Understanding the issues around quantifying GHG emissions in the financial sector

Volume 1

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

Financial sector

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ABC
ASSOCIATION BILAN CARBONE

ORSE
Observatoire de la responsabilité sociétale des entreprises

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PREFACE by Brice Lalonde

In 2014, or the first time the Assessment Report by the Intergovernmental Panel on Climate Change (IPCC) contained a chapter on climate investment and finance. According to this report, climate finance is both about adaptation and mitigation, although the emphasis is on estimating short-term investment needs
(in the next 5 to 10 years) i.e. on climate change mitigation as a priority .

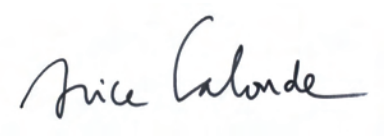
From 2010 to 2012, total global climate finance is estimated at $343-385 billion a year almost evenly invested in developed and developing countries. The private sector's contribution to climate finance stands at around 62 to 74%, according to various estimates.

These figures give an idea of the crucial role to be played by financial players. As those responsible for financing the global economy, they provide significant leverage in supporting changes in their clients' practices so as to reduce the impact on the climate and facilitate the transition to a low-carbon economy.

In this context, one of the key concerns of financial players is to have access to the right tools and methods for quantifying direct and indirect greenhouse gas emissions (GHG) as a basis for decision-making on finance and investment.

I therefore welcome the publication of this guide as a response to an increasingly crucial need. It is the result of joined-up work led by ORSE's Finance Club in partnership with the ADEME, the Association Bilan Carbone and the Caisse des Dépôts (long-term public investment group) with the technical support of Carbone 4. This guide has brought together a broad spectrum of players and experts on climate issues. It presents a wide range of methods and tools reflecting the diverse nature of businesses and organisations. As such it is intended to be educational and its content is based on established expertise.

This document is an important first step. It is up to financial institutions to build on this momentum in order to gradually produce the management tools to help them define their policy on climate change and develop innovative solutions to meet the challenges.



A sectoral approach reflecting the diversity of the financial sector and the issues facing it

In the face of climate change which is creating a need to reduce greenhouse gas emissions on the one hand, and for the adaptation of societies on the other, the financial sector appears to be a key player. Thus, one of the primary issues facing the sector is the need for access to methods and tools for quantifying GHG emissions.

This context has led the Club Finance de l'Observatoire de la Responsabilité Sociétale des Entreprises (ORSE), the Agence De l'Environnement et de la Maîtrise de l'Energie (ADEME) and Association Bilan Carbone (ABC), with the support of the firm Carbone 4, to launch a sectoral approach aimed at producing a practical guide to catalogue issues, tools and methodologies with a view to helping the various players within the finance sector (banks, insurance companies, asset manager) to calculate their direct or indirect GHG emissions.

A participatory process

The players all of whom have a financial background and represent the whole financial sector, decided to join forces because they face different problems in terms of carbon issues. At each stage, other entities were asked to contribute to this work. Thus, some twenty financial institutions, several consultancy firms, NGOs and associations contributed to the meetings. In total, this guide is the fruit of work by some seventy individual participants over the course of a year. In addition, in September 2014 the consultation was extended to include stakeholders representing directly or indirectly the financial sector. These stakeholders were thus able to present their views and experiences if they wished.

Engage a collective dynamic and create a common language

The benefit of the sectoral approach to carbon accounting is two-fold. This approach can be used to harmonise practice and agree common language whilst tailoring carbon accounting to the specific features of the businesses in question. In parallel, the sectoral approach is a means of pooling efforts, raising awareness of stakeholders and thus promoting the sharing of good practice through a network of experts who can capitalise on experiences. The aim of the approach is thus to have a guide for wide circulation to improve the relevancy, completeness, consistency, accuracy and transparency of any GHG reports produced by this sector. However, this guide is not prescriptive and players have contributed on a voluntary basis. In this context, this work complements regulatory requirements.

Contents for each sector needs

This guide is divided into 3 parts to ease the reading
Volume 1 introduces the context and identifies sectorial challenges related to climate change, then risks and opportunities. Moreover, it shows methodological guidelines in order to quantify those emissions. By way of example, numerous practical applications will be laid out. Volume 2 proposes tools to estimate emissions arising from organisation's back-office functions.
By way of a methodological contribution, Volume 3, via case studies, offers methodological information for institutions within the sector (more specifically lenders) who wish to quantify their financed emissions simply through a 'Top-down' approach. Moreover, it allows these financial actors to get a cartography of their financed emissions by sector and geographical area.

An evolutionary process

The discussions arising from the drafting of this document confirmed the different needs of various businesses and financial institutions (investment banks, insurance companies, retail banks, commercial banks, asset managers etc.) in terms of quantifying and managing financed emissions. As such, developing a single and universal methodology would appear to be a fruitless task.
This guide shows particularly it is possible quantify financed emissions. Other methods and tools will be needed to complement those presented here in managing their emissions going forward. Thus this is a living document to be regularly updated as advances on carbon accounting are made. It is a first step to be followed by complementary work which will be necessary in order to respond to the many questions and requirements of players within the sector.

A French iniative calling for a wide spread

Through the publication of this guide, France shows it has the Knowledge and Know-how to contribute to the dynamic thinking about these issues and to produce relevant tools for both current and emerging needs. The methodological principles are presented within an international perspective, capitalizing on French expertise and benefit from international main references.

Prospects and expectations

The aim of the approach is to have a guide for wide circulation to improve the relevancy, completeness, consistency, accuracy and transparency of any GHG reports produced by this sector.
This document does not answer the question of how to manage emissions but is a step in the right direction. Other methods and tools will be needed to complement those presented here in managing their emissions going forward.

Nonetheless, it sets out the willing of financial circles to mobilise themselves in order to address the challenge of climate change and energetic transition.

Daniel Lebègue
Président de l'ORSE

Bruno Lechevin
Président de l'Ademe

Volume I - Background and Issues

1. About the guidelines

This guide is aimed primarily at the finance sector as defined by the Statistical Classification of Economic Activities in the European Community (NACE)1.
According to the NACE-rev classification, the categories in question are:
64 – Other financial service activities, except insurance and pension funding
65 – Insurance, reinsurance and pension funding
66 – Activities auxiliary to financial services and insurance activities.

It is aimed at helping the financial sector to gain a better understanding of how issues relating to climate change affect it and the need to quantify the Greenhouse Gas Emissions from its operations. A range of approaches are recommended in this guide according to the specific features (and objectives) of the financial institutions.

1.1. Presentation of the various activities within the financial sector

The various categories of activities draw on the classification of activities proposed under the Climate Principles2:

- retail banking
- corporate banking
- investment banking
- asset management
- research activities / brokerage
- insurance and reinsurance
- pension funds
- specialist financial services

1.2. The climate context

The development of human activities is responsible for the growth of the greenhouse effect which is causing an increase in the temperature of the earth surface synonymous with significant climate change.
The greenhouse effect is a natural and necessary phenomenon which helps to maintain the bioclimatic balance of our planet3. However, it is human activities that are behind the high volumes of so called 'anthropic' GHG emissions which gradually modify the concentration of these gases in the atmosphere thus intensifying the greenhouse effect. The IEA estimates that in 157 years, mankind has multiplied its greenhouse gas emissions 145-fold. By way of example, in 2010 the concentration of CO2 in the atmosphere stood at 389 ppm, compared with 280 ppm in 1750 according to the World Meteorological Organization.

The IPCC's fifth report4, published in April 2014, gives an in-depth, detailed and informed assessment of the current state of scientific knowledge on climate change, both for scientists themselves and for decision-makers worldwide. According to this report:

- ➔ Global anthropogenic emissions of GHGs grew by 80% over the period 1970-2010, reaching 49 Gt CO2e in 2010 [compared with 27 Gt CO2e in 1970].
- ➔ If global GHG emissions continue at the current rate [+2.2 % per year over the period 2000-2010], the increase in average global temperatures should be between 3.7 and 4.8°C by 2100 (i.e. well in excess of the 2°C target): according to a baseline scenario in the fifth report, the concentrations of GHGs in the atmosphere will exceed 450ppm CO2 in 2030 and will reach levels of between 750 and 1300 ppm CO2 in 2100, the level of 430ppm CO2 having already been reached in 2011
- ➔ The target of limiting average temperature increases to 2°C by 2010 is based on reduction scenarios. Although these reductions are technically and economically feasible, they will require significant efforts, to take effect quickly or even immediately, with a clear break from current trends: in order not to exceed 450ppm by 2100, the 5th IPCC report recommends reducing global GHG emissions from 40 to 70% by 2050 (compared with 2010) in order to achieve levels approaching zero Gt CO2 in 2100.

1.3. The energy and climate-related issues facing the financial sector and their impact

The specific impacts and issues to the financial sector may be viewed from two perspectives:

- those related to the operations of institutions: buildings, travel, waste, ICT etc.
- those arising from finance and investment which may be analysed according to two main strands:
  -> Exposure to risks related to the climate change adaptation and mitigation of relevant parties.5
  -> the role of the financial sector in combating global warming and particularly the role of finance in the energy transition.

Depending on the form taken by finance and investment (lending to projects, companies or individuals, proprietary trading or asset management for third parties etc.) the financial players may be more or less sensitive to the various issues:

- the foreseeable impact of financial performance will be of particular significance for asset management where the ability to identify players in the investment universe liable to outperform compared with an average performance is a key factor of success.
- potential changes to (average) default risks for an economic sector, country or bank product type will be a major issue for lenders.

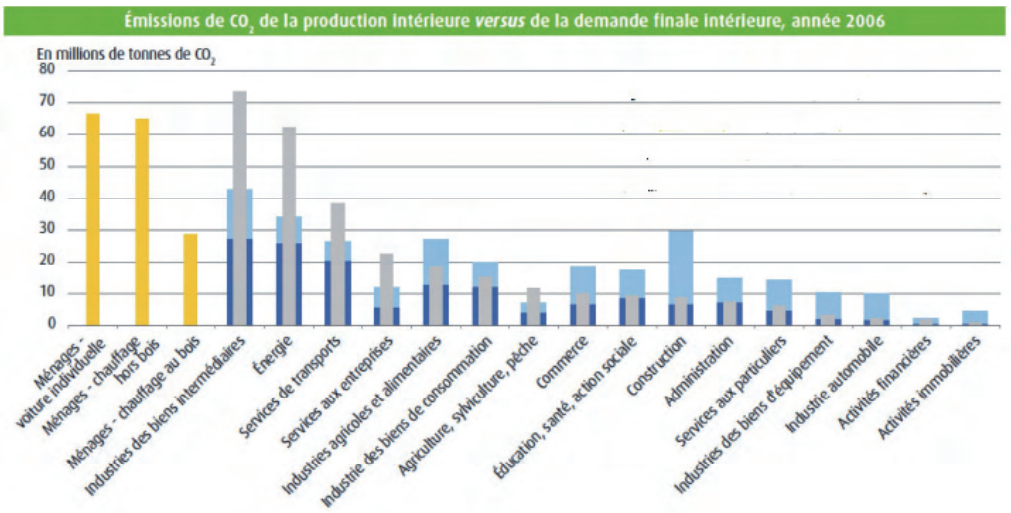
The issue of communication and reputation may also be broken down differently depending on the areas of finance, for example:

- sending companies a sign for investors
- social values and commitments demonstrated by lenders or products marketed by banking networks.

Although exposure to the risks arising from global warming and the contribution to financing the energy transition are two key issues for the financial sector as a whole, the form that these issues take may vary enormously depending on the specific business. A breakdown by type is presented in the follow.ing pages. These differences translate into differing needs in terms of analytical tools (comparisons of the performance of specific players versus sectoral or geographical mapping of exposure, for example).

1.3.1. The impacts of the financial sector and the key figures for financing the energy transition

Assessing the direct impact of the financial sector on global warming through key figures proves a complex task given the diverse range of players operating in the financial sector.
An initial approach is to break down greenhouse gas emissions in the national inventory by sector. This approach uses different parameters according to how imported or exported emissions are dealt with and, above all, how these are adjusted to final demand for a 'consumption', rather than a 'production' perspective. According to this approach the finance sector is not one of the main contributors.



Interpretation: in France, businesses in the construction industry emitted 8.6 Mt in CO2 in 2006. In the same year, the final demand in construction generated 29.5 Mt in CO2 emissions in France (excluding imports), of which 23 Mt indirectly through CO2 associated with intermediate consumption in the construction industry. (A proportion of output from the construction industry is used as intermediary consumption by businesses in other industries.)

Source: étude CGDD - CO2 et activités économiques de la France – August 2010

Another approach, developed by VIGEO & WWF (Entreprises et changement climatique: défis sectoriels et perspectives pour une approche globale) ranks sectors in terms of CO2 emissions, incorporating the concept of indirect emissions extended to include financed emissions. According to this approach the finance sector ranks first. This top position reflects the fact that practically the whole economy is financed by banks. Double-counting of emissions leads to global emissions being attributed repeatedly to the financial sector as a whole. Nevertheless, at least this perspective highlights the essential role that can be played by the sector in financing the energy transition, but also, consequently, the financial sector's exposure to climate risk.
In a report dated 3 June 2014, the IEA (International Energy Agency) estimated the amount of investment needed to cover global energy needs to 2035 at $48,000 billion.
Out of the $48,000 billion needed to meet growing energy demand, $40,000 billion are for energy supply alone. The remainder is for energy efficiency measures essentially in the main markets of the European Union, North America and China with 90% of this figure concentrated in the transport and construction sectors. Out of the $40,000 billion for supply:

- $23,000 billion are for the extraction of fossil fuels, their transportation and refining,
- $10,000 billion are for electricity production
- $7,000 billion are for the transmission and distribution of electricity.

More than half of investments will go towards maintaining current levels of production.

Thus, according to the IEA, in order to meet the 2°C target, $53 000 billion in combined energy and energy efficiency investment is needed by 2035.
Indeed, $14 000 billion spent on energy efficiency would allow a reduction in consumption of almost 15% by 2035.

1.3.2. The exposure of the sector to issues associated with climate change

Through their activities, financial institutions are exposed to two types of potential financial impacts associated with climate change.
All regulatory changes aimed at restricting GHG emissions (mitigation-related risks or carbon risks) on the one hand, as well as adapting to the physical consequences of climate change (issues related to adaptation or climate risks) on the other hand. Both factors are potentially the source of additional costs for the clients of financial institutions, resulting in an increase in associated financial and non-financial risks for those institutions. The following diagram sets out the different categories of issues facing the financial sector relating to climate change.

