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# Principal Adverse Indicators 1.2

## Data Content Guide

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### Morningstar Data Content

17 November 2022

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### Data Content Details

Version: 1.1

Description: {dataset expansion}

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### Background

The EU's sustainability finance disclosure regulation, or SFDR, mandates that certain financial market participants must disclose the principal adverse impacts, or PAIs, of their holdings. The regulation provides a list of mandatory and voluntary indicators related to the holdings that need to be disclosed at the aggregated group level annually.

Although the regulation only mandates the disclosure of these PAIs at the group level, they are of interest to consumers at a product level. A full list of the PAIs calculated can be found in Appendix 1.

### Definition of the Dataset

Principle adverse impact indicators are a set of mandatory and voluntary indicators and metrics that aim to show the financial market an investment's potential sustainability risks.

The indicators focus on standard environmental, social, and governance issues.

### Content

The PAIs use our standard ESG calculations:

- ▶ Each PAI has a calculation type assigned as either an average, involvement/policy, share of emissions or emissions per EURm invested calculation, average percentage of female board members, social violation, corruption convictions, and corruption fines.
- ▶ Dependent on the calculation type assigned to the PAI, there will be a unique calculation, either average value, portfolio involved/with policy or not involved/lacking policy, tonnes, tonnes per EURm.
- ▶ Each PAI will then have the standard ESG calculations:
  - ▶ Eligible holding type
  - ▶ Percentage of portfolio eligible
  - ▶ Percentage of portfolio covered
  - ▶ Percentage of portfolio eligible not covered
  - ▶ Percentage of portfolio not eligible
  - ▶ Percentage of portfolio not covered
  - ▶ Percentage of eligible portfolio covered
  - ▶ Percentage of eligible portfolio not covered
  - ▶ Number of holdings covered

Mock-up of an involvement PAI calculation:

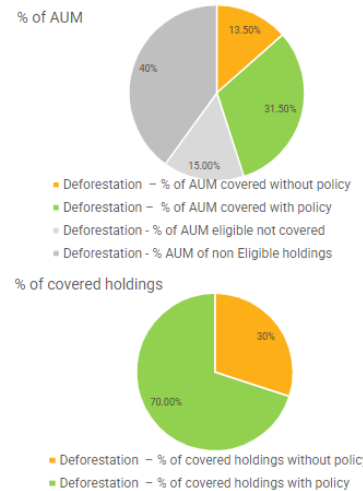
### EU SFDR – PAI aggregation

Mock up- Involvement based



Lack of Deforestation Policy

PAIs % based	Value
PAIs % based	Value
Deforestation – Eligible holding type	Corporate
<b>Indicator</b>	
Deforestation – % of covered AUM without policy	30%
Deforestation – % of covered AUM with policy	70.00%
Deforestation – % of AUM covered without policy	13.50%
Deforestation – % of AUM with policy	31.50%
<b>Coverage</b>	
Deforestation - % AUM eligible	60%
Deforestation - % AUM covered	45.00%
Deforestation - % AUM eligible not covered	15.00%
Deforestation - % AUM non eligible	40%
Deforestation - % Eligible AUM covered	75.00%
Deforestation - % Eligible AUM not covered	25.00%



The standard ESG calculations are structured to show full transparency of the portfolio. With these calculations you can see the full portfolio, the portion of the portfolio that is eligible for the calculation, and the portion of the portfolio that has data coverage.

### Inputs/Sources/Timings

These fund level statistics would be calculated using the underlying Sustainalytics PAI data and either custom client portfolios or on the collected fund portfolios. Portfolio aggregations would be based on the latest available Sustainalytics data.

The calculation will be performed on the collection of the portfolio, regardless of date, and so will be calculated on intramonth and month-end portfolios. Only data that is available to the market on the portfolio date will be used in the calculation of the aggregate values.

Morningstar will first attempt to "look through" any funds that are held by the portfolio to find underlying, indirectly held holdings. The "look through" function goes up to 10 portfolios "deep" — that is, when a portfolio holds a fund and in turn that fund hold other funds, the "look through" process will assess 10 "levels" of portfolios. The exception to this rule is for funds that are synthetically replicated; for the purpose of the PAI calculations, they will be treated as being equivalent to a portfolio holding derivatives. The derivative holding will not be "looked through" and for the purposes of the calculations is treated as "other holdings" — that is, not corporate nor sovereign holdings.

### Limitations/Exceptions

- ▶ These calculations cannot be described as “regulatory.” The calculations are Morningstar’s best efforts to replicate the regulation; to use these calculations for regulatory purposes, we would recommend having your compliance team’s review.
- ▶ Our methodology will not look through derivatives and will remove short positions from the portfolio (so the statistics will be based on long-only positions).
- ▶ No PAIs can be calculated where there is no underlying Sustainalytics data, and real estate PAIs will not be covered.

### Markets

All funds with collected portfolio in all markets.

### Universes

These calculations are available for all investments that have a portfolio and will be calculated for Morningstar indexes but will not be calculated for indexes from other companies.

### Calculation Description

#### Portfolio Weights

Morningstar calculates portfolio weights based on the proportion of a portfolio a holding represents once any fund holdings have been “looked through.” The weights are based on the market value of the securities. For the EU principal adverse impact calculations, some additional steps will be taken to calculate the final portfolio weight:

1. Any securities that have both long and short positions will be “netted out” — that is, the short position weight will be subtracted from the long position weight.
2. Any remaining short positions will be removed.
3. Any currency offsets will be removed.
4. The portfolio weight will then be recalculated on the netted-out long positions only.

