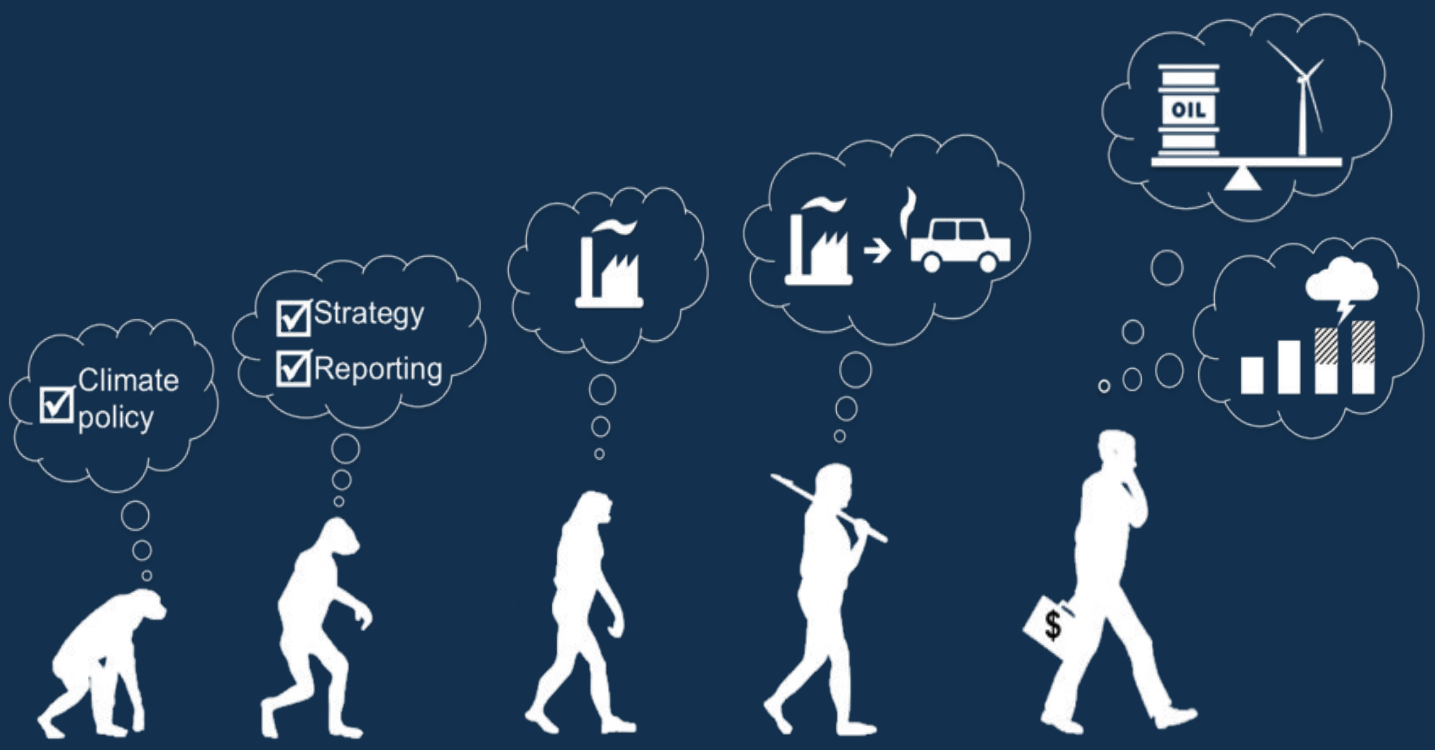
2° Investing Initiative

FROM FINANCED EMISSIONS TO LONG-TERM INVESTING METRICS

STATE-OF-THE-ART REVIEW OF GHG EMISSIONS ACCOUNTING FOR THE FINANCIAL SECTOR



Short version (July 2013)

In partnership with:

ADEME Agence de l'Environnement et de la Maîtrise de l'Energie

Caisse des Dépôts

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2°INVESTING INITIATIVE

The 2° Investing Initiative is a multi-stakeholder think tank bringing together financial institutions, policy makers, research institutes, experts and environmental NGOs. Dedicated to research and awareness raising to promote the integration of climate goals in financial institutions' investment strategies and financial regulation, 2°ii organizes sharing and diffusion of knowledge, and coordinates research projects.

The 2° Investing Initiative has been created in 2012. Its work is funded by Caisse des Dépôts, CGDD/French Ministry of Ecology and Energy, ADEME (French Environment and Energy Management Agency) and AFD (French Development Agency). The members include 60 organizations and professionals from the financial sector from 6 countries, including most 'financed emissions' practitioners.

The name of the initiative relates to the objective of connecting the dots between the +2°C climate goal, risk and performance assessment of investment portfolios, and financial regulatory frameworks. This report builds on our previous study that describes the 2° investing framework based on three pillars:

1. Measurement of investment portfolios' climate risk exposure and performance;
2. Disclosure of climate risks and performance by non-financial companies and investors;
3. Incentives targeting investors (e.g. tax incentives), in order to channel capitals toward financing the energy transition.

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DOWNLOAD THE FULL STUDY ON OUR WEBSITE!

This paper is the short version of a 100 pages report developing the state-of-the art review (chapter II) and including case studies.

FOREWORD

Dear Reader,

The past several years have highlighted the increasing challenge of matching rhetoric on climate change with political and societal action. Particularly the financial sector is still far removed from allocating capital in line with the 2° C climate goals. One of the main challenges in this regard is linking these goals with the risk and performance assessment of investment portfolios and financial regulatory frameworks. Benchmarking of financial portfolios relative to climate targets and creating a financial regulatory framework focused on impact both require the development and application of new metrics.

In recent years, the accounting of the environmental impact of investment portfolios has experienced a significant boost. Particularly 'financed emissions' methodologies have achieved increasing levels of sophistication. While these methodologies were largely non-existent in the early 2000s, the past ten years have seen the development of a range of methodologies and their pilot-testing.

Equally, knowledge in this field remains dispersed and its practical application in driving investment decisions limited. The topic has not only shown itself to be very complex but also contentious, with no consensus on – sometimes crucial – assumptions.

This report summarizes the results of the state-of-the-art of current 'financed emissions' methodologies. In this, it brings together the insights of practitioners and provides the landscape of current practices for a broader audience. It highlights the historical development of metrics and the theoretical and practical arguments for accounting 'financed emissions'. The review pinpoints the next steps towards achieving an investment environment in line with 2° investment roadmaps.

The results provide the basis for the future work plan of the 2° Investing Initiative focused on the development of a cross-asset, impact-based climate performance indicator for investment portfolios and banks. I am very grateful to the 2°ii team for the preparation of this report and to the practitioners of the analysed methodologies and experts of the review panel for their valuable inputs.

We hope you enjoy reading the report.
Sincerely,

J.P. SICARD

Jean-Pierre Sicard, President of the 2° Investing Initiative

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ABOUT THE AUTHORS

This report has been produced by the 2° Investing Initiative (2°ii) in partnership with ADEME (French Environment and Energy Management Agency), Caisse des Dépôts* and AFD (French Development Bank). Additional support has been provided by UNEP-FI and the Association Bilan Carbone* (ABC). Author of the report is the 2°ii team lead by Stanislas Dupré**, including Hugues Chenet, Jakob Thomä, and Guylaine Déniel, with the support of Antoine Rose** (Finance and Sustainable Development Chair, University of Paris Dauphine) in research and writing and Romain Morel and Ian Cochran (CDC Climat Research) in managing the review process.

INPUTS FROM PRACTITIONERS

The description of each methodology, the analysis as well as the identification of the challenges benefits from the inputs and comments of:

- A. Vincent (Trucost*)
- P. Spicher (Inrate*)
- JW. Van Gelder (Profundo*)
- M. Horster (South Pole Carbon*)
- V. Lucas-Leclin (BoA-ML)
- A. Rose (Chair FSD, Univ.Paris 9)
- A. Gazuit* (Money Footprint Soft.)
- J. Loots (ASN Bank)
- G. Linthorst (Ecofys)
- J. Leaton (Carbon Tracker*)
- H. Ohlsen (VfU)

REVIEW PANEL

The report has been improved and reviewed by a panel chaired by CDC Climat Research, composed of experts and practitioners. The composition of the panel and its feedbacks are presented in the full version of the report: www.2degrees-investing.org

* Member of the 2° Investing Initiative.
** S. Dupré and A. Rose both contributed to the development of assessment methodologies featured in this document (Cross-Asset Footprint and P9XCA respectively).

EXECUTIVE SUMMARY

Overview. This report presents the results of the *2° Investing Initiative* review of GHG emissions' accounting for the financial sector. Part I of the report establishes the case for developing financed emissions methodologies. Part II provides the state-of-the-art review of a dozen of 'financed emissions' methodologies developed to assess equity portfolios, corporate loan books, and banks. The study concludes with an outlook as to the potential of financed emissions methodologies to help align the financial sector with 2° climate scenarios and the associated implications for policy makers.

PART I . LONG-TERM INVESTING REQUIRES CROSS-ASSET, IMPACT-BASED METRICS.

• **Capital misallocation.** The global economy faces a substantial shortfall in long-term and climate finance relative to projected capital demand and climate targets. Climate-specific finance reached about $360 bn in 2010-11, flows that still fall far short of the $500 bn of annual additional investment that according to the IEA needs to be mobilized over the next decade. Besides, overinvestment in fossil-fuel reserves and equipment leads to locked-in emissions that widen the carbon budget deficit. The carbon content of existing reserves today is 3 to 6 times higher than the maximum amount of carbon we can release in the atmosphere in order to keep global warming under 2°C.

• **Reorienting the financial sector.** The financial sector is increasingly exposed to carbon risk. This risk manifests itself in the form of short-term policy risks, the threat of 'stranded assets', and possible climate litigation in the medium to long-term. However, the lack of a price signal on carbon and the short investment horizon of most long-term investors keeps point-in-time carbon risks off the radar screen. Reorienting the finance sector will therefore require incentives directly targeting investors that help bridge the climate and long-term finance gap, mobilize the assets of long-term investors, and reduce excessive investment in fossil fuels.

• **The chance for new metrics.** Aligning the finance sector with 2° climate scenarios and the associated climate performance and carbon risk challenges will require new cross-asset, impact-based methodologies and incentives to not only move assets towards 'green' investment but also away from fossil fuels. Assessing the impact of green/ responsible vehicles also calls for performance indicators. 'Financed emissions' methodologies could be relevant candidates in the process of building the underlying metrics.

PART II . EXISTING METHODS AND TOOLS ALLOW INVESTORS TO TRACK THEIR FINANCED EMISSIONS

• **Landscape of practices.** We identified a dozen methodologies developed for equity managers, banks, and environmental NGOs. Together, they cover most asset classes including private and listed equities, corporate, financial and sovereign bonds, corporate loans, project finance, mortgages, and consumer credit. Several financed emission data providers offer calculation tools and direct access to databases covering the components of major stock indices.

• **Gaps in GHG reporting**. Despite progress, corporate reporting of GHG emissions covers less than 50% of mainstream investment indices. Gaps remain for supply-chain and sold products emissions, small companies, and all other investees (governments, households, etc.).

• **Use of modeling techniques**. To fill the gaps, carbon data providers estimate GHG emissions with models (Environmentally Extended Input Output matrix, regression models, life-cycle data, etc.). A combination of reported carbon data and best-available modeling techniques allows for an assessment of financed emissions with a level of certainty sufficient to inform certain investment decisions (fund selection, industry allocation, selection in certain industries) when combined with qualitative analysis. On a macroeconomic level, financed emissions metrics generally provide a better granularity compared to most economic data based on national accounts, which are currently used to inform policy makers on the impact of financial intermediation.

• **Need for a broad coverage**. A pronounced diversity of practices exists regarding the integration of supply-chain and sold product emissions of investees, the coverage of non-corporate assets (sovereign bonds, mortgages, etc.), and off-balance sheet items (underwriting, retailing of UCITS, etc.). Our analysis calls for the coverage of a broad scope, methodologically already achievable, when assessing an investment portfolio in order to avoid basing investment decisions on misleading data.

• **Manageable cost**. Data providers have developed datasets and calculation tools allowing bulk processing of data, the use of average emission factors for top-down assessment approaches, and scale economies in the analysis of investees. Thus, our estimates suggest that implementation costs of financed emissions methodologies are relatively marginal for financial institutions.

PART III. NEED FOR STANDARDIZATION, RESEARCH AND REGULATION

• **Need to ensure consistency between portfolio and scenario approaches.** To date, it is impossible to connect bottom-up investment practices at portfolio scale and top-down macroeconomic/climate scenarios. It appears that both long-term and climate goals cannot be reached without proper allocation models and consistent regulation frameworks.

• **Lack of performance indicator**. The report concludes that, given the current status of the 'financed emissions' methodologies landscape, the evolution toward genuine climate performance and carbon risk metrics will require further methodological development:

- To date, most models focus on *annual* emissions, whereas *cumulated emissions* (the sum of all emissions associated with the investment) and *locked-in emissions* (the level of emissions pre-determined over the lifetime of an asset) seem more material in terms of informing investment decision-making. Gaps also remain for covering complex assets such as derivatives. Finally investment horizons are not appropriately taken into account in existing methodologies.
- More importantly, current methodologies are largely missing the layers of sophistication necessary to benchmark an investment portfolio's carbon impact against 2° investment road maps (such as those published by the International Energy Agency).

• **Standardization and research underway.** Several initiatives are starting to standardize methodologies. Notable initiatives include the GHG Protocol/ UNEP-FI and national initiatives in France and Germany, which all aim at introducing a standard by 2014-15. While the development of carbon accounting standards for the financial sector will likely boost reporting practice and increase transparency, the standards are equally likely to leave certain issues unresolved, notably the lack of genuine performance indicators and 'benchmarks' to track the alignment of investment strategies with climate scenarios. The research program of the 2° Investing Initiative aims at bridging this gap by developing a model to assess the contribution of investors toward financing the transition to a low carbon economy and realizing long-term economic targets.

• **Regulation required now**. Parallel to the research push, governments should act now to support the drive towards improving accounting and reporting standards and incentivizing transparency. This report recommends the following measures:

- Finance the development of methodologies and test them on a large scale e.g. via public banks;
- Immediately improve mandatory disclosure by the private sector to increase the availability and quality of raw data from non-financial companies;
- Introduce mandatory disclosure for the financial sector to create reporting channels and boost innovation from data, indices, and services providers;
- Plan the introduction of incentives based on 2°/long-term investing metrics, notably regarding tax incentives on savings interests, which are one of the main driver of asset allocation by private investors.

LIST OF ACRONYMS

ADB	Asian Development Bank
ADEME	Agence de l'Environnement et de la Maîtrise de l'Energie (French Environmental Agency)
AFD	Agence Française de Développement (French Agency for the Environment and Energy Management)
AODP	Asset Owner Disclosure Project
ASN	ASN Bank
BNEF	Bloomberg New Energy Finance
BofA ML	Bank of America Merrill Lynch
CAF	Cross-Asset Footprint
CDC	Caisse des Dépôts
CDP	Carbon Disclosure Project
EC	European Commission
EBRD	European Bank for Reconstruction and Development
ESG	Environmental, Social, corporate Governance
GHG	Greenhouse Gases
IADB	Inter-American Development Bank
IEA	International Energy Agency
IFC	International Finance Corporation
KfW	Kreditanstalt für Wiederaufbau, German Development Bank
NEFCO	Nordic Environment Finance Corporation
RBS	Royal Bank of Scotland
SRI	Socially-responsible investor/investing
UNEP-FI	United Nations Environment Programme Finance Initiative
VfU	Verein für Umweltmanagement und Nachhaltigkeit in Finanzinstituten e.v., Association for Environmental Management and Sustainability in Financial Institutions
WEF	World Economic Forum

COMMENT FROM THE CHAIR OF THE REVIEW PANEL

The work presented by 2° Investing Initiative in this report is both significant and high quality. The report deals with a complex topic on which knowledge is not yet homogeneous and on which there is no consensus on – sometimes crucial – starting assumptions. There is a large consensus on the difficulties that a 2°C compatible portfolio indicator would face as well for its definition and implementation. Bringing together such different topics as carbon accounting, investment strategies, and climate scenarios is not a small challenge. We can attest to the complexity and the wide range of opinions it can create through our role as the chair of the review panel. It is only necessary to look at the diverse perspectives presented in the submitted comments by reviewers to understand the variety of viewpoints and perspectives on this topic.

Among the feedback received, we noted multiple viewpoints concerning the relevance of a "financed emissions" indicator and of its technical construction (scope of emissions and financial activities included, development of sector-specific indicators, etc.). Opinions equally differ on the credibility of a litigation risk related to lawsuits against companies "responsible" for climate change as well as on the – absolute or not – necessity to improve at any cost the precision of annual emissions estimates. In fact, dissension was even raised on the underlying objective of measuring financed emissions altogether.

- *Is the final objective a response to a moral need to fight climate change as it was raised in the comments? That would imply implementing moral safeguards on the methodology guaranteeing that speculation for instance is not incentivized, or the need to integrate social indicators.*

- *Is the objective to avoid potential future regulatory and operational risks linked to climate change and fossil fuels? Depending on the underlying risk addressed – systemic, financial, long/short term, etc. –, the indicator and the dedicated tool needed for its assessment can vary greatly.*

- *Is such a tool's objective to reduce information asymmetries in order to no longer being able to say "I did not know what impacts my investment had"? Or rather is the objective to be able to place the responsibility explicitly on different actors?*

Each of these uses can be justified. One could even hope that the 2° Investing Initiative will be able to respond to as many of these issues as possible. Nevertheless, a trade-off – not to say a limitation of scope – will probably be necessary.

Many very interesting suggestions were submitted to improve the study and the indicator: integrating adaptation, assessing the issues linked with non-energy related GHG emissions, highlighting the opportunities and not only the risks of investing in a 2°C compatible portfolio, considering the risk of investing in a 2°C compatible portfolio of assets that may be stranded due to a lack of policy signals/political will.

One of the principal challenges that remains is the ability to address the trade-off between necessary components of such an indicator that looks difficult to implement and those ideas that appear interesting but could lead to more confusion of the results instead of adding operational value. Perfect can, indeed, be the enemy of better.

This report raises many crucial questions and offers the authors' answer based on existing knowledge. Even if the general acceptance of a number of the answers could be disputed, this report brings a highly valuable contribution to the knowledge base on climate change-aware investment.

Romain Morel, CDC Climat Research

PART I. WHY DO FINANCED EMISSIONS MATTER?

KEY MESSAGES

- **The failure of climate policies (e.g. 'cap and trade' systems) coupled with misaligned, myopic investment horizons in the financial sector has led to a 'finance gap' for long-term and low-carbon investments.** Clean energy investments dropped to $225 bn in 2012 after peaking at $257 bn in 2011. These amounts seem small given the IEA projections that $500 bn of annual additional investment needs to be mobilized over the next decade and $1,000 bn annual average until 2050. Beyond clean technologies, macroeconomists forecast a gap in long-term financing for the coming decades.

- **The long-term finance gap forms an unholy alliance with overinvestment in fossil-fuels.** Until 2035, the IEA estimates in their 2°scenario a necessary reduction in total fossil-fuel supply investment of $4.9 tn vis-à-vis a 'New Policies Scenario' (~26% of total estimated investment), and additional divestment away from power transmission and distribution of $1.2 tn (~7%).

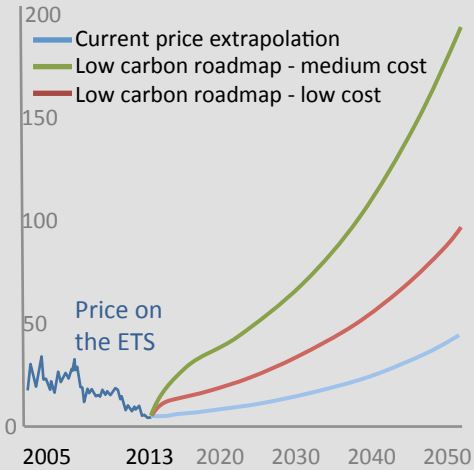
- **Carbon exposure is increasingly becoming a material risk for investments, particularly in the long-term and for assets with a long-term time horizon.** Risks include short-term risks (e.g. carbon price, regulation, etc.), impairment risks, and litigation risks. In addition, climate change may be particularly damaging for fossil-fuel assets. While both the time horizons and the scopes of these risks are still very unclear, their presence should be accounted for in risk-management analysis.

- **Bridging the climate and long-term finance gap and managing the exposure to carbon risk will require new metrics.** Appropriate metrics and benchmarks accounting financed emissions will allow governments to sensibly and appropriately integrate climate finance targets into policy frameworks. These policy frameworks can address public banks performance, taxation regimes, and macroprudential policies. In addition, they will allow for the assessment and stress-testing for carbon risks on the portfolio, company and macroeconomic level. Finally, new metrics focused on impact are a necessary complement to 'process-oriented' SRI/ESG frameworks.

- **In order for new metrics to be effective, they will have to integrate cross-asset and impact-based incentives.** Cross-asset incentives allow for a consideration of both 'green' investment and fossil-fuel divestment. Moreover, given the challenge of applying 'green vehicles' to diffuse stakes, cross-asset incentives are well adapted to targeting established players. Impact-based incentives in turn provide technology neutral incentives, thus facilitating market economy outcomes with a 'touch of planning'

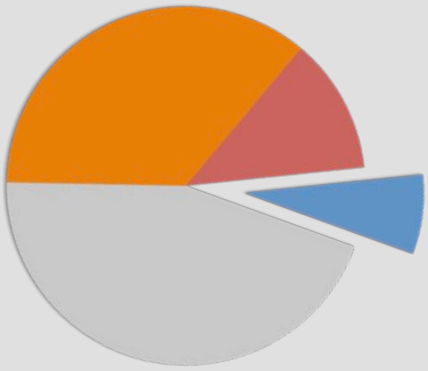
1. THE CASE FOR LONG-TERM INVESTING METRICS

FIG.1. CARBON PRICE IN €/T
Source: modified from *CDC Climat Research* (2013)



Market implied current EUA price pathway to 2050 versus abatement cost forecasts of low carbon roadmap

FIG.2. ALLOCATION STRATEGY OF LONG-TERM INVESTORS
Source: WEF (2012)



- Liquid due to the structure of liabilities
- Liquid due to investment processes
- Potentially illiquid… but liquid
- Actually illiquid

Long term investors include Pension funds, insurers, SWF and endowments. Total of $27 tn.

"Mark-to-market rules require long-term illiquid portfolios to be evaluated to a public market benchmark. While the goal of increased transparency is laudable, short-term variations in the value of assets held for the long-term can lead to shifts in investment policy or execution that hinder success in long-term investing." **World Economic Forum**

This chapter makes the case for the assessing the alignment of financial portfolios with 2°climate scenarios by looking at the need to channel investments, the growing exposure to carbon risk and the opportunity for new metrics to provide a comprehensive and quantitative measure of 'financed emissions'.

