Estimating Portfolio Coherence with Climate Scenarios

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Whether voluntary or in response to regulation, investors are increasingly looking at the links between their portfolios and climate change. So far, there is no clear consensus as to how to perform such evaluations.

Among the existing approaches based on carbon emissions, nearly all exclude lifecycle emissions of a company's products and do not take into account their potential to reduce emissions. In addition, the absolute results (i.e. tons of CO_2) of these approaches are not necessarily suited to straightforward interpretation.

Other methods seek to evaluate portfolios relative to a breakdown of investments by energy subsector needed to attain a certain climate scenario. These approaches avoid the complexity introduced by carbon emissions and offer a simple result: compatible or not compatible. But, measuring a portfolio against an allocation of investments has its limits. Not all portfolios are intended to be representative of the economy as a whole, and, more importantly, there is no single, agreed-upon investment scenario for achieving climate objectives.

So, we have developed a new method to evaluate the coherence of a portfolio with climate scenarios using:

- A carbon emissions database, including both "induced" and "avoided" emissions over the lifecycle of a company's products. This database was created following a multiyear collaboration between Mirova and the consulting firm Carbone4.
- Climate scenarios from the Intergovernmental Panel on Climate Change (IPCC).
- Investment projections from the International Energy Agency (IEA).

Combining these sources allows us to respond to the existing approaches' main limits and produce an evaluation in degrees Celsius corresponding to the climate scenario implied by a portfolio's investments.

Example of Index Climate Evaluations

S&P 500	MSCI World	MSCI Europe	CAC 40	Barclays Euro Aggregate Corporates
4.9°C	5.0°C	5.2°C	5.2°C	5.2°C

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1. Rationale

Currently, two main methods exist for comparing portfolios' climate impact:

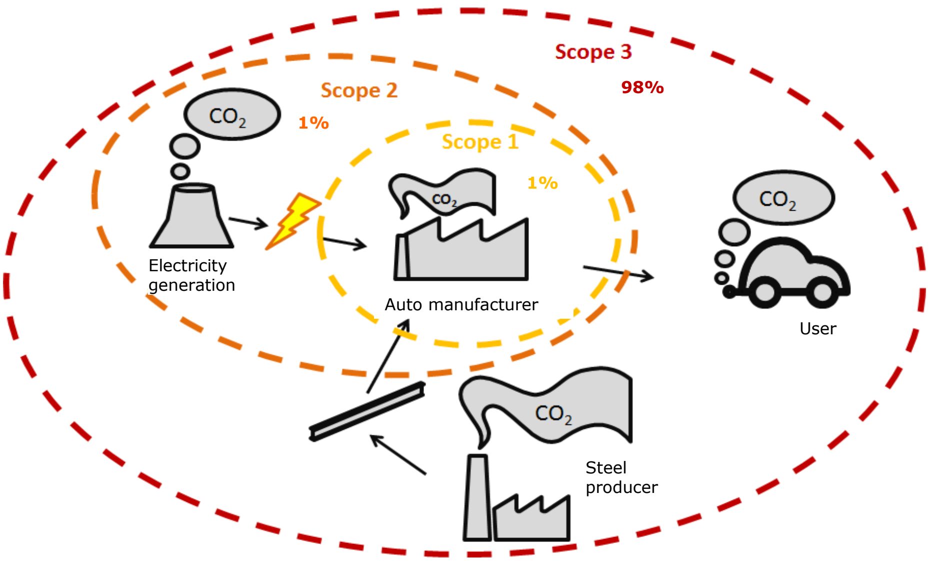
- Methods based on carbon emissions
- Methods which seek to evaluate a portfolio compared to a macro-level breakdown of investments technology by technology

A careful look at these reveals their shortcomings, and thus highlights some important factors to consider when designing a new approach.

1.1 Emissions-Based Assessments

A company's carbon emissions are typically divided into scopes 1, 2, and 3. Most carbon-based assessment methods only take direct emissions into account through scopes 1 and 2: the company's direct emissions and the result of the company's energy use, respectively.

