The FRR and the climate challenge

REPORT UNDER ARTICLE 173 OF THE ENERGY TRANSITION ACT FOR THE YEAR 2016

FRR
FONDS DE RESERVE POUR LES RETRAITES

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The Fonds de Réserve pour les Retraites (FRR) is not directly subject to article 173 of the Energy Transition act of 17 August 2015; however, to foster communication and transparency, it seeks to apply current best practices.

1.

Full incorporation of non-financial issues into the FRR's investment policy

1. THE FRR AND ITS SOCIALLY RESPONSIBLE INVESTMENT POLICY

Since 2003, the Supervisory Board has required a strong commitment to responsible investment from the Fonds de Réserve pour les Retraites. As a public investor, and a vehicle for intergenerational solidarity, the FRR has decided to lead by example and factor Environmental, Social and Governance (ESG) criteria into its management practices. The FRR promotes responsible best practices, both for its investments and at its service providers.

The FRR has therefore gradually laid the foundations for incorporating socially responsible criteria, across its entire portfolio, when selecting its asset managers and the securities in which they invest. It has also introduced a comprehensive voting rights policy. In addition, the FRR made a commitment in April 2006 to apply the UN-supported Principles for Responsible Investment (PRI).

The first reason that the FRR became a responsible investor relates to its core mission and objective: **to optimise returns on the funds entrusted to it, on behalf of the community, in as secure an environment as possible.** As such, ESG criteria need to be factored into the FRR's management practices for it to fully understand the (financial and non-financial) risks and opportunities presented by the businesses in which it invests. The FRR believes that these criteria can have an impact on company valuations and therefore on the Fund's returns. Failure to incorporate these factors into its decision-making process could therefore undermine its objective.

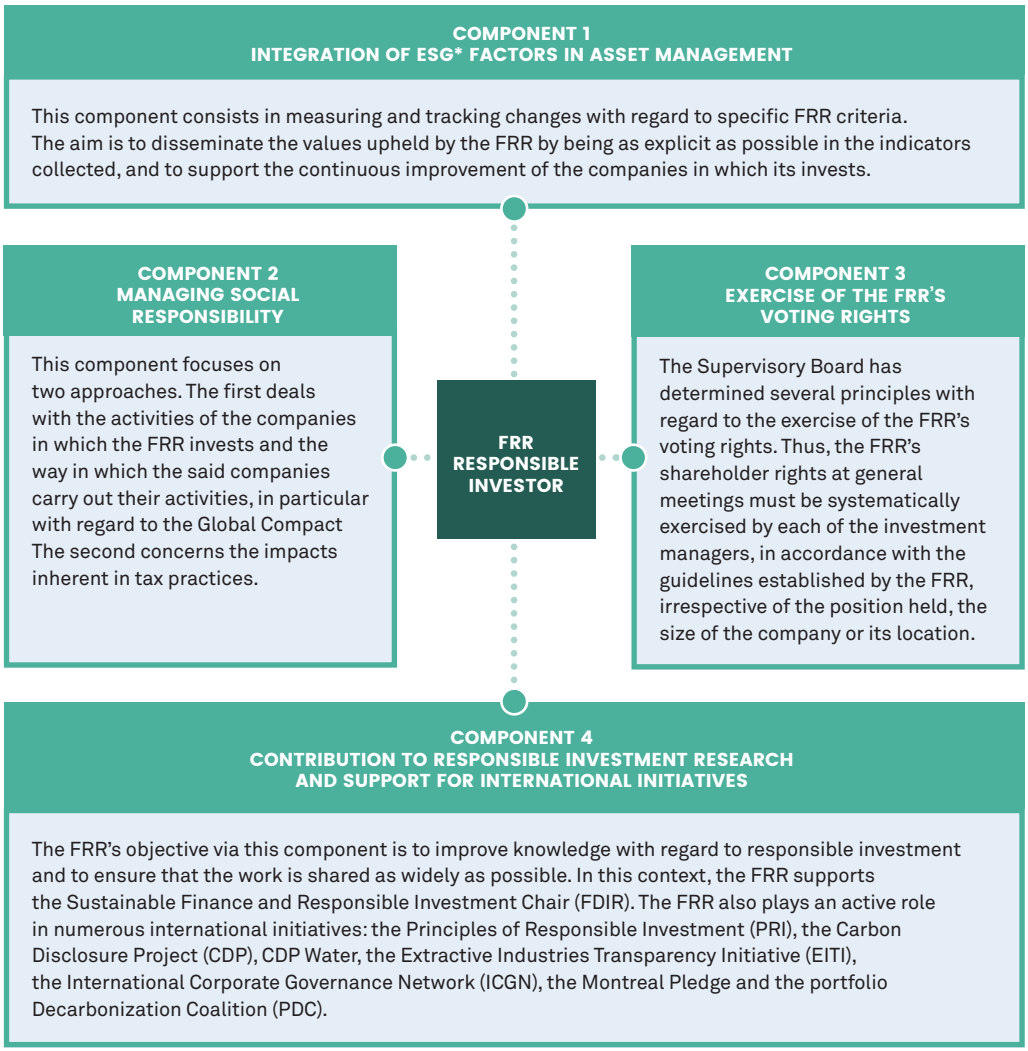
The second reason is economic: investment returns do not depend solely on the impact of companies' financial and non-financial strategies, but also on the externalities they generate for their industry or the economy as a whole. An analysis of the environmental and social externalities of corporate strategies and their effects on the community is required, in particular for a public universal investor tasked with optimising and protecting its investments over the long term.

Although its investment horizon was shortened in 2010 due to pension reform, the FRR has maintained its objective of protecting the long-term value of its investments. The FRR is, by virtue of the volume of its assets, a universal investor whose diversification constraints force it to be present in all asset classes, sectors, regions, etc. It is therefore in its interest for the entire system to perform well over the long term.

The increasingly close relationships between the SRI and management teams within management companies have allowed non-financial information to be incorporated into their management practices for all of the FRR's asset classes, including those that are not specifically labelled SRI. The FRR will continue to encourage all of its investment managers to move in this direction by deepening those ties in order to build the institutional investor and management company community.

The Supervisory Board consulted with the Responsible Investment Committee and also considered changes in the practices developed by other institutional investors before outlining the FRR's identity as a responsible investor for 2013-2017.

While this strategy expands the FRR's basis for action beyond the traditional scope of SRI and defines new ways to apply it to asset classes still largely unaffected by responsible management, such as small- and mid-cap companies, private placements and private equity, it nevertheless remains grounded in the same principles. It will be implemented differently depending on the specific nature of each investment vehicle in accordance with four strategic priorities.



** Environmental, Social and Governance.*

The FRR applies the UN's six principles for responsible investment. These principles encourage it to strengthen its socially responsible investment policy and thus to fully incorporate environmental, social and governance issues into its investment policy.

Principle 1: We will incorporate ESG issues into investment analysis and decision-making processes.

Principle 2: We will be active owners and incorporate ESG issues into our ownership policies and practices.

Principle 3: We will seek appropriate disclosure on ESG issues by the entities in which we invest.

Principle 4: We will promote acceptance and implementation of the Principles within the investment industry.

Principle 5: We will work together to enhance our effectiveness in implementing the Principles.

Principle 6: We will each report on our activities and progress towards implementing the Principles.

2. A DELEGATED MANAGEMENT APPROACH THAT FULLY INCORPORATES ENVIRONMENTAL, SOCIAL AND GOVERNANCE ISSUES

With the exception of the management of operational cash requirements, all of the FRR's investments are made through investment service providers (portfolio managers).

To meet its investment objectives and thus retain the best providers, the FRR may either use management mandates awarded through tender processes, or invest directly in collective investment undertakings (UCIs). The FRR uses UCIs, with the exception of money market UCIs, to expose its portfolio to emerging assets (equities and bonds), high yield assets and unlisted assets.

While mandates are a tool it can use to require investment managers to adopt its policy of incorporating non-financial issues, the FRR's decision to select collective funds directly allows it to take a different approach and benefit from a strategy that already exists on the market and is accessible to all, even though it cannot change the investment parameters. For UCIs, the FRR must therefore verify, before making its selection, that the balance between the manager's investment strategy and the incorporation of non-financial criteria is consistent with its overall investment policy.

This approach is driven by the FRR's key role as a global institutional investor and its positioning across all asset classes. To obtain the best sustainable investment/reward ratio, the FRR has, since its inception, believed that the mechanism whereby traditional asset managers adopt ESG policies is an evolving and, by its very nature, gradual process. The FRR would therefore like to continue its efforts so that its investment managers further augment their analyses with non-financial data and incorporate this information into their management practices. As part of its responsible investment laboratory, the FRR is also endeavouring to facilitate discussions with investment managers, in particular those responsible for French and European small- and mid-cap equity management mandates. The FRR promotes dialogue with companies through its investment managers to take advantage of the leverage they have due to the volume of assets under management, as well as their research capabilities.

REGULARLY EVALUATING THE PORTFOLIO FROM A NON-FINANCIAL PERSPECTIVE

Since 2005, the FRR has sought to evaluate its portfolio's exposure to non-financial risks by calling on service providers that specialise in SRI research.

To identify the risks associated with issuer behaviour, the FRR depends on the external expertise of Vigeo-Eiris to monitor and prevent the non-financial risks of the securities that make up its portfolio and that could have an impact on the Fund's reputation. These risks could be defined, in particular, as those likely to harm the FRR's image, i.e. to permanently break the bond of trust that a public institutional investor focused on intergenerational solidarity must preserve and maintain with key stakeholders (public authorities and social partners) that are represented on its Supervisory Board. These risks could also threaten the financial soundness of the companies in which FRR invests, due to lawsuits and fines, among others. Such risks consist of serious, proven and repeated breaches of core principles, such as the Global Compact, good governance principles and the Ottawa and Oslo conventions.

To fully incorporate issues associated with climate change and with the ecological and environmental transition risk, the FRR also relies on external expertise to assist it in implementing a more environmentally friendly policy in the long term. It has therefore selected Trucost Ltd to measure, analyse and monitor the environmental footprint of the FRR's financial asset portfolio. The FRR's environmental footprint identifies

the climate change risks to which it is exposed through the financial assets that it holds.

This footprint should enable it to assess:
- its carbon footprint (greenhouse gas emissions and stocks, including coal);
- its physical risks;
- its transition risks;
- its portfolio's alignment with a 2°C scenario; as well as
- opportunities linked to ecological and energy transition.

INTEGRATING THE RISKS ASSOCIATED WITH THE QUALITY OF CORPORATE GOVERNANCE

The FRR's responsible investor policy requires a shareholder approval at every general meeting. Given the wide-ranging and international nature of the FRR's investments, its voting policy guidelines incorporate three dimensions:

1) The benefits for the FRR of **working actively to improve the governance of the companies** in which it invests. Governance aims to promote the balance of power within companies' management bodies and clarity about these powers, as well as the quality of the information provided to shareholders and respect for their rights and for the integrity of their votes. Accordingly, it is one of the factors that play an important role in the long-term survival of the corporate community, in the continuity of the strategy that companies pursue, and in the way they fulfil their responsibilities to all their stakeholders. All these factors contribute directly to strong future valuations.

2) **The fact that the FRR is a long-term investor.** It has chosen to prioritise, in its portfolio structure and the management mandates that reflect the asset allocation strategy set by the Supervisory Board, an active approach based on an analysis of the fundamental valuation outlook for equity and debt securities issued by various categories of issuers. It therefore stands to reason that investment managers would take this horizon into consideration in their application, on a case-by-case basis, of the guidelines included in the voting rights principles, in particular when assessing the appropriateness of financial transactions that affect corporate capital.

3) Lastly, efforts to improve corporate governance, whether made by the companies themselves, lawmakers or regulators, have intensified in recent years and must continue. The active exercise of the FRR's voting rights must, however, **realistically consider the specific conditions in each market,** mainly based on the issuers' capitalisation, and the significant differences that may exist in corporate law and in terms of the corporate governance practices in the relevant countries.

The FRR's voting guidelines[1] incorporate all of these factors and must therefore be broad enough to account for particular national circumstances (in France and internationally). The FRR therefore aims to capitalise on investment managers' knowledge and their ability to understand the practices in force in various financial centres. Investment managers may also rely on these practices for subjects not covered by the FRR's guidelines.

To assist it with its monitoring, the FRR is working on a system to score the quality of the governance of its portfolio. This new analytical approach will improve the FRR's understanding of the key characteristics of its portfolio.

ADAPTING NON-FINANCIAL ISSUES TO DIFFERENT ASSET CLASSES

The incorporation of non-financial issues into management of the portfolio is adapted to the characteristics of each asset class, geographic region, and market capitalisation. For example, on the recommendation of the Responsible Investment Committee, the FRR decided to safeguard its investments by not investing in agricultural commodities.

WORKING TRANSPARENTLY

As a public entity, the FRR regularly reports to its own bodies and the public. It documents the progress made and conclusions drawn in implementing its investment strategy. Lastly, once a year the FRR publishes the composition of its portfolio[2] on its website.

1 *http://www.fondsdereserve.fr/documents/politique-en-matiere-de-votes-du-FRR.pdf.*

2 *http://www.fondsdereserve.fr/documents/Portfolio-of-the-FRR-31-03-2017.pdf.*

ENGAGING WITH ISSUERS, VIA ITS INVESTMENT MANAGERS, TO IMPLEMENT SUSTAINABLE AND RESPONSIBLE POLICIES

The FRR outlined its identity as an investor for 2013-2017 in a Responsible Investment Strategy that permits the use of shareholder dialogue. The FRR has a range of options available, from dialogue with the company to, as a last resort, a decision to put the company on its investment exclusion list if it refuses to put an end to repeated violations.

The FRR promotes dialogue with companies through its investment managers to take advantage of the leverage they have due to the volume of assets under management, as well as their research capabilities.

3. A COMMITMENT TO AND ACTIVE SUPPORT FOR SEVERAL INDUSTRY INITIATIVES

PRI Principles for Responsible Investment

INVOLVEMENT IN DRAFTING THE UNITED NATIONS PRINCIPLES FOR RESPONSIBLE INVESTMENT

At the beginning of 2005, the Secretary General of the United Nations invited a few of the world's biggest institutional investors, including the FRR, to come together and establish a number of principles for promoting the incorporation of socially responsible investment practices into financial management. After six working sessions, and with expert help from representatives of the various stakeholders (companies, NGOs, researchers, etc.), the "Principles for Responsible Investment" were established before being officially signed in New York and Paris during the spring of 2006.

The PRI now reflect the shared values of a group of investors having a long-term investment horizon and diversified portfolios, including insurers and reinsurers, pension funds and other private and public institutional investors. They are fully compatible with the FRR's SRI strategy.

CDP DRIVING SUSTAINABLE ECONOMIES

ADOPTION OF THE CDP, CDP WATER AND CDP FOREST

Supported by the United Nations Environment Programme, the CDP is one of the most important international initiatives for the environment and climate change. Wanting better information on companies' behaviour with regard to the environment, energy consumption and the effects of climate change, the FRR gave the CDP its backing in 2005, before the biggest 120 French companies were questioned.

SIGNATURE OF THE CLIMATE CHANGE DECLARATION AT THE UN SUMMIT HELD ON 23 SEPTEMBER 2014

In signing this initiative, the FRR committed to:

- collaborate with the authorities to take measures that encourage financing of energy transition towards a low-carbon economy;
- identify and assess low-carbon investment opportunities;
- develop investors' ability to assess risks and opportunities linked to climate change, and incorporate this into investment methodologies;
- foster dialogue on the issue of climate change with companies included in the portfolios;
- publish the initiatives taken and progress made.

EXTRACTIVE INDUSTRIES TRANSPARENCY INITIATIVE (EITI)

This initiative seeks to increase the transparency and responsibility of companies operating in extractive industries, by checking and publishing all payments made by companies, as well as all income received by governments, as a result of mineral, oil and gas extraction. In supporting the EITI, the FRR invites all companies directly or indirectly concerned by the above, and in which it holds shares, to contribute. It also encourages those companies already committed to supporting the initiative to play an active role in its implementation.

THE INTERNATIONAL CORPORATE GOVERNANCE NETWORK (ICGN)

The ICGN, which was founded in 1995, is an international organisation of governance professionals. Its aim is to inspire and promote international corporate governance standards. These improvements contribute to a more sustainable performance of companies and help to make them more transparent.

In this context, the ICGN has various committees which reflect on the establishment of best practices in corporate governance.

Anne-Marie Jourdan, Chief Legal Officer and Head of Communications at the FRR, is a member of the ICGN board of governors.

THE MONTREAL PLEDGE

Signed by 35 institutional investors at the Principles for Responsible Investment conference in Montreal on 25 September 2014, it is backed up by the PRI and United Nations Environment Programme Finance Initiative (UNEP-FI). The investors who signed the Montreal Pledge have undertaken to publish the carbon footprint of their equity investments each year.

THE PORTFOLIO DECARBONIZATION COALITION (PDC)

Launched in September 2014, this collaborative initiative aims to reduce greenhouse gas emissions by mobilising a critical mass of institutional investors committed to measuring and decarbonising their portfolios. The FRR is at the forefront of this coalition.

Olivier Rousseau, a member of the FRR's Management Board, sits on the PDC's steering committee.

STATEMENT ON ESG IN CREDIT RATINGS (APRIL 2016)

Alongside six rating agencies, including S&P and Moody's, and 100 international investors representing assets of USD 16 trillion, the FRR signed a joint declaration on more systematic consideration of ESG criteria in assessing issuers. This is an important stage in the integration of ESG factors in asset management.

GLOBAL INVESTOR LETTER TO THE G20 (JULY 2016 – APRIL 2017)

Along with 158 institutional investors, the FRR signed a letter addressed to the G20 and G7 leaders before the summits held in 2016 and 2017. This letter invited the G20 to adopt measures for combatting climate change.

INSTITUTIONAL INVESTORS GROUP ON CLIMATE CHANGE (IIGCC)

The IIGCC is a forum for investors to collaborate on climate change. The IIGCC provides its members with a collaborative platform to encourage public policies, investment practices, and corporate behaviour that address long-term risks and opportunities associated with climate change.

PARIS PLEDGE

By joining the Pledge, *businesses, cities, civil society groups, investors, regions, trade unions and other signatories* promised to ensure that the ambition set out by the Paris Agreement is met or exceeded to limit global temperature rise to less than 2 degrees Celsius.

MANIFESTO TO DECARBONIZE EUROPE (2016)

The signatories of the manifesto call upon all European States to immediately implement policies aiming to achieve a level of greenhouse gas emissions close to zero by 2050!

2.

An analysis of the portfolio's non-financial issues from the perspective of controversies

All measurements and analyses conducted for this report are based on a snapshot of the financial assets in the FRR's portfolio at:

- **30 December 2016** for the analysis of the consolidated equity and corporate bond portfolios under management mandates (developed markets);
- **30 October 2016** for the funds (emerging markets).

In 2008, the FRR adopted a system to monitor and prevent non-financial risks likely to have an impact not just on its investments but also on its reputation. Risks to the FRR may arise from companies in which it invests failing to comply with universally recognised principles, such as those of the **United Nations Global Compact** and of **good governance,** as well as with international conventions ratified by France, in particular the **Ottawa**[1] and **Oslo**[2] Conventions.

1 *Convention on the prohibition of the use, stockpiling, production and transfer of anti-personnel mines and on their destruction.*

2 *Convention on the prohibition of the use, stockpiling, production and transfer of cluster bombs and on their destruction.*

1. SERVICE PROVIDER SELECTED BY THE FRR

Vigeo-Eiris has been responsible for assessing the non-financial risks of the FRR's portfolio since 2016.

2. PRESENTATION OF THE DIFFERENT METHODOLOGIES USED TO ANALYSE CONTROVERSIES

Vigeo-Eiris applies methodologies that are appropriate and specific to the different categories of controversies:

- those related to controversial weapons;
- those related to the Global Compact;
- those inherent in the tobacco industry.

METHODOLOGY APPLIED TO CONTROVERSIAL WEAPONS

The methodology seeks to **identify** companies involved in the development, production, maintenance, use, distribution, stockpiling, transport or trade of banned weapons or their key components.

Stakeholders have traditionally characterised these weapons as:
- weapons of mass destruction;
- nuclear, biological and chemical weapons; as well as
- anti-personnel mines, cluster bombs and certain conventional weapons.

The production and proliferation of these weapons is governed by international treaties. At the FRR's request, Vigeo-Eiris focused on the weapons listed below:
- cluster bombs;
- anti-personnel mines;
- chemical and bacteriological weapons.

France has ratified all the conventions on these weapons.

