MEIN FAIRMÖGEN

Technical Documentation

The fund database

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About MeinFairMögen:

MeinFairMögen was developed by the 2° Investing Initiative with financial support from the German Federal Ministry of the Environment.

MeinFairMögen is based on three pillars:

1. On the website, interested investors can find out about sustainable investments for retail clients in general.
2. With the help of a questionnaire, investors can determine their personal sustainability profile, which they can take with them as a basis for a consultation with a bank or financial advisor.
3. An extensive fund database with several thousand funds provides detailed information on the sustainability of funds. Users can search for individual funds and analyse them for sustainability aspects.

This document serves as technical documentation for the third pillar, the fund database.

About the 2° Investing Initative:

The 2° Investing Initiative (hereafter 2DII) is an international, independent and non-profit think tank for the development of climate metrics for the financial sector and their integration into financial regulation. Founded in 2012, the initiative works in Paris, Berlin, London, Brussels and New York City with the aim of bringing financial flows in line with the climate target defined in the Paris Agreement. The approximately 40 staff members combine expertise in financial markets, financial regulation, climate indicators, decarbonisation scenarios, risk models, and business strategies. We work on research projects with over 40 partners from the financial sector, business, research institutions, NGOs, universities, regulators, and policy makers. The focus of our activities is on PACTA climate scenario analyses, risk management, impact measurement and consumer protection for retail investors.

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1 Introduction

This document serves as technical documentation on the information that is shown in the fund database on MeinFairMögen and is intended to fulfil two purposes: On the one hand, it outlines the separate steps that are necessary to compile the fund database. On the other hand, the calculation, and the interpretation of the individual indicators is explained. The different steps described in this document are part of an iterative process which is undertaken on a 3-4 monthly basis and, therefore, the information on MeinFairMögen does not reflect real-time updates. Due to the complexity and the long-running analyses, real-time updates cannot be provided.

The financial products covered by MeinFairMögen are currently investment funds (e.g. Mutal Funds, Exchange Traded Funds). This requires that, in a first step, data on funds must be compiled and processed (see chapter 2).

Subsequently, the funds are analysed with the Paris Agreement Capital Transition Assessment (PACTA) scenario analysis, which was developed by 2° Investing Initiative (see chapter 3).

Following PACTA, the resulting outputs are combined with further information and are compiled into a spreadsheet format called a fund matrix (see chapter 4).

Explanations of the information in the fund database can all be found in chapter 4, except for the Paris-Alignment-Score. Due to its particular importance and complexity, the methodology is explained separately in chapter 5.

2 Fund data

As mentioned in the introduction, the scope of the fund database are investment funds, for which data needs to be obtained and prepared in the first place.

2.1 Project funds

The first step involves creating a list of project-relevant funds which shall later be displayed on the website. Hereby two broad categories exist:

- Funds which are available for retail investors in the D-A-CH (Germany, Austria, Switzerland) region
- Funds which carry a sustainability label

2.1.1 Retail funds registered in D-A-CH

First of all, all funds are taken into account that fall into the geographical as well as investor-specific focus.

In the case of MeinFairMögen, all funds registered for sale in Germany, Austria and Switzerland are identified. Of these funds, only those that are explicitly available to private investors or whose non-availability to private investors has not been reported are taken into account. Among these funds, the share class that the data provider Lipper identifies as the primary share class is then used to compile a list of fund ISINs which will then serve as an input for the later analysis.

2.1.2 Funds with sustainability label

In addition, sustainable marketed funds that do not fall within the scope described under 2.1.1 are added in order to integrate particularly relevant funds. Here, too, only the primary share class is used. The ISIN of funds that were awarded at least one of the following sustainability labels were added to the list in 2.1.1.:

FNG-Label
FNG Transparency Profile
ISR-Label
Austria Ecolabel
LuxFlag (Environment, ESG & Climate Finance)

2.2 Fund holding data

For the list of project relevant funds holding data is then obtained from the data provider Lipper. The holding data should consist of at least the following information: i) fund ISIN, ii) holding ISIN, iii) holding weight/value. Since up-to-date holding data with high coverage[1] is not always available for all funds, the following parameters were set in order to be able to analyse as many funds as possible, but also to ensure the quality of the analysis and not to use outdated data.

In the first step, the current holding data is compiled for all funds. If up-to-date data is not available, this process is repeated for the previous months, but only for a maximum of three quarters in the past (at the time of the data update on MeinFairMögen). In general, the holding data at the end of each month was used.

Since it is possible that Lipper may subsequently change the coverage of funds, the most recent download date was used for funds for which holding data was recorded several times in succession for one date.

Afterwards, all funds were assigned the available holding data at the end of the month and the respective coverage per fund per month was calculated (for example, for Fund A 96% of the holdings were recorded in August, 67% in September and 92% in October).

Then, only funds above 90% coverage are considered (in the example, the September holding data would be filtered out). This was set as a relevant threshold above which certain quality assurance is assumed. For funds below 90%, the probability is high that potentially relevant holdings have not been included, so that an incorrect assessment is subsequently made. Even at 90%, this cannot be guaranteed, but this threshold represents a compromise in order to analyse as many funds as possible at the same time. However, the vast majority of the funds displayed on MeinFairMögen have a coverage of 100%.

If a fund has holding data for several months with sufficient coverage, the most recent month is choosen (in the example described above, this would be October, even if the fund has better coverage in August).

At this point, a list is obtained in which each fund and the associated holdings appear for a timestamp, but not more than once and not at different times.

2.3 Fund-in-Fund Analysis

Next, the so-called fund-in-fund (FiF) analysis is carried out. If a fund (in this case the so-called parent fund) itself invests in another fund (so-called child fund), it also invests indirectly in the companies from the child fund. With the FiF, these investments can be attributed to the parent fund and these therefore also flow into the subsequent analysis.

In the first step, all child funds are identified and, if not already done, holding data is collected for them. These are then scaled and attributed to the parent fund (e.g., if the parent fund invests

[1] Coverage is defined as the share of the fund size, which is known, meaning that for this proportion of a fund holding data is available.

10% in a child fund and the latter invests 20% in Volkswagen, the parent fund then indirectly invests 2% of its values in Volkswagen, even if it did not invest directly beforehand).