[1]

$$W_R = \frac{\text{Portfolio Weight}_i}{\sum_{i=1}^n \text{Portfolio Weight}_i}$$

Where

$W_R$	=	Rescaled portfolio weight
$\text{Portfolio Weight}_i$	=	Original portfolio weight
$i=1, n$	=	All long, noncash offset holdings

The portfolio following these amendments will from here on in be referred to as the *adjusted portfolio*.

## Holding Types

Different PAIs are applicable to different holding types. The regulation outlines PAIs based on three holding types:

1. Investee companies—Applicable to corporate issuances like equities or corporate bonds.
2. Sovereign or supranational—Applicable to government, some agency, and supranational bonds.
3. Real estate—Applicable to direct physical property holdings.

Morningstar applies a detailed type identifier, or DTID, to portfolio holdings, and these are then used to map the holding to the relevant holding type. Portfolio holdings will therefore be mapped to corporate, sovereign, or other as a holding type for the purposes of the PAI calculations.

- ▶ Equity and equitylike securities will be mapped to the corporate type.
- ▶ Bonds issued by corporations, including Freddie Mac and Fannie Mae, will be mapped to the corporate type. [Note: Green bonds will use the same underlying PAI data as a standard corporate bond—that is, the data of the issuing entity. They will not have their own separate underlying PAI data.] Government bonds, government agency bonds (except for Freddie Mac and Fannie Mae), and supranational bonds will be mapped to the sovereign type.
- ▶ All other security types (including cash, commodities, real estate, derivatives, and unknown securities) will be mapped to the other type.

Details of the DTIDs that map to corporates and sovereign or supranationals can be found in Appendix 2. All other DTIDs will map to other.

## Coverage Calculations

Different PAIs apply to different types of holdings, and not all holdings disclose the relevant data required for the individual PAIs. Because of this, Morningstar will provide the field "eligible holding type" for each PAI to identify which PAI holding type is applicable for that particular PAI (corporate or sovereign).

For all PAIs, coverage statistics will be calculated to enable users to see the proportion of the adjusted portfolio that is eligible and covered. In this context, "eligible" means those holdings that are the relevant type for the PAI in question (so, a corporate holding for a corporate PAI), and "covered" means those holdings for which the relevant underlying data has been obtained or estimated. A field indicating the number of holdings covered (that is, that have the relevant data for the PAI statistic) will also be calculated for all PAIs.

To start, the proportions of the adjusted portfolio that are eligible, not eligible, covered, not covered, and eligible but not covered will be calculated.

[2]

$$PortfolioEligible_R = \sum_{i=1}^E W_R$$

Where

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<i>PortfolioEligible<sub>R</sub></i>	=	The proportion of the adjusted portfolio that is held in securities the PAI in question is relevant to.
<i>i = 1, E</i>	=	Securities in the adjusted portfolio that are of the relevant holding type (eligible) for the PAI in question.

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[3]

$$PortfolioNotEligible_R = \sum_{i=1}^{NE} NotEligibleW_R$$

Where

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<i>PortfolioNotEligible<sub>R</sub></i>	=	The proportion of the adjusted portfolio that is not held in securities the PAI in question is relevant to. These may be securities where the holding type is not relevant for the PAI or where the type is not known.
<i>i = 1, NE</i>	=	Securities in the adjusted portfolio that are not of the relevant holding type (eligible) for the PAI in question.

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[4]

$$PortfolioCovered_R = \sum_{i=1}^{EC} W_R$$

Where

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<i>PortfolioCovered<sub>R</sub></i>	=	The proportion of the adjusted portfolio that is held in securities for which the underlying data is available for the calculation.
<i>i = 1, EC</i>	=	Securities in the adjusted portfolio that are of the relevant holding type (eligible) for the PAI in question and where the relevant underlying data is known.

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[5]

$$PortfolioNotCovered_R = \sum_{i=1}^{NC} W_R$$

Where

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$PortfolioNotCovered_R$  = The proportion of the adjusted portfolio that is held in securities for which the underlying data is not available for the calculation.

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$i = 1, NC$  = Securities in the adjusted portfolio where the relevant underlying data is not known (regardless of whether the holding type is relevant [eligible] or not).

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[6]

$$PortfolioEligibleNotCovered_R = \sum_{i=1}^{ENC} W_R$$

Where

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$PortfolioEligibleNotCovered_R$  = The proportion of the adjusted portfolio that is held in securities the PAI in question is relevant to but where the underlying data is not available for the calculation.

---

$i = 1, ENC$  = Securities in the adjusted portfolio that are of the relevant holding type (eligible) for the PAI in question and where the relevant underlying data is not known.

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Next, the proportion of the eligible part of the adjusted portfolio where the relevant data is known (covered) and not known (not covered) is calculated.

This is calculated by taking the proportion of the adjusted portfolio that is covered (or not covered) and dividing it by the proportion of the portfolio that is eligible.

[7]

$$EligiblePortfolioCovered_R = \frac{PortfolioCovered_R}{PortfolioEligible_R}$$

Where

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$EligiblePortfolioCovered_R$  = The proportion of only the eligible part of the adjusted portfolio where the underlying data is available for the calculation.

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[8]

$$EligiblePortfolioNotCovered_R = \frac{PortfolioNotCovered_R}{PortfolioEligible_R}$$

Where

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<i>EligiblePortfolioNotCovered<sub>R</sub></i>	=	The proportion of only the eligible part of the adjusted portfolio where the underlying data is not available for the calculation.
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The number of holdings where the underlying data (covered) is known is also calculated.

