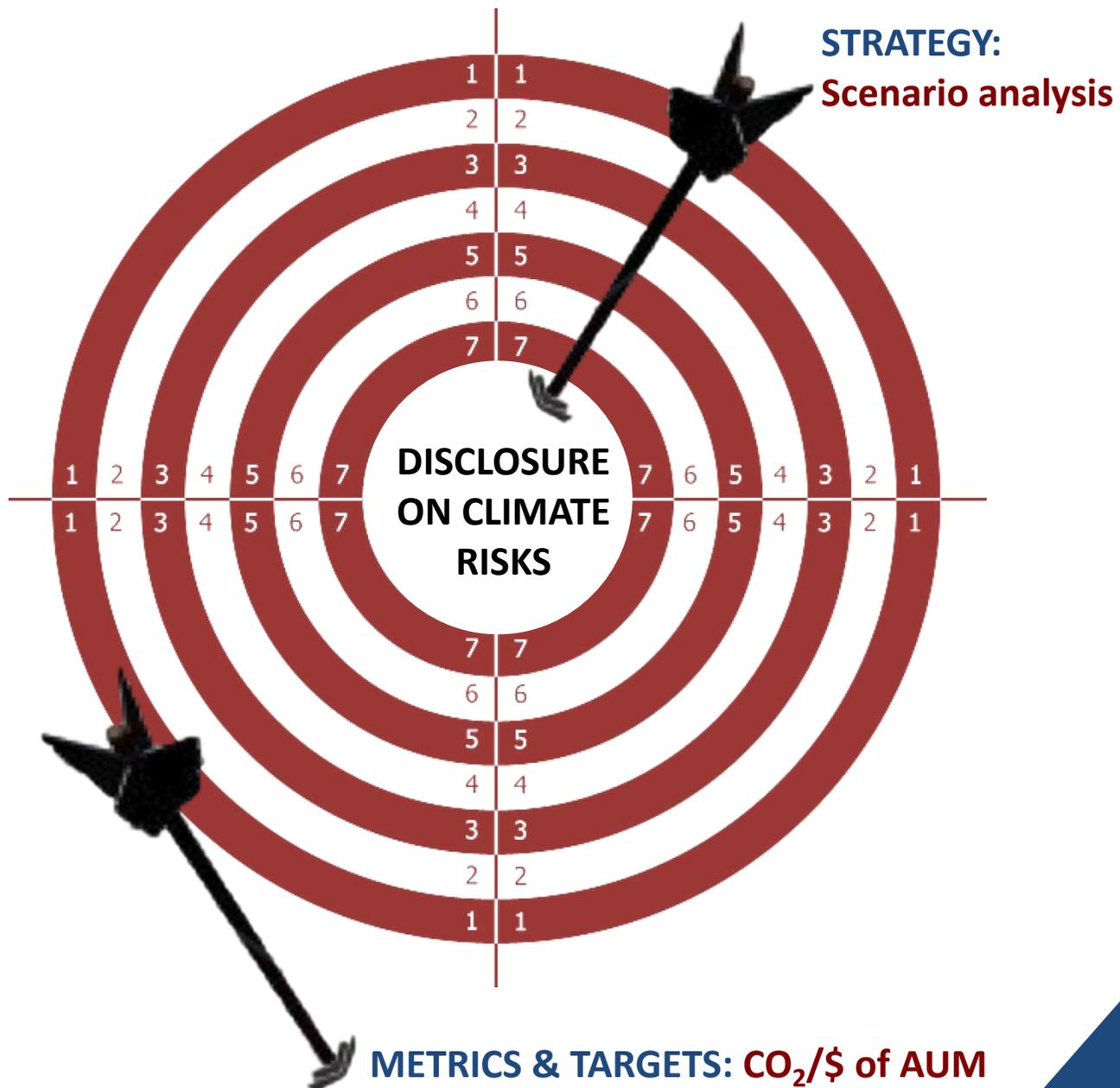


HIT AND MISS

ABOUT TCFD DISCLOSURE GUIDANCE
FOR FINANCIAL INSTITUTIONS



March 2017

Feedbacks on the
TCFD
Recommendations

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In the draft report of the TCFD we recommend investors (asset owners, asset managers and insurers) report on the **CO₂ per \$ of AUM** of their portfolio.

Please do not keep that in the final report: it is a bad idea!

We know that is not ideal, but it looks like an easy first step.



So what do you suggest then?



It isn't: besides being disconnected from the TCFD objectives and principles, it is likely to set back the efforts of investors and governments who are trying to develop a consistent reporting framework.

Simply recommend investors to disclose the results of the scenario analysis you prescribe as part of 'Strategy' disclosure. There are a number of existing practices. If you do not want to recommend them, it would be way better not to recommend any metric for investors!



AUTHORS



CHRIS WEBER

Co-led the GHG Protocol/ UNEP FI Portfolio Carbon Initiative, 4 year multi-stakeholder process to provide guidance to investors and banks on climate metrics. More precisely, the project aimed at enhancing the GHG Protocol technical guide on investment (cat 15) that is now referenced by the TCFD report. This process led to the conclusion that financial portfolio carbon footprinting was of limited value for climate-related risk assessment and for performance tracking outside specific asset classes (e.g. project finance), and that other metrics should be explored.



STAN DUPRE

Developed the first carbon footprint-based labeling scheme for financial institutions in 2007 in France, and wrote the first comprehensive review of financial sector carbon footprinting in 2011. He also took part to GHG Protocol/UNEP-Fi's Portfolio Carbon Initiative, first as a member of the advisory committee and then as co-leader. Stan is also chair of ISO 14097, the project of standard on climate-related metrics for the finance sector.



JAKOB THOMA

Project manager for European Commission-funded climate metrics research consortium (Sustainable Energy Investment Metrics, Energy Transition Risk project) focused on metrics and tools for assessing portfolio alignment with climate goals and associated potential financial risk.

Collectively the team spent about 25 years trying to improve portfolio carbon footprint metrics and related data, and then looked to develop alternative climate-related metrics for financial institutions, as a response to the shortcomings identified. Initiatives involve:

- Co-Leading the GHG Protocol/UNEP FI/2dii Portfolio Carbon Initiative (see above)
- Designing and launching two multi-million EUR research consortia focused on the assessment of transition risk and alignment of financial portfolios
- Co-founding (with the French Ministry of Environment and French Treasury) the [International Award on Investor Climate-related Disclosures](#), which identified market leading practices in investor climate risk and performance reporting
- Co-convening (with the UNFCCC) the new ISO Standards process on climate-related assessment for financial institutions (ISO 14097), which will standardize the assessment of investor "contribution" to climate goals.

REFERENCES

[From financed emissions to long-term investing metrics.](#) (2dii 2013)

[Reviewing the evidence: 10 questions for the FSB Climate Disclosure Taskforce](#) (2dii, Jan 2016)

[Assessing the Alignment of Portfolios with Climate Goals](#) (2dii 2015)

[Transition Risk Toolbox: scenario, data and models](#) (2dii 2017)

[Asset Level Data and Climate-related Financial Analysis: a Market Survey](#) (2dii 2017)

[Stranded assets and the fossil fuel divestment campaign: what does divestment mean for the valuation of fossil fuel assets?](#) (Oxford 2014)

[Investing in a Time of Climate Change.](#) (Mercer 2015)

[Environmental Risks: Heat Map Shows Wide Variations in Credit Impact Across Sectors.](#) (Moody's 2016)

[Climate Strategies and Metrics: Exploring Options for Institutional Investors](#) (PCI 2015)

[Carbon Asset Risk: Discussion Framework.](#) (WRI/UNEP 2015)

[Carbon Intensity ≠ carbon risk exposure](#) (2°ii/Grizzly RI, 2015)

[Climate Disclosure: how to make it fly?](#) (2°ii/Oxford, 2016)

[Investor climate disclosure: stitching together best practices](#) (2dii, May 2016)

[All swans are black in the dark](#) (2°ii/Generation, 2017)

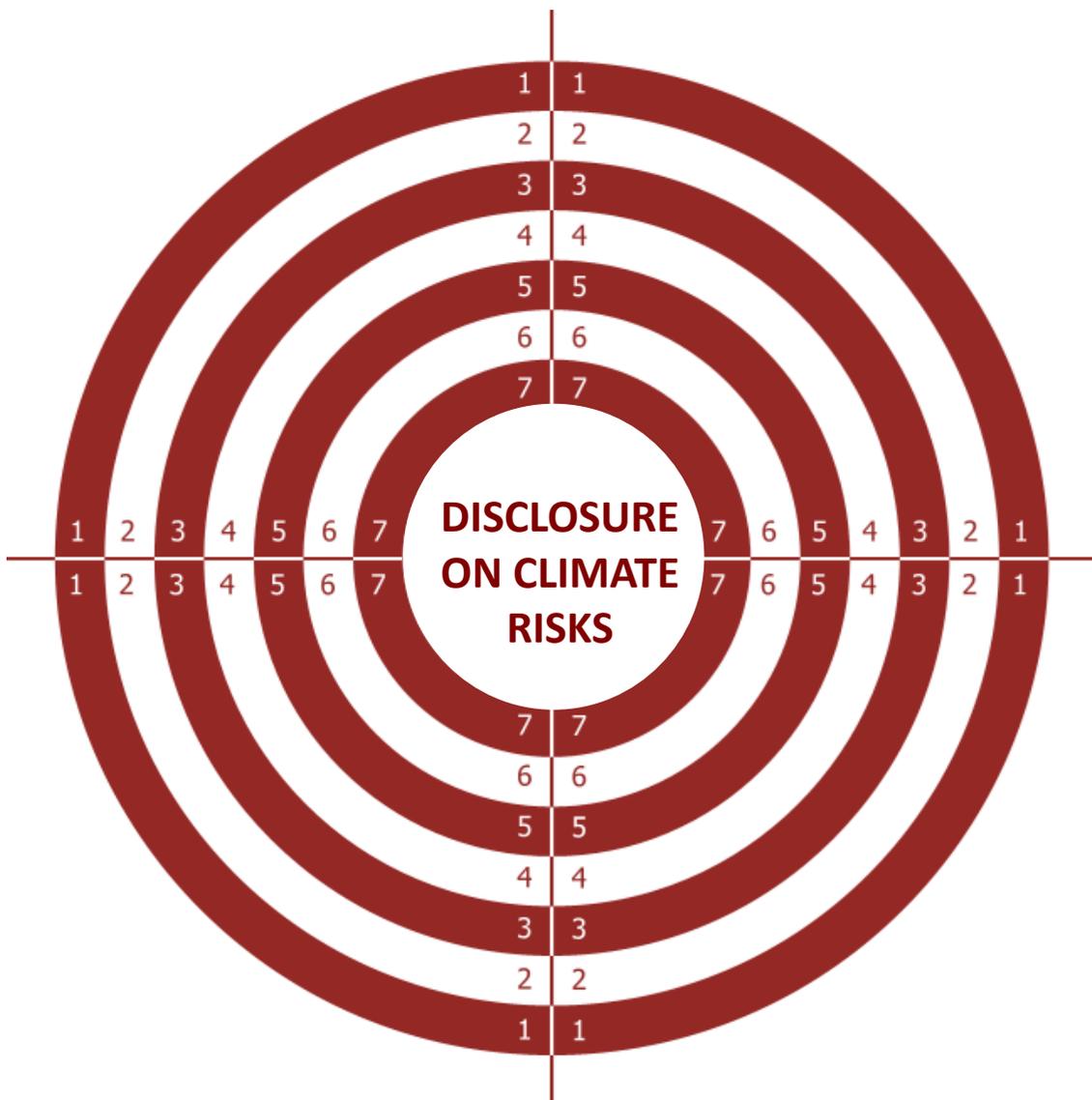
[The long and winding road](#) (Mercer/2°ii/Generation, 2017)





