: Run what-if analysis via the scenario generator. After the initial score calculations, a scenario generator can be used to determine how certain actions, for example, engagement, can change the portfolio temperature score over time. When running these what-if scenarios, the temperature score is recalculated with the assumption that, based on various engagements, some or all the companies in the portfolio decided to set (more ambitious) targets. The following what-if analyses are included in the tool in Table F4:

Table F4. What-If Analysis Options

Scenario 1	In this scenario all companies in the portfolio that did not yet set a valid target have been persuaded to set 2.0°C targets. This is simulated by changing all scores that used the default score to a score of 2.0°C.
Scenario 2	In this scenario all companies that already set targets are persuaded to set “well-below 2.0°C (WB2C) targets. This is simulated by setting all scores of the companies that have valid targets to at most 1.75°C.

Scenario 3	In these scenarios the top 10 contributors to the portfolio temperature score are persuaded to set 2.0°C targets. <ul style="list-style-type: none"> ○ Scenario 3a: All top 10 contributors set 2.0°C targets. ○ Scenario 3b: All top 10 contributors set WB2C, i.e., 1.75°C targets.
Scenario 4	In this scenario the user can specify (by adding “TRUE” in the engagement targets column in the portfolio data file) which companies it wants to engage with to set 2.0°C or WB2C targets. <ul style="list-style-type: none"> ○ Scenario 4a: All companies that are marked as engagement targets set 2.0°C targets ○ Scenario 4b: All companies that are marked as engagement targets set WB2C targets.

Source: Authors.

How can I Run the tool?

The SBTi Finance Tool has been built as an open-source, data-agnostic tool and works with input data from any data provider and in many different IT infrastructures.

As such, the SBTi Finance Tool for temperature rating and portfolio coverage can be used in several ways, depending on the specific preferences of the user.

If you are unsure whether the tool will be useful for your application and workflow, or you would first like to run some examples to get a better idea of how the tool works and what types of outputs it generates, the ‘1_analysis_example’ notebook (https://github.com/OFBDAV/SBTi/blob/master/examples/1_analysis_example.ipynb) offers a quick and no-code opportunity for such testing. The notebook combines text and code to provide a testing environment for your research, to give you an understanding of how the tool can help you analyze companies’ and portfolios’ temperature scores, and to aid your engagement and investment decisions. The notebook is loaded with example data, but you can also use your own data. For your first test, you can simply run the code cells one by one in the current sequence, to get an understanding of how it works. If you are not familiar with Notebooks, please refer to [this introduction](#).

Technical Structure

Figure F5 provides an overview of the different parts of the full tool kit and their dependencies:



Figure F5. Overview of the Tool Kit

```
+-----+
|  UI    : Simple user interface on top of API  |
|  Install: via dockerhub                       |
|          docker.io/sbti/ui:latest            |
+-----+
|  REST API: Dockerized FastAPI/NGINX         |
|  Source  : github.com/OFBDABV/SBTi_api      |
|  Install: via source or dockerhub           |
|          docker.io/sbti/sbti/api:latest     |
+-----+
|  Core   : Python Module                     |
|  Source  : github.com/OFBDABV/SBTi         |
|  Install: via source or PyPi                |
+-----+
```

Source: Authors.

As shown above, the Python code forms the core codebase of the SBTi Finance Tool. The Python package is recommended if users would like to integrate the tool in their own codebase. In turn, the second option is running the tool via the application programming interface (API) if users' preference is to include the tool as a Microservice in their existing IT infrastructure in the cloud or on premise. The development project also included the creation of a simple user interface (UI), which can be used for easier user interaction in combination with the API.

The SBTi tool enables three main ways of installing and/or running the tool:

- Users can integrate the **Python package** in their codebase. For more detailed and up-to-date information on how to run the tool via the Python package, please consult the "Getting Started Using Python" section at <https://sciencebasedtargets.github.io/SBTi-finance-tool/index.html>.
- The tool can be included as a Microservice (**containerized REST API**) in any IT infrastructure (in the cloud or on premise). For more detailed and up-to-date information on how to run the tool via the API, please consult the "Getting Started Using REST API" section at <http://getting-https://sciencebasedtargets.github.io/SBTi-finance-tool/index.html>. Optionally, the API can be run with a frontend UI. This simple user interface makes testing by nontechnical users easier. For more detailed and up-to-date information on how to use the UI as a frontend to the API, please consult the "Getting Started Using REST API" section at <https://sciencebasedtargets.github.io/SBTi-finance-tool/index.html>.
- During the development of this tool, we have worked with several data and service providers to the financial and ESG markets, some who have or are in the process of implementing the tool and methodology into their commercial solutions. These providers include Bloomberg, CDP, ISS, MSCI, Ortec Finance, TruCost, and Urgentem. Making use of their solutions can for some users be the easiest way to integrate the tool into existing infrastructure and workflow, to analyze portfolios' and companies' temperature scores.

Given the open-source nature of the tool, the community is encouraged to make contributions (refer to “Contributing” section at <https://sciencebasedtargets.github.io/SBTi-finance-tool/index.html>) to further develop and/or update the codebase. Contributions can range from submitting a bug report, to submitting a new feature request, all the way to further enhancing the tool’s functionalities by contributing code.