Figure 1: Example of a Car Manufacturer's Carbon Footprint



Using both lifecycle (scope 1, 2, and 3) induced and avoided emissions are necessary to understand a company's climate impacts.

However, the indirect scope 3 emissions arising from the use of a company's goods or services, transportation, distribution, its supply chain, and more can be far more consequential than scopes 1 and 2 in certain sectors (oil and gas, for example). As a result, we believe it is necessary to take all three scopes into account when assessing a company's climate impacts.

Furthermore, these "induced" emissions arising from the lifecycle of the company's activities do not necessarily take into account any of their climate benefits. For example, a company which manufactures cosmetics might have the same scope 1, 2, and 3 emissions as a company that manufactures wind turbines. Should we only look at induced emissions, the cosmetics company and the turbine manufacturer would appear comparable in terms of climate impacts, whereas the turbine manufacturer clearly contributes far more to decarbonization objectives and the energy transition. To valorize these positive climate contributions, we believe that "avoided" emissions relative to an adaptable, baseline scenario should be estimated alongside induced emissions.

Given that most methods for assessing and understanding carbon data exclude scope 3 and do not adequately consider the emissions savings contributed by a company, introducing both induced (scope 1, 2, and 3) and avoided emissions is necessary to understand a company's climate impacts.

In addition, approaches based on carbon emissions tend to produce results in absolute terms, which complicate interpretation. When do we consider a strategy to have good carbon performance? When is it a failure? These thresholds are complex to define, and the results can therefore be difficult to communicate.

1.2 Breakdown-Based Assessments

Some research has been done to create a set of macro-level investment breakdowns by energy subsector compatible with limiting climate impacts.[1] These projections are especially useful for guiding regulators' policymaking with regards to the climate.

Then, estimating a portfolio's level of consistency with an investment breakdown leads to a simple result: the closer a portfolio is to a low-carbon scenario, the better it is from a climate standpoint.

However, such approaches have their limits. They cannot be applied to thematic portfolios with specific sectorial foci as the investment breakdown would no longer be comparable with the macro projection. Then, even for a portfolio diversified over the entire economy, these approaches are too reliant on a single forecast; there are numerous potential pathways for achieving today's energy transition objectives.

2. Inputs

So, with the strengths and weaknesses of the existing methods in mind, we have developed a new method to evaluate the coherence of a portfolio with climate scenarios based on:

- A carbon emissions database, including both "induced" and "avoided" emissions over the lifecycle of a company's products
- Climate scenarios developed by the IPCC
- Investment projections from the International Energy Agency (IEA)

2.1 Induced and Avoided Emissions

Since no existing emissions databases took into account risks and opportunities with a lifecycle approach, Mirova entered into a partnership with the consulting firm Carbone4. [2] For each asset in any given portfolio, two pieces of data are provided by Carbone4:

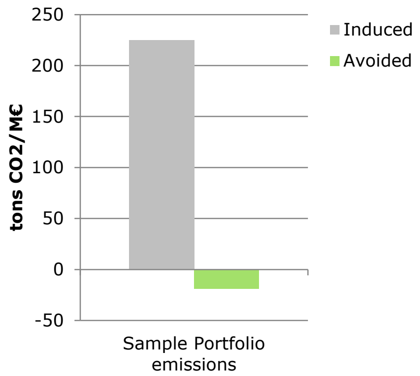
- Induced CO_2 emissions, from the lifecycle of a company's activities (scopes 1, 2, and 3)
- Avoided CO_2 emissions, due to green solutions or energy efficiency

[1] *See International Energy Agency, 2016*
2 *For more information, see www.carbone4.com*

Note that these figures provide a snapshot of a company's climate performance at a moment in time, and thus do not provide any indication of potential strategic evolutions.

These figures are then normalized by the company's enterprise value, which considers both market capitalization and debt. This allows attributes the emissions figures to both equity and debt investors, in line with their respective share in the company's capital and irrespective of the capital structure or leverage level.