CHAPTER 1

GUIDANCE ON METRICS: TARGET MISSED



TCFD GUIDANCE ON METRICS DOESN'T COMPLY WITH ITS OWN PRINCIPLES



The Task Force on Climate-related Financial Disclosures (TCFD) draft guidance on Metrics & Targets says “Asset-owners [and asset managers] should provide GHG emissions, where data are available, associated with each fund [product] or investment strategy normalized for every million of the reporting currency invested”. For calculation, the TCFD recommendations refer to the GHG Protocol Technical Guidance on investments (category 15) that prescribes the disclosure of scope 1 and 2 emissions associates with the investee entity financed by equities or debt.

The table below assesses this metric against the TCFD’s “Principles of for effective disclosure”:

Principles for Effective Disclosures	Is principle met for the recommended metric?
1 Disclosures should represent relevant information	✗ It is unclear for whom the metric represents relevant information and what type of decisions it allows to inform (p. 10)
2 Disclosures should be specific and complete	✗ As defined by TCFD, the recommended metric is neither specific (aggregated) nor complete (covers 20-25% of GHG emissions, p. 5)
3 Disclosures should be clear, balanced, and understandable	✗ It is unclear what the metric actually tells you (p. 5-8), the metric being misleading in most use cases
4 Disclosures should be consistent over time	✗ GHG emissions per \$M of investment is not consistent over time, given various biases such as stock valuation (p. 7)
5 Disclosures should be comparable among companies within a sector, industry, or portfolio	✗ The recommended metric does not provide a comparable information across portfolios, nor across sectors (Pg 5-6)
6 Disclosures should be reliable, verifiable, and objective	✗ Currently the recommended metric is not verifiable due to substantial necessary estimation for non-disclosers
7 Disclosures should be provided on a timely basis	✗ Backward-looking GHG emissions per \$M of AUM are usually linked to data outdated by over 2 years in some cases.

CO₂ PER \$ OF AUM IS NOT A RISK METRIC AT PORTFOLIO LEVEL

“The Task Force believes that disclosures by the financial sector could foster an early assessment of climate-related risks and opportunities, improve pricing of climate-related risks, and lead to more informed capital allocation decisions. Such disclosures might also “provide a source of data that can be analyzed at a systemic level, to facilitate authorities’ assessments of the materiality of any risks posed by climate change to the financial sector, and the channels through which this is most likely to be transmitted”

Super cool! But reporting of CO₂ emissions per AUM reported at portfolio level won’t help you achieve that: it is not a risk metric!

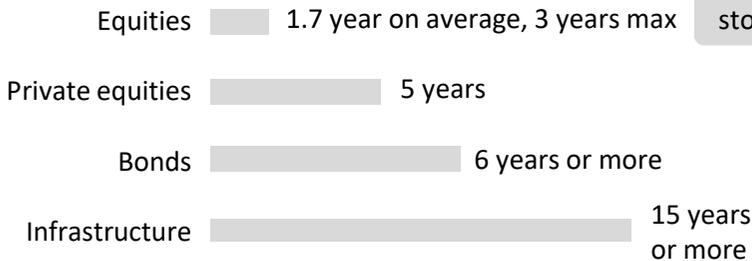
Yes, we know, we said in the report that « GHG emissions should not necessarily be interpreted as a risk metric. » but it could be used as a proxy?

Actually, the value-at-risk due to climate-related risks results from multiple factors, the carbon intensity of the activities is (at best) one of them. As highlighted by Mark Carney, another important one is the time horizon!

What do you mean? Can you give me an example?

Most climate-related risks are likely to become really material from a financial perspective in 5, 10, 20 or 30 years from now. But for long-term investors, holding periods vary across asset classes, thus exposing very differently investors to these long-term risks.

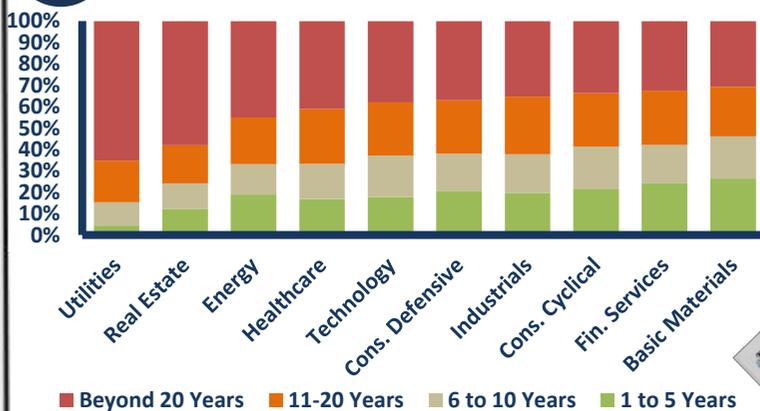
1 REPRESENTATIVE HOLDING PERIODS



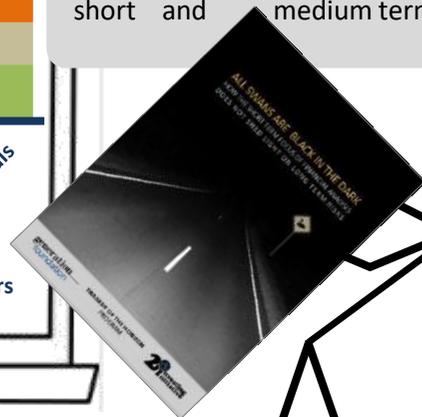
An indicator that doesn't capture this (such as GHG intensity) misses a big part of the story and thus cannot be used as a proxy

Yes but within an asset class, GHG intensity can still be relevant?

2 BREAKDOWN OF STOCKS NPV BY PERIOD



Same problem here. How the net present value of stocks is based on on long-term cash flows varies a lot across sectors: electric utilities are mostly exposed to long-term risks, while materials are mostly exposed to short and medium term risks.



CO₂ PER \$ OF AUM IS NOT A RISK METRIC AT SECTOR LEVEL

Ok, but maybe investors could report by industry group then, distinguishing average tenor? We already recommend that for banks*. After all, "all organizations with significant emissions are likely to be more strongly impacted by transition risk than other organizations. In addition, current or future constraints on emissions, either directly by emission restrictions or indirectly through carbon budgets, may impact organizations financially." (page 22 of the annex).

You don't want to do that for 3 reasons:

1. For sectors such as automotive and fossil fuels, what matters are the emissions associated with the use of products, not scope 1 and 2 emissions. Scope 1 and 2 (blue on Fig1) is the relevant carbon metric for 12% of AuM in a diversified portfolio, and they only represent 20-25% of total emissions (including scope 3).

Yea but for these relevant sectors, it could be useful?

2. No. Different sectors have different pricing power, financial cushion, and exposure to policy risks that greatly change their resilience to potential carbon-related constraints. In 2015, Moody's estimated the sensitivity of the creditworthiness to climate risks, for all sectors of the bond universe (Fig2), and the correlation with GHG intensity is very low.

3. At the end of the day, you don't need to ask investors to report on the footprint of their portfolio by sector to screen for transition risk; there are dozens of studies that identify which sectors are most exposed to climate-related risks. You just have to ask them to report on their exposure by sector, like you do for banks.

1 SCOPE 1 AND 2 EMISSIONS ARE MISLEADING FOR MOST INDUSTRIES**

■ Use of Products ■ Scope 3 Upstream ■ Scope 2 ■ Scope 1

Risk Level	Sector (color: Carbon Intensity)
Immediate Elevated	Independent Power Producers, Coal & Consumable Fuels
Emerging Elevated	Steel, Aluminum, Oil & Gas E&P, Construction Materials, Diversified Metals & Mining, Auto Manufacturers
Emerging Moderate	Regulated Utilities, Airlines, Integrated Oil & Gas, Paper, Oil & Gas services, Auto Parts, Gas Utilities
Low	Marine, Diversified Chemicals, Industrial Gases, Marine Ports

2 SECTOR LEVEL: CARBON INTENSITY ≠ ENVIRONMENTAL RISK EXPOSURE

3 YOU WANT INVESTORS TO DISCLOSE THEIR SECTOR EXPOSURE

*Banks should provide the metrics used to assess the impact of (physical and transition) climate-related risks on their lending and other financial intermediary business activities in the short, medium, and long term. Metrics provided may relate to credit exposure, equity and debt holdings, or trading positions, broken down by: Industry, Geography, Credit quality (e.g., investment grade or non-investment grade, internal rating system), Average tenor. Banks should also provide the amount and percentage of carbon-related assets relative to total assets as well as the amount of lending and other financing connected with climate-related opportunities.