[9]

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<b>Number of Holdings Covered</b>	=	A simple count of the holdings in the adjusted portfolio where the underlying data is available.
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### PAI Calculation Types

In total, there are 64 PAIs described in the regulation; however, some of them have more than one indicator associated with them. The PAIs can be grouped into those that follow certain calculation methodologies:

1. Average value calculations
2. Involvement calculations
3. Policy calculations
4. Emission calculations
5. Social violation calculations
6. Anticorruption/bribery violation calculations

### Average Value PAI Calculations

These PAIs require a calculation of the average value of the holdings; as such, only holdings with the relevant underlying data can be used in the calculation. Except for the gender diversity PAI, Morningstar calculates the weighted average value of the holdings.

[10]

$$AverageValue_R = \frac{\sum_{i=1}^{EC} W_R * UnderlyingPAIValue}{PortfolioCovered_R}$$

Where

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<i>AverageValue<sub>R</sub></i>	=	The weighted average amount (for the PAI in question) of the covered holdings (that is, holdings where the data is known) in the portfolio.
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<b>UnderlyingPAIValue</b>	=	The value for the individual holding for the underlying PAI in question.
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For the gender diversity PAI, the regulation asks for the "average ratio of female to male board members." If a company has no male board members, that ratio would be impossible to calculate. Considering this, the harmonic average of the number of females on the board is calculated by taking the weighted average number of females for the portfolio and dividing by the weighted average total number of board members. It does not need to be rescaled by the percentage covered. The technique reduces the effect of outliers on the average.

[10a]

$$AverageValue\%Female_R = \frac{\sum_{i=1}^{EC} W_R * \text{number of females on the board}}{\sum_{i=1}^{EC} W_R * \text{total number of board members}}$$

Where

<i>AverageValue%Female<sub>R</sub></i>	=	The harmonic average of the percentage of females on the board for the portfolio.
<i>number of females on the board</i>	=	The number of people who identify as female on the board for the individual holding.
<i>total number of board members</i>	=	The total number of board members for the individual holding.

#### Involvement and Policy Calculations

These PAIs require a calculation of the share of the investments that are involved with (or exposed to) certain industries or activities. The proportion that is involved is calculated as a percentage of the total adjusted portfolio (that is, all long positions after being netting out), the eligible portion of the portfolio (those holdings that could have data), and the covered portfolio of the portfolio (those holdings that do have data).

For the adjusted portfolio, the involved/not involved statistics only include those holdings where the information is known. So, combining the involved/not involved statistics (as a percentage of the adjusted portfolio) with the percentage of the portfolio not covered (or percentage eligible not covered and percentage not eligible) will sum to 100%.

Policy calculations are identical to the involvement calculations but describe the proportions of the portfolio that have or lack the relevant policy or process and are generally denoted as "with policy" or "lacking policy."

[12]

$$PortfolioInvolved_R = \sum_{i=1}^{CI} W_R$$



Where

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$PortfolioInvolved_R$  = The proportion of the adjusted portfolio that is held in securities that are exposed to or involved in the relevant industry/activity.

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$i = 1, CI$  = Securities in the adjusted portfolio that are exposed to or involved in the relevant industry/activity.

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[13]

$$PortfolioNotInvolved_R = \sum_{i=1}^{CNI} W_R$$

Where

---

$PortfolioNotInvolved_R$  = The proportion of the adjusted portfolio that is held in securities that are not exposed to or involved in the relevant industry/activity.

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$i = 1, CNI$  = Securities in the adjusted portfolio that are not exposed to or involved in the relevant industry/activity. This does not include securities where it is not known if the security is involved or not.

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For eligible portfolios, the involved and not involved statistics only include those holdings where the information is known, and so combining the involved/not involved statistics (as a percentage of the eligible portfolio) with the percentage eligible not covered of the portfolio will sum to 100%.

[14]

$$EligiblePortfolioInvolved_R = \frac{PortfolioInvolved_R}{PortfolioEligible_R}$$

Where

---

$EligiblePortfolioInvolved_R$  = The proportion of the eligible portion of the portfolio that is held in securities that are exposed to or involved in the relevant industry/activity.

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[15]

$$EligiblePortfolioNotInvolved_R = \frac{PortfolioNotInvolved_R}{PortfolioEligible_R}$$

Where

---

$EligiblePortfolioNotInvolved_R$  = The proportion of the eligible portion of the portfolio that is held in securities that are not exposed to or involved in the relevant industry/activity.

---

The involved/not involved statistic (as a percentage of the covered portfolio) will sum to 100% as it only contains holdings that have data.

[16]

$$CoveredPortfolioInvolved_R = \frac{PortfolioInvolved_R}{PortfolioCovered_R}$$

Where

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*CoveredPortfolioInvolved<sub>R</sub>* = The proportion of the covered portion of the portfolio that is held in securities that are exposed to or involved in the relevant industry/activity.

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[17]

$$CoveredPortfolioNotInvolved_R = \frac{PortfolioNotInvolved_R}{PortfolioCovered_R}$$

Where

---

*CoveredPortfolioNotInvolved<sub>R</sub>* = The proportion of the covered portion of the portfolio that is held in securities that are not exposed to or involved in the relevant industry/activity.

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### Emission Calculations

These PAIs come in two flavors: the total amount of emissions (in metric tons) the portfolio is responsible for and the amount of emissions per million of euros invested (in metric tons per EUR million). These calculations only include those holdings for which data is available.

The portfolio is considered responsible for all of the underlying holding's emissions in proportion to the amount of the company owned. For example, if a portfolio owned 10% of Bayerische Motoren Werke AG BMW, it would be responsible for 10% of its emissions.