METHODOLOGY APPLIED TO ASSESS GLOBAL COMPACT-RELATED CONTROVERSIES

The **analysis of Global Compact-related controversies** is based on three factors:

- **The severity of the controversy**

Severity is divided into four levels (Minor, Significant, High and Critical).
The severity of a controversy is considered critical when related to a fundamental issue, with high adverse impact on the interests of the company and stakeholders.

- **The company's responsiveness to the controversy**

Responsiveness is assessed on a four-level scale (Non-communicative, Reactive, Preventive, Proactive).

- **The frequency with which a company is exposed to controversies**

Frequency is divided into four levels (Isolated, Occasional, Frequent, Persistent).
Companies are analysed against all these criteria and this process and, where appropriate, are placed on a warning list.

METHODOLOGY APPLIED TO CONTROVERSIAL TOBACCO INDUSTRY ACTIVITIES

Activities related to the tobacco industry are analysed in terms of **the production of tobacco products** (manufacture of cigarettes, cigars, rolling tobacco, snuff or chewing tobacco, and the production or growing of tobacco as a commodity).

3. SCOPE COVERED BY THE CONTROVERSY ANALYSIS

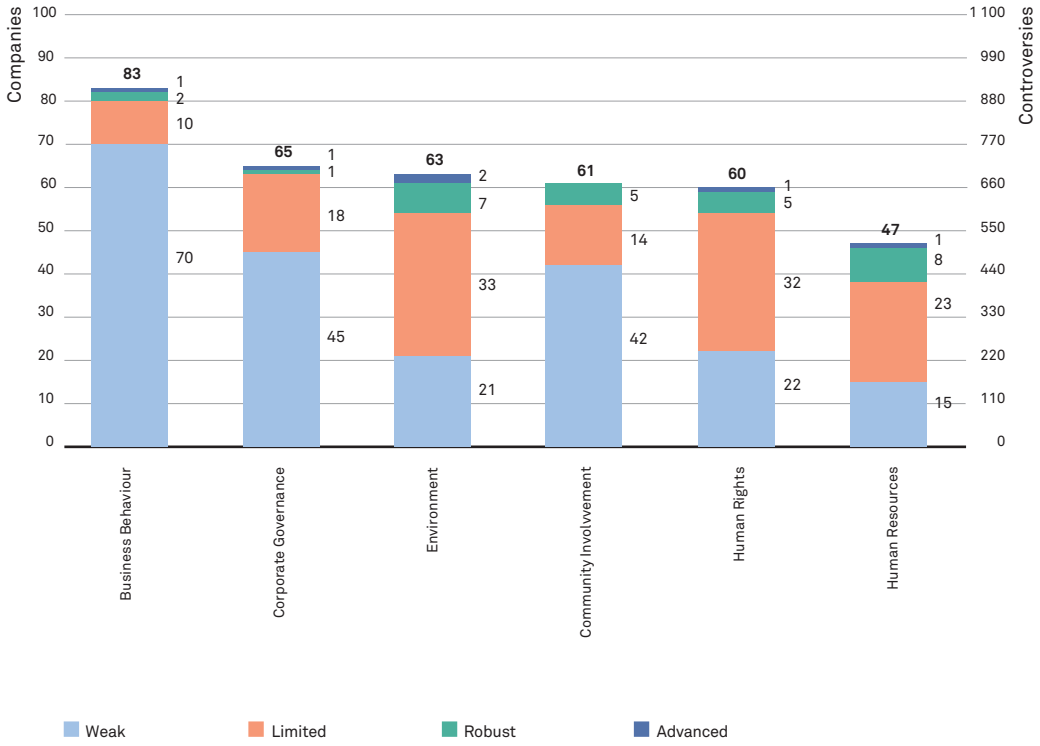
Of the 3,422 companies in the FRR's consolidated portfolio, Vigeo-Eiris analysed how 2,481 companies manage their controversies, **i.e. 72.5% of companies.**

Of the 2,481 companies analysed, 1,286 have dealt with controversies of varying importance; 85 were involved in major controversies. These are the companies on the FRR's Warning List.

This list represents the universe of companies that have a combination of either "Critical" severity, regardless of other factors, or "High" severity, if the frequency is "Frequent" or "Persistent", and "Non-communicative" responsiveness.

ANALYSIS BY ESG AREA

→ ANALYSIS BY ESG AREA FOR THE MOST CONTROVERSIAL COMPANIES

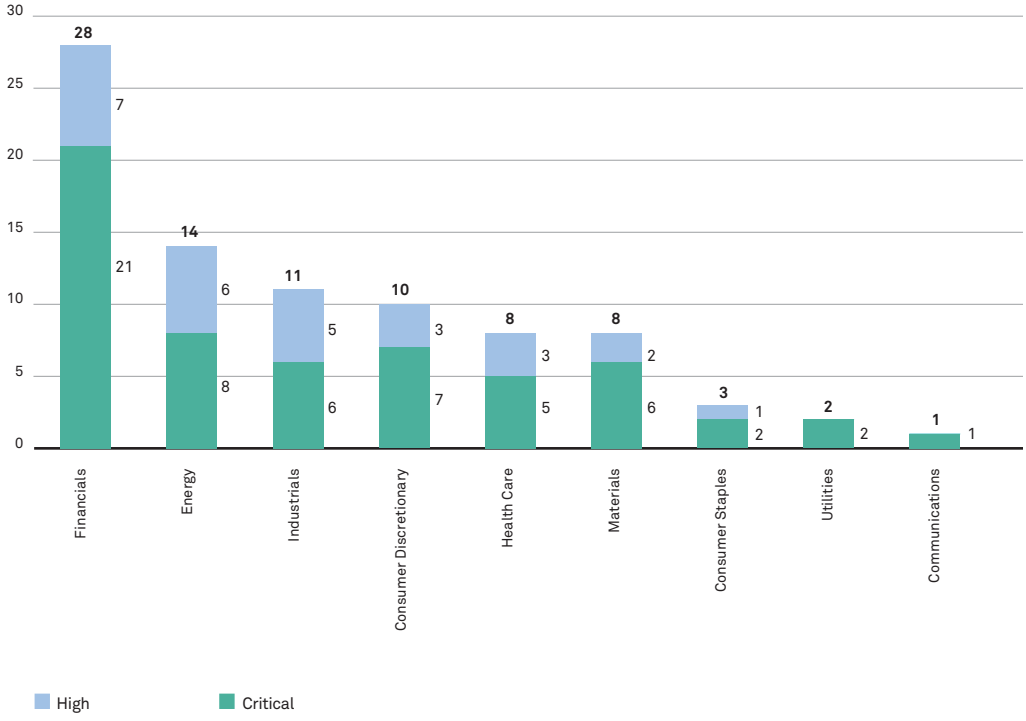


Though they account for just 3.4% of companies in the consolidated portfolio, **the 85 companies on the Warning List are responsible for 28.5% of controversies,** or 2,141 controversies identified. Of these, 47% concerned "Market Behaviour" (with a critical or high severity level for 51% of related controversies) and 16% "Corporate Governance" (with a critical or high severity level for 71% of related controversies). Deutsche Bank is the company with the highest total number of controversies in these two areas, with 36 (32 with critical or high severity) and 27 (24 with critical or high severity) controversies, respectively. All areas combined, Chevron is the most controversial company with a total of 56 controversies, including 26 regarding the "Environment" alone (10% of controversies identified for this scope). The FRR gives special consideration to this company in its engagement strategy. It entered into direct correspondence with the company, which is not a common occurrence, and is continuing its dialogue through collaborative initiatives stemming from the PRI platform as well as through its investment managers.

83 of the 85 companies on the Warning List were the subject of at least one controversy regarding "Market Behaviour", 65 for "Corporate Governance", 63 for the "Environment", 61 for "Societal Commitment", 60 for "Human Rights" and 47 for "Human Resources". Management of controversies affecting "Market Behaviour" is poor for 84% of companies and for 69% for "Societal Commitment" and "Corporate Governance".

SECTOR ANALYSIS

SECTOR ANALYSIS OF THE MOST CONTROVERSIAL COMPANIES IN THE PORTFOLIO
NUMBER AND SEVERITY OF CORPORATE CONTROVERSIES ON WARNING LIST - CONSOLIDATED



Financial companies are the most controversial companies in the FRR's investment universe. They represent 19% of the MSCI World index by capitalisation and 33% of controversies. They are followed by the Oil & Gas sector and then Industry.

SPLIT BETWEEN DEVELOPED/ EMERGING MARKETS

The controversy divide goes against developed countries. Of the 2,012 companies analysed, 56% have faced at least one controversy, for a total of 5,987 controversies.
There are 80 companies on the Warning List, or 3.98% of companies analysed.

Of the 469 emerging market companies analysed, 35% have faced at least one controversy, for a total of 378 controversies.
There are 5 companies on the Warning List, or 1.07% of companies analysed.
This is a quarter of the total in developed countries.

Comments on the 2015 assessment

Last year, Eiris Ltd analysed the FRR's portfolio against the Global Compact principles and the conventions on prohibited weapons. Since then, a call for tenders has been conducted and was won by Vigeo-Eiris, which uses a new methodology. It is therefore more difficult to make connections between the results at end-2015 and at end-2016.

The controversy breakdown was quite different in 2015. 43 companies in developed countries were the subject of allegations related to the Global Compact, and considered as representing a high risk, with an inadequate or no response by the company concerned, and 33 companies in emerging countries.

It is worth noting that the number of serious controversies in relation to the number of securities held in the FRR's portfolio was identical for developed and emerging countries, which is no longer the case.

4. DIVESTING THE PORTFOLIO FROM THE TOBACCO INDUSTRY

Smoking is recognised as one of the greatest and most serious threats to public health worldwide. The World Health Organization (WHO) estimates that smoking is responsible for nearly 12% of deaths among adults over the age of 30. Of the one billion smokers around the world, 80% live in low- or middle-income countries, where the burden of tobacco use is the heaviest. Furthermore, children from poor households are frequently employed in tobacco farming. Tobacco workers are also exposed to green tobacco sickness, which is caused by the nicotine that is absorbed through the skin from handling wet tobacco leaves.

The WHO Framework Convention on Tobacco Control entered into force in 2005. Its primary objective is to protect present and future generations from the health, social, environmental and economic consequences of tobacco consumption and exposure to tobacco smoke. The fight against tobacco has gained ground since then with the implementation of measures such as plain packaging, higher taxes, and a ban on advertising, etc. Tobacco use has nevertheless continued to increase among adults in developing countries, indicating that much work remains to be done.

Tobacco companies are also playing an active role in promoting tobacco use, even though it has long been said that tobacco consumption has very harmful effects on human health. Although regulation has been tightened in developed countries, it is still limited in a number of developing countries, where several tobacco companies have discovered new markets and thus new smokers.

Lastly, the taxes imposed on the sale of tobacco fall well short of what is needed to cover smoking-related healthcare expenses. In Europe, the ratio is 1 to 5; tobacco companies therefore represent a net cost to society.

The WHO Framework Convention on Tobacco Control signed by France is also the first treaty negotiated under the auspices of the WHO. It is an evidence-based treaty that reaffirms the right of all people to the highest standard of health. The Convention represents a paradigm shift in developing a strategy to regulate addictive substances. In contrast to previous drug control treaties, the Framework Convention also asserts the importance of demand reduction strategies as well as supply issues.

This Convention is thus directed at the production and marketing of tobacco as well as at investors.

The FRR decided to join the fight when it elected to divest from tobacco in 2017.

Vigeo-Eiris analysed the involvement in tobacco of 2,234 out of the 3,422 stocks in the FRR's consolidated portfolio, or 65% of companies.

7 of the 11 tobacco producers identified are from developed countries. This activity accounts for more than 50% of the income of 10 of these companies and for 20%-50% of the income of 1 company.

This exclusion will take effect at end-2017 with the elimination of the seven companies held through the FRR's mandates, as the three others are held indirectly through collective funds.

5. DIVESTING THE PORTFOLIO FROM CONTROVERSIAL WEAPONS

The one company identified within the FRR's portfolio is the Hanwha Group, headquartered in South Korea. Given the group's geographic location (emerging countries), this stock is held through an undertaking for collective investment (UCITS fund).

In 2016, Hanwha Group was held by an actively managed UCITS fund whose benchmark index was the MSCI Emerging Markets Index. Hanwha Group is one of the constituents of this index.

At the end of 2017, the stake in Hanwha Group represented 0.2% of the EUR 2 billion collective fund. Since then, the fund in question has sold the stock based on its new exclusion policy. The FRR welcomes the investment manager's adoption of an effective exclusion policy.

3.

The FRR portfolio's Environmental Footprint

1. MEASURING AND ANALYSING THE CARBON FOOTPRINT OF THE FRR'S PORTFOLIO

S&P Dow Jones Indices
ESG Analysis

SERVICE PROVIDER SELECTED BY THE FRR

The FRR has selected **Trucost Ltd** to analyse and measure the environmental footprint of the portfolio. Trucost Ltd is an expert in analysing and measuring portfolios' carbon footprints. To assist it in its work and to meet all of the FRR's needs, Trucost Ltd has delegated specific tasks to four highly specialised agencies:

Beyond Ratings
Sovereign Risk Matters

Beyond Ratings specialises in analysing sovereign bonds.

427 Four Twenty Seven Climate Solutions

Four Twenty Seven specialises in analysing physical and climate risks.

GRIZZLY RESPONSIBLE INVESTMENT

Grizzly Responsible Investment specialises in aligning portfolios with a 2°C scenario.

icare & consult

I Care & Consult specialises in analysing the green share of portfolios.

The FRR relied on this panel of experts to obtain a comprehensive, accurate and fully integrated analysis.

METHODOLOGIES USED TO MEASURE THE PORTFOLIO'S CARBON FOOTPRINT

The study prepared by Trucost Ltd covers the emissions generated by the operations of companies, their direct suppliers and their fossil reserves.

The FRR decided to use **three methods** to measure its portfolio's carbon footprint:

- **the footprint in capital terms** is calculated per million euro invested[1];
- **the carbon footprint in terms of revenue** is calculated by dividing companies' annual CO_2 emissions by the annual revenue generated by their activities[2];
- **the average footprint** is calculated as the arithmetic average of the carbon intensities of companies in the portfolio weighted by their share in the portfolio[3].

The approach favours the **per million euro in revenue generated method,** which applies the **equity ownership proxy** principle (allocation to the investor based on the percentage interest in the company) to emissions and to revenues generated by the portfolio, and thus evaluates the portfolio's effectiveness in creating value. **The footprint per million euro invested** excludes the concept of effectiveness as it does not consider revenue creation, but it does give investors a better understanding of the absolute impact of their portfolio. Lastly, **the weighted average of the portfolio's carbon footprints** only evaluates the portfolio's exposure to emission-intensive companies, and thus does not consider the concept of responsibility.

1 *This ratio is expressed in tonnes of CO_2 equivalent (tCO_2e) per million euro invested; it can also be expressed in kg per thousand euro ($kgCO_2e$/EUR 1,000).*

2 *This ratio is expressed in tonnes of CO_2 equivalent (tCO_2e) per million euro in revenue.*

3 *This ratio is expressed in tonnes of CO_2 equivalent (tCO_2e) per million euro in revenue.*

To calculate its footprint, the FRR decided to analyse:

- **scope 1,** reflecting the company's direct emissions;
- **scope 2,** reflecting indirect emissions from purchased electricity or heat; and
- **scope 3,** upstream first tier, reflecting the emissions of key suppliers.

In its previous analyses, Trucost Ltd assigned the proportion of emissions "held" to the FRR's portfolio as follows:

$$\frac{\text{Value held} \times \text{Total emissions of the company}}{\text{The company's market capitalisation}}$$

It is now calculated as follows:

$$\frac{\text{Value held} \times \text{Total emissions of the company}}{\text{Entreprise value}}$$

This new methodology allows the FRR to calculate the consolidated carbon footprint of its equity and bond portfolios.

The FRR decided that, when evaluating its portfolio, it would differentiate between investments made in developed markets, where it can impose its own investment rules on investment managers through management mandates, and those made in emerging markets, where it invests through UCITS funds that have their own investment policies.

In order to gain a better understanding of the origin of the difference between its carbon footprint and that of its benchmark index, the FRR has also distinguished between the **sectoral effect** and the asset **selection effect** within each sector.

The analysis was carried out in comparison to a composite index reflecting each portfolio's investment universe.

SCOPE OF THE PORTFOLIO COVERED BY TRUCOST LTD'S ANALYSIS

The analysis of the equity and bond portfolios at 30 December 2016 concerns **3,735 companies,** for a total value analysed of nearly **EUR 20 billion. The analysis therefore covers 95% of the total value of the equity portfolio and 86% of the total value of the bond portfolio.**

The bond portfolio has a lower coverage rate because "non-corporate" stocks were excluded from the scope of the analysis.

ANALYSIS OF THE FRR'S PORTFOLIO BY ASSET CLASS

The **results of the 2016 study** show that the FRR's equity portfolio's carbon footprint in terms of revenue, at the end of 2016, was **272.9 tonnes of CO_2 equivalent per million euro of revenue** (318.8 in 2015) and that it was 29% less than that of the FRR's benchmark index.

Portfolios	FRR benchmark index
Consolidated equity portfolio	**Composition of the overall equity composite index:** 15.9% MSCI Emerging Markets 42.5% FTSE Developed All Cap Excluding Eurozone 41.6% FTSE Developed Eurozone All Cap
Developed market equity portfolio	**Composition of the developed equity composite index:** 50.5% FTSE Developed All Cap Excluding Eurozone 49.5% FTSE Developed Eurozone All Cap
Emerging market equity portfolio	**MSCI Emerging Markets Index**
Corporate bond portfolio	**Composition of the overall bond composite index:** 56% Barclays Euro Aggregate Corporates 27.6% Barclays USD Corporate Investment 8.4% S&P U.S. High Yield Index 8% Iboxx Euro High Yield

Furthermore, for each million euro invested in the FRR's portfolio, emissions in absolute terms are 232.6 tonnes of CO_2 (245.5 in 2015). **At the end of 2016, the FRR's portfolio was therefore emitting 28% less carbon than its benchmark index.**

The results of the analysis of the FRR's carbon footprint are therefore positive, as they are well below the index's values, and also point to improvements in the carbon footprint in terms of revenue, capital and average intensity in 2016. In other words, no matter which evaluation method is used, the "weight" of carbon in the FRR's portfolio has decreased, and the results relative to the overall index are positive.

Main results

This carbon footprint analysis highlights the portfolios' positive performance relative to their composite indices, no matter which methodology is used.

The equity portfolio emits 241.07 tonnes of CO_2e per million euro in revenues generated, i.e. an intensity that is **28% lower** than that of its benchmark index. Essentially, the equity portfolio companies are on average 28% more efficient than their benchmark index peers in terms of emissions of CO_2e per million euro in revenue generated.

The bond portfolio emits 308.67 tonnes of CO_2e per million euro in revenues generated, i.e. an intensity that is **30% lower** than that of its benchmark index. These results also hold true when using the per million euro invested and weighted average methodologies.

The FRR's portfolios were also analysed to estimate their exposure to fossil fuels and, more broadly, to different types of power generation. The aim of this analysis was to identify companies exposed to the risk of a fall in their assets' value or, in contrast, those likely to benefit from the energy transition.

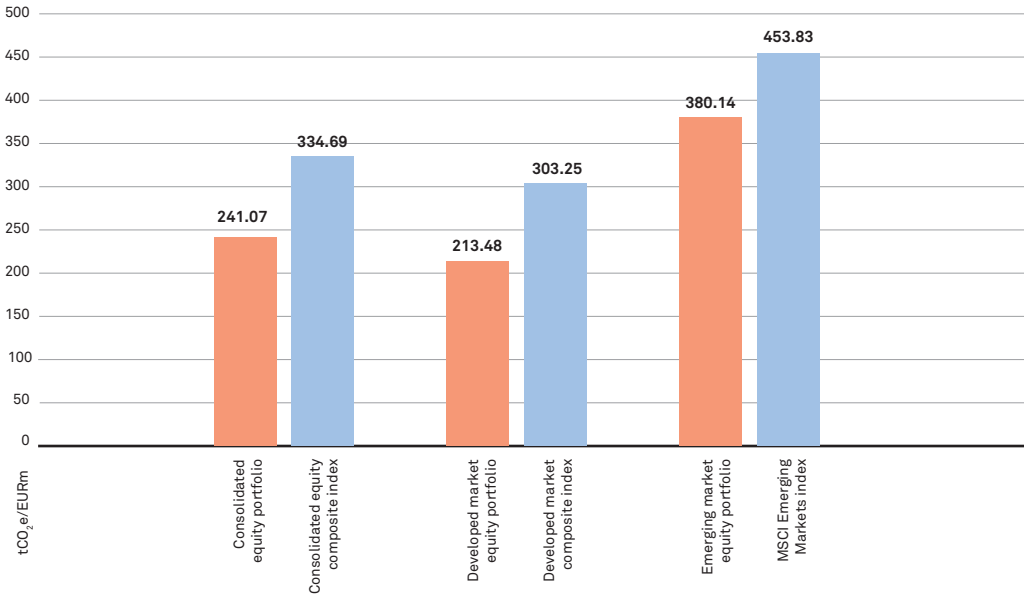
An analysis of the FRR's portfolios' exposure to fossil fuel extraction activities shows that the stranded asset[4] risk for each of the portfolios analysed is lower than that of the benchmark index used. This risk is mainly limited to the emerging equity portfolio, which derives 0.36% of its revenues from companies that generate more than 20% of their revenue from coal compared with 0.23% for the developed market equity portfolio.