1.1. THE NEED TO CHANNEL INVESTMENTS

• Lack of a strong long-term price signal

Current climate policies have not been and will not be able to drive the shift to a low-carbon climate-resilient economy alone.[1] The first and well documented reason is the failure of governments to agree on an ambitious and binding framework at international level. Even when impulsion does exist (e.g. the EU "20-20-20" objective), it is not tangible enough to drastically reorient the industry and drive investments. The materiality of physical and macroeconomic risks related to climate change is mainly long-term (2030-50 and beyond), even if some recent catastrophic events (e.g. Hurricane Sandy) returned the question of impact and adaptation to the fore. Climate policies (caps, taxes, standards and norms) introduce tangible short term signals, essentially via a price on GHG emissions. For instance, auctions of allowances in Europe have so far raised €5.3 bn in Phase II and €2 bn in Phase III.[2] However, given the lack of visibility regarding future regulation, the low price of carbon to date, and the incoherence between policies, this has been unsuccessful in significantly impacting industrial strategies. Consequently, policy risks are not perceived as material enough, and probably will not be for the next 5 to 10 years, to drive capital allocation in line with climate scenarios.

• Long term stakes off the radar screen

A second obstacle - less documented - lies in the functioning of financial markets. Setting a price on carbon that could create a policy risk for investors, takes for granted that financial markets will anticipate risks and opportunities by adjusting their asset allocation strategy, thus financing the transition.[3] Unfortunately this, as Nicholas Stern stressed in his *Economics of Climate Change Review*, only works on paper.[4] In the real world, even if policy makers finally agree on a framework, time horizons of investors are far too short to capture any long term policy risk (cf. Fig 2).[5]

Risk analysis. Traditional financial analysis, either for credit risk or equity research, does perform forward modeling up to 3-5 years for specific activities. Beyond that however, analysis is limited to trend extrapolation. As a consequence, no long term signal, even if credible and possibly radical, is included in risk - and opportunity - analyses. Financial analysis therefore mainly aligns recommendations with business as usual scenarios (e.g. no policy change, no climate impact), which are the only scenarios that have a 100% probability of not happening.

Investment processes. As recently noted by the OECD, institutional investors are in theory able to take into account climate policy risks and climate change expected impacts, given their long term liabilities (households savings and rights in pension funds).[6] However, in practice the investment horizon of most institutional investors is shorter relative to what a rational client-oriented approach of risk-adjusted returns would require (cf. Fig. 2).

The main reasons for this apparent disconnect include mark-to-market accounting and the lack of risk metrics, but also principal-agent concerns[7], the impact of capital requirements, and behavioral bias[8].

Information on risk. Finally, the information provided to individual investors is usually limited to the volatility of portfolios over the last 12 months, without any forward looking information[9].

• Long-term finance gap & unbalanced investments

Climate finance gap. As stressed by different sources,[10, 11, 12] the investment challenge is a question of magnitude and of adequacy both in terms of technological potential and regional efficiency. Climate finance brings together different tools (climate bonds, funds, guaranties, etc.) that finance mitigation and adaptation actions. Capital flows targeting low-carbon and climate-resilient development reached about $360 bn in 2010-11 and clean energy investments were only little above $200 bn in 2012.[11] While significant, these amounts have to be seen relatively to the $500 bn of annual additional investment that needs to be mobilized over the next decade and the $1,000 bn annual average until 2050.[10] Moreover, those numbers almost only cover GHG emissions from energy (55% of the whole).

The role of long term investors. The IEA[14] and OECD[6] therefore identify the mobilization of long-term investors' assets as one of the key challenges of the energy transition. Beyond the broader policy measures designed to improve the ability of the green economy to attract capital (carbon taxes, subsidies, etc.), this challenge requires overcoming the obstacles specific to the finance sector and finding new vehicles and policies to channel investments toward green assets. The need to channel financial investments in line with long-term forecasted financing needs is not limited to climate change reasons. Given the trends in asset allocation (cf. Fig. 2), various economists from financial institutions[15], the OECD,[16] the WEF,[5] MGI,[17] and the Group of Thirty[18] stress the increasing gap between future needs and the future flows of financing delivered by both the financial sector and markets in general.

Too much investment in fossil-fuels assets. The energy transition is not only a question of additional investments. Based on IEA data,[19] limiting global warming to +2°C over pre-industrial levels requires a massive shift in investments from fossil-fuel sectors (coal-fired power plants, oil extraction) to clean technologies. The economic case of their 2°scenario[10] is based on average fuel savings estimated at $2.5 tn per year until 2050. The associated reduction of coal and oil consumption suggests that a major part of existing reserves will become stranded. For financial markets, this requires a sharp investment drop in fossil-fuels industries. This reality currently stands in stark contrast with the following trends:

- The carbon content of fossil-fuels reserves is already 3 to 6 times higher than what we can release in the atmosphere until 2050 in order to meet the 2°C target (see page 14). This situation challenges the macroeconomic case of investing $600 to 700 bn each year in oil & gas exploration and production.[20]
- On the other side of the energy supply chain, the locked-in emissions of existing fossil-fuel powered equipment (power-plants, factories, cars, buildings, etc.) will exceed our 'carbon budget' in 5 to 7 years.[19] Even if carbon capture and storage delivers, unlikely before 2030, these devices will have to be replaced before the end of their planned lifetime. Despite this, $300 bn are still invested each year in new fossil-fuel power capacities.[11]

From an investor's perspective, the energy transition requires a reallocation of investments and diversification of portfolios' exposure (see page 11).

FIG.3. INVESTMENT IN CLEAN ENERGY (in $bn)

Source: BNEF 2012

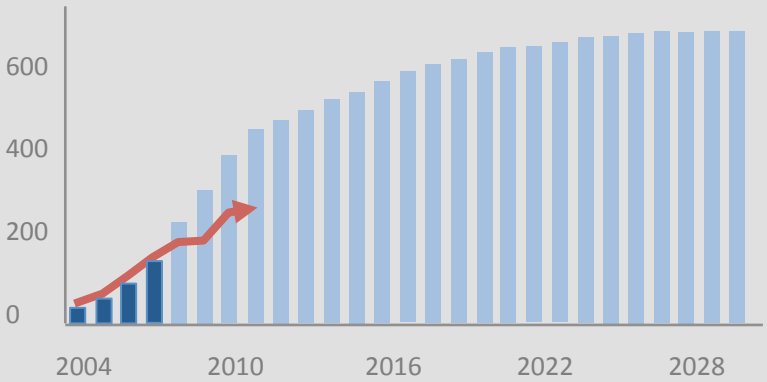
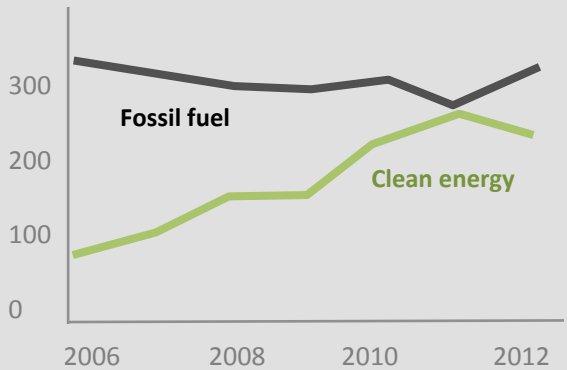


FIG.4. INVESTMENT 2006 – 2012 ($ bn)

Source: BNEF, IEA



2° INVESTMENT IN CEMENT

Cement is used as a binding material to produce concrete. Its production emits 2.3 GT of CO2 per year. 2° investors can finance new capacities or retrofitting programs based on best-available-technologies, switching to dry-process kilns, away from coal to waste fuels and biomass, and adding low-carbon binding materials (e.g. fly-ash) in the product. All together, this can cut emissions by 30% in 2050 compared to a baseline scenario.[10] But alignment with 2° scenarios requires almost zero emissions from cement plants in the long term[21] and tripling the emission reductions by 2050.

Given the lifetime of a cement plant (40-50 years),[1] a 2° investor needs to invest now in:

- advanced concrete helping to improve buildings energy performance (e.g. insulation);
- construction services and materials based on low-carbon alternatives to concrete (e.g. wood for individual dwellings);
- R&D in low-carbon alternatives to cement (e.g. copying the chemical process producing eggshell or coral reef at industrial scale)[22] and/or carbon-capture and storage to allow low-carbon concrete in the future.

From an investor perspective, this investment roadmap involves a selection of best-in-class cement manufacturers. However, no listed cement group currently invests massively in breakthrough technologies. A diversification to other industry groups and other asset classes such as climate bonds (financing retrofitting programs), private equity and venture capital (R&D and CCS) is therefore needed.

2° INVESTMENT IN ROAD TRANSPORTATION

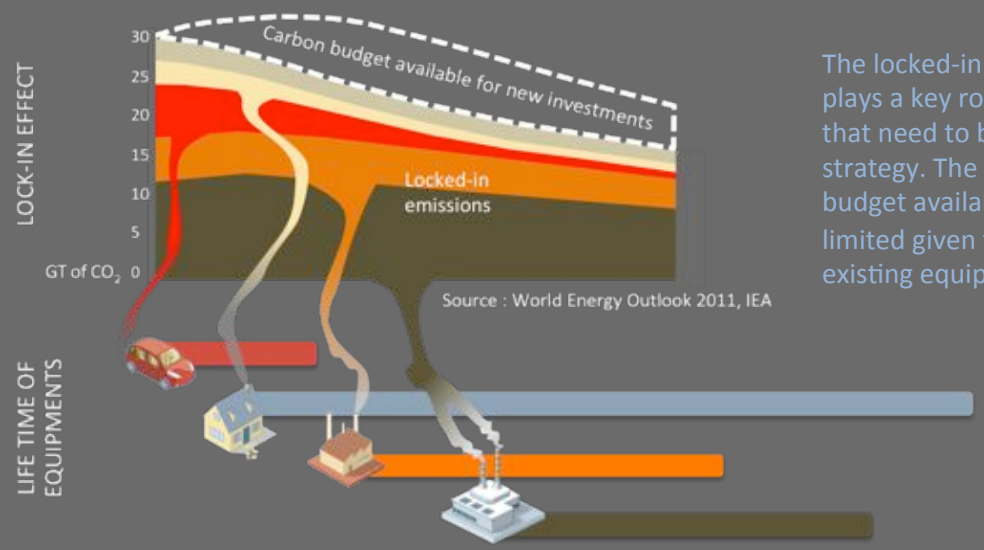
Road transportation emits 6 GT of CO2 annually.[10] Listed companies contribute to future emissions via investments in fuels ($350 bn/year), automobile ($180 bn/year), and road construction ($30 bn/year). In addition, about $2 tn are invested each year in new cars, partly financed by bank loans, and $0.9 tn by governments in paved roads. The locked-in effect is high for roads (40+ years), refineries (25-30 years) and oil reserves (10-15 years).[11] The lifetime of a car ranges from 7 to 20 years, but car design (2-3 years) and the upstream R&D should be taken into account when assessing the inertia of investment decisions. Climate scenarios disagree on which technologies to prioritize and the magnitude of modal shift.

Overall, a 2° investor should finance:

- The development of existing low-carbon engines (hybrids, flex-fuel, electric, natural gas, efficient gasoline/diesel) and massive R&D in breakthrough technologies (fuel-cells, new batteries, etc.) in the automotive sector;
- R&D in the next generation of clean fuels including production, transformation and distribution, leading to investments in agriculture, refining, and distribution.
- The modal shift, involving investment in rail companies, and smart multimodal transportation projects.

The current level of diversification of R&D and capital expenditures among large capitalizations in the automotive and oil sectors prevents such an investment strategy. A 2° investor will need to broaden his or her universe to small caps and private companies, and increase his or her exposure to rail companies and climate bonds.

FIG.5. LOCKED-IN EMISSIONS



The locked-in effect of new investments plays a key role in the type of investments that need to be prioritized in a 2° investing strategy. The IEA finds that the carbon budget available for new investments is very limited given the locked-in emissions of existing equipment and infrastructure.

FOSSIL-FUEL DIVESTMENT

Divesting from fossil-fuels is an integral piece to aligning the financial sector with 2° C climate scenarios. Until 2035, the IEA estimates[19] in their 2°scenario a necessary reduction in total fossil-fuel investment of $4.9 tn vis-à-vis 'New Policies Scenario' (~26% of total estimated investment) and additional divestment away from power transmission and distribution of $1.2 tn (~7%).

One of the main challenges to fossil-fuel divestment has been the perceived danger that, given the size of the sector (conventional energy constitutes roughly 9-12% in most broad market indices), excluding fossil-fuels limits the investment universe and thus leads to underperformance. This fear has been underpinned by studies commissioned by the American Petroleum Institute.[23] However, Figure 6 shows that a renewable equity index has in fact outperformed oil equities between 2003-2011 66% of the time, although performance of renewables has lagged since 2011. Nevertheless, both types of equities have outperformed the benchmark and cleantech and oil equities seem to be correlated, suggesting at least for the near future that moving from fossil-fuel assets to 'green' assets does not significantly change the risk/return profile.[24]

Two key approaches with regard to fossil-fuel divestment have been put forward recently:

- A study published in the context of the 350.org campaign by the Tellus Institute suggests a radical divestment strategy out of fossil fuels.[25] This is to be realized in three steps:
  - freeze all new fossil fuel investments,
  - divest all direct holdings,
  - unwind commingled holdings.

Portfolio 21 (Cf. Figure 7) provides a long-term example of success, having run a fossil-free global equity strategy that has outperformed its unscreened benchmark, the MSCI World Equity Index, by 212 basis points since its inception in 1999 (on an annualized basis net of fees). While these examples do not prove that fossil-free investments will always 'beat the market', they do underline the feasibility of divesting out of fossil-fuels along the lines of a 2° C scenario.

- The alternative approach, articulated with some degree of variation by both Carbon Tracker[20] and the IEA,[19] is more conservative and suggests that instead of equity divestment, shareholders should pressure oil and gas companies to reduce investment levels in E&P. With lower investment leading to lower value vis-à-vis other sectors, shareholders would reduce their exposure.

FIG.6. PERFORMANCE OF RENEWABLES STOCKS

Sources: Bloomberg data (total return)

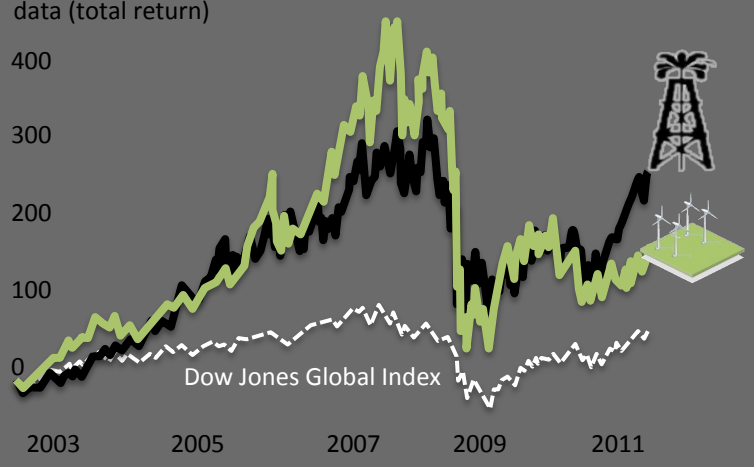
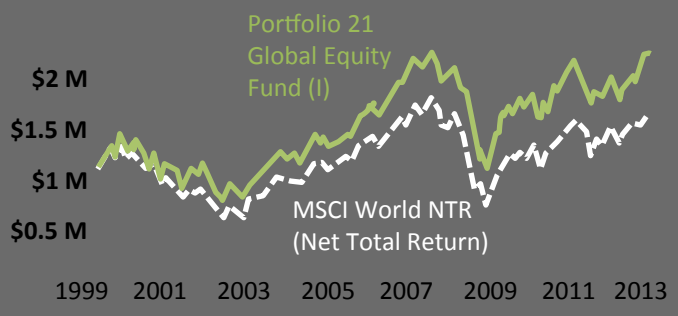


FIG.7. PERFORMANCE OF $1 MILLION INVESTMENT IN PORTFOLIO 21 GLOBAL EQUITY FUND

Source: *Humphreys, 2013*



GRASSROOTS FOSSIL-FUEL DIVESTMENT MOVEMENT

The United States in particular has seen a strong grassroots movement driven by 350.org to pressure major investors in divesting from fossil fuels. Indeed, a growing number of institutional investors, notably U.S. college funds, religious funds and other endowed and non-profit organization are beginning to divest from fossil fuels. Major U.S. municipalities (e.g. Seattle and San Francisco) have also announced divestment decisions.

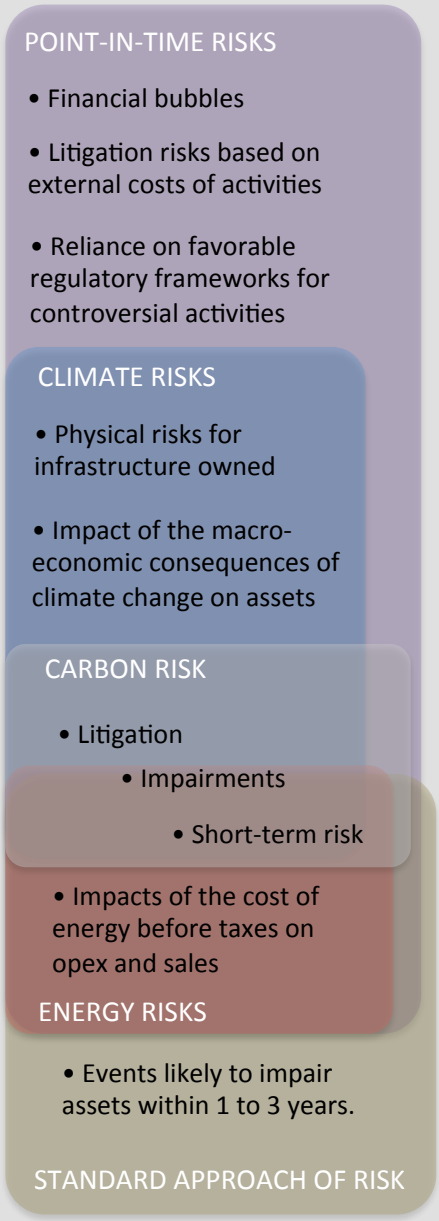
DEFINING CARBON RISK

Carbon risk for investors is defined as the financial risk correlated with the GHG emissions allocated to its investees, excluding all sorts of climate change-related physical and macroeconomic risks, but including policy and energy price risk. It includes both short-term and point-in-time policy and litigation risks.

DEFINING POINT-IN TIME RISKS

A risk that is highly predictable, very likely to occur at one point in time, can cause the owner to go bankrupt, can sometimes have systemic effects, but is not material in the short term.

FIG.8. RISK FACTORS FOR INVESTORS



1.2. PUTTING CARBON RISK ON THE RADAR SCREEN

• The sources of carbon risks

Climate-policies. Defining climate risks as the family of risks related to climate change, we must distinguish 'physical risks' and 'carbon risks'. Physical risks result from the effects of climate change such as variations in temperature and precipitation, the increase of sea levels, etc. Carbon risks are linked with the mitigation of climate change, via the efforts to reduce the emissions of greenhouse gases (GHG), mostly driven by climate-policies (e.g. regulatory standards, tax schemes, market prices and changes in consumption patterns).[1] Finally, it is important to stress that from a financial perspective, carbon risks also include the risk of going low-carbon when governments and policies are not.

Correlation with other risks. Carbon emissions are correlated with other impacts such as resources depletion, local air-pollution, local environmental impact of extractive activities, water consumption and pollution, etc. Carbon intensity can therefore be used as a proxy for risk exposure to other environmental and energy efficiency policies (e.g. air quality standards for cars), contested operation licenses (e.g. for fracking), and increasing market prices (e.g. energy). Equally, it cannot alone cover the whole scope of risks (e.g. large hydro, biofuels).

• Nature of carbon risks

Carbon risks can materialize in three distinct but potentially mutually reinforcing ways:

Short-term risk. This is the short (and medium-term) risk essentially associated with costs related to the evolution of the carbon price on regulated markets, the increase in energy prices, the introduction of new taxes and energy-efficiency standards (e.g. for cars, appliances, real estate, etc.). The exposure to short-term risk is primarily a function of year-to-year emission levels. While potentially material in the short term, this risk is expected to evolve and become stronger in the long run. The 2010 Global Investor Survey on Climate Change suggests this type of risk is the 'main worry' for investors.[2]

Impairment. Some long-lifetime physical assets owned by the investee such as power plants and coal reserves may become 'stranded' at one point in time, due to the implementation of more stringent policies or changes in consumption patterns. The risk extends to long-term, capital-intensive R&D programs in carbon-intensive technologies. The automotive sector is a prominent example in this regard. Impairment is correlated with locked-in emissions and not limited to direct emissions (Cf. page 14).

Litigation. This is the long-term risk that lawsuits targeting companies with high cumulated past emissions create liabilities, based on the company's share of responsibility in the cost of global warming. It is not limited to direct emissions and likely to occur in countries where extra-territorial jurisdiction and class action lawsuits exist. The tort cost could include adaptation costs at local level for States and cities (invested by anticipation), thus shortening the time horizon of risk from the years 2050-2100 to today.

To date, the integration of these risks in assessment frameworks is limited to short-term risks. Impairments and litigation that could be assessed through stress-tests are not even mentioned as risk factors in the dedicated sections of the companies' annual reports.[3]

- **The influence of climate change**

While finance continues to largely turn a blind eye to more medium- and long-term impairment and litigation, climate-change specific risks are increasingly being considered by the financial sector in their analysis. According to the 2011 Global Investor Survey on Climate Change, more than 83% of asset owners and 77% of asset managers view climate change issues as a material investment risk across the entire investment portfolio.[4] It is unclear to what degree this feeds into investment decisions as only 31% of asset owners try to quantify these risks. Moreover, the results of the 2° Investing Initiative workshops suggest these risks do not materially inform investment decisions except for utilities and are generally viewed in terms of a very short time horizon. A recent study by Ceres on the insurance industry confirms this result.[5] Only 23 of the 184 surveyed insurance companies have a 'comprehensive climate change strategy'.

A number of climate change factors carry a particular risk for fossil-fuel assets. In China, the coal sector has the largest share of industrial water use. Already ten Chinese provinces suffer from water scarcity per capita and increased scarcity may affect coal-plant operations. Water scarcity may also affect shale gas development in the future. In the United States, the share of weather-related shocks to electricity distribution has increased dramatically. This trend is likely to continue over the next decades. A 1° C increase in temperature in the summer in the 2040s is estimated to reduce available (thermal) electric capacity by 16% in the United States and 19% in Europe. Moreover, 60% of coal-fired power plants in the United States are vulnerable to water demand supply concerns. In India, around 70% of planned thermal power capacity is located in water-stressed or water-scarce areas.[6]

While thermal power plants may be retrofitted to better respond to extreme weather events and reduce resource consumption, these measures are associated with costs. Closed-loop cooling systems can cost between $100-$1,000 per kilowatt[7]. Iraq's "Common Seawater Supply Facility" treating seawater to use for maintaining reservoir pressure in oil fields is expected to cost $10 bn.