Note: The result of the total amount in metric tons calculation will be different for portfolios with identical holdings in identical proportions solely because of portfolio size. The metric tons per million of euros invested "normalizes" this figure and allows for a portfolio's impact to be compared in relation to the same amount invested.

As these calculations are based on the amount (in millions of euros) held in the company, some additional coverage statistics are also calculated. For the purpose of these calculations, the holding value is market value for any equity-based securities and the nominal or face value for any bond holdings.

[18]

$$PortfolioEligible_{EURm} = \sum_{i=1}^E H_{EURm}$$

Where

$PortfolioEligible_{EURm}$	=	The amount in millions of euros held in eligible holdings.
$H_{EURm}$	=	The amount in millions of euros held in the company.
$i = 1, E$	=	Securities in the adjusted portfolio that are of the relevant holding type (eligible) for the PAI in question.

[19]

$$PortfolioCovered_{EURm} = \sum_{i=1}^{EC} H_{EURm}$$

Where

$PortfolioCovered_{EURm}$	=	The amount in millions of euros held in covered holdings.
$H_{EURm}$	=	The amount in millions of euros held in the company.
$i = 1, EC$	=	Securities in the adjusted portfolio that are of the relevant holding type (eligible) for the PAI in question and have data (covered).

[20]

$$PortfolioEligibleNotCovered_{EURm} = \sum_{i=1}^{ENC} H_{EURm}$$

Where

$PortfolioEligibleNotCovered_{EURm}$	=	The amount in millions of euros held in eligible holdings where the relevant underlying data is not known.
$H_{EURm}$	=	The amount in millions of euros held in the company.
$i = 1, ENC$	=	Securities in the adjusted portfolio that are of the relevant holding type (eligible) for the PAI in question and do not have data (not covered).

[21]

$$TotalEmissions_R = \sum_{i=1}^{EC} \frac{Investment}{EVIC} * CompanyEmissions$$

Where

<i>TotalEmissions<sub>R</sub></i>	=	The amount in metric tons of the relevant emission(s) for which the portfolio is known to be responsible.
<i>Investment</i>	=	The amount in millions of euros the portfolio has invested in the relevant underlying company.
<i>EVIC</i>	=	The entire value of the company (enterprise value including cash, value as at the portfolio date). This is calculated by summing the market capitalization, the total preferred stock/units/securities, the noncontrolling/minority interests in equity, and the total debt.
<i>CompanyEmissions</i>	=	The amount in metric tons of the relevant emission(s) for which the relevant company is responsible.

[22]

$$EmissionsperEURm_R = \frac{TotalEmissions_R}{PortfolioCovered_{EURm}}$$

Where

<i>EmissionsEURm<sub>R</sub></i>	=	The amount in metric tons per millions of euros invested of the relevant emission(s) for which the portfolio is known to be responsible.
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### Social Violation Calculations

These PAIs represent the number of countries (as an absolute number and as a percentage of the total number of countries invested in) in which the portfolio invests that are subject to social violations. These statistics note if a country has been invested in; the amount invested in the country and the weight in the portfolio are not factors. This PAI is for sovereign (including some agency) issuances only.

Four statistics are calculated: number of countries with violations, number of countries without violations, percentage of countries with violations, and percentage of countries without violations.

[22]

$$CountriesViolation_R = \sum_{i=1}^{i,SV} C_R$$

Where

<i>CountriesViolation<sub>R</sub></i>	=	The absolute number of countries the portfolio invests in that are subject to social violations.
<i>C<sub>R</sub></i>	=	The unique countries the portfolio invests in via sovereign or some types of agency bond.
<i>i = 1, SV</i>	=	Countries invested in that are subject to social violations.

[23]

$$CountriesNoViolation_R = \sum_{i=1}^{NV} C_R$$

Where

$CountriesNoViolation_R$	=	The absolute number of countries the portfolio invests in that are not subject to social violations.
$C_R$	=	The unique countries the portfolio invests in via sovereign or some types of agency bond.
$i = 1, NV$	=	Countries invested in that are not subject to social violations.

[24]

$$\%CountriesViolation_R = \frac{CountriesViolation_R}{CountriesViolation_R + CountriesNoViolation_R}$$

Where

$\%CountriesViolation_R$	=	The percentage of countries the portfolio invests in that are subject to social violations.
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[25]

$$\%CountriesNoViolation_R = \frac{CountriesNoViolation_R}{CountriesViolation_R + CountriesNoViolation_R}$$

Where

$\%CountriesNoViolation_R$	=	The percentage of countries the portfolio invests in that are not subject to social violations.
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### Anticorruption/Bribery Violation Calculations

These PAIs represent the number of convictions and amount of fines (in euros) for corruption and/or bribery offenses of the underlying holdings of the portfolio. These statistics note if a company has been invested in; the amount invested in the company or the weight in the portfolio are not factors.

[26]

$$AntiCorruptionViolation_R = \sum_{i=1}^E Convictions_R$$

Where

$AntiCorruptionViolation_R$	=	The total number of convictions for corruption and/or bribery offenses of all the companies the portfolio invests in.
$Convictions_R$	=	The number of convictions the company has for corruption and/or bribery offenses.
$i = 1, E$	=	All eligible portfolio holdings.

[27]

$$AntiCorruptionFines_R = \sum_{i=1}^E CorruptionFines_R$$

Where

<i>AntiCorruptionFines<sub>R</sub></i>	=	The total amount in euros of fines for corruption and/or bribery offenses of all the companies the portfolio invests in.
<i>CorruptionFines<sub>R</sub></i>	=	The amount in euros the company has been fined for corruption and/or bribery offenses.
<i>i = 1, E</i>	=	All eligible portfolio holdings.