RISKS RELATED TO MITIGATION (CARBON RISKS)

- **Direct risks for the financial sector related to gradually taking into account carbon externalities in the economic environment through taxes, carbon trading (credits and quotas) or any other regulatory changes (affecting, for example, the clients of the financial sector). These are risks that are essentially arising from costs of:**
  - changes in the price of carbon on the markets,
  - increases in energy prices,
  - the introduction of new taxes and standards (e.g. taxes on cars, domestic appliances, real estate etc.).
- **Risks associated with climate-related litigation, this category of risk includes the following legal risks (see study by ADEME/ OTC 2010):**

- Rights and responsibility
- Trust
- Support
- Conseil

RISKS RELATED TO ADAPTATION (CLIMATE-RELATED RISKS)

- **Rsks related to the physical consequences of global warming resulting in additional costs incurred by clients and banks due to global warming:**
  - **Extreme weather events,**
  - **changes in agricultural output,**
  - **rising sea levels,**
  - **ocean acidification,**
  - **increase in the range between wet and dry season precipitation.**

POTENTIAL IMPACTS ON FINANCIAL PLAYERS

- **Counterparty default risk,**
- **Depreciation of the assets value,**
- **Under-performance of portfolios,**
- **Reputation,**
- **Litigation.**

The exposure of financial sector players to the various categories of risk associated with climate change will vary according to the characteristics and nature of their activities. The following table draws on examples from the Climate Principles to present the context and risks associated with each type of financial player. The challenge for each of the main categories of financial institutions will be to put forward an approach for taking into account the risks associated with climate change adapted to their activity whilst seeking to incorporate the concerns of their clients in their products.

Classification of activities in the financial sector according to the Climate Principles	Main types or products/ services affected	Background	Related risks for the financial sector
Personal banking / retail banking	Real estate loans Car loans Personal loans	Consumers are exposed to varying degrees to carbon and climate risk according to a certain number of factors such as: - the type of housing (property loans, e.g. houses on the outskirts of towns vs flats in urban centres) - the introduction of high carbon prices (having a knock-on effect on the cost of energy in particular) - climate-related extreme events - the type of transport (car loan etc.)	- Risk of defaults following a change in loan repayment capacity, particularly in the case of property loans.
Corporate banking	Corporate Finance Project Finance	Professional and corporate clients of commercial banks are also exposed to carbon and climate-related risks to varying degrees depending on: - The location of assets - The introduction of binding regulation in their sector - Their exposure to climate-related extreme events	- Default risk: increased likelihood of borrowers defaulting - Risk to reputation
Investment banking and Markets	Proprietary investment Bond issues	Businesses in which investment banks invest or to which they offer services are also exposed to carbon and climate risks to varying degrees depending on their business and geographical location.	- Risks of asset depreciation - Risk to reputation
Asset management	Proprietary unvestments Third Party investments	Businesses in which investment banks invest or to which they offer services are also exposed to carbon and climate risks to varying degrees depending on their business and geographical location.	- Risks of asset depreciation, - Risks of litigation related to fiduciary liability - Risk to reputation

Classification of activities in the financial sector according to the Climate Principles	Main types or products/ services affected	Background	Related risks for the financial sector
Insurance and reinsurance	Property and health insurance	Insurers are generally more sensitive to climate risks in their insurance activities than carbon risks. Changes in the frequency and cost of extreme weather events is a case in point. Managing assets in respect of insurance contracts. Carbon risks may ultimately affect the value of businesses and must therefore be taken into account.	- Risk of deterioration of technical results - Risks of asset depreciation - Risks of litigation related to fiduciary liability - Risk to reputation
Pension funds	Proprietary investments	Pension funds are long-term investors by nature and as such are exposed to climate and carbon risks over a range of horizonsand across all categories of assets.	- Risks of asset depreciation - Regulatory risks - Risks of litigation related to fiduciary liability - Risk to reputation
Research activities / brokerage	Financial and non-financial analysis	Carbon risks may ultimately affect the value of businesses and must therefore be taken into account in financial and non-financial research.	- Risk to reputation resulting from unsatisfactory analysis
Specialist services	Real Estate Leasing		- Commercial risk

1.3.3. The role of the financial sector in combating global warming

Financial institutions are essential contributors to wealth and development. As such, they must show commitment to conducting their business in a responsible way. Given the risks facing its clients, the financial sector must support them in combating climate change.

Classification of activities in the financial sector according to the Climate Principles	Challenges	Opportunities / triggers
Personal banking / retail banking	The challenges facing banking networks are: - to identify and assess the potential impact of climate and carbon risks on their clients and products - to define the resulting needs of their clients and to offer suitable products and services	➔ adapting or designing new products and services enabling clients to reduce their carbon footprint (thermal insulation of homes, energy efficiency etc.). ➔ considering specific approaches in order to raise awareness among their clients of how to manage and reduce their greenhouse gas emissions
Corporate Banking	The issue facing these institutions is to: understand these potential changes - resulting from climate and carbon risks - establish pragmatic methods to assess - such risks.	Commercial banks have an important role to play in financing the energy transition also by offering traditional products and services and/or developing finance solutions aimed at helping their clients to adapt to climate restrictions. ➔ Commercial banks can also raise awareness among certain clients of the climate risks and opportunities associated with their business, particularly in a consultative capacity.

Classification of activities in the financial sector according to the Climate Principles	Challenges	Opportunities / triggers
Corporate Banking	In the specific case of project finance: carbon and climate risks will be particularly high in the case of project finance with banks facing a direct risk of non-repayment of loans. It would therefore seem necessary for them to conduct appropriate analysis of climate and carbon risks specific to the project by taking into account the project business sector, its specific location and estimated life-span.	➔ Commercial banks can actively participate in financing the development of low-carbon power ➔ They can show greater diligence when faced with projects emitting a significant quantity of GHGs (analysing alternative solutions, quantifying and publishing GHCs emitted by the client etc.) or set themselves a specific financing policy (sectoral policies for example).
Investment Banking and Markets	The issue facing these institutions is to understand these potential changes, in particular by seeking to establish pragmatic methods to assess specific climate and carbon risks.	Investment banks have an important role to play in financing the energy transition also by adapting what they offer or finance solutions aimed at helping their clients to adapt to climate restrictions. They may, for example, develop financing solutions such as green bonds or specific funds to facilitate investment in low-carbon technologies and projects to reduce GHG emissions.
Asset management	- Favouring financial and non-financial research into climate risks and opportunities and taking these into account when making investment decisions. - Gaining a better understanding of how the businesses in which their clients invest minimise risk and optimise climate opportunities in the context of fiduciary liability and asset management.	➔ Asset managers may ask their analysts to incorporate climate risks and opportunities into their research and take these into account in their investment decisions where relevant. ➔ They may also contribute to raising awareness among their investor clients and design tailored products and services (such as specific funds). ➔ It falls within their fiduciary responsibility to encourage the businesses in which funds are invested to improve their governance and reporting on the management of climate risks and opportunities.
Insurance and reinsurance	- Having to hand the necessary knowledge, skills, and tools to measure climate risks associated with their transactions and their financial implications as well as the guarantees in place. Working on developing risk assessment techniques aimed at helping their clients to better understand and prevent climate change - Adapting the range of insurance products and services to encourage clients to reduce their climate risk.	➔ LInsurers and re-insurers may design insurance products and services which encourage their customers to: - reduce their climate risks (branded products) - facilitate the development and adoption of new GHG mitigation technologies and strategies - adapt their statistical models.
Pension funds	The issues facing pension funds are many. The first issue is to succeed in measuring carbon and climate risk more accurately. In doing this, pension funds may then turn their efforts towards: - asset/liability management - strategic allocation - share selection strategies.	➔ In the (temporary) absence of indicators for measuring the alignment of investments with climate objectives, pension funds may measure the carbon footprint of their assets. ➔ This initial measurement will allow them to go on to set targets for reducing that carbon footprint ➔ Pension funds may also influence issuers to adjust their strategy in favour of lower-carbon activities or those which offer solutions to climate change issues. ➔ Pension funds must also communicate more effectively to their members/policyholders on their carbon and climate risk management. ➔ Finally, pension funds may support R&D programmes on tools for measuring carbon and climate risk.

Classification of activities in the financial sector according to the Climate Principles	Challenges	Opportunities / triggers
Research activities	Incorporating climate issues in financial and non-financial research activities may be worthwhile not only for asset managers but also for other financial industry players (retail banks, corporate and investment banks, insurers and re-insurers) in order to: - gain a better understanding of their specific risks and, where relevant, - tailor products and services to help their customers to better respond to their own climate issues.	➔ Incorporating climate issues in financial and non-financial research activities may be a powerful lever for: - raising awareness among the financial community and developing products and services that help to promote a lower carbon economy - better financial risk management.

1.3.4. Existing practices for quantifying the GHG emissions of financial institutions

Most businesses in the financial sector calculate and report their GHG emissions in annual reports and institutional communications based on direct energy consumption (scope 1) and indirect energy consumption (scope 2). The sector has become aware of issues relating to its emissions from operations and is taking the appropriate steps to reduce these. Other indirect emissions (scope 3) are currently under investigation and practices vary greatly between players.

Most of the financial institutions that calculate and report a scope 3 in their GHG report restrict themselves to indirect emissions relating to their inputs (paper, purchasing, merchandise transport etc.) and employee commuting. Few calculate, let alone publish, indicators on emissions 'generated' by their activity. Where they do, the calculations are generally for the small number of projects financed or a portfolio of specific assets.

Historically, the first quantification methodologies were developed for asset managers or to analyse specific projects (see Chapter 5).

However, implementing them raises difficulties in terms of the coherence of information, multiple counting and the comprehensive nature of data where the objective is to calculate the emissions financed by a large commercial, or diversified bank for mapping and reporting purposes. The complexity of such organisations and their multiple activities have limited the number of GHG reports that incorporate all emissions 'generated' by their activity.

1.3.4.1. Mapping of main existing methods by 2ii

This list is not intended to be completely exhaustive and not all existing or pending developments in the world are catalogued in this document.

TRUCOST

Trucost was the first to calculate the carbon footprint of an equity portfolio for Henderson Global Investors in 2006. The firm carries out impact studies in the United Kingdom and the United States. The business generates €2 million in income, of which €1 with investors. The model is based, in part, on businesses' own carbon data. For those who do not produce inventories, emissions are estimated using statistical modelling (US environment extended input-output analysis). This covers over 4,500 listed companies for direct emissions from electricity and tier 1 suppliers. Trucost data are available to clients through on-line proprietary tools enabling them to rank companies, access a full database and analyse a portfolio. Data are also available on Factset terminals. Finally, Trucost uses its data to publish green rankings of funds, companies and studies.

KEY FEATURES		ASN Ecofys[a]	MSCI ESG Research	South pole Carbon[b]	Trucost	Inrate	Profundo	Carbon Screener	Cross Asset FootPrint[c]	P9XCA	P9XCA per scope*	Carbon Tracker
ACCOUNTING RULES	Scopes accounted for investees	1 and 2 (+ scope 3 in specific cases, e.g. Building companies)	1 and 2 (+ scope 3 when reported)	1 and 2	1 and 2 + 3 first tier supply chain	1, 2 and 3 (full supply chain & sold products)	1 + sold products	1 + 2	1, 2 and 3 (full supply chain & sold products)	N/A	1 and 2 (+ 3 supply chain)	Reserves for energy cies
	Management of multiple counting	Non systematic	Not managed	Not managed		Identification & discounting	Not managed		Identification & discounting	No double counting		No double counting
	Time boundaries (investees)	Annual	Annual	Annual	Annual	Annual + lifetime for sold products	Forward looking	Annual	Annual + lifetime for sold products	Annual	Annual	Forward looking (reserves)
	Time boundaries (investors)	Assets outstanding	Assets Outstanding	Assets Outstanding	Assets outstanding	Assets outstanding	Assets outstanding + cash flows	Assets outstanding	Assets outstanding	Assets outstanding	Assets outstanding	Assets outstanding
	Rule of allocation to investors	Share of equity+debt	Share of equity	Share of equity	Share of equity or equity+debt	Share of equity	Share of equity+debt	Share of equity	Share of equity or equity+debt	Share of equity+debt	Share of equity+debt	Share of equity
COVERAGE OF ASSET TYPES	Listed equities	◆	◆ 9,000 (reported + modeled data)	◆ 50,000 (reported + modeled data)	◆ 4,500 (reported + modeled)	◆ 2,800 (modeled data)	◆ 120 (coal, power, oil palm)	◆ 7,000+	◆ Same as Inrate + industry average data for all listed cies	•	•	◆ 200
	Corp. bonds & loans	•	•	⁘◆ Bonds issued by listed companies (mapping from YourSRI.com)	⁘ Listed companies	•	•		⁘◆ Industry average	•	•	
	Private equities / SME loans		•	⁘◆ Sector Modelling - Private Equity analysis available through ESG Analytics	• Industry average	•	◆ 90 (coal, power, oil palm)		⁘◆ Industry average	•	•	
	Sovereign bonds	• (Calculated specifically in each country, for municipalities, waterboards, social housing)			• Methodology is set up with data for all countries				⁘◆ 20 countries	◆ 15 zones	◆ 34 countries (limited to "operation" emissions of public entities financed)	
	Fin. institutions (including financed emissions)	•(calculated specifically for some partner institutions)			•⁘ (on client request - detailed loan data or estimated from reporting [industry average])		◆ 50 (balance sheet + AM + underwriting)		⁘◆ Industry average (balance sheet)			
	Other asset types covered			⁘ Real Estate, Impact Investments, project finance	Real estate, infrastructure				⁘ Real estate, mortgages, cons.loans, climate projects			
SOURCES OF CARBON & ACTIVITY DATA	GHG data used to calculate investees' footprint	Reporting and specific emissions based on national inventories	Company data reported by company (via CDP) or by government agencies	Validatated data from all available sources (CDP, CSR reports, other sources), plus models		US EEIO model enhanced with Life-cycle data	Life Cycle data	CDP + reporting (checked)	Inrate model enhanced + additional LCA + model per $ of asset held for banks + reporting	GHG Emission factors based on national inventories and public accounts	GHG Emission factors based on WIOD database + public accounts (BACH database)	Life-cycle data IPCC guidelines
	GHG data used to calculate the carbon intensity of non-reporting investees	Dutch GHG inventory and accounts	Derived from reported data by 156 GICS sub-industries; separate models for high-emitting industries such as Utilities	Regression models, proprietary carbon adjusted classification + extrapolation	US EEIO model includes some LCA data, national inventory data and disclosed sector averages			Regression model + inverse distance weighted interpolation				
	Number of categories in the underlying model	34	156	800		340	Not applicable	1000	340	9	34	Not applicable
	Method used to adapt the model to global or/and local contexts	Not applicable	No	Calculation with/without constant	Agriculture - non-energy GHGs based on country level production and GHG coefficients; mining, coal, oil & gas, utilities and chemicals/metals manufacturing apply GHG coefficients to LCA and process data	CO2 intensity of electricity adjusted to global	Not applicable	Yes. Scope 2: geo sales / assets-weighted mix (use of the WDWW geo model)	Same as Inrate + 131 countries specifics	GHG data specific per geographical zone, extrapolation of EU public accounts to 15 regions	GHG data specific (34 countries), extrapolation of EU public accounts to 15 regions	Not applicable
	Sources of activity data and methods used for matching with emission factors of the model	Specific data based on reporting. Equities specific data provided by Trucost.	Simple assignment (one company = one GICS sub-industry) except for high-emitting industries (generation/ capacity or production data from companies or regulatory authorities matched to emissions factors of each fuel type)	Industry specific approximation formulae based on 1 to 10 activity data (sales, staff, assets, COGS, etc.)		Detailed segmentation of 2.800 listed cies (sales, outputs)	In house analysis + transactions covered in financial databases	Thomson Reuters (Asset4 for carbon data and Worldscope segmentation by SIC Group (sales)	Inrate data + segmentation for governments (budget) & listed banks (assets)	Simple assignment (one company = one sector)	Simple assignment (one company = one sector)	Method based on reserves reported
	Method used when detailed segmentation is not performed	Industry-average or reported data extrapolated	Average intensity for each of 156 industries		Average intensity per industry group (cies) weighted by country production for primary sectors	No extension	Not applicable	Not covered	Average intensity per industry group (cies) & sector/country			Not applicable
DATA PROCESSING	Bulk data processing		Listed equities and bonds (290,000 securities)	Equities, Corp Bonds, also via YourSRI.com and Bloomberg Screener					Listed equities			
	Measurement and reduction of uncertainties	Data quality monitoring for sectors / asset classes over time; verified by external parties	Confidence levels for each of 156 industries are determined based on their coefficient of variance (standard deviation/industry average intensity)	Validation of reported data, uncertainty analysis per industry, subsector-specific model quality assessment		Model calibrated with LCA data for some industries		Analysis of Variance (ANOVA) Real-Data vs. Estimated Data	Model calibrated with LCA data + reported data for some companies			Not applicable
	CO_2 data analysts (FTEs)	Not applicable	50 ratings analysts cover carbon issues as part of general company rating; 4 data analysts load and quality check data, 3 modelers are involved in maintaining the estimation model	32 analysts (5 financial industry focussed)		N/A	9	0.25	2	Not applicable	Not applicable	Not applicable