Figure 2: Example of Induced and Avoided Emissions

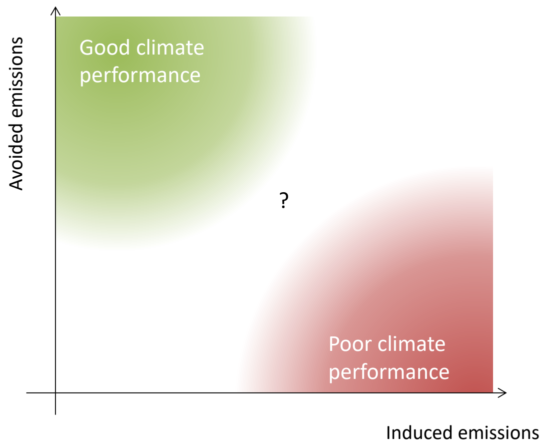


Source: Mirova / Carbone4

Although they have the same unit, these two indicators measure dfferent concepts. As induced emissions are "real" emissions and avoided emissions are "virtual", i.e. hypothetical emissions avoided compared to a reference scenario, they cannot be aggregated into one single indicator that represents the asset's total climate performance. [3]

Sometimes, analyzing carbon performance is straightforward: high induced with low avoided emissions indicates negative climate impacts, while high avoided with low induced emissions indicates substantial climate benefit. But when both indicators are of comparable value, no matter whether high are low, the interpretation is more challenging.

Figure 3 : Climate Performance Schematic



[3] *For more information, see "A Carbon Impact Methodology in Line with a 2° Scenario" (Mirova / Carbone 4, 2015)*

Straightforward communication of carbon emissions at the portfolio-level requires a specialized and simplified indicator. In our view, a formula which combines these induced and avoided emissions would have two main advantages:

- Good source data quality, as it takes into account both climate risks and solutions with a lifecycle approach
- A simple-to-interpret final indicator providing the coherence of an investment strategy with the climate scenarios

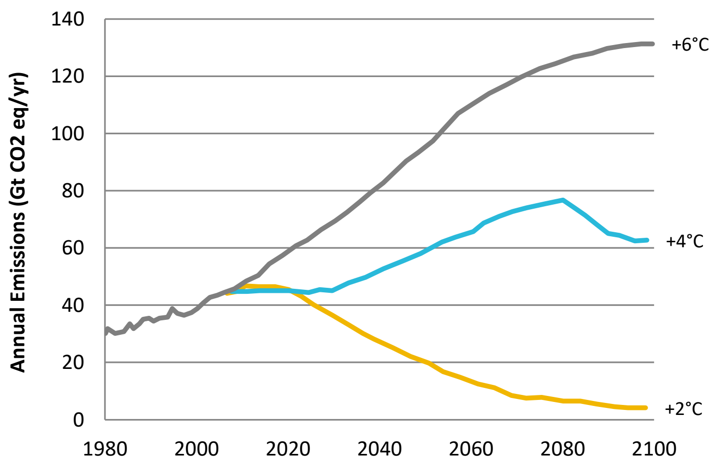
2.2 Climate Scenarios

The international consensus is that temperature rise should remain limited to 2°C, which implies severe cuts in GHG emissions in the coming decades.

The IPCC has outlined several emissions scenarios, each implying different consequences in terms of global temperature rise by 2100 relative to preindustrial averages.

- **2°C Scenario:** The international consensus is that temperature rise should remain limited to 2°C in order to limit the most severe effects of climate change. The Paris Agreement also outlines the possibility for a more ambitious scenario, which would limit the temperature rise to 1.5°C. Both imply severe cuts in GHG emissions in the coming decades.
- **4°C Scenario:** This scenario represents the likely outcome if the new climate regulations and commitments in place today (like the Paris Agreement) are respected.
- **6°C Scenario:** This is the likely outcome if old policies are maintained. This scenario would lead to catastrophic, global consequences.