FOCUS. THE MATERIALITY OF CARBON RISKS

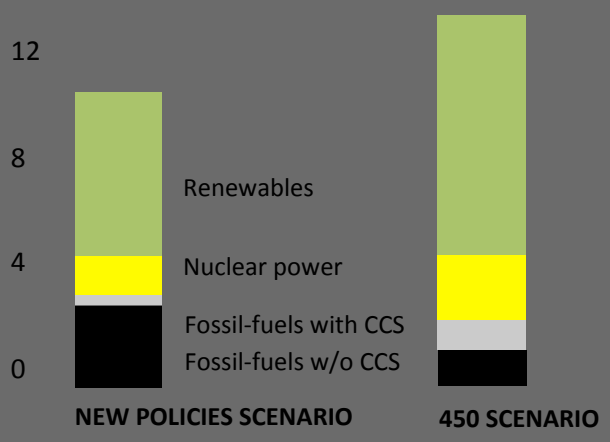
SHORT-TERM CARBON RISKS

Short-term risks include the price of carbon allowances in cap-and-trade systems, such as the European Trading Scheme (EU-ETS, impacting direct emissions from fixed-sources and aircrafts), energy-efficiency taxes on vehicles and buildings, and taxes on fuels and fertilizers, but also energy-efficiency standards and energy prices. UNEP-FI[8] classifies these different types of risks as either *external* or *internal,* external factors arising out of exogenous policy or economic changes and internal risks intrinsic to the balance-sheet of the respective company.

These short term risks impact the operational expenses of the companies and their sales. This risk is highly correlated with the geographic location of the facilities and sales. Carbon pricing systems are increasingly being developed across the globe, with nearly twenty cap & trade or carbon tax systems in place or under development, most recently as a pilot-project in China.

FIG.9. NET REVENUES AFTER ACCOUNTING FOR DEPRECIATION AND INVESTMENTS FOR NEW POWER PLANTS BY SCENARIO (IN 2011 $ tn), 2012-2035

Source: IEA (2013)



The effects of the implementation of these systems suggest short term risks are already manifesting themselves across different countries and regions. The impact on investors has been assessed by equity research analysts in the context of industry-specific ad-hoc papers following the debate over or introduction of related regulation (e.g. ETS and new energy-efficiency standards on cars). In the most exposed industries (electric utilities), they forecasted an impact ranging from -10 to +10% on the share price.[9] Based on the conclusion of our workshop with equity analysts,[10] these risks are limited in the foreseeable future (3 to 5 years) and already integrated by mainstream analysts in their valuation models for electric utilities, cement, steel and automotive.

IMPAIRMENTS

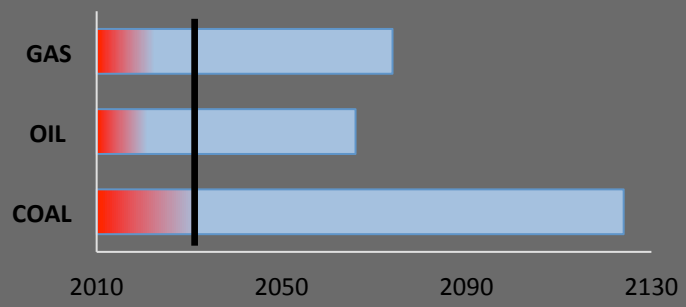
Impairment risks may arise due to some form of political, social or economic constraint on carbon consumption that may lead to some fossil-fuel or associated industry assets becoming stranded. For an investor, impairment risks become material either in the form of valuation adjustments to equities or actual stakes in 'stranded assets'. Companies with long-term energy-related assets with long payback periods (e.g. electric utilities, heavy industries, fossil fuel extraction, etc.) are likely to be particularly affected.

The scope of potential impairment is substantial. The Carbon Tracker 'Unburnable Carbon' report suggests that 60-80% of reserves are at risk of becoming stranded under a 2° scenario.[10] The top 200 listed oil, gas and coal companies analyzed by Carbon Tracker have a total market capitalization of $4 trillion and debt outstanding of $1.27 trillion. The the value of plants, equipment and properties of listed companies in industries highly exposed to the locked-in effect is worth about $10 trillion.[11]

The IEA estimates that current energy infrastructure 'locks-in' about 80% of the carbon budget of the 450 scenario, with another 10% projected to be locked-in by 2015 and the entire budget locked-in by 2017 (figure below).[12] Current emission levels put us on path to use our carbon budget around 2030. Estimated annual investment over the next decade in fossil-fuel assets of $6 tn suggests the risk is substantial.

In 2012, HSBC research on the energy sector concluded that the impact of a carbon bubble burst on stock prices can reach up to 40-60% for oil companies[13] and 4-15% for diversified mining companies.[14] The Carbon Tracker Report suggests a similar scope of 'impairment risk[10]. The IEA[12] in turn projects an additional 5% of proven oil reserves and 6% of proven gas reserves impaired in their 450 scenario vis-à-vis their 'New Policies Scenario and similarly low impairment for coal. Given that exploration costs are only about 15%, this outlook seems benign. However, it also hinges on optimistic nuclear and CCS assumptions and still accounts for roughly 50% undeveloped fossil-fuel assets. Moreover, current investment suggests that 'business as usual' projections drive strategy and thus will likely increase impairment risk relative to 2° C baselines.

FIG.10. LIFETIME RESERVES & CARBON BUDGET



Note: The black line represents the expected date by which we will have reached our 'carbon budget'. The red shade reflects a broad measure of the extent to which we have already 'locked-in' this budget (Cf. page 10). The bars give a measure of the years left for reserves based on current production. Source. BP[25], IEA[12]

CLIMATE LITIGATION

For about a decade, towns and states (e.g. Connecticut[15], California[16]) impacted by climate change have started to sue oil companies, electric utilities and automakers in US courts, on the basis of their GHG emissions.[17] As of yet, all these cases have been dismissed. However, a closer look shows that massive tort cost can occur after 40 years of dismissed claims[18] (e.g. tobacco litigation) and that not all options have been explored in the US,[19] but also in other countries with extraterritorial jurisdiction and class action systems or with 'activist courts' (e.g. India, New Zealand, Australia, Brazil, etc.).[20] In addition, under the no-harm rule, international law allows countries to sue each other for cross-border damages, even if the pollution comes from private companies. Recent academic research shows that progress in modeling will soon make it possible to attribute extreme weather costs to climate change[21].

Thus, while climate litigation is not a major risk in the short term, it can turn into a material risk for large, carbon-intensive companies listed in exposed countries if a ground-breaking judgment occurs. Finally, an unknown variable in this regard is the role of 'illegal emissions'. Cumulated and locked-in energy-related CO2 emissions between the first IPCC report in 1990 and 2035 represent an estimated external cost of $21-88 trillion.[23] This number increases to $90 tn when applying the Trucost/UNEP-Fi calculations.[24] For 2008, *Trucost* concluded that the top 3,000 companies external cost amounts to $2.15 tn or 1/3 of the global external cost of human activity. About 2/3 of the total cost comes from GHG emissions. In the future, a major technical obstacle will be to determine the threshold between an acceptable and harmful emission level.

1.3. THE CHANCE FOR NEW METRICS

• To channel investments (carbon performance)

As outlined above, current investing trends and the lack of a price signal threaten the achievement of official climate goals. If governments continue to commit to these objectives, complementary 'top down' financial regulatory approaches need to be applied that supplement the carbon price signal and 'green', real economy incentives. One of these approaches could include assigning climate finance targets to public banks. Integrating climate goals as such in the policy frameworks that directly or indirectly drive private capital allocation (e.g. tax incentives on savings interests) will then become a key policy tool. In both cases, targets and incentives will have to rely on precise cross-assets metrics.

In a recent Green Paper, the EC acknowledged the issues related to the long-term financing gap and the misallocation of capital by financial markets.[26] The paper stressed the lack of relevant metrics and benchmarks for 'long-term investing'.

• To manage carbon exposure (carbon risks)

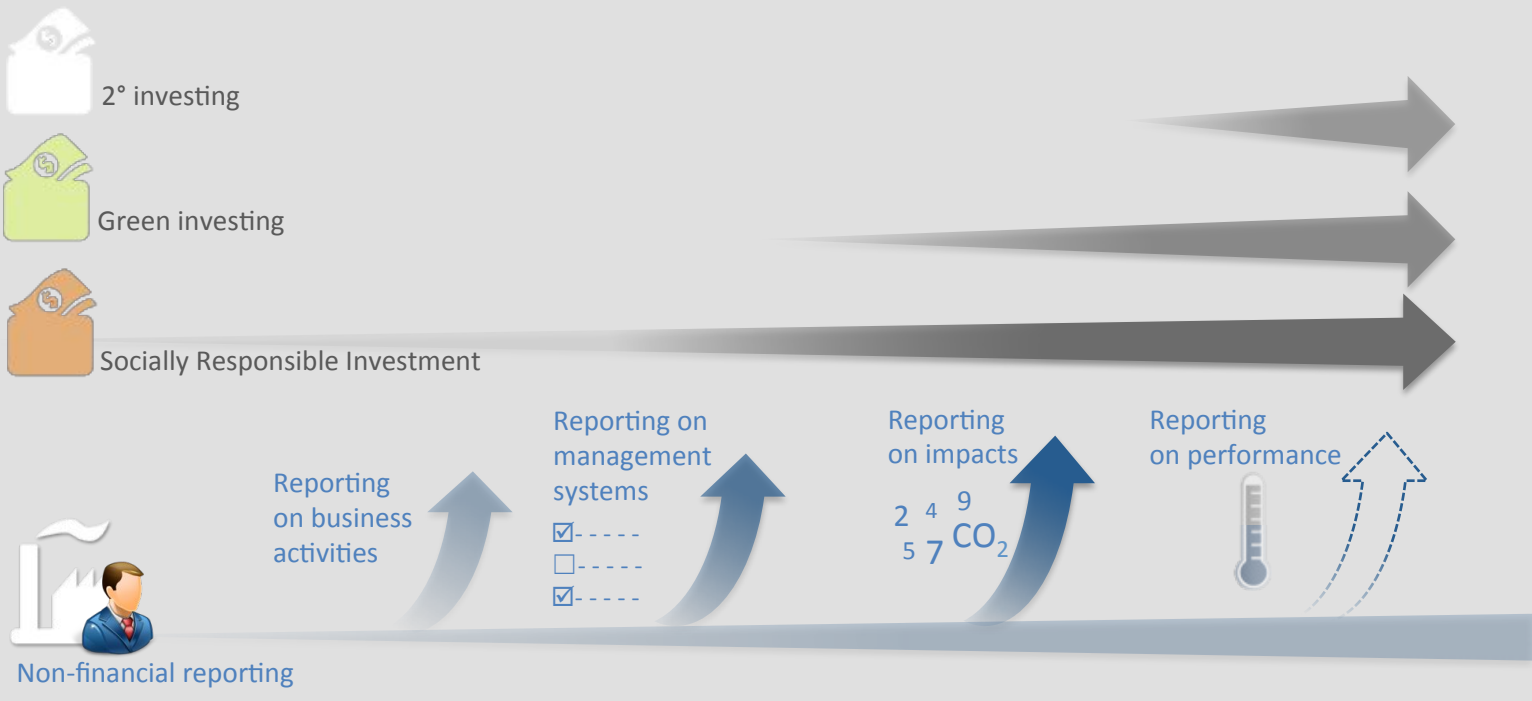
If governments finally turn climate goals into stringent regulations, the impairment risk will materialize. If they do not, litigation will increase with the cumulated cost of adaptation. In either case, given the magnitude of risks, it is worth stress-testing the impact on companies and long-term financial assets:

- At company level to inform risk factors and strategy;
- At portfolio level for long-term investors with buy and hold strategies;
- At macroeconomic level in order to assess systemic risks.

• To assess the impact of green/responsible vehicles

New metrics are also needed to sustain the growth of socially responsible investing (SRI) and 'green investing'. SRI now represents about 1% of equities under management and up to 4% of shareholding in certain industries.[27] The SRI feature of financial products will increasingly be labeled.[28] However, currently SRI self-labeling is primarily based on a scoring of investment processes rather than impact assessment.[30] In addition to SRI, a wave of new 'green investing' has been met with a growing interest from investors and policy makers to tackle climate change. Climate effectiveness standards providing the basis for labelling climate investments are for instance put forward by the Climate Bonds Initiative. 'Green finance' and SRI need performance indicators in order to benefit from public support and incentives[31] and will sooner or later have to measure their impact. Regulators too will have an interest in metrics satisfying public standards and ensuring credibility.

FIG.11. EVOLUTION OF CORPORATE NON-FINANCIAL REPORTING & THEMED INVESTING



GREEN PAPER ON LONG-TERM FINANCING (Extracts)[26]

There is no single, universally-accepted definition of long-term financing. In broad terms, long-term financing can be considered as the process by which the financial system provides the funding to pay for investments that stretch over an extended time period. This definition focuses on the range of features associated with long-term finance. (…) Benchmarks and credit ratings may focus also on annual or short horizons. The Commission has proposed tightening the rules to reduce reliance on traditional ratings and political agreement was reached on several legislative reforms in November 2012.

The development of metrics and ratings that balance fostering a long-term perspective with short-term accountability could provide a useful tool to assist long-term investors.

Questions:

- *To what extent can increased integration of financial and non-financial information help provide a clearer overview of a company's long-term performance, and contribute to better investment decision-making?*

- *Is there a need to develop specific long-term benchmarks?*

Source: European Commission, DG Mark (2013)

- **Need for impact-based, cross-asset incentives**

The logic underpinning the chance for new metrics equally determines the nature these new metrics should take. New regulation and legislation will require some sort of insight into the appropriate alignment of the overall financial sector with climate targets. Measuring impact will become increasingly important for 'green' and SRI investment vehicles.[32] Equally, carbon risk exposure will need to account for the overall asset-allocation of the portfolio.[33] This suggests that new metrics will need to include incentives that are both cross-asset and impact-based.

Cross-asset incentives. As exemplified on pages 10 and 11, the reallocation of investments should occur at company level (technology switch in capital expenditures and R&D), but also portfolio level (reallocation between industries involving creative destruction) and strategic asset allocation level (e.g. reinforcement of venture capital, private equity and SME lending to foster innovation).[34] This landscape requires cross-asset incentives and disincentives rather than only support measures targeting green investment vehicles. There are two main reasons for this:

- Carbon-intensive companies and investors need to be incentivized to phase-out of fossil-fuel assets, not only to invest in green assets;
- Specific green vehicles are not necessarily adapted for responding to diffuse stakes. Green investment vehicles are very powerful when associated with large-scale projects, notably smart grids and railroads, but may be less adapted to addressing the broader (diffuse) challenges associated with financing the energy transition (e.g. breakthrough R&D investments in carbon-intensive industries). Indeed, this approach requires analyzing each eligible project twice (by the company and the investor), thus doubling the origination cost, already a major barrier for small-scale projects' financing. Asset finance and small bank loans will therefore remain the dominant way to invest in low-carbon projects. This calls for incentives targeting established players.

Impact-based incentives. In many areas, low-carbon technologies are controversial (e.g. carbon capture and storage, nuclear power, biofuels), immature (e.g. marine energy), or still to be invented (e.g. low carbon alternatives to cement and steel). In this context, where the role of subsidies is major on both high/low carbon, the technological risk is high for both investors and policy makers. The various climate scenarios, even from the environmental movement, are based on different bets and the future will certainly be a mix of solutions.[35] Policy makers therefore need to rely on assessment frameworks that can, at the same time, allow them to strongly incentivize investors to align their investment on +2°C pathways and let them free to bet on alternative technologies. In other words, investors need a touch of planning regarding the expected outcomes, while remaining in a market economy. Achieving both goals requires an impact-based indicator.

➔ **The present report explores the potential of current financed emissions methodologies to assess portfolio's carbon performance and/or risk exposure. It then looks at how these methodologies can inspire a new generation of metrics we call '2° investing metrics' and 'long-term investing metrics' to help align the financial sector with climate goals and more generally long-term financing needs.[36]**

2. THE SHORT HISTORY OF FINANCED EMISSIONS

2.1. CONTEXTUALIZING FINANCED EMISSIONS

• **Carbon-intensive projects' footprints**
'Climate performance' assessment and 'climate risk' assessment (as defined p.37) both require an inventory of GHG emissions associated with the investment portfolio or the balance sheet of a bank. In the past ten years, about twenty different calculation methodologies have been developed to assess GHG emissions related to investments. Most approaches rely on the application of classic carbon footprint assessment methodologies (based on the GHG Protocol/UNEP-FI[1]) to carbon-intensive projects (power plants, oil & gas projects, etc.). Many development banks such as the IFC, the EIB or the AFD (the French development bank) have started to assess new loans based on 'financed emissions' methodologies.

The application at 'portfolio level' is more recent and originates from three largely parallel trends:

• **Reaction to NGOs pressure.** In the mid-2000s, environmental NGOs such as WWF[2] and Platform[3] developed assessment methodologies to consolidate projects' footprints as part of their campaign against 'dirty' projects. Some banks responded by implementing their own assessment framework based on the same 'bottom-up' approach.[4] The consultancy *Profundo* has extended this approach since 2007 to various types of financing based on publicly available data in order to rank banks based on their level of involvement in the 'financing of climate change'.[5] NGOs (e.g. Friends of the Earth, Rainforest Action Network and Greenpeace, and their international network BankTrack) have commissioned studies. More recently, the Carbon Tracker Initiative developed a similar bottom-up approach focused on the ownership of fossil-fuel reserves.[6] To date, no bank has tried to apply these approaches to its loan book or balance sheet.

• **Innovation from equity managers.** At the same time, two equity managers (Henderson Global Investor[7] and Pictet AM) commissioned *Trucost* and *Inrate* to estimate the footprint of equity funds for research and marketing purposes. At this time the Carbon Disclosure Project (CDP) was still at its infancy. Given this lack of standardized reporting and their aim to include supply chain emissions, they developed 'top-down' approaches, mostly based on input/output macroeconomic models. Over the years their data has been used by other equity managers (to develop green funds), by index providers (e.g. NYSE-Euronext), and consultants publishing funds rankings. More recently, in 2010 and 2013, new players, namely *South Pole Carbon* and *Bank of America Merrill Lynch*, used mathematical models to extrapolate the carbon emissions reported by listed companies to estimate the footprint of a broader spectrum. Financed emissions data is now available on Bloomberg terminals (*South Pole Carbon*), Factset (*Trucost*), and Reuters (*Asset 4*).

• **Broader application.** Over the years, commercial and development banks also started developing portfolio-level approaches in addition to project-per-project footprinting in order to cover corporate loan books. In 2004, Bank of America began accounting and setting reduction targets for its portfolio and in 2010 RBS published the footprint of its energy portfolio.[4] This approach has also been extended to multi-industry loan books (Rabobank).

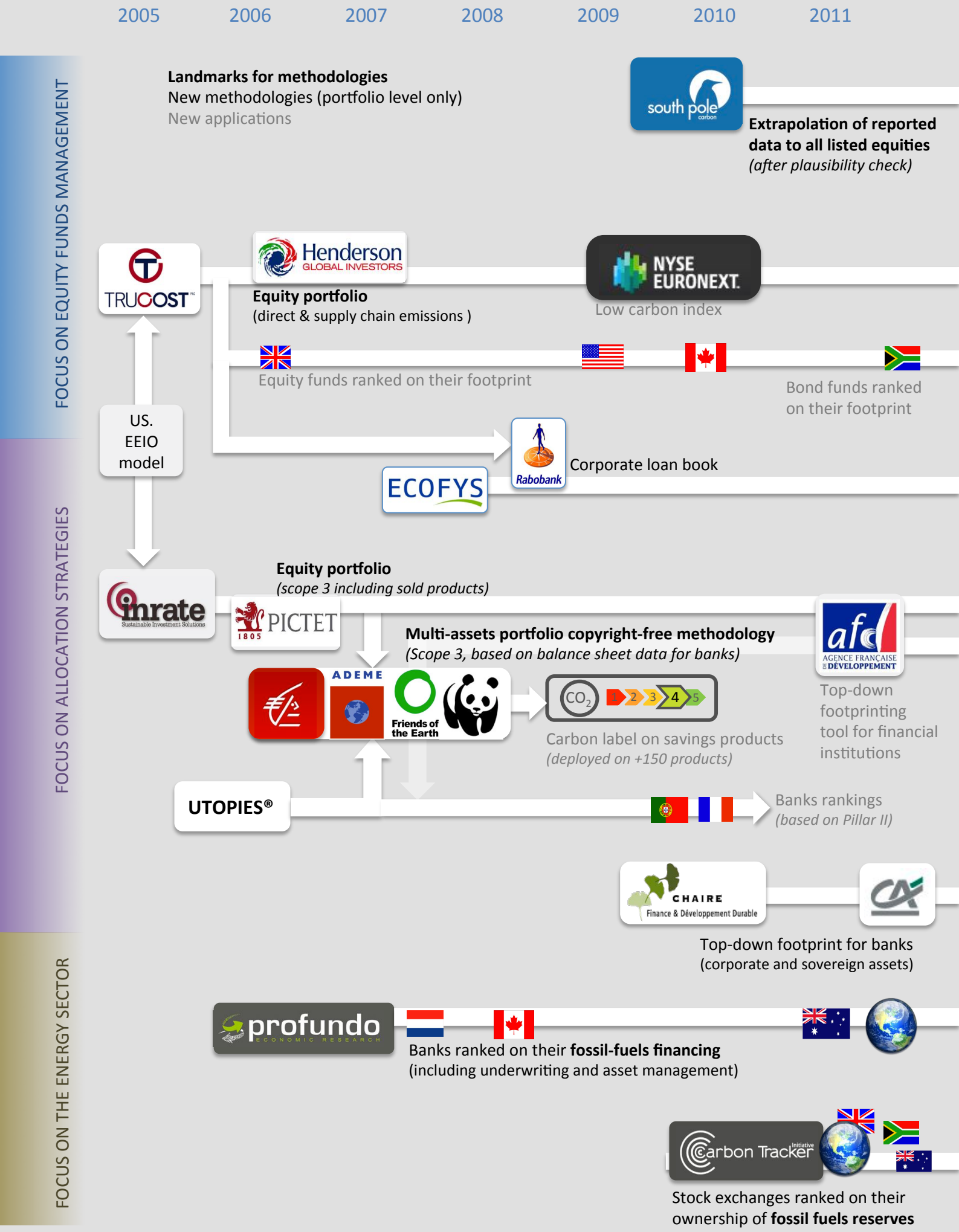
BANKS RANKINGS BY PROFUNDO

The Dutch economic research consultancy *Profundo* focused on sustainability, particularly in terms of commodity chains, the financial sector and CSR, has published a ranking of the 93 largest global banks and their contribution to financing the coal industry since 2005. The study was released in 2011 in partnership with the German NGO Urgewald and BankTrack. The total value of coal financing provided by these banks since 2005 (the year the Kyoto Protocol came into force) amounts to €232 bn.