### Category Averages

For a selection of portfolio impact metrics, category averages are computed in order to enable a comparison of funds against their peer groups. The peer groups used are the standard Morningstar Categories.

Funds need to have at least 67% of their eligible portfolio covered to be included in the category average calculation. A category average is computed for a given Morningstar Category only when at least five funds meet the coverage requirement within this category. The number of funds included in the calculation is also provided.

Category averages will be calculated for the average value PAIs, the emissions per EURm invested PAIs, and the involved/with policy PAIs based upon the involved/with policy statistics as a percentage of the covered portfolio.

Category averages will not be calculated for the social violation, anticorruption/bribery, and total amount of emissions PAIs, as these are not considered useful when averaged at a category level, as the fund values depend, to some extent, on the size of the fund and/or the number of holdings/countries invested in.

[28]

$$CategoryAverage_R = \frac{\sum_{i=1}^F PAI Value_f}{Number\ of\ Funds}$$

Where

<i>PAI Value<sub>f</sub></i>	=	The relevant PAI value for fund f.
<b>Number of Funds</b>	=	The number of funds in the category that meet the relevant criteria to be included in the category average calculation.
<i>i = 1, F</i>	=	All funds in the category that meet the relevant criteria.

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### Data Content History

Version: 1.0	31 Jan 2022	Original publication
Version 1.1	October 2022	Expansion and input changes

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## Glossary

Eligible holding type	A field denoting which of the corporate, sovereign, or other classification is eligible for calculations.
PAI	Principal adverse impact forms part of the EU's Sustainable Finance Disclosure Regulation, or SFDR. These PAI indicators are essentially a set of environmental, social, and governance indicators and metrics, ranging from carbon emissions, water emissions, biodiversity impacts, social violations, and gender parity on the board.
Tons per EURm	The amount in tons per million (euro) invested for the specified emissions that are attributable to the portfolio. The amount of specified emissions (in tons) divided by the amount invested (in euros) known as the carbon footprint of a portfolio. This is calculated by working out for each unique holding the percentage of that company the portfolio owns. The portfolio is therefore responsible for that portion of the company's specified emissions. Then, each holding's responsible share of those emissions are summed to give an overall emissions in tons, divided by the millions (euro) invested in total in those companies.
Tons	The amount in tons of the specified emissions that is attributable to the portfolio. This is calculated by working out for each unique holding the percentage of that company that the portfolio owns. The portfolio is therefore responsible for that portion of the company's specified emissions. Then, each holdings responsible share of the emissions are summed to give an overall emissions in tons.
SFDR	Sustainable Finance Disclosure Regulation is a European regulation introduced to improve transparency in the market for sustainable investment products, to prevent greenwashing, and to increase transparency around sustainability claims made by financial-market participants.



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## Frequently Asked Questions

### For what vehicles will these PAIs be calculated?

The PAIs can be useful to investors globally, and so the decision was taken to calculate them for all funds regardless of where they are domiciled or sold. Additionally, they will be calculated for Morningstar indexes to allow investors to compare a fund's PAIs against an index. The emissions PAIs will not be calculated for the indexes as they are based on the holding value in the portfolio (not the weight in the portfolio).

### How frequently is the data updated?

The calculation will be updated each time the portfolio of an eligible fund is refreshed in the Morningstar database, which will be on a monthly or quarterly basis in the majority of cases.

### Will historical data be calculated?

Once launched, any PAIs calculated will be stored, and retained, on the relevant portfolio date, but PAIs on portfolios received prior to the launch of the PAI calculations will not be back-calculated because of the low availability of the underlying data historically.

### Will Morningstar calculate every PAI?

Most of the PAIs will be covered; however, some will not be—for example, those for real estate holdings. Generally, a lack of available relevant data on the underlying holdings is the reason some PAIs are not covered. See Appendix 1 for the full list of PAIs calculated and the calculation type.

### What data is used to calculate the PAIs?

Morningstar's market-leading fund holdings' look-through database is combined with Sustainalytics company ESG research to produce the indicators. The combination ensures material exposures are identified and assessed through Sustainalytics' leading research.

### Will the calculations be based on all holdings?

Different PAIs focus on different types of securities. The investee company PAIs are for equity and corporate bond holdings, the sovereign/supranational ones are for government, some agency, and supranational bonds, and the real estate ones are for direct physical property holdings.

As funds may have a mixture of different holding types alongside the PAI calculations, various coverage statistics will be supplied. For each PAI, the following is calculated: the percentage of "eligible" securities (that is, the percentage of the portfolio invested in securities the PAI is measuring), the percentage of the portfolio that is "covered" by data (where the required input is known for the holdings), and the percentage of the "eligible" part of the portfolio that is "covered." For example, a portfolio may have 60% in corporate holdings and 40% in sovereign holdings; of the corporate holdings, 50% may have data. For the PAIs, the percentage of the portfolio that is eligible would be 60% and the amount covered would be 30% ( $60\% * 50\%$ ).

The PAIs will be calculated for all funds regardless of the percentage of eligible or covered holdings (unless there are no eligible or covered holdings), so these coverage statistics are important to bring context to the PAI indicators themselves.

Additionally, any short positions that remain after netting out from long positions are excluded from the calculation. As such, the PAIs are calculated on rescaled long positions only. For more information, refer to Morningstar's Principal Adverse Impacts Indicators methodology document.

### What are the main calculation types for the PAIs?

There are six main calculation types:

1. Average value calculations

These are simple weighted averages of the relevant data for the holdings. The calculations only include those holdings for which there is underlying data. The weighted average is based on their relative weights in the portfolio.