Figure 4: Emissions Scenarios



Source: Mirova / IPCC 2014

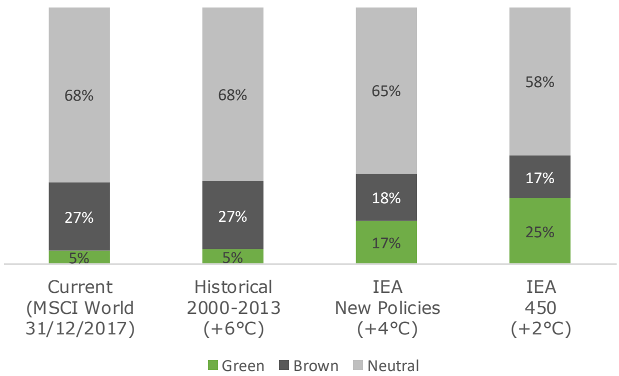
Estimating the level of coherence between a portfolio and these scenarios, allows us to produce a simple-to-interpret indicator (+2°C = good, +4°C = in line with the status quo, +6°C = bad).

2.3 The IEA World Energy Investment Outlook

The IEA provides the distribution of energy investments, which we translate into tons of CO_2 per million euros.

To link CO_2 emissions and the climate scenarios, we rely on the global investment figures provided by the International Energy Agency (IEA). The IEA's World Energy Investment Outlook provides figures on annual investments by energy subsector, as well as projections for investment amounts under the 2°C and 4°C scenarios. As our calculation basis, we used these projections for the 2°C and 4°C scenarios, plus an extrapolation based on historical data for the 6°C scenario.

Figure 5: Retained Portfolio Allocation Assumptions



While agriculture represents substantial carbon emissions, it is not included in the IEA's projections, its carbon impacts are difficult to quantify, and integrating agriculture into investment strategies remains challenging. As a result, it is not currently part of this estimation.

Source: Mirova / IEA 2015

3. Method

Connecting this data to a portfolio of investments takes place in two steps.

First, we estimate at what level induced and avoided emissions correspond to the different IEA scenarios so that we can position a portfolio's emissions in relation. Based on the green/brown/neutral breakdown of the MSCI World and its induced and avoided carbon emissions figures, we estimate:

- Investments in fossil energy contribute, on average, to induced emissions of approximately 1275 tCO_2/M€
- Investments in renewable energy and energy efficiency lead to, on average, about 225 tCO_2/M€ in avoided emissions

Once the IEA scenarios have been converted into induced and avoided emissions, we can extrapolate a formula applicable to all possible portfolios:

$$t = 15\frac{\beta}{\alpha} + 0.0025(\alpha - \beta) + 5.65$$

t = temperature,
α = induced emissions (always positive)
β = avoided emissions (always negative)

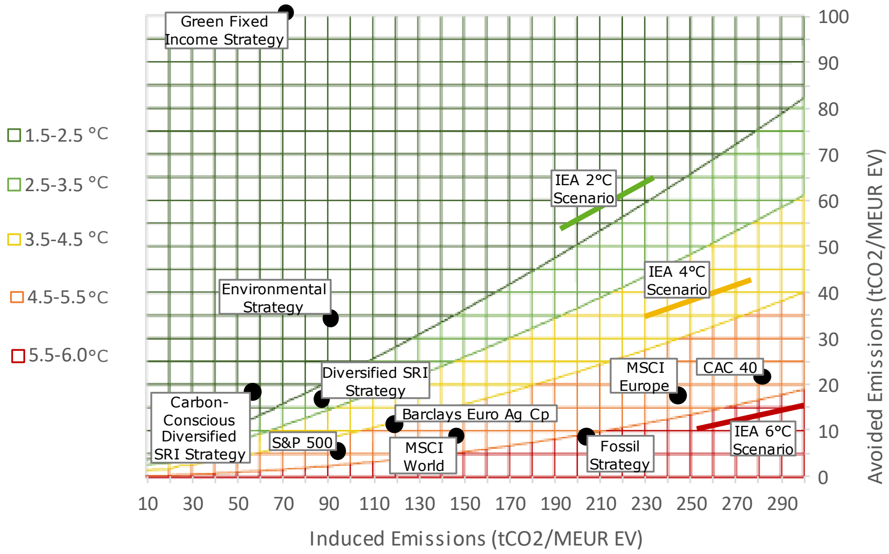
The details of these calculations can be found in the annex.