4 *See Section 3 The portfolio's exposure to Stranded Assets.*

The carbon performance of the equity and bond portfolios was better than that of their respective composite indices. This was the case for each of the indicators used (tonnes of CO_2e per million euro in revenue, per million euro invested and by weighted average) and each of the methodologies applied to calculate the percentage interest held (as a percentage of the value of the company or market capitalisation).

The graph below compares the carbon performance of the developed market and emerging market equity portfolios. The results presented here are based on a percentage holding calculated on the basis of the company's value.

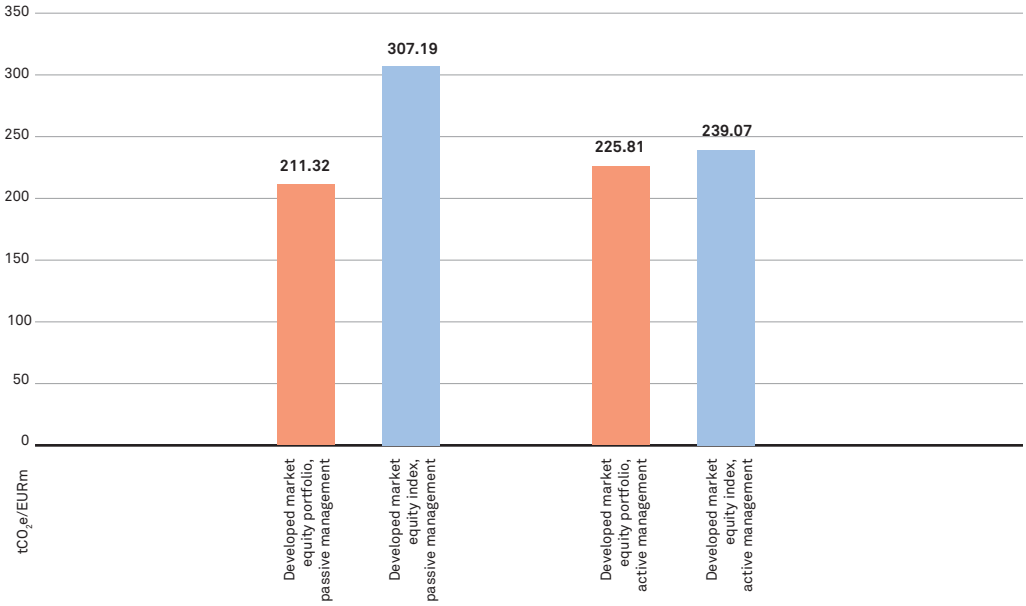
→ CARBON FOOTPRINT RESULTS BY EQUITY PORTFOLIO, CALCULATED IN TONNES OF CO_2 EQUIVALENT PER EUR 1 MILLION OF REVENUE



The emerging market equity portfolio has the highest carbon intensity, and this is the case for each of the indicators and percentage interests used. This is mainly due to the higher carbon intensity of companies operating in emerging countries relative to that of companies operating in developed countries. This portfolio's carbon intensity is nevertheless lower than that of its benchmark index, the MSCI Emerging Markets.

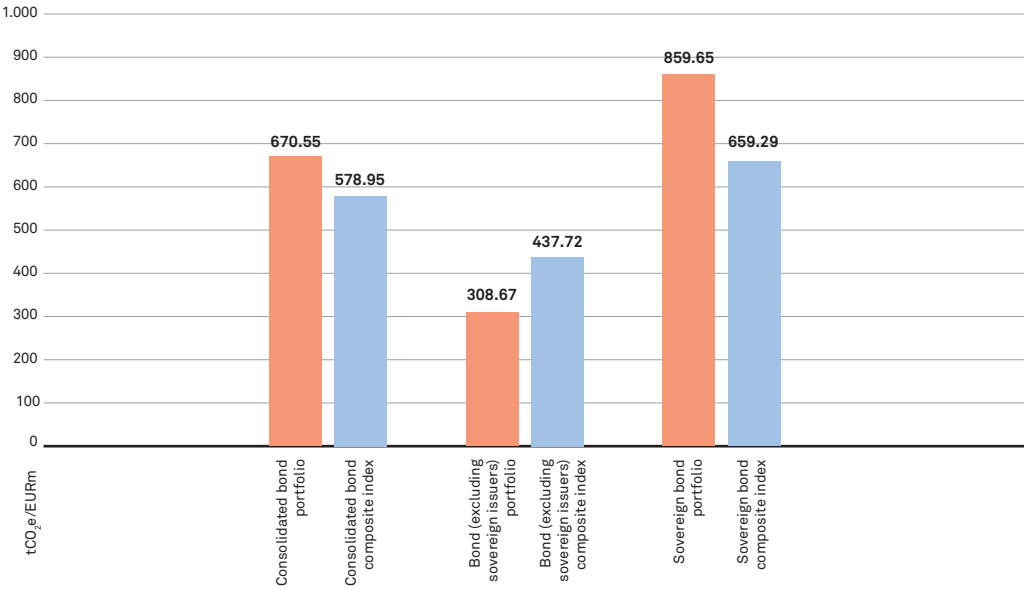
The following graph details the results of the developed market equity portfolio's carbon footprint by **management type** (active and passive). Both portfolios have fairly similar carbon intensities, which are lower than those of their respective benchmark index indices.

CARBON FOOTPRINT RESULTS OF THE DEVELOPED MARKET EQUITY PORTFOLIO BY MANAGEMENT TYPE, CALCULATED IN TONNES OF CO_2 EQUIVALENT PER EUR 1 MILLION OF REVENUE



The graph compares the results of the aggregate bond, non-sovereign bond and sovereign bond portfolios. While the carbon performance of the non-sovereign bond portfolio was 29% higher than that of its benchmark index, the carbon performance of the sovereign bond portfolio was 14% lower than that of its benchmark index. This is mainly because the emerging debt funds overweight certain countries such as Indonesia, South Africa and Russia.

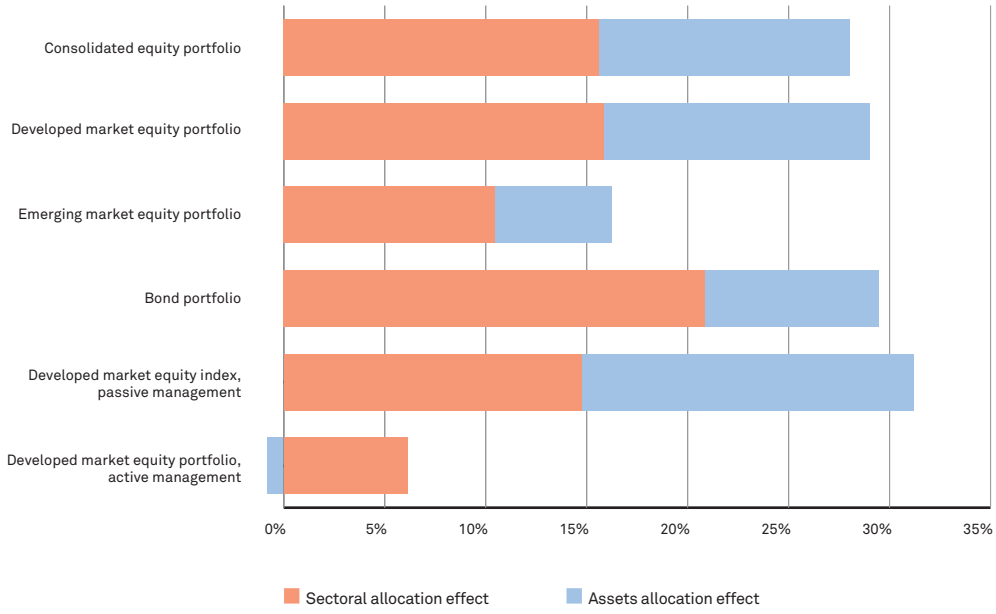
CARBON FOOTPRINT RESULTS OF BOND PORTFOLIOS, CALCULATED IN TONNES OF CO_2 EQUIVALENT PER EUR 1 MILLION OF REVENUE/GDP



Allocation of performance by portfolio, expressed as a percentage

The main contributors to the carbon footprint of the equity and bond portfolios are the companies that represent a significant share of the portfolio's revenues and whose production processes are carbon-intensive.

PERFORMANCE ALLOCATION BY PORTFOLIO



- **Equity portfolio**

The top 10 contributors to the equity portfolio's total carbon footprint are in the Utilities and Energy & Materials sectors. These companies represent 19% of emissions financed by the equity portfolio and increase this portfolio's carbon footprint by 15%.

- **Bond portfolio**

The top 10 contributors to the bond portfolio's carbon footprint have a greater carbon impact: they represent 40% of emissions financed by the portfolio and account for 34% of its total carbon footprint.

Analysis of total emissions (scopes 1, 2 and 3)

Trucost Ltd estimated the total emissions (scopes 1, 2 and 3) of companies in the FRR's equity and bond portfolios. This meant going above and beyond the standard carbon footprint method which takes into account direct emissions plus "direct suppliers" but not the rest of the value chain. Scope 3 emissions include indirect emissions from sources not controlled by the company.

Scope 3 emissions are generally separated into **two categories:**

- **upstream emissions** relate to the company's direct and indirect suppliers;
- **downstream emissions** relate to the use of the products and services provided by the company.

Given the difficulty of evaluating scope 3 in its entirety, the following analysis should be treated with caution. Nevertheless, the initial estimates show that the carbon footprints of the equity and bond portfolios remain lower than those of their respective benchmark index indices when all emissions in the value chain are taken into account.

The table below presents the carbon footprint by emissions scope for each of the two portfolios.

→ CARBON FOOTPRINT OF THE EQUITY PORTFOLIO AND ITS COMPOSITE INDEX, BY SCOPE

	Scope 1 direct emissions intensity (tCO_2e/ EURm)	Scope 2 emissions intensity (tCO_2e/ EURm)	Scope 3 upstream emissions intensity (tCO_2e/ EURm)	Scope 3 downstream emissions intensity (tCO_2e/ EURm)	Total emissions intensity (tCO_2e/ EURm)
Equity portfolio	138.10	33.64	189.55	553.42	914.72
FRR benchmark composite index	216.54	42.03	196.13	629.50	1,084.19
Relative performance (%)	-36%	-20%	-5%	-12%	-16%

→ CARBON FOOTPRINT OF THE BOND PORTFOLIO AND ITS COMPOSITE INDEX, BY SCOPE

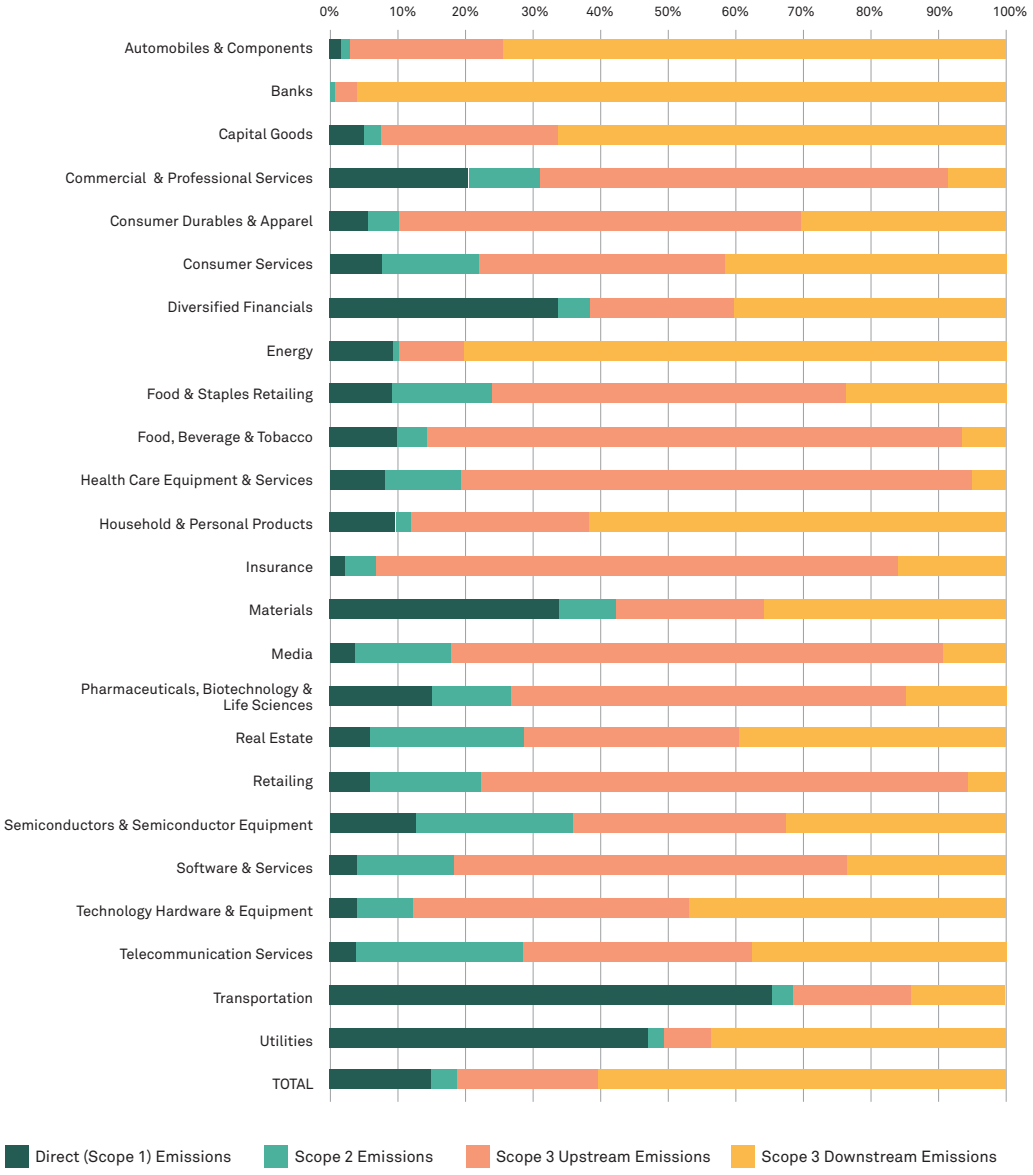
	Scope 1 direct emissions intensity (tCO_2e/ EURm)	Scope 2 emissions intensity (tCO_2e/ EURm)	Scope 3 upstream emissions intensity (tCO_2e/ EURm)	Scope 3 downstream emissions intensity (tCO_2e/ EURm)	Total emissions intensity (tCO_2e/ EURm)
Bond portfolio	215.02	30.58	166.61	609.22	1,021.42
FRR benchmark composite index	318.71	43.41	193.36	833.78	1,389.25
Relative performance (%)	-33%	-30%	-15%	-27%	-26%

Scope 3 downstream represents about 60% of the equity and bond portfolios' emissions, followed by scope 3 upstream (21% for the equity portfolio and 16% for the bond portfolio) and scope 1 (15% and 21%). The composite indices have a similar emissions profile.

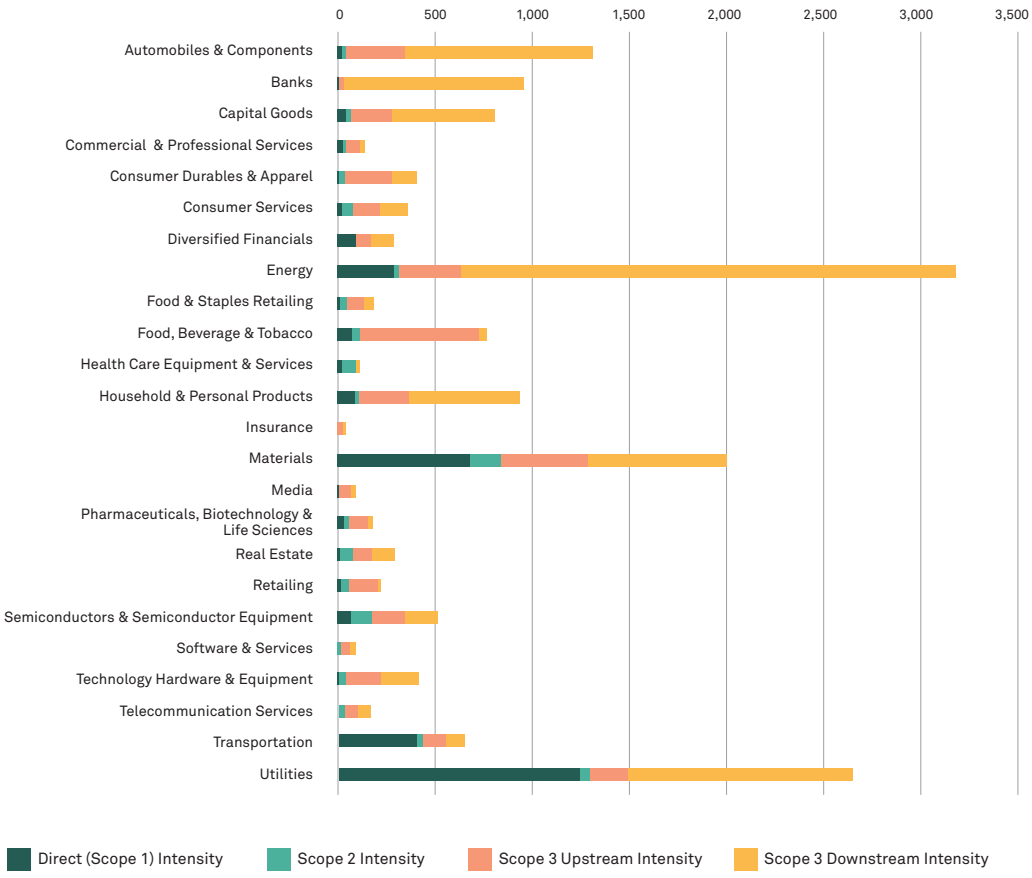
The breakdown of carbon emissions by scope varies according to business sector.

The graph below presents the sector breakdown for the equity portfolio. The results are similar for the bond portfolio and the composite indices.

SECTOR BREAKDOWN OF THE CARBON EMISSIONS FOR THE EQUITY PORTFOLIO, BY SCOPE



INTENSITY OF THE CARBON EMISSIONS FOR THE EQUITY PORTFOLIO, BY SCOPE (TCO_2E/EURM)



The sectors with the most significant scope 3 downstream emissions, as a percentage of total emissions are oil and gas, finance and the automotive sector. In other words, carbon emissions in these sectors relate mainly to **the use of their goods and services.**

Companies where the **scope 3 upstream emissions are the most significant are found in the agri-food, consumer goods and commodities sectors.**

The two primary recommendations for managing carbon risks arising from scope 3 are to evaluate indirect suppliers' exposure to carbon risks, in particular for companies dependent on commodities (agricultural and textile sectors), and to focus the scope 3 downstream emissions analysis on the sectors with the highest exposure to this category of emissions as a percentage of total emissions (automotive and finance sectors).

2. MEASURING AND ANALYSING THE CARBON FOOTPRINT OF THE SOVEREIGN BOND PORTFOLIO

SERVICE PROVIDER SELECTED BY THE FRR

Trucost Ltd works with **Beyond Ratings,** which specialises in analysing sovereign bond portfolios, to analyse and measure environmental footprints.

APPLICABLE METHODOLOGY

Beyond Ratings' methodology for analysing a portfolio's carbon footprint **measures the exposure of sovereign assets, portfolios and benchmark index indices to greenhouse gas emissions.**

It compares carbon intensity levels among countries. This service was developed in partnership with Trucost Ltd. This analysis is based on several criteria used to evaluate both territorial emissions and those related to foreign trade. Intensities are evaluated based on total greenhouse gas emissions by country, **reflecting the specific role of the public sector** as a provider of key services for the economy and as a lawmaker that can influence carbon footprints. The analysis includes measurements of carbon intensity and contributions and a variety of other indicators.