In the FiF analysis, the parent fund is ideally assigned the holdings of the child fund from the same timestamp. However, if holding data are not available at the same time, different time stamps of parent and child funds are also accepted in order to identify possible controversies and climate-relevant companies later on. However, the possible difference in the timestamps is limited to the period of the project from chapter 2.3, so that there is at most a difference in the timestamps of parent and child funds of a few months.

Child funds with high coverage were added to the parent funds first. Overall, no minimum coverage was set for the FiFs, but poor coverage of a child fund affects the parent fund later (e.g., if a parent fund has 100% coverage but invests 10% in a child fund with a coverage of 50%, the parent fund will only have 95% coverage after the FiF analysis).

All remaining child funds for which no holding data were available are filtered out. This is necessary because otherwise one would assume too good coverage for a parent fund. If, for example, the remaining, unanalysed child fund makes up 50% of the parent fund, the parent fund invests 50% indirectly in many other companies, which, however, cannot be analysed.

After filtering out all funds with a coverage of less than 90% in 2.2, the following FiF analysis may have led to another deterioration in coverage. Therefore, after the FiF analysis, all funds with less than 90% coverage are filtered again. Furthermore, there are cases in which coverage exceeds 100%. In most cases, this is due to rounding and the excess is only a few decimal places. In a few cases, however, the coverage totals far more than 100%, which is why a tolerance of 10% is also set here so that only funds are finally taken into account that lie between 90% and 110%.

2.4 PACTA Input portfolio

After having compiled the fund holding data, the PACTA input portfolio is then prepared. Since PACTA uses market values instead of weights for the analysis, the weights of the holdings are converted into absolute values. Since not all portfolios have 100% coverage, this must be considered in the input portfolio (e.g., if a fund invests 10% in share A but only has 95% coverage, PACTA would assume that the fund invests 10.5% in share A without taking the missing 5% into account, which would distort the analysis). Therefore, a dummy holding is inserted in each portfolio to account for the missing coverage.

Since the PACTA input portfolio also needs an entry for the investor of a portfolio and this is not always available, a dummy name is entered (e.g., Investor A, Investor B, etc.), which should be manually overwritten later in the final matrix.

More information about the format and structure of the PACTA input portfolio is available here.

3 PACTA

After having prepared the fund data which shall be displayed on MeinFairMögen, the Paris Agreement Capital Transition Assessment (PACTA) climate scenario analysis is used to analyse the fund data.

PACTA measures the alignment of financial portfolios to climate change scenarios, including Paris aligned scenarios, across climate relevant sectors. PACTA is aimed at informing about transition risk with the ultimate goal of driving emissions reductions in the real economy and is able to measure the alignment of listed equities, corporate bonds, and corporate lending.

The assessment of portfolio alignment to a climate scenario is based on forward-looking production values, which are measured in economic units of output in the real economy. It is thus distinguished from purely carbon accounting frameworks, which are often based on historic data. Despite this distinction, PACTA can be used as an input into carbon accounting frameworks, with the use of emission factor models, and can complement such frameworks in their own right.

PACTA is an open-source iterative methodology. Designed in consortium with academic institutions, industry initiatives, not for profits and financial institutions, it has received funding from the EU Life Programme, International Climate Initiative (IKI) and Germany's Federal Ministry for the Environment, Nature Conservation and Nuclear Safety.

For information about the methodology, the underlying scenarios, the data sources and how to use PACTA, please visit transitionmonitor.com and the PACTA Knowledge Hub.

4 Fund Matrix

After having applied PACTA, the so-called fund matrix needs to be compiled, which can be understood as a spreadsheet consisting of the information displayed on MeinFairMögen for each fund.

To create the fund matrix, several output files from the PACTA analysis are needed as well as, depending on the scope and objective, data from third-party providers to analyse controversial activities of companies or to assign funds sustainability labels. In the next chapters, an overview of the necessary input data is given, followed by a detailed explanation of the calculation of the individual indicators.

4.1 Overview of input data

4.1.1 PACTA-Outputs

4.1.1.1 Total Portfolio

Running the PACTA methodology on a personal machine for an individual project creates a particular folder structure. This yields a file in the project folder "30_Processed_Inputs" which contains the name of the respective project and the suffix "total_portfolio". This file contains all the portfolios of all funds, i.e. information on the fund ISIN, holding ISIN, market values, shares and sector classification of the holdings as well as information on whether they have been analysed by PACTA. In the following, this file is referred to as the total portfolio.

4.1.1.2 PACTA-Results

The results of the PACTA analysis can be found in the project folder "40_Results". This folder contains the results both in aggregated form and separately for each investor (in the individual subfolders). The results are available at both company and portfolio level (suffix "company" or "portfolio") and are differentiated according to equity and bonds (prefix "bonds" or "equity"). All four files are needed to create the fund matrix, but results of different asset classes are combined so that in the following we speak of the portfolio results ("Equity_results_portfolio" & "Bonds_results_portfolio") and company results ("Equity_results_company" & "Bonds_results_company").

4.1.1.1 Project specifications of the PACTA outputs

The results from the PACTA analysis for sectors and technologies are available for different time periods, scenarios, regions and allocation principles, so that specifications must be made for the compilation of the fund matrix according to which the results are filtered. In the analysis for MeinFairMögen, the results at a global level are used for the B2DS scenario of the International Energy Agency, and the so-called "portfolio weight approach" is applied as an allocation principle. In addition, a 5-year horizon is analysed depending on the year of the analysis.

4.1.2 Controversial activities of companies

One key instrument to analyse the sustainability of a fund, is the analysis of the controversial activities of companies within a fund. Therefore, information must be available on which companies are associated with which controversies. In order for this information to be aggregated at the portfolio level, ISINs f or all securitiesshould be available for the associated companies.

4.1.3 Fund labels and ESG scores

If not already created for the compilation of project-relevant funds (cf. chapter 2.1.2), a list of ISINs and the associated fund labels must be available for the compilation of the fund matrix. The information on whether a fund carries a label is gathered directly from the publicly available lists of the respective organization or agency. The lists available at the time of the analysis are used and, where possible, the information on this is updated when new lists become available.