EQUITY FUNDS RANKINGS: FOCUS ON TRUCOST WORK

Trucost released a Carbon Footprint Ranking of UK Investment Funds since 2006. The report ranks the carbon intensity of 44 main UK investment and mutual funds, revealing the best and worst performers in terms of their carbon footprint. For 2006, the funds were valued at £45 bn and managed by 28 different fund managers. Their first results in showed that the worst-performing fund had a footprint five times larger than the best 'carbon'-performing fund.

2.2. SEVEN YEARS OF DEVELOPMENT AND PILOT-TESTING



2012 2013 2014

Data available on Bloomberg terminals

New extrapolation model

Infrastructure portfolio footprint

Bank cross-asset methodology

Cross-asset top-down + bottom up tool for banks
(covering all listed companies, all asset types)

EXTRACTS FROM PUBLICATIONS

FIG.12. EQUITY FUNDS FOOTPRINTS (TRUCOST, 2009)

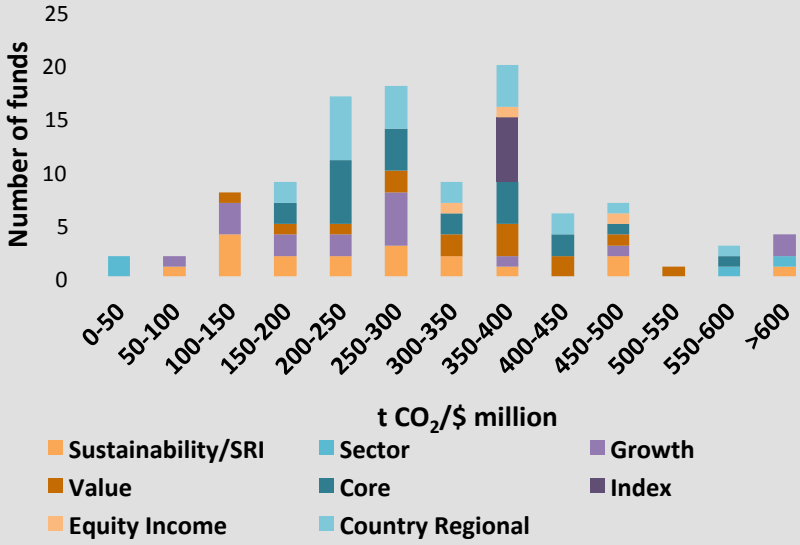


FIG.13. CARBON INTENSITY OF CAISSE D'EPARGNE SAVINGS PRODUCTS (CAISSE D'EPARGNE, 2009)

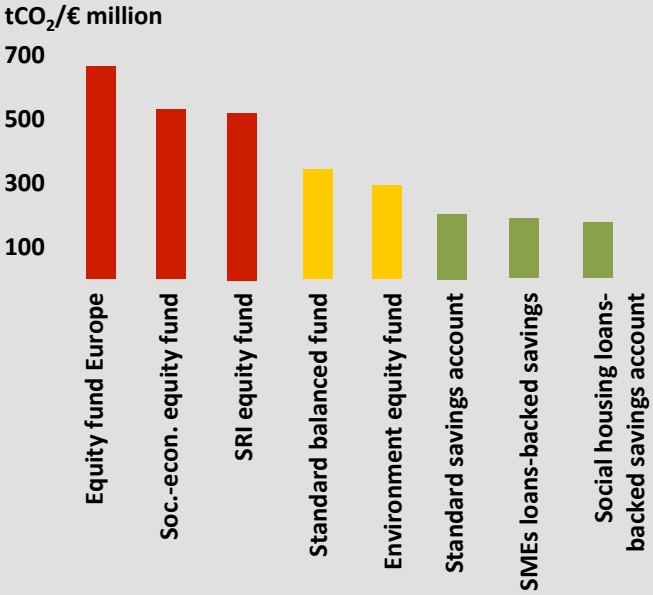
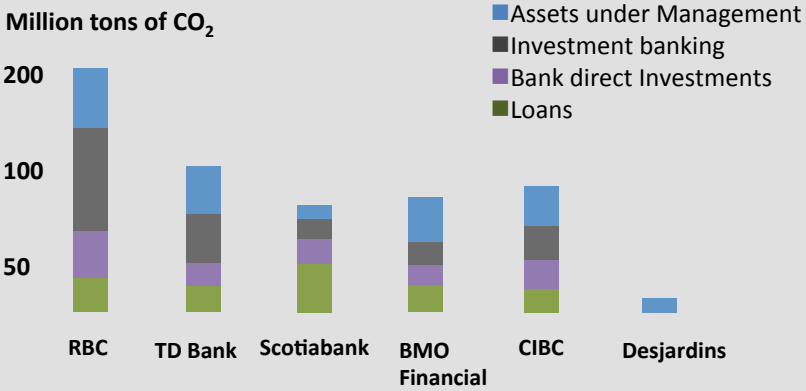


FIG.14. EMISSIONS FROM FINANCED FOSSIL FUELS PROFUNDO / RAN (2008)



GHG Protocol/UNEP-FI

In its scope 3 standard, the GHG Protocol addresses financed emissions.[9] In 2012, they partnered with the UNEP Financial Initiative to further develop guidance in this area. The guidelines and conclusions of the first workshops they conducted are analyzed throughout the present report.

ISO 14069

Similarly, the ISO standard for corporate carbon footprinting (2013) has an investment category. To date the guidance for the financial sector is very limited (3 pages) and aligned with the GHG Protocol.

PROJECT FINANCE FRAMEWORK

Nine development banks ((ADB, AFD, EBRD, EIB, IDB, IFC, KFW, Nefco and the World Bank) committed to accounting and reporting emissions in 2012. Most banks perform 'standard' carbon footprinting on a project-per-project basis using detailed process-based data.

ASSET OWNER DISCLOSURE PROJECT (AODP)

Following the success of the CDP, a major global campaign by the Asset Owner Disclosure Project (AODP) to mobilize pension and other investment beneficiaries, to request increased transparency on GHG emissions and on broader climate change-related risks from their investment agents was launched in 2012.

2008) and the whole balance sheet of banks (corporate loans and bonds, sovereign bonds, mortgages). In 2007, the French bank Caisse d'Epargne commissioned *Inrate* and *Utopies* to assess the footprint of savings products, current accounts, and the bank.[8]

- **Cross-asset approaches**. These approaches have lead to the publication of a copyrights-free, cross-asset methodology tested by a few other banks and insurers and endorsed by the French Environmental Agency (ADEME). The key accounting rules have then been taken up by *Inrate* and *Money Footprint* in 2012 to develop a banks' pilot-footprinting tool for the AFD. In 2013, Ecofys developed a methodology based on similar principles to assess ASN Bank's balance sheet (NL). In addition, Credit Agricole Corporate Investment Bank developed in 2011-12 an alternative methodology exclusively based on a 'top-down approach' in collaboration with Paris-Dauphine University.

- **Niche market and standardisation**

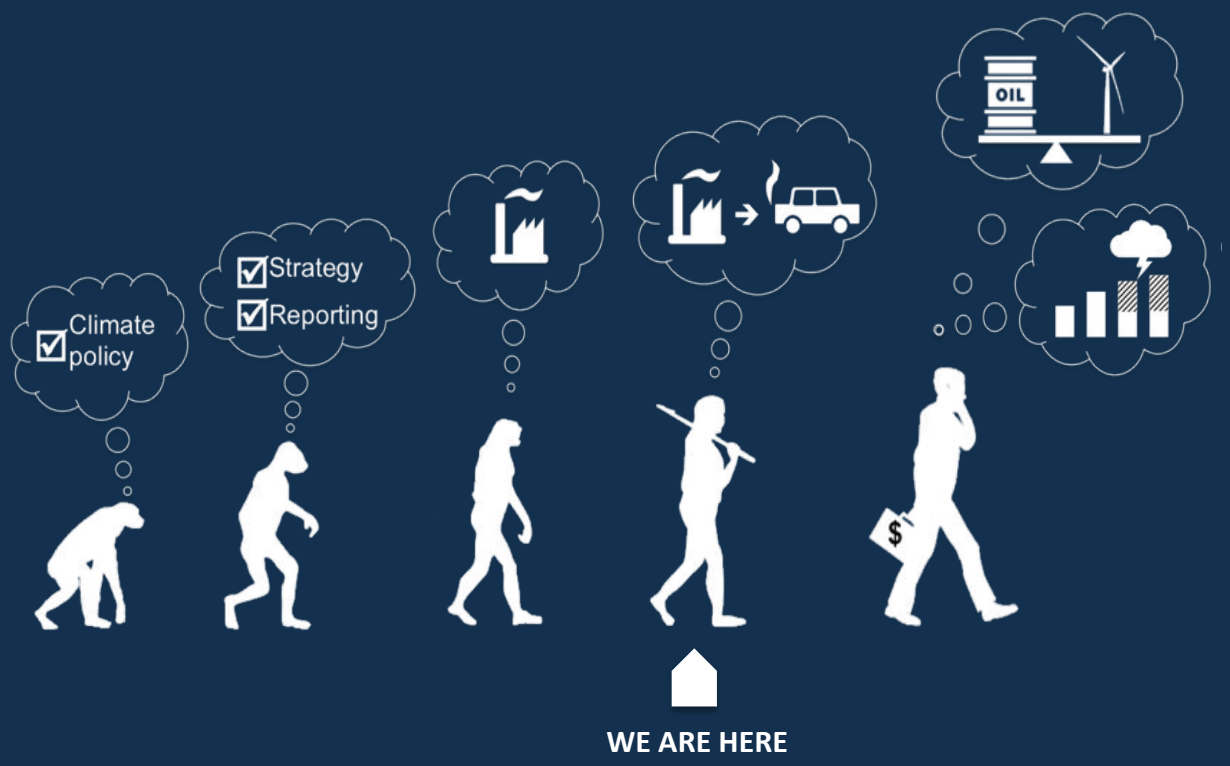
We estimate that the 'financed emissions' data market is still in its infancy with €2-3 m of global revenues, about 10-20 times smaller than the global market for ESG ratings. However financed emissions assessment now receives a growing interest from standard setters. The GHG Protocol and the UNEP Financial Initiative plan to publish an accounting standard by 2014. At national level, similar initiatives are planned in France and Germany.

So far all these initiatives have been mainly driven by reputation concerns, with the goal of getting risk departments and portfolio managers involved. However, once accounting standards will be published, they can easily be turned into mandatory disclosure requirements for banks and institutional investors. Indeed, regulation in several countries, including France and the UK, obliges listed companies to report on their direct and electricity-related GHG emissions. Moreover, progress in reporting practices in recent years paves the way for an expansion of reporting to indirect emissions. Another potential driver is the reinforcement of reporting requirements regarding the use of ESG criteria in funds management, debated in France and at European level.

CROSS-ASSET METHODOLOGY AND LABELING SCHEME (France)

In 2007, the CEO of Group Caisse d'Epargne announced the objectives of applying a sustainability label to all savings products and reporting the financed emissions of the bank, based on a copyrights-free assessment methodology developed in partnership with a stakeholder panel. For nearly a year, Caisse d'Epargne and the consultancy Utopies worked in partnership with the French Environment Agency (ADEME), two environmental NGOs (Friends of the Earth and the WWF), and a consumer organization. In 2008, the methodology was endorsed by the panel. The bank applied the label on the leaflets of all savings products and posted detailed fact sheets on the website. The score for each product was reported in the annual report and assured by auditors. A year later, savings products integrated the short list of product categories eligible for mandatory carbon labeling and two insurers joined the project. However, the combined effect of the French government retreat on carbon labeling and the merger of the bank with a competitor stopped the project after a year.

PART II. STATE-OF-THE-ART REVIEW



KEY MESSAGES

- **We have identified a dozen methodologies developed for equity managers, banks and environmental NGOs.** Together, they cover most asset classes including listed and private equities, corporate, financial and sovereign bonds, corporate loans, project finance, mortgages and consumer credit. Several financed emission data providers offer calculation tools and direct access to databases covering major stock indices components.

- **'Financed emissions' methodologies still face substantial gaps in corporate reporting, with coverage extending to only about 50% of total market capitalization for GHG emissions.** Gaps remain for supply-chain and sold products emissions, small companies, and all other investees (governments, households, etc.). To fill the gaps, carbon data providers estimate GHG emissions with statistical models (e.g. input output including environmental data) or regression models (e.g. estimating emissions for non-reporting companies based on the data from reporters).

- **A combination of reported carbon data and modeling techniques allows for an assessment of financed emissions with a sufficient level of certainty at relatively peripheral costs for financial institutions.** When combined with qualitative analysis, levels of certainty (<5-10% for a large diversified equity portfolios) exceed that of most economic data based on national accounts currently informing policy makers on the impact of financial intermediation. We estimate that annual costs for financial institutions range between $6,000 for a basic coverage of listed equities and $200,000 for offering detailed assessment on a cross-assets basis. Low costs can largely be achieved as a result of bulk processing of data, the use of average emission factors to apply top-down assessment approaches, and scale economies in the analysis of investees.

- **The review suggests a number of areas of improvement in developing more sophisticated methodologies.** Key areas of further development for 'financed emissions' methodologies include accounting for *cumulated* and *locked-in* emissions beyond *annual* emissions. Gaps also remain for covering complex assets such as derivatives. Finally, investments horizons are not appropriately taken into account in existing methodologies.

1. THE LANDSCAPE OF ASSESSMENT METHODOLOGIES

We list here the organizations that developed a methodology or model at portfolio level and still use it (for internal or commercial purpose). One-shot attempts and approaches limited to project or company levels have not been included in the review. The related projects are briefly discussed in the box "out of scope" (next page).

1.1. TRUCOST'S MODEL

Trucost[1] conducted its first carbon footprint for an equity portfolio with Henderson Global Investors in 2006. *Trucost* has about 35 people dedicated to footprinting in the UK and the US. The activity generates a £2 m income, of which 50% is dedicated to investor activities. From a commercial perspective, it is the market leader. The model is based on carbon data reported by companies. Emissions for non-reporting companies are estimated based on the US statistical model (environmentally extended input-output) to extend coverage to +4,500 listed companies for cradle-to-gate emissions (direct, electricity + third tier suppliers). Trucost data are available to clients via proprietary online tools, allowing them to screen companies, access company briefing and perform portfolio analysis, as well as access Factset's terminals. Trucost also uses its data to publish funds rankings, company rankings, and research papers.

1.2. ENV'IMPACT® MODEL (INRATE)

Inrate[2] is an ESG rating agency established in 1990. They developed the env'Impact® model for Pictet AM equity portfolios in 2006. Since then, financed emissions data are sold as a complement to ESG data to their clients (asset managers, financial analysts). The model is based on the same US statistical model enhanced with life-cycle data to cover the sold products emissions of the investees. Inrate covers +2,800 listed companies for cradle-to-cradle emissions (including emissions from sold products use). The Inrate team includes 20 people dedicated to ESG rating in Switzerland. In 2007, the env'Impact® model has been used as a basis for the development of a cross-assets, copyrights-free methodology by Stanislas Dupré and Marie-Christine Korniloff* for Utopies and Caisse d'Epargne, in partnership with the ADEME, WWF and Friends of the Earth (see case study on page 18). This method has then be used by Utopies to assess savings products and publish bank rankings.

1.3. CROSS-ASSET FOOTPRINT® MODEL (MFS/ AFD)

The *Cross-Asset Footprint* model was developed in 2012 for the AFD by a start-up, Money Footprint Software,[3] based on Inrate's model and Caisse d'Epargne's methodology. The model blends bottom-up and top-down approaches to cover all listed non-financial companies and financial institutions (including financed emissions), sovereign bonds, loans to SMEs and households, mortgages, and green projects, for cradle-to-cradle emissions. It is pilot-tested by the AFD since 2012 and commercially available since 2013, as an online balance sheet/portfolio analysis tool.

1.4. P9XCA METHODOLOGY (FINANCE & SUSTAINABILITY CHAIR / CREDIT-AGRICOLE-CIB)

The *P9XCA* methodology was developed in 2011 by Antoine Rose*, PhD student from the Paris-based Sustainability Chair for Crédit Agricole CIB. It covers commitments to non-financial companies and sovereign issuers. The main goal of the methodology is to avoid multiple counting in order to provide an order of magnitude for a bank's financed emissions, rather than informing client selection or industry-allocation. It is based exclusively on open-access public statistics (e.g. national GHG inventories, public accounts from UNO and OECD). The methodology will be published in 2014 as a PhD thesis.

1.5. SOUTH POLE CARBON'S MODEL

South Pole Carbon[4] is a branch of the South Pole Carbon Group, a company specialized in carbon offset (sourcing Clean Development Mechanisms (CDM) and voluntary projects, asset management, etc.) with €24 m income and 100 employees, including 5 EFTs dedicated to financed emissions analysis. They operate in 15 offices worldwide. With a mathematical model, they extrapolate from reported carbon data to provide carbon footprints for every listed company. The data is available on Bloomberg terminals since 2012. The methodology is also used to calculate GHG footprints of private equity portfolios in partnership with ESG analytics. *South Pole Carbon* is currently developing a screening tool for real estate portfolios.

**Both authors took part in the redaction, review or editing process of the present report.*

1.6. CARBON SCREENER® MODEL (BANK OF AMERICA MERRILL LYNCH / CAMRADATA)

In 2012, BofAML developed another mathematical approach to extrapolate reported data (Asset 4) to non-reporting listed companies. Since 2013, the related financed emissions data are sold by *Camradata,* [5] a firm specialized in institutional investment data and analysis. The approach is based on CDP data (direct + electricity) and covers about 8,000 listed companies.

1.7. PROFUNDO'S APPROACH

Profundo is a 9 people economic research organization based in the Netherlands and working mostly for NGOs.[6] They produce bank rankings based on the amount of financing provided to fossil-fuel extraction, coal powered electricity, etc. Their approach is exclusively bottom-up: they inventory fossil-fuel companies both listed and private and track the transactions (loans, equities and bonds issuance) between banks and the companies, as well as equity holdings (asset management and on-balance sheet) based on data from Bloomberg and public sources.

1.8. CARBON TRACKER INITIATIVE'S APPROACH

The Carbon Tracker Initiative is not technically a data provider.[7] They use external data to raise awareness about the carbon bubble issue. Their data are exclusively based on the carbon content of fossil fuels reserves (oil, gas, coal), which is allocated to the owners i.e. the shareholders of energy companies. They analyze 200 listed companies.

1.9. ASN BANK'S METHODOLOGY

The Dutch ASN Bank recently developed a cross-assets framework to assess its balance sheet and track carbon performance.[8] This methodology will be applied to the total balance sheet. For equity portfolios (scope 1, 2 & supply chain), it is based on the *Trucost* framework and data. For sovereign and municipal bonds, mortgages, and real estate, ASN commissioned Ecofys,[9] which built a methodology similar to the framework developed by Caisse d'Epargne, to calculate emission factors based on a mix of reported data and national statistics. Finally, for emissions avoided on project finance, ASN relies on the GHG Protocol. The goal is to balance avoided and financed emissions by 2030 in order to reach carbon neutrality.

1.10. VFU'S METHODOLOGY (WORK IN PROGRESS)

VfU (Association for Environmental Management and Sustainability in Financial Institutions) is a network of financial service providers in Germany, Austria and Switzerland working on environmental issues.[10] They are developing a cross-assets methodology with two consultancies, Connexis and E2. So far tests have been conducted on listed equities and mortgages.

1.11. AD HOC DEVELOPMENTS

In many cases, ad hoc users have commissioned in-house or external experts to fine tune or extend an existing methodology. The examples we identified include Kepler-Cheuvreux[11] which developed a methodology to calculate the sold products emissions in the automotive, oil & gas, and coal mining sectors for the NYSE EURONEXT LC 100 Index, and CDC, which finetuned *Trucost's* approach for the construction and use phase of infrastructure.

OUT OF SCOPE

The scope of the study is limited to organizations that developed and applied methodologies in order to calculate the 'financed emissions' of investment portfolios. Some major initiatives in the field of carbon accounting are therefore not formally included in the review, but mentioned where relevant.

CARBON DISCLOSURE PROJECT

The Carbon Disclosure Project (CDP) is an NGO that asks listed companies to report their carbon emissions, on behalf of institutional investors.[12] They provide raw data directly or via Bloomberg.

ASSET4 (THOMPSON REUTERS)

Asset4 provides carbon data reported by companies and quality-checked by their analysts[13]. For some industries, their carbon data can be combined with activity data from the Worldscope database in order to provide carbon intensity indicators such as the CO_2 emissions per passenger for the airline industry.

CO2 BENCHMARK

CO2 Benchmark specializes in providing global carbon & energy data of 3,000 companies in 80 sectors and 30 countries.[14] Their methodology includes a sector definition based on the international standard industry classification (ISIC 2006). When calculating carbon intensity, the approach applies employees as a common denominator across countries and companies as opposed to turnover or volume of sales. They also provide sector specific indicators to compare companies.