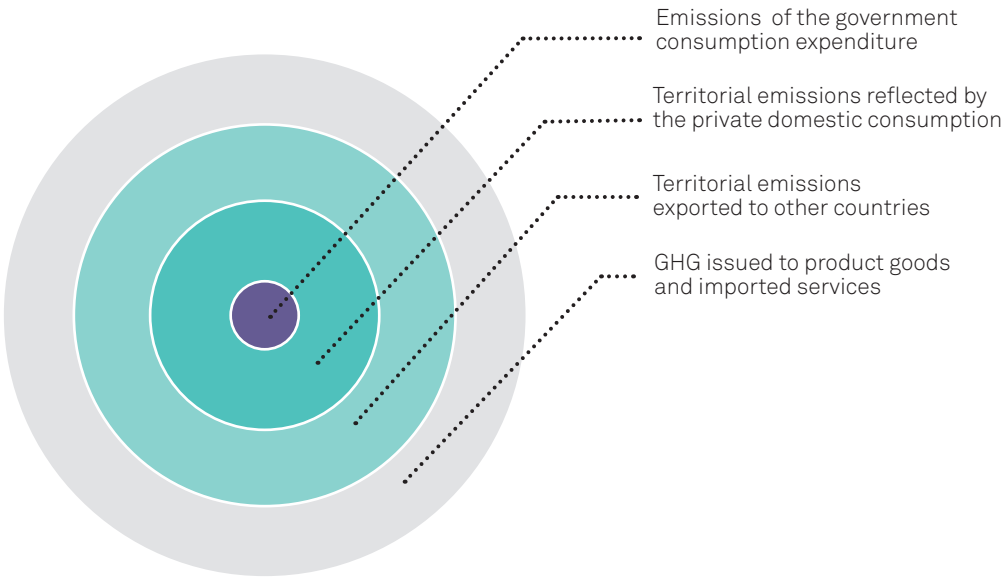
The carbon exposure of the bond portfolio and of its scope of comparison is based on the carbon profiles of sovereign issuers at the national level. It is calculated based on profiles **that include countries' greenhouse gas emissions as a whole.** This reflects the public sector's unique role in managing the carbon footprint of national economies, as a legislator and provider of key public services. The analysis of the portfolios and benchmark index indices is therefore based on **national emissions rather than only on emissions directly related to public activities.**

At the portfolio level, the ratio of greenhouse gases [territorial + imported]/GDP is the key indicator for evaluating the carbon footprint of sovereign assets. This means that a country is exposed to domestic greenhouse gases as well as to those emitted to produce imported goods and services. This approach is consistent with the direct greenhouse gas + direct supplier greenhouse gas approach used in Trucost Ltd's "Corporate" carbon footprints.

As noted below, the greenhouse gas [territorial + imported]/GDP indicator covers the following scope:

- emissions generated by the consumption of goods and services by the public sector;
- territorial emissions resulting from domestic consumption or exports;
- emissions used in the manufacture of goods and services produced abroad but supplied to the analysed country.

→ SCOPE OF GREENHOUSE GAS (GHG) EMISSIONS COVERED BY GHG [TERRITORIAL + IMPORTED]



Estimates are calculated to ensure that data and projections are up to date. The following principles are used to estimate GHG [territorial + imported] when data are missing:

- reporting data are used as much as possible and emissions are not extrapolated;
- GHG/GDP ratios are calculated from (i) available GHG data and (ii) the IMF's GDP series at constant prices in national currency (most recent data and future projections);
- the above ratio is extrapolated based on the 10-year CAGR (10-year moving average);
- by combining them with the IMF's GDP data and forecasts, the extrapolated GHG/GDP ratios can be used to estimate total GHG emissions for the analysis period and future years;
- for the annual variation analysis, data at constant prices eliminate inflation impacts;
- if data are not available, the breakdown of GHG emissions is considered stable;
- estimated GHGs are compared with the most recent GDP data or estimates to calculate the ratios.

Available data **cover nearly 100% of countries analysed.** A benchmark index was created based on France's large weighting and on a segment made up of the portfolio's emerging countries reweighted for the share of their public debt, excluding China due to its very small presence in the portfolio.

MAIN RESULTS

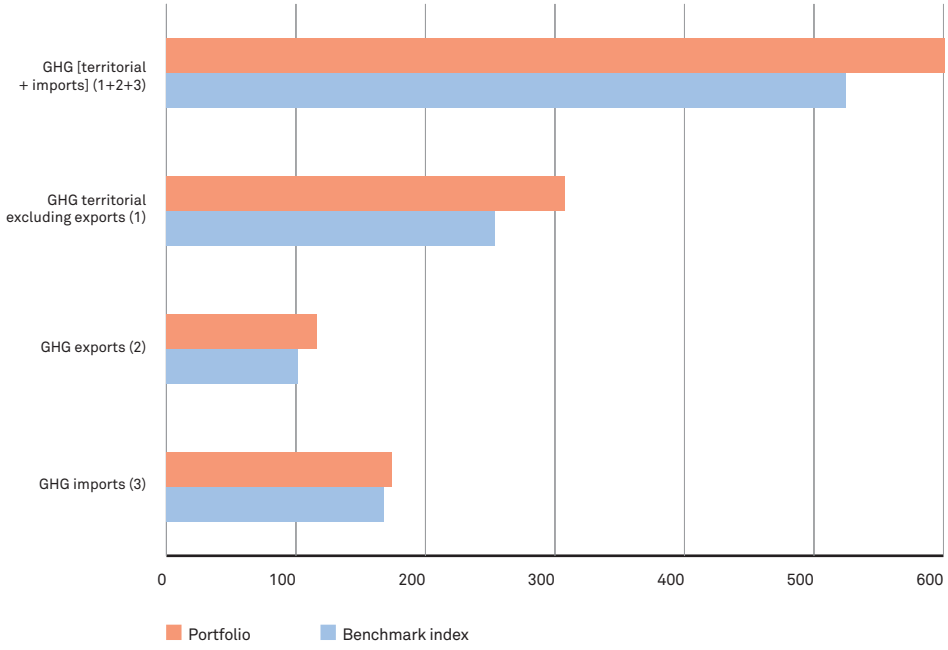
Based on positions held in 2016 and on 2015 data, the average carbon exposure of the sovereign Bond portfolio is **601 tCO_2e/EURm of GDP (GHG/GDP [territorial + imported]),** compared with **the benchmark index's exposure of 525 tCO_2e/EURm of GDP.**

On that basis, this portfolio's exposure **is 144% higher than that of the benchmark index.** This accounts for both territorial and imported greenhouse gases.

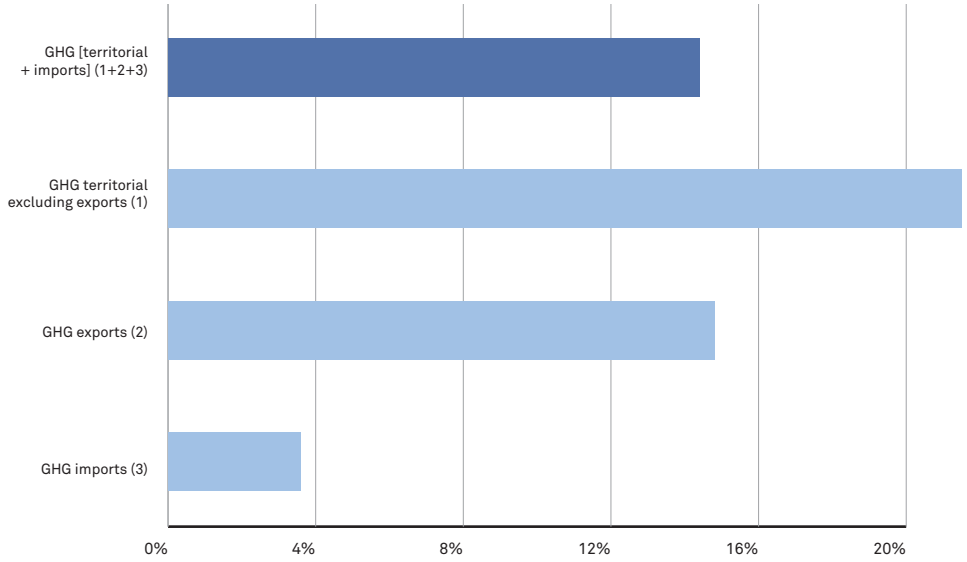
In terms of emissions of territorial GHG excluding exports/GDP, the portfolio's exposure is 21.5% higher than the benchmark index.

Similarly, exported GHG/GDP and imported GHG/GDP exposures are 14.8% and 3.6% less favourable, respectively.

→ WEIGHTED AVERAGE OF GHG/GDP [T+I] FOR 2016

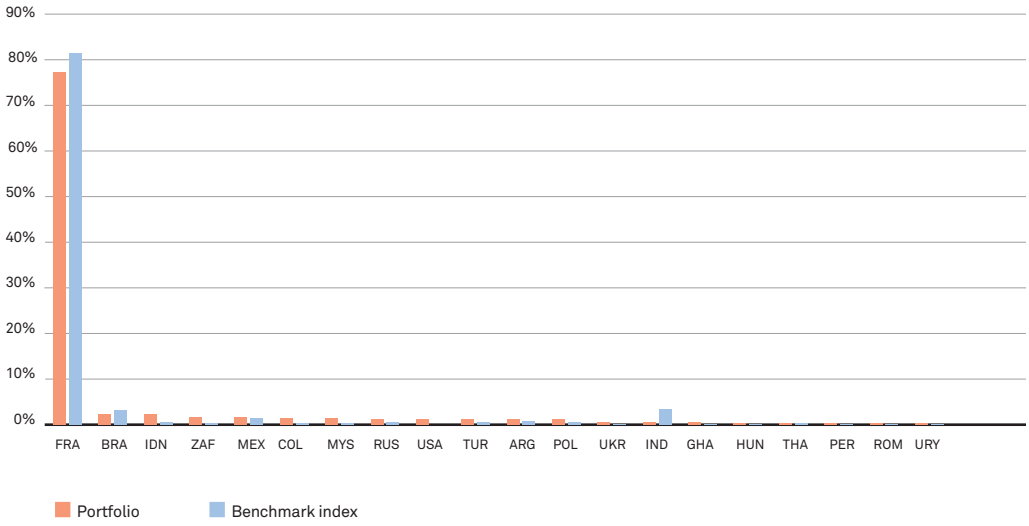


→ DIFFERENCE IN CARBON FOOTPRINT OF THE PORTFOLIO AND THE INDEX



The graph below presents the weighting of the main countries that make up the portfolio and the benchmark index. As the portfolio includes a total of 91 countries and 2 supranational entities, **only the top 20 countries in weighting terms are depicted.** The portfolio is characterised by **France's very large weighting** (77% of the total) and the very small weighting of the other positions. Second-ranked Brazil therefore accounts for only 2.3% of the portfolio.

COUNTRIES THAT MAKE UP THE PORTFOLIO AND THE BENCHMARK INDEX



The following graphs present a breakdown of carbon impacts by country (portfolio and benchmark index).

Because of its weighting, France represents by far the largest percentage of the portfolio's footprint. **Its weighting in the carbon footprint is, however, significantly lower than its weighting in value terms in the sovereign bond portfolio.** This corresponds to the moderate level of carbon exposure for France, except for imported GHGs.

Conversely, certain countries' contributions to the carbon footprint are substantially higher than their weighting in the portfolio. This is true in particular for **Indonesia, which represents 11.2% of the portfolio's footprint compared with a weighting in value terms of 2.2%, due to a high country footprint.** Indonesia's 2.2% weighting in the portfolio compared with 0.6% in the benchmark index is one of the key explanatory factors that adversely affect the portfolio's performance.

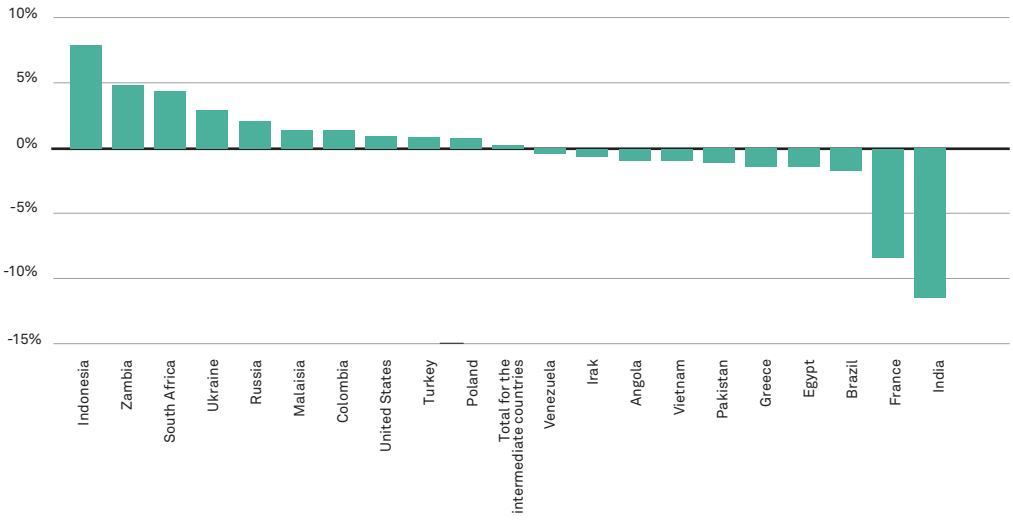
BREAKDOWN OF GHG/GDP FOOTPRINTS BASED ON 2015 ESTIMATES

The following graph details, for 20 portfolio countries, the difference between their contribution to the portfolio's footprint and their contribution to the benchmark index's footprint in terms of GHG/GDP [territorial + imported].

The countries represented are the 10 countries with the most positive and most negative differences; the average of the intermediate countries is also noted. A box identifies the data point for France due to its particularly large weighting.

The 73 countries and supranational entities not included represent 7.2% of the portfolio's weightings for 12.2% of its footprint; their differences are very small, ranging from -0.3% to 0.8%. This is largely because these are countries that, on the whole, have a very small weighting within the portfolio.

DIFFERENCE IN COUNTRY CONTRIBUTIONS TO THE GHG/GDP [T+I] OF THE PORTFOLIO AND THE BENCHMARK INDEX

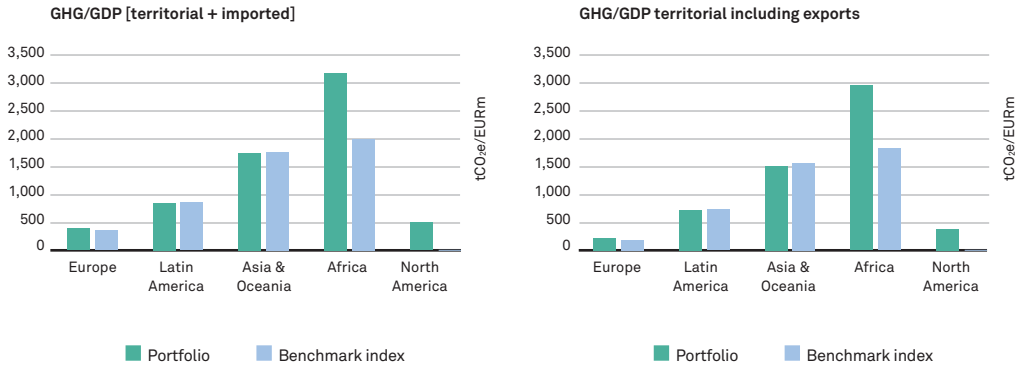


NB: This graph represents the share of the portfolio's total footprint less the share of the benchmark index's footprint (expressed in percentage points). For example, Indonesia's share in the portfolio's total GHG/GDP [T+I] footprint is 8 percentage points higher than its share in the benchmark index's footprint (i.e. 11% vs. 3%). Data for the 10 countries with the most positive differences, the 10 with the most negative differences and unweighted average for the other countries.

The graphs below show the GHG emissions/GDP for different categories of countries according to their region. All the countries in the portfolio and the benchmark index are included. GHG/GDP levels are weighted by the share of each country in the portfolio and benchmark index.

At the regional level, the African countries tend to have the worst GHG/GDP ratios. This is due to the weighting of South Africa, which has a high footprint relative to the averages of other regions, and to the particularly negative footprint of countries such as Zambia. In general, footprints are higher in the portfolio's emerging countries and considerably lower in Europe.

→ GHG/GDP BY REGION (TCO_2E/EURM, COUNTRIES WEIGHTED BY THEIR SHARE IN THE PORTFOLIO/BENCHMARK INDEX)



NB: Data are based on the countries included in the analysis by sub-region, excluding supranational entities.

The breakdown of countries by region is as follows:

- **Europe:** France; Russia; Poland; Ukraine; Hungary; Romania; Serbia; United Kingdom; Italy; Croatia; Belarus; Montenegro; Czech Republic; Netherlands; Lithuania; Ireland; Switzerland, Slovenia, Bosnia and Herzegovina; Greece; Belgium; Latvia; Spain.
- **Latin America:** Brazil; Mexico; Colombia; Argentina; Peru, Uruguay; Venezuela; Dominican Republic; Panama; Costa Rica; Jamaica; Paraguay; El Salvador; Ecuador; Chile; Guatemala; Trinidad and Tobago; Honduras; Cayman Islands; Belize.
- **Asia & Oceania:** Indonesia; Malaysia; Turkey; India; Thailand; Philippines; Japan; Lebanon; Sri Lanka; Kazakhstan; Iraq; Pakistan; South Korea; Vietnam; Bahrain; Oman; Saudi Arabia; China; Azerbaijan; Mongolia; Georgia; Singapore; Armenia; Hong Kong; United Arab Emirates; Fiji; Qatar; Australia.
- **Africa:** South Africa; Ghana; Zambia; Senegal; Kenya; Ethiopia; Tanzania; Côte d'Ivoire; Nigeria; Morocco; Egypt; Gabon; Cameroon; Mozambique; Tunisia; Namibia; Angola; Rwanda.
- **North America: United States;** Canada.

3. THE PORTFOLIO'S EXPOSURE TO STRANDED ASSETS

Stranded assets are assets that lose their value as a result of changes in the market. This devaluation is due primarily to sudden and significant changes in legislation, environmental constraints or technological innovations that make the assets obsolete before they are fully depreciated.

SERVICE PROVIDER SELECTED BY THE FRR

Trucost Ltd conducts this analysis.

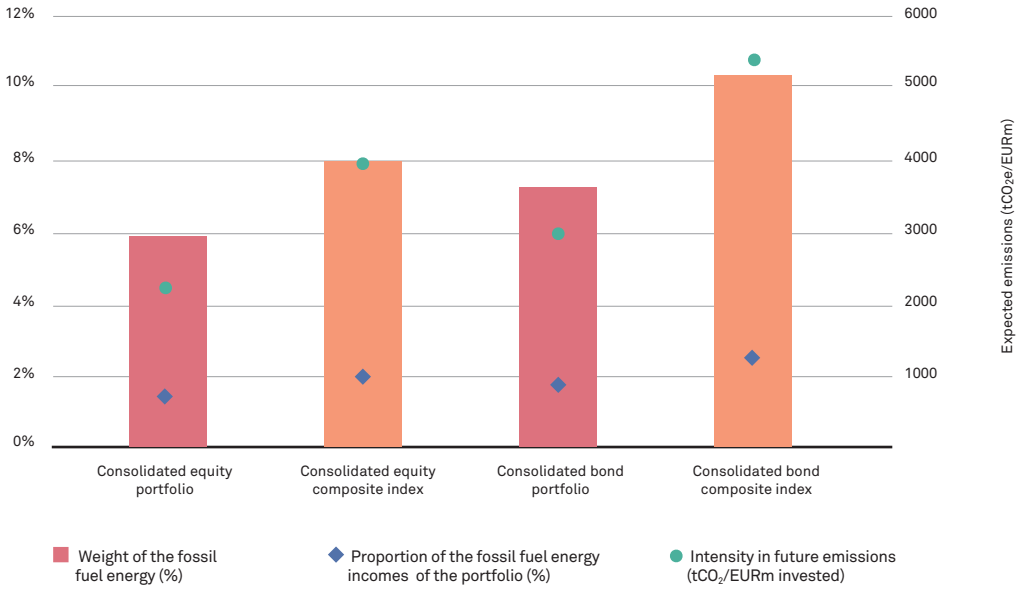
MAIN RESULTS

The equity and bond portfolios' exposure to fossil fuel extraction activities is lower than that of their respective composite indices.

Three indicators are used to describe this exposure:

- the weighting within the portfolio of companies involved in these sectors;
- their contribution to the portfolio's revenues; and
- future emissions financed per million euro invested.