**From Financed emissions to long-term investing metrics (2Dii/UNEP-FI/ABC, 2013).

CO₂ PER \$ OF AUM IS NOT EVEN A RISK METRIC AT COMPANY LEVEL

If investors start to report their carbon footprint, they will ask companies to report and be able to take climate-risks into their investment decisions, like screening and stock picking!

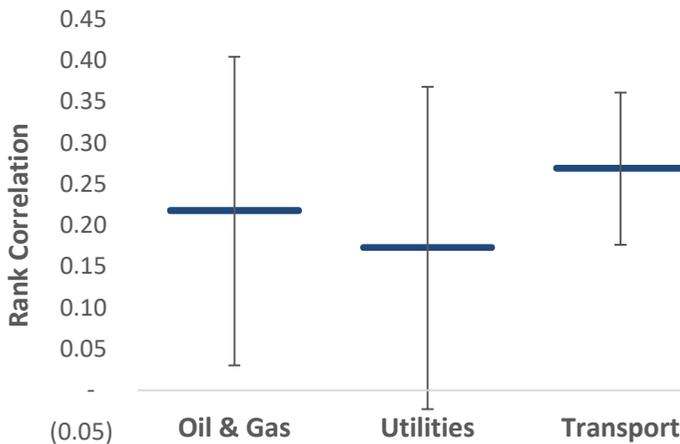
“Asset owners sit at the top of the investment chain and, therefore, have an important role to play in influencing the organizations in which they invest to provide better climate-related financial disclosures. (...) climate-related financial disclosures by asset owners may encourage better disclosures across the investment chain—from asset owners to asset managers to underlying companies—thus enabling all organizations and individuals to make better-informed investment decisions.”

So you think that, within a given sector climate-risks are correlated with carbon intensity by \$ invested, correct?

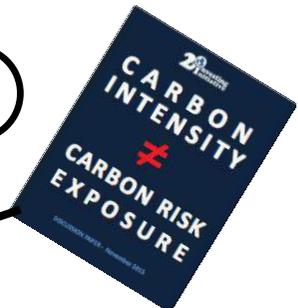
Maybe?

It sound intuitive, but...it is at best one factor!

1 COMPANY LEVEL: CLIMATE RISK EXPOSURE ≠ CARBON INTENSITY



2 YOU WANT COMPANIES TO DISCLOSE THEIR CLIMATE-RISK EXPOSURE

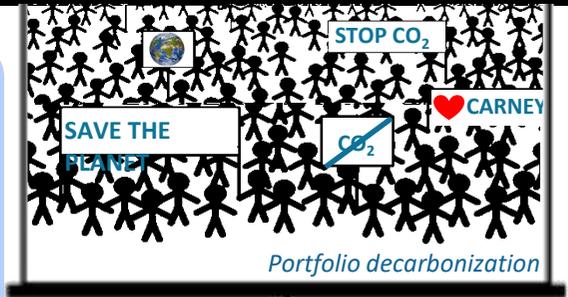


In 2015, we reviewed all the papers from financial analysts assessing the exposure of various companies to climate risk: how these risks impact their net present value. In each sector we ranked companies based on their exposure to climate-risks (as calculated by financial analysts) and their scope 1+2 carbon intensity.

We found very limited correlation in energy and transport (for which scope 1+2 are not relevant). But surprisingly, the correlation was just as bad for utilities, since their cost and revenue structure is highly sensitive to the local situation.

IF 'WHAT GETS MEASURED GETS MANAGED': AVOID CO₂ PER \$ OF AUM

Ok, so it doesn't work for assessing financial risks. You made your point. But as you have probably noticed the TCFD recommendations do not only deal with risk management: It is also about climate target-setting and how organizations would adapt in a 2° C future, all the stuff you NGOs asked for to help save the planet!



Yes! In this case investors will set their own carbon targets, pick low-carbon stocks, divest high-carbon stocks, and require issuers to reduce their emissions!

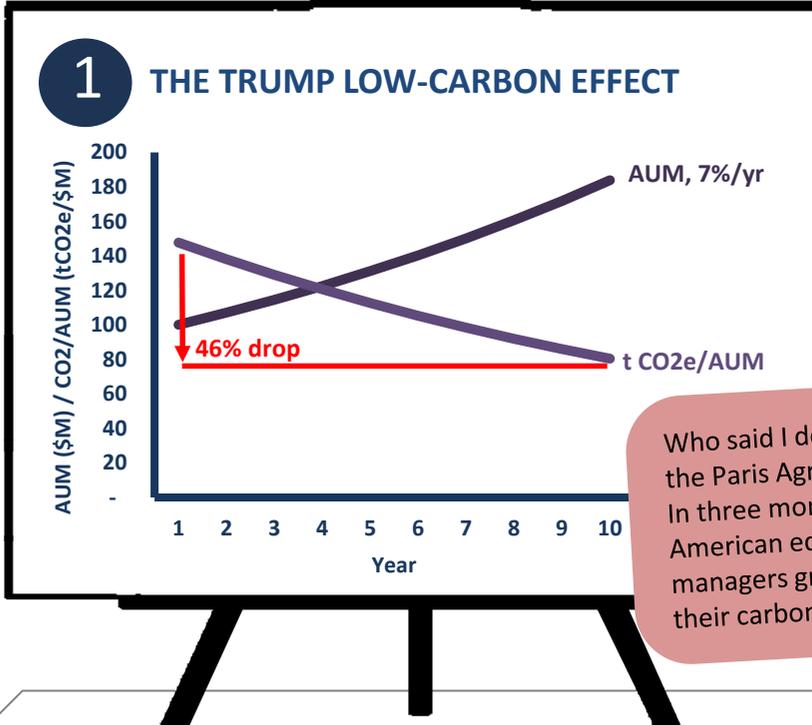
Ah got it! You want investors to disclosure climate metrics so that they ask companies to report and reduce their GHG emissions?



WHAT GETS MEASURED  **GETS MANAGED**

Ok then you really don't want the investors to "manage" their CO₂ per \$ of AUM*, for two reasons:

First, the investors will just have to sit back, relax and enjoy the show. When stock prices go up, all else equal, carbon intensity per \$AUM invested goes down. In this respect, it is interesting to notice that, in France, where setting climate targets became mandatory for investors, the first movers chose to set targets that are less ambitious than doing nothing at 7% growth!



Who said I don't support the Paris Agreement?! In three months, I made American equity portfolio managers great again by cutting their carbon footprint by 10%!

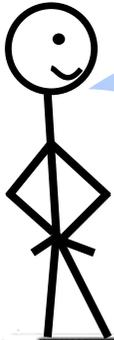


* * *

DECARBONIZATION OF YOUR PORTFOLIO

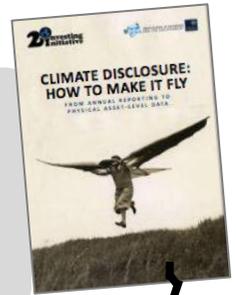
Huge • Tremendous • Amazing • Big League • Terrific

* * *



Ok, but certain investors and index providers screen out and underweight high-carbon companies in each sector, to reward best-in-class companies and penalize laggards.

Yes, but given the misleading focus on scope 1 and 2, the side effects could largely offset the benefits. This is why some index providers screen not only for Scope 1 and 2 emissions—for instance MSCI uses fossil fuel reserves as well. The side effects can be huge!



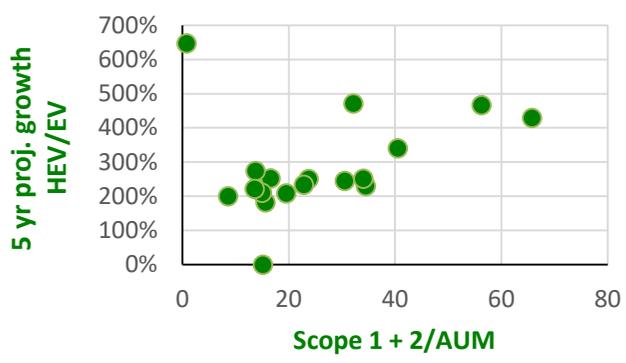
2 THE HIGH-CARBON SIDE EFFECTS OF LOW-CARBON REWEIGHTING

Less CO₂ reported from facilities, but...

Since Scope 1 and 2 emissions don't cover supply chain and product use, screening and reweighting certain industries using t CO₂/AUM can actually increase the misalignment with 2° C pathways:

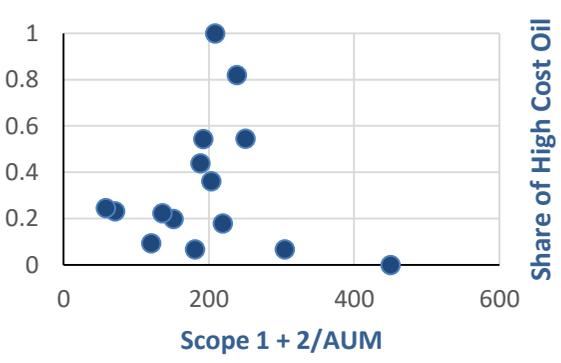
...Less green cars on the road

Many car makers with high growth projections in hybrid and electric vehicles happen to be the most GHG-intensive in Scope 1/2 per \$ of AuM



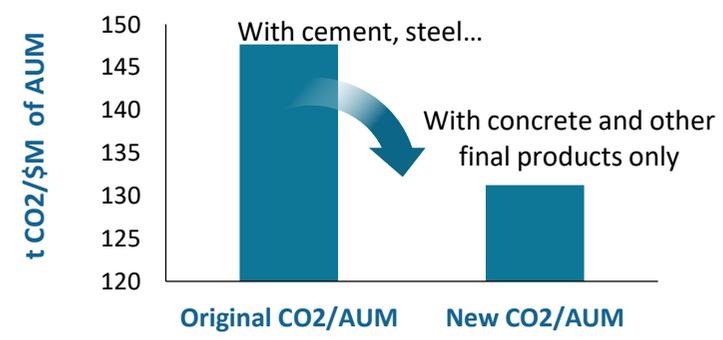
...more exposure to stranded assets

In the oil and gas sectors, the reweighting may increase the exposure to high cost projects (e.g. deep water, tar sands) and pipelines.