OVERVIEW OF PORTFOLIO FOOTPRINT METHODOLOGIES

	KEY FEATURES	Trucost	Inrate EnvIMPACT®	Cross-asset Footprint®	P9XCA
ACCOUNTING RULES	Scopes accounted for investees	Direct + first tier indirect	1+2+ supply chain & sold products	1+2+ supply chain & sold products	N/A
	Management of multiple counting		Identification & discounting	Identification & discounting	No double counting
	Time boundaries (investees)	Annual	Annual + lifetime for sold products	Annual + lifetime for sold products	Annual
	Time boundaries (investors)	Assets outstanding	Assets outstanding	Assets outstanding	Assets outstanding
	Rule of allocation to investors	Share of ownership (equities) or investment	Share of ownership	Share of investment or share of financing	Share of investment
COVERAGE OF ASSET TYPES	Listed equities	◆ 4,500 (reported + modeled)	◆ 2,800 (modeled data)	◆ Same as Inrate + industry-average data for all listed cies	◆
	Corp. bonds & loans	❖ Listed cies	◆	❖ ◆ industry-average	◆
	Private equities /SME loans	◆ Industry average	◆	❖ ◆ Industry average	◆
	Sovereign bonds	◆ Methodology is set up with data for all countries		❖ ◆ 20 countries	◆ 15 zones
	Fin. institutions (including financed emissions)			❖ ◆ industry-average (balance sheet)	◆
	Other asset types covered	◆ Real estate, infrastructure		❖ Real estate, mortgages, cons.loans, climate projects	
SOURCES OF CARBON & ACTIVITY DATA	GHG data used to calculate investees' footprint	CDP + reported + modeled data	US EEIO model enhanced with Life-cycle data	Inrate model enhanced + additional LCA + model per $ of asset held for banks + reporting	GHG Emission factors based on national inventories and public accounts
	GHG data used to calculate the carbon intensity of non-reporting investees	US EEIO model			
	Number of categories in the underlying model	531	340	340	9
	Method used to adapt the model to global or/and local contexts	CO2 intensity of electricity adjusted to global	CO2 intensity of electricity adjusted to global	Same as Inrate + 131 countries specifics	Extrapolation of EU countries to 15 regions
	Sources of activity data and methods used for matching with emission factors of the model	Detailed segmentation for 4.500 listed cies (sales)	Detailed segmentation of 2.800 listed cies *(sales, outputs)*	Inrate data + segmentation for governments (budget) & listed banks (assets)	Simple assignment (one company = one sector)
	Method used when detailed segmentation is not performed	Average intensity per industry group (cies)	No extension	Average intensity per industry group (cies) & sector/country	
DATA PROCESSING	Bulk data processing	Listed equities		Listed equities	
	Measurement and reduction of uncertainties	Model calibrated with reported data for some industries	Model calibrated with LCA data for some industries	Model calibrated with LCA data + reported data for some industries	
	CO_2 data analysts (FTEs)	N/A	N/A	2	Not applicable

◆ Methodology applicable ❖ Footprinting tool for investees provided (based on activity/liability data provided by the user)
◆ Financed GHG data (per $ of asset held) provided to users Items in grey relate to developments underway

South Pole Carbon	Carbon Screener® (BofA ML/ Camradata)	ASN/Ecofys	Carbon Tracker	Profundo
1 + 2	1 + 2	1+2	Reserves for energy cies	1+ sold products
			No double counting	Not managed
Annual	Annual	Annual	Forward looking	Forward looking
Assets outstanding	Assets outstanding	Assets outstanding	Assets outstanding	Assets outstanding + Cash flows
Share of ownership	Share of ownership	Share of of investment	Share of ownership	Share of investment
◆50,000 (reported +modeled data)	◆8,000 (reported +modeled data)		◆200	◆120 (coal, power, oil palm)
❖◆Industry-average		◆		◆
❖◆Industry-average				◆90 (coal, power, oil palm)
		◆		
				◆50 (balance sheet + AM +underwriting)
❖Real estate		◆ Mortgages + Housing + projects		
CDP + reporting (checked)	CDP + reporting (checked)	Reporting	Life-cycle data IPPCC guidelines	Life-cycle data
Regression model + extrapolation	Regression model + inverse distance weighted interpolation	Dutch GHG inventory & accounts		
600	1.000	14	Not applicable	Not applicable
No	Yes. Scope 2: geo sales/ assets-weighted mix (use of the WDWW geo model)	No	Not applicable	Not applicable
Industry specific approximation formulae based on 1 to 10 activity data (sales, staff, assets, COGS, etc.) from Bloomberg.	Thomson Reuters (Asset4 for carbon data and Worldscope segmentation by SIC group (sales)	Simple assignment (one company = one sector)	Method based on reserves reported	In house analysis + transactions covered in financial databases
	Not covered	Industry-average or reported data extrapolated	Not applicable	Not applicable
Equities, Corp. bonds				
Plausibility check of reported data + uncertainty per industry	Analysis of Variance (ANOVA) Real-Data vs. Estimated Data		Not applicable	
5	0.25	N/A	Not applicable	9

2. ACCOUNTING PRINCIPLES

2.1. INVESTEE'S OPERATIONAL BOUNDARIES (SCOPES)

The GHG Protocol[1] classifies companies' emissions into three 'scopes': Scope 1 covers the direct emissions of the company's facilities and vehicles. Scope 2 refers to purchase of electricity, heat, cooling and steam emissions. Scope 3 in turn covers all other indirect GHG emissions, classified into upstream (supply-chain) and downstream (sold products use phase, disposal, and investments i.e. financed emissions). Scope 3 corporate reporting is still in its infancy.

The review reveals a great diversity of approaches for dealing with scopes. From both a risk and performance perspective, a non-inclusive approach to scopes can mislead investors. According to *Inrate*, in the MSCI World Index, pre-dominantly 'direct-emitting' non-financial companies (e.g. power production) represent 10-15% compared to 50-55% for predominantly sold products-emitters (e.g. automotive) and 30-35% predominantly supply chain emitters (e.g. food production). Thus, the choice of operational boundaries very much depends on the use of carbon data by the investor. If the investor only wants to inform a 'best-in-class' approach in selected direct-emitting industries, like power-production, cement and airlines, it makes sense to prioritize scope 1 and 2. In other cases, and to inform industry-group and strategic allocation, scope 3 emissions, especially for sold products, need to be included.

Equally, a broader application of scopes is fraught with difficulties. This is primarily due to limited data availability (primary data provided by companies are limited to scope 1 and 2), challenges associated with weighting the different scopes, and multiple counting when two companies in a portfolio operate in the same supply-chain. Nevertheless, these are technical challenges to which a number of methodologies have already developed (or are in the process of developing) solutions.

2.2. TIME BOUNDARIES FOR INVESTEES

Two rules coexist in carbon accounting regarding the time boundaries. In the general case, the GHG emissions are accounted on an annual basis.[2] Alternatively, lifetime emissions accounting is recommended for the emissions related to sold products and projects financed.[3] Our analysis suggests that lifetime accounting makes more sense as investors are likely to be concerned about future regulation that increases the cost of future emissions and thus may lead to a loss in profitability, impairment or litigation. In addition, lifetime accounting is also much more applicable when it comes to tracking 'climate performance' since 2° investment roadmaps, which can be used as 'benchmarks', are associated with locked-in emissions.[4] While this suggests that carbon accounting should switch to lifetime emissions of assets, the challenge of allocating emissions over a lifetime to certain assets (e.g. highways), the possibility of retrofitting, and lack of data all challenge implementation. These are the key challenges to accounting the proper time boundaries for investees.

FIG.15. ACCOUNTING PRINCIPLES: OVERVIEW OF KEY QUESTIONS

Source: 2°ii

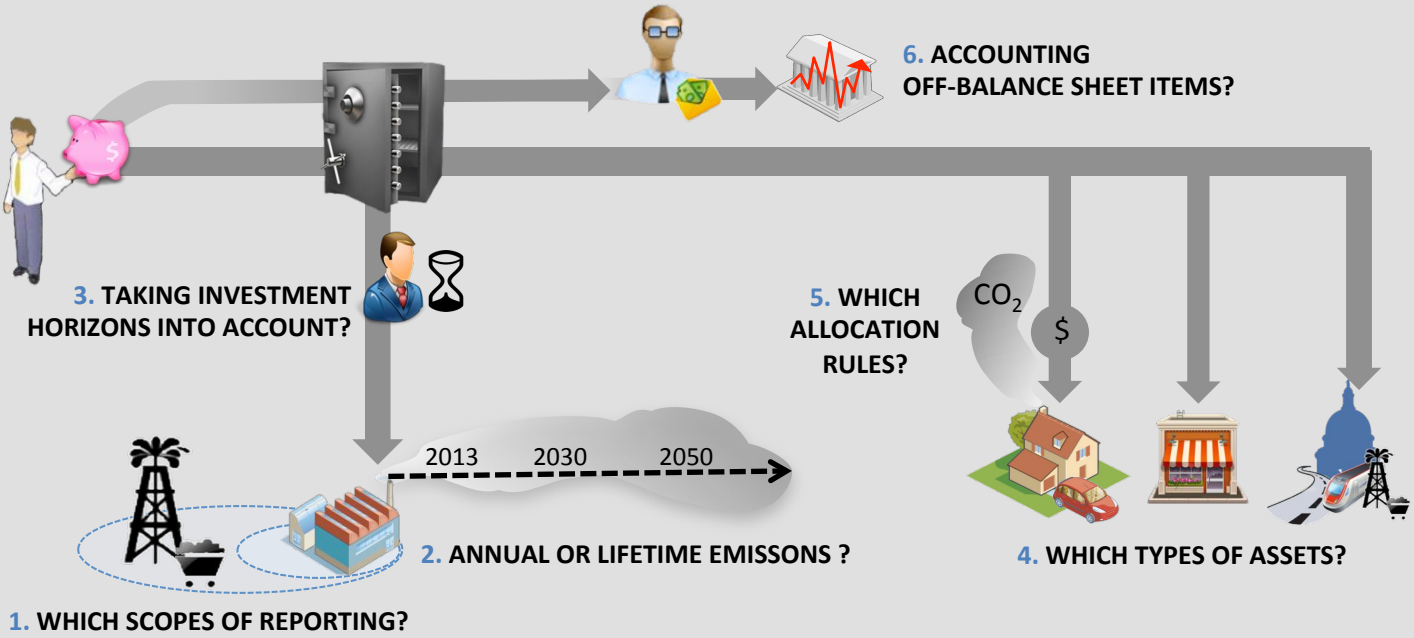
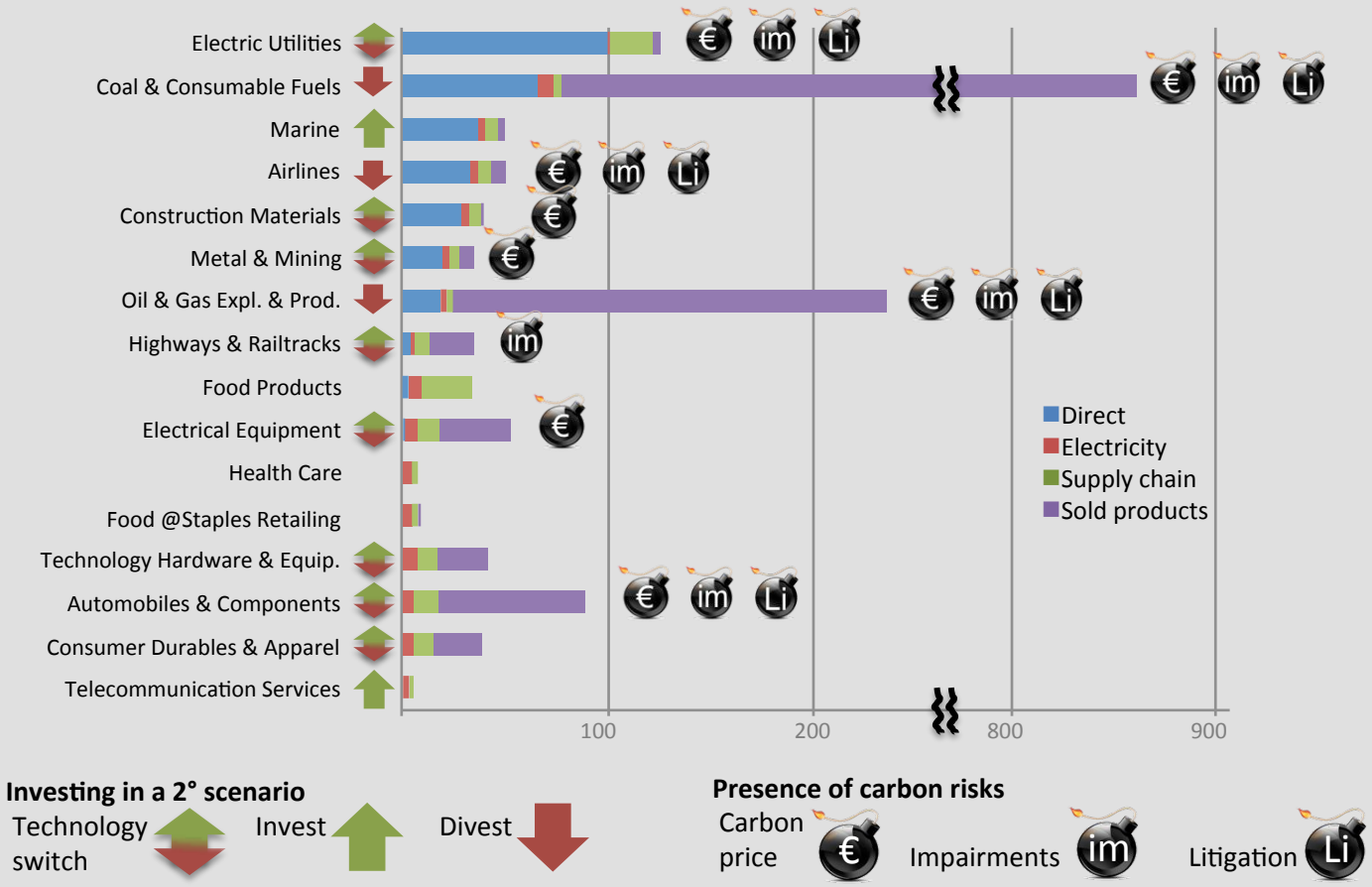


FIG.16. INTENSITY AND MATERIALITY OF FINANCED EMISSIONS BY SCOPE OF REPORTING FOR SELECTED INDUSTRY GROUPS

Sources: 2°ii, Inrate data for MSCI World index companies



Notes:

• The carbon intensities are based on the revenues (an indicator based on assets value would lead to a different ranking, notably for coal), and normalized (100 = intensity for electric utilities direct emissions). The sample covers about 50% of the MSCI World capitalization and 50% of consolidated scope 1+2+3 emissions, excluding the financial sector. The category 'electricity' includes emissions of the supply chain. Industry-groups are based on GICS taxonomy, with different levels of aggregation applied.

• The analysis of investing needs is based on the IEA WEO and ETP scenarios, completed with 2°ii analysis. The analysis of carbon risks is adapted from the ADEME/OTC 2011 study, and relies on explanations p.13-14.

2.3. TIME BOUNDARIES FOR INVESTORS

Time boundaries for investees is a question already addressed by existing guidance. Investors on the other hand suffer from almost no applicable guidance or even conceptual framework to set time boundaries. Generally investors can either report on the footprint of their stock of assets or the impacts of the transactions incurred (cash-flow accounting). Stock-based accounting is preferred by all practitioners working on equities and most practitioners working on loans. It is also recommended by the GHG Protocol in order to account investments for financial companies' annual emissions. However, it raises several questions related to investment horizons (e.g. payback period, maturity and holding), long-term investments being accounted the same way as short-term ones, even if both influence and risk exposure are different. Cash flow-based accounting is mostly used for project finance (for both absolute emissions and emission reductions). In this case, the link between the financial investment and the investment in the real economy is easier to establish (cf. Figure 17), but time boundary issues remain.

2.4. TYPES OF ASSETS ACCOUNTED

We define 'asset types' as a mix of *asset classes* (equities, private equities, fixed-income, real estate, etc.) used in finance, and *sectors* used in economics (households, banks, central administrations, etc.). A bank balance sheet also includes other assets such as derivatives and repurchase agreements that are very difficult to link with investments in the real economy from a methodological and technical point of view, but that may also 'finance emissions'.

• **Listed equities** are the main focus for asset managers. They represent almost all market outlets for 'financed emissions' data providers.

• **Project finance** is the main focus of banks. The GHG Protocol/UNEP-FI survey[5] identified at least nine banks accounting their related emissions.

• **Corporate loans** is the second step for bankers and NGOs initially focused on high-impact projects and data providers, who started with listed equities. The GHG Protocol/UNEP-FI survey identified five banks accounting their emissions for at least a part of their portfolio.
• **Corporate bonds and SMEs**. Several providers of equity data extend their approach to corporate bonds and SMEs on a company-per-company basis (when requested). In addition, some data providers developed a dataset of industry-average factors based on industry assignment of the companies to allow for a systematic coverage.
• **Other assets.** Accounting for other assets has been much more limited to date: only three methodologies cover sovereign bonds based on industry-average or macro-sector data. Two of them also cover mortgages, and only one allows for assessing car and consumer loans. No methodology has been identified that account commodities and derivatives.

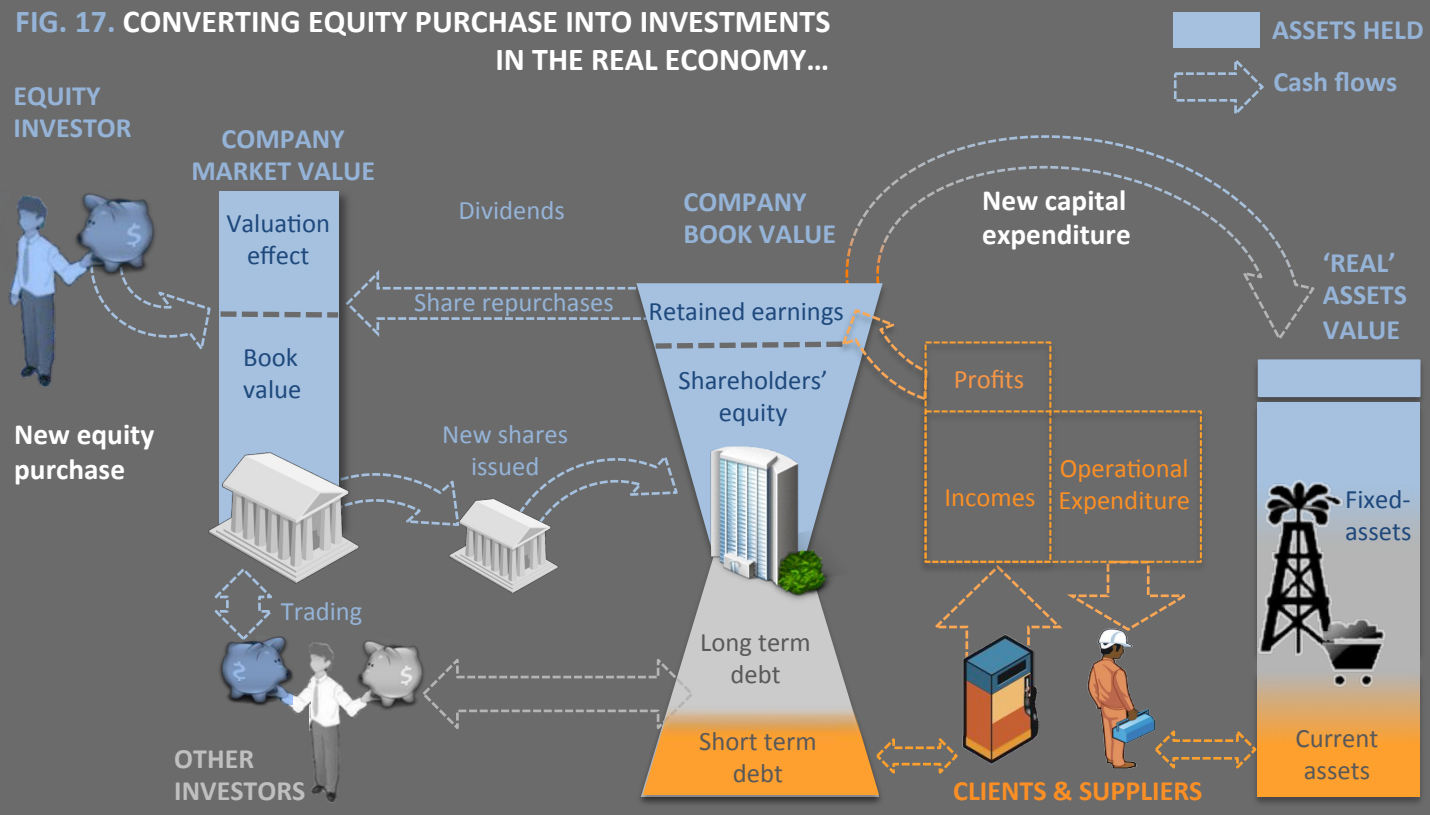
The priority of projects and listed equities by most practitioners seems to be primarily driven by the availability of primary carbon data and the clients' motivations, rather than a comprehensive review of risks and levers for change from an investor's perspective. Our analysis shows that assets analyzed not only usually represent a small share of total assets of the institution but are also not systematically the most exposed to carbon risks (e.g. equities). While there is some evolution underway, a more comprehensive approach is needed.

2.5. ALLOCATION OF EMISSIONS TO DIFFERENT TYPES OF INVESTORS

• **Equity share**. For most practitioners, financed emissions are calculated separately for each asset type (usually listed equities of projects only) and are not consolidated. In this case, most practitioners follow the GHG Protocol corporate standard's 'financial control' approach and apply the 'equity share' principle by allocating 100% of GHG emissions to the shareholder.

• **Share of investment**. The process is far more complex in the case of cross-assets methodologies. When a bank, a pension fund, or an insurer want to assess their balance sheet, it is necessary to allocate the emissions of the investees to various types of financing (equities, bonds, loans, etc.) and then to the related investors. Here, the 'proportional share of investment' principle applies, according to which 100% of the investee's emissions are allocated to equity and debt investors (based on their share of 'equity + financial debt). The current allocation rules are relatively simplistic and based on accounting principles rather than a genuine attempt to model economic effects or risk exposure. Beyond the time horizon issue (page 26), a number of other interfering factors exist (e.g. financed emissions accounting is based on the assumption that the allocation of funds to an asset will lead to new investments in the real economy, etc.). This is exemplified below for equity investments.

FIG. 17. CONVERTING EQUITY PURCHASE INTO INVESTMENTS IN THE REAL ECONOMY…



Sources: 2°ii©

Finally, all these limits call for a fine-tuning of existing allocation rules, but this will clearly come with an increase in the complexity of calculations and the amount of financial data required regarding investees. Moreover, this would probably require different rules for investors seeking to optimize their 'climate performance' and those seeking to reduce their 'risk exposure'.

2.6. ORGANIZATIONAL BOUNDARIES FOR BANKS

The accounting for banks is the most complex case. Financial institutions (especially banks) influence the allocation of capital in various ways, mot all of which are necessarily accounted on their balance sheets (cf. focus on page 30). The opportunity to consider these items has been intensively discussed during the 'scoping phase' of the GHG Protocol/ UNEP-FI work.[6] The participating banks tend to favor a reporting standard limited to on-balance sheet items, while acknowledging the key economic role of other channels and their weight in the industry revenues.

• **Practices.** To date, few practitioners (namely *Cross-Asset Footprint*, *Ecofys* and *P9XCA*) have tried to calculate the footprint of entire banks or multi-activity institutions. As far as the role of investors in financing the energy transition is concerned, our analysis calls for the integration of at least some off-balance sheet items in the inventory of the financed emissions of a bank. While the exposure is higher for on-balance sheet items in which the bank has a legal claim, at least from a risk-management perspective, some off-balance sheet items such as guarantees also carry direct financial risks. Other categories such as asset management, retailing of mutual funds, underwriting and securitization bear indirect risks related to litigation. During the subprime crisis, issuers of sub-prime backed securities and fund managers have been sued for breach of their fiduciary duties. In terms of providing a comprehensive view of performance, including off-balance sheet items in the methodology is crucial for providing an accurate account of financed emissions. A summary of the arguments in favor and against off-balance sheet accounting can be found in the table below.

• **Obstacles.** In terms of methodology, there is no specific difficulty in including off-balance sheet items beyond those already identified for complex asset types (guaranties, derivatives, etc.). The main barrier is the accessibility of financial data. Thus, 'siloism' and subcontracting of mandates usually slows down the process of in-house data reporting. The challenge is much more pronounced when the assessment is based on public reporting, where reporting on assets under management is usually limited to total amounts and at most the exposure by asset classes. The amounts related to product retailing are barely mentioned, with little detail about the underlying assets. Due to the fact that underwriting is considered a service, reporting is limited to total fees. While data is also available from financial databases, it requires significant qualitative analysis, does not cover all transactions, and is based on assumptions regarding the allocation of emissions between bookrunners and other banks.