FOSSIL FUEL EXPOSURE OF THE EQUITY AND BOND PORTFOLIOS



The weighting of the companies involved in these sectors is lower in the equity and bond portfolios than in their respective composite indices.

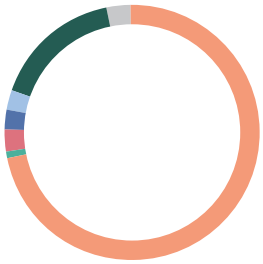
Likewise, the proportion of revenues derived from fossil fuel extraction activities is lower in the FRR's portfolios than in their respective indices.

These revenues are generated mostly from oil and natural gas extraction activities (72% for the equity portfolio and 80% for the bond portfolio).

The graph below breaks down the revenues of the equity and bond portfolios by activity.

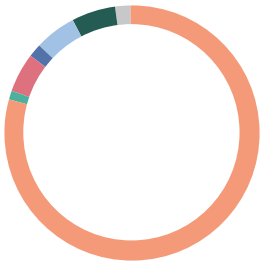
REVENUES OF THE EQUITY AND BOND PORTFOLIOS, BY EXTRACTIVE ACTIVITY (%)

Revenues by type of fossil fuel extractive activities for the consolidated equity portfolio (in %)



- Crude petroleum and natural gas extraction **84%**
- Bituminous coal underground mining **1%**
- Bituminous coal and lignite surface mining **3%**
- Natural gas liquid extraction **3%**
- Tar sands extraction **3%**
- Support activities for oil and gas operations **18%**
- Drilling oil and gas wells **3%**

Revenues by type of fossil fuel extractive activities for the consolidated bond portfolio (in %)



- Crude petroleum and natural gas extraction **86%**
- Bituminous coal underground mining **1%**
- Bituminous coal and lignite surface mining **5%**
- Natural gas liquid extraction **2%**
- Tar sands extraction **6%**
- Support activities for oil and gas operations **6%**
- Drilling oil and gas wells **2%**

NB: After compiling the fossil reserves published by companies and converting them into future CO_2 emissions, it is apparent that, on average, the equity and bond portfolios finance a smaller volume of future emissions per million euro invested than their respective benchmark index indices.

The table below lists the **top 10 companies** in the equity portfolio in terms of future CO_2 emissions related to fossil reserves and the type of reserve held.

→ MAIN CONTRIBUTORS TO FUTURE EMISSIONS OF THE EQUITY PORTFOLIO

Company	Future emissions attributable to the portfolio ('000 TCO_2)	Ratio of future emissions per EUR million invested ('000 tonnes/ EURm)	Types of reserves	Value held (EURm)
Total SA	3,194.81	27.47	Oil, Gas	116.31
Oil Co. Lukoil PJSC	3,050.53	216.85	Oil, Gas	14.07
Diamondback Energy, Inc.	2,644.21	885.01	Oil, Gas	2.99
Gazprom PJSC	1,927.88	579.20	Oil, Gas	3.33
Arch Coal, Inc.	1,131.67	3,878.35	Coal	0.29
Exxaro Resources Ltd.	932.32	4,859.36	Coal	0.19
PT Adaro Energy Tbk	875.27	717.86	Coal	1.22
BP Plc	687.61	45.11	Oil, Gas	15.24
African Rainbow Minerals Ltd.	654.94	636.00	Coal	1.03
Rep Repsol SA sol SA	583.98	22.61	Oil, Gas	25.83

NB: Emissions attributable to the portfolio are obtained by applying the percentage interest in the company to the potential CO_2 emissions held in the fossil fuel reserves. These are then divided by the amount of value in the portfolio to estimate the volume of emissions financed per million euro invested ("Ratio of future emissions per EUR million invested").

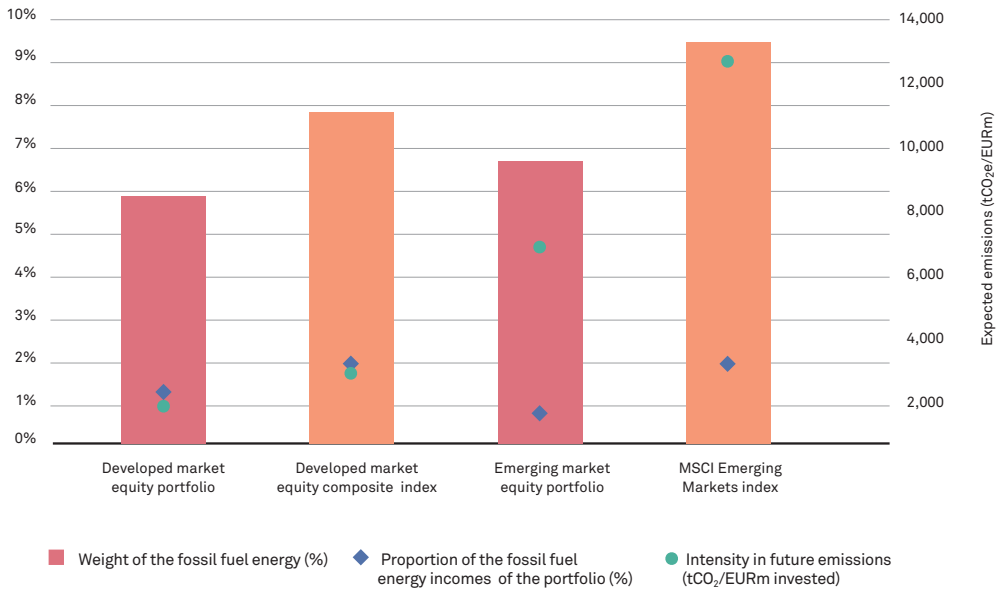
Within the equity investment universe, the developed market equity portfolio has lower exposure than that of the emerging equity portfolio across all indicators, except for the proportion of revenues derived from fossil fuel extraction activities. This is mainly due to the weighting of Total SA and ConocoPhillips in the portfolio.

MAIN CONTRIBUTORS TO FUTURE EMISSIONS OF THE BOND PORTFOLIO

Company	Future emissions attributable to the portfolio ('000 TCO_2)	Ratio of future emissions per EUR million invested ('000 tonnes/EURm)	Types of reserves	Value held (EURm)
Glencore Plc	626.72	19.68	Coal, Oil	31.84
Husky Energy, Inc.	569.67	81.95	Oil, Gas	6.95
Gazprom PJSC	531.08	131.33	Oil, Gas	4.04
Black Hills Corp.	508.60	65.80	Coal, Oil, Gas	7.73
BHP Billiton Ltd.	451.90	29.60	Coal, Oil, Gas	15.27
BP Plc	443.18	5.26	Oil, Gas	84.33
Genel Energy Plc	251.02	404.91	Oil, Gas	0.62
Wesfarmers Ltd.	205.63	14.75	Coal	13.95
Eni SpA	181.86	2.96	Oil, Gas	61.53
Anglo American Plc	181.29	14.69	Coal	12.34

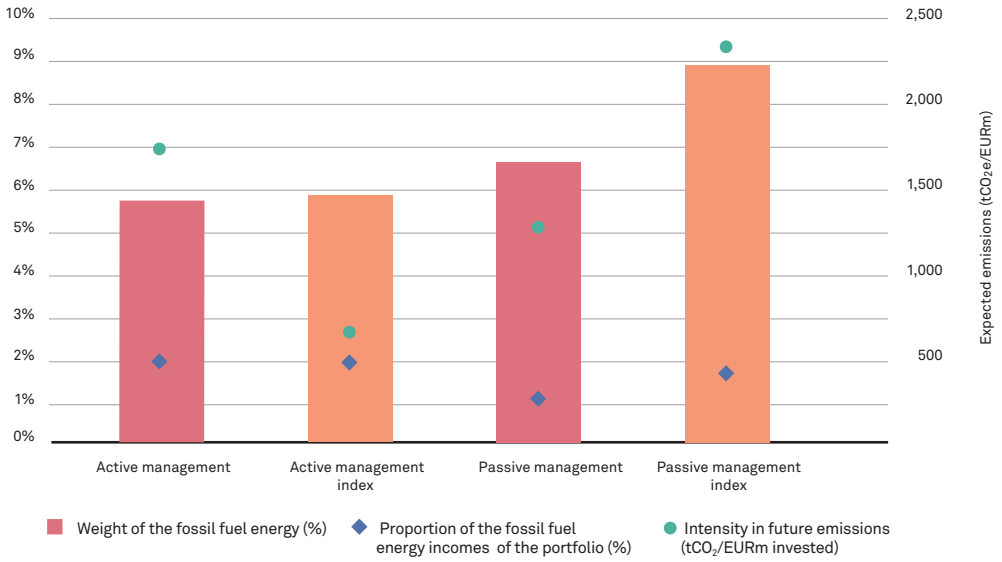
The graph below summarises the performance of both equity portfolios relative to their respective benchmark index indices.

FOSSIL FUEL EXPOSURE OF THE DEVELOPED AND EMERGING MARKET EQUITY PORTFOLIOS



Coal exposure is high primarily for the emerging equity portfolio. Coal extraction generates 20% of revenues related to fossil fuels compared with just 2%-6% for the other portfolios. This level of coal exposure is lower than that of the MSCI Emerging Markets index, in particular in terms of future emissions financed (6,557 tCO_2/EURm invested for the portfolio versus 12,468 for the index).

→ FOSSIL FUEL EXPOSURE OF THE DEVELOPED MARKET EQUITY PORTFOLIO, BY MANAGEMENT TYPE



4. THE PORTFOLIO'S EXPOSURE TO COAL

SERVICE PROVIDER SELECTED BY THE FRR

Trucost Ltd conducts this analysis.

MAIN RESULTS

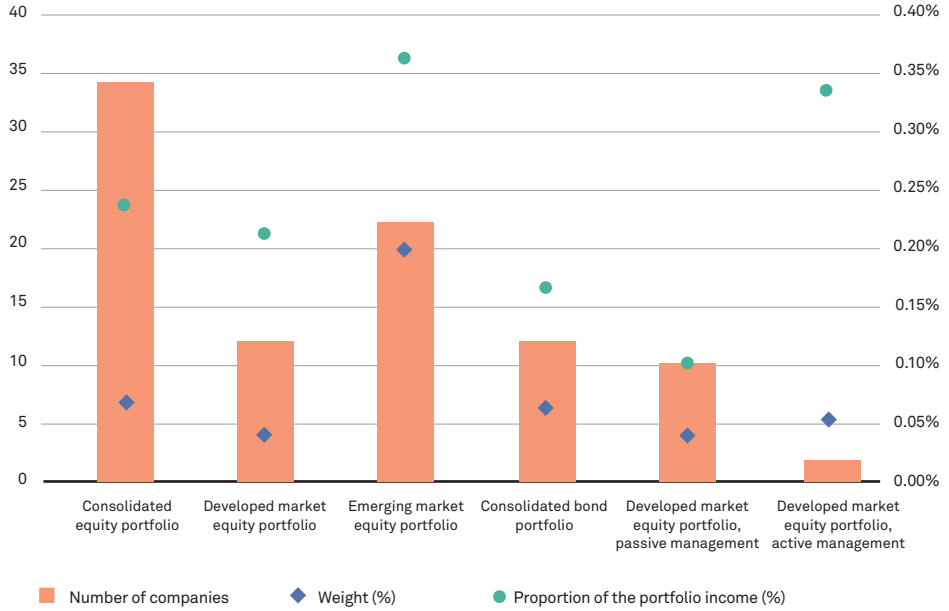
Trucost Ltd has identified the companies in the equity and bond portfolios that derive more than 20% of their revenue from coal extraction and coal-fired power generation activities.

Three indicators are used to describe this exposure:

- the number of companies deriving more than 20% of their revenue from these activities;
- their weighting in the portfolio; and
- the proportion of the portfolio's revenue that is at risk. This last indicator represents the percentage of each company's revenue attributable to the portfolio that is generated from coal-related activities.

The results for each of the portfolios are detailed in the graph below.

→ EXPOSURE TO COMPANIES DERIVING MORE THAN 20% OF THEIR REVENUE FROM COAL, BY PORTFOLIO



The coal exposure of the FRR's portfolios remains **fairly limited** (0.23% of the equity portfolio and 0.17% of the bond portfolio) **and overall is lower than that of the composite indices.**

The emerging market equity portfolio has the **highest exposure to companies deriving more than 20%** of their revenue from coal with 24 companies involved, including 11 that derive more than 95% of their revenue from coal. These companies are located mainly in **India, China and Poland.** However, the portfolio is less exposed than the MSCI Emerging Markets index in terms of weightings and revenues derived from these activities.

5. THE PORTFOLIO'S EXPOSURE TO THE ENERGY TRANSITION, ENERGY MIX AND ALIGNMENT WITH A 2-DEGREE SCENARIO FOR UTILITIES

This section presents an analysis of the future carbon trajectories of the FRR's different portfolios and their alignment with a 2°C scenario.

SERVICE PROVIDER SELECTED BY THE FRR

Trucost Ltd was assisted by **Grizzly Responsible Investment,** which specialises in aligning portfolios with the 2°C scenario.

MAIN RESULTS

To gain the best insights into the alignment of its portfolio, the FRR chose to analyse its entire portfolio using the methodology developed by Grizzly Responsible Investment, but also to apply a method developed by Trucost Ltd to take a closer look at companies in the power generation sector.

METHODOLOGY USED

Analysing an investment's carbon trajectory offers a new perspective that synthesises and supplements several existing techniques and considerations:

- the current carbon footprint, but viewed dynamically year after year;
- the matter of the budget for the level of emissions that would still be acceptable by 2050 from the perspective of a maximum increase in the world's average temperature of 2°C, and thus of a target to gradually reduce emissions and carbon intensity;
- the possibility of a non-index analysis, where each company, by virtue of its activity or activities, is compared and standardised against a specific point of reference and where the trajectory of the portfolio itself is therefore a weighted aggregation of companies' standardised trajectories.

With that in mind, a company's trajectory may be calculated as follows:

- select a starting year which will serve as the baseline and will be rebased to 100: the year selected is in this case the one used in the work of the IPCC[1], the IEA[2] and the SDA consortium[3], i.e. 2010;
- match each sector and each activity with a standard trajectory as defined and calculated in a macroeconomic climate scenario. The main trajectories of the SDA consortium were used;
- standardise (separate) a company's carbon intensity with (from) the carbon intensity of its business sector: this is done by setting a starting level in 2010 that is equal to 100 if the company has the same level of intensity as its benchmark index sector, a starting level above 100 if the company's level is greater (higher emissions) than its sector, and below 100 if the company has a better level (lower emissions);
- each year, the expected or observed carbon intensity is therefore standardised against the baseline level of the benchmark index sector as calculated in 2010, making it possible to estimate both company and sector performance;
- an "observed" performance is calculated from available historical data and an "expected" future performance is calculated for each sector and each company;
- the change expected can be described as an extension of the current curve, i.e. as the trend observed in past years and adjusted for information such as announcements of future investments and divestments, the commissioning or stranding of assets, the rollout of new technologies, etc;
- while extending the trend is a useful tool, it has some limitations in that it generally reflects the efforts a company has recently made and cannot predict future efforts.

Advantages of the methodology

The trajectory has several major advantages, in particular:

- the trajectory eliminates the problem of double- and triple-counting insofar as it is possible to set a carbon budget for each scope. For each company, the scope 1 emissions trajectory is therefore defined in the carbon budget specific to the company's business sector and the scope 2 emissions trajectory is defined in the carbon budget specific to the power producer sector. A company's trajectory therefore corresponds to the aggregation of these two trajectories, weighted by the share of each scope in the company's total emissions;
- the trajectory can be analysed without studying the impacts of allocation and selection, insofar as the performance is standardised with the benchmark index sector(s) or activity/activities: a sector that is over- or underweighted can therefore no longer affect the performance of a portfolio relative to its benchmark index;
- the trajectory links the performance of a company, sector or fund to the ecological transition and to the 2050 expectations derived from scientific and economic research;
- each sector has a different, potentially very binding target (Utilities versus Cement Manufacturers, for example), and enables carbon bubble issues related to the use of fossil fuels to be taken into account; investing in fossil fuels is therefore equivalent to setting a very binding target for this sector and thus creates the risk of deviation from the trajectory.

Lastly, it should be noted that a portfolio's trajectory is calculated relative to its real-time composition. A change in investments results in a change in the real and theoretical trajectories.

1 *Intergovernmental Panel on Climate Change.*

2 *Energy Technology Perspective (IEA, 2014).*

3 *Sectoral Decarbonization Approach (SDA): A method for setting corporate emission reduction targets in line with climate science (Science Based Targets Initiative, 2015).*

The trajectory can therefore be seen as:

- a backward projection[4] and extrapolation exercise, based on a set composition on a given date. That is the approach adopted here;
- a calculation on a given date of the real and theoretical trajectories updated whenever there is a change in the composition of the portfolio. So, while the portfolio trajectory may be highly volatile to changes in sector investments (as each sector has a specific expected trajectory), the crux of the analysis lies in the differences between the portfolio's real and theoretical trajectories.

Limitations of the methodology

While studying the carbon trajectory allows for a forward-looking analysis of a portfolio's carbon risks, it nevertheless has **the significant methodological limitations highlighted below:**

- the approach developed in this analysis is based on the projected carbon intensity of a company's revenue, at constant revenue. It therefore does not account for either a change in revenue or a change in the products and services offered by the company. Including these two variables in the analysis would allow for a more accurate measurement of the company's positioning in the energy transition and for further fine-tuning of its carbon trajectory;
- the quality of the estimated and reported data on changes in the products and services offered by the company as well as the time length of the series may, however, not be sufficient to be incorporated into the analysis;
- projected data on future technologies, investments and divestments are fairly limited for the time being and are therefore difficult to incorporate;
- growth and change assumptions only make sense if they systematically converge in the long term, in line with the scenarios developed through the SDA approach. In the absence of this assumption, the long-term viability of certain sectors or certain companies could be threatened;
- the weighting system (by percentage contribution to total emissions) is realistic but has the disadvantage of giving more weight to poor performers.

Weighting of company performances in the portfolio

Based on all the information available in our proprietary database and on the macroeconomic climate trajectories as calculated by the SDA consortium from the work of the IPCC and the IEA, trajectories were calculated for the companies included in the FRR's various portfolios at **31 December 2016** and these company trajectories were aggregated by portfolio, while taking care also to present the results at an intermediate sector level.

To be significant, this aggregation uses **a different weighting key** from the usual weighting by amounts invested.

Since each company is compared with its sector and since sectors and companies all start at 100 in 2010, using a weighting by amounts invested in the portfolio would therefore mean all companies and all sectors are given equal importance. The efforts in base 100 of a company in a very low emissions and hence insignificant sector could therefore offset the performances of a company in a very high emissions sector. Accordingly, the climate trajectory calculation for a portfolio which is half media companies that are highly proactive about reducing emissions and half moderately efficient power producers would be positive due to the efforts of the media sector.

A weighting solely by amount invested is therefore insufficient, and must be supplemented by each company's carbon contribution to the total carbon contribution of the portfolio. In the previous example, as the carbon contribution of utilities is well above that of media, the portfolio's final trajectory will therefore be closer to that of utilities.

This contribution-weighting approach may have two major limitations:

- as each company's contribution varies each year, its influence on the portfolio's trajectories can also vary without having an impact on each company's trajectory;
- underperforming companies generally make a more significant contribution, all else being equal, since they emit "too much". Weighting by contribution gives greater weight to underperforming companies and makes it more difficult to achieve a strong trajectory at the portfolio level.

4 *Recalculation of prior year data based on the concepts and using the classifications of the new system.*

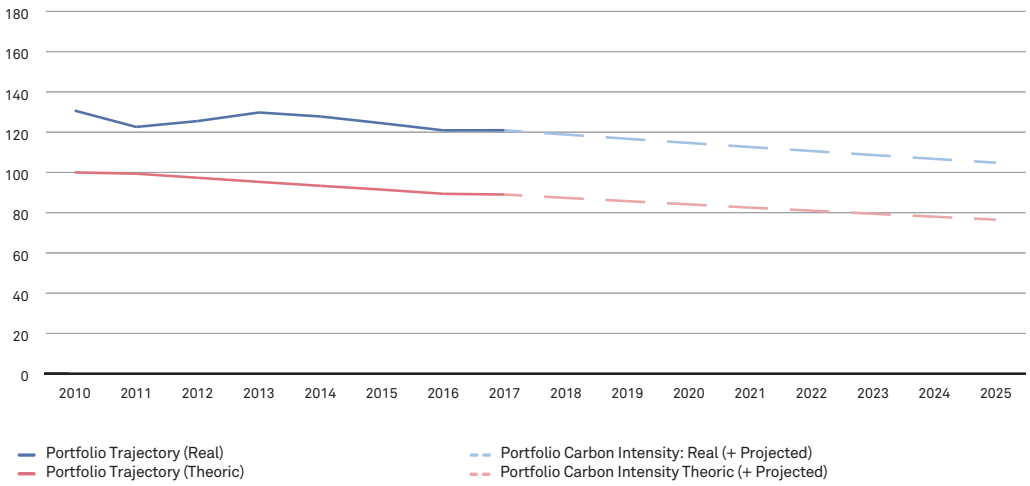
Lastly, **each company's carbon contribution depends directly on the investment the portfolio has made in a company** since the contribution is, in principle, equal to the company's total emissions times a proportion equal to the amount invested in the company divided by the value of the company in question.