...no raw material, but still the final products

An easy way to reduce the CO₂/AUM is to screen high-carbon materials (steel, cement). However, this just pushes exposure to building products companies who are heavily reliant on such materials.



Further, buying and selling equities won't save the planet! When you sell a stock or a bond, someone else buys it--you need critical mass of investors to impact the cost of capital (Oxford 2014).

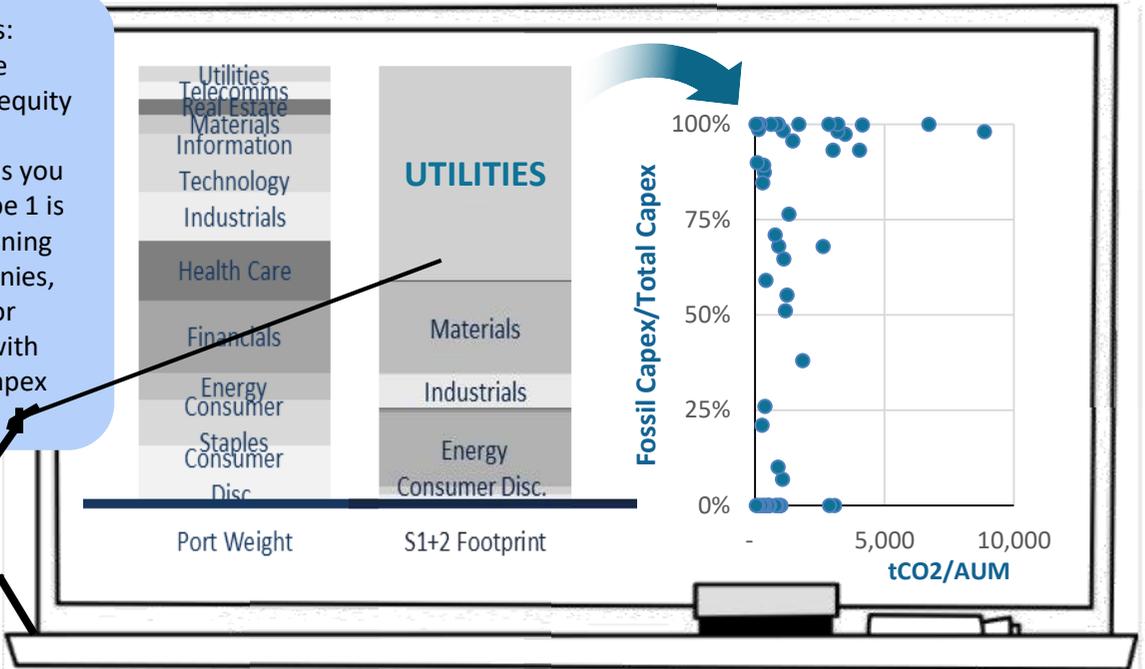
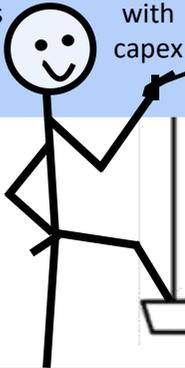


Ben →

NB: Calculations done using MSCI World and GHG Data from Bloomberg and Trucost. Screening and reweighting based on GICS categories using the top 10-15% of Industry Group 'Energy', Industry 'Automobiles', and Industry Group 'Materials', and Industry 'Building Products'. Oil cost fractions based on estimates from GlobalData. Projected Hybrid and Electric Sales based on AutoForecastSolutions projections for 2020.

WHY ASK TO REPORT ON PROXIES WHEN RELEVANT DATA ARE AVAILABLE?

Ok, ok, but two things:
First, about 50% of the Scope 1+2 of a global equity portfolio comes from electric utilities. And as you can see here, the scope 1 is relevant, and by screening high CO₂/AUM companies, you actually favor companies with greener plans!



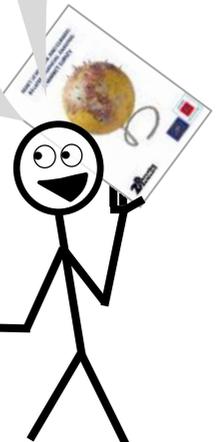
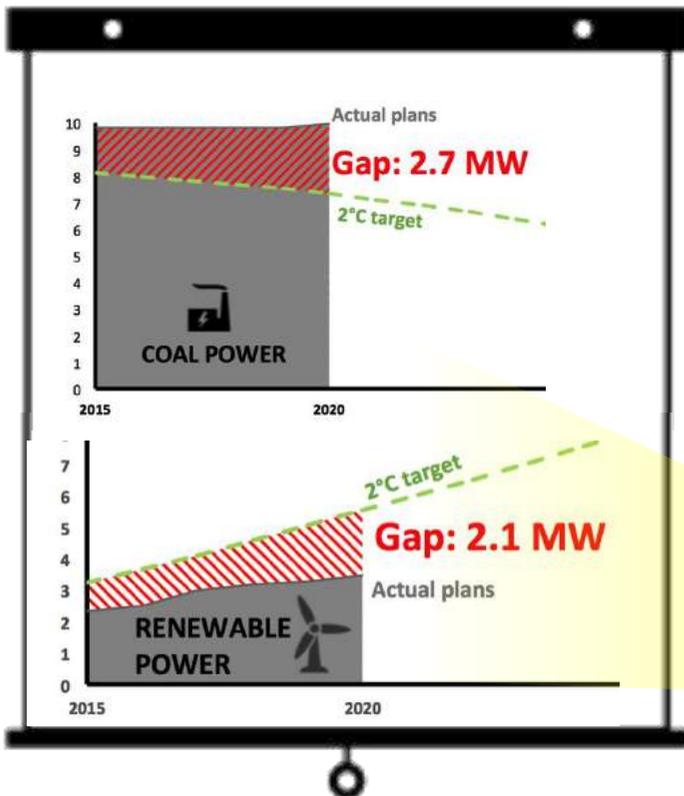
Second, certain investors only use divestment and overweighting as sticks and carrots, to engage with companies and request them to change their investment plans. In France, where climate target setting is now mandatory for investors, an investor even committed to reach its target through engagement mostly!

Ok, but if the CO₂/\$ indicator is only relevant for electric utilities, and to support engagement on companies capex and production plans: why don't you ask investors to directly report on these indicators?

That is what we ask to companies, but it will take them years to report on that: investors do not have the data now!

Well actually, they do: for utilities, energy, automotive, aircraft manufacturing and many other sectors market intelligence data provides information on plants, their location, associated capex and production plans (2ii 2017).

It is available for all companies and comparable with 2°C scenarios! Dozens of investors and some regulators are starting to use that to assess their alignment with climate targets and for financial risk considerations.



NB: Calculations done using MSCI World and GHG Data from Bloomberg and Trucost. Power capex plans for MSCI World utilities and merchant power generators taken from GlobalData Power.

RECOMMENDING CO₂ PER \$ OF AUM IS A FIRST STEP... TO KILL THE DYNAMIC

Ok, there are better metrics. But as we said in the report *“The Task Force views the reporting of GHG emissions associated with investments as a first step and expects disclosure of this information to prompt important advancements in the development of decision-useful, climate-related risk metrics.”*

We create a dynamic here, metrics will improve over time, carbon footprint is just a ‘bridge solution’.

Your bridge looks like that then!

Based on what happened with climate disclosure in the past 20 years, and on what investors do today this what is what is more likely to happen:



*Trails for Climate disclosure: a regulatory review (2Dii, 2016)

**Reviewing the evidence: 10 questions for the FSB Climate Disclosure Taskforce (2Dii, Jan 2016)



1 POTENTIAL COLLATERAL DAMAGE: FRENCH LAW ON CLIMATE DISCLOSURE (ART. 173)

In July 2015, France strengthened mandatory climate disclosure requirements for listed companies and introduced the first mandatory requirements for institutional investors as part of Article 173 of the *Law for the Energy Transition and Green Growth*. For investors, the law introduces disclosure requirements that aligned with the objectives of the TCFD: report on the alignment of their portfolios with climate targets, related financial risk exposure and set progress targets.

The French government drafted the implementation guidance in 2016. They face a strong lobbying push from carbon data providers and their client asset managers to make portfolio carbon footprint mandatory (CO₂ per € of AUM) despite the well known flaws of the indicator. They also opposed the explicit recommendation of existing smarter metrics.

The government resisted this lobbying push, but only published 'high level' guidance, postponing its technical guidance on metrics to 2018. This decision has partly been motivated by the objective to wait for the TCFD report. In the meantime the government organized the first [International Investors Climate Disclosure Awards](#) in 2016*, in order to foster the emergence of best practices and the convergence of practices between French and international investors. The international independent jury (including all investors coalitions, French and European policy-makers and NGOs) did not award any investors using CO₂ per AUM given the poor relevance of the indicator and its misalignment with the objectives of the law.



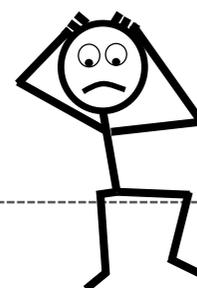
In this context, if the TCFD eventually recommend CO₂ per AUM as the metric to report on climate-related risks, investors who made the effort to innovate and develop smarter metrics, as well as the government will have no choice but to align on the international consensus. The official guidance expected in 2018 would very likely align with the TCFD recommendation locking France into at least five years of useless reporting and killing the current dynamic of innovation on metrics.