2. Involvement calculations

These denote the percentage of the holdings that are involved/not involved with, or exposed to, certain industries or activities (for example, fossil fuels). These are calculated as a percentage of the portfolio, the percentage of the "eligible" portfolio, and the percentage of the "covered" portfolio. A company that derives any of its revenue from the activity will be classed as involved.

### 3. Policy calculations

These denote the percentage of the holdings that have/do not have a policy on a specific matter (for example, deforestation). These are calculated as a percentage of the portfolio, the percentage of the "eligible" portfolio, and the percentage of the "covered" portfolio.

### 4. Emission calculations

These PAIs come in two flavors: the total amount of emissions (in metric tons) the portfolio is responsible for; and the amount of emissions per million of euros invested (in metric tons per EURmillion). These calculations only include those holdings for which data is available. The portfolio is considered responsible for all of the underlying holding's emissions in proportion to the amount of the company owned. For example, if a portfolio owned 10% of Bayerische Motoren Werke AG, BMW, it would be responsible for 10% of its emissions. In most cases, the PAI is shown as an emissions per million of euros invested. These PAIs are the same calculation as the share of emissions, but once the emissions the portfolio is responsible for are calculated, the value is divided by the total amount invested by the portfolio (in millions of euros) in those companies where the emissions are known.

### 5. Social violation calculations

This is a simple count of the number of countries and the percentage of countries invested in that are subject to social violations.

### 6. Anticorruption/Bribery violation calculations

This is a simple count of the number of convictions and amount of fines (in euros) for corruption and/or bribery offenses of the underlying holdings of the portfolio.

#### **How is the percentage of a company the portfolio owns calculated?**

The calculation of the emissions PAIs require the percentage of the company the portfolio owns to be calculated. This is calculated by taking the value of the investment in the portfolio (for equity-based investment, this will be the market value, and for bonds, the nominal or book value) and dividing by the relevant company's enterprise value including cash as at the portfolio date (the market capitalization of all ordinary and preference shares plus the book value of total debt and minority interests).

#### **What happens when a fund holds another fund?**

Morningstar will first attempt to "look through" any funds that are held by the portfolio to find underlying, indirectly held holdings. Morningstar will look through 10 levels as standard. The exception to this rule is for funds that are synthetically replicated; for the purpose of the PAI calculations, they will be treated as being equivalent to a portfolio holding derivatives (where no "look-through" is attempted).

#### **How is the portfolio weight of a holding calculated?**

Morningstar calculates portfolio weights based on the proportion of a portfolio that a holding represents (using the market value) once any fund holdings have been looked through. For the EU principal adverse impact calculations, some additional steps will be taken to calculate the final portfolio weight:

1. Any securities that have both long and short positions will be "netted out" — that is, the short position weight will be subtracted from the long position weight.
2. Any remaining short positions will be removed.
3. Any currency offsets will be removed.
4. The portfolio weight will then be recalculated on the netted-out long positions only.

#### **Will Morningstar Category averages be calculated for PAIs?**

In most cases, yes; however, there may be some occasions when this does not happen. A category average will be calculated for a given Morningstar Category only when at least five funds meet the coverage requirement within this category. In the case of PAIs, a fund will need to have at least 67% of its eligible portfolio covered to be included in the category average calculation.

Category averages will be calculated for the average value PAIs, the emissions per EURm invested PAIs, and the involved/with policy PAIs based on the involved/with policy statistics as a percentage of the covered portfolio.

Category averages will not be calculated for the social violation, anticorruption/bribery, and total amount of emissions PAIs, as these are not considered useful when averaged at a category level, as the fund's values depend, to some extent, on the size of the fund and/or the number of holdings/countries invested in.

### **Are there any differences between the regulatory calculations and the Morningstar calculations?**

These calculations are based on the regulatory rules, but there are some differences.

Green bonds: The regulation allows the underlying data for green bonds to be calculated based on the use of proceeds of those bonds; however, this data is not widely available. For now, when a portfolio holds green bonds, the Morningstar calculation will use the underlying data of the issuer.

Derivative look-through: The regulation allows derivatives to be looked through to the underlying companies. Morningstar does not look through derivative holding positions; rather, these are treated as "other" holdings for the calculations.

Board gender diversity: The regulation asks for the average ratio of female to male board members. This calculation can cause issues when there are no male board members. Morningstar calculates the average percentage of females on the board. This is calculated by taking the weighted average number of females for the portfolio and dividing by the weighted average total number of board members. This harmonic averaging technique reduces the effect of outliers on the average.

### **Is there a minimum criterion for coverage before the PAIs will be calculated?**

No. The PAIs will be calculated on the data that is available with no minimum criterion for coverage applied. Coverage and eligibility metrics will be calculated, so there is a fully transparent view on the amount of the portfolio the statistics are based on.

### **Are these PAIs all calculated by Morningstar?**

Yes. These PAIs are calculated by Morningstar. Because of differences in underlying data or methodology, they may differ from those reported by fund. Morningstar will also look to collect reported PAIs from funds via the proposed European ESG Template being developed by FinDatEx.

### **Why do the individual scope 1, 2, and 3 greenhouse gas emissions not sum up to scope 1, 2, and 3 combined PAI?**

The portfolio calculations use the underlying Sustainalytics fields to aggregate. For scope 1&2&3, we use the underlying Sustainalytics fields for scope 1&2&3; we do not sum the scope 1, scope 2, and scope 3 results. There may be cases where the underlying companies have scope 1&2&3 data (or scope 1&2 data) without the individual scope 1, scope 2, and scope 3 data. This can be the case when companies only report aggregated emissions (either 1&2&3, or 1&2, or both) and not the individual scope breakdowns. This will lead to differences in coverage and in results between a calculation based on the scope 1&2&3 field and the sum of the individual scope 1, scope 2, and scope 3 results.