4.1.4 Additional fund information

Based on the processing of fund data and further information from Lipper, a file is necessary for the characteristics of a fund. This should contain the timestamp of the fund data for each fund, the fund size (in the case of MeinFairMögen across all share classes), the fund name and the fund management company. Again, this information should be given per ISIN.

4.2 Detailed information on indicators

4.2.1 CO_2 intensities per sector of a portfolio

The CO_2 intensities for a portfolio are reported at a sector level, for which the CO_2-intensities from the portfolio results are used for the start year of the given time period. However, since these are available at the technology level, the sector level CO_2-intensity is derived as a weighted average of the technology CO_2-intensities. The weighting is done according to the production share attributable to technology in a sector.

$$I_S = \frac{\sum(I_T \times P_T)}{\sum P_T}$$

$Sector\ CO_2\ Intensity\ I_S$
$Technology\ CO_2\ Intensity\ I_T$
$Technology\ Production\ P_T$

The calculated CO_2-intensities can be understood as the average CO_2-intensity of all companies in the portfolio per sector in the present, which are then compared to climate scenarios. A distinction is made here according to three colours: Green stands for a portfolio sector intensity in line with the Paris climate goals, yellow for a scenario based on the current climate efforts of policies and red for a scenario that stands for "business as usual". The following table shows the intervals for the classification:

Sector	Red	Yellow	Green	Unit
Power	> 499	499 - 440	< 440	$kgCO_2$ (scope 1)/MWh
Automotive	> 99.8	99.8 - 95	< 95	gCO_2 (scope 3)/pkm
Steel	> 1.79	1.79 – 1.44	< 1.44	tCO_2 (scope 1 & 2)/t crude steel
Aviation	> 110	110 - 104	< 104	gCO_2 (scope 1)/pkm
Cement	> 0.59	0.59 – 0.538	< 0.538	tCO_2 (scope 1 & 2)/t cement

4.2.2 Overall PACTA und Sector Exposure of a portfolio

Based on the total portfolio, the sector exposure of a fund is calculated. However, due to the special focus of the platform, only positions that have also been analyzed with PACTA are taken into account, meaning that companies that are in principle also active in these sectors but, for example, have no production capacities or are active in the supply industry were not included in the calculation of sector exposures. The total exposure to PACTA-relevant sectors is the sum of the individual sector exposures. The calculation is based on the company classification made in PACTA.

More information on company classification in PACTA can be found here.

4.2.1 Technology und Portfolio Alignment

The indicators about technology and portfolio alignment are based on the Paris-Alignment-Methodology. More details about the calculation can be found in chapter 5 of this document.

4.2.2 Controversial corporate activities

For the analysis of a fund's controversial corporate activities, the individual holdings in the total portfolio are matched against a list of companies that have been associated with these controversies (for an overview, see table below). A fund is analyzed for a total of 15 controversies, and it is also indicated whether the portfolio as a whole is in line with the Paris climate goals, i.e., has a positive Paris Alignment Score and has therefore been awarded an A (see chapter 5 for more information). For each controversy, the weight of holdings, which are associated with that controversy, is calculated. In the following chapters, detailed information about the list of companies with controversial corporate activities is presented.

Source	Environment	Social & Ethics	Governance
ISS ESG	Genetically modified organisms	Weapons	Corruption
	Hazardous Pesticides	Addictive Substances (Tobacco, Alcohol)	No women on board or management
	Palm Oil	Human Rights Controversies	Violation UN Global Compact
	Controversial Environmental Practices	Labour Rights Controversies	
		Violation of animal welfare	
2DII (2DII relies on different data sources for this, more on this at transitionmonitor.com)	Non-compliance with the Paris-Goals		
	Coal		
	Oil & Gas		
	Nuclear energy		

4.2.2.1 ISS ESG

For 12 of the 15 controversies mapped on MeinFairMögen, information from the data provider ISS ESG is used. In case of queries regarding individual controversial indicator, we refer directly to ISS ESG. In general, no revenue thresholds were taken into account for the company activities, and activities along the value chain were also recorded. The following tables give an overview of the indicators:

Genetically modified organisms	The weighting of companies in the fund that are involved in the production and/or processing of products from genetically modified organisms is shown. This includes companies that are involved in the production of seeds, crops and/or food additives with the aid of genetic engineering. Also included are companies involved in the production of pharmaceutical drugs or active ingredients, industrial chemicals, biofuels and/or other consumer products using genetic engineering.
Hazardous Pesticides	The weighting of companies in the fund that are involved in the production of pesticides containing ingredients classified as extremely or highly hazardous by the World Health Organisation (WHO) is shown.
Palm Oil	The weighting of companies in the fund that are active in the production, distribution or processing of palm oil and finished palm oil-based products is shown. This includes companies involved in the cultivation of oil palms (producers), the operation of palm oil mills, refineries and/or fractionation plants (processors), the manufacture of finished products using palm oil, including food and non-food products (chemicals, biofuels, personal care products) (users) or the distribution of crude palm oil, palm kernel oil, palm kernel flour, derivatives or fractions (distributors).
Controversial Environmental Practices	The weighting of companies in the fund that are involved in serious or very serious environmental controversies according to ISS ESG is shown. These include violations of international environmental standards, such as the Rio Declaration on Environment and Development, the Convention on Biological Diversity or the Paris Climate Agreement, among others. The assessments are updated when relevant new information is available or at least annually.

Weapons	The weighting of companies in the fund that are involved in controversial weapons (ABC weapons, anti-personnel mines, incendiary weapons, cluster munitions, uranium ammunition and armour, ammunition with white phosphorus) and/or are generally involved in the production, distribution or provision of services related to military equipment (weapons of war, supporting military equipment, as well as their components) or/and civilian firearms is presented. Services include maintenance, repair, testing, transport and similar activities in the aforementioned areas. This indicator is broadly defined, so that it also includes companies that are active in the field of logic (e.g. by transporting tanks) or that produce goods that have both civilian and military uses (e.g. oxygen masks for pilots), provided that these goods have been specifically developed or modified for military use.