2 POTENTIAL COLLATERAL DAMAGE: EC HIGH LEVEL EXPERT GROUP ON SUSTAINABLE FINANCE

The [High Level Expert Group on Sustainable Finance](#)* has been initiated by the European Commission DG FISMA in order to develop policy recommendation regarding the integration of sustainability objectives into the European financial regulatory framework.

One of the key topic on the agenda is mandatory climate-related disclosure for financial institutions. The French example is a potential source of inspiration, but more importantly the group expect to build on the recommendations of the TCFD. The potential policy implications relate to the Non-Financial Reporting Directive, as well as the mandatory disclosures for financial institutions in the context of prudential frameworks.

Like for France, the recommendation of CO₂ per AUM by the TCFD is likely to lock Europe into 5 to 10 years of finance sector disclosure disconnected from policy goals, thus preventing any further policy action.



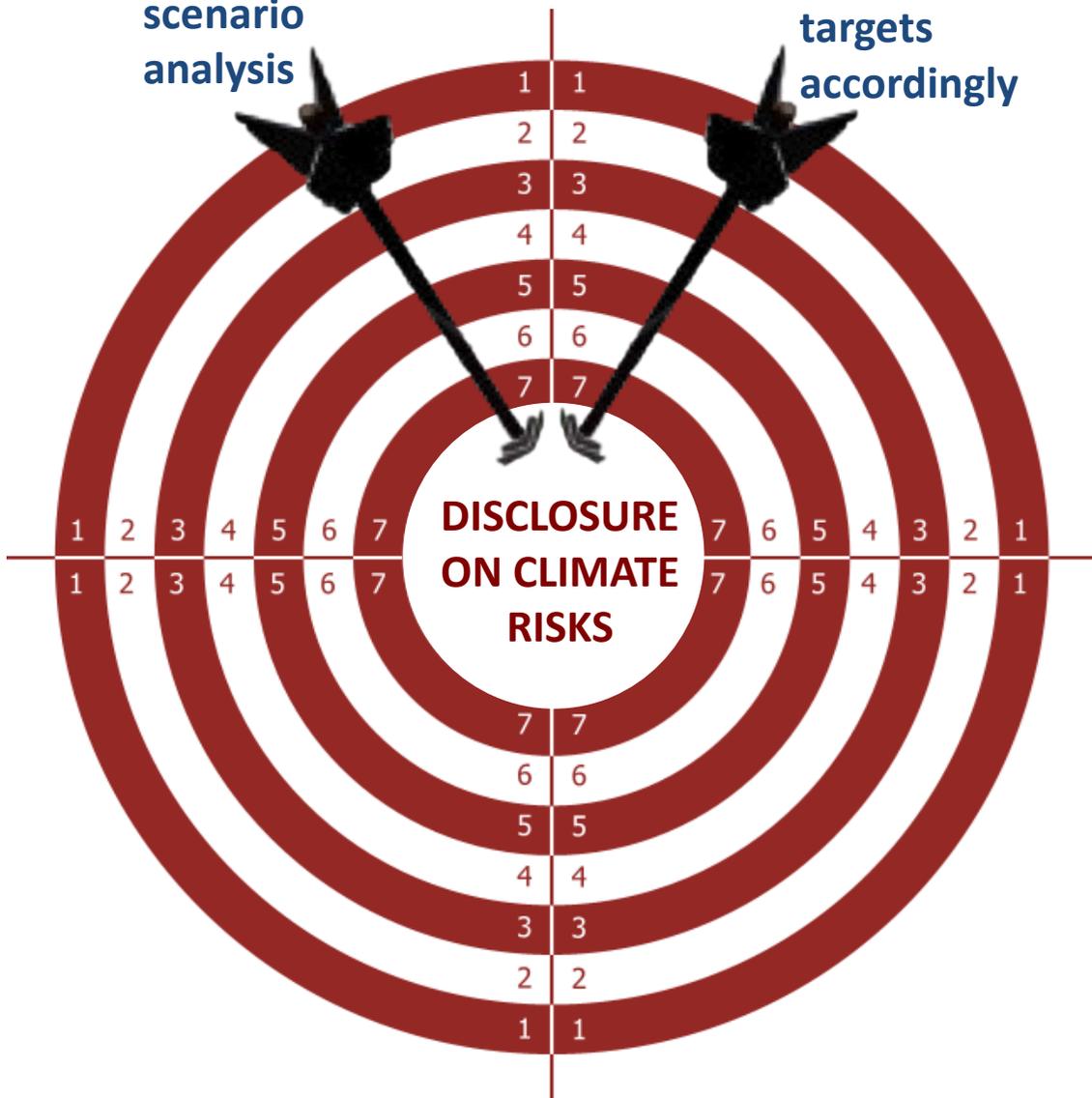
*2Dii is co-organizer of the awards and member of the HLEG

CHAPTER 2

MAKE RECOMMENDATIONS ON METRICS CONSISTENT WITH THOSE ON STRATEGY

Strategy:
Perform
scenario
analysis

**Metrics
& Targets:**
Disclose results
of scenario
analysis and set
targets
accordingly



METRICS TO BE CONSIDERED

Ok, CO2 per \$ of AUM is misleading as risk metric, not very useful to inform engagement, and might lock us in 10 years of useless reporting...

I get it, so what do you suggest? I want something simple that people can understand quickly.

Well, for investors, I would recommend three things that are actually pretty consistent with what you already recommend for disclosure on "strategy".

FYI, these are the best practices* that came out from the first international award on investors climate-related disclosure



1 2°C SCENARIO ANALYSIS

All sectors are encouraged to disclose exposure to climate-related risk via different scenarios—why not for investors? For key industries (namely power, energy, transport, real estate), investors can already report on the alignment of their portfolio with 2°C scenarios in key regions. They can use physical-asset level data and associated forward-looking indicators (technology deployment, production plans, committed CO₂ emissions, etc.), that are available for both direct investments and liquid assets related to companies (stocks, bonds). This indicator could be reported at a granular level. There are also options to think about reporting some type of aggregate misalignment – if really desired. This may also be misleading given the complexity, but at the very least is based on indicators that make sense. Over 100 investors have done this type of analysis to date, as well as two central banks.

For further information see: "Asset level data and climate financial analysis: a market survey" (2° ii 2017)

	Fossil Fuels			Automotive			Power					
	Gas Production	Oil Production	Coal Production	Electric Vehicles	Hybrid Vehicles	ICE Vehicles	Renewable Capacity	Hydro Capacity	Nuclear Capacity	Oil Capacity	Gas Capacity	Coal Capacity
Global	16.5%	-26.1%	-100%	-94.7%	-85%	5.9%	-19.2%	-58.1%	189.2%	-39.3%	-32.1%	15.4%
Global Aggregated	-70.3%	-79.7%	NaN				-21.9%	-40.4%	163.9%	-31.6%	-32.9%	43%
OECD	-4.4%	-32.2%	-100%	No regional benchmark for automotive sector			-23.1%	-39.1%	163.9%	-34.5%	-33.4%	41.2%
Non-OECD	-91.2%	-94.6%	-100%	No regional benchmark for automotive sector			-3.3%	-86.8%	-100%	-3.3%	-24.7%	58.7%
U.S.	-30.9%	-67.1%	-100%	No regional benchmark for automotive sector			384.8%	-100%	177.7%	-100%	-18.7%	-100%
EU28	-70.6%	-34.3%	-100%	No regional benchmark for automotive sector			-42.6%	-59.5%	115%	-7.2%	-19.1%	62.2%

*Investor climate disclosure: stitching together best practices (2Dii, May 2016)

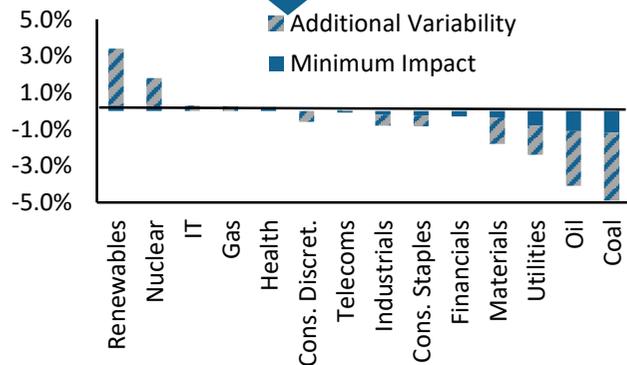
2 ESTIMATED VALUE-AT-CLIMATE-RISK IN A 2°C SCENARIO

A substantial amount of investor research already exists that can be used to estimate value at climate risk at asset class level (Mercer TRIP model), sector-level (same for equities, Moody's sensitivity analysis for creditworthiness), and even company levels (bespoke sell-side equity research, model from CO-Firm). This analysis is freely available (Moody's), commercially available off the shelf (Mercer), or can be commissioned (company-level analysis). Investors can use such estimates to get a quick understanding of their risk exposure across the portfolio and value at risk for different investment horizons.