RESULTS BY TYPE OF PORTFOLIO

Results for the equity portfolio

The graph below shows the trajectory for the equity Portfolio (in blue) and its theoretical portfolio (in red).

TRAJECTORY OF THE PORTFOLIO AND ALIGNMENT WITH THE THEORETICAL PORTFOLIO



Relative to its theoretical trajectory (i.e. portfolio made up of the same companies but behaving in line with the sector trajectories as defined in the IPCC/IEA/SDA scenarios), the equity portfolio trajectory:

- has higher emissions in 2010 than the theoretical portfolio;
- shows an improvement in its trajectory similar to that of the theoretical portfolio and is therefore unable to close the gap.

The table below presents the trajectories at the sector level.

How to read this table

- **2010E:** standardised CI data in base 100 (100 = Carbon Intensity of the sector/activity in 2010);
- **2017F:** forward CI data in 2017, also standardised relative to the activity/sector;
- **Average:** average annualised change in each company considered in the sector.

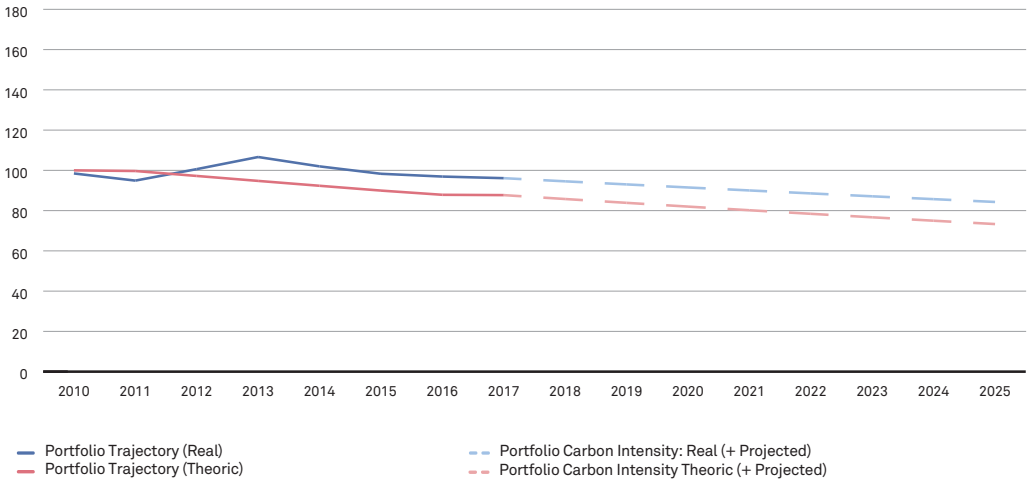
→ EQUITY PORTFOLIO SECTOR TRAJECTORIES

ICB supersector	2010E	2017F	Average
Automobiles & parts	124.8	96.3	-2.8%
Banks	248.9	211.3	-4.0%
Basic resources	169.9	169.2	1.9%
Chemicals	127.7	139.5	-0.4%
Construction & materials	106.5	107.0	-1.8%
Financial services (Supersector)	370.0	286.2	6.7%
Food & beverage	217.4	180.4	-0.4%
Health care	195.2	194.4	-2.1%
Industrial goods & services	233.7	294.2	-0.8%
Insurance	131.6	109.3	-1.5%
Media	249.5	278.4	-2.7%
Oil & gas	94.9	74.4	-0.1%
Personal & household goods	254.5	394.4	0.7%
Real estate	152.7	226.2	3.8%
Retail	132.8	102.4	1.9%
Technology	283.6	215.4	-1.1%
Telecommunications	171.6	171.4	-0.5%
Travel & leisure	104.3	88.1	-1.9%
Utilities	109.4	127.3	-1.7%
Average	**130,7**	**121.0**	**0.0%**

Results for the developed market equity portfolio

The graph below shows the trajectory of the developed market equity Portfolio (in blue) and its theoretical portfolio (in red).

TRAJECTORY OF THE DEVELOPED MARKET EQUITY PORTFOLIO AND ALIGNMENT WITH THE THEORETICAL PORTFOLIO



While the starting point for the portfolio is almost identical to the base 100 formalised from the IPCC/IEA/SDA scenario for 2010, the portfolio's performance showed some irregularities and moved slightly above the theoretical curve expected. Carbon intensity then stabilised after 2012-2013, a peak that was likely due to the rebound in the global economy after the 2008 crisis. The trend is now moving in the same direction as and in the same proportion to that of the trajectory expected in theoretical terms, but is again unable to close the gap. By 2025, an approximately 5-basis-point deviation still remains between estimated and actual at constant trajectory.

The table below presents the trajectories at the sector level.

How to read this table

- **2010E:** standardised CI data in base 100 (100 = Carbon Intensity of the sector/activity in 2010);
- **2017F:** forward CI data in 2017, also standardised relative to the activity/sector;
- **Average:** average annualised change in each company considered in the sector.

→ SECTOR TRAJECTORIES OF THE DEVELOPED MARKET EQUITY PORTFOLIO

ICB supersector	2010E	2017F	Average
Automobiles & parts	87.0	73.4	-2.5%
Banks	127.3	128.2	-1.3%
Basic resources	108.2	131.3	5.7%
Chemicals	137.8	143.2	1.5%
Construction & materials	69.5	68.8	-1.0%
Financial services (Supersector)	294.4	329.9	1.8%
Food & beverage	225.5	154.2	1.2%
Health care	127.4	184.4	-1.0%
Industrial goods & services	158.7	226.5	-1.2%
Insurance	33.6	117.3	4.9%
Media	127.5	145.0	-3.3%
Oil & gas	101.2	152.4	4.6%
Personal & household goods	131.8	212.7	-0.7%
Real estate	194.3	146.2	-1.6%
Retail	134.3	121.0	4.9%
Technology	188.9	141.8	-1.9%
Telecommunications	110.3	128.1	0.6%
Travel & leisure	94.6	79.9	-2.5%
Utilities	87.5	85.5	-1.0%
Average	**98.5**	**96.1**	**0.0%**

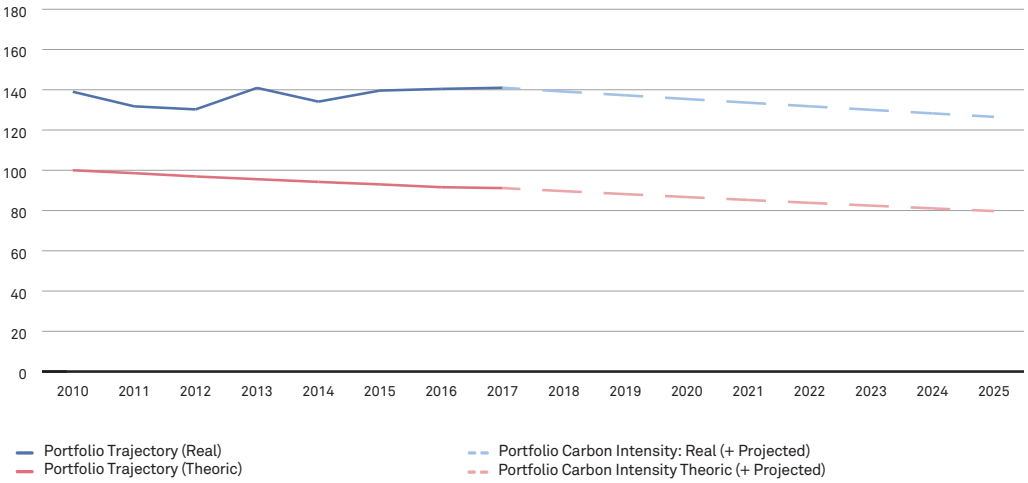
The 2010-2017 table shows that the main sector contributors are moving in the right direction:

- Automobiles & Parts (scopes 1, 2 and 3 usage) declines from 87.0 to 73.4, with an average annual reduction in each company of 2.5%;
- Utilities remain at a low level, at 85.5 versus 87.5, with an average annual decline per company of 1.0%;
- Construction & Materials is at 68.8 (versus 69.5), with an average annual decline per company of 1.0%;
- in contrast, Basic Resources, Chemicals and Industrial Goods and Services rise, partly due to two factors: first, the inclusion of data for new companies between 2010 and 2017 for which data were not available in 2010 and, second, the reduction in the annual contribution of the top performing companies. The average annual change per company for these three sectors is much more moderate and acceptable, with the exception of Basic Resources, at +5.7%.

Results for the developed market equity portfolio, active management

The graph below shows the trajectory of the developed market equity portfolio (active management) (in blue) and its theoretical portfolio (in red).

TRAJECTORY OF THE DEVELOPED MARKET EQUITY PORTFOLIO, ACTIVE MANAGEMENT, AND ALIGNMENT WITH THE THEORETICAL PORTFOLIO



The trajectory of this portfolio is substantially above that of the theoretical portfolio, with a high starting point of almost 140, versus 100 on a theoretical basis, and a slight downslope. Between 2010 and 2017, and given the adverse weight of contributions as a weighting factor, no sector is considered to be on a downward trajectory.

The table below presents the trajectories at the sector level.

How to read this table

- **2010E:** standardised CI data in base 100 (100 = Carbon Intensity of the sector/activity in 2010);
- **2017F:** forward CI data in 2017, also standardised relative to the activity/sector;
- **Average:** average annualised change in each company considered in the sector.

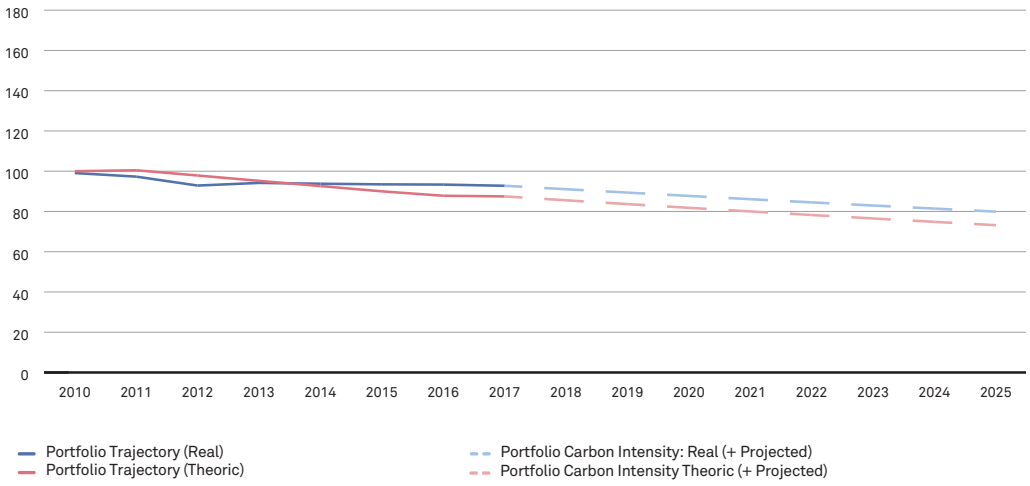
→ SECTOR TRAJECTORIES OF THE DEVELOPED MARKET EQUITY PORTFOLIO, ACTIVE MANAGEMENT

ICB supersector	2010E	2017F	Average
Automobiles & parts	122.9	119.7	-3.3%
Banks	144.3	116.2	-3.0%
Basic resources	119.3	126.1	0.0%
Chemicals	132,1	118.2	-1.6%
Construction & materials	82.8	96.3	-1.6%
Financial services (Supersector)	235.5	275.4	0.6%
Food & beverage	336.5	271.0	-2.6%
Health care	200.1	209.2	-1.8%
Industrial goods & services	259.0	286.9	-1.8%
Insurance	143.1	122.9	-1.1%
Media	292.5	334.5	-1.9%
Oil & gas	87.6	94.3	10.4%
Personal & household goods	259.1	401.3	1.5%
Real estate	157.7	178.4	-0.4%
Retail	193.1	132.5	-1.2%
Technology	378.1	210.9	-2.2%
Telecommunications	146.0	123.5	-2.6%
Travel & leisure	104.1	80.7	-2.5%
Utilities	154.3	161.2	-4.2%
Average	**139.0**	**141.0**	**0.0%**

Results for the developed market equity portfolio, passive management

The graph below shows the trajectory of the developed market equity portfolio (passive management) (in blue) and its theoretical portfolio (in red).

TRAJECTORY OF THE DEVELOPED MARKET EQUITY PORTFOLIO, PASSIVE MANAGEMENT, AND ALIGNMENT WITH THE THEORETICAL PORTFOLIO



The portfolio had one of the best trajectories observed, with satisfactory performances across a number of high-contribution sectors, primarily Automobiles & Parts, Construction and Utilities. The FRR focused its efforts on this portfolio.

The trajectories of other lower-contribution sectors were also in line with the theoretical trajectories (Travel & Leisure, Telecommunications, Banks).

The table below presents the trajectories at the sector level.

How to read this table

- **2010E:** standardised CI data in base 100 (100 = Carbon Intensity of the sector/activity in 2010);
- **2017F:** forward CI data in 2017, also standardised relative to the activity/sector;
- **Average:** average annualised change in each company considered in the sector.

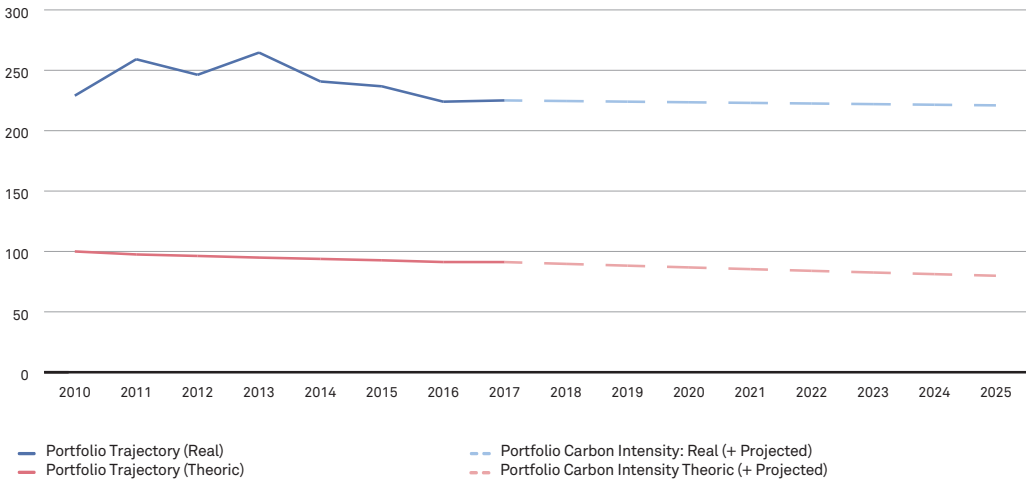
→ SECTOR TRAJECTORIES OF THE DEVELOPED MARKET EQUITY PORTFOLIO, PASSIVE MANAGEMENT

ICB supersector	2010E	2017F	Average
Automobiles & parts	95.5	74.4	-3.4%
Banks	96.9	75.5	-1.3%
Basic resources	114.4	114.5	1.0%
Chemicals	100.9	117.1	0.3%
Construction & materials	48.3	71.6	-0.7%
Financial services (Supersector)	268.0	276.5	8.4%
Food & beverage	129.5	111.9	2.8%
Health care	127.9	161.4	0.4%
Industrial goods & services	228.5	303.7	0.9%
Insurance	147.1	115.8	-1.7%
Media	142.6	238.5	-1.0%
Oil & gas	100.7	105.6	1.5%
Personal & household goods	92.9	93.9	1.0%
Real estate	223.1	145.2	1.5%
Retail	133.7	104.4	7.0%
Technology	124.5	110.0	-1.5%
Telecommunications	90.5	97.8	-0.3%
Travel & leisure	88.0	78.2	-2.3%
Utilities	81.8	77.7	-0.8%
Average	**99.1**	**92.8**	**0.0%**

Results for the emerging market equity portfolio

The graph below shows the trajectory of the emerging market equity portfolio (in blue) and its theoretical portfolio (in red).

TRAJECTORY OF THE EMERGING MARKET EQUITY PORTFOLIO AND ALIGNMENT WITH THE THEORETICAL PORTFOLIO



The trajectories recorded for emerging market companies significantly exceed the theoretical levels set in 2010. The weighting of the top contributing sectors, such as Utilities, Basic Resources, Automobiles & Parts, Construction and Chemicals is the primary reason for the trajectory differential.

The table below presents the trajectories at the sector level.

How to read this table

- **2010E:** standardised CI data in base 100 (100 = Carbon Intensity of the sector/activity in 2010);
- **2017F:** forward CI data in 2017, also standardised relative to the activity/sector;
- **Average:** average annualised change in each company considered in the sector.

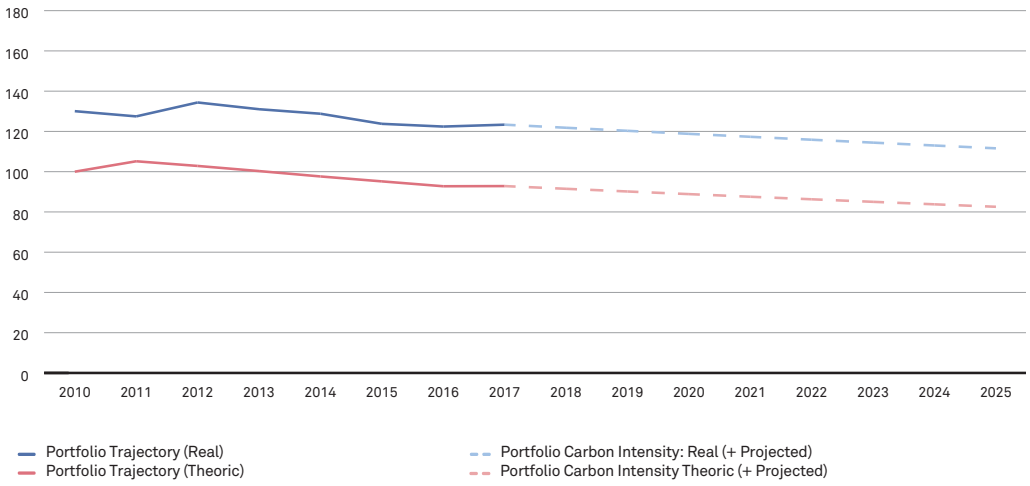
→ SECTOR TRAJECTORIES OF THE EMERGING MARKET EQUITY PORTFOLIO

ICB supersector	2010E	2017F	Average
Automobiles & parts	122.8	165.9	3.8%
Banks	140.1	147.9	-1.9%
Basic resources	275.8	330.0	2.2%
Chemicals	655.4	549.4	-2.5%
Construction & materials	166.1	141.8	0.4%
Financial services (Supersector)	321.4	436.0	4.2%
Food & beverage	133.5	125.9	-1.0%
Health care	335.8	254.2	-1.0%
Industrial goods & services	194.0	147.8	-4.7%
Insurance	193.8	391.0	-0.9%
Media	172.7	186.5	-3.4%
Oil & gas	144.8	106.9	0.7%
Personal & household goods	238.6	249.1	-1.8%
Real estate	156.0	134.2	-4.6%
Retail	97.9	115.4	0.0%
Technology	398.1	312.9	-0.9%
Telecommunications	256.3	273.4	1.6%
Travel & leisure	95.6	96.4	-2.7%
Utilities	261.7	196.2	1.1%
Average	**229.0**	**225.1**	**0.0%**

Bond portfolio (non-sovereign)

The graph below shows the trajectory of the non-sovereign bond portfolio (in blue) and its theoretical portfolio (in red).