Addictive Substances	The weighting of companies in the fund that are engaged in the production, distribution or provision of services related to alcoholic beverages and/or tobacco products is presented. Distribution includes companies engaged in the wholesale or retail sale of alcoholic beverages and/or tobacco, including liquor shops, supermarkets, bars and restaurants. Services include enterprises engaged in the licensing, marketing and advertising of alcoholic beverages and/or tobacco and also enterprises that supply key raw materials and packaging products specifically used in the production of alcoholic beverages and/or tobacco products, such as beer bottles, wine corks or cigarette packaging. This indicator does not require a minimum share of activities in turnover.
Human Rights Controversies	This indicator shows the weighting of companies in the fund that are involved in serious or very serious human rights controversies according to ISS ESG. These include violations of international human rights standards, such as the International Bill of Human Rights, the International Covenant on Civil and Political Rights (ICCPR) or the International Covenant on Economic, Social and Cultural Rights (ICESCR), among others. Assessments are updated when relevant new information is available or at least annually.
Labour Rights Controversies	The weighting of companies in the fund that are involved in serious or very serious labour rights controversies according to ISS ESG is shown. This includes violations of international labour rights standards, such as the International Labour Organisation (ILO) Convention, among others. The ratings are updated when relevant new information is received or at least annually.
Violation animal welfare	The weighting of companies in the fund that violate animal welfare is shown. On the one hand, this includes companies that conduct animal experiments on live animals for pharmaceutical and non-pharmaceutical purposes. Secondly, this excludes companies that engage in intensive farming to produce food, including meat, eggs and dairy products, or companies that breed, trap or slaughter animals for their fur and leather.

Violation UN Global Compact	The weighting of companies in the fund that are involved in serious or very serious controversies in at least one of the four core areas of the UN Global Compact according to ISS ESG is shown. These include violations of international standards in the areas of environmental protection, human rights, labour rights and corruption. The ratings are updated when relevant new information is received or at least annually.
No women on board or management	The weighting of companies in the fund that do not have women on their management and/or supervisory boards is shown.

Corruption	The weighting of companies in the fund is shown which, according to ISS ESG, are involved in serious or very serious controversies in the area of corruption. This includes violations of international anti-corruption standards, such as the UN Convention against Corruption, among others. The ratings are updated when relevant new information is available or at least annually.

4.2.2.1 2° Investing Initative (2DII)

The activities of companies in the coal, oil & gas and nuclear energy sectors are provided by 2DII in two different ways. First, information from Bloomberg is used that shows which companies are active in the mentioned areas. Then, this list is completed with companies that show production capacities for the current year in the company results file (from the PACTA analysis). Here, the production figures at technology level are used.

The controversy of non-compliance with the Paris climate targets is based on the Paris-Alignment-Score, which is calculated by 2DII for funds as a whole. Funds with negative values, corresponding to a score of B-F, are subsequently marked with this controversy (for the calculation of the Paris Alignment Score, see chapter 5).

Non-compliance Paris-Goals	The fund includes companies that do not meet the targets of the Paris Climate Agreement according to the Paris Compatibility Score.
Coal	The fund contains companies that are active in the mining and/or conversion of coal into electricity.
Oil & Gas	The fund contains companies that are active in the production and/or conversion of oil and gas.
Nuclear Energy	The fund includes companies that are active in the extraction and/or conversion of uranium into electricity.

4.3 Further fund information

4.3.1 Fund characteristics

Following the previous analysis, information on the fund's management company, size and name is incorporated from the relevant input file (again by ISIN). The fund size is reported for the entire fund and not just for the respective share class and at the time from which the data on the holdings is also available.

4.3.2 Label & ESG-Scores

Subsequently, each fund is matched with the list of labelled funds as well as their ESG scores from the relevant input file. For more information on the label characteristics and specifications, we refer to the particular labelling agency. Following fund labels, scores and ratings are currently included:

FNG-Label
FNG Transparency Profile
ISR-Label
Austria Ecolabel
LuxFlag (Environment, ESG & Climate Finance)
ISS ESG Primate Status
ISS ESG Fund Rating

4.4 Quality assurance

In chapter 2, a 90% coverage threshold was introduced below which funds are not considered. However, before the final list of funds is uploaded to the platform, final quality assurance is undertaken.

While only funds with a coverage of over 90% were included in the PACTA analysis, not all holdings of a portfolio can always be analysed in this process. This can happen when the ISIN of a security cannot be matched to a company and therefore it cannot be ensured that they would not have to be attributed to a relevant company from the PACTA sectors after all. Reasons for this may be that Bloomberg has no information about the ISIN, that an ISIN is incorrect or that it is a very recent ISINs (e.g., of a newly issued bond) that has not yet been included in the database. To account for this, the share of these non-analysed ISINs in a fund is calculated and deducted from the previous fund coverage. If for example 95% of a fund's holdings were previously known, but a further 6% could not be analysed, the actual coverage in the PACTA analysis is 89% of a fund. In such cases, the fund is no longer displayed on the platform.

Positions without ISIN (e.g., cash positions) and short positions are excluded from this rule, as the former are usually not relevant for PACTA and the latter cannot be analysed by PACTA, as PACTA does not have a methodology to analyse them in a meaningful way at the moment.

5 Paris Alignment Score

The Paris-Alignment-Score was developed by FinanceMap with the support of 2DII. FinanceMap is a publicly accessible platform operated by the London think tank InfluenceMap. The Paris-Alignment-Score is based on the results of the PACTA analysis, which analyses individual technologies in a sector. However, within PACTA there is neither an aggregation of the individual technologies to a single sector nor an aggregation to an individual portfolio. The Paris-Alignment-Score, therefore, attempts to combine the results of the PACTA analysis into one indicator.

5.1 Paris Agreement Capital Transition Assessment (PACTA)

5.1.1 General Information

For general information about PACTA, please go to chapter 3 or visit transitionmonitor.com and the PACTA Knowledge Hub.

5.1.2 Measuring Technology Alignment

The PACTA method involves three basic steps to determine technology alignment.

5.1.2.1 Roadmap Translation

The analysis translates leading climate scenarios such as those published by the International Energy Agency (IEA) into a form that can be compared with financial portfolios. To achieve this, the scenario is adapted to reflect the global availability and production of key climate-relevant industrial sectors on global financial markets through public equity and corporate bonds. This is then used to construct a theoretical target portfolio whose exposure to different sectors & technologies is aligned with the scenario.