FIG.18. INCLUDING OFF BALANCE-SHEET ITEMS? SUMMARY OF GHG PROTOCOL/UNEP-FI WORKSHOPS

PRO

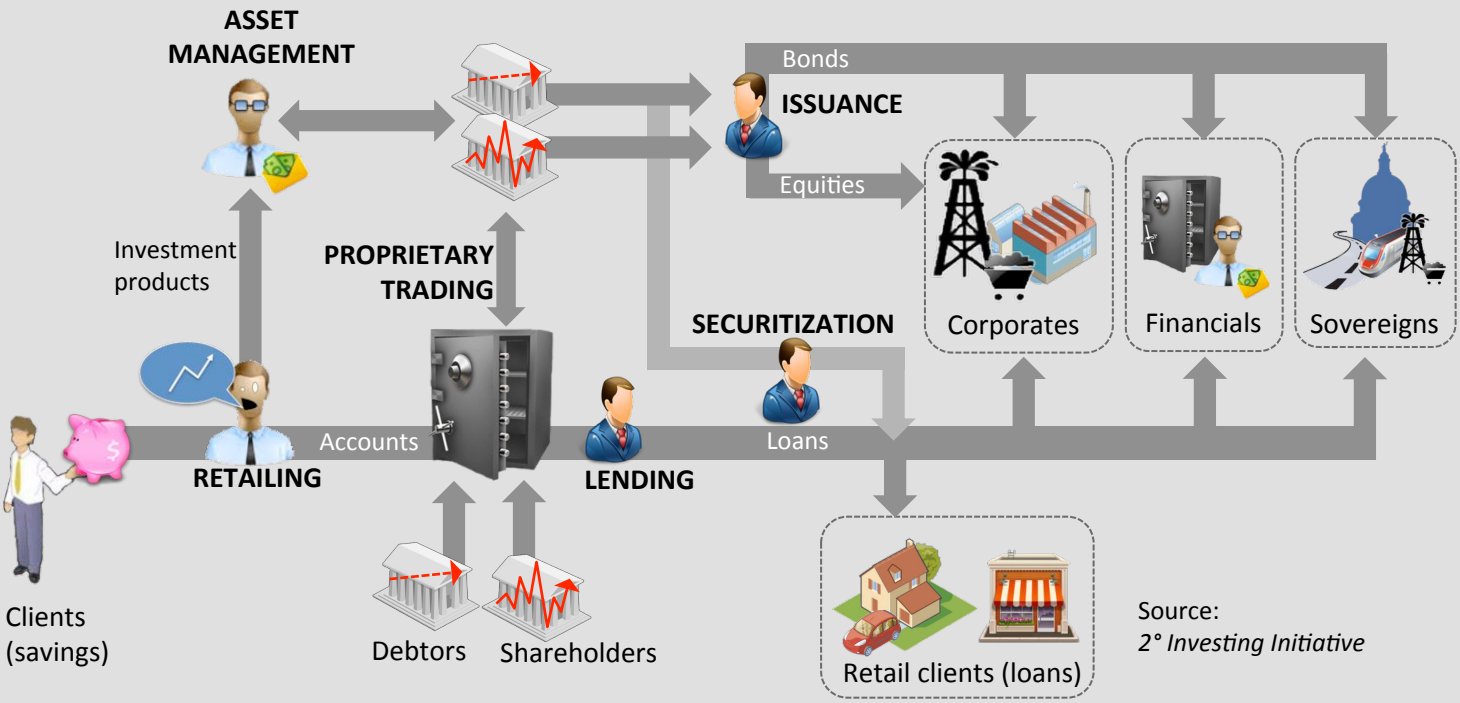
- Services such as underwriting are essential to company activities so they 'enable' the company's emissions
- Underwriting [IPO] is the point of maximum information in the market and therefore potentially the point of most influence
- Financial services can represent a large portion of a FI's revenue stream and where you are earning money you are responsible
- To change behavior in your organization you need to look at the P&L valuation
- The guidance should be as comprehensive as possible – all of a FI's activities should be covered
- GHG emissions reporting on underwriting can improve transparency in general

- They are off-balance sheet activities, so they should be accounted for by the holders of the assets instead
- In most cases, like for underwriting, the service company is not directly exposed to a financial risk
- There is no clear way to allocate a proportion of the company's emissions to the financial service provider
- If service providers have to account for the emissions from the companies to which they provide the service, then this logic should also be applied to other service providers that are equally essential to the transaction, e.g., lawyers, consultants, etc.

CON

Source: WRI/UNEP-FI

FOCUS. BOUNDARIES AND ALLOCATION RULES FOR BANKS



Source: *2° Investing Initiative*

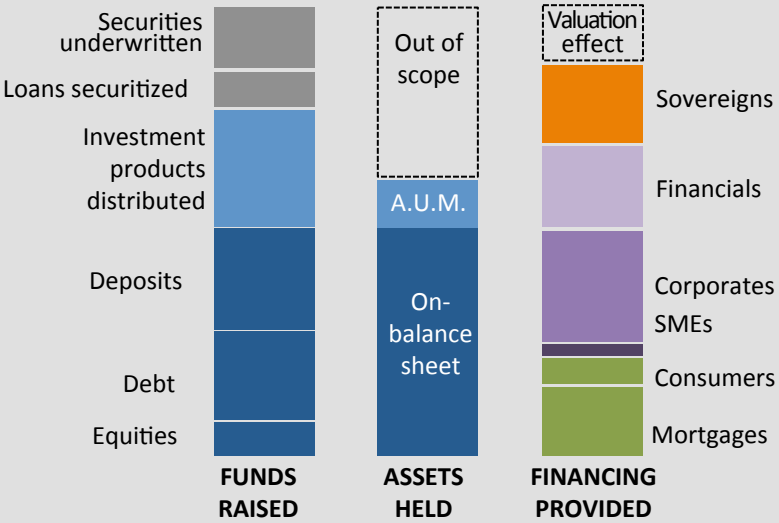
ROLE OF A BANK IN CHANNELING CAPITAL

The diagram above illustrates the role of a 'universal' bank in allocating capital across asset classes and sectors:

- Lending and proprietary trading relates to 'on-balance sheet' items for which the bank directly bears the risks, although they may also transfer it to others, particularly via securitization;
- For other activities that are not on the balance sheet, the bank plays an active role in the allocation of capital while carrying no financial risk (except in the case of capital guarantees or guaranteed yields e.g. guaranteed annuities via an insurance subsidiary).

The capacity to channel capital is not necessarily correlated with the level of risk taken by the bank. For instance, given constraints related to capital requirements, a bank may have more influence as a retailer of investment products than as a lender. The chart below provides an example of asset allocation ('on' and 'off' balance sheet) for a universal bank.

FIG.19. FINANCIAL INTERMEDIATION BY UNIVERSAL BANKS



LANDSCAPE OF ACCOUNTING STATEMENTS FOR FINANCIAL CORPORATIONS

- **Profit and loss statement**. A summary of the revenues, costs and expenses for the reporting period. Given the reporting format for financial companies and the variability in the revenues generated by different activities, it is very difficult to associate P&L items with investees or activities related to carbon emission factors. However it can help identify the relative weight of advisory services, off-balance sheet transactions and on-balance sheet investments.

- **Balance sheet**. A statement of what the firm owns and owes at a point in time (e.g. the assets held, the obligations toward its debt investors (liabilities), and the shareholders' equity). In financial corporations accounting, the list of assets generally helps identify the underlying type of investee, but retreatment is often needed. Nevertheless, the liabilities help to identify how the institution is financed.

- **Cash flow statement.** The cash received from operations (receipts and payments) and the changes in balance sheet during the reporting year: purchase and sale of assets, loan granted or received, issuance of securities, dividends paid and repurchase of equities, etc. It can be an alternative to the balance sheet for flow-based carbon accounting.

- **Basel II, Pillar III report.** A snapshot of banks' gross credit exposure by asset category, industry-group and country at balance sheet date. It can be very useful as a complement to the balance sheet, but requires retreatment.

3. DATA SOURCES

3.1. TAXONOMY OF CALCULATION APPROACHES

The taxonomy of calculation approaches refers to calculating the investee's footprint, the asset lines' financed emissions, and the portfolio's footprint.

• **Calculation of the investees' footprint.** Three methods are used to assign emissions to an investee:

1. For project finance, the banks usually calculate the footprint using life-cycle emission factors, based on a detailed analysis of the construction and planed operational inputs and outputs in volume.
2. For companies' scope 1 and 2, most practitioners use the data reported by the companies in their annual report or through the CDP. Some of them (e.g. *South Pole Carbon*, *Trucost*), perform plausibility checks and correct mistakes.
3. For scope 3 and non-reporting investees (e.g. states, households, SMEs, etc.), the emissions are estimated applying *carbon emission factors* to *activity data* reported by the investee in annual reports. Several types of emission factors are used depending on the type of activity data available:
    - CO_2 per volume of output (tons of cement, barrels of oil, coal-based kwh of electricity, etc.) or inputs (jet fuel, etc.);
    - CO_2 per $ of revenues/spending by category of industry/product. In this case, most practitioners conduct an in-depth analysis of the activities for each investee and assign several categories to an organization. Others only rely on the industry group assignment.

A closer look shows that several providers actually merge various approaches in order to fill gaps and/or extend the spectrum to non-reporting investees.

• **Calculation of the asset lines' financed emissions.** The footprint of the investee should be converted to financed emissions per $ of asset held by the investor. While the application of the "equity share approach" does not require much data on the companies liabilities, since 100% of emissions are allocated to equity investors, the situation is more complex when the "share of investment" (equity + financial debt) approach is applied. For securities held for trading, it requires additional data on the liabilities of the investee and the market price of its shares and bonds, since the value accounted on the investor's books (assets) does not match with the value recognized on the investee's books (liabilities).

• **Calculation of the portfolio's footprint.** To consolidate the emissions of a portfolio, there are two approaches:

The *'bottom up' approach*, aligned with traditional carbon accounting, is based on the consolidation of reported' emissions, calculated or estimated for each investee financed. In practice, investors face three cases:

1. Some assets types are associated with ID codes matching with datasets of pre-calculated financed emissions (e.g. listed equities). In this case bulk processing is possible for thousands of lines (e.g. *South Pole Carbon*, *Trucost*, *CAF*);
2. Other asset types (e.g. corporate loans and bonds) enjoy a dataset but no standardized ID code, necessitating manual matching;
3. Datasets of pre-calculated financed emissions do not cover all assets (e.g. private equities, loans to SMEs). The calculation should thus be performed by the investor based on the activity data available on the individual investee. Practitioners usually provide online calculation tools to exploit their model (e.g. *South Pole Carbon*, *CAF*).

The *'top down' approach* speeds up the process when there are many lines (e.g. loans to SMEs and households) and fills the gaps where a long investment chain hinders the tracking of the final destination of some asset lines (e.g. shares in mutual funds). The approach relies on specific 'secondary' emission factors (by $ of asset) directly applied to the outstanding amount held by the investor. Emissions factors usually match the categories reported in banks information systems e.g. industry groups for companies, countries for sovereign bonds, and country-specific subcategories for mortgages/consumer loans. This approach is applied by *Cross-Asset Footprint (AFD)*, *P9XCA (Credit Agricole)* and *Ecofys* (ASN Bank).

3.2. SOURCES OF CARBON AND ACTIVITY DATA

A range of different sources is available for calculating carbon information per investee and asset line.

• **GHG reporting (scope 1 + 2).** Practitioners mainly rely on corporate reporting for data on listed equities. Annual carbon emissions for scope 1 & 2 are disclosed in annual reports and via the CDP (cf. page 23). For non-reporting companies, and to cover scope 3 emissions, low reporting levels requires filling the gaps with estimates based on models. The same applies to other asset types (states, mortgages, etc.). The only exception identified is the Netherlands, where public reporting of municipalities and private companies is widely developed.

• **Life-Cycle emission factors (all scopes).** Life-Cycle Analysis (LCA) provides emission factors per unit of output for each stage of the life-cycle and therefore each scope (i.e. 1,2, supply chain and sold products). Carbon data exist for virtually every type of raw material (e.g. barrels of oil, tons of cement) and manufactured product (e.g. car, appliances). Several carbon-intensive industries report in a compatible format (e.g. oil & gas, coal mining, car manufacturers, etc.) but not necessarily in a standardized format: analysts need to be careful when processing the data to allow comparability.

• **EEIO models (scopes 1 + 2 + 3 upstream).** Environmentally-Extended Input/Output (EEIO) models quantify the economic exchanges between industries in a national economy in order to calculate the carbon *emissions per $ of revenue* for each industry or product category. These emission factors include cradle-to-gate emissions (scope 1, 2 and 3 upstream), but exclude the use of sold products. The application of these emission factors requires an analysis of the investee's activity. Listed companies are not legally required to report the breakdown of their sales by product category or activity, and practices in this area are not standardized. To match the companies activity data with the categories of their EEIO models, most practitioners perform in-house segmentation analysis. This approach is mostly applied to companies' sales, but some practitioners also apply it to governmental and households expenditures (for sovereign bonds and consumption loans).

• **Regression models (scope 1 +2)** are an alternative to the use of EEIO. The core principle is based on an identification of the correlations between the carbon footprint reported by companies (on scope 1+2) and their activity data, in each industry-group. These models allow practitioners (*BofA ML* and *South Pole Carbon*) to develop specific emission factors applicable to companies' revenues or other activity data.

• **Industry-average and macro-sector factors.** The activity data for other types of investees (e.g. states, small-caps and private companies, mortgages, etc.) is generally limited to the outstanding assets held by investors and the assignment to an industry-group (e.g. food manufacturing) or macro-sector (e.g. mortgages in the UK). Some practitioners therefore developed specific emission factors (per $ of asset held) based either on national accounts and GHG inventories (*P9XCA*, *Ecofys*) or industry-average from their dataset (e.g. *CAF*, *South Pole Carbon*, *Trucost*).

• **The case of financial institutions.** Most methodologies and datasets are primarily designed for non-financial companies even if financial institutions (banks, insurers, mutual funds) represent a major part of global financial markets. Paradoxically, most calculation methodologies do not assign 'financed emissions' to financial institutions resulting in measured emissions about 700 times lower than the scope 3 footprint calculated for portfolios holding similar financial assets. The reason mostly lies in the lack of reporting on relevant activity data: most financial institutions only report their exposure by asset-class (e.g. equity, fixed-income). Three practitioners have tried to overcome this obstacle relying either on internal information (*P9XCA*, *CAF*), exposure by industry-group disclosed by a few banks[7] - compliance with Pillar III of Basel II (*CAF*) and transactions and holdings listed by Bloomberg (*Profundo*).

• **Data available on forward looking and historical items.** Most methodologies are based on annual emissions. However, our analysis shows that it is worth including 'locked-in' emissions from both a risk and performance perspective, as well as the cumulated past emissions to assess climate litigation risks. In these cases, the assessment should obviously entirely rely on the application of emission factors to the relevant activity data (e.g. historical data, data on physical assets, and capital R&D expenditure data). To date, attempts to estimates future emissions are limited to the energy (oil, gas and coal) and power sectors (*Carbon Tracker*, *Profundo*).

• **Beyond carbon emissions.** Some providers look at other negative impacts (e.g. toxic waste, etc.). Data for this approach is partly available (e.g. the US EEIO model includes about a 30 different outputs, although other models generally are much more limited). Among 'financed emissions' data providers reviewed, only *Trucost* integrates most outputs available in the US EEIO model. Accounting for broader externalities allows for a more comprehensive estimating of annual social costs of economic activity associated with a company (cf. page 14)

4. PRACTICAL ISSUES

4.1. LEVEL OF UNCERTAINTIES

• **The need for precision** depends on the way the information is used to inform investment decisions. To inform stock-picking and client selection, the level of precision is crucial in industries with low dispersion between companies. Stock-picking based on carbon data appears to make sense only in industries facing a challenge related to carbon intensity: improving their contribution to the energy transition or managing policy risk (see page 36). At portfolio level, precision for categories with low carbon intensity will not significantly affect the whole picture. It is indeed important to focus on sectors with high carbon intensity. In addition, policy makers and economists may want to calculate the order of magnitude of financed emissions in order to compare the climate impact of the whole financial sector with that of other sectors. Here, any systematic deviation of the underlying model will be key insofar as absolute numbers are concerned (global emissions vs. ranking).

• **The level of uncertainty** of a footprint calculation depends on four factors:
- The systematic deviation of the underlying models and emission factors used for individual calculation (in the case of EEIO models for instance);
- The non-systematic errors in reporting and consolidation;
- The uncertainties introduced when average data are used as proxies;
- The positive averaging effect related to the diversification of portfolios.

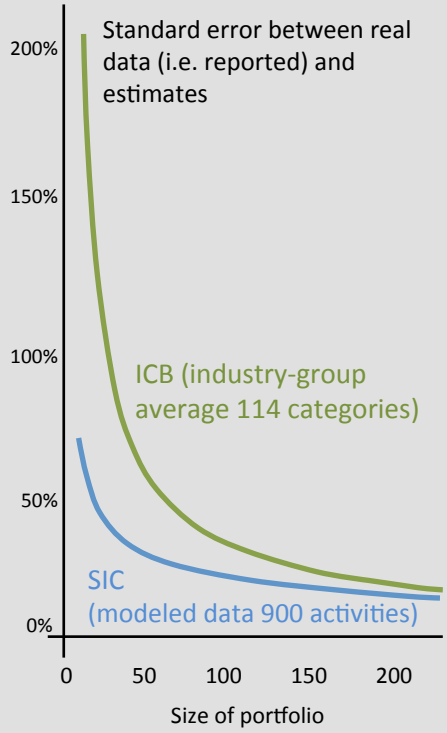
To date, no practitioner has comprehensively assessed the overall level of uncertainty associated with the data they provide. The best practices include:
- Providing 'trust metrics' based on consistency tests for reported data;
- The calculation of the standard deviation of modeled data vis-à-vis reported data to evaluate the uncertainty introduced by modeling;
- In addition several practitioners use various techniques to reduce uncertainties and 'calibrate' their model.

• **The use of industry-average emission factors** in place of real company data can be relevant for items in categories with low carbon intensity and/or low dispersion, but can be strongly misleading if applied in industries with both high carbon intensity and high dispersion (e.g. power sector).

• **'Best-in-class' selection should be limited to some industries** for which the precision of models appears to be sufficient, notably in some carbon-intensive industries like oil & gas, power and car manufacturers. Given the difference in carbon intensity between industries (1:900), financed emissions are relevant for best-in-universe approaches and industry allocation.

• **The averaging effect at portfolio level** makes footprinting assessment rather precise and relevant for large diversified equity portfolios and multi-assets portfolios. Indeed, the standard deviation of a typical bank's footprint, or multi-asset balanced portfolio, is estimated to be below the uncertainty for large equity portfolios (based on a mix of best-practices), given the low carbon intensity of non-corporate assets.

FIG.20. UNCERTAINTY OF ESTIMATES USING INDUSTRY-GROUP AVERAGE DATA AND MODELED DATA (scope 1+2)
Source: BofAML



UNCERTAINTIES FOR LARGE PORTFOLIOS

Despite the high variability of firms emission profiles, the carbon footprint of portfolio can be estimated in the absence of real data. Above 200 lines, assessments of diversified equity portfolios based on estimated scope 1+2 data show a rather small (<20%, and down to 10% for 500 lines) deviation compared with reported data, whatever the approach (EEIO models, regression models or even fine sub-industry-group average data). This is in line with uncertainties for standard non-financial companies or product footprinting. Assuming a level of carbon disclosure of 50% for a 200-line portfolio, this deviation decreases to about 8-10% for certain models, and to below 5% above 500 lines.

WHAT IF FINANCED EMISSIONS REPORTING BECOMES MANDATORY?

Financed emissions calculations are a capital-intensive activity: R&D expenditure and fixed costs are very high for a niche market. On the contrary, variable costs are limited to client relationship management and quality-checks.

Data providers will be able to smooth out R&D and fixed costs and thus cut the prices by a factor of 2-3, or more, in addition to realizing sharp improvements in data quality and accuracy of methodologies. Over time, basic financial database packages will integrate financed emission data.

CONFIDENTIALITY

Accessing the components of investment portfolios and balance sheets in financial institutions requires a high level of clearance. For most practices reviewed, this issue is managed via confidentiality agreements between the clients and the data provider. Besides, the development of assessment software and apps embedded in financial data terminals allows investors to assess their portfolio while keeping the components confidential.

As far as public reporting is concerned, the disclosure of financed emissions, even with a high level of details regarding the breakdown by industry-group and asset type, does not significantly reveal information that is not already available in financial databases, annual reports and market studies. If applied to extended scopes with advanced methodologies, they might however shed light on some controversial facts e.g. the heavy weight of derivatives and the weakness of SME outstanding loans in banks balance sheets, or the short term investment horizons of long-term investors.

4.2. FREQUENCY OF UPDATES

For equity managers, the frequency of updates is a key concern. Regression models are updated on a yearly basis, based on reported data. EEIO models are usually updated every 5 to 10 years by statistics departments, but they are adjusted every year by the data providers to reflect evolutions in price levels. Life-cycle data share similar update frequencies. For reported emissions and activity data, the company usually reports the results for the previous year between March and May. The data are then analyzed until October and sometimes until March (N+1). Finally, the asset managers apply these data to assess their portfolio usually at closure date (31/12/N +1).Ultimately, the information provided to the final investor is one to three years old.[8]

At first sight, the usage of 'vintage' data might appear as a major obstacle to professionals accustomed to tracking the weekly or daily performance of their portfolio. However the picture is actually more balanced. From a final user perspective, the annual financed emissions indicators are used in most cases as a proxy of either carbon risk or performance (cf. page 36). Both risks and performance are actually connected to future and/or past emissions rather than annual emissions, reducing the need for current data.

4.3. COST

- **Cost of R&D.** Based on the experience of practitioners, the cost of R&D ranges from $50,000 to $M1+ for developing a full framework (method, model, dataset and tool). In the past, it has usually been co-financed by the client and the data provider or consultant. Despite the current limited size of the market for financed emissions data, the collaboration between practitioners has been limited to date, even if informal cross-fertilization has taken place. This suggests practitioners to date have not profited from scale economies.

- **Fixed-costs for data providers.** Unlike carbon footprinting for non-financial sectors, providing financed emissions data involves significant annual operational expenditures to ensure the access to financial databases We estimate the annual costs between $50,000 for a basic coverage of listed equities and $300,000 for offering detailed assessment on a cross-assets basis. The annual cost of carbon data in this number is negligible. Depending on the framework, the workload required to quality-check carbon data and/or analyze activity data ranges from zero to several hours per company.

- **Cost for users.** In the GHG Protocol/UNEP-FI survey, potential users identify cost as a major barrier to developing financed emissions methodologies. Our analysis shows that while costs for R&D and data may be significant, scale economies, bulk data processing, and the use of sector-average factors for low-carbon intensity segments of the portfolios can keep the total cost for investors relatively low. For a financial institution, the cost of fully assessing its financed emissions (balance sheet, asset under management, and sold investment products) using a mix of techniques can range from $6,000 to $200,000 per year, depending on the level of uncertainties and scope of reporting. The time required for portfolio assessment very much depends on the approach used and the availability of a calculation tool. Our analysis shows that the combination of bulk data processing in a bottom-up approach and the application of industry-average factors in a top-down way allow financial institutions to adjust the cost to the level of uncertainty required to inform investment decisions.