TRAJECTORY OF THE (NON-SOVEREIGN) BOND PORTFOLIO AND ALIGNMENT WITH THE THEORETICAL PORTFOLIO



→ SECTOR TRAJECTORIES OF THE (NON-SOVEREIGN) BOND PORTFOLIO

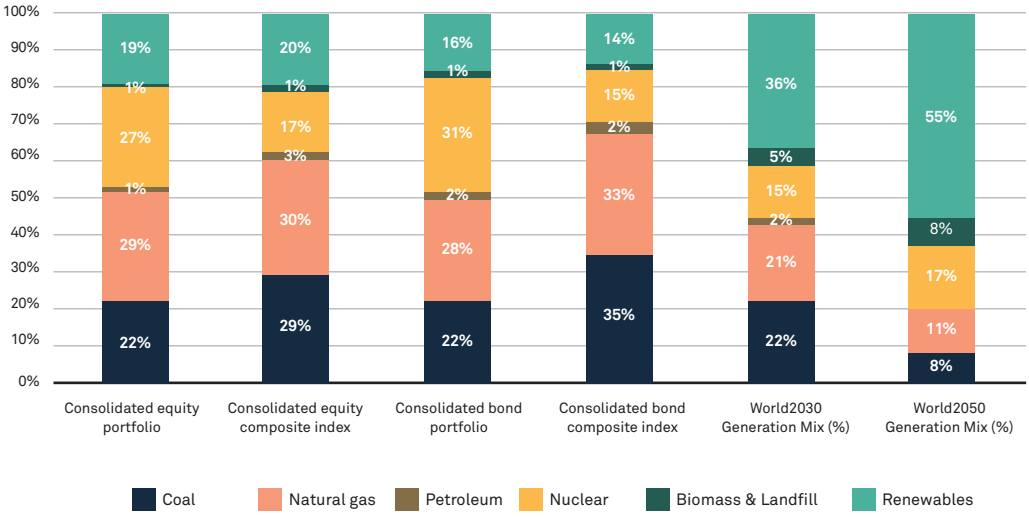
ICB supersector	2010E	2017F	Average
Automobiles & parts	91.1	86.2	-2.2%
Banks	160.7	106.2	-3.5%
Basic resources	113.7	92.7	1.1%
Chemicals	118.4	104.2	-1.3%
Construction & materials	99.2	99.8	0.4%
Financial services (Supersector)	297.8	211.1	-1.1%
Food & beverage	146.6	136.7	-0.1%
Health care	91.9	92.9	-2.5%
Industrial goods & services	136.4	117.3	-2.8%
Insurance	217.5	104.4	-0.7%
Media	260.0	267.3	-1.0%
Oil & gas	114.8	103.0	1.3%
Personal & household goods	171.4	150.5	-4.1%
Real estate	486.5	3,310.6	14.7%
Retail	138.2	116.8	-4.1%
Technology	15.3	9.0	2.4%
Telecommunications	340.7	222.8	-6.9%
Travel & leisure	127.1	99.9	-1.6%
Utilities	155.6	142.1	-1.6%
Average	**130.1**	**123.4**	**0.0%**

ANALYSIS OF THE PORTFOLIO'S POWER-PRODUCING COMPANIES

The analysis of the portfolio's power-producing companies is used to determine whether their activities are compatible with international climate targets. In this regard, the climate trajectories defined by the IEA are a very useful point of comparison, as they detail the energy mix of key countries/regions in a climate scenario where global warming is limited to 2 degrees Celsius.

Trucost Ltd applies the equity ownership proxy principle to the power generation of the utilities in the FRR's portfolios and is thus able to reconstruct the portfolios' energy mix and view them in the context of the OECD's 2-degree energy mix.

ENERGY MIX OF THE EQUITY AND BOND PORTFOLIOS, COMPARISON WITH THE COMPOSITE INDICES AND ALIGNMENT WITH A 2-DEGREE SCENARIOS



NB: The World 2030 Generation Mix and World 2050 Generation Mix represent the world energy mix in 2030 and 2050. The Renewables category includes wind, solar, ocean and geothermal energies.

The two right-hand columns show the change needed in the world energy mix to marginalise fossil fuels and give renewable energies an increasingly prominent role. Although these scenarios are based on increased availability of green technologies in the future (CO_2 storage, for example), this comparison shows the energy mix that companies in the consolidated portfolio should strive towards to align with a 2-degree scenario.

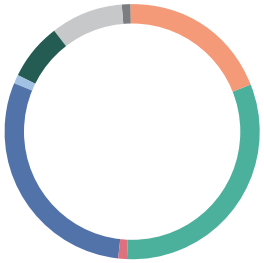
Priority should therefore be given to analysing the strategy of the power-producing companies in the portfolio (change in energy mix, deactivation of fossil units, etc.) to ensure the portfolio aligns with the policy objectives of limiting global warming.

The energy mix of the equity and bond portfolios is fairly similar, with significant exposure to power generation from fossil fuels (natural gas, nuclear and coal). Renewable energies represent a slightly larger share of the overall equity portfolio relative to the overall bond portfolio (21% versus 17%).

The exposure to coal of the overall equity portfolio's energy mix derives mainly from the emerging market equity portfolio, where the energy mix consists mostly of coal (37%) and hydropower (25%). The developed market equity portfolio consists mostly of natural gas (31%) and nuclear (29%).

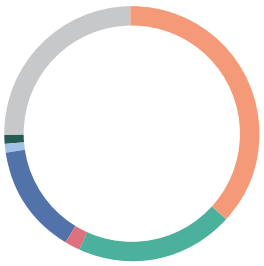
→ ENERGY MIX OF DEVELOPED AND EMERGING MARKET EQUITY PORTFOLIOS

Energy mix of the developed market equity portfolio



- Coal **19%**
- Nuclear **29%**
- Natural gas **31%**
- Biomass **1%**
- Petroleum **1%**
- Landfill **0%**
- Solar **0%**
- Geothermal **1%**
- Wind **7%**
- Wave and Tidal **0%**
- Hydro **9%**
- Other **0%**

Energy mix of the emerging market equity portfolio



- Coal **37%**
- Nuclear **14%**
- Natural gas **20%**
- Biomass **1%**
- Petroleum **2%**
- Landfill **0%**
- Solar **0%**
- Geothermal **0%**
- Wind **1%**
- Wave and Tidal **0%**
- Hydro **25%**
- Other **0%**

6. ANALYSIS OF THE GREEN SHARE AND AVOIDED EMISSIONS

An analysis of the contribution to energy transition and to climate targets should make it possible to determine to what extent the activities financed by the FRR help to achieve this transition (the activities' **"green share"**) and the amount of GHG emissions that are avoided through this contribution to the climate transition (**"avoided emissions"**).

SERVICE PROVIDER SELECTED BY THE FRR

Trucost Ltd was assisted by **I Care & Consult,** which specialises in analysing the green share of portfolios.

METHODOLOGY APPLIED TO THE GREEN SHARE AND TO AVOIDED EMISSIONS

State-of-the-art thinking and calculation methods do not currently allow for a meaningful analysis of all economic sectors.

Furthermore, not all of the data needed to conduct these analyses for all exposed sectors were collected in 2017 in sufficient detail.

The **analysis for 2016 is therefore limited to the following sectors corresponding to the classifications used in the SDA (Sectoral Decarbonization Approach) methodology:**

- power generation;
- automotive;
- passenger transport;
- goods transport;
- cement;
- steel.

Coverage will be expanded to other sectors in the subsequent analysis.

"Green share" and "avoided emissions" are relative indicators that compare the issuer's performance with average sector performances or with sector performance targets: they therefore intrinsically contain a "physical" benchmark index.

To build these three climate performance indicators, benchmark index sector averages are developed from emissions data derived from different sources, whether international organisations (IEA, Eurostats), academic institutions (Imperial College) or international life cycle analysis databases (Ecoinvent). These physical averages are world averages that represent all activities in these sectors, whether or not they are listed.

Methodology applicable to the "Green Share of the portfolio"

The "green share" was calculated as the share of issuers' revenue corresponding to a green activity within the meaning of the Ecological and Energy Transition. To do this, a decision was made to use the breakdown of revenue by business sector supplied by Trucost Ltd as well as data collected directly from issuers' reports. The green share of revenue is calculated using a methodology designed specifically for each sector studied. For example, the green share for the Automotive sector is defined as the share of revenue derived from the sale of electric and hybrid vehicles. For most automakers, this indicator was between 0% and 2% in 2015.

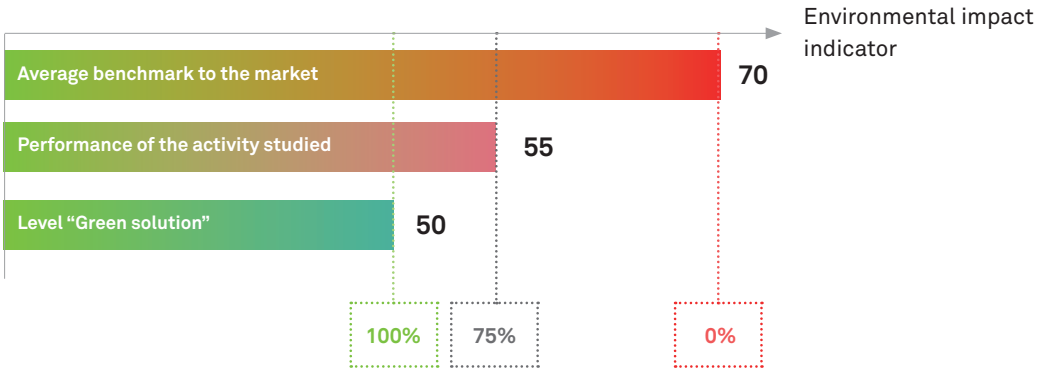
At the sector or portfolio level, this indicator is aggregated by weighting for the issuer's share in the portfolio.

This "green share" indicator is of interest because it is used to **identify a number of key technologies for the Ecological and Energy Transition,** but has the disadvantage of having **"technological biases"** and of not evaluating the issuer's climate performance as a whole.

A second more comprehensive indicator, the "Intensity of the contribution to the Climate Transition", is also used.

This indicator seeks to evaluate where a company's performance stands on a **scale of 0% to 100%:**

- 100% if the activity's climate performance is equal to that of green activities as defined by the TEEC label (renewable energies, electric vehicles, etc.);
- 0% if the activity's environmental performance corresponds to the average of its sector;
- Between 0% and 100% if the performance falls between these two ends of the scale.



The **strengths of this method** are as follows:

- it is based on the use of physical indicators that provide real information about a company's climate performance with no financial biases;
- because the climate performance indicator is on a scale of 0% to 100%, this method enables a comprehensive assessment of an activity's climate performance and transcends the binary nature (0% or 100%) of defining a green activity while remaining true to the TEEC label framework.

So, again taking the example of the automotive sector, this means determining where the average performance of an automaker (gCO_2/km) falls on this scale:

- if average vehicle emissions in Europe are taken as a proxy for the average performance of the automotive sector (0%), and if an electric vehicle powered by European average electricity is taken as the best possible solution (100%), the performance of each automaker can be situated on this scale;
- for example, while Peugeot has an approximately 2% green share (share of electric and hybrid vehicles), its overall carbon performance is well above the average, which puts it at an intensity of the contribution to the Climate Transition of 24% on a scale of 0% to 100%.

At the sector or portfolio level, this indicator is aggregated by weighting for the issuer's share in the portfolio.

Methodology applicable to "avoided emissions"

Avoided emissions are defined as emissions avoided when a carbon performance is above the average performance of each sector. Here, the preferred definition of carbon performance is based on physical indicators (e.g. gCO_2/KWh), for both the issuer and the benchmark index scenario, so as to avoid economic biases.

These physical indicators capture the carbon emissions material to the sector, whether direct (for example, plant activities for cement production) or indirect (for example, the use of the car for automotive manufacturing).

Only emissions avoided by issuers for whom the intensity of their contribution to the Climate Transition is greater than zero are considered avoided emissions. "Excess emissions" related to issuers whose carbon performance is below the sector average are therefore not counted here.

At the sector or portfolio level, avoided emissions are assigned in proportion to the investor's share of enterprise value.

MAIN RESULTS

Results for the equity portfolio

The equity portfolio is made up of shares from around the world, and consists of developed and emerging market equity portfolios under active and passive management.

→ MAIN RESULTS OF THE ANALYSIS OF THE "GREEN SHARE" OF THE EQUITY PORTFOLIO

	Securities covered by the sectors analysed	Green Share	Intensity of the Contribution to the Climate Transition	Avoided emissions	
	%	%	%	tCO_2/year	tCO_2/year/EURm invested
Automotive manufacturing	2.4%	5%	9%	4,188	15
Power generation	2.0%	8%	16%	124,262	515
Cement manufacturing	0.3%	8%	14 %	11,567	280
Steel manufacturing	0.3%	51%	44%	8,585	234
Passenger transport	0.7%	35%	35%	10,010	112
Freight transport	1.7%	17%	7%	7,480	36
Total	**7.5%**	**13%**	**14%**	**166,092**	**185**

The weighting of the sectors analysed represents 7.5% of the portfolio. **The average green share of the portfolio is 13%** while the average intensity of the contribution to the climate transition is 14%, driven primarily by power generation, but also by passenger transport and steel manufacturing, although their shares in the portfolio are smaller. The portfolio's total avoided emissions represent about 185 tCO_2e per million euro invested. As a reminder, the portfolio's absolute direct + first-tier indirect (part of scope 3) carbon footprint is 232.56 tCO_2e per million euro invested. Most of the avoided emissions come from the power generation sector.

While the automotive manufacturing sector has a significant weighting, its contribution to the ecological and energy transition is small and it therefore generates fewer avoided emissions than the other sectors.

The passenger transport sector's overall performance is linked to the mode of transport: within the portfolio, just over one-third of the stocks selected are involved in rail transport. For freight companies, despite the significant share of low-carbon modes, their modal mix split is similar to that of the global mix, which is why the intensity of the contribution to the climate transition is limited.

The table below presents the top 10 contributors to the green share of this portfolio.

LIST OF THE 10 LEADING CONTRIBUTORS TO THE GREEN SHARE OF THE EQUITY PORTFOLIO

	Company name	Weighting in the portfolio (%)	Business sector	Green Share revenue held (USDk)	Green share (%)	Intensity of the contribution to the climate transition (%)	Avoided emissions (tCO_2/ year)
1	**Deutsche Post**	0.097%	Delivery Services	12,357.5	87%	0%	0
2	**Yamato Kogyo**	0.031%	Iron & Steel	6,200.7	96%	96%	443,040
3	**Norfolk Southern**	0.088%	Railroads	2,963.8	100%	100%	17,999,274
4	**Peugeot**	0.281%	Automotive	2,605.1	1%	18%	565,144
5	**Union Pacific**	0.067%	Railroads	1,753.3	100%	100%	36,369,502
6	**Clarkson**	0.022%	Transportation Services	1,467.1	100%	88%	0
7	**Steel Dynamics**	0.014%	Iron & Steel	1,389.9	72%	NA	NA
8	**Tesla**	0.084%	Automotive	1,352.0	100%	100%	72,532
9	**Nucor**	0.014%	Iron & Steel	1,319.5	88%	9%	1,998,957
10	**Container Corp.of India**	0.029%	Delivery Services	908.5	100%	100%	1,743,814

Results for the developed market equity portfolio (active/passive)

This portfolio is made up of actively and passively managed developed market equities.

→ MAIN RESULTS OF THE ANALYSIS OF THE "GREEN SHARE" OF THE DEVELOPED MARKET EQUITY PORTFOLIO, ACTIVE AND PASSIVE MANAGEMENT

	Securities covered by the sectors analysed	Green Share	Intensity of the Contribution to the Climate Transition	Avoided emissions	
	%	%	%	tCO_2/year	tCO_2/year/EURm invested
Automotive manufacturing	2.4%	6%	10%	4,119	17
Power generation	2.0%	7%	18%	109,718	530
Cement manufacturing	0.2%	8%	10%	4,442	265
Steel manufacturing	0.2%	58%	59%	6,948	380
Passenger transport	0.8%	37%	37%	10,010	118
Freight transport	1.7%	17%	4%	999	6
Total	**7.3%**	**14%**	**15%**	**136,234**	**185**

The sectors analysed represent 7.3% of the portfolio. The portfolio studied performed well overall, with a **score of 14% for the green share indicator and 15% for the intensity of the contribution to the climate transition.** This portfolio performs in much the same way as the equity portfolio, with slight outperformances or underperformances relative to portfolio 1 each offsetting the other to reach overall the same level for the three indicators.

The table below presents the top 10 contributors to the green share of this portfolio.

→ LIST OF THE 10 LEADING CONTRIBUTORS TO THE GREEN SHARE OF THE DEVELOPED MARKET EQUITY PORTFOLIO, ACTIVE AND PASSIVE MANAGEMENT

	Company name	Weighting in the portfolio (%)	Business sector	Green Share revenue held (USDk)	Green share (%)	Intensity of the contribution to the climate transition (%)	Avoided emissions (tCO_2/ year)
1	**Deutsche Post**	0.116%	Delivery Services	12,357.5	87%	0%	0
2	**Yamato Kogyo**	0.037%	Iron & Steel	6,200.7	96.4%	96.4%	443,040
3	**Norfolk Southern**	0.105%	Railroads	2,963.8	100%	100%	17,999,274
4	**Peugeot**	0.333%	Automotive	2,605.1	1.0%	18.3%	565,144
5	**Union Pacific**	0.080%	Railroads	1,753.3	100%	100%	36,369,502
6	**Clarkson**	0.027%	Transportation Services	1,467.1	100%	88%	0
7	**Steel Dynamics**	0.017%	Iron & Steel	1,389.9	72.0%	NA	NA
8	**Tesla**	0.100%	Automotive	1,352.0	100.0%	100.0%	72,532
9	**Nucor**	0.016%	Iron & Steel	1,319.5	87.6%	8.5%	1,998,957
10	**United Parcel Ser.'B'**	0.149%	Delivery Services	889.4	66%	0%	0

Results for the emerging market equity portfolio (active/passive)

This portfolio is made up of actively and passively managed emerging market equities.

→ MAIN RESULTS OF THE ANALYSIS OF THE "GREEN SHARE" OF THE EMERGING MARKET EQUITY PORTFOLIO

	Securities covered by the sectors analysed	Green Share	Intensity of the Contribution to the Climate Transition	Avoided emissions	
	%	%	%	tCO_2/year	tCO_2/year/EURm invested
Automotive manufacturing	2.4%	1%	3%	69	2
Power generation	1.8%	8%	8%	14,544	420
Cement manufacturing	1.3%	9%	17%	7,125	290
Steel manufacturing	1.0%	27%	13%	1,637	89
Passenger transport	0.2%	0%	0%	-	-
Freight transport	2.0%	21%	21%	6,481	169
Total	**8.8%**	**12%**	**11%**	**29,857**	**180**

The sectors analysed represent 8.8% of the portfolio. The average green share of this emerging market equity portfolio is 12% and the intensity of the contribution to the climate transition stands at 11%. The limited performance in the power generation sector as well as its limited weighting within the exposed portfolios explain the average ratio of avoided emissions of 180 tCO_2e/year/EURm invested.

The passenger transport stocks held consist only of airline companies: avoided emissions, the green share and the intensity of the contribution to the climate transition are therefore zero.

The table below presents the top 10 contributors to the green share of this portfolio.

LIST OF THE 10 LEADING CONTRIBUTORS TO THE GREEN SHARE OF THE EMERGING MARKET EQUITY PORTFOLIO

	Company name	Weighting in the portfolio (%)	Business sector	Green Share revenue held (USDk)	Green share (%)	Intensity of the contribution to the climate transition (%)	Avoided emissions (tCO_2/ year)
1	**Container Corp.of India**	0.182%	Automotive	908.5	100%	100%	1,743,814
2	**Agility Pub. whsg.**	0.091%	Conventional Electricity	692.8	22%	19%	1,532,413
3	**Dp World**	0.032%	Building Materials & Fixtures	118.1	100%	88%	ND
4	**Bangkok Expressway And Metro**	0.064%	Railroads	101.9	100%	100%	NA
5	**Engie Brasil Energia On**	0.030%	Railroads	100.8	87%	57%	1,419,657
6	**Rushydro**	0.018%	Automotive	90.8	58%	35%	30,815,771
7	**Centrais Eletr Bras- Eletro-bras**	0.048%	Building Materials & Fixtures	87.4	44%	43%	83,496,767
8	**Ambuja Cements**	0.069%	Conventional Electricity	71.9	13%	56%	4,745,507
9	**Geely Automobile Hdg.**	0.079%	Automotive	67.1	4%	NA	NA
10	**Cia Paranaense De Energia Copel**	0.039%	Conventional Electricity	60.1	34%	32%	10,352,464

Results for the non-sovereign bond portfolio

→ MAIN RESULTS OF THE ANALYSIS OF THE "GREEN SHARE" OF THE NON-SOVEREIGN BOND PORTFOLIO

	Securities covered by the sectors analysed	Green Share	Intensity of the Contribution to the Climate Transition	Avoided emissions	
	%	%	%	tCO_2/year	tCO_2/year/EURm invested
Automotive manufacturing	3.8%	1%	6%	1,328	4
Power generation	4.5%	7%	15%	263,978	593
Cement manufacturing	0.6%	10%	14%	14,841	239
Steel manufacturing	0.1%	30%	1%	119	13
Passenger transport	0.4%	19%	19%	2,844	79
Freight transport	2.1%	1%	0%	0	0
Total	**11.6%**	**5%**	**9%**	**283,110**	**248**

The sectors analysed represent 11.6% of the portfolio. Despite the limited overall performance in terms of green share (5%) and intensity of the contribution to the climate transition (9%), the very strong weighting of the electricity sector and its strong performance explain the high ratio of avoided emissions to amount invested, which stands at 248 tCO_2/year/EURm.