[a] ASN/Ecofys methodology uses Trucost data

[b] South Pole Carbon partners with *Carbon Asset Footprint* for Scope 3 data and related multiple counting analysis, and for financial institutions financed emissions

[c] Cross Asset Footprint methodology uses Inrate estimation models

* Reviewe during WG4 for the working group ORSE/ADEME/ABC

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

MSCI ESG RESEARCH

MSCI ESG Research ('MSCI') collects data on greenhouse gas emissions, where relevant, from around 9,000 businesses. The data are collected once a year mostly using the most recent company sources, including annual reports, CSR reports and websites. Where data is not available directly from company reports MSCI uses data on greenhouse gases sent by the Carbon Disclosure Project or government databases. In cases where businesses do not disclose their data, MSCI uses an exclusive method to estimate both direct (Scope 1) emissions and indirect (Scope 2) emissions. This method draws on three different models. The Company Specific Intensity Model is based on data previously disclosed by the company in question. If the company has not disclosed any information, the Global Industry Classification Standard2 (GICS) Sub-Industry Model is used which is more general but based on our own emissions data. Finally, for companies that have not disclosed any information and for which the Global Industry Classification Standard2 (GICS) model is not in our database, we use the Input-Output Life-Cycle Assessment Model, a general method based on international SIC classification standards.

ENV'IMPACT® MODEL (INRATE)

Inrate is an ESG ratings agency established in 1990. In 2006, it developed the env'Impact model to rate the equity portfolios of Pictet AM. Since that time, data on financed emissions have been sold to their clients (asset managers, financial analysts) alongside ESG data. The model is based on the same American statistical model as Trucost, but Inrate has added life cycle analysis data in order to estimate emissions arising from the use of products sold. Inrate covers over 2,800 listed companies for all scope 3 emissions (direct emissions, electricity, suppliers, products/clients).

CROSS-ASSET FOOTPRINT® MODEL (MFS/ AFD)

The Cross-Asset Footprint model was developed in 2012 for AFD by a start-up, Money Footprint Software, based on the Inrate model and the Caisse d'Epargne methodology. The model combines a line-by-line calculation approach with the use of sectoral statistical averages to cover all listed non-financial companies, financial institutions, sovereign bonds, loans to SMEs and households, mortgages and green projects, for all scope 3 emissions, including financed emissions (in the case of banks, the financial assets of States etc.). It has been trialled by AFD since 2012 and on the market since 2013 in the form of an online tool for analysing a portfolio or a bank's balance sheet.

P9XCA METHODOLOGY

The methodology was developed for Crédit Agricole CIB in 2011 by Antoine Rose, a PhD student at the Finance and Sustainable Development Chair of Paris-Dauphine. The method applies to commitments to non-financial businesses and sovereign issuers. Its main objective is to estimate an order of magnitude for a bank's financed emissions whilst avoiding double-counting, rather than comparing clients' footprints or guiding on industry allocation of a portfolio. As such it has been developed to meet the needs of a lender rather than an assets manager. It is based solely on national GHG inventories and national accounts drawing on public statistics (and compiled by certain institutions such as the UN or OECD). The methodology was published in October 2014 as a PhD thesis. In 2014, this methodology was reworked with the technical support of Carbone 4 to offer a 'top-down' method for quantifying emissions by scope (scopes 1, 2 and 3). As such the P9XCA methodology exists in two versions, by 'issue' and by 'scope' (see Volume 3 of this guide).

SOUTH POLE CARBON MODEL

South Pole Carbon is a branch of the South Pole Group, a company specialised in carbon offsetting (Clean Development methods, voluntary projects, asset management etc.). South Pole Carbon has developed a mathematical model for extrapolating carbon data from company reports in order to estimate the carbon footprint for every listed company. Data have been sold on Bloomberg terminals since 2012. The methodology is also used to calculate the carbon footprint of Private Equity portfolios in partnership with ESG Analytics. Finally, South Pole Carbon is currently developing a screening tool for real estate portfolios.

MODELE CARBON SCREENER® (BANK OF AMERICA MERRILL LYNCH/ CAMRADATA)

In 2012, BofAML developed a mathematical approach for using carbon data from company reports in order to extrapolate data for those companies that do not publish an inventory. The initial carbon data are from the Carbon Disclosure Project (direct emissions + electricity), reworked by Asset4. Data can be extrapolated for a total of 8,000 listed companies. Since 2013, these data have been sold by Camradata, supplier of data and analysis for institutional investors.

APPROCHE PROFUNDO

Profundo is an economic research body based in the Netherlands which works with NGOs. It produces rankings of banks according to their financing of the sectors of oil extraction, coal mining or coal-fired electricity production etc. Their approach is based solely on a detailed analysis: they catalogue listed or unlisted companies in the field of fossil fuel and analyse transactions (loans, issues of securities) between those companies and the banks that finance them as well as the equity share held by the same banks (directly or on behalf of a third party). Profundo draws on Bloomberg and other public sources.

APPROCHE CARBON TRACKER INITIATIVE

Carbon Tracker Initiative is not a supplier of data. It uses existing data to raise awareness of the issue of the carbon bubble. Their data relates exclusively to the carbon content of fossil fuel reserves (oil, gas, coal) and that which is allocated to shareholders in the companies with the rights to these reserves. In this way they analyse 200 listed companies and the 'carbon weight' of various marketplaces.

METHODOLOGIE ASN BANK

The Dutch bank recently developed a multi-asset method to calculate its emissions and monitor its carbon performance. This methodology is intended to be applied to the balance sheet as a whole. For share portfolios (direct emissions, electricity and suppliers), ASN uses Trucost data. For sovereign bonds and local government financing, real estate loans and investment, ASN appointed Ecofys to develop a methodology similar to that developed by the Caisse d'Epargne in 2007. It allows emission factors to be calculated using data from national reports and statistics. Finally, ASN draws on the GHG Protocol to calculate the emissions avoided by financing green projects. ASN's objective is to achieve carbon neutrality by 2030 by balancing emissions financed and avoided through its financial operations.

METHODOLOGIE VfU

VfU (Association for Environmental Management and Sustainability in Financial Institutions) is a network of financial service providers in Germany, Austria and Switzerland. They are developing a multi-asset methodology drawing on the services of the firms Connexis and E2. The methodology has been tested on listed companies and real estate loans.

1.3.5. The importance of a comprehensive approach to quantifying GHG emissions

Quantifying GHGs generated by the financial sector in a comprehensive way (taking into account clients, finance or investment) may be a useful first step in implementing actions to respond to the two categories of risks and opportunities listed above.

The range of examples presented above illustrates the wide-ranging expectations placed on a GHG emissions quantification exercise by players in the financial sector. In particular, these may be:

- assessing changes in carbon risk for retail customers, from a general point of view or in relation to a specific product (property loans for example)
- mapping carbon risk associated with business clients (by sector and/or geographic area)
- quantifying emissions relating to a project or portfolio of projects
- access to comparative data when making investment decisions
- comparing banks in order to select those which might be more resilient to climate risks
- notifying investor-clients for the purposes of fiduciary responsibility.
- access to consolidated data on an institution for the purposes of comprehensive mapping or reporting (quantifying financed emissions), changes in models or product and services.

In this guide, 'financed emissions' are defined as greenhouse gas emissions generated by holding a financial asset. This definition means that emissions can be attributed to balance sheet commitments and credit flows (annual credit flows). More indirect links - consultancy services for companies or individuals, arranging finance which is syndicated or invested with other financial or non-financial players - are not covered by this definition..

Financed emissions

'Financed emissions are defined as greenhouse gas emissions generated by holding a financial asset[9]'

For example, the greenhouse gas emissions from a given industrial activity result from the construction of this industrial facility, its maintenance and operations. The financial activity (finance, investment etc.) which made this industrial activity, and consequently its GHG emissions, possible may, therefore, in some ways be associated with these emissions, having, in a sense, helped to produce them (without finance, the industrial activity would not have seen the light of day, nor would have its GHG emissions.)'

1.4. The objectives and limitations of this sectoral guide

In order to reflect the major issues facing the financial sector, the objectives of this guide are three-fold:

- Defining the principles for quantifying emissions from financial players' operations (scope 1, 2, 3, excluding financed emissions), examples: electricity consumption, purchase of products & services, business travel, software etc. The objective is to offer a robust and standardised methodology offering good reporting practices.
- Offering methodological recommendations for quantifying the emissions financed by their activities (Scope 3 – category 15 'Investments'). The wide range of players, objectives and methodologies that may be chosen restricts any attempts at standardisation in the short term. This guide is not intended to offer a ready-to-use, universal method.
- Insofar as possible, placing thinking in a European, or even international, perspective, thus contributing to the emergence of shared methodological principles.

Chapter 3 thus sets out the general principles for quantifying GHG emissions. Chapter 4 offers guidelines for quantifying emissions from operations and Chapter 5 sets out methodological recommendations for quantifying financed emissions.

2. About the sectoral approach

In order to meet the objectives set out in Chapter 1.4, a sectoral approach was adopted by ORSE's Finance Club with the financial and technical support of ADEME and the Association Bilan Carbon and the technical support of Carbone 4.

2.1. Project overview

This guide is a collaborative work, drawing on technical groups, each of which brings together stakeholders concerned with measuring and managing their carbon footprint and wishing to contribute to the creation of shared methodological rules. Several types of contributors have contributed to this sectoral guide. The Steering Committee is made up of project sponsors, who oversaw the project, ensured it was running smoothly, and approved the proposals of technical groups.

Technical groups

These are made up of professionals from the financial institutions who exchanged their points of view with stakeholders such as NGOs, consultants and academics. They met regularly with a remit to provide technical and pedagogical insight to feed into the discussion and drafting of the final guidelines.

Contributors during the consultation

Contributors during this phase are organisations identified as belonging to different readership 'categories'. They were asked to give their opinions and comments based on a draft document. They include, in particular, professional bodies, non-financial rating agencies, associations, NGOs, experts, institutions and political bodies working on sustainable development as well as specialist research bodies.

2.2. Objectives and division of technical work

Four technical groups have worked on putting together this guide. Groups were assigned objectives:

WG 1: Climate issues in the financial sector
- To identify the issues facing the financial sector in terms of climate constraints and GHG emissions' reporting

WG 2: Specific methodological principles related to GHG emissions generated by the financial sector (scope 3b)
- Establishing a methodological basis for quantifying GHG emissions according to the objectives of financial players identified by WG 1
- Proposing a shared vocabulary for improving transparency and accountability of calculation methods.

WG 3: Establishing methodologies for the financial sector's operations (Scope 1, 2, 3a)
- Establishing a methodological basis for quantifying entities' GHG emissions from operations.
- Several 'methods' were proposed to tailor reporting methods to data accessibility and the relevance of each GHG emissions category.

WG 4: Example of method: Rules and recommendations for calculating GHG emissions generated by financial activities: global top-down approach to emissions
- Proposing technical improvements for the implementation of the method of the Finance and Sustainable Development Chair, to eliminate any inaccuracies already identified
- testing this method and identifying possible improvements

2.3. Calendar

The calendar chosen for this project was relatively ambitious so as to favour a range of contributions and produce an initial document as a basis for broader work dynamic between players. It is the first step in a long-term approach.
The project was launched in September 2013. After a period of study, experimentation and consultation in the first half of 2014, work began, resulting in this initial version being circulated in December 2014.

2.4. Links with international initiatives

By reviewing approaches and studies on the subject, several works and projects that are compatible with and complement this sectoral guide were able to be identified.
It emerged, in particular, that the project 'Guidance for the financial sector: accounting and reporting scope 3 emissions by financial intermediaries' led by the GHG Protocol and UNEPFI tackles the subject of quantifying finance-related emissions over a longer period. The authors of this guide hope that this work may be feed into work by the GHG Protocol and UNEP-FI.

3. The general principles for quantifying greenhouse gas (GHG) emissions

This chapter presents all concepts drawn on in an organisation's GHG emissions accounting. It contains certain general recommendations which are not strictly specific to the financial sector.
Greenhouse gas accounting falls within a range of environmental accountancy methodologies and particularly the category of those which address the relationship of entities (firms, organisations, states etc.) with nature (natural capital) (see boxed text).

Accounting and Sustainable Development

In his book, 'Comptabilité et Développement durable' (Accounting and Sustainable Development), Jacques Richard offers a classification of different forms of environmental accounting based on a distinction inspired by a proposal by Schaltegger and Burritt (2000)1, between 'External-Internal Environmental Accounting (EIEA) and 'Internal- External Environmental Accounting (IEEA):

- The key objective of the 'external-internal' forms of EA, is to find out the net impact of the environment on the entity in question (enforcement of environmental laws, quota trading etc.).
- The purpose of 'internal-external' forms of accounting is to find out all impacts of an entity on the environment, whether or not these impacts affect traditional forms of micro- or macro-economic financial accounting. Carbon accounting is of course on this side of the dichotomy.

But in addition to this initial distinction, Jacques Richard (2012) distinguishes between two main forms of internal-external environmental accounting according to the model of environmental protection resulting from their implementation: low sustainability, based on the assumption that financial and environmental capital can be substituted for one another; or high sustainability, with financial and environmental capital kept separate.
Internal-external forms of environmental accounting aimed at low sustainability allow deteriorations in natural capital (NC) to be offset by increases in financial capital (FC). These EC models use market prices or substitutes for these prices, to calculate natural capital, adding it to the value of FC for the purposes of checking the consistency through time of the total value of these two capitals (assuming economic balance)13.