PART III. TOWARD 2° INVESTING

KEY MESSAGES

- **Overall, 'financed emissions' data are used to communicate on consolidated emissions at portfolio level and to optimize carbon-intensity based on a best-in-class approach.** However, we did not identify investors using all levers to optimize carbon-intensity thus failing to exploit the full potential of financed emissions metrics. The main reason is the willingness to fit in traditional investment processes (notably the use of benchmarks), but there are also technical difficulties in situating relevant performance and targets at portfolio level.

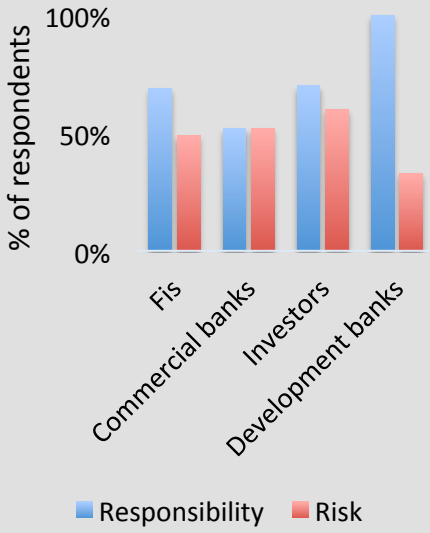
- **Current methodologies are limited in allowing investors to optimize their carbon footprint in a meaningful way and are not robust enough to inform risk management.** To improve the measurement of climate performance, research is needed to define a denominator and benchmarks reflecting the industry and energy-technology weighting in the long-term investment needs of the real economy. At the same time, the materiality of carbon-risk in existing risk assessment frameworks is too weak to forecast a rise in demand in the short term. If new metrics do develop, we believe that policy makers are more likely to prioritize carbon performance, which is both less costly to evaluate and more material to public policy goals.

- **The success of new methodologies will hinge on their ability to benchmark portfolios relative to 2° investment road maps.** A range of 2° investment road maps already exist, the most prominent published by the International Energy Agency. The research program of the 2° Investing Initiative aims at developing a methodology to assess the contribution of investors toward financing the energy transition and long-term. This research program expects to situate itself in a broader research push by practitioners and other institutions.

- **Parallel to the research push, governments should act now to support the drive towards improving accounting and reporting standards and incentivizing transparency.** This report recommends the following measures:
  - Finance the development of methodologies and test them on a large scale e.g. via public banks;
  - Immediately improve mandatory disclosure by the private sector;
  - Introduce mandatory disclosure for the financial sector to create reporting channels and boost innovation from data, indices, and services providers;
  - Plan the introduction of incentives based on 2°/long-term investing metrics, notably regarding tax incentives on savings interests, which is one of the main drivers of asset allocation by private investors.

1. SETTING PERFORMANCE INDICATORS

FIG.21. WHY MEASURE FINANCED EMISSIONS?



Source: *GHG Protocol/UNEP-FI*

CARBON-TILTED INVESTMENT PRODUCTS INDICES

UNEP-FI listed the 18 most important carbon-tilted investment products and indices in place today. These products generally track mainstream and thus carbon-intensive benchmarks (e.g. DJ Stoxx 600, FTSE UK 350, etc.) and are associated with large financial institutions. 4 out of the 18 identified products or indices have a specific carbon footprinting target relative to the respective benchmark.

An example is NYSE Euronext 'Low Carbon 100 Europe Index', whose target is a carbon footprint 42% lower than the benchmark (FTSEurofirst 300 Index). LGIM's 'UK Carbon Optimised Index Fund' tracking FTSE All-Share has a target of 20% lower carbon footprint than the benchmark.

Source: UNEP-Fi[1]

1.1. STATUS QUO: CARBON INTENSITY PER $ AS A PROXY

How does carbon data inform investment decisions?

To date, the objectives followed by investors when using 'financed emissions' are more or less in line with those of SRI investors when they use ESG criteria. On paper, they are used as a proxy to assess either their exposure to financial risks correlated with carbon intensity (a.k.a. carbon risk – cf. page 12 and 37) or their contribution to financing the transition to a low-carbon economy (a.k.a. climate performance and responsibility – cf. page 9 and 39). But in practice, as outlined below, the way 'financed emissions' are used is not always consistent with the objective.

- **Investment research.** Equity research analysts (sell side or buy side) use carbon intensity data to adjust their ESG rating or the valuation of the company (DCF) - cf. page 38 for examples.

- **Selection**. The selection of the less carbon-intensive companies within their industry-group, while keeping the industry-group weighting in line with the benchmark index seems to be the main way 'financed emissions' are directly used by 'low-carbon' equity funds managers and indices providers (Cf. box on the left).

- **Industry-group allocation**. A small minority of SRI investors underweights carbon-intensive industry-groups thus diverging significantly from benchmark indices (e.g. Mirova – an investment division of Natixis AM). These approaches are today still largely limited to oil & gas extraction and coal mining, thus not requiring financed emission data.

- **Strategic asset allocation.** We have identified very few investors using carbon data (among other data), to adjust asset-class weighting. Such cases are usually limited to pilot tests (e.g. Mercer[2] and FRR[3], Cf. Fig.22).

- **Ranking of equity funds and savings products**. Several rankings have been published in the UK, US, Australia, and France. The UK, US, and Australian rankings by *Trucost* have largely focused on equity funds.[4] The German[5] and French[6] rating by *Inrate* in turn focuses on savings funds. Online brokers like BNP Paribas' subsidiary Cortal Consors (France, Germany) also use footprinting to provide additional criteria to their clients for funds selection[7].

- **Banks footprints**. Finally, several NGOs published bank rankings to inform clients' choice for current and savings accounts (cf. page17).

Overall, 'financed emissions' data are used in two ways:
- To communicate on consolidated emissions at portfolio level;
- To optimize carbon-intensity based on a best-in-class approach with carbon data acting as a complement or substitute to ESG ratings.

However, we did not identify investors using all levers available to optimize carbon-intensity thus failing to exploit the full potential of financed emissions metrics. The main reason is the willingness to fit in traditional investment processes (notably the use of benchmarks), but there are also technical difficulties in situating relevant performance and targets at portfolio level. This issue will be treated in the following chapter.

1.2. MOVING TOWARDS MANAGING CARBON RISK

This section explore the potential of financed emissions to be used as a basis for the development of carbon risk indicators that can fit in current and future risk assessment frameworks. As highlighted on page 8, from a business perspective carbon risk assessment is only relevant for banks and long-term investors with buy and hold strategies. As far as regulation is concerned, it would require the introduction of long-term stress tests to cover point-in-time risks at company or financial institution level (Cf. page 44). These stress tests might be useful for regulators in order to monitor systemic risks. In each case, we assume that it would make sense to assess the full spectrum of carbon risks.

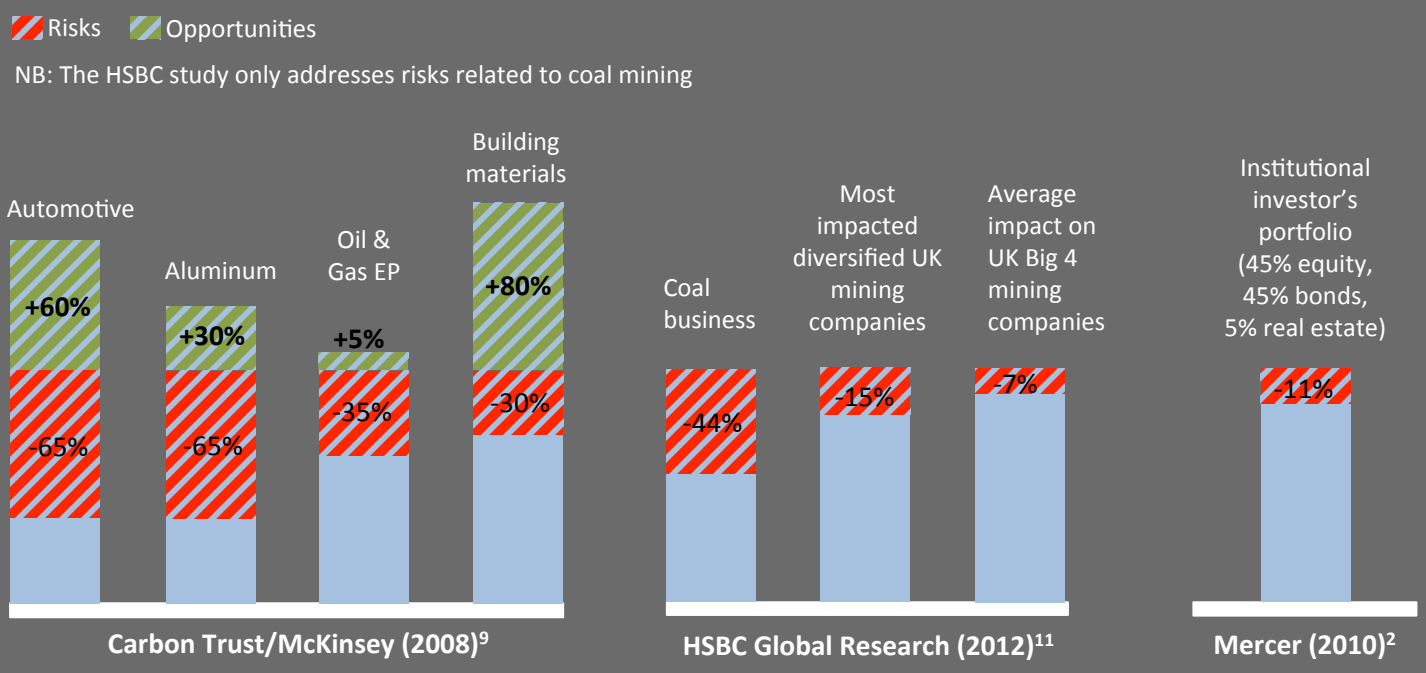
• **The case of non-financial organizations.** The best practices are based on a stress test of specific scenarios for a specific industry conducted on an ad hoc basis (Cf. fig 22). They have in most cases been computed by equity research teams[7] (e.g. Cheuvreux, HSBC), credit-rating agencies (S&P) or strategic advisors (McKinsey)[8] based on a modification of their existing DCF model. They only cover non-financial companies in risky industries (e.g. power, coal, tar sands, etc.). The scenario is usually based on the increase in the price of carbon and more recently on a sharp drop in the demand for fossil-fuels based on the IEA 2°scenario. We did not identify scenarios based on litigation.

As illustrated in Fig.23, to assess the carbon risk exposure of a company, the data required are:

- The GHG emissions, covering for certain industries the sold products emissions (scope 3), as well as the past and locked-in emissions. On these items, carbon data are inexistent and activity data reporting is minimum (cf. page 32)
- A dozen of other activity parameters affecting the exposure and resilience to policies and litigation risks (cf. figure 23). Reporting on these items is also minimal and not standardized. The assessment therefore requires an in-depth analysis of each company.

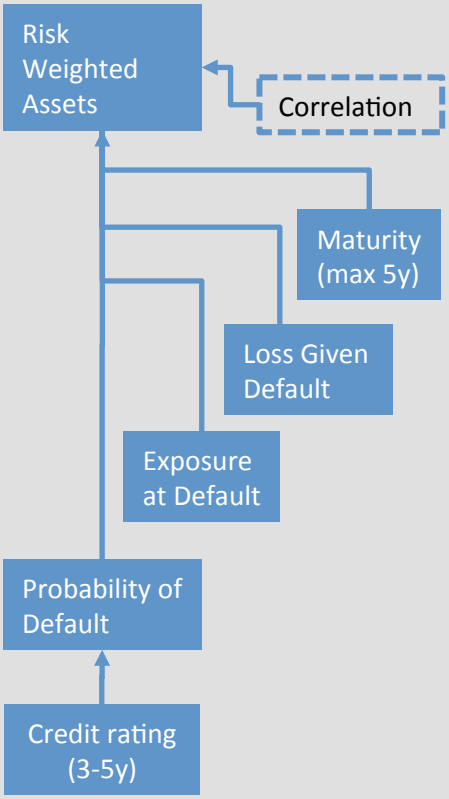
To date this analysis is possible for reporting organizations themselves, or in the best case mainstream analysts who know the company, the industry, have a good access to their top management and run a DCF model on a regular basis.

FIG.22. IMPACT OF A 2° SCENARIO ON ASSETS VALUE



In order to assess the (positive/negative) impact of a climate scenario for a company, it is possible to model the effect of several parameters such as prices of direct or induced GHG emissions on its discounted cash flows (DCF) through the related costs, revenues, and competitive differentials. These approaches have been pilot-tested by brokerage houses and analysts on climate-sensitive industries. Three different examples of such analyses are displayed above.

FIG.23. FROM CARBON INTENSITY TO CREDIT RISK EXPOSURE

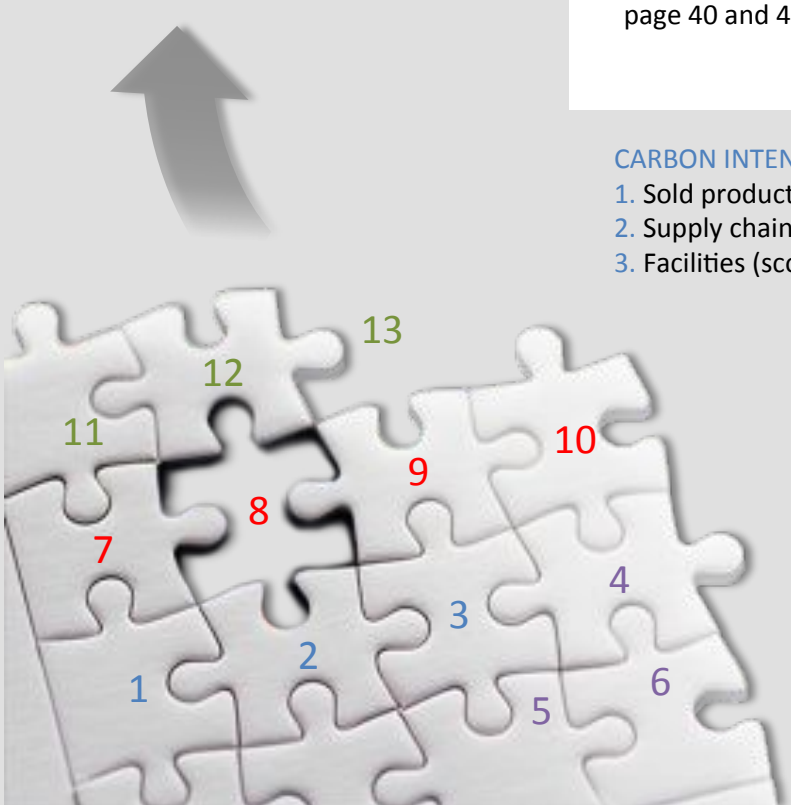


- **The case of financial organizations and diversified portfolios.**

At portfolio level, most quantitative approaches are based on a price set on consolidated financed emissions and do not distinguish the type of regulatory or litigation risks they face. Usually, the same approach is applied whatever the maturity of credit and the turnover of trading portfolios.

This approach relies on the basic hypothesis that managing carbon is a sign of good management in general. This notion is best summarized by the 'carbon efficiency hypothesis', which postulates that increasing carbon efficiency reduces operating costs, helps drive lean business and encourages innovation.[10] Given that increasing carbon efficiency may be challenging, 'success' is said to bespeak good management. However the materiality of such a criteria is limited for mainstream investors, who look for more concrete evidence. In this respect, one of the key weaknesses of reporting consolidated financed emissions is reflected in the results of the GHG Protocol/UNEP-Fi London workshop, which suggest that once data at the investee-level is aggregated into data at the portfolio level, it loses its ability to inform risk assessment. This is because carbon risk is a function of both carbon emissions (or carbon emissions intensity) and carbon regulation (carbon price, etc.) in the places where the emissions occur. Figure 23 highlights the puzzle that is moving from carbon intensity to carbon risk exposure and the current methodological gap

- **Next steps.** The current approach for portfolios is useful in order to raise awareness but not robust enough to inform risk management. We only identify a few alternative approaches for multi-assets portfolios (cf. Fig. 23), which are based on asset-classes scoring[2], rather than financed emissions (Cf. Fig 22). As a consequence, we believe that carbon-risk assessment will not be the sole purpose of investors' accounting and reporting of their consolidated financed emissions, at least in the short and medium term since practitioners face a number of technical challenges to turn them into meaningful risk exposure indicators. Besides, the materiality of carbon-risk in existing risk assessment frameworks is too weak to forecast a rise in demand in the short term. If they become a driving force for 'advanced financed emissions' reporting, we believe that policy makers are more likely to prioritize carbon performance, which is both less costly to evaluate and more material to public policy goals (Cf. page 40 and 44).



CARBON INTENSITY OF ACTIVITIES
1. Sold products (scope 3)
2. Supply chain (scope 3)
3. Facilities (scope 1 and 2)

TIME DIMENSIONS OF CARBON RISK
4. Past emissions (litigation)
5. Annual emissions (carbon price)
6. Locked-in emissions (impairment)

EXPOSURE TO REGULATION AND LITIGATION
7. Sales geographic exposure
8. Supply-chain geographic exposure
9. Facilities geographic exposure
10. Critical size to be an interesting target for litigation

CAPACITY TO ADAPT TO NEW POLICIES
11. Cash available for acquisitions, R&D and face liabilities
12. Ability to relocate facilities and supplies
13. Cost pass through capacity

1.3. MOVING TOWARDS MANAGING CARBON PERFORMANCE

This section analyzes the possibility to use financed emissions data to build a carbon performance indicator(s). For the purpose of this report, we define an investor's 'carbon performance' as its contribution, positive or negative, to financing the transition to a low-carbon economy, in line with 2° scenarios (see page 9). This definition is focused on mitigation rather than adaptation.

We assume that the purpose of indicators at portfolio level is to manage the performance of the portfolio and report results in order to inform clients' and investors' choices and benefit from potential tax incentives. Consequently, performance indicators should allow users to:

- Benchmark diversified portfolios;
- Set performance targets for inclusion in mandates and bonus schemes;
- Optimize the carbon footprint while continuing to finance the economy;
- Link performance with climate policy goals (2° scenarios).

To be effective, these indicators should fit in investment processes:

- They are useful when investors use metrics to weight portfolios with a top-down approach: creation of benchmarks, definition of mandates, strategic asset allocation, setting of sector exposure for loan books, etc.;
- They need to be used hand-in-hand with standard metrics such as liquidity, risk exposure and management cost in order to optimize climate performance without compromising financial performance.

• **Defining a relevant denominator.** To date most performance indicators based on 'financed emissions' measure the carbon intensity per $. The most common indicators are expressed:

- per $ of investee turnover, and sometimes per EBITDA for equity portfolios;
- per $ of asset held by the investor for equity and multi-assets portfolios.

On paper, financed emissions data offer the possibility to inform industry weighting and strategic asset allocation. To a certain extent NGOs, retail banks and online brokers who compare the carbon intensity of funds and banks use the data this way. However, current indicators based on carbon intensity per $ of asset or turnover are just a proxy for climate performance. Their use as a genuine performance indicator is limited by two factors:

- The biases related to price levels and capital intensity;
- The denominator in $ that does not measure the economic contribution.

• **Best-in-class.** Carbon intensity per $ can be misleading for certain industries (cf. page 27). For instance a gas-guzzling sport car manufacturer like Porsche has a lower than average carbon intensity per $ of sales due to its luxury positioning. In those cases, fund managers use industry-specific indicators to inform best-in-class selection: carbon emissions per kWh of electricity (utilities), per km (automotive manufacturing), per barrel (oil), per ton of cement, etc. However this option is limited to a short list of industry-groups (cf. page 32) that do report on sales in volume.

• **Allocation**. At portfolio level, the carbon intensity per $ cannot distinguish a 'low-carbon' portfolio built with non-industrial assets (software, service sector, etc.) which has no significant impact - positive or negative - on the energy transition, and another portfolio composed of low carbon part-of-the-solution industries, such as renewables or green housing. In practice, this obstacle does not significantly bias the comparison between equity funds or banks, since the exposure of stock indices and large banks to these

THE CLIMATE-UNFRIENDLY BIAS OF STOCK INDICES

The sector allocation of standard stock indices do not reflect the sector exposure of the real economy. The main criteria for the selection of components is capitalization and free-float. That leads to an over-weighting of established players and the exclusion of new comers from the investment universe. The consequence is a high exposure to fossil industries (10-15%) and a very low exposure to clean technologies (<2%) compared to both investment targets of climate scenarios and the trends of the real economy.

TRACKING CARBON PERFORMANCE

• **ASN Bank** has the objective to balance avoided and financed emissions (estimated with Ecofys methodology) by 2030 in order to reach carbon neutrality.

• The **AFD** Group has pledged to reach a level of 50% of its activity in developing countries providing climate co-benefit (in terms of mitigation or adaptation) and a level of 30% for its private sector arm Proparco.

• Since 2010, **Royal Bank of Scotland** (RBS) is tracking the share of its energy lending to the oil & gas and power sectors, and the share of structured finance dedicated to renewables. Based on data from Trucost, RBS estimates the carbon intensity of its clients in the energy sector.

• **Bank of America** is tracking and reporting GHG emissions of its U.S. power utility loan portfolio, working with the World Resources Institute (WRI). Bank of America recently reported in its 2012 CSR report a 22.5% decrease of emissions (in tons of CO_2 per MWh) from 2004 to 2011.

part-of-the-solution industries is usually not significant (Cf. box). However it is a major obstacle for the use of financed emissions in optimization processes. In other words, financed emissions can inform divestment decisions but not reinvestment decisions (Cf. page 11).