For further information see several reports cited in the References section

- Mercer TRIP report (Mercer 2015)
- Moody's Heat map (Moody's 2016)
- WRI/UNEP Carbon Asset Risk report (WRI/UNEP FI 2015)

Sensitivity to an accelerated energy transition scenario (Mercer 2015)

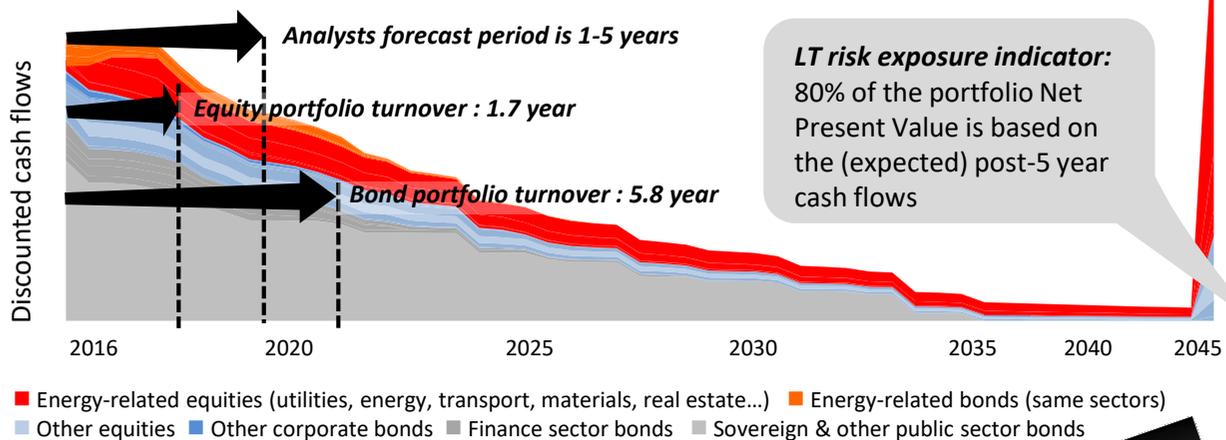


3 EXPOSURE OF THE INVESTMENT STRATEGY TO LONG TERM RISKS

To disclose how the investment horizon of investors exposes them to long-term risks and thus create more or less appetite for long-term risk management, investors can report:

- On the average holding period per asset-class, and their distribution per sector;
- On the time horizon for risk assessment in different asset classes (e.g. forecast period of analysts);
- These indicator can be compared to the breakdown of the Net Present Value of securities held by period (discounted cash flows breakdown by period).

For further information on these indicators see "All swans are black in the Dark" (2° ii, Generation – 2017) and "The Long and winding road" (Mercer, 2° ii, Generation – 2017).



Source: 2Dii 2017, representative institutional investor portfolio, 40% equity, 60% fixed-income

2° SCENARIO ANALYSIS: EXAMPLES OF EXISTING APPROACHES

The Task Force believes that “all organizations exposed to climate-related risks should consider: (1) using scenario analysis to help inform their strategic and financial planning processes and (2) disclosing the potential impacts and related organizational responses.” but in the sector specific guidance for financial institutions, we only recommend to disclose which scenarios are used and how, not the results.

Why not?

Well, it looks too complicated and expensive, and we don't know which metrics should be disclosed?

It is not that difficult and it is actually free. You can disclose two types of metrics :

Technology deployment – It involves comparing company technology deployment plans with the needed technology deployment in a 2° C scenario for the technology and regions concerned.

CO2 Intensity – it involves comparing a company's GHG emissions profile associated with specific products or services and the 2° C pathway for its sector in the regions where the company operates.

SUGGESTED SCENARIO ANALYSIS METHODOLOGY BY SECTOR (SOURCE: 2ii)

TECHNOLOGY DEPLOYMENT PATHWAYS	CO2 INTENSITY PATHWAYS	NO SCENARIO
Oil	Cement	Pharmaceuticals
Gas	Steel	Food & beverage
Coal	Aluminum	IT
Electric power	Shipping	
Automobile	Aviation	

Financial institutions → report activity-specific indicators at portfolio level

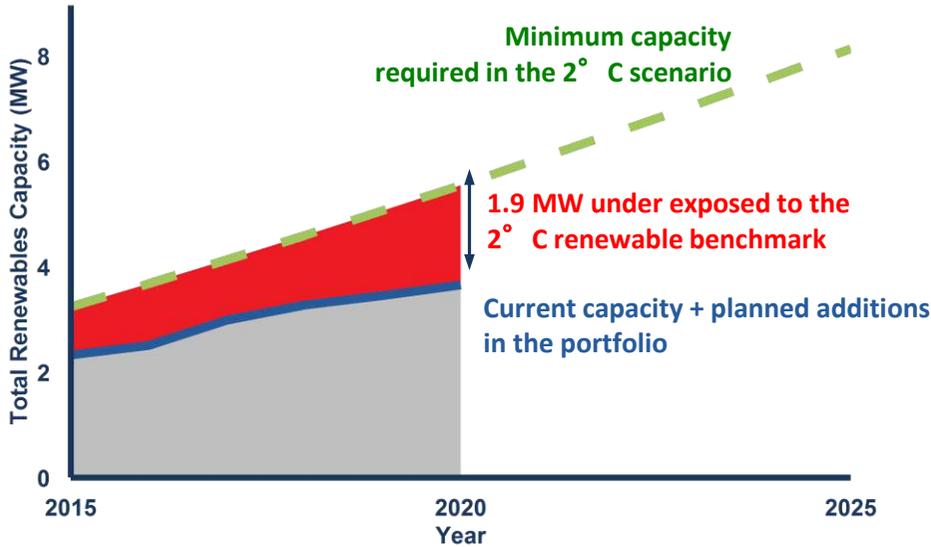
Choosing one methodology over another largely depends on the following conditions:

- **Sectors with specific technology pathways.** Where scenarios have specific technology pathways (e.g. renewables for power, fossil fuel production, drivetrain (e.g. electric / hybrid) for automobile, technology assessments are likely to be more meaningful since they directly speak to a 2° C pathway. In terms of application, technology assessments may also be easier since they relate to primary data (e.g. MW, number of cars, etc.) rather calculations relying on conversion factors.
- **Sectors without zero carbon technologies.** For certain sectors like cement and aviation there is no zero carbon technology at deployment stage, only various efficiency techniques. Metrics could therefore only be based on CO₂ intensity per unit produced or operated. R&D investment in breakthrough zero-carb technologies could be used to complement that.
- **Sector with no scenario.** Most sectors do not have associated scenarios. In this case qualitative ‘ESG’ analysis and scoring is more relevant than the use of misleading indicators.



1 TECHNOLOGY DEPLOYMENT PLANS

Developed by the *Sustainable Energy Investments Metrics* consortium (involving the 2° Investing Initiative, WWF DE, WWF EPO, Climate Bonds Initiative, CDP, Kepler-Cheuvreux, Cired, University of Zurich, and Frankfurt School of Finance) and funded by the European Horizon 2020 program, the framework measures the alignment with 2° C scenarios of listed equity and corporate bonds portfolios, covering ~20% by market cap, ~70%-90% by GHG emissions. >100 investors have used the tool at portfolio level to date, including asset managers, asset owners and insurers. The tool can be used as well by issuers for 2°C scenario analysis and related disclosure. Sectors currently covered are fossil fuels, electric utility, and automobile sector. The tool is being retailed by Trucost / S&P, South Pole Group, Sustainalytics, ET Index, and Grizzly RI, and is currently **available for free**.



Analysis in terms of 2°C alignment or misalignment can be expressed in percentage, capacity production level, investment, or revenue terms at both global and geography-specific level.

Results can be presented at portfolio (see page 13), sector (see Figure for a utilities) or security level.

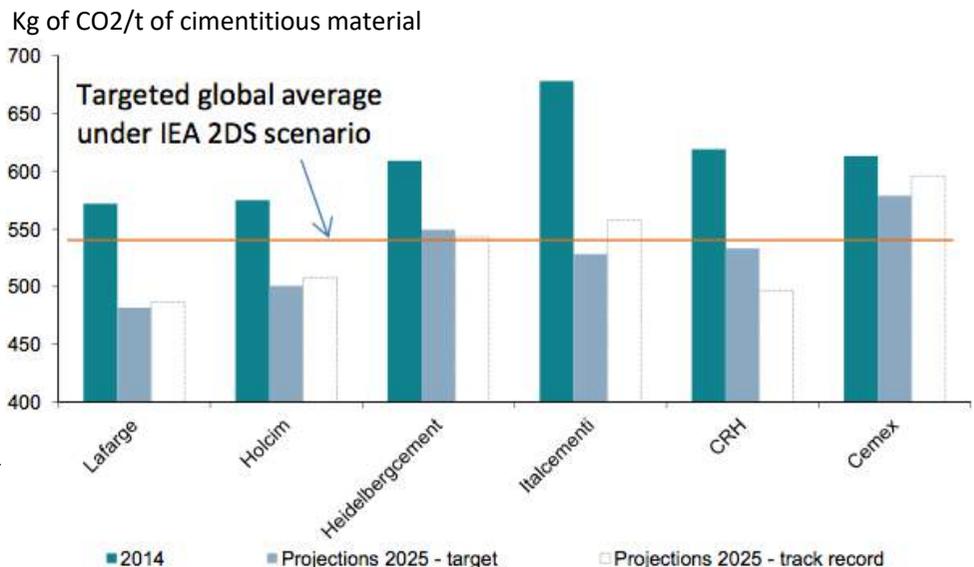
2 FORWARD-LOOKING CARBON INTENSITY

Launched in May 2015 by CDP, UN Global Compact, WRI and WWF, the SBT initiative has the objective to provide a standard framework which companies can use to define and adopt ambitious emissions reduction targets in line with climate science. As of February 2017, 210 companies have joined of which only 33 comply with the eligibility criteria that approves the target as science-based.

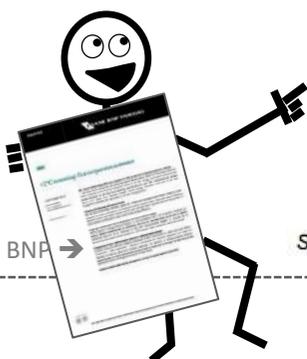
This framework could be used to compare *corporate targets or projections* with the target in 2° C scenario. Most companies do not have or disclose targets. In this case the projection could be based on an extrapolation of past trends (not ideal) or an analysis of existing and planned physical assets (better, but requires asset level data).

In 2015, Exane BNP Paribas released an analysis based on the 'extrapolation approach' for a few sectors (cement on the figure).