The freight exposure does not contribute to the green share or to the climate transition as the stocks that make up this non-sovereign bond portfolio are road and airport infrastructure companies, as well as transport companies with a modal mix that has higher emissions (little to no maritime or rail transport) relative to the average modal mix.

The table below presents the top 10 contributors to the green share of this portfolio.

LIST OF THE 10 LEADING CONTRIBUTORS TO THE GREEN SHARE OF THE NON-SOVEREIGN BOND PORTFOLIO

	Company name	Weighting in the portfolio (%)	Business sector	Green Share revenue held (USDk)	Green share (%)	Intensity of the contribution to the climate transition (%)	Avoided emissions (tCO_2/ year)
1	**Toyota Motor**	0.177%	Automotive	2,607.0	14%	18%	1,170,477
2	**Acea**	0.091%	Conventional Electricity	1,047.9	55%	49%	212,862
3	**Heidelberg-cement**	0.239%	Building Materials & Fixtures	754.4	12%	19%	11,217,053
4	**Norfolk Southern**	0.027%	Railroads	746.9	100%	100%	17,999,274
5	**Union Pacific**	0.033%	Railroads	700.5	100%	100%	36,369,502
6	**Daimler**	0.490%	Automotive	613.7	2%	0%	0
7	**Crh**	0.211%	Building Materials & Fixtures	467.2	9%	5%	5,437,431
8	**Enel**	0.491%	Conventional Electricity	412.9	12%	8%	25,733,056
9	**Renault**	0.617%	Automotive	354.7	1%	23%	477,391
10	**Iberdrola**	0.433%	Conventional Electricity	260.6	12%	26%	26,828

7. ANALYSIS OF PHYSICAL RISKS

Economies and financial markets worldwide will inevitably suffer severe disruption due to climate change. Caused by one-time phenomena or long-term trends, the effects of climate change can take the form of commodity shortages, price fluctuations, or damage to or loss of infrastructure.

The risks associated with natural disasters and environmental hazards are not new, but investors have not yet adopted a standard approach to systematically integrating the physical effects of climate change on corporate assets and value chains. This lack of established norms presents an opportunity to innovate and create new indicators to capture the multifaceted effects that climate has on the economy and the financial markets.

SERVICE PROVIDER SELECTED BY THE FRR

Trucost Ltd was assisted by **Four Twenty Seven (427),** a research firm specialising in climate risk, in developing a method to **evaluate the effects of climate change on companies.**

METHODOLOGY APPLIED BY 427 TO ANALYSE PHYSICAL RISKS: ANALYSIS OF SECTOR RISKS

Four Twenty Seven (427) presents an analysis of "hotspots", i.e. areas of risk, which measures equities' exposure to different types of sector risks. This assessment aims to identify the type and level of climate risks inherent in the FRR's assets.

Climate risks are a combination of localised risks (which relate to the assets) and risks related to the value chain (which relate to the sector). The climate risk score assigned by Four Twenty Seven is designed to determine companies' relative exposure to climate risks based on a breakdown of their assets around the world and the activities and sectors on which they depend the most. This 2017 report (2016 data) provides scores derived from an analysis of sector risks.

While the effects of climate change are generally localised, the risks are cross-border and follow international trade flows due to the globalisation of supply chains. Climate risks can therefore arise not only from products and services provided but also from the countries where they originate.

The **427 methodology therefore measures three business sector-related risks:**

- exposure to climate risks based on the geographic location of the value chain;
- their consumption of natural resources; and
- their sensitivity to weather variability.

These three risk factors **determine the exposure of the world's major economic sectors.**

427 METHODOLOGY FOR MODELLING SECTOR RISK

Risk indicators	Definition	Calculation method	Weighting	Data source
Country of origin	Measures the current and future level of climate risks of countries contributing to the output of the sector and to export activities	Modelling of trade flows specific to each industry and assignment of a risk score to the countries of origin based on the 427 Country Risk Index	50%	UN Comtrade (2015)[1], Four Twenty Seven Country Risk Index (2017)[2]
Natural resources	Measures the sector's dependence on natural resources: water, energy, and land use	Modelling of the intensity of natural resource consumption specific to each industry to represent demand for resources that will be affected by climate change	25%	Economic Input-Output Life Cycle Analysis (EIO-LCA)[3]
Weather sensitivity	Measures the sector's sensitivity to weather variability	Quantification of the economic impacts associated with changes in temperature and precipitation by industry, based on historical economic and weather data	25%	WeatherBill (2008)[4], Larsen et al. (2006)[5], Lazo et al. (2011)[6]

NB: The analysis includes all of the 428 major economic sectors (North American Industry Classification System, NAICS), all of the 537 commodities traded (Harmonized System, HS) and 146 of the world's 196 countries. The sectors are assessed as accurately as possible (six-digit NAICS and six-digit HS classifications), except in the case of climate sensitivity, which is measured at two digits.

1 *UN Comtrade (2015). United Nations Commodity Trade Statistics Database. URL: http://comtrade.un.org.*

2 *Four Twenty Seven: Assessing Physical Climate Risk in the Financial Sector, forthcoming (June 2017).*

3 *Carnegie Mellon University Green Design Institute. (2008) Economic Input-Output Life Cycle Assessment (EIO-LCA), US 1997 Industry Benchmark index Model.*

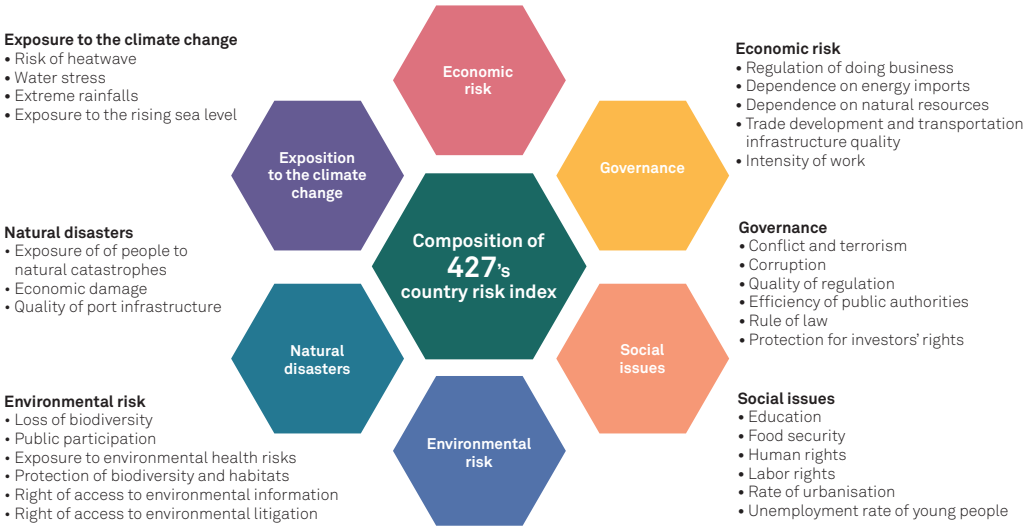
4 *WeatherBill, (2008) Global Weather Sensitivity; a Comparative Study, published by WeatherBill.*

5 *Larsen, P. H., Lawson, M., Lazo, J. K., & Waldman, D. M. (2007). Sensitivity of the US economy to weather variability. Boulder: Research Applications Laboratory, NCAR.*

6 *Lazo, Jeffrey K., et al. (2011). "US economic sensitivity to weather variability". Bulletin of the American Meteorological Society 92.6. 709-720.*

Country risk is assessed and scored taking account of each country's exposure to climate risk and its ability to resist and respond to physical impacts. 427's Country Climate Risk Index includes 31 indicators organised into six categories (economic, social, environmental and governance risk, and risks associated with natural disasters). Countries are scored on a scale of 0 to 100.

Composition of 427's country risk index



NB: Global trade flow data and the Country Climate Risk Index cover all countries in the world save four (Samoa, Saint Vincent and the Grenadines, Palau, Antigua and Barbuda), i.e. 99% of the value of global trade flows.[7]

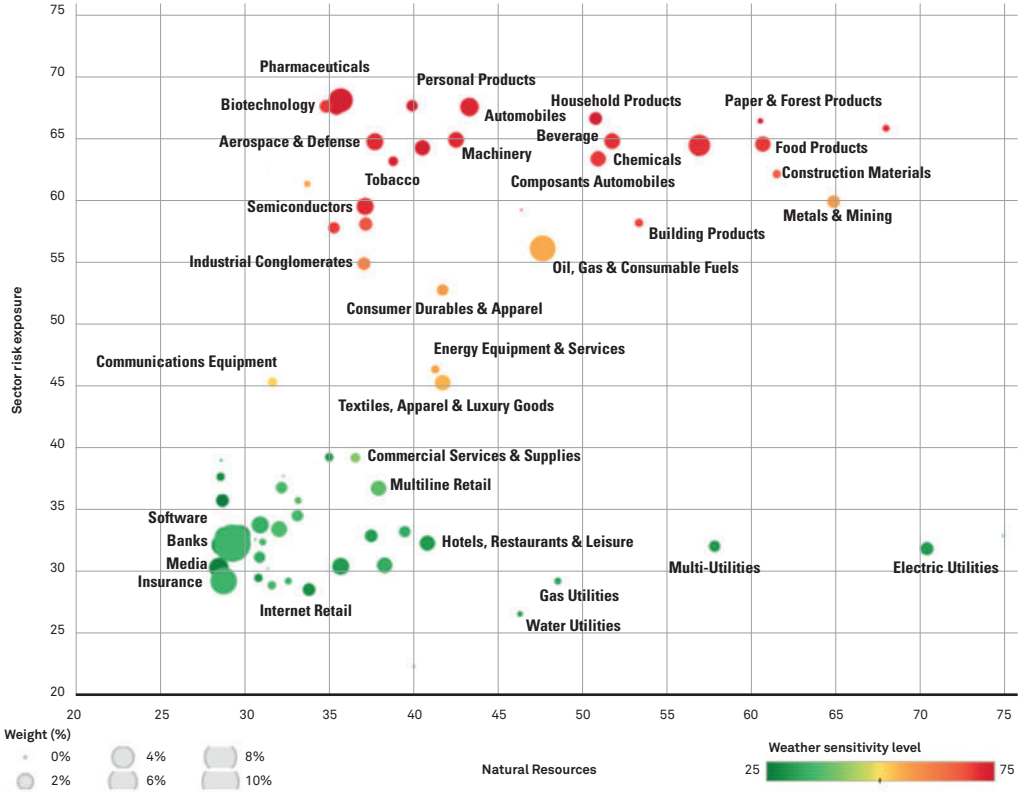
Sector risk matrix: the most exposed sectors

Sector risk indicators are designed to represent the physical risks associated with certain industrial or extractive economic activities; accordingly, services sectors, such as finance and telecommunications, have the lowest exposure scores. In contrast, sectors with highly natural resource-intensive manufacturing processes, such as the materials (metals and mining operations, building products) and food product sectors, have the highest scores.

The sectors that depend on a complex globalised logistics chain, such as the automotive, consumer staples and pharmaceuticals sectors, are also assigned a high score. Real estate has low sector risk scores; however, its real exposure lies in its physical assets, which are not included in this year's report. The graph below presents a detailed mapping of the risks by GICS industry for the FRR's equity portfolio.

7 *Not all economic sectors were available in the UN Commodity Trade Statistics Database (Comtrade, 2016) and 46 sectors were not reported in 2016. If a sector does not export or re-export goods, no value is reported to the UN; 427 therefore has reason to believe that if these sectors do not export or re-export tangible goods, regardless of the year considered, it is because they operate in the banking, finance, public service or retail sectors. Insofar as the activities and material flows of these sectors are clearly local, 427 applies a climate risk score based on the known geographic situation of the company's headquarters.*

SECTOR RISK SCORES BY GICS INDUSTRY (EQUITY PORTFOLIO)



NB: This scatter diagram shows the natural resources score on the x-axis, the country of origin score on the y-axis and the weather sensitivity score by colour. The size of the dots represents the weighting of that sector's securities in the overall equity portfolio. The riskiest sectors are the red dots concentrated in the upper right-hand corner of the graph.

Company scoring

Companies that issue securities are scored on the basis of a breakdown of their revenue by sector (based on Trucost Ltd data). The final score is the average of the sector risk of the business sectors weighted by the percentage of revenue in each of these business segments (see example of digital below).

→ EXAMPLE OF THE SCORING OF A COMPANY'S SECTOR RISK

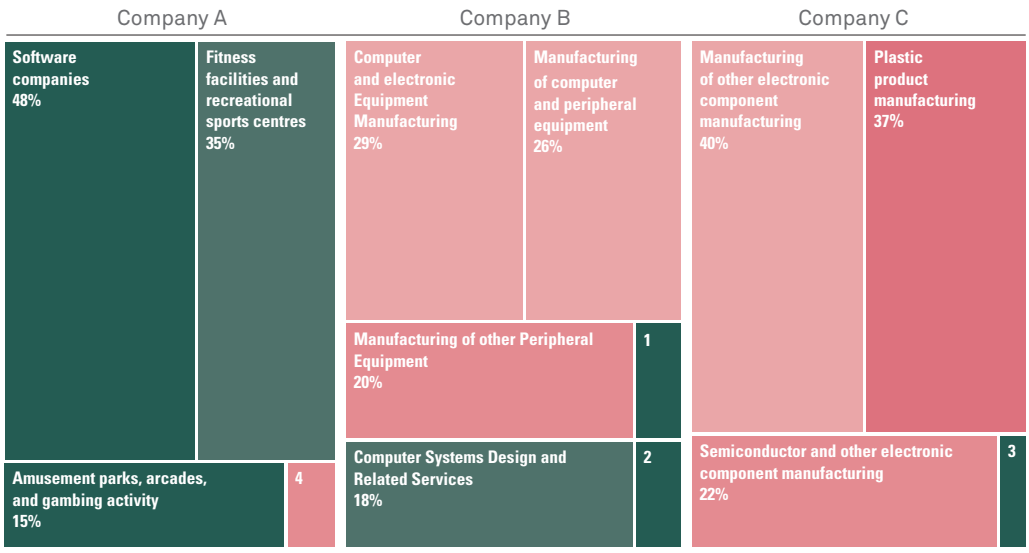
Industry	Revenues in %	Sectoral risk
Computer and electronic Equipment Manufacturing	29%	57.0
Manufacturing of computer and Peripheral equipment	26%	56.6
Manufacturing and other Peripheral Equipment	20%	60.7
Computer System Design and Related Services	18%	33.6
Software companies	3%	27.0
Industrial machinery and equipment rental and leasing services	3%	28.4
Total	**100%**	**51.6**

NB: This company generates 75% of its revenues from manufacturing different types of IT products and the remaining 25% from service and software development activities, which have a much lower risk. It is assigned a score of 51.6, which is the weighted average of the scores of these six business sectors.

To allow for portfolio synthesis and analysis, companies are grouped by GICS sector. Within each portfolio and benchmark index, the underlying sector composition varies by company and activity, to the extent that the average risk score within a single GICS sector sometimes differs from one portfolio to another.

To illustrate this point, the graph below provides three real examples of companies in the information technology sector as well as a breakdown of their relative score.

BREAKDOWN OF RISKS BY SUB-SECTOR: EXAMPLE OF THREE INFORMATION TECHNOLOGY COMPANIES



1. Software companies 3%
2. Industrial machinery and equipment rental and leasing services 3%
3. Real Estate services 1%
4. Other manufacturing activities 3%

Company A produces video games, **Company B** (from the previous example) manufactures computers and hard drives, and **Company C** offers semi-conductors and printed circuit boards. As can be seen in the graph, these companies have very different sector risk scores even though they all come under the information technology umbrella.

The sector scores cover 99.4% of the securities included in the FRR's portfolios provided by Trucost Ltd, which represent approximately 99.7% of the value of the portfolio. Furthermore, 99.8% of the securities in the benchmark index indices are scored. For bonds, 99.9% of the securities provided by Trucost Ltd are scored.

Limitations of the methodology

Sector risk modelling and risk mapping are useful **educational tools** for identifying the sectors and companies that are the most vulnerable to certain effects of climate change. However, the hotspot maps are only the **first step in assessing the physical risks** to which financial portfolios are exposed. This approach does not estimate the maximum potential loss of a given portfolio and is not accurate enough to allow portfolio managers to select securities and change the composition of a portfolio to reduce its exposure to climate risk.

Starting in 2018, the scores assigned to each company based on the exposure of its physical assets (production sites, facilities, stores, etc.) to the physical effects of climate change, such as risks of flooding, drought, heat stress, and rising sea levels, will also be included. The scores assigned to companies based on localised and sector risks will allow for a much more detailed analysis and will help when faced with decisions, for example, about whether to eliminate the riskiest components of each portfolio or engage in a dialogue with senior management of securities-issuing companies to better understand their resilience strategy. A better measure of climate risk will ultimately make it possible to incorporate climate risk vulnerability into the scoring of companies on the markets.

Lastly, **exposure and sensitivity are important aspects of vulnerability to climate change,** but they say nothing about each company's ability to anticipate and prepare for any potential impacts. Companies' ability to adapt could be modelled using **governance and risk management indicators** but, for a more comprehensive view of the climate risk management strategy and the potential financial impacts, these will be fully known only when companies include this essential information in their annual financial reports.

MAIN RESULTS

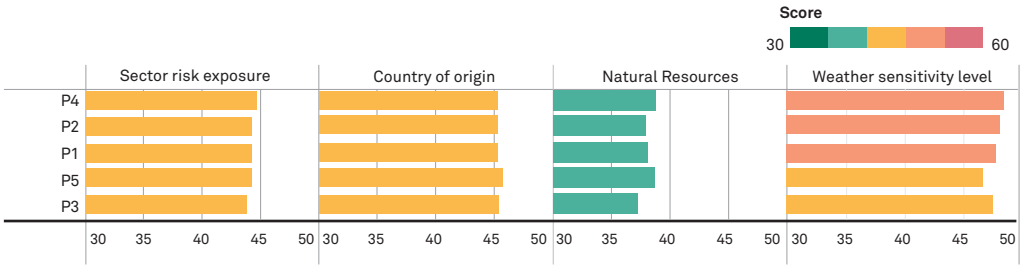
→ SCORES FOR THE PORTFOLIOS AND THEIR BENCHMARK INDEX INDICES

No.	Portfolio	Score	Benchmark index	Weighting	Index score
P1	**Consolidated equity portfolio**	**44.41**	MSCI Emerging Markets	16%	43.83
			FTSE Developed All Cap Excluding Eurozone	43%	44.71
			FTSE Developed Eurozone All Cap	42%	46.95
			Total	**100%**	**45.29**
P2	**Developed market equity portfolio**	**44.43**	FTSE Developed All Cap Excluding Eurozone	51%	44.71
			FTSE Developed Eurozone All Cap	50%	46.45
			Total	**100%**	**45.57**
P3	**Developed market equity portfolio, active management**	**44.22**	FTSE Developed Europe Small Cap	25%	43.45
			FTSE France Small & Mid Cap	13%	42.25
			FTSE USA Large & Mid Cap	47%	43.83
			FTSE Japan All Cap	12%	49.53
			FTSE Developed ex Korea Large & Mid cap	4%	44,82
			Total	**100%**	**44.28**
P4	**Developed market equity portfolio, passive management**	**44.58**	FTSE Developed Eurozone Large & Mid Cap	48%	46.19
			FTSE France Large & Mid Cap	14%	47.79
			FTSE Developed Europe Large & Mid Cap	12%	47.34
			FTSE North America Large & Mid Cap	20%	43.6
			FTSE Developed Asia Pacific ex Japan Large & Mid Cap	7%	41.99
			Total	**100%**	**45.76**
P5	**Emerging market equity portfolios**	**44.31