For more information on the tool, illustrative use cases, as well as how to install and run the tool, please consult <https://sciencebasedtargets.github.io/SBTi-finance-tool/index.html>.

Superseded

References

- 2dii (2 Degrees Investing Initiative). 2014. Paris Agreement Capital Transition Assessment. <https://www.transitionmonitor.com/>.
- Amundi Asset Management. 2020. "CDP Pioneers New Temperature Rating of Companies for Investors." <https://int.media.amundi.com/assets/pr-7-july-cdp-temperature-ratings-pdf-7016-b6afb.html?lang=en>.
- Aden, Nate. 2019. "Japan Is Leading on Business Climate Engagement. Will Ambitious Policies Follow?," June 28. World Resources Institute. <https://www.wri.org/blog/2019/06/japan-leading-business-climate-engagement-will-ambitious-policies-follow>.
- BAFU (Bundesamt für Umwelt). 2016. "Lifecycle Inventory Data in the Building Sector." https://www.kbob.admin.ch/kbob/de/home/publikationen/nachhaltiges-bauen/oekobilanzdaten_baubereich.html.
- Bank J. Safra Sarasin, Ltd. 2020. "Asset Management Climate Pledge." https://www.jsafrasarasin.com/internet/com/com_index/news/j_safra_sarasin_asset_management_launched_a_climate_pledge_aiming_for_a_carbon-neutral_outcome_by_2035/com_media_relations.htm.
- CDP Worldwide and WWF International. 2020. *Temperature Rating Methodology: A Temperature Rating Method for Targets, Corporates, and Portfolios-Beta Version*. CDP Worldwide and WWF International. https://6fefcbb86e61af1b2fc4-c70d8ead6ced550b4d987d7c03fcdd1d.ssl.cf3.rackcdn.com/comfy/cms/files/files/000/003/741/original/Temperature_scoring_-_beta_methodology.pdf.
- "Commission Delegated Regulation (EU)." 2020. European Commission. <https://ec.europa.eu/transparency/regdoc/rep/3/2020/EN/C-2020-4757-F1-EN-MAIN-PART-1.PDF>.
- CRREM (Carbon Risk Real Estate Monitor). 2020. "Global Pathways." <https://www.crrem.org/pathways/>.
- Cummis, Cynthia, Shilpa Patel, Chris Weber, Jakob Thomae, Stan Dupre, and Remco Fischer. "Exploring Metrics to Measure the Climate Progress of Banks." 2018. <https://www.wri.org/publication/exploring-metrics-to-measure-the-climate-progress-of-banks>.
- The Economist*. n.d. "How Much Can Financiers Do about Climate Change?" <https://www.economist.com/briefing/2020/06/20/how-much-can-financiers-do-about-climate-change>.
- Hoepner, A.G.F., P. Masoni, B. Kramer, D. Slevin, S. Hoerter, S. Humphreys, H. Viñes Fiestas et al. 2019. "Handbook of Climate Transition Benchmarks. Paris-Aligned Benchmark and Benchmarks' ESG Disclosure." Brussels: European Commission.
- IEA (International Energy Agency). 2013. *Transition to Sustainable Buildings: Strategies and Opportunities to 2050*. Paris: IEA.
- IEA. 2016. *World Energy Investment 2016*. Paris: IEA.

IEA. 2017. *Energy Technology Perspectives 2017*. Paris: IEA.

IPCC (Intergovernmental Panel on Climate Change). 2018. *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*. Edited by V. Masson-Delmotte, P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, et. al.

Raynaud, Julie, Stephane Voisin, Peter Tankov, Anuschka Hilke, and Alice Pauthier. 2020. *The Alignment Cookbook - A Technical Review of Methodologies Assessing a Portfolio's Alignment with Low-Carbon Trajectories or Temperature Goal*. Institut Louis Bachelier. <https://www.louisbachelier.org/wp-content/uploads/2020/07/rapport-0207-mis-a-jours.pdf>.

Jakob, Michael, Jan Christoph Steckel, Frank Jotzo, Benjamin K. Sovacool, Laura Cornelsen, Rohit Chandra, Ottmar Edenhofer, et al. 2020. "The Future of Coal in a Carbon-Constrained Climate." *Nature Climate Change* 10, no. 8 (August 2020): 704–7. <https://doi.org/10.1038/s41558-020-0866-1>.

"KLP Goes Coal Free." 2020. *KLP - English*. Accessed September 25. <https://www.klp.no/en/press-room/klp-goes-coal-free>.

Kölbel, Julian F., Florian Heeb, Falko Paetzold, and Timo Busch. 2019. "Can Sustainable Investing Save the World? Reviewing the Mechanisms of Investor Impact." SSRN Scholarly Paper. Rochester, NY: Social Science Research Network, July 20. <https://papers.ssrn.com/abstract=3289544>.