### **Why have the values under the air pollutant PAI changed?**

We have moved to calculating the PAI on total air pollutants, whereas previously we were only calculating based on nitrogen oxides and sulfur oxides.

### **Why have the values under the controversial weapons PAI changed?**

We have moved to calculating the controversial weapons PAI to now exclude nuclear. ■■■

**Appendix 1 – List of PAIs**

<b>Generic PAI name</b>	<b>Calculation type</b>	<b>DL Indicator Name</b>
PAI scope 1 GHG Emissions	3a. share of emissions calculations	Carbon - Scope 1 Emissions
PAI scope 2 GHG Emissions	3a. share of emissions calculations	Carbon - Scope 2 Emissions
PAI scope 3 GHG Emissions	3a. share of emissions calculations	Carbon - Scope 3 Emissions
PAI scope 1&2 GHG Emissions	3a. share of emissions calculations	Carbon - Total Emissions Scope 1&2
PAI scope 1,2&3 GHG Emissions	3a. share of emissions calculations	Carbon - Total Emissions Scope 1,2&3
PAI Carbon Footprint scope 1&2	3b. Emissions per EURm invested	Carbon - Total Emissions Scope 1&2
PAI Carbon Footprint scope 1,2&3	3b. Emissions per EURm invested	Carbon - Total Emissions Scope 1,2&3
PAI GHG intensity Scope 1&2	1. average value	Carbon Intensity Scope 1&2_EUR
PAI GHG intensity Scope 1, 2, & 3	1. average value	Carbon Intensity Scope 1,2&3_EUR
PAI Fossil Fuel	2. involvement /policy—Involvement	Fossil Fuel-Revenue Percentage
PAI Non-Renewable Energy consumption	1. average value	Share of Non-Renewable Energy Consumption Percentage
PAI Non-Renewable Energy production	1. average value	Share of Non-Renewable Energy Production Percentage
PAI energy consumption Intensity - NACE A	1. average value	Energy Consumption Intensity Agriculture, Forestry & Fishing
PAI energy consumption Intensity - NACE B	1. average value	Energy Consumption Intensity Mining & Quarrying
PAI energy consumption Intensity - NACE C	1. average value	Energy Consumption Intensity Manufacturing
PAI energy consumption Intensity - NACE D	1. average value	Energy Consumption Intensity Electricity, Gas, Steam & Air Conditioning Supply
PAI energy consumption Intensity - NACE E	1. average value	Energy Consumption Intensity Water Supply, Sewerage, Waste Management & Remediation Activities
PAI energy consumption Intensity - NACE F	1. average value	Energy Consumption Intensity Construction
PAI energy consumption Intensity - NACE G	1. average value	Energy Consumption Intensity Wholesale & Retail Trade & Repair of Motor Vehicles
PAI energy consumption Intensity - NACE H	1. average value	Energy Consumption Intensity Transportation & Storage
PAI energy consumption Intensity - NACE L	1. average value	Energy Consumption Intensity Real Estate Activities
PAI Negative effect on Biodiversity	2. involvement /policy—Involvement	Activities Negatively Affecting Biodiversity Areas
PAI Emissions to Water	3b. Emissions per EURm invested	Emissions to Water Tons
PAI Hazardous waste	3b. Emissions per EURm invested	Hazardous Waste Production Tons
PAI UNGC principles/OECD guidelines Violations	2. involvement /policy—UNGC Violation	Breach of U.N. Global Compact Principles & OECD Guidelines for Multinational Enterprises Lack of Processes & Compliance Mechanisms to Monitor Compliance With U.N. Global Compact Principles & OECD Guidelines for MNEs
PAI UNGC Lack of compliance mechanisms	2. involvement /policy—Involvement	
PAI Gender pay gap	1. average value	N/A
PAI percentage of female board members	1. average value	N/A
PAI Controversial Weapons	2. involvement /policy—Involvement	Controversial Weapons (SFDR Definition)—Evidence of Activity
PAI Carbon intensity (Sov)	1. average value	Carbon Emissions Intensity
PAI Social Violations	4. Social violations	Any Country Social Violations
PAI Inorganic Pollutants	3b. Emissions per EURm invested	Emissions of Inorganic Pollutants Tonnes
PAI Air pollutant emissions	3b. Emissions per EURm invested	Emissions of Air Pollutants—Total Tonnes
PAI Ozone Depletion Substances	3b. Emissions per EURm invested	Emissions of Ozone Depletion Substances Tonnes
PAI Carbon reduction	2. involvement /policy—policy	Lack of Carbon Emission Reduction Initiatives
PAI Share of Energy Consumption Coal	1. average value	Share of Non-Renewable Energy Consumption From Coal Percentage
PAI Share of Energy Consumption Natural Gas	1. average value	Share of Non-Renewable Energy Consumption From Natural Gas Percentage
PAI Share of Energy Consumption Nuclear	1. average value	Share of Non-Renewable Energy Consumption From Nuclear Percentage
PAI Share of Energy Consumption Oil	1. average value	Share of Non-Renewable Energy Consumption From Oil Percentage
PAI Water Consumed and Reclaimed Intensity	1. average value	Water Recycling & Reuse Cubic Meters