Internal-external forms of accounting aimed at high sustainability are based on the principle of keeping natural capital and its constituent parts apart on the grounds that, at least in the case of what is referred to as critical natural capital (CNC), which assures the vital functions of humanity and, more broadly, of biodiversity, this type of capital cannot be substituted by financial capital (non-substitutability hypothesis). In these types of environmental accounting, any measurement of environmental impact must be combined with a measurement of the scientific limit on 'acceptable' deterioration of the natural capital in question so that its environmental functions are not compromised. Notwithstanding these shared aspects, external forms of accounting aimed at high sustainability are very wide-ranging. Drawing on the criterion of 'value' (in the broadest sense), the following can be distinguished (Richard 2012):

- ➔ Internal-external forms of environmental accounting based on quantities alone: for example the CO2 emissions of an entity compared with the limits stipulated by the IPCC applied to that entity.
- ➔ Internal-external forms of environmental accounting in terms of units of ecological value: for example the number of hectares of used up and available land (example of Wackernagel and Rees's ecological footprint), eco-points (example of Müller Wenck's Swiss school) or units of used up and available solar energy (example of Odum and Pillet)
- ➔ Internal-external forms of environmental accounting based on valuations in terms of cost: in macroeconomic terms the oldest are those of Hueting (1989) who modified the traditional demand curve of neoclassical theory to impose the 'demands' of respecting scientific environmental limits and to deduce the corresponding corrective measures from the Dutch GDP.

'High sustainability' internal-external forms of environmental accounting, like 'low sustainability' counterparts, may be subdivided according to their scope , the extent of their responsibility (area of control) and temporality (actual or provisional accounting) (Richard, 2012)

Quantifying GHG emissions is an essential first step towards implementing all of these forms of accounting. However, how this is done will differ greatly depending on the purpose.

3.1. Basic methodological conventions

The GHG emissions of an organisation are generally not measured (using physical measurement tools), but estimated (using statistical data) according to the following formula

Greenhouse gas report - $\sum_i$ *Ai.FEi*

Where: 'Ai' = activity data (based on physical flows) and EFi is emission factors expressing the intensity of GHG emissions associated with these physical flows.
Example: the number of cars in a vehicle fleet is an activity data and the associated emission factor expresses the average quantity of GHG emissions by car.
However, before applying this formula, many methodological conventions must be specified.

- **Defining the scope:** which of the organisation's activities are covered by the GHG emissions quantifying exercise? What is the geographical scope? (See 3.2 Organisational and operational boundaries). Which gases are taken into account? (See 3.3 'Gases taken into account'). What is the time-frame?

- **Inventory and collection of activity data:** What are the most suitable internal databases for the exercise? Which departments have these activity data? (See 3.4 'Activity data').

- **Rules for allocating GHG emissions:** which GHG emissions are taken into account: fossil energies burned (scope 1), indirect energy consumed (scope 2), other indirect emissions or financed emissions (scope 3)? How are these emissions allocated to the organisation's activities? (See 3.5 'Calculating GHG emission**s').**

- **Calculating emission factors:** on what basis (averages or estimates) are corresponding emission factors calculated? (See 3.6 'Emission factors').

- **Managing uncertainties in estimates:** what is the margin of uncertainty in the results?
  How is it incorporated when interpreting the results? (See 3.8 'Managing uncertainties')?

The issue of double-counts for financed emissions

Accounting for financed GHG emissions raises a new methodological challenge for carbon accounting. Indeed, as both production and consumption activities, or several economic players in a single value chain can be financed concurrently, the estimation of financed emissions runs the risk of the same GHG emissions being counted several times and thus producing skewed figures if the emissions financed by the organisation are consolidated. This type of double counting, which differs from that identified by ISO 14069, arises from the allocation of GHG emissions to different economic activities. As such it is important to explain the methodological conventions for handling these cases of double counting to limit them as much as possible.
(See 3.7 'Double counting').

3.2. Organisational, operational and temporal boundaries

3.2.1. Organisational boundaries

Organisational boundaries can take two forms:
1. The 'control' approach involves the reporting organisation counting emissions from the sites over which it has financial or operational control.
2. The equity share approach involves counting the emissions from sites in proportion to equity share.

3.2.2. Operational boundaries

Operational boundaries may be defined as the list of emissions categories deemed to be relevant and thus included in the calculation.
Several criteria should be taken into account in assessing the relevance of a given emissions category:

- Reliability of information: does accessible and reliable information exist for this category?
- Relative significance: is the volume of emissions under this category significant or negligible compared with other emissions categories? A so-called 'significance threshold' may be defined, below which a category will be deemed negligible.
- Levers for action: what are the possible levers for reducing emissions in this category?

The organisation should identify emissions from sources and the relative contributions of these categories.

3.2.3. Temporal boundaries

These boundaries are liable to vary through time. It is therefore essential for each player to develop a process for monitoring these boundaries in order to analyse any changes in results arising from changes in boundaries (acquisitions, disposals, mergers etc.).
Each carbon footprint includes different emissions categories which enables the questions raised by monitoring to be answered. These categories are referenced and standardised in an international ISO standard and GHG Protocol to which the methodological notes should refer.

3.3. Gases taken into account

The greenhouse gases included in this document and referred to as 'GH' below are the six gases included in the Kyoto protocol:

- Carbon dioxide (CO2)
- Methane (CH4)
- Nitrous oxide (N2O)
- Hydrofluorocarbons (HFC),
- Perfluorinated Hydrocarbons (PFC)
- Sulfur hexafluoride (CF6)

3.4. Activity data

We recommended that you use information that already exists in internal information systems to facilitate the collection of data and thus build a stable and time-proof protocol for quantifying GHG emissions. Collection must be documented to enable the calculations carried out and made public to be checked.

3.5. Calculating GHG emissions

Choices must be based on the principles for GHG emissions accounting in ISO 14064-1 and in the GHG Protocol:

- Completeness and Relevance: the quantification of financed GHG emissions must cover all activities (within the scope of analysis);
- Transparency: the basic methodological conventions must be documented and we recommend that you use open source public data;
- Accuracy: uncertainty relating to the data and imprecision of methods should be taken into account so as to ensure that GHG emission estimates have the required level of accuracy for their intended use;
- Consistency: we recommend producing future-proof procedures for reporting GHG emissions through time in order to monitor any changes and trends within the limits of accuracy of the quantifications. Methodological changes that emerge over time must be documented.

3.6. Emission factors

'Emission factors' used in quantifying GHG emissions are taken from measurements and calculations using average and estimated values. They are intended to be improved and updated.
In terms of emissions from operations, most main emission factors are taken from referenced databases (Carbon Database produced by l'Ademe, Ecoinvent, GaBI, ELCD, Defra, AIE, etc.). It is nevertheless important to remain vigilant in terms of the geographical boundaries for the factors in question18 and adapt them if needed.
In accordance with the principles of the ISO method as well as that of the GHGP, in certain cases it is possible to calculate one's own emission factors, either in the absence of factors or because those provided are not appropriate. In this case, the method used should be explained. In order to incorporate these emission factors when calculating the carbon footprint, it is essential to include the following information:

- Creation date,
- Last revised,
- Transparency of details, calculations and source estimates.

In the case of financed emissions, the use of public databases is also recommended.
Each report must be accompanied with a methodological note setting out the scope, database and methodology used as well as any significant impact of variations in emission factors on totals.

3.7. Double-counting

According to ISO 14069, double counting must be avoided in two cases:

1. Within a single organisation where two subsidiaries have each counted the transport for which one is invoicing the other for example.
2. Or within a single organisation where GHG emissions or capture are taken into account in different emissions categories. For example, the emissions from transporting the raw material of one organisation have been counted in the category 'upstream transport' whereas they also appear in the life-cycle inventory which enabled emission factors for the aforementioned raw materials to be established. Here, the same emissions have been counted twice by one organisation.

In the case of the financial sector, the risks of double counting when quantifying financed emissions is different. It is an issue of allocation. For example, in the case of a bank financing two businesses in the 'construction' and 'heavy industry' sectors. If 100% of emissions from cement production are allocated to both sectors, the consolidation of financed emissions associated with financing both businesses results in 200% of the emissions from cement production being counted in the bank's financed emissions. The situations giving rise to this kind of double-counting must be identified and handled robustly and transparently to eliminate them if the organisation consolidates its financed emissions. This process must be documented so as to ensure the figures are interpreted as accurately

3.8. Managing uncertainties

Estimates of GHG emissions are based on data that vary greatly in quality (activity data and emission factors) and as such are often very imprecise with only orders of magnitude being usable. It is worth attempting to measure the level of uncertainty and take it into account when interpreting results so as not to exceed the significance threshold for figures obtained.

Unlike traditional accounting practices, greenhouse gas balance sheets incorporate a margin of error or 'uncertainty'. This uncertainty may be estimated at the level of each elementary flow. It combines uncertainty relating to:

- the emission factor (for example the number of CO_2 kg equivalent resulting from burning a litre of oil assumed to be known to within 5%)
- data activity chosen for calculation (expressing for example the level of imprecision relating to the quantity of oil the company consumed).

The percentage of uncertainty of emission factors enters the emission factors database and thus follows the same rules in terms of application and updating as emission factors.

The use of the results must be compatible with the level of uncertainty determined, in particular where calculations include a scope 3 or financed emissions, given the level of uncertainty related to any data that is then necessary.

3.9. Communicating results

Communication must be tailored to the target readership:

- Internally, it helps to promote employee buy-in through the introduction of performance indicators (communication in the form of dashboards). It is a means of determining the effectiveness of the measures taken into account by operational staff in taking action on the carbon footprint of organisations.
- Externally, it is tailored to the environmental strategy of external stakeholders (clients, public authorities, shareholders, rating agencies, non-governmental organisations) and is an exercise in pedagogy and transparency through the annual report, the sustainable development report or other specific documents.

Further reading

This sectoral guide is based on the following methodological resources:

- ISO 14064-1 and ISO TR 14069:
  - ISO 14064-1 specifies the principles and requirements at the organisation level for the quantification and reporting of greenhouse gas emissions and removals. It includes requirements for the design, development, management, reporting and verification of an organisation's GHG inventory.
  - ISO TR 14069 provides guidance for the application of ISO 14069-1 to greenhouse gas inventories at the organisation level, for the quantification and reporting of direct emissions, energy indirect emissions and other indirect emissions.
  - Ademe's working document, 'Lignes directrices pour le développement d'un guide sectoriel bilan d'émission de gaz à effet de serre' – April 2014.
- The GHG Protocol framework: Corporate Accounting and Reporting Standards (Corporate Standard)
- Le Bilan Carbone, developed in 2004 for Ademe then taken over by the Association Bilan Carbone (ABC) in 2011, is a method for calculating an organisation's carbon footprint.

It draws on regulatory resources:

- The method for GHG emissions reporting, from article 75 of French law n°2010-788 of 12 July 2010. Three-yearly GHG emissions reporting is compulsory in France for 'private corporations employing more than five hundred people'.

In addition to the documentation on specific existing methodologies, other useful resources include:

- The report by 2°ii: 'des émissions financées aux indicateurs de performance climatique : état de l'art de la comptabilité des émissions de gaz à effet de serre pour le secteur financier' – June 2013
- The study by Ademe and OTC Conseil: 'Valorisation des enjeux climatiques dans l'analyse financière' - May 2011.

4. Methodology for quantifying the GHG emissions from operations in the finance sector

The purpose of this chapter is to set out the main methodological guidelines for quantifying GHG emissions from the operations of financial institutions. Volume 2 goes into more operational details and covers the specific features of the sector, category by category, as well as operating procedures for quantification.

4.1. Establishing organisational boundaries

Before a GHG emissions report is produced, its organisational boundaries should be determined. This involves defining and listing the entities to be included in the report.

Concept of control:

To help define the boundaries, it is recommended that a table is kept up to date, listing the entities included in the report, the sites where they operate as well as their nature (offices, branches, headquarters etc.) as well as whether or not they report to the entity reporting its emissions or are included in or excluded from the inventory. The significance of details in such a table will depend to large extent on the scope of boundaries.

Example of a table: the values are given solely as an example:

ENTITY	NATURE OF THE SITE	CONTROL	NATURE OF THE SITE
Company headquarters	Headquarters	Operational	Included
Subsidiary 1	Offices	Operational	Included
Subsidiary 1+2	Business centre	Operational	Included
Subsidiary 2	Commercial branches	Operational	Included
Subsidiary 2	Offices	Operational	Included
Subsidiary 3	Commercial Branches	No control	Excluded

Comments on the terminology used in this guide: for the remainder of this guide, the term, 'branch' refers to branches where a customer may perform their usual transactions and/or speak with an adviser. The term 'offices' refers to all other sites: headquarters, administrative offices, business centres. The term 'premises' covers all of the above.

Geographical area

It is essential to define the geographical boundaries of the GHG inventory. Indeed, an international group may decide to include all countries where it has a presence in this GHG emissions report, or merely all legal entities in a specific zone. For example, a group only established in France may opt to produce the report only for a region where it is established.

Critical mass

The exhaustive inventory of sources of GHG emissions may prove labour intensive for a large scale entity with many sites spread across a country. As such, each entity may opt not to include, or to extrapolate, certain sites to ensure reliable results or comply with restrictive regulatory reporting requirements.
It is nevertheless essential to provide evidence for, and to document, exclusions from the scope with, where possible, an order of magnitude of the impact.
In order to make it easier to determine boundaries, it may be useful to base them on the scope of employment data collection.

4.2. Establishing operational boundaries

Drawing on the relevance criteria set out under Chapter 3.3, it is possible to place the different categories into three groups:

- Priority category, such as emissions related to the entity's energy consumption, travel and purchase of supplies etc.
- Secondary category, such as emissions from customer travel or from waste etc.
- Categories not relevant to the sector within the scope of emissions from operations (item NR)

A table in Volume 2 summarises all categories that are relevant to the financial sector.

In order to rank the categories according to its own organisation, the entity may use a table in which it notes each of the three criteria (materiality, volume, levers for action) for each category, or sub-category. The categories that rank highest will be the priority categories. Conversely, those that rank the lowest may be excluded.

Example

Specific sub-categories for banks	Relevant for materiality	Relevance for volume of emissions as a proportion of the total	Relevant in terms of levers for action	Priority category	Secondary category	NR category
Headquarters	++	++	+++	x		
Branches	++	+++ (if bank network)	++ (if bank network)	x		
Data centre	++	++	+++	x		
Vehicle fleets	+	++	+++	x		
Liquid emissions from vehicle refrigerants	-	-	-			x
Liquid emissions from buildings refrigerants	-	+	+		x	

4.3. Recommendations

Volume 2 of this guide proposes the following breakdown for each of the emission categories referenced in ISO TR 14069:

- **Relevant activities and nature of the emissions**: description of the emission categories and related activities.
- **Specificities of the financial sector**: particular and specific aspects of the financial sector
- **Preferred method**: method recommended for calculating emissions
  - ***Data and sources:*** data to be collected in order to use the method. This point also includes suggested sources and sites within the entity or available from other partners for gathering these data.

Comment: data followed by an asterisk (*) are ratios or average values. Values are proposed in Annex 2 of Volume 2 where a relevant default value exists.