This formula leads to results coherent with a qualitative analysis. Fossil-heavy strategies tend towards 5-6°C and strategies focused on

Fossil-focused strategies tend towards 5-6°C, environmentally-conscious strategies 1.5-2°C, and indices 3.5-5.5°C.

environmentally-conscious investments are in line with the 1.5-2°C. Indices are generally 3.5-5.5°C-compatible, which is consistent with our understanding of the climate trajectory of the global economy.

Figure 6: Defined Climate Scenario Zones



Source: Mirova / Carbone4

- *Environmental Strategy: equity, with a focus on companies contributing positively to environmental and climate-related sustainability objectives.*
- *Fossil Strategy: equity, with a focus on companies involved along all steps of the fossil fuel value chain*
- *Diversified SRI Strategy: equity, seeking to address a wide set of long-term sustainability trends (i.e. climate change, aging population, growing middle class, and more).*
- *Diversified SRI, Carbon-Conscious Strategy: equity, seeking to address a wide set of long-term sustainability trends, with company choice adjusted for improved carbon performance.*
- *Green Fixed Income Strategy: fixed income, containing both corporate and green bonds.*

Figure 7: Index Evaluations

	S&P 500	**MSCI World**	**MSCI Europe**	**CAC 40**	**Barclays Euro Aggregate Corporates**
	4.9°C	**5.0°C**	**5.2°C**	**5.2°C**	**5.2°C**
Induced (tCO2/m€)	*95*	*146*	*242*	*277*	*183*
Avoided (tCO2/m€)	*-7*	*-10*	*-18*	*-22*	*-12*

Source: Mirova / Carbone4

Immediately, the exercise leads to some interesting insights: while European equities are generally advanced compared to their North American peers in terms of their attention to and disclosure around sustainable development issues, the may not be true of the economy's overall carbon performance. The S&P 500, for example, has a lower carbon footprint than the MSCI Europe or the CAC 40. This stems in part from the higher weighting of technology in the S&P 500, which dilutes the index's carbon intensity.

4. Conclusion

The IEA provides investment breakdowns, which we then translate into tons CO2 per million EUR invested.

This innovative method for estimating portfolio coherence with climate scenarios presents several advantages compared to existing methods.

- It relies on lifecycle data which considers climate risks as well as solutions.
- The result is a simple-to-interpret indicator and leads to results coherent with qualitative analysis.

However, our approach also has its limits:

- The reliance on several levels of estimates, including scope 3 carbon emissions, definition of the reference scenarios for avoided emissions, and extrapolation of the IEA data to define a formula
- There are no forward-looking elements in the final evaluation.

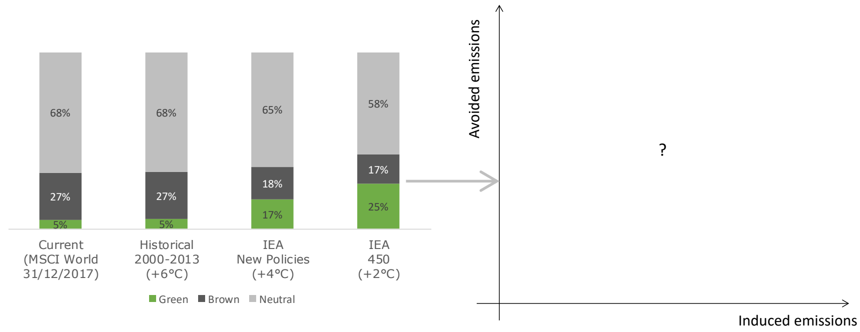
In our opinion, this impact indicator is nevertheless a useful tool to guide investors in their asset allocation, whether they are looking to create impact, contribute to the energy transition, or better take into account the risks and opportunities linked to the energy transition.

5. Annex: Calculation Details

5.1 From Investment Projections to CO_2 Emissions

Converting investment distributions into tons of CO2 per million euros invested required the distribution of investments provided by the IEA.