Krabbe, Oskar, Giel Linthorst, Kornelis Blok, Wina Crijns-Graus, Detlef P. van Vuuren, Niklas Höhne, Pedro Faria, Nate Aden, and Alberto Carrillo Pineda. 2015. "Aligning Corporate Greenhouse-Gas Emissions Targets with Climate Goals." *Nature Climate Change* 5 (12): 1057–1060. doi:[10.1038/nclimate2770](https://doi.org/10.1038/nclimate2770).

NATIXIS. 2018. "ESR Sector Policy Applicable to Oil & Gas Industry." https://www.natixis.com/natixis/upload/docs/application/pdf/2018-11/natixis_esr_sector_policy_oil_gas.pdf.

Partington, Richard. 2019. "Bank of England Boss Says Global Finance Is Funding 4C Temperature Rise." *The Guardian*. https://www.theguardian.com/business/2019/oct/15/bank-of-england-boss-warns-global-finance-it-is-funding-climate-crisis?CMP=share_btn_link.

PCAF (Partnership for Carbon Accounting Financials). 2019a. *Shaping the Climate Action Journey for Financial Institutions*. <https://carbonaccountingfinancials.com/files/downloads/Overview-Initiatives-Shaping-Climate-Action-Journey-for-FIs.pdf>.

PCAF. (Partnership for Carbon Accounting Financials). 2019b. *Accounting GHG Emissions and Taking Action: Harmonised Approach for the Financial Sector in the Netherlands*. <https://carbonaccountingfinancials.com/files/downloads/1911-pcaf-report-nl.pdf?6253ce57ac>.

- PCAF. (Partnership for Carbon Accounting Financials). 2019c. *Harmonizing and Implementing a Carbon Accounting Approach for the Financial Sector in North America*.
<https://carbonaccountingfinancials.com/files/2019-10/20191028-pcaf-report-2019.pdf>.
- PCAF (Partnership for Carbon Accounting Financials). 2020. “The Global GHG Accounting and Reporting Standard for the Financial Industry.” First Edition.
<https://carbonaccountingfinancials.com/files/downloads/PCAF-Global-GHG-Standard.pdf>.
- RICS (Royal Institution of Chartered Surveyors). 2017. *Whole Life Carbon Assessment for the Built Environment*.
<https://www.rics.org/globalassets/rics-website/media/upholding-professional-standards/sector-standards/building-surveying/whole-life-carbon-assessment-for-the-built-environment-1st-edition-rics.pdf>.
- Robeco Institutional Asset Management B.V. 2020. “Exclusion Policy Robeco: Robeco Institutional Asset Management.” <https://www.robeco.com/docm/docu-exclusion-policy-and-list.pdf>.
- Rocky Mountain Institute, Carbon Tracker Initiative, Sierra Club. 2020. “How to Retire Early: Making Accelerated Coal Phaseout Feasible and Just.” Basalt, CO: Rocky Mountain Institute.
- SAST (Safra Sarasin Investment Foundation). 2019. *Sustainable Real Estate Switzerland, Sustainability Report*.
<https://product.jsafrasarasin.com/internet/product/en/dl-fl?dl=0E9D7D47EBCEAC30>.
- SBTi (Science Based Targets initiative). 2015. *Sectoral Decarbonization Approach (SDA): A Method for Setting Corporate Emission Reduction Targets in Line with Climate Science*. Science Base Targets.
<https://sciencebasedtargets.org/wp-content/uploads/2015/05/Sectoral-Decarbonization-Approach-Report.pdf>.
- SBTi. 2020. “SBTi for Residential Mortgage and Commercial Real Estate Calculation Sheet.”
- SBTi. 2024a. “SBTi Corporate Near-Term Criteria (Version 5.2).”
<https://sciencebasedtargets.org/resources/files/SBTi-criteria.pdf>.
- SBTi. 2024b. “SBTi Criteria Assessment Indicators.”
<https://sciencebasedtargets.org/resources/files/Financial-Institutions-Criteria-Assessment-Indicators.pdf>.

Swiss Parliament. 2020. "Total Revision of the Swiss CO₂-Law after 2020."

<https://www.parlament.ch/de/ratsbetrieb/suche-curia-vista/geschaefte?AffairId=20170071>.

WRI (World Resources Institute) and WBCSD (World Business Council for Sustainable Development). 2004. *The Greenhouse Gas Protocol. A Corporate Accounting and Reporting Standard*, 2nd ed. Washington, DC: WRI and WBCSD.

WRI and WBCSD. 2011. *The Greenhouse Gas Protocol. Corporate Value Chain (Scope 3) Accounting and Reporting Standard*. Washington, DC: WRI and WBCSD. <https://ghgprotocol.org/corporate-value-chain-scope-3-standard>.

WRI and WBCSD. 2013. *Technical Guidance for Calculating Scope 3 Emissions*. Version 1.0. Washington, DC: WRI and WBCSD. https://ghgprotocol.org/sites/default/files/standards/Scope3_Calculation_Guidance_0.pdf.

WRI and WBCSD. 2015. *The Greenhouse Gas Protocol. Scope 2 Guidance*. Washington, DC: WRI and WBCSD. <https://ghgprotocol.org/scope-2-guidance>.

WWF (World Wildlife Fund). 2019. *Asset Owner Guide to Oil and Gas Producers*. Brussels: WWF.

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