- ***Points for consideration****: additional important explanations about the method, data or emission factors.*
- ***Formula****: formula for applying the method.*

The values of emission factors proposed in the formulas are given in Volume 2.

- **Alternative methods**: presented in the same way as the preferred method, the alternative methods (one or two proposed methods depending on the category) are a means of calculating emissions where data for the preferred method is not available.

Comment: The alternative method formula does not always produce emissions directly, unlike the preferred method. In these cases, the proposed formula produces the data to which an appropriate emission factor will then be applied.

4.4. Uncertainty calculations

The user may estimate the accuracy of activity data in their GHG emissions report. The table below gives an indication of the level of uncertainty according to the original data source.

	Description	Example:	Possible estimation of uncertainty rates
Primary data	Data observed, taken from information systems and physical samples belonging to or used by the company (or a company in its supply chain).	Accounting, electricity meter readings, travel log obtained from the travel agency.	5 % to 20 %
Secondary data	Generic or averaged data from published sources which are representative of the activities of a company or its products	Kwh/m2/year stated in the ADEME database, ACV study	15 % to 40 %

	Description	Example:	Possible estimation of uncertainty rates
Extrapolated data	Primary or secondary data related to a similar activity which are adjusted or tailored to a new situation.	Estimated kilometres travelled for a commute to a site in town from another site in the suburbs, adjusting the average distances travelled.	20 % to 50 %
Approximate data	Primary or secondary data related to a similar activity which can be used instead of representative data. These existing data are used as is without adjustment.	Estimated kilometres travelled for the commute to a site from a similar site.	30 % to 50 %

The uncertainty of a category will incorporate the uncertainty estimated for an emission factor (for example the number of CO2 kg equivalent resulting from the combustion of a litre of petrol is assumed to be known within a margin of error of 5%), and the error estimated in the data chosen for calculation (expressing, for example, the imprecise knowledge of the quantity of petrol consumed by the company).

4.5. Communicating results

In order to make results more legible, facilitate the analysis of changes and in some cases compare the performance of several entities, it is essential to state the scope of the categories chosen or excluded. It is also worth stating which calculation method has been used for which category. The following table breaks down emissions in each category according to the methods chosen. If the category is excluded from the report, this is also specified.
Such a table makes it easier to understand the results of the report and to compare them with the results of other financial sector reports.

Example of a table: values are given solely as an example:

1. Direct emissions from stationary combustion	90%	10%	0%
2. Direct emissions from mobile combustion	0%	50%	50%
3. Direct process-related emissions			
4. Direct fugitive emissions	Excluded	Excluded	
5. Direct emissions and removals from land-use, land-use change and forestry (excluding combustion)			
6. Emissions from energy-related activities not included in direct emissions and energy indirect emissions	50%	50%	0%
7. Indirect emissions from consumed electricity imported through a physical network	50%	50%	
8. Emissions from energy-related activities not included in direct emissions and energy indirect emissions	0%	50%	50%
9. Purchased products and services	100%	0%	
10. Fixed assets	50%	50%	0%
11. Waste generated from organisational activities	90%	10%	0%
12. Upstream transport and distribution	Excluded	Excluded	
13. Business travel	50%	50%	
14. Upstream leased assets			
15. Investments			
16. Client and visitor travel	100 %		
17. Downstream transport and distribution			
18. Use stage of the product			
19. End of life of the product			
20. Franchises			
21. Downstream leased assets			
22. Employee commuting	100 %		
23. Other indirect emissions not included in the other 22 categories			

5. Methodology: financed emissions

Chapter 5 sets out methodological recommendations for quantifying financed emissions.

5.1. Two types of approach

Two types of approach can be identified:

- A micro-economic approach which involves incorporating the GHG emissions of clients of a financial institution line by line.
- A macro-economic approach which involves attributing global GHG emissions to the sources of finance based on their market share by sector and by geographical zone.

Financed GHG emissions may be quantified for specific areas of activity, a specific business, or one or several assets, a project or group of projects. As such a micro-economic approach is usually adopted. In this approach, methodologies used to attribute the GHG emissions of companies or financed projects to outstanding loans, may be referred to as 'bottom-up'. Where financial institutions seek to estimate their total financed GHG emissions within a broader scope for example, the activities of complex organisations such as universal banks or investment banks, it would seem difficult to apply a micro-economic approach. Bottom-up methodologies are not currently used by this type of financial player.

'Top-down' methodologies involving allocating all global GHG emissions to sources of finance based on the market share by sector and geographical zone of the financial players then enable to estimate an order of magnitude of global financed emissions as well as a mapping of emissions by sector and geographic zone (macro-economic approach).

5.2. 'Bottom-up' methodologies: a micro-economic approach

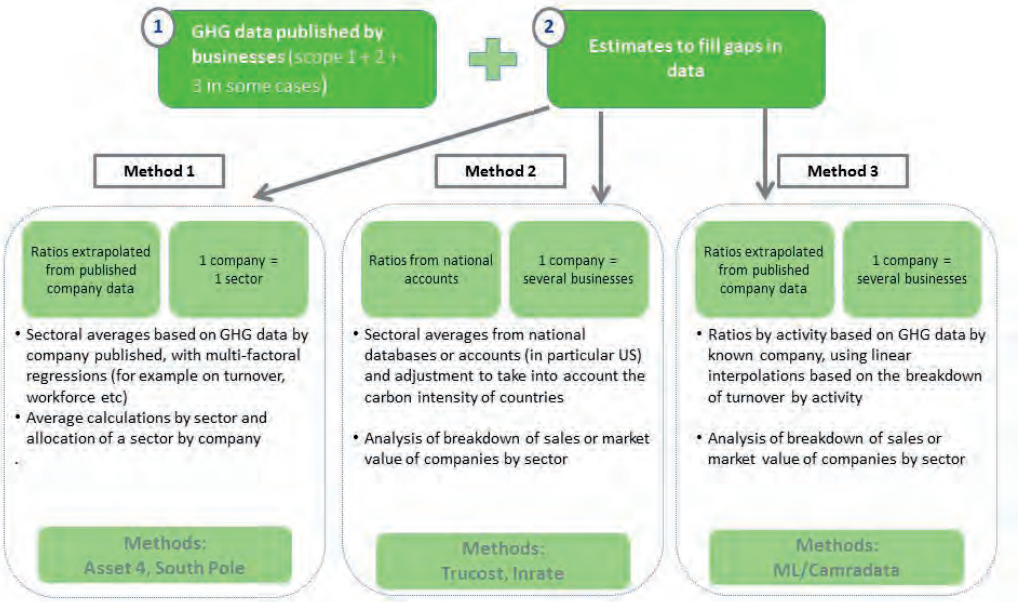
5.2.1. Principles

'Bottom-up' methodologies are based on emissions data produced by financed companies or projects as part of dedicated environmental reporting.

The launch of the Carbon Disclosure Project in 2000 led to the publication of a large quantity of data relating to the GHG emissions of major international companies, data which are now reproduced and combined by Bloomberg and Asset4. It is on the basis of these GHG emissions data that private operators such as Trucost and Inrate developed the first methodological tools for quantifying GHG aimed mainly at asset managers.

Where GHG emissions data are not available (particularly, where the companies involved are not listed), there are several methods for estimating missing data as set out below:

Principle of developing bottom-up methods for quantifying emissions generated *(according to analysis by Merill Lynch)*



5.2.2. Illustrations of bottom-up methodologies

Case study n° 1

MIROVA : rmethodological research into the quantification of GHG emissions adapted to asset management

JUntil 2013, Mirova, an asset management company which is part of the responsible investment group BPCE, restricted itself to qualitative assessments of the carbon performance of its investments. It found that until that point, carbon quantification methodologies had not been robust enough to assess the carbon performance of investments. In particular, Mirova considered that approaches restricted to 'Scope 1 and 2' provided only limited insight into the issue of the energy transition. For example, a company producing solar panels is only assessed on its emissions associated with the production of panels. 'Avoided' emissions associated with the use of the panel are not taken into account in the assessment. Similarly, an oil company is only assessed on the emissions associated with the extraction and refining of hydrocarbons, but not on emissions associated with the use of fuels.

In 2014, Mirova began to think about how investments could fit into a 2°C scenario. An initial internal study was developed to compare the breakdown of energy investment on the part of investment funds with the investment needs recommended by the International Energy Agency (IEA) in its study 'World Energy Investment Outlook'. The methodology, based on a bottom-up approach, involved an extensive review of companies within a given area of investment. For each company, an estimate of investments in each type of energy and in energy efficiency was carried out. These figures were then consolidated and compared with the figures recommended by the IEA.

The result of this exercise was in line with the messages of international bodies. Traditional investment strategies, relying to a large extent on indexes, show levels of investment in energy efficiency solutions and renewable energies to be much too low.
This exercise is intended to be a first step ahead of more in-depth work through which, in addition to the issue of the carbon footprint of funds, an attempt will be made to assess any carbon benefits for a given climate scenario. This work will focus in particular on taking into account the positive or negative impacts associated with products and services.

This approach obviously raises a number of methodological difficulties which are addressed in particular in this guide and the report '2ii: Des émissions financées aux indicateurs de performance climatique'. In particular, for an asset manager:

- the issue of allocating impact across the value chain raises serious difficulties. When a consumer uses their car, to whom should the CO2 emissions be allocated: the consumer? In this case the emissions will be invisible in the portfolio's report. The car manufacturer? The oil company? Based on which allocation key?
- the issue of the baseline scenario also needs to be addressed. Investing in a solar company is a means of avoiding CO2 emissions compared with a 'business as usual' scenario. But how can this 'business as usual' scenario be defined? Should this scenario be defined on a global basis? A local basis?
- access to information is always a complex issue in this type of approach. In many cases, estimates need to be made.

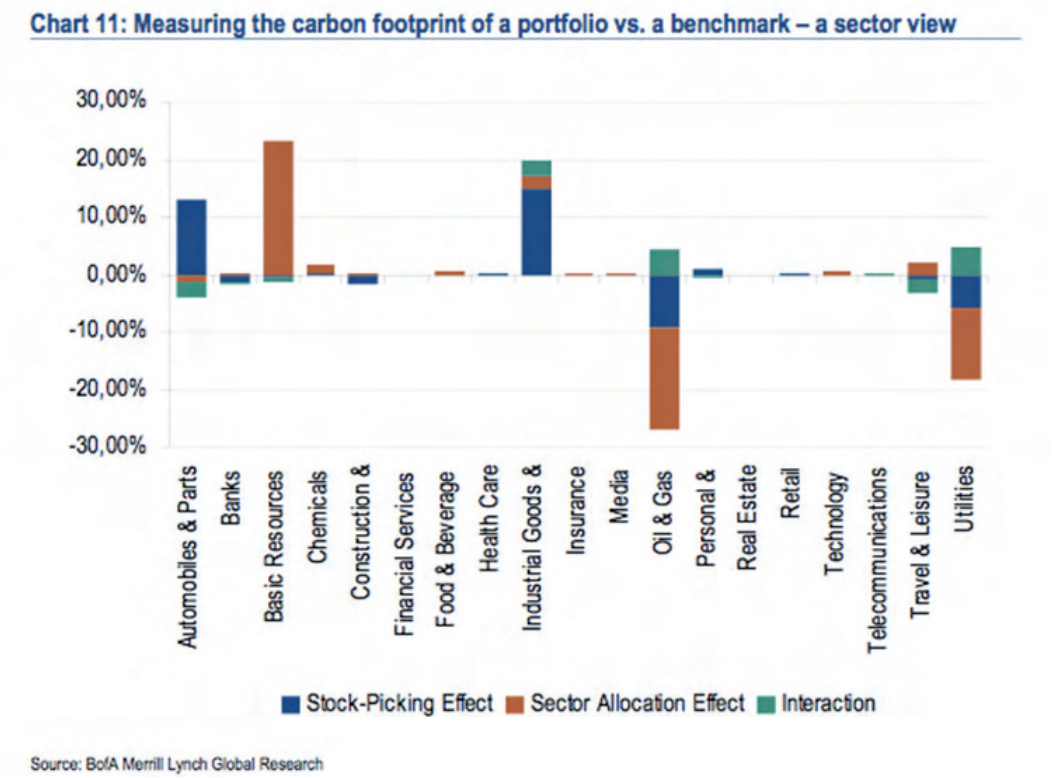
Case study n° 2

Feedback on the implementation of Bank of America Merrill Lynch's Carbon Screener

In 2013, Bank of America Merrill Lynch in partnership with the investment consultancy firm, Camradata, proposed both an original method for estimating the emissions of listed companies, and a method for calculating the carbon footprint of listed share portfolios using robust methods for allocating the contribution of financial performance. For this, it draws on Scope 1 and 2 emissions data published by over 1,000 listed companies and American industrial classification standards to offer estimates for 4,000 companies that do not publish their CO2 emissions.

BofAML analysts will compare the intensity of reported CO2 emissions to the turnover for each of the industrial activities and services, in addition to the traditional market classifications. By cross-referencing carbon intensity by activity with the breakdown of the company's turnover, BAML obtains an approximation that is specific to each company and may be reused to fill in any gaps in data when calculating the footprints of portfolios. The footprint is then calculated by separating out the contribution of any portfolio in terms of the effect of the sectoral allocation and in terms of the specific intra-sectoral choice of the manager (so-called stock picking effect).

The purpose of 'Carbon Screener' is to place the 'out-performance' of a portfolio in the context of its CO2 emissions baseline index and specifically to observe the impact of the sectoral composition



Case study n° 3

ERAFP : feedback on the implementation of a method for calculating the carbon footprint of a public pension fund's share portfolio

In March 2014, the ERAFP (Etablissement de Retraite Additionnelle de la Fonction Publique), a French public pension fund managing €18 billion, published the first carbon footprint of its portfolio of shares in major international listed companies. ERAFP, which opted for a 'bottom-up' approach, explains its motivations, the data used, the benefits and limitations of the exercise.

What is behind your approach?

Since its creation almost ten years ago, as a public pension fund the ERAFP has opted to develop a socially responsible investment policy (SRI) of its own. This policy is implemented through a so-called 'best in class19' management strategy, meaning that we invest in all sectors, without exception, with the aim of choosing the best businesses according to three criteria: the environment, social and governance (ESG). Indeed, ERAFP is convinced that 'best in class' SRI selection is a means of assessing the medium-long term risks more effectively and identifying the businesses which will drive the lasting growth to which we aspire in the future.

This strategy, the most used in France, is sometimes criticised for its lack of transparency and difficulty in reporting on its real environmental and broader societal impact: a crisis of legitimacy as it were. More recently, ERAFP has raised questions about the effectiveness of its SRI approach in terms of mitigating carbon and climate risk.

It is with this in mind that we decided to attempt to quantify greenhouse gas emissions generated by our investments, in traded shares in major companies initially (€3.4 billion in investment, or 23% of ERAFP assets as of the date of the exercise).

There are many methods for measuring a carbon footprint. Which did you decide to implement and why?

First and foremost it is important to specify that the ERAFP wanted support in calculating the carbon footprint of its equity investments. Indeed, collecting the data on greenhouse gas emissions of all companies that make up the stock index is a long-term undertaking which requires dedicated staff and resources. In the face of wide-ranging methodologies developed to count the emissions underlying a portfolio of financial assets, the investor must make decisions based on the main objectives assigned to the exercise.