PAI Percentage of Water Recycled and Reused	1. average value	Water Recycling & Reuse Percentage of Water Withdrawal
PAI Water Management	2. involvement /policy—policy	Lack of Water Management Policies
PAI Chemical production	2. involvement /policy—involvement	Pesticides Production Involvement
PAI Land Degradation	2. involvement /policy—involvement	Activities Causing Land Degradation, Desertification, or Soil Sealing
PAI Sustainable Oceans	2. involvement /policy—policy	Lack of Sustainable Oceans/Seas Practices or Policies
PAI Non-Recycled waste	3b. Emissions per EURm invested	Non-Recycled Waste Generation Tons
PAI Threatened Species	2. involvement /policy—involvement	Operations Affecting Threatened Species
PAI Biodiversity Protection	2. involvement /policy—policy	Lack of Biodiversity Protection Policy
PAI Deforestation	2. involvement /policy—policy	Lack of Deforestation Policy
PAI Workplace accidents prevention	2. involvement /policy—policy	Lack of Workplace Accident Prevention Policy
PAI Rate of accidents	1. average value	Recordable Work-Related Injuries Rate
PAI Days Lost to accidents	1. average value	Employee & Contractor Lost Days Due to Injuries, Accidents, Fatalities, or Illness
PAI Code of conduct	2. involvement /policy—policy	Lack of Supplier Code of Conduct
PAI Employee Grievance Mechanisms	2. involvement /policy—policy	Lack of Grievance/Complaints Handling Mechanisms Related to Employee Matters
PAI Whistleblower protection	2. involvement /policy—policy	Lack of Whistleblower Protection
PAI Discrimination Incidents	1. average value	Number of Incidents of Discrimination
PAI Discrimination Incidents Leading to Sanctions	1. average value	Number of Incidents of Discrimination Leading to Sanctions
PAI CEO pay ratio	1. average value	Excessive CEO Pay Ratio
PAI Human rights	2. involvement /policy—policy	Lack of Human Rights Policy
PAI Due diligence	2. involvement /policy—policy	Lack of Human Rights Due Diligence
PAI Anti human trafficking	2. involvement /policy—policy	Lack of Processes to Prevent Human Trafficking
PAI Risk of Child Labour	2. involvement /policy—involvement	Operations and Suppliers Exposed to Child Labour
PAI Risk of Forced Labour	2. involvement /policy—involvement	Operations and Suppliers Exposed to Forced or Compulsory Labour
PAI Human rights incidents	1. average value	Number of Identified Cases of Severe Human Rights Issues & Incidents
PAI Anti bribery/corruption	2. involvement /policy—policy	Lack of Anticorruption & Anti-Bribery Policy
PAI Anti bribery/corruption lack of action	2. involvement /policy—involvement	Insufficient Action on Breaches of Anticorruption Policy
PAI Corruption/Bribery convictions	5. Corruption convictions/fines	Number of Convictions for Violations of Anticorruptions & Anti-Bribery Laws
PAI Corruption/Bribery fines	5. Corruption convictions/fines	Amount of Fines for Violations of Anticorruptions & Anti-Bribery Laws EUR
PAI Income inequality	1. average value	Income Inequality
PAI Freedom of expression	1. average value	IC - Voice and Accountability—Score
PAI human rights score	1. average value	Average Human Rights Performance
PAI control of corruption	1. average value	IC - Control of Corruption—Score
PAI Noncooperative tax jurisdictions	2. involvement /policy—Involvement	Noncooperative Tax Jurisdictions
PAI Political stability	1. average value	IC - Political Stability—Score
PAI Rule of law	1. average value	IC - Rule of Law—Score

## Appendix 2 - List of DTIDs and Mapping to the Corporate or Sovereign Holding Type

<b>DetailType</b>	<b>DetailDescription</b>	<b>ESG Holding Type</b>
BG	Bond - Gov't Agency Pass-Thru	Sovereign/Corporate based on Issuer
NC	Bond - Gov't Agency CMO	Sovereign/Corporate based on Issuer
NE	Bond - Gov't Agency ARM	Sovereign/Corporate based on Issuer
CD	Cash - CD/Time Deposit	Corporate
CP	Cash - Commercial Paper	Corporate
B	Bond - Corporate Bond	Corporate
BC	Bond - Convertible	Corporate
BR	Bond - Bank Loans	Corporate
BU	Bond - Units	Corporate
IP	Bond - Corp Inflation Protected	Corporate
P	Preferred Stock	Corporate
PC	Convertible Preferred	Corporate
BT	Bond - Gov't/Treasury	Sovereign
TP	Bond - Gov't Inflation Protected	Sovereign
BD	Bond - Gov't Agency Debt	Sovereign
BZ	Bond - Supranational	Sovereign
BQ	Bond - Undefined	Corporate
ND	Bond - Covered Bond	Corporate
BH	Bond - Non-Agency Residential MBS	Corporate
NB	Bond - Commercial MBS	Corporate
E	Equity	Corporate
EQ	Equity - Undefined	Corporate
ER	Equity - REIT	Corporate
EU	Equity - Units	Corporate
BB	Short-term Corporate Bills	Corporate
BM	Non-U.S. Gov't Agency MBS	Corporate
CN	Contingent Convertible	Corporate
CT	Capital Contingent Debt	Corporate
GC	Global Non-Agency CMO	Corporate
GM	Global Non-Agency MBS	Corporate
GS	Short-term Government Bills	Sovereign
NR	U.S. Agency Credit Risk CMO	Corporate
PA	Participating Preferred	Corporate
TG	U.S. Agency TBA	Sovereign/Corporate based on Issuer
GA	Non-U.S. Gov't Agency CMO	Corporate