FinanceMap uses the IEA 'Beyond 2 Degrees' (B2DS) scenario as a 'roadmap' for the mix of 'technologies' required to meet global demand while adhering to an emissions pathway that maintains a 50% chance of keeping the global average temperature to 1.75°C above pre-industrial levels. This scenario is currently the most ambitious available from the IEA with respect to climate change targets that have been translated for PACTA analysis.

5.1.2.2 Technology Exposure

Using industry-specific databases, PACTA determines a company's future production in the climate-relevant technologies over a five-year time horizon using forward-looking production data, such as the company's verified plans for new power capacity. Company production is determined at the asset-level, e.g., the level of the individual power plant or vehicle manufacturing facility. The company's total production in technology is then allocated proportionately to a financial portfolio based on the portfolio weight approach. This approach calculates the portfolio's technology exposures based on the weighting of each position within the portfolio. The technology exposure is presented in weighted technology share (i.e., percentage values). The weighting of the technology share is done by the weight of the

company in the portfolio. For more information on accounting principles, please have a look at the relevant section in the PACTA Knowledge Hub.

5.1.2.3 Alignment analysis

Based on the companies, a portfolio's total exposure to each technology or sector is compared to the exposure of the target B2DS portfolio. The deviation between the target and the portfolio under consideration is calculated for each technology. The alignment can be calculated for every year, but in the context of the Paris-Alignment-Score, a five-year time horizon is chosen. In this context, to measure the alignment for the Paris-Alignment-Score, a distinction must be made as to whether build-out roadmaps exist for a technology and sector in the scenarios and to what extent information on forward-looking build-out plans exist. Both are available for the power, automotive, coal and oil & gas sector. For aviation, cement and steel, there is currently no forward-looking data available, and the scenarios do not specify absolute technology production figures, but rather CO_2-intensity targets on a sector level.

5.1.2.3.1 Sectors with technology build-out roadmap and forward-looking data

In the context of technologies with a technology roadmap and forward-looking data, two different alignment indicators can be calculated: trajectory and build-out alignment.

To calculate the trajectory alignment, the total planned production of technology is compared against the total production, which the scenario would require. If the companies in a portfolio plan to produce 350 MW renewable energy by 2025, but the scenario would actually require 400 MW, the trajectory alignment is -12.5% for this specific technology.

The calculation of the build-out alignment is similar but compares the planned and required build-out (or "build back" for emission intensive technologies) in production against each other. Taking the same example as above, and assuming the companies in a portfolio produce 300 MW renewable energy today, their required build-out is 100 MW. But as the planned build-out is only 50 MW, the build-out alignment for this specific technology is -50%.

While the former gives a better picture of the general alignment in the end year, the latter is a better measure of which companies, hence also portfolio, actual take action and build out green technologies and build back emission intensive technologies. For the Paris-Alignment-Score on MeinFairMögen, the build-out alignment is taken as the input.

5.1.2.3.2 Sectors without technology build-out roadmap and forward-looking data

In the context of sectors without technology build-out roadmaps and without forward looking data, which is the case for aviation steel and cement, production is less relevant than CO_2-intensity, which is taken as a measure of alignment. For this purpose, the results of all technologies from these sectors in PACTA are first aggregated at sector level (weighted by share of production). Then the target CO_2-intensity in 5 years is compared with the current CO_2-intensity. The greater the difference between today's CO_2-intensity and the target CO_2-intensity in 5 years, the worse the alignment.

Ideally, the planned CO_2-intensity in 5 years should be compared with the target CO2-intensity in 5 years, but this is not possible due to a lack of data. Therefore, the current status quo is taken as a proxy for the alignment in 5 years.

5.2 Portfolio Paris Alignment

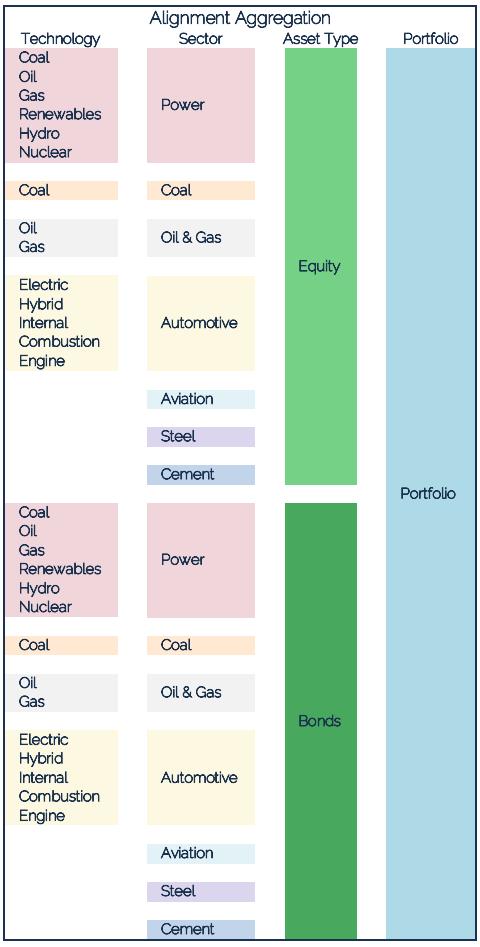
FinanceMap has devised a methodology for aggregating the alignment estimates of the PACTA analysis, which are provided at technology level per asset type. The goal is to produce not only sector-level indicators but also a single top-line indicator for the whole portfolio called 'Paris Alignment-Score'.