In the ERAFP's case, it was mainly about testing the effectiveness of its best in class approach. As such, the methodology used needed to be able to separate out the impact of the choice of shares within each sector in terms of CO2 emissions. There also needed to be limited use of estimates based on the allocation of average emissions levels to businesses according to their activity. Indeed, how can a distinction be drawn between the practices of different businesses within a sector if the starting point is the scenario that businesses with the same activity have the same emission levels? Conversely, the issue of neutralising 'double-counts' was not crucial for us, given that we wanted first and foremost to test the appropriateness of choosing shares between sectors.

The quality of data and estimates relating to CO2 emissions is also an issue. Indeed, this is why for the time being we have restricted ourselves to calculating the carbon footprint of our portfolio of shares in major companies, for which we tend to have access to quality data. Using a bottom-up methodology also allows us to set in motion shareholder engagement initiatives with the companies in which we invest, based on results at the issuer and/or sectoral level.

As such, due to these objectives and a relatively homogeneous and restricted investment universe (traded shares in major international companies), we quickly came to opt for 'bottom-up' methodologies which offer the major advantage of increased granularity in the way data is exploited. Based on our internal selection criteria, we opted to work with Trucost20, the database of which guarantees the limited use of extrapolations, with a comprehensive scope for analysing GHG emissions (scope 1 + scope 2 + tier 1 suppliers) and a tool which can be used to carry out 'performance attributions' and therefore to separate out the impact of the selection of shares within each sector from that of the sectoral allocation.

What are the results of the carbon footprint and what benefits have you drawn from them?

The main outcome of this study is that the ERAFP's equity investments are resulting in standardised greenhouse gas emissions that are 19% lower than those of a traditional market index (MSCI World in this case). As such, this carbon footprint offered some evidence of the effectiveness of our best-in-class approach. Indeed, if only the impact of the selection of shares within each sector is taken into account, in other words if the effect of over- or under-weighting of certain sectors is neutralised, the gap is still 11%. In other words, the decarbonisation of ERAFP's share portfolio compared with the index can be explained in one third of cases by the choice of sectoral allocation (over- or under-weighting of a sector compared with the index) and in two thirds of cases by the choice of shares within each sector, itself influenced by our SRI policy.

For ERAFP beneficiaries, for whom our SRI policy may seem complex, this offers a tangible indicator of the positive impact of such an approach on the environment.

What are the limitations of the exercise and the difficulties encountered?

We did not encounter any particular difficulties but remain aware that there remains scope for improvement in the quality of data published by businesses and the methodologies for counting emissions if tools for calculating the carbon footprint of share portfolios are to become more operational for investors.

In particular, the scope of emissions taken into account must be extended, particularly if we are to calculate the impact of the products and services of businesses more effectively. Work on the sectoral classifications developed by the main suppliers of market indexes must also be carried out so as not to create a bias within the sectors used as a baseline. Indeed, the best-in-class approach is only consistent if the sectors to which it is applied are homogeneous. A sector as broad as the oil sector includes prospecting, production, transportation, refinery and distribution companies, the activities of which vary significantly in terms of their carbon footprint. As such, the methodologies must improve the granularity of their data so as to maximise the relevancy of results and the benefit that might be derived by the sponsors and users of such studies.

Finally, although our carbon footprint allowed us to better assess the issue of carbon risk, the volumes of emissions that could be attributed to our shareholders, and the performance of the businesses in which we invest, it cannot provide a definitive answer to the carbon and climate risks facing investors.

What next steps are you considering in the areas of carbon and climate risk?

In the coming months two projects will be launched by ERAFP in parallel. In the short-term the carbon footprint exercise will be extended to other categories of assets in which the ERAFP is currently investing. We would also like to encourage, support and contribute to R&D programmes (under the 2°C Investing initiative for example) which are aimed at developing tools for measuring the alignment of investments with climate objectives and moving funds towards investments that protect the climate.

Case study n° 4

Trucost : snapshot of the methodological principles behind the tools for calculating a carbon footprint

The methodological principles and tools we use vary according to the data that our client has access to, as well as the category of asset analysed. We use mainly five sources of information we combine according to the project. These sources are described below.

For example, for analysis into a portfolio of infrastructures (by the Caisse des Dépôts et Consignations for example), we combine numerous data from life cycle analysis and a 'bottom-up' approach by asset to ascertain the carbon impact and carbon savings across the asset's lifetime. We then assign a proportion of net impact (positive or negative) to the portfolio according to the funds invested. An increasing number of clients are interested in calculating the carbon savings of certain types of investments such as direct investments in wind energy (study conducted for the Danish pension fund PKA). For this we use primary data collected for the projects and use a GHG Protocol methodology to carry out the carbon accounting of projects and to quantify the additional carbon savings made as a result of the funds invested.

Other projects use a more 'top-down' approach. For example, we recently partnered up with the European Development Bank which wanted to understand the environmental impact per million in long-term credit/ debt allocated to a particular sector. We adopted a macro 'top-down' approach to calculate this impact, allocating total emissions of a sector to the amount of long-term debt issued by that sector. This example illustrates the different methodologies that can be adopted to offer solutions tailored to our clients' requirements.

In the case of portfolios of traded shares, in order to quantify the carbon footprint of a portfolio we use 'cleaned' data from our database (described below) and the profiles of our own EEIO model (Environmentally Extended Input Output Model) to fill the gap in data (also described below).

We believe that the quality of our data, taken from business's reports then cleaned up, the level of granularity of our model (split into 531 separate sectors) and the sophistication of the 'bottom-up' approach used to calculate the coefficients of our model, are what gives our analysis the edge. The standard methodology we used to calculate the carbon footprint of portfolio of traded shares is to allocate carbon emissions (Scope 1 and 2) to a portfolio according to the equity share held for each asset and to proceed in the same way for the benchmark. The results are then standardised to obtain results such as the following: For every million Euros invested by the portfolio, how many tonnes of carbon are generated? How does the portfolio's performance compare to its benchmark?

The example of the carbon footprint attached shows that these results may be attributed to the various sectors in the portfolio to analyse the impact of the sector attribution and the impact of the choice of assets in a given sector (stock selection). Our clients like our approach which enables them to understand the reasons behind their carbon footprint. Most of our clients are interested in Scope 1 and 2, insofar as Scope 2 includes the electricity used, over which the company has significant control and which gives it high exposure to risks related to the price of energy and carbon regulations. However, some clients prefer not to include Scope 2 so as to prevent double-counts.

To meet such requirements, our Eboard platform can be used to tailor data analysis, by selecting scopes to be included in the analysis. We include Scope 2 in our standard methodology due to the importance of including in the selection of shares, on the one hand the costs, and on the other hand the energy impact of the use of electricity.

At the global or country level, aggregating all Scope 1 and 2s from all countries results in double counting (as the Scope 1 of one company is the Scope 2 of another). However, from the point of view of selecting assets and understanding the source of the carbon footprint of a portfolio, the question becomes less relevant, insofar as the purpose of calculating a carbon footprint is not to obtain total global emissions but rather to identify the companies in the portfolio with the highest emissions and those presenting the greatest risk. As such, excluding Scope 2 from the analysis would only give an impartial response to these questions.

A few examples of the data and tools used by Trucost.

1. Environmental database from company reports: Developed by Trucost, it covers over 5,000 companies over a ten year period and hundreds of environmental data such as GHG, water, waste and soil and air pollution. These data are included in Scope 1,2 and 3 if reported by companies.
2. Trucost's exclusive EEIO model (Environmentally Extended Input Output Model): in the absence of data reported by the companies, the EEIO model may be used to fill in any gaps in the data. This unique and innovative econometric model calculates the environmental resources and impacts required by a company to generate its economic output.
3. Company profiles compiled by Trucost: The creation of a profile based on analysis of the company's various sectors of activity (531 options according to our model) then the distribution of revenue between those sectors produces a profile using the EEIO model. Any data reported by the company replaces the data estimated by the model if it is deemed to be of sufficient quality.
4. Inventories of life cycle analysis e.g.: Ecoinvent.
5. Trucost database of natural capital valuations.
6. Other sources of environmental impact data: FAO, Hoekstra, UN, World Bank, Aquastat, Pfist etc.

Case study n° 5

The pioneering example of the French Development Agency (Agence Française de Développement - AFD) in implementing a systematic estimation of the carbon impact of French aid project finance.

A systematic review of the carbon impact of the agency's financial operations, an approach which reflects French commitments to combating climate change.

With over €15 billion in finance granted between 2005 and 2013 for investments with a climate-related co-benefit, AFD is currently a major and innovative player in climate finance at the international level, both in quantitative and qualitative terms and particularly in terms of the financial methods and instruments used. Thanks to high levels of finance, a wide range of flexible tools, knowledge of the field and recognised experience, AFD has the comparative advantage for pursuing and consolidating its action to combat climate change and put in place climate-related resources or international and European mandates. As part of France's commitments to combating climate climate change, the Group Agence Française de Développement is seeking to promote low-carbon development through the operations it finances, in accordance with its strategy and action plan for 2012-2016. This strategy, which is intended to be formative, is the result of action undertaken by AFD over a number of years on the issue of climate change. It is based on three pillars which are broken down operationally according to the target geographical area:

- a long-term financial target of 50% of AFD finance to be awarded to climate projects
- in developing countries and 30% of the finance by its subsidiary Proparco to the private sector;
- systematic measurement of the carbon footprint of projects using a robust, transparent methodology;
- a policy of selecting projects according to their climate impact, taking into account the level of development of the countries in question.

One of the strands of this strategy is a systematic review of the carbon impact of the projects using a robust, transparent methodology. Since 2007, with the help of Carbone 4, AFD has developed and improved a methodology and tool for quantifying and reducing the greenhouse gas emissions of the projects it helps to finance which is helping to account for the expected impact of mitigation in combating climate change. The GHG report over the lifetime of a project includes any emissions occurring during its construction, operations, maintenance and dismantling.

The carbon footprint methodology

The tool is a means of estimating the climate impact of a project/investment using operational data available as part of the initial exploratory stages - i.e. during the feasibility study phase aimed at verifying the technical, economic, organisational and financial viability of the project. The estimation of emissions or reduction of emissions that the future activity is liable to generate is achieved by applying the methodology and using the tool which is made available to operational structures. As such it is possible to determine the carbon footprint of a project in three stages:

1. by estimating the emissions generated by its existence, i.e. both through its construction and operations.
2. by highlighting the difference in emissions between this project finance situation and a baseline without a project but reflecting a set of dynamic scenarios involving changes which would have occurred without the new investment/project.
3. The net balance of emissions reductions and emissions generated can determine whether the project has a positive or negative impact on climate change.

The 'net' footprint of the project is therefore calculated by subtracting from these 'gross' emissions the total emissions of a baseline, i.e. the scenario without the project. In order to reconcile development and combating climate change, the calculation of CO2 emissions associated with financed projects using the Carbon Footprint should reveal potential for limiting emissions to be studied in the initial exploratory stages and favour operations that optimise this climate co-benefit.

This carbon footprint provision is included in AFD's operational manual and incorporates an estimation of the carbon footprint of projects as early as possible in the finance feasibility stage.

Projects selected based on their 'climate' impact
This carbon footprint measurement, which is used as soon as the financial operation is identified and is refined gradually over the feasibility stage, is not only used to help to account for 'climate' issues when studying the feasibility of its finance and accountability of shareholders and AFD stakeholders, but also as a means of robustly classifying the Group's climate change mitigation projects.
In addition, the AFD has made use of a project selection grid, the purpose of which is to help to identify projects by looking for those which also offer climate co-benefits and by ceasing to invest in certain high-emission projects depending on the economic level of the country, the financial instrument used and the part played by the climate in the country's development policies.

	Pays les moins avancés ou en crise	Pays à revenu intermédiaire	Pays émergents
PROJET D'ATTÉNUATION ($< -10 KteqCO_2/an$) Ou **PROJET À IMPACT NÉGLIGEABLE** (entre $-10 kteqCO_2/an$ et $10 kteqCO_2/an$)	Financement possible par le groupe AFD.	Financement possible par le groupe AFD.	Financement possible par le groupe AFD.
PROJET ÉMISSIF (entre $10 KteqCO_2/an$ et $1 MteqCO_2/an$)	Financement possible par le groupe AFD.	Financement possible par le groupe AFD.	Financement, si le concours n'est pas concessionnel. Si le concours est concessionnel, financement si et seulement si le pays a une politique climat.
PROJET FORTEMENT ÉMISSIF ($>1 MteqCO_2/an$)	Financement possible. Si le concours est concessionnel le pays doit être engagé dans une politique climat.	Pas de financement, sauf si le pays a une politique climat.	Le groupe AFD ne finance pas ces projets.

A pioneering approach within international multilateral institutions which has given rise to a harmonised international framework.
AFD is playing a pioneering role within international financial institutions and development banks on these issues of measuring carbon footprints and has been invited to enter into several partnerships with other financial institutions in both the developed and developing world. It is on this basis that in 2012 multilateral financial institutions and development banks, including the World Bank, The Asian Development Bank, the EBRD, the AFD and KfW agree to common principles for a harmonised approach to greenhouse gas accounting. In addition to these procedures and methods in helping to assess the impact of the projects financed by AFD, by developing and sharing these accounting methodologies, the agency is also contributing to efforts to standardise the international community's climate measuring and reporting tools.

Perspectives
AFD is trialling a method for accounting for vulnerability to the effects of climate change of the projects it finances so as to provide an appropriate response during the feasibility study and lifespan of its projects. It is also seeking to assess the impact of its action on adaptation to the effects of climate change more effectively and to report on it. In addition, AFD is aware that this is just a first stage and, working alongside its partners and the scientific community, intends to pursue its efforts to harmonise practices and develop indicators and measurements allowing a more global and advanced assessment of the sometimes complex impacts in order to aid decision-making and the evaluation of the effectiveness of its work.

To find out more about AFD's climate approach:

To find out more about AFD's climate approach:
http://www.afd.fr/home/projets_afd/AFD-et-environnement/changement_climatique
particularly: 'Concilier développement et lutte contre la changement climatique - Plan d'actions 2012-2016'

Case study n° 6

The European Investment Bank's carbon strategy, a tool for promoting the European Union's climate change policy

The carbon footprint of European Investment Bank projects

As the bank of the European Union, the European Investment Bank is committed to promoting the European policy on climate change , to positioning itself as a multilateral agency leading on climate finance, encouraging low-carbon, climate-resilient growth both within the European Union and beyond its borders. Climate action is one of the cross-cutting objectives of the EIB's public policy, supported by a substantial portfolio of projects in climate-related sectors. A global climate action target was introduced in 2010 with a commitment to invest 20% of the EIB's lending portfolio in climate action projects, with this target being increased to 25% for the 2012-2014 period. A set of coherent definitions and standards is used to determine which projects or project consequences are attributable to climate action. In addition to the specific volume of climate actions, the EIB has sought to do more to incorporate climate-related considerations in the processes it uses in order to assess, monitor and evaluate all projects.