In 2017, the SEI Metrics consortium (see above) will release results for the second approach based on asset analysis, for cement, steel, aviation and shipping



Source: Companies, IEA, Exane BNP Paribas

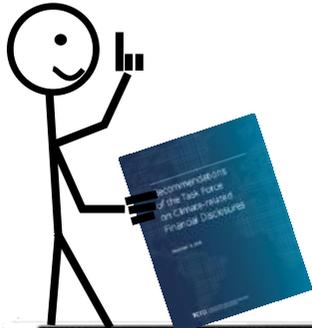


Exane BNP →

VALUE AT RISK ESTIMATES: EXAMPLES OF EXISTING APPROACHES

Your scenario analysis looks great, but people want simplicity, not 30 indicators for their portfolio. And your 2° C scenario analysis not a genuine risk approach since you do not actually assess the financial impact on the business of the companies.

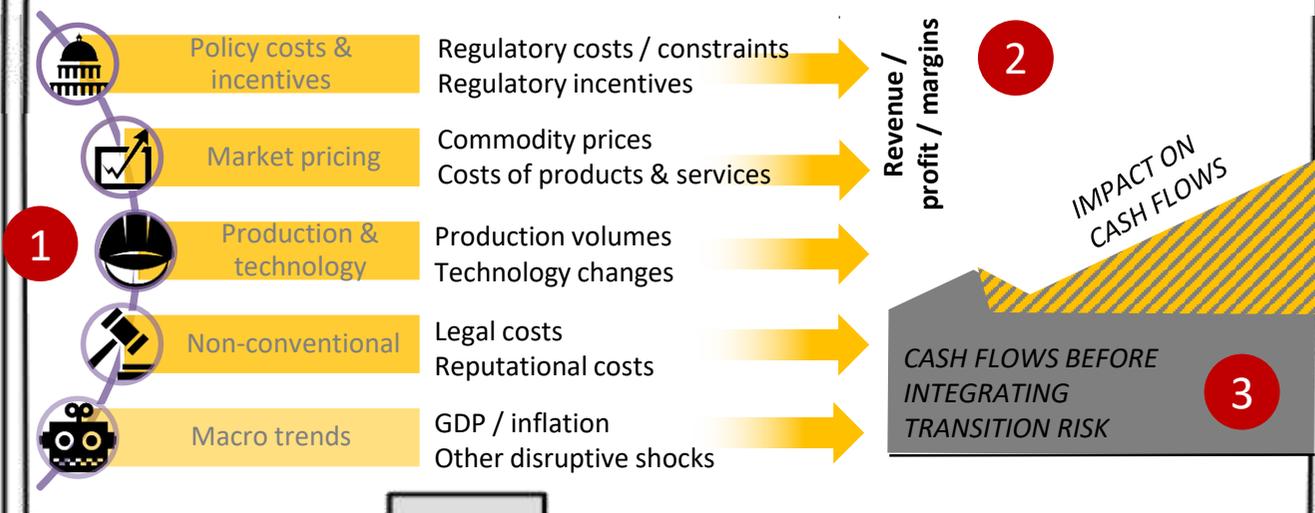
Well, if you want a real risk metric like the 'value at risk in a 2° scenario', you will need to 'translate' the scenario into risk parameters that can be used as inputs in risk models (DCF, strategic asset allocation, etc.). This process requires a lot of work and access to risk models, this is why only commercial financial service providers offer this analysis today and the number of users is limited (see examples on the next page).



	2° scenario analysis (misalignment of activities)	Value at risk calculation (potential losses)
Unit of output	Economic units, GHG emissions, or % misalignment	Financial units (e.g. margins, profits)
Type of scenario data needed	Future production by technology / fuel, Activity-based emissions curves at country / region level	Economic scenarios (left) + scenarios on policy costs and incentives, and market prices (e.g. oil prices, etc.) and trends
Types of company data needed	Future production by technology / fuel, Activity-based emissions curves at country / region level	Economic company data + e.g. costs of production, cost pass-through capacity, etc.
Examples / Users	SEI metrics 2°C portfolio test (+100 investors) , Science-based targets initiative (+150 companies)	CO-Firm Climate Xcellence Model, Mercer TRIP model (+20 investors)

In general, climate risk assessment analysis considers three steps:

1. **Translating the scenario** into metrics that can be integrated into risk models.
2. **Defining the variable** that should form the output of the risk assessment (e.g. margins, share price)
3. **Defining the modelling parameters** (e.g. discount rate, etc.) and then running the model.



1 ASSET CLASS AND SECTOR LEVEL ESTIMATES

Cross-asset, portfolio-level transition risk models allow investors to identify risk hotspots in their portfolio and identify potential financial opportunity. The Mercer TRIP is currently the only model that delivers such an assessment. It is a top-down model that allows investors to assess transition and physical climate risks at asset class and sector level for equities. The model has a time horizon of 10 to 35 years. It builds on the first assessment developed in 2010. There are over 30 investors that have used the model, including the 18 participants in the study. The standardized nature of the model ensures commercially scalable application. It integrates a comprehensive set of risk factors, including both physical (out of scope in this review) and transition risk. The model includes a specific reference to a 2° C scenario, but also more high-carbon scenarios.

The model does not cover all asset classes and as a top-down approach cannot inform with more granularity on security-level risks. Sector-specific analyses may be limited given differences within sector.



2 ESTIMATES PER SECURITY

Developed by The CO-Firm, the *ClimateXcellence* Model analyses company exposure to transition risks based on a cost and product volume approach and its effects on company margins, operating cashflows and capital expenditures viability. The analysis therefore consists on a threefold approach considering: i. regional/country-level regulatory changes; ii. impact of regulatory risks on internal processes based on an energy and carbon intensity analysis; and, iii. company adaptive capacity and a cost/benefit and margins analysis. The model – first designed in partnership with Allianz Climate Solutions / Allianz Global Investors / WWF Germany, extended with the Investment Leaders Group, facilitated by the *Cambridge Institute for Sustainability Leadership* (CISL)– is now being expanded as part of the EU-funded *Energy Transition Risk project** to measure regulatory, technological and market-based risks associated with 2° C scenarios and soft transition scenarios for a series of sectors (i.e. utilities, automotive, steel, cement), complementing existing models on gas production and oil refining. The model is being used by Kepler-Cheuvreux and S&P Market Intelligence to develop valuation models and credit risk models, approaches that could ultimately be applied in the context of company reporting or even financial portfolio assessments.

The model considers different scenarios with a time horizon until 2050, it enables sensitivity analysis and stress-testing.

									
		Regulation impact	After mitigation	Regulation impact	After mitigation	Regulation impact	After mitigation	Regulation impact	After mitigation
 Oil refining	Transition Scenario	-0.2 EUR/ bbl -3%	-0.1 EUR/ bbl -1%	-0.1 EUR/ bbl -1%	+0.2 EUR/ bbl +2%	0.0 EUR/ bbl 0%	+0.1 EUR/ bbl +1%	-0.1 EUR/ bbl -1%	+0.5 EUR/ bbl +6%
	€45 carbon price	-1.2 EUR/ bbl -15%	-0.9 EUR/ bbl -11%	-1.1 EUR/ bbl -12%	-0.8 EUR/ bbl -9%	-1.4 EUR/ bbl -11%	-1.1 EUR/ bbl -9%	-1.2 EUR/ bbl -15%	-0.4 EUR/ bbl -5%
 Gas production	Transition Scenario	-0.6 EUR/ km³ gas 0%	0.0 EUR/ km³ gas 0%	0.0 EUR/ km³ gas 0%	+0.4 EUR/ km³ gas 0%	0.0 EUR/ km³ gas 0%	+0.2 EUR/ km³ gas 0%	-0.4 EUR/ km³ gas 0%	+0.1 EUR/ km³ gas 0%
	€45 carbon price	-4.7 EUR/ km³ gas -4%	-4.0 EUR/ km³ gas -3%	0.0 EUR/ km³ gas 0%	+0.8 EUR/ km³ gas +1%	-4.2 EUR/ km³ gas -11%	-3.7 EUR/ km³ gas -9%	-3.7 EUR/ km³ gas -3%	-3.1 EUR/ km³ gas -2%

* The 2° Investing Initiative leads the Energy Transition Risk project. Other consortium partners include Oxford Sustainable Finance Programme, CO-Firm, S&P, Kepler-Cheuvreux, Carbon Tracker Initiative, and I4CE.

EXPOSURE TO LONG TERM RISKS: EXAMPLES OF EXISTING APPROACHES

In the draft report, we recommend to discuss what is considered short, medium and long-term horizons, and which climate risk are material when? (strategy/a). However this time horizon dimension is only translated into metrics for the banking sector (average tenor of loans) and industrial sectors (capital allocation to long-lived assets vs short term).

You can easily recommend the same for asset owners, asset managers and insurers. These indicators are necessary if you want to understand how investors are exposed to risk of mispricing of climate risks.

But it is complex and requires a lot of data, isn't it?

Actually it is pretty straightforward, the calculation methodologies are described and illustrated in the papers referenced below and the data required are basic financial data usually available in house.



1 BREAKDOWN OF THE NPV OF SECURITIES BY PERIOD

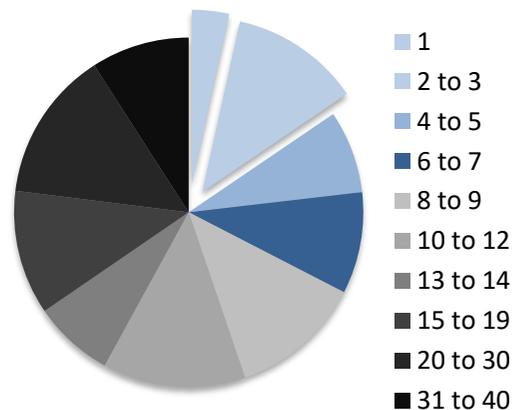
This metrics shows how the net present value of a security (stock or bond) is based on short or long term cash flows. The results can be consolidated by sector (see next page), asset class (here) and at cross-asset level (see page 16). Climate-related risks mispricing is likely to be more pronounced for long-term cash flows given the uncertainty on policies and technologies. This metric is therefore critical to understand the exposure of various assets to a potential repricing by the markets.