The score grades funds according to their alignment with the climate targets of the Paris Agreement to limit global warming to within 1.5°C. Depending on the sector, the forward-looking and scenario-based assessment method refers to either technology expansion plans until 2025 or CO_2-intensities of the most energy-intensive companies in a fund. The build-out plans and CO_2-intensities are used to assess whether funds would be in line with the Paris climate target in 2025. For this, the alignment measures of per technology or sector of the PACTA analysis are taken, as these are calculated on the comparison of build-out plans and CO_2 intensity with scenario targets (see chapter 5.1.2.3). The alignment is scaled from a range of -100% to 100%, with a result of 0% implying the technology or sector is exactly in line with the target, and a deviation greater than 0% implying the technology or sector is exceeding the IEA B2DS target. The alignment estimates are then aggregated with a methodology explained in the next pages to derive the portfolio Paris-Alignment, also scaled from 100% to -100%. For a score above 0%, the expansion plans and/or CO_2 intensities of the companies in a portfolio on average meet the Paris climate targets. Any score below 0 means that the ambitions of the companies in the fund are not sufficient on average. To simplify the Score, grades are given along the following intervals:

A	B	C	D	E	F
>= 0	-1 to -10	-11 to -20	-21 to -40	-41 to -60	-61 to -100

Aggregation to derive the portfolio Paris-Alignment

As visualized in the righthand chart and as the first step, the alignment figures of each technology in all sectors which are in the scope of PACTA are gathered for a fund from the portfolio results. As the second step, technology estimates are aggregated on a sector level by a weighting methodology explained in the next chapters (for aviation, steel and cement, alignment is measured directly at sector level). As PACTA differentiates between bonds and equity, sector-level results are aggregated both for equity and bonds following another weighting methodology. Finally, in the fourth step, the portfolio Paris-Alignment is calculated based on the importance of the asset types.



5.2.1 From Technology Alignment to Sector Alignment

To arrive at the sector-level Paris Alignment, FinanceMap generates a weighted average of the technology alignments ($TA_{a,s,t}$) for each technology t in a sector s and per asset type a, weighted according to two parameters: the technology share ($TS_{a,s,t}$) and the technology contribution to global emissions ($TE_{a,s,t}$).

$$Sector\ Alignment\ s_{asset\ type\ a} = \frac{\sum_{a,s,t}(TA_{a,s,t} \times TS_{a,s,t} \times TE_{a,s,t})}{\sum_{a,s,t}(TS_{a,s,t} \times TE_{a,s,t})}$$

5.2.1.1 Technology Share ($TS_{a,s,t}$)

For each technology, the methodology compares the amount of production in the sector that is contributed by each technology to gauge its relative importance to the portfolio's sector exposure. This means that even if a technology has a modest deviation, if production in that technology is dominant in the portfolio, it is weighted more heavily than a technology that the portfolio has limited exposure to in terms of absolute production.

5.2.1.2 Technology Contribution to Emissions ($TE_{a,s,t}$)

Within a sector, each technology makes a different relative contribution to global emissions or emissions reduction. Consequently, changes in the use of technologies (e.g. coal-fired power and renewable energy) are more crucial than others for meeting the B2DS pathway. To reflect this, each technology in a sector is weighted based on the extent to which its emissions contribution must change between 2019 and 2050 based on the changes in total production outlined in the Beyond 2Degrees (B2DS) scenario.

The result is that in addition to weighting the individual technology deviations on the basis of the size of the portfolio's exposure, the sector alignment also accurately captures the variable importance of different technologies to the global energy transition.

Two of the sectors covered by the B2DS Scenario, Power and Automotive, contain both 'emission intensive and 'green' technologies, used here in a simplistic sense to refer to technologies that either do or do not emit CO_2, respectively. For instance, renewable and hydro energy are considered 'green' technologies, while natural gas and coal power are considered 'emission intensive.

To account for these differences, the methodology employs a measure of each green technology's importance to global emissions by assessing the emissions that have been effectively avoided as a result of using the green generating technology, under the assumption that in the absence of these technologies, the resulting gap, be it TWh generated or number of vehicles in the global fleet, would otherwise be filled with 'emission intensivetechnologies to meet the same global demand.

The method of calculation is unique to each sector (if applicable) and will be discussed in detail below.

5.2.1.2.1 Power technologies

5.2.1.2.1.1 Calculating Avoided Emissions

To derive the emissions effectively avoided by the non-emitting technologies, a weighted average of CO_2 emissions per TWh generated for each of the three emitting technologies (coal, oil, and gas) is computed. This value is then multiplied by the TWh generated by each non-emitting technology to produce a value for effective emissions avoided.

5.2.1.2.1.2 Emissions Contribution: Change over Time

To capture the relative importance of each technology in the power sector, it is necessary to compare the change in that technology's contribution to emissions over time, in this case between 2018 and 2050, in line with the Beyond 2 Degrees Scenario used throughout this analysis.

The reason for focusing on change over time is simple: if one were to just take the current time point to evaluate emissions contribution, a green technology like renewable power, which has not yet achieved significant uptake globally compared with other power sources, would be significantly underweighted relative to its importance to the energy transition. Conversely, to solely take each technology's emissions contribution in 2050 in line with the scenario would lead to major emission intensive technologies such as coal power to be significantly underweighted relative to their current share of production and to the urgency of phasing out these high emitting forms of production.

The methodology, therefore, calculates the change in TWh for each technology in the power sector between 2018 and 2050 according to IEA Beyond 2 Degrees Scenario. It then applies the CO_2 emissions per TWh for each technology to obtain a figure for the approximate change in each technology's contribution to global emissions between now and 2050.

The technologies that must undergo a proportionately significant change, either through an increase or decrease in production, and/or make a major contribution to emissions, are therefore weighted highly. The result is that key technologies like renewable and coal power are weighted more relative to less critical technologies like oil, which comprises a negligible portion of global electricity generation, as well as to those technologies whose relative share in the energy mix does not change as drastically according to the scenario, such as hydro energy.

5.2.1.2.2 Automotive technologies

5.2.1.2.2.1 Calculating Avoided Emissions

The Automotive Sector similarly has both green and brown technologies. For the purposes of this methodology, these are divided into three distinct categories: Electric vehicles (EV), hybrids, and Internal Combustion Engine (ICE) vehicles.

EVs are zero-emission vehicles while in use, though it is noted that their charging is linked to the release of some CO_2 unless electricity is supplied by non-emitting sources. Within this analysis, EVs are treated as zero-emissions vehicles. Hybrid vehicles may either be non-emitting or low-emitting vehicles while in use depending on a range of variables, such as individual journey length. Average emissions per mile travelled for hybrid vehicles as well as ICE vehicles is available from the ICCT.