In this context, since 2009, drawing on the best international practices, the Bank has studied methods for assessing the volume of Greenhouse Gas Emissions from significant investment projects. Today the carbon footprint of projects is mainstreamed into the Bank's operations following a pilot from 2009 to 2011. The EIB applies its carbon footprint methodology to all sectors and not just to projects related to climate change mitigation. An external audit and review of data for 2011 were carried out in 2013, confirming the approach to the carbon footprint exercise (CFE) and its methodology The aim is to continuously improve the CFE method by learning from other financial institutions and partners and to play an active role working alongside other IFI (International Financial Institutions) in the working group for a Harmonised
Approach to Greenhouse Gas Accounting.

Factoring in an economic cost for carbon in projects financed

In order to incorporate climate considerations (measured in tonnes of carbon dioxide equivalent) in economic assessment (cost benefit analysis in Euros), carbon needs to be given an economic cost. In accordance with its best practice, the bank has adopted an increasing value for carbon, currently set in relation to a baseline scenario at €27 (for the emission of one tonne of CO2 equivalent in 2012, measured at the 2006 price), with a subsequent annual adder of around €1. These values are based on a review of available scientific evidence and have been subject to regular review subsequently.

- **EIB's carbon footprint approach**

The absolute GHG emissions of each project are at the heart of our carbon footprint approach. Whereas the evaluation and reporting of savings and increases in GHG emissions give an important indication of GHG emissions in comparison with other technologies or other projects, the absolute GHG emissions of a project are considered to be a fundamental aspect as it is these that will ultimately affect our climate. When estimating savings and increases in GHG emissions, we consider it important to compare emissions between projects as consistently as possible, particularly for the power generation sector. In order to estimate savings and increase in GHG emissions, the Bank uses the same approach involving points of comparison for all new power generation projects, whether using renewable energy or not. In order to review the overall impact of the loans, it is considered important to evaluate the significant GHG emissions of all the sectors financed, not just green sectors. Conventional power generation and renewable energy and power transmission lines, energy efficiency, transport, industry, water and waste are the key sectors from which projects are included in the annual carbon footprint exercise. It enables the Bank to assess the contribution of each type of loan.

The methodology

Insofar as possible, the carbon footprint work is incorporated in the project appraisal (point of comparison etc.). Two types of GHG emissions data are estimated for a typical year of project operations:

- the project's absolute GHG emissions, i.e. its actual emissions, and the energy purchased / acquired by the project;
- relative GHG emissions, i.e. the increase or reduction in emissions from the project compared with a baseline scenario without the implementation of that project.

However, the methodological restrictions and the limitations related to available data mean that carbon footprint measurements cannot cover all mitigation aspects of a project. For carbon footprinting, an estimate and GHG emissions report are produced for projects where emissions are expected to be significant, i.e. emissions above one of the following thresholds:

- Absolute emissions (project's actual emissions) greater than 100, 000 tCO2-e per year for a standard year of operations

And / or

- Relative emissions (estimate of emissions increases or savings or emissions avoided compared with the expected alternative scenario) greater than 20,000 tCO2-e per year.

Analysis of carbon footprinting suggests that these two thresholds capture approximately 95% of GHG emissions from EIB investment projects. The Bank's threshold for inclusion in carbon footprinting is strictly enforced to prevent any possible distortion of the results through random selection whilst acknowledging that other EIB projects that are not included in the exercise are also the target of GHG emission savings, for example, credit lines dedicated to energy efficiency.

Transparency

The project data in absolute and relative figures have been published since 2012 for projects above the emission thresholds and are available in the environmental information publications on the Bank's website. Moreover, since 2012, the current version of EIB methodologies for estimating GHG emissions has also been published: http://www.eib.org/about/documents/footprint-methodologies.htm

We are currently at version 10.1 and the 11th version is under development for publication later this year - it will incorporate the recent audit conclusions. As such, carbon footprinting is a work in progress, undergoing continuous improvement.

Each year, the consolidated figures from absolute and relative emissions are published in the Bank's annual report and these figures are consolidated for all projects included in carbon footprinting for that year, i.e. all lending over that year (or any major lending commitments approved that year). These consolidated data are based on the figures calculated on a pro rata basis of actual lending by the EIB during that year in order to prevent double-counting with other financial institutions.

Project footprint 2013

In 2013, 67 of the projects in our portfolio had estimated emissions above the absolute or relative emissions thresholds and were as such included in the 2013 carbon footprint exercise. They amount to a total of €13.8 in loan signatures or approvals. Absolute correlated emissions are estimated at 3.2 Mt equivalent CO2 per year with total savings through the projects in question estimated at 2.4 Mt CO2-equivalent per year.

Projects included in the CFE	2013	2012	2011
No. of projects	67	61	71
Total EIB amount signed[a] - EUR bn	13.8	11.2	11.4
Total project cost – EUR bn	79.6	45.7	55.4
Average % EIB-financed	17%	25%	21%
Absolute emissions – Mt CO_2-eq/year	3.2	5.7	7.5
Relative emissions – Mt CO_2-eq/year	-2.4	-3.0	-2.1

Individual project GHG data are assessed at appraisal but for the purposes of annual reporting the project figures are aggregated, based on prorated figures in proportion to the volume of EIB funding of each project. Thus if the EIB funds 50% of a project in a particular year, 50% of the project emissions will be reported in that year.

NB the 2011 data is based on the 2011 Pilot Carbon Footprint methodology. The methodology was revised and updated for the 2012 and subsequent exercises.

The above table illustrates the results of the consolidated figures for the last three years of EIB projects in the carbon footprint exercise. In 2013 absolute emissions figures were affected by the reduction in the number of power plants in the European Union as a result of the reduction in the number of such projects in the EIB portfolio. Despite our conservative approach to the carbon footprint exercise, each year global emissions figures show extensive GHG emissions savings, estimated at a consolidated figure of between 2 and 3 Mt CO2 equivalent each year.

5.3. Suitability of the micro-economic approach

There is grounds for using a 'bottom-up' type methodology when evaluating financed GHG emissions from a given portfolio or specific activity (assets management, project finance). This methodological approach may allow carbon performance indicators to be produced for such activities. Processing emissions data from clients (directly or indirectly), tends to offer more accurate results than using the macro-economic approach. This allows changes in GHG emissions associated with a portfolio to be monitored year-on-year.
However, several aspects may limit the usefulness of such an approach for broader or more varied sectors of activity:

- number of clients and transactions
- nature of transactions which are sometimes difficult to attribute to specific physical assets
- corporate clients belong to all economic sectors which results in double-counting of emissions (the Scope 1 emissions of one client are accounted for in Scope 2 and Scope 3 of many others)
- the lack of data relating to the carbon footprint of some clients (individual customers and small business or businesses in certain countries)
- complexity of consolidation rules for financial players who have diversified across several business lines.

5.4. 'Top-down' methodologies: a macro-economic approach

Another strategy involves allocating global emissions to their source of finance on the basis of a sectoral and geographical breakdown.
A 'top-down' methodology for quantifying financed emissions thus consists of allocating all GHG emissions to sources of finance (through bank debts, bond debt and equity - which are the three usual forms of financing the economy) based on their market share according to the chosen sectoral and geographical breakdown.

An example of 'top-down' methodology: the P9XCA methodology

The aim of the P9XCA methodology, developed at the initiative of Crédit Agricole CIB by the Sustainable Development Chair of Paris Dauphine University, is to map the emissions resulting from financing and proprietary investment in macro-sectors quantitatively according to financial players, sector and geographical zone.
Financed emissions are calculated according to the rule set out below:

$$\text{Financed emissions } (s,p) = \text{Commitment}(s,p) \times \frac{\text{Emissions } (s,p)}{\text{Total finance } (s,p)}$$

With:

- Financed emissions (s,p): Emissions generated by financing and proprietary investment, by macro-sector and by country (or by geographical zone)
- Commitments (s,p): Outstanding amount of loans and investments in the balance sheet of the financial institution by sector and by country or geographical area (non-public data)
- Emissions (s,p): Emissions by sector and by country, according to the scope of emissions in question
- Total finance (s,p): Total finance by sector and country (debt + equity)

Ratios $\frac{\text{Emissions } (s,p) \text{ Total}}{\text{finance } (s,p)}$ by sector and by country (or by geographical zone) are the 'Emission factors' of the method, shared by all players (see Volume 3).

The emissions taken into account are the annual GHG emissions by sector (production and/or consumption) and by country. The methodology does not take into account cumulative historic (past) emissions nor future emissions.

These emissions are broken down on a pro-rata basis according to finance and investment outstanding in the macro-sectors.

In the P9XCA methodology, all global GHG emissions are allocated to sources of finance on a pro-rata basis of their share of finance (in debts and equity). Thus, in order to obtain figures that can be consolidated, only outstanding credit and equity shares included in the balance sheet of financial institutions are used. Financial flows between banks and trading that do not constitute finance21 (such as swaps, hedging products) and are not taken into account. The methodology only takes into account finance of activities that actually emit GHGs.

Financial institutions often finance both production and consumption activities; therefore the risk of double counting when carrying out an overall calculation of financed emissions seems high. As such, clear and specific rules for allocating GHG emissions should be adopted. The P9XCA methodology allocates all GHG emissions to production (economic sectors), i.e. to the financing of companies and, marginally to States in the government sector.

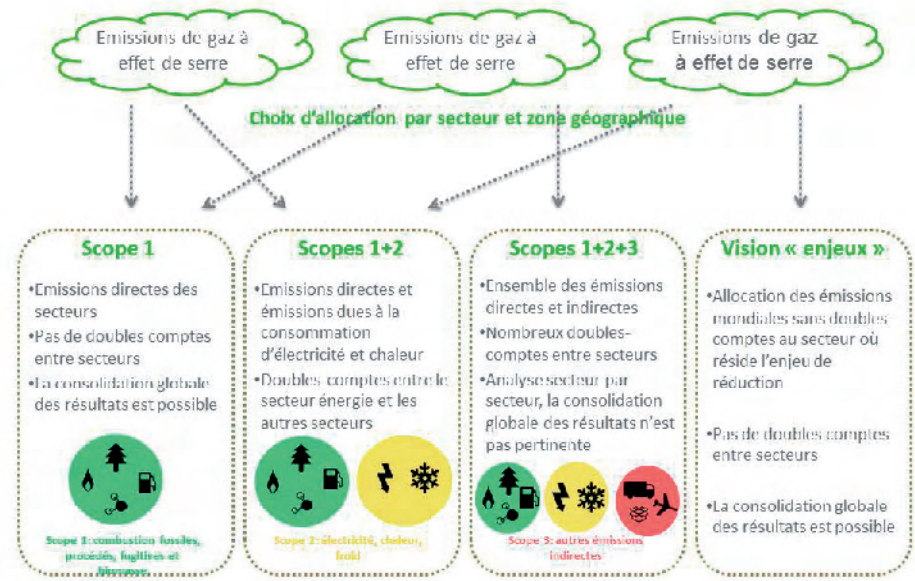
But an allocation of the same emissions to consumer activities (household and public administration) would be preferable in the case of a player whose activity is particularly focussed on private individuals and/or government. Similarly, rules for allocating GHG emissions to intermediary activities could be determined, for example by breaking GHG emissions down according to source ownership: companies, households and administration. This option has the benefit of allowing the financing of production and consumption to be consolidated but necessarily dilutes the carbon signal between producers and consumers.

Annual GHG emissions by sector and by country may be seen from two perspectives: one involving quantification by 'scope' allowing direct and indirect emissions associated with the financing of macro-sectors to be quantified, and the other an 'issue'-based perspective (see below) offering a strategic analysis of the emissions of macro-sectors according to their capacity for reduction

'Issue'-based perspective

This approach is based on the rule of specific allocation of global GHG emissions by macro-sector. This means allocating GHG emissions to sectors according to their capacity for reduction (Rose, 2013, 2014). The 'issue' of an economic agent is the quantity of GHG emissions that this agent is liable to reduce in an economy where heavy restrictions on GHG emissions are introduced (carbon prices, taxes, standards). In this context the internalisation of any additional cost would lead to a reduced demand for high-carbon, in favour of lower carbon, goods. The producer of the high carbon goods should then respond to the change in demand through 'innovation in processes' (efficiency savings throughout the product life). The GHG emissions targeted by these innovative approaches are the producer's 'issue'.

The choice of allocation by sector and geographical zone will lead to substantial methodological differences detailed below.



5.5. Suitability of the macro-economic approach

The macro-economic approach to quantifying GHG emissions can be used to map financed emissions by sector and geographical area for financial players with broad and varied activities.
The freedoms given in terms of allocating the GHG emissions between different sectors, according to a scope-based perspective or an issue-based perspective, allow financial institutions to develop their own methodology based on the objectives they set themselves. Moreover, top-down methodologies can be based on free open-source data. The application of a 'top-down' methodology is possible for a large range of assets by players wishing to map financed emissions. It should be noted that the P9XCA methodology, as it is currently designed, may be relevant for investment banks as all emissions are allocated to a macro-sector (0 emissions allocated to households and partial view of financed emissions for sovereign assets).

However, the accuracy of macro-economic approaches remains limited and uncertainties relating to inaccuracies in the GHG emissions data and their allocation to economic activities mean that comparisons cannot be made between different financial players.

The application of a 'top-down' method allows an order of magnitude calculation of global financed emissions and the sectoral and geographical mapping of these annual emissions related to proprietary trading. Uncertainties associated with the results remain relatively high. These are due to uncertainties associated with the emission factors used and uncertainties relating to activity data collected (balance sheet stocks and their classification). This methodology is not intended to be a monitoring tool, nor to be used to calculate avoided emissions. Moreover, due to the significant uncertainty (particularly arising from methods of economic classification that are largely unsuited to the climate issue: example of the energy sector) they do not allow the results of different financial players to be compared.
Nevertheless, these uncertainties do not undermine the objective of calculating an order of magnitude of financed emissions and mapping emissions by sector and geographical zone. The ranking of sectors and geographical zones in terms of greenhouse gas emissions is indeed robust, which allows players to identify sectors where action is a priority. Moreover, this methodology produces results that can be aggregated.

5.6. Choosing approach

Two types of approach (micro-economic or macro-economic) can thus be implemented. The choice of a methodology will depend on the characteristics of financial players, their context and the objectives they set themselves. Such a methodology should nevertheless follow the general recommendations set out in Chapter 5.

In accordance with the four principles of the GHG Protocol set out in Chapter 3.6, it would seem that:
- 'Bottom-up' methodologies are particularly suitable for a limited scope; they allow a detailed overview of financed activities but require large quantities of information.
- Top-down methodologies are more specifically suited to a broader scope; they allow a global overview of carbon issues in diversified portfolios but as yet lack precision.
- 'Bottom-up' methodologies are widespread and currently developed by many service-providers (see table in Chapter 1.3.4) who can be approached by readers wishing to implement them. AFD's methodology for project portfolios has the advantage of being freely accessible.
- 'Top-down' methodologies are more recent. One of them is presented in Volume 3 of this guide.