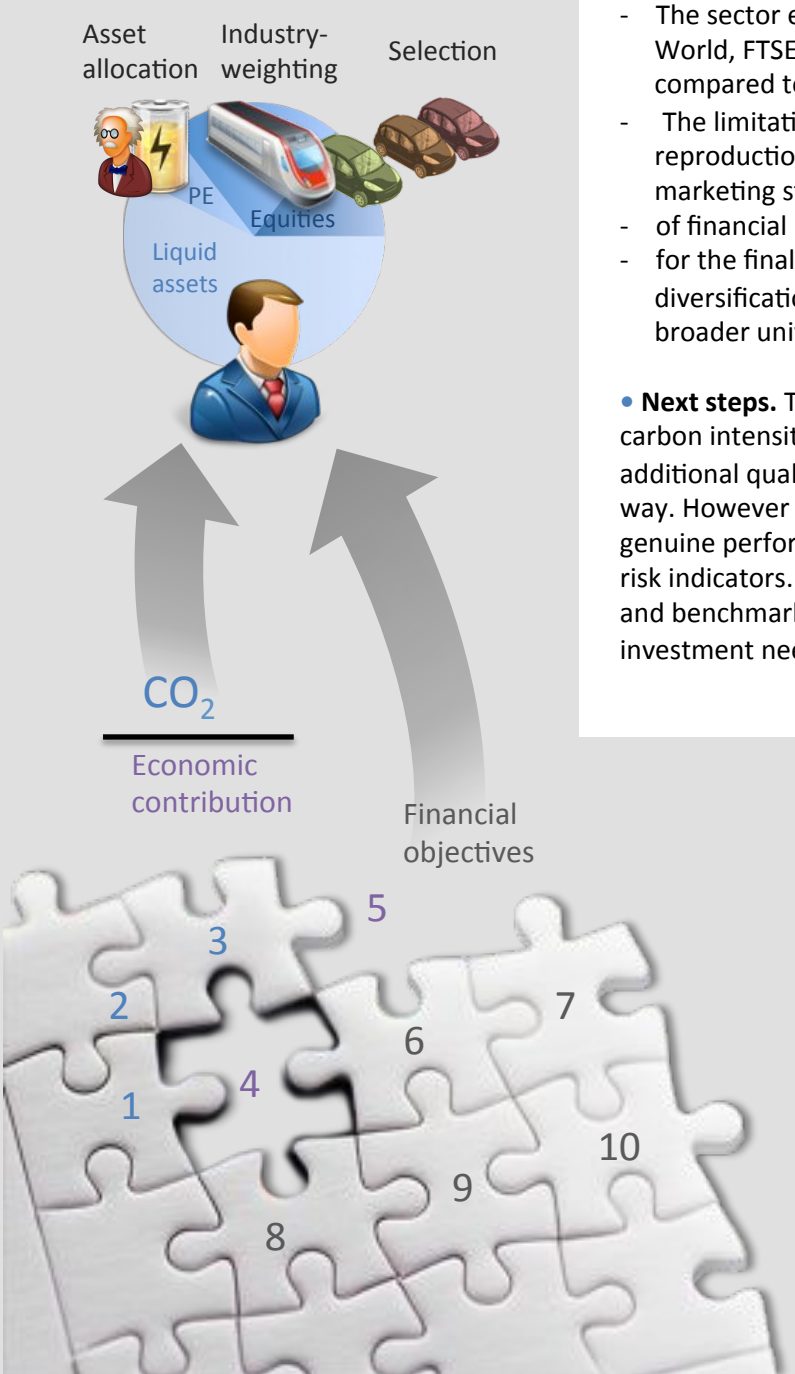
• **Net emissions.** To overcome this obstacle, various banks track the 'net emissions' calculated at project level by comparing the project footprint (e.g. for a wind farm) with the footprint of baseline scenario (e.g. a coal-fired power). In this case, they use the country-specific fuel mix of electricity as a baseline scenario. Some of them have extended this approach to energy efficiency investments, in this case the net emissions equal the additional emissions related to the extension of capacity or lifetime (e.g. retrofitting of a plant). However the potential of this approach is limited: when the investment includes several industries and countries, the concept of baseline scenario is not meaningful or at least difficult to establish.

• **Selecting the appropriate benchmark.** Most managers using financed emissions data benchmark their fund against a stock index to assess the 'emission reductions' or their portfolio. Doing so they use the index as a 'baseline scenario'. Our analysis shows that this approach is at the very least questionable, if not misleading, for two reasons:

- The sector exposure of most stock-indices used as benchmarks (MSCI World, FTSE, DJ, Stoxx, S&P, etc.) is strongly biased toward fossil fuels compared to the real economy;[12]
- The limitation of the investment universe to large caps and the reproduction of the benchmark's industry exposure has its origin in marketing strategies, remuneration schemes and governance structures
- of financial institutions.[13] It is almost never an absolute constraint
- for the final investor. Targets in terms of risk-adjusted returns, liquidity, diversification and control of management fees can be achieved with a broader universe.

• **Next steps.** The current state of methodologies allows investors to use carbon intensity as a proxy for climate performance, but it requires additional qualitative analysis to optimize the footprint in a meaningful way. However the gap between the current state of methodologies and genuine performance indicators is limited compared to the situation for risk indicators. To go further, research is needed to define a denominator and benchmarks reflecting the industry weighting in the long term investment needs of the real economy.

FIG.24. FROM CARBON INTENSITY TO 2° INVESTING PERFORMANCE



CARBON INTENSITY OF ACTIVITIES
1. Locked-in emissions of assets
2. Future emissions of capital expenditure
3. Potential impact of R&D expenditures

ECONOMIC CONTRIBUTION
4. Contribution to financing long term investment needs
5. Strategic role of capital vs other factors

FINANCIAL PROFILE
6. Expected returns
7. Credit and market risk
8. Diversification of exposure
9. Liquidity
10. Cost of asset management fees

2.1. NEXT STEP: CARBON ACCOUNTING STANDARD

Managing carbon risk or performance leads to different types of indicators and thus different reporting formats for financial institutions. To date, the priorities of the various standard organizations in terms of users and roles in the investment processes are not clearly set. The objectives seem to oscillate between the harmonization of the current practices (GHG Protocol/UNEP-FI), the creation of a new methodology (VFU) and the endorsement of an existing one as a national standard (ORSE).

• **Technical stakes and options.** As far as financed emissions are concerned, the standard organizations will have several options. If they choose to cover a large scope while ensuring comparability, they will need to 'get their hands dirty' by providing guidance regarding: the calculation of emission factors for each type of investee and each industry, the construction or the use of the underlying models, the use of financial data, the conversion of securities market value, etc. Based on the content of existing models, methods and databases and our understanding of the landscape, this task will be far more costly than what is currently budgeted by standard organizations. In the current landscape it should therefore rely on a - voluntary or not, free or not - transfer of knowledge from data providers. Therefore, the current standardization processes are likely to be more guidelines than comprehensive frameworks and will probably continue to use $ as a proxy for economic activity.

• **Financial and business stakes.** The landscape of methodology authors and data providers shows that the profitability of the activity is currently very low due to fixed and R&D costs and very limited outlets (to date). If well managed, the emergence of a standard could boost demand and fuel R&D expenditure, leading to dramatic improvements in methodologies and data quality. Even if limited to carbon accounting in its first version, it can pave the way for the development of genuine performance indicators (cf. page 40) through road testing by public banks, the deployment of assessment tools, and the emergence of a debate on mandatory disclosure (Cf. page 43). On the contrary, an alignment with the lowest common denominator can impair the value of past and current R&D investments and limit the pool of potential users to compliance-oriented players.

• **Toward 2° investing.** Our analysis concludes that an ambitious standardization project designed as a first step toward the development of carbon performance indicators will be more likely to receive strong support from financial institutions and governmental authorities, and to reach 'mainstream' professionals than a project strictly restricted to carbon accounting, without any 'next step'.

This calls for the construction of an international R&D project involving all players to level the playing field and share the cost of the upstream phase of research. We consider that a general carbon accounting guidance document can be published in the short-term based on best-practices, followed by a more ambitious methodology (Cf. next page) addressing potential user needs.

GHG PROTOCOL/UNEP-FI SURVEY AND WORKSHOPS OUTCOMES

"There is also broad interest in the availability of a standardized methodology for measuring and reporting financed emissions, but many financial institutions are concerned about complexity and the cost-benefit ratio."

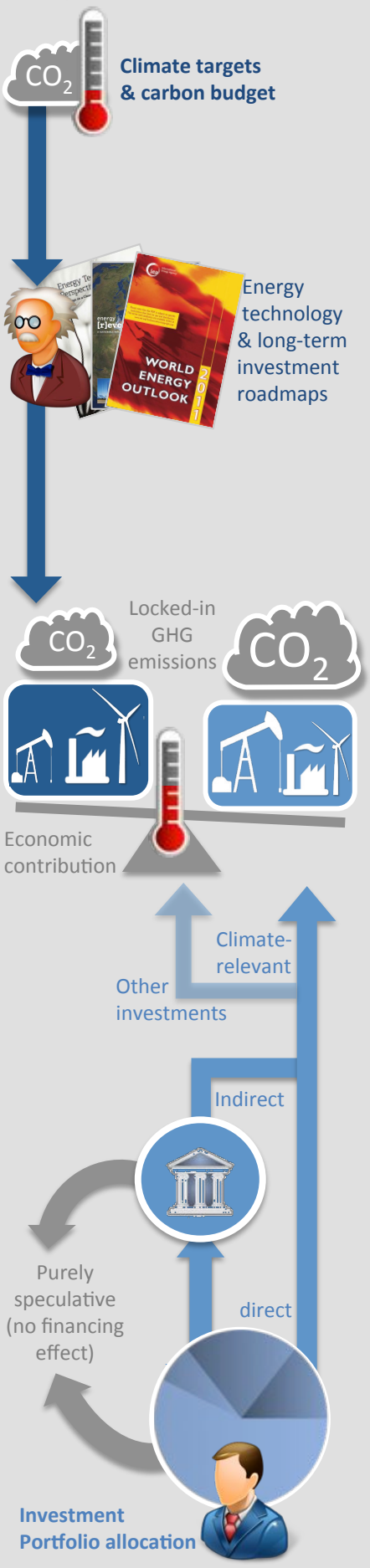
Main concerns

- Data availability and quality
- Normalizing emissions to enable comparison of companies
- Time and resources required
- Methodological concerns (e.g., avoiding double counting)
- Protecting client confidentiality
- Ensuring consistency between different financing activities
- Interpretation of results (unclear what the resulting figures mean)
- Lack of senior management buy-in (and resulting lack of any sanctions for non-compliance)

THE LANDSCAPE OF STANDISATION PROJECTS

The landscape of standardization projects is currently in a significant flux. The GHG Protocol and UNEP-FI have started a two-year project to release an international standard in 2015. To date, two workshops have been conducted, involving about 70 people, to discuss expectations and priorities. In France, several organizations have announced their willingness to develop a standard: the CSR business network (ORSE) and the carbon accounting association (ABC) will team up, sponsored by the ADEME, for a one-year project with the objective of developing reporting guidelines for the financial sector. In Germany, the banks and insurers' environmental network VfU has commissioned two consultancies to develop a cross-assets standard. A few meetings have been organized to discuss the scope and priorities.

2° INVESTING PERFORMANCE ASSESSMENT FRAMEWORK



2.2. THE STEP BEYOND: 2°INVESTING METRICS

• **Research objectives**. The development of a carbon accounting standard for the financial sector will probably boost reporting practices and strengthen the capacity of data providers to connect the dots between financial assets and investments in the real economy. Nevertheless, whatever the level of sophistication achieved, the standard will probably leave certain issues unresolved such as the lack of genuine performance indicators and 'benchmarks' to track the alignment of investment strategies with climate scenarios (cf. page 40). The research program of the 2° Investing Initiative aims at bridging this gap. It aims at developing a 'model' to *assess the contribution of investors toward financing the transition to a low carbon economy, and long-term economic targets*. The objective is to build on existing climate scenarios, best-practices in financed emissions methodologies, and other 'micro-to-macro' methodologies in order to:

- convert climate scenarios and economic prospective studies into 'investment targets' for long-term investors;
- benchmark the forward-looking economic and carbon footprint of investors against these targets.

• **2° Investing model**. The final deliverable of the project will be a pilot-model including:

- The translation of 2° climate scenarios into a carbon budget available for a given amount of economic services provided by economic players (energy production, housing, transportation, etc.);
- A methodology and dataset enabling an assessment of the contribution of the role of a multi-assets portfolio (fund, bank, insurer, etc.) in financing economic activity and associated carbon emission;
- A set of key performance indicators indicating to the investor the alignment of his investment strategy with investment needs for 2°C climate scenarios, and allowing him to adjust selection, industry and strategic allocation while keeping same risk-adjusted returns / liquidity.

The final output will be designed as a 'plug-in' for climate scenarios and portfolios management tools. The output will be made publicly available to facilitate the adoption by data providers, users and policy makers.
The intermediate deliverables will include methodological inputs on major gaps identified in this review in order to supplement existing carbon accounting standards and methodologies.

• **Scope and governance.** The project, led and coordinated by the 2° Investing Initiative team, is conducted in partnership with our members and partners: final users (investors, banks and public authorities), authors of climate scenarios, academic researchers and data providers in order to avoid duplication of research efforts.

The project started in 2012 with a study exploring the feasibility of a 2° investing indicator for investments in the power and transportation sectors.[14] The present state-of-the art review will be followed by a scoping phase in mid-2013 to link our program with the research streams of standardization initiatives.

In addition, the research team has started to engage with financial analysts, investors and companies to explore methodological issues in uncharted waters through working groups. The first two groups launched in May 2013 will develop and test advanced 2° performance metric for large companies and financing to SMEs (venture capital, PE, lending, etc.).

3. IMPLICATIONS FOR INVESTORS AND POLICY MAKERS[15]

• **Embedding climate goals in financial regulation**. The emergence of financed emissions standards and advanced assessment methods will allow investors and policy makers to develop new approaches and incentives to channel capital toward financing the energy transition and - to a lesser extent managing carbon risks.

• **Micro to macroeconomics.** Beyond climate issues, financed emissions assessments provide methodological pathways and calculation tools to connect the dots between financial assets and investments in the real economy, develop stress-tests for point-in-time risks, and integrate investment horizons in the understanding of financial markets. In this respect, the methodologies reviewed are not only interesting from an environmental perspective but also as constitute the avant-garde of a new generation of micro-to-macro economic tools.

3.1. DISCLOSURE FOR NON-FINANCIAL COMPANIES

To assess climate performance or risk, investors need forward-looking data allowing a comparison of companies performance with 2° investment roadmaps, as well as 'integrated performance' indicators:

• **Forward-looking activity data**. For industries highly affected by the energy transition, companies should report on the breakdown of their fixed assets, capital and R&D expenditure by type of energy-technology and type innovation (business as usual, incremental innovation, radical innovation) in the context of climate scenarios.

• **Locked-in GHG emissions**. When associated with long-term assets or durable products (e.g. power-plant, aircraft manufacturing, etc.), these activity data need to be associated with estimates on locked-in GHG emissions (e.g. coal plants, real estate, etc.).

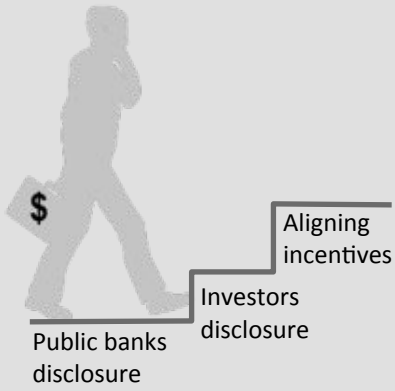
• **Point-in-time risks stress-tests**. Companies with high carbon risk exposure need to conduct climate stress tests on long-term carbon risks. Policy makers can modify existing reporting requirements on risk factors in 10k reports and equivalent or the emerging requirements regarding ESG performance and GHG emissions.

3.2. DISCLOSURE FOR FINANCIAL INSTITUTIONS

• **Investments in the real economy**. Institutions should be required to report on the breakdown of their assets and 'financed investments' by sector and industry group, and - when relevant – energy technology; - by investment horizons (maturity or portfolio turnover); and by country (already done partially in the "Large Exposures" regulation).

• **Financed emissions.** Today, financials institutions are in the best case required to report on their direct and electricity-related emissions. By 2014, policy makers can introduce mandatory disclosure of annual financed emissions based on the first accounting standard and existing modeling techniques to fill the corporate reporting gaps. Once again, in several countries it only requires a modification of existing reporting guidelines on GHG emissions and/or ESG performance.

2° INVESTING REGULATION STEP-BY-STEP



IMPLICATIONS FOR PUBLIC FINANCIAL INSTITUTIONS

Most public financial institutions have in their mandate the objective to finance the long-term needs of the economy, and (often explicitly) the energy transition. The advanced financed emissions metrics will provide tools to manage and report on these objectives. The emergence of new metrics allows public and development banks to report annually and set progress targets.

ASN Bank provides an example of such a policy. Beyond lending and assets directly managed by public banks, the new metrics allow public banks to cascade their objective in the requests for proposals for the management of their equity and bonds portfolios.

WHERE DO WE STAND ON DISCLOSURE?

INVESTMENT CRITERIA

Since 2002, several countries including Australia, Denmark, Belgium, Germany, Great Britain and recently France introduced mandatory disclosure of ESG criteria for pension funds or investment products. A similar obligation is currently debated at European level of packaged retail products (PRIPS regulation).

TRACEABILITY

Basel II and III requirements indirectly obliged banks to identify the economic activities financed with their assets. However, disclosure is limited to the credit exposure by top level sector and asset types. Only a few small ethical banks such as Triodos (NL) or NEF (Fr) report on all the activities they finance. In 2012, the retail bank Crédit Coopératif (Fr) introduced a 'green current account' only associated with green financing, similar to electric utilities for renewable power.

From 2015 onwards, the requirements can be extended to the disclosure of other items currently associated with less mature assessment methodologies and datasets such as the alignment of their asset allocation with climate goals set in eligible 2°scenarios (cf. page 42). Such a requirement might seem premature but introducing it today will trigger research, pilot-testing and the development of reporting practices.

• **Stress-testing**. A number of countries stress-test so-called 'systemic important financial institutions' (e.g. banks, insurers) on a regular basis. They evaluate the resilience of the bank to an extreme adverse economic scenario, described by the IMF as "unlikely but plausible". To date these scenarios do not include the surge of point-in-time carbon risks (cf. page 12) related to a new wave of climate policies combined with successful mass litigation, triggered for instance by an extreme local weather event. It arguably makes sense to include such a scenario in future stress-tests.

3.3. KEY INFORMATION DOCUMENTS (KID) FOR INVESTMENT PRODUCTS

In Europe, the market for packaged investment products was €9 trillion in 2009.[16] Mandatory disclosure on the activities financed by financial products in KIDs is usually limited to the investment universe (asset class, stock index, etc.) and in the best case the integration of ESG criteria in management processes. At European level, the related regulation (PRIPS) is currently debated and will be implemented from 2014 onwards.

• **Where does my money go?** The implementation of a 2°investing framework would require disclosure of the same items as for financial institutions (investments in the real economy and financed emissions) for all savings products: savings accounts, funds, life-insurance products, etc.

• **Risk exposure**. Information on financial risks in KIDs is usually based on past performance and a short-term investment horizons (1 to 3 years), reflecting a huge gap vis-à-vis investors' average horizons (5 to 15 years). Our analysis calls for the inclusion of scenario analysis, including an adverse economic scenario with the surge of point-in-time carbon risks.

3.4. ALIGNMENT OF TOP-DOWN INCENTIVES

The asset allocation strategies of financial intermediaries results from a complex mix of bottom-up and top-down approaches:

- risk/return analysis is conducted asset line by asset line to select securities and clients,
- but the investment decisions are also driven in a 'top-down way', by risk-weighing from capital requirement regulations, tax incentives on savings interests that determine the composition and sales of investment products, and the use of benchmarks (e.g. stock indices) to set industry allocation for most equity funds.

The emergence of 2° investing metrics can allow governments to align these incentives with their economic growth and climate-related goals.

• **Regulation of benchmarks.** As described on page 40, the use of stock indices as benchmarks in equity management massively channels equity investments toward fossil-fuel industries. To date this practice is not regulated, even if it strengthens the 'sheep-like' behavior of equity managers.

It also prevents the anticipation of some long-term financial risk and reduces the availability of capital for industries not well weighted in major stock indices (such as clean techs).

In the short term we recommend that policy makers require stock-indices and bond-indices providers to assess and disclose the gap between the index allocation and the allocation aligned with long-term investment needs over the next 10-20 years.

This reporting will allow market authorities to evaluate if financial markets contribute toward financing the real economy and do not fuel new financial bubbles. They can then introduce regulations or incentives on the use of benchmarks if the results are interpreted as a threat to economic growth and financial stability.

• **Taxes on savings.** In most countries, tax incentives on savings interests (or similar incentives) are the main policy tool to channel private savings and influence asset managers' allocation strategies.

From a public accounting perspective, these incentives are considered as subsidies to foster savings and investments in the real economy. Their cost is significant: they represent tens of billions of euros in countries like France or the UK.
These tax schemes are designed at country level and reviewed on a yearly basis. Incentives related to the financing of the economy (e.g. bonus for long term savings and investment in equities) are in most cases indirectly linked with specific investment vehicles (e.g. tax-free accounts, UCITS, etc.).

In this context, the 2° Investing Initiative recommends that policy makers:

- Assess, in each country, the impact of tax incentives on long-term finance and the energy transition, using the best-available techniques. Could these incentives be considered as fossil-fuel subsidies given the weight of the energy sector in investment portfolios?
- Explore pathways to align these incentives with the investment roadmaps of 2°scenarios. A mechanism for this would for instance include the modulation of the tax scale applied to all savings products (fund, account, life-insurance contract, etc.) based on the contribution of the underlying asset portfolio to the financing of the energy transition (cf. metrics page 42).

FIG.25. 2° INVESTING INCENTIVES

To achieve climate targets, policies 'pulling' capital towards low-carbon investments will need to be complemented by 2° investing incentives 'pushing' low-carbon investment strategies.

EUROPEAN COMMISSION GREEN PAPER ON LONG-TERM FINANCING 2013
(Extracts)

The taxation of savings has a number of important economic implications, including by affecting the total amount of savings in the economy and thereby influencing capital allocation and investment. Given these effects, tax policies in this area have to be designed carefully. Many Member States have already put in place a number of incentives to increase (long-term) savings, notably with respect to pension-related savings. In addition, many Member States apply dual income tax systems, where capital income is generally taxed separately at a lower rate than other sources of income; Tax incentives are often considered as instruments to encourage certain types of investment; a tax subsidy might be justified when the social return to an investment is higher than the private return of the investor and therefore investment levels are below the social optimum (e.g. R&D and environmental concerns).
(...)
Q: What considerations should be taken into account for setting the right incentives at national level for long-term saving? In particular, how should tax incentives be used to encourage long-term saving in a balanced way?
(...)
Q: Is there a need to develop specific long-term benchmarks?

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The 2° Investing Initiative (2°ii) is a multi-stakeholder think tank bringing together financial institutions, policy makers, research institutes, experts and environmental NGOs. Dedicated to research and awareness raising to promote the integration of climate goals in financial institutions' investment strategies and financial regulation, 2°ii organizes sharing and diffusion of knowledge, and coordinates research projects.

The 2° Investing Initiative has been created in 2012. Its work is funded by the Caisse des Dépôts, the CGDD/French Ministry of Ecology and Energy, the AFD (French Development Agency) and the ADEME (French Environment and Energy Management Agency). The members include 70 organizations and professionals from the financial sector from 10 countries, including most 'financed emissions' practitioners.

The name of the initiative relates to the objective of connecting the dots between the +2°C climate goal, risk and performance assessment of investment portfolios, and financial regulatory frameworks.

This report offers an overview of selected methodologies to assess investors' financed emissions. It explores the next steps for practitioners and the related opportunities for investors and policy makers. The report is the first brick of a research project that aims at developing a model to measure how a portfolio allocation strategy contributes (positively or negatively) to the financing of the energy transition.

CONTACT:

contact@2degrees-investing.org
47 rue de la Victoire – 75009 Paris, France
+33 1 4281 1997
@2degreesinvest

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- This paper is the short version of a 100-page report developing the state-of-the art review (chapter II)
- The report is presented online with an animated video with audio comments

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