To calculate the avoided emissions for the two 'green' technologies, the methodology considers the number of vehicles of each type in the global fleet in 2019 and 2050 and calculates the effective emissions that would have been produced had these vehicles been replaced with ICE vehicles. For electric vehicles, this entails multiplying the number of electric vehicles in the fleet by the weighted average emissions factor for ICE and hybrid vehicles to estimate the effective emissions abated by the replacement of emitting vehicle types with electric vehicles. For hybrids, the number of hybrid vehicles in the global fleet is multiplied by the difference between the emissions factors of ICE vs. hybrid vehicles to create an estimate of the effective emissions abated by the replacement of ICE vehicles in the global fleet with hybrids.

5.2.1.2.2.2 Emissions Contribution: Change over Time

Using the same method as for the Power Sector, the methodology calculates the difference between the effective emissions contribution from each technology in the global vehicle fleet in 2019 and in 2050 as prescribed by the Beyond 2 Degrees Scenario. The relative size of the change in emissions associated with each technology (expressed as a % of the total change) is then used as the final weighting. The result is that ICE and EVs are weighted significantly more heavily than hybrid vehicles, for which fleet size is projected to change to a much smaller degree between 2018 and 2050, and which contributes a modest emissions contribution/abatement relative to ICE and electric vehicles respectively.

5.2.1.2.3 Oil & Gas

The Oil & Gas sector contains only brown technologies. However, oil is significantly more carbon-intensive than natural gas and therefore, according to the scenario, the necessary pace for phasing out oil production is significantly faster than for natural gas. Indeed, the Beyond 2 Degrees scenario allows for moderate increases in the production of natural gas in the near term, while requiring a more immediate phase-out of oil production. The methodology considers the change in emissions contribution from oil & gas production for primary energy use between 2019 and 2050 in line with total primary energy demand according to the Beyond 2 Degrees scenario. The result is that oil production is weighted more heavily than natural gas, reflecting its higher emissions profile and stricter requirements for reductions in its use in the scenario.

5.2.2 From Sector Alignment to Asset Type Alignment

The process of rolling up from sector alignment to asset type alignment closely mirrors the calculation to derive the sector alignment ($SA_{a,s}$), and is also weighted according to two parameters: the sector value exposed ($SV_{a,s}$) and the sector contribution to global emissions ($SE_{a,s}$).

$$Asset\ type\ alignment\ a = \frac{\sum_{a,s}(SA_{a,s} \times SV_{a,s} \times SE_{a,s})}{\sum_{a,s}(SV_{a,s} \times SE_{a,s})}$$

5.2.2.1 Sector Value Exposed ($SV_{a,s}$)

Unlike weighting different technologies within a sector, between sectors there are entirely different production types (e.g., MW of capacity, tons of coal produced annually), which makes weighting on the basis of absolute production not possible. As a proxy, to aggregate the sector deviation to an overall asset type deviation, each sector deviation is weighted based on the relative portfolio value exposed to that sector according to the calculation below. Note that in this calculation only those companies for which the sector at hand is the company's primary sector of operation are counted, in order to avoid double-counting as well as to prevent highly valuable companies with negligible production in a sector, such as Apple Inc. in the Power sector, from skewing the weighting.

5.2.2.2 Contribution to emissions ($SE_{a,s}$)

In this case, the emissions contribution weight is not derived from the change in emissions required for each sector by 2050. Rather, in line with the IPCC's October 2018 Special Report on Global Warming of 1.5°C, which calls for global net-zero emissions by 2050 at the latest, the methodology assumes that all industrial sectors must reduce their emissions drastically. FinanceMap, therefore, takes the current emissions share of each to represent its 'real-world' importance to emissions reductions. The result is that sectors such as power, fossil fuels and automotive are weighted more heavily in the final deviation indicator than aviation, while still addressing the need for emissions reductions in all sectors. Further, while all technologies within a given sector have the same unit of production, e.g. MW of power capacity or number of units produced per year, between sectors units differ significantly and are non-comparable.

5.2.3 From Asset Type Alignment to Portfolio Alignment

In a final step, the alignment for the whole portfolio is calculated by aggregating the alignment for each asset type (AA_a), The aggregation is weighted by the portfolio value (AV_a), which is invested in each asset type.

$$Portfolio\ Alignment = \frac{\sum_a(AA_a \times AV_a)}{\sum_a(AV_a)}$$

5.2.4 Emissions Weights

As noted above, to aggregate alignment from the level of individual technologies (e.g. Renewable Power, Coal Power) to the sector level (Power), trajectory results at the technology

level are weighted in part according to their relative importance to global emissions. This ensures that the sector deviation better reflects real-world impact. The same logic applies with respect to weighting individual sectors when aggregating to the level of the portfolio.

The following tables exhibit the different emission weights which are used in the aggregation.

5.2.4.1 Technology Contribution to Emissions ($TE_{a,s,t}$)

Coal	25%
Gas	6%
Hydro	9%
Nuclear	11%
Oil	2%
Renewables	46%

Gas	34%
Oil	66%

Electric	44%
Hybrid	17%
ICE	38%

5.2.4.2 Contribution to global emissions ($SE_{a,s}$)

Power	22%
Oil & Gas	35%
Coal	23%
Automotive	9%
Aviation	1%
Cement	5%
Steel	3%
Shipping	2%

5.2.5 Threshold for obtaining a Paris-Alignment-Score

So far, the previous chapters described the methodology of how to derive the Paris-Alignment-Score on a portfolio level based on PACTA results, hence it could be seen as a score for the whole portfolio. However, if the 7 sectors, which are in the scope of PACTA, only make up a low proportion of the overall portfolio, the question remains whether all the other sectors outside of the scope of PACTA are in total not more relevant than the ones which have been analysed. In such cases, displaying the Paris-Alignment-Score as a score for the whole portfolio could be misleading. An example could be a portfolio with a strong real-estate, chemical or agriculture focus, all climate-relevant industries which are not in the scope of PACTA.

To address this risk and to ensure that the Paris-Alignment-Score is in fact a score for the whole portfolio, 2DII developed a method to estimate the share of CO_2-emissions of a portfolio that arise within PACTA sectors and the share of CO_2-emissions which are emitted outside of PACTA sectors. The more the portfolio emissions covered by PACTA exceed those outside PACTA, the lower the risk that the Paris Alignment Score gives a misleading result.