Figure 8 : Schematic – Translation of Investments to Tons of CO_2



Source: Mirova / IEA 2015

In addition to the energy investment distribution for the 2°C, 4°C and 6°C scenarios, we assumed that:

- Renewable energy and energy efficiency are the principal contributors to avoided emissions
- Fossil fuels are the main contributors to induced emissions

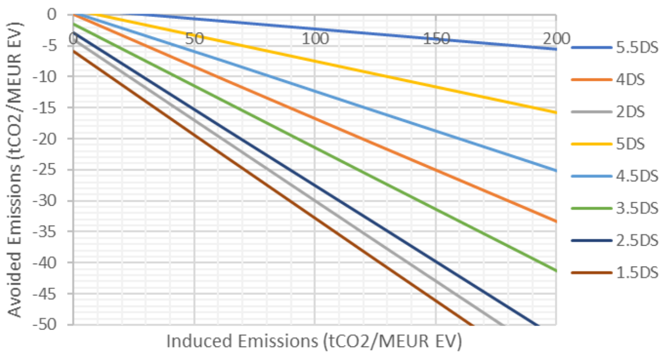
The avoided emissions associated with renewables / energy efficiency and the induced emissions associated with fossil energy were calculated using average figures for companies implicated in these technologies (based on our emissions database), using the MSCI World.

Based on these principles, the retained conversion factors are:

- Investments in fossil energy contribute, on average, to induced emissions of approximately 1275 tCO_2/M€
- Investments in renewable energy and energy efficiency lead to, on average, about 225 tCO_2/M€ in avoided emissions

When applied to the three IEA scenarios, these conversion factors lead to a first set of induced and avoided emissions data. Then, by varying the part of energy in the total level of investments, it is possible to increase the number of points. These are presented in figure 9, below.

Figure 9 : Scenarios in terms of Avoided and Induced Emissions (based on the MSCI World)



Source: Mirova / Carbone 4 / IEA 2015

This acts as a first mapping of the climactic impact of different induced/avoided emissions combinations.

5.2 Determining and Adjusting the Formula

The formula was determined by performing a regression based on the data points in figure 9:

$$t = 15\frac{\beta}{\alpha} + 0.0025(\alpha - \beta) + 5.65 \qquad \textbf{(1)}$$

t = temperature,
α = induced emissions
β = avoided emissions

Some adjustments are then made to compensate for additional factors not able to be considered mathematically. Since some sectors (like finance, technology, and health care) lead to low levels of both avoided and induced emissions, portfolios mainly composed of these sectors risk being classified as 2°C compatible, while they are actually minimally exposed to climate issues.

So, a linear approximation based on a portfolio's exposure to carbon-implicated sectors allows for more nuanced scaling between the equation's output and a business-as-usual scenario. A portfolio with zero exposure to climate-intensive assets will thus be considered consistent with 4°C by default. Finally, the model's output is bounded below at 1.5 and capped at 6; this ensures that the results have physical significance.

$$t_{adjusted} = \begin{cases} 1.5 & t < 1.5 \\ 4\left(\frac{s-p}{s}\right) + t\left(1 - \frac{s-p}{s}\right) & 1.5 \le t \le 6, if\ p < s \\ t & 1.5 \le t \le 6, if\ p \ge s \\ 6 & t > 6 \end{cases}$$

(2)

$t_{adjusted}$ = *final climate scenario in °C,*
t = *climate scenario calculated in equation 1,*
s = carbon-intensive investment cutoff (typically 30%, based on indices),
p = fraction of portfolio investments in carbon-intensive assets

Bibliography

Carbone 4 / Mirova. (2015). *Carbon Impact Analytics.* Retrieved from http://www.carbone4.com/sites/default/files/CarbonImpactAnalytics.pdf

International Energy Agency. (2016). *World Energy Investment Outlook.* Paris: OECD / IEA.

Mirova / Carbone 4. (2015). *A Carbon Impact Methodology in Line with a 2 Degree Scenario.* Paris: Mirova.

The World Bank. (2017, June 1). *World Bank Open Data*. Retrieved from The World Bank: http://data.worldbank.org/

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