FIXED INCOME - The exposure to long-term risks of a bond portfolio can be estimated based on the discounted coupons of each bond. The calculation is pretty straightforward and depends mostly on the maturity, given the current low interest rate environment. Such a metric is notably used by the Bank of England in its discussion of climate-related risks ([M. Carney speech, Sept 2016](#)). The data needed to perform the analysis are available in all fixed-income financial databases.

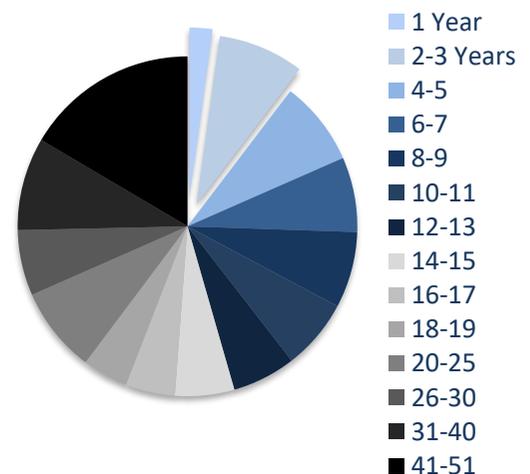
EQUITIES – In a DCF model, the value of a stock is based on the future cash flows generated by the issuer, after discount. To calculate these cash flows and break them down by time period, it is possible to use the DCF of buy side analysts (for asset managers) or rely on the DCF that try to summarize the market consensus available in financial databases like Morningstar. DCF are not available for each and every stock, but sector average can be applied to securities not covered (see page 32 of this report).

The data required for such analysis is available in financial databases used by investors and the calculation is straightforward, there is therefore no additional cost associated with disclosure on this metric.

Breakdown of a bond portfolio NPV by Time Period



Breakdown of an equity Portfolio NPV by Time Period



Sources: 2Dii calculation for a large European asset owner, Morningstar DCF models, Thomson Eikon bond data

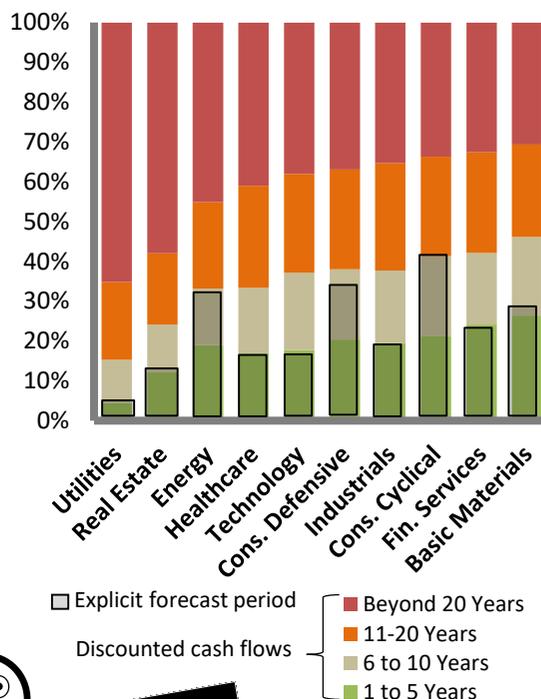
2 TIME HORIZON OF FINANCIAL ANALYSIS

Both equity research and credit analysts rely on estimates for future cash flows generated by issuers activities to assess their value or creditworthiness. To perform this analysis they forecast cash flows for the next few years (usually 3 to 5) based on available intelligence, and then extrapolate trends to estimate long term cash flows. This extrapolation exposed investors to mispricing since only short term risk signals, material during the forecast period are likely to be correctly priced.

In the context of climate-related risk disclosures for investors, it is therefore relevant to report quantitatively on the 'explicit forecast period' used for each sector (see chart) and the related share of the NPV covered. Where applicable, it is also useful to complement these figures with a discussion of how long-term signals that only material after this forecast period are integrated into the valuation of cash flows.

The various indicators are discussed in this [research paper](#). The analysis only requires access to models used in house or available on financial databases like Morningstar (used here).

Share of NPV Covered by the explicit forecast period in the DCF model



Calculation methodology for free in these papers!



3 TURNOVER OF PORTFOLIOS

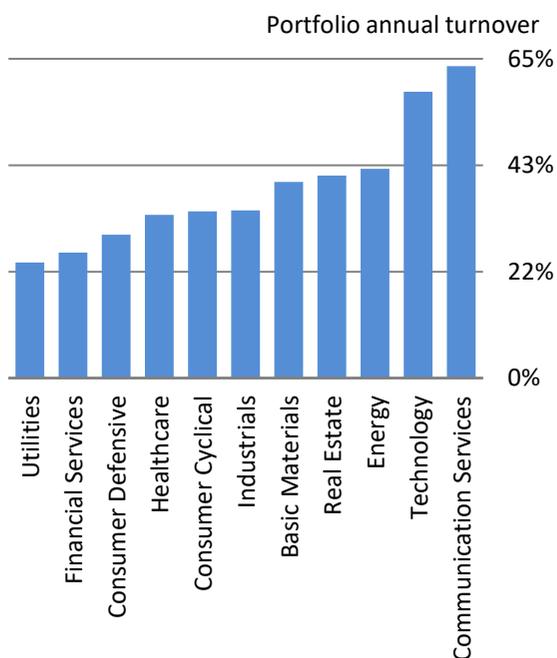
The average holding period of different assets in the portfolio are an important indicator of investors' net exposure to long-term risks. If an investor turns his/her portfolio every two years, there is no point in assessing the risk beyond 5 years. In this case climate-related risk management becomes less relevant from his/her perspective (even if the securities are still exposed to the long-term risks).

To complete the analysis of the exposure of securities held at a given date to climate-related risks (other indicators), it is therefore relevant to disclose the turnover of the portfolio by sector, especially for the sectors that are both exposed to climate-risks and valued on their long-term cash flows (auto, unregulated utilities, power generation).

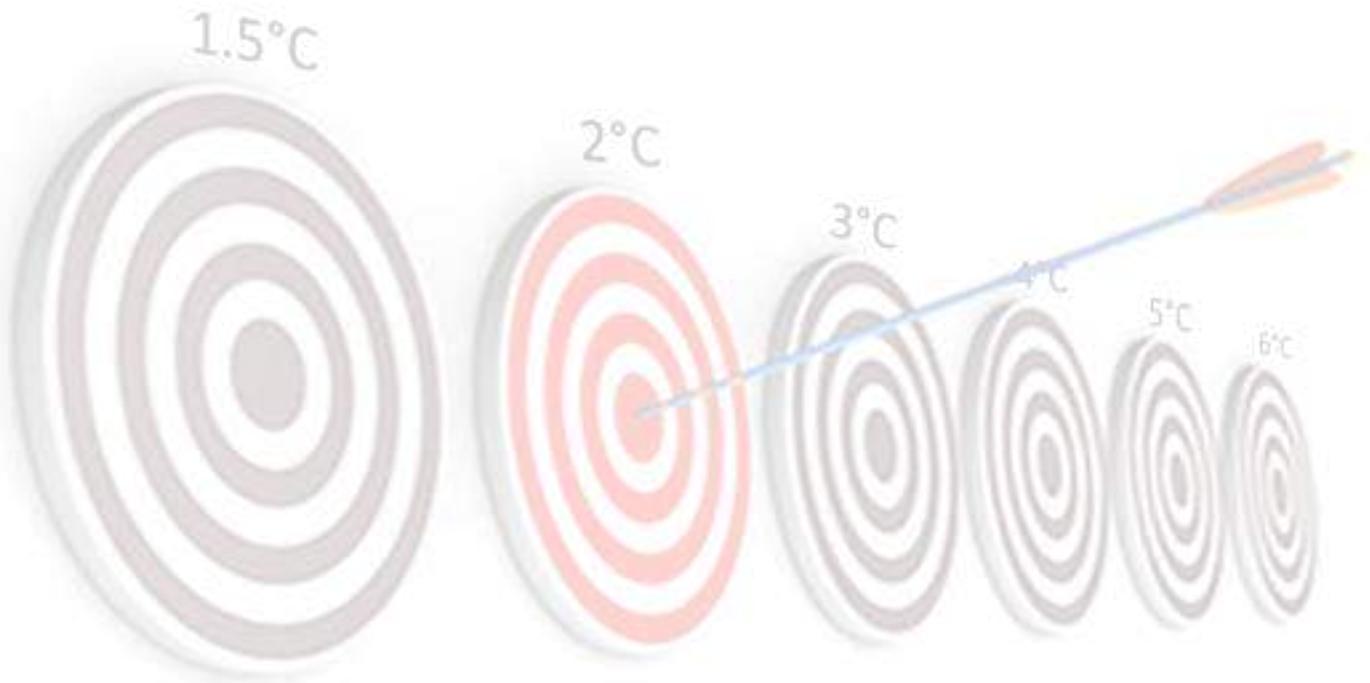
The indicators are easy to calculate based on the trading book of the asset manager. Most asset manager also report on these indicators to their clients.

The various indicators and calculation methods are discussed in this [research paper](#) (Mercer, 2Dii, Generation).

Average turnover by Sector among the top 40 US Mutual Funds by AUM, 2015-2016



Source: 2Dii, Morningstar Direct data, 2016



ABOUT 2° INVESTING INITIATIVE

The 2° Investing Initiative [2°ii] is a multi-stakeholder think tank working to align the financial sector with 2°C climate goals. We are the leading research organization on climate-related metrics for investors. Our research work seeks to align investment processes of financial institutions with climate goals; develop the metrics and tools to measure the climate friendliness of financial institutions; and mobilize regulatory and policy incentives to shift capital to energy transition financing. The association was founded in 2012 and has offices in Paris, London, Berlin, and New York City.

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