The table below summarises the benefits and limitations of the various methodologies identified and the recommendations for use according to the type of financial player:

Category of method	Bottom-up, applicable to many categories of assets	Bottom-up, for project finance and infrastructure investment	Top-down by issues	Top-down by scope
Method creator	- Trucost, - SouthPole Carbon, - Money Footprint, - Inrate Envimpact, - Cross asset Footprint, - Carbon screener (BofA Camradata), - ASN Ecofys, - CarbonTracker, - Profundo[23]	- AFD, - IFC, - KFW, - BEI - CDC Infrastructure	Sustainable development chair	P9XCA by scope, see Volume 3
Purpose of the method	➔ Access to traceable data for dialogue with managers or investors. ➔ Measuring the impact of the organisation's SRI policies (debatable) ➔ Taking asset allocation into account in decision-making	➔ Help in selecting involvements/finance ➔ Reporting (ultimately) as for the time being these methods are essentially applied ex-ante (during the information-gathering phase) and not ex-post (reporting)	➔ Order of magnitude of financed emissions (including for reporting purposes in calculating the Scope 3 of financial players) ➔ Sectoral and geographical mapping of these emissions	
Organisational boundaries	Managed funds Financial institutions	Financed projects	Financial institutions	
Scopes	Scope 1, 2, 3 , multiple selection	Scope 1, 2 et 3	Not applicable	Scope 1, 2 et 3
Periodicity	Annually, or for a portfolio audit or specific investigation	For each project in the information-gathering phase	Every three years or any other frequency	
Interlocutors and users	Asset managers, pension funds	Specialists in project finance internationally and long-term investors in infrastructures	Corporate and investment banks and universal banks	
Budget	Chargeable portfolio audit, chargeable licence to access detailed data (eBoard product)	Methods generally free to use or developed by TruCost in the case of the CDC methodology.	Methodology free and open source	
Limitations	- Labour intensive due to the need to recover activity data and certify and approve emissions line-by-line. Is not suitable for very broad scopes (e.g. multi-business finance players) - Restricted accessibility of data for non-listed clients. - Double-counting	- Requires systematic data collection for projects - Effect of overwriting results and annual variations in the event of a significant change in scope (e.g. new investment in a major more emissive asset) - Not applicable outside of project finance activities	- No option of going back line-by-line - Not a monitoring tool - Interpretation of variations and comparisons between players is currently not possible	

Annex 1: definitions

Adaptation to climate change
Adaptation to climate change refers to the strategies, initiatives and measures taken by individuals or groups (businesses, associations, administrations etc.) to reduce the vulnerability of natural and human systems against the actual or anticipated effects of change.

Anthropogenic emissions
Emissions resulting from human activities. This is used to describe any emissions caused directly or indirectly by human activities: soil erosion, atmospheric pollution etc. From the Greek 'anthropos' (man).

Approximate data
Primary or secondary data related to a similar activity which can be used instead of representative data. These existing data are used directly without adjustment.
Ex : données de consommations énergétiques d'un bâtiment dans les Vosges non corrigées du climat pour d'un bâtiment similaire située dans les Landes.

Assets under management
Assets under management are all assets held at a given time. This could refer to stocks or banking customer loans. As such this refers to money that has been tied up and not yet recovered.

Best in class
In the field of asset management, the Best-in-Class approach is a type of selection involving favouring those businesses with the best rating against certain performance criteria set by the asset manager within a given sector. The Best-in-class approach used extensively by French SRI fund managers, enables them not to separate the sectoral distribution of a fund from that of its baseline index, unlike in the case of ESG thematic approaches or sectoral exclusions.

Bottom-up
Type of methodological approach used to quantify financed GHG emissions. A micro-economic approach which involves incorporating the GHG emissions of customers of a financial institution line-by-line. 'Bottom-up' methodologies are based on emissions data produced by financed companies or projects as part of dedicated environmental reporting.

Choice of allocation
The choice of allocation by sector and geographical zone will result in significant methodological differences.

Climate change mitigation
Mitigation is defined as the human efforts aimed at reducing GHG emissions of various sources or increasing carbon sinks. Mitigation coupled with adaptation contributes to meeting the objective set under Article 2 of the UNFCCC's Convention on Climate Change.

Commitments
Financial organisation commitments by sector and by country or geographical zone (non-public data).

Direct emissions
GHG emissions from sources belonging to or under the control of the organisation and usually referred to in certain frameworks as Scope 1.

Double-counting
Emissions from a single source are counted twice or several times. Double-counting may arise between organisations where at least two organisations report the same GHG emissions or capture. Double-counting may also arise within a single organisation where GHG emissions or capture are taken into account in different emissions categories.

Emission categories
GHG emissions from homogeneous sources or types of source. An emission category may be combined with a sub-category.

Emission category
All GHG emission categories. Three emission categories can be distinguished, direct GHG emissions, indirect GHG emissions from energy and other indirect GHG emissions. These categories are referred to as 'scope' in certain international classifications.

Emission factors
Emission Factor (EF): emission rate of a given GHG for a given source, relative to units of activity.

Emissions from operations
Scope 1, Scope 2 and (partially) Scope 3 emissions. Emissions arising from an organisation's back-office functions. In the case of the financial sector, emissions from investments and the use of products sold are not included.

Extrapolated data
Primary or secondary data related to a similar activity which are adjusted or tailored to a new situation.
Ex : données de consommations énergétiques d'un bâtiment dans les Vosges corrigées du climat pour un bâtiment similaire située dans les Landes.

Financed emissions
Financed emissions are defined as greenhouse gas emissions generated by holding a financial asset. The emissions of a given industrial activity, for example, greenhouse gas emissions produced by the construction of this industrial facility, its maintenance and operations. The financial activity (finance, investment etc.) which made this industrial activity possible may, therefore, in some ways be associated with these emissions, having helped to produce them (without finance, the industrial activity would not have seen the light of day, nor would its GHG emissions.)

GHG (Greenhouse gas)
Greenhouse gas. A gas in the natural or anthropogenic atmosphere that absorbs and emits radiation within the thermal infra-red range emitted by the earth surface, atmosphere and clouds. The six gases included the Kyoto protocol, i.e.:
- Carbon dioxide (CO2)
- Methane (CH4)
- Nitrous oxide (N2O)
- Hydrofluorocarbons (HFC),
- Perfluorinated Hydrocarbons (PFC)
- Sulfur hexafluoride (CF6)
-

GHG sources
Physical unit or process releasing a GHG into the atmosphere (e.g. a thermal engine, thermal boiler, cow etc.)

Greenhouse Effect
The sun's rays that reach the Earth reheat its surface and two thirds of them are absorbed. With reverberation, the remaining third is sent back into space in the form of infra-red rays but is partially trapped by a layer of gas in the lower atmosphere: this sends the heat back toward the Earth and contributes to warming it further. Through this natural phenomenon called the greenhouse effect, the average temperature of the air at the Earth's surface is around + 15°C. Without this natural thermostat, the average temperature would be around 33°C cooler at around – 18°C. In large part they are of natural origin, but the proportion due to human activity, known as 'athropogenic', has been increasing since the beginning of industrial times (1750). The result is global warming.

Gt CO_2
1 gigatonne of carbon (GtC) = 1015 grammes of carbon. It corresponds to 3.667 GtCO2. A unit used by IPCC in particular.

IEA
The International Energy Agency which works to ensure reliable, affordable and clean energy for its 29 member countries and beyond. The main areas of IEA focus are: energy security, economic development, environmental awareness worldwide.

Indirect emissions
GHG emissions from sources arising from the consumption by an organisation of purchased electricity, heat or steam and GHG emissions (usually referred to in certain frameworks as Scope 2 emissions, and any other GHG emissions resulting from the activities of an organisation but from greenhouse gas sources belonging to and/or controlled by other organisations (usually referred to in certain frameworks as Scope 3).

IPCC
Intergovernmental Panel on Climate Change.

'Issue'-based perspective
This approach is based on the rule of specific allocation of global greenhouse gas emissions by macro-sector. This means allocating GHG emissions to sectors according to their capacity for reduction (Rose, 2013, 2014). The 'issue' of an economic agent is the quantity of GHG emissions that this agent is liable to reduce in an economy where heavy restrictions on GHG emissions are introduced (carbon prices, taxes, standards). In this context the internalisation of any additional cost would lead to a reduced demand for high-carbon, in favour of lower carbon, goods. The producer of the high carbon goods should then respond to the change in demand through 'innovation in processes' (efficiency savings throughout the product life). The GHG emissions targeted by these innovative approaches are the producer's 'issue'.

NACE
NACE2: Statistical classification of economic activities in the European Community NACE rev. 2 was the subject of regulation n°1893/2006 published in the Official Journal of the European Union on 30 December 2006. NACE has 615 categories each with a 4 digit code. NAF rev. 2 is the French classification of economic activities and corresponds directly to NACE ref. 2. NAF has 732 subcategories. NAF codes are made up of the NACE digits plus a country-specific letter.

Natural capital
Environmental accounting aimed at high sustainability is based on the principle of keeping natural capital and its elements apart on the grounds that, at least in terms of what is referred to as critical natural capital (CNC), which assures the vital functions of humanity and, more broadly, of biodiversity, this type of capital cannot be substituted by financial capital (non-substitutability assumption).

Operational boundaries
Operational boundaries may be defined as the list of emissions categories chosen for the calculation as deemed to be relevant.

Organisational boundaries
Organisational boundaries can take two forms:
- The 'control' approach involves the reporting organisation counting emissions from the sites over which it has financial or operational control.
- The equity share approach involves counting the emissions from sites in proportion to equity share.

Ppm
Parts per million. Measure of the concentration of GHG emissions. Ratio of the number of gas molecules out of the total number of molecules in dry air.

Primary data
Data observed, taken from information systems and physical samples belonging to or used by the administration or company (or a company in its supply chain).
E.g. actual fossil fuel consumption.

Quick win
This term general refers to actions that can be achieved quickly and easily. They generally require little or no financial investment.

Secondary data
Generic or averaged data from published sources which are representative of the activities of a company or its products or the public administration and the area it covers.
E.g: Average national energy consumptions for a city-based petrol powered car.

Sectoral approach
An approach involving the production of a sectoral guide which sets out the principles for producing a greenhouse gas emissions report for the organisations within a given sector or branch. There is a particular emphasis on defining sources, types of gas, the necessary data and calculation processes for each significant issuing category and/or each category with relevance for the sector in question, in order to optimise GHG emissions reporting. A sectoral guide is drafted with the aim of improving the quality of GHG emissions reporting within the sector, in accordance with the following principles: Relevance, completeness, consistency, accuracy and transparency (ISO 14064-1, GHG Protocol).

Stock picking
A market strategy involving trying to find within a market the shares that will offer the best returns. Stock picking is based on a strategic and financial analysis of companies.

Temporal boundaries
Boundaries that may vary through time according to the changes in the country's boundaries: acquisitions, disposals, mergers etc.

Top-down
Type of methodological approach used to quantify financed GHG emissions. A macro-economic approach which involves attributing global GHG emissions to sources of finance based on their market share by economic sector and geographical zone. Under such an approach an order of magnitude calculation of global financed emissions is produced and emissions are mapped by sector and geographical zone.

Uncertainty
Uncertainty is a parameter, associated with the result of measurement that characterises the range of the values that could be reasonably attributed to the measured quantity. Uncertainty information generally specifies the quantitative estimates or probable range of values and a qualitative description of the possible causes of the range. Uncertainty can usually be differentiated from emissions factors on the one hand and the accuracy/quality of data on the other.

Annex 2: footnotes

1. http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-RA-07-015/FR/KS-RA-07-015-FR.PDF

2. The Climate Principles are principles that were adopted by a number of financial institutions in December 2008. They offer a framework for institutions to account for the climate issue.

3. The atmosphere, the envelope of gases surrounding our planet, filters out the sun's rays: only the solar radiation needed for life reaches the Earth's surface. Approximately 30% of this radiation is reflected back to space by clouds, dust and reflective surfaces. As for the remaining 70%, this is absorbed by the Earth's surface and re-emitted in the form of infra-red radiation. A proportion of this infra-red radiation is then absorbed by the atmosphere which heats up. The use of greenhouses in vegetable production is based on this principle and gives its name to the phenomenon.

4. Created by the UN in 1988, the Intergovernmental Panel on Climate Change (IPCC) exists to provide regular updates on the current state of knowledge on climate change. With over 2,000 scientists, including some of the world's best researchers, this network does not conduct research itself, but summarises the results of studies appearing in scientific literature worldwide.

5. The parties in question may be banking customers, issuers in the case of asset management, debtors etc.

6. The Climate Principles, 2008

7. According to the classification of risks set out on the previous page

8. According to the Novethic definition: a green or social bond is a debt issued on the market aimed at financing a clearly earmarked project generating a direct environmental benefit (renewable energies, energy efficiency and climate change adaptation) or a social benefit (social housing, health and education). Issuers commit to reporting on fund allocation.

9. Ademe & Vous, Stratégies & Etudes: orienter les capitaux vers une économie bas-carbone, n°40-June 2014

10. The Finance and Sustainable Development Chair, created under the auspices of the Fondation Institut Europlace de Finance in 2006, and sponsored by EDF and Crédit Agricole, works in partnership with the Université Paris-Dauphine and Ecole Polytechnique. The aim is to contribute to the production of knowledge and methods for assessing, quantifying and managing risks for the sustainability of societies by cross-referencing quantitative finance and the different fields of the economy, particularly economics of the environment and of raw energy materials.

11. Richard J (2012), Comptabilité et Développement Durable. Paris. Economica.

12. Schaltegger S, Burritt R (2000), Contemporary Environmental Accounting. Greenleaf Publishing.

13. These internal forms of environmental accounting have been used in many high-profile international studies: the United Nations Environmental and Economic Accounting System (United Nations and alii., 2003), the World Bank' Genuine Saving (2006), the Inclusive Wealth Index (IWI) (United Nations University,2012) and work by P. Sukhdev (2008) on valuing biodiversity.

14. ADEME Carbon Database: http://www.basecarbone.fr/

1. EcoInvent database: http://www.ecoinvent.org/
2. EcoInvent ddatabase: http://www.ecoinvent.org/
3. http://www.gabi-software.com/france/bases-de-donnees-acv/gabi-databases/
4. http://eplca.jrc.ec.europa.eu/ELCD3/index.xhtml
5. For example, Ademe's emission factors for French electricity are not valid outside of France.
6. « Meilleur de la catégorie » en français
7. http://www.trucost.com/
8. http://2degrees-investing.org/fr/
9. In reporting, these transactions are generally entered as balanced entries which are offset and not taken into account.
10. 2° Investing Initiative "From financed emissions to long term investing metrics, state of the art review of GHG emissions accounting for the financial sector", 2013

About ADEME

ADEME, the French Environment and Energy Management Agency, is involved in the implementation of public policies in the fields of the environment, energy and sustainable development. It offers its expertise and advice to businesses, local government, public administrations and the general public. It also helps them to finance projects and conduct research in the following fields: waste management, soil conservation, energy savings and renewable energies, air quality and noise control. ADEME is a public agency under the joint authority of the Ministry for Ecology, Sustainable Development and Energy and the Ministry for Higher Education and Research.

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