To do so, the MSCI ACWI and its holdings are taken as a proxy for all portfolios. In a first step, absolute CO_2-emissions for all scopes (i.e., scope 1, 2 and 3) are obtained from Trucost for the year 2018 for all individual holdings of the MSCI ACWI. In a second step, the absolute CO_2-emissions for all scopes are multiplied by the weight of each company within the MSCI ACWI to calculate the weighted CO_2-emissions. In a third step, the calculated weighted emissions are then summarized and grouped by the sub-sector classification of the Bloomberg Industry Classification System (BICS). This aggregation is needed as the companies within other portfolios are not always part of the MSCI ACWI. By this, results will be transferable. After this step, the corresponding weight of BICS sub-sectors, as well as their weighted emissions for each scope, are obtained for the MSCI ACWI.

This information is now applied to the total portfolio which has been analysed by PACTA. In the fourth step, the share of each BICS sub-sector in each portfolio is calculated. As the fifth step, the information from the MSCI ACWI is added. Now as the sixth step, the sub-sector exposure of a given portfolio can be compared to the one of the MSCI ACWI to derive a ratio of the difference. With this ratio, the original weighted emissions of the MSCI ACWI can be re-weighted to reflect the specific sector distribution of a fund. After this step, it can be estimated how the share of portfolio CO_2 emissions of the MSCI ACWI would be distributed across different sub-sectors if the MSCI ACWI would have the same sub-sector exposure as the given fund.

This is now taken as a proxy to estimate which share of CO_2-emissions arise within sub-sectors that fall under the scope of PACTA. For this, only the scope 1 emissions were taken into account, except for the automotive and oil & gas industry, where the majority of emissions are emitted in scope 3. This choice is motivated to capture those emissions which a company has control over, e.g., the automotive industry is responsible to produce cars with low or zero emissions, even though the emissions of cars aren't emitted by the industry directly. Moreover, these are the scopes that are analysed by PACTA.

In a final step, a threshold must be set for the portfolio CO_2-emissions which must take place in PACTA sectors in order for a fund to receive a Paris-Alignment-Score. For this, a threshold of

75% was chosen. It could be argued that 50% would already be enough, as in this case the majority of emissions would already be covered by PACTA and hence the Paris-Alignment-Score. However, to mimise the risk of a misleading portfolio Paris-Alignment-Score, 75% were chosen to introduce an even higher barrier. Moreover, the sectors covered by PACTA are responsible for 75% of CO2 emissions in the economy. Finally, this means that if in a fund for example 30% of the portfolio CO2 emissions, estimated by the method described above, arise within PACTA sectors, this fund would lose its calculated Paris-Alignment-Score, as the risk of misleading results is too high. On the other hand, if 80% of the portfolio CO2 emissions arise within PACTA sectors, this fund would keep its Paris-Alignment-Score.

6 Limitations

6.1 Fund data

One limitation with regard to the fund data is that the current timestamps are not always available, so that the information on MeinFairMögen about a fund is also not up-to-date. If a fund has changed its holdings in the meantime, the reported controversies and climate performance cannot reflect the status quo, which may be worse or better. For large funds, it can be assumed that the results do not vary so much, as the analysis includes many companies that do not all change at once. However, especially for small funds, which may only invest in two or three climate-relevant companies, a change here can already significantly change the results.

In addition, the 90% coverage threshold should be mentioned in relation to the fund data. This is a compromise in order to analyse as many funds as possible and to ensure a minimum quality of the statements, but it is of course possible that the 10% does contain relevant companies with regard to controversies or climate performance. This residual risk remains.

6.2 PACTA

PACTA is a climate scenario analysis and thus entails many uncertainties and limitations. The climate scenarios present one possible manifestation of how the energy transition aligned with the Paris climate agreement could look like. Even though the necessary actions are not controversial (expansion of renewables, retirement of high-carbon technologies), the precise way in which a carbon budget is distributed across sectors will be solved in different ways by different scenarios.

Furthermore, different models will include different assumptions about the future development and potential of certain technologies. This analysis therefore focuses on those technologies that are proven and available to the market. As a result, this analysis does not consider investments in R&D, which represent an important way for financial institutions to help bring new solutions to the market.

Although the input data is sourced from reliable, third-party data providers, errors are possible, either in the production plans themselves, or in mapping the ownership structure of a companies. Furthermore, planned production plans do not necessarily materialize and production forecasts should be interpreted baring this in mind.

In addition, PACTA does not cover certain sectors, such as agriculture and forestry, even though they are highly relevant for limiting future GHG emissions, due to lack of available data. Furthermore, asset classes such as sovereign bonds or private equity are also not included in the analysis.

Finally, PACTA cannot analyse short positions or positions without an ISIN, even if they have been issued by climate-relevant companies.

6.3 Fund Matrix

The previous limitations on fund data and PACTA must generally be taken into account for the information on MeinFairMögen, which is defined in the fund matrix.

In addition, the sector exposures should be mentioned, which on MeinFairMögen only refer to the PACTA sectors and not to other companies in this sector, e.g. in the supply industry. Hence, the actual sector exposure, i.e. including the supply industry or other services, might be bigger than the exposure reported on MeinFairMögen.

With regard to controversies, it must be mentioned that not all securites always carry ISINs, even if they were issued by a company (e.g. swaps). Since securities are always matched via ISINs, this exposure to controversies cannot be analysed.

6.4 Paris-Alignment-Score

Since the Paris-Alignment-Score is based on the results from the PACTA analysis, the limitations mentioned beforehand must also be taken into account here.

Another limitation is that the Paris-Alignment-Score uses two different alignment metrics. On the one hand, the alignment for sectors with expansion plans and technology roadmaps, and on the other hand the alignment for sectors without forward-looking data. Due to these, the comparability among the sectors is limited.

In addition, there is a limitation in the emission weights as to whether they are always up-to-date, such as the share of global emissions. Moreover, the effectively avoided emissions were estimated to weight different technologies, however, the calculation of those is associated with uncertainty and the concept of avoided emissions experiences also criticism.

Furthermore, the threshold attempts to assign the Paris-Alignment-Score only if it is likely that most emissions will take place in the PACTA sectors. However, this assessment is limited in that it is a relative comparison to the MSCI World, which might not always be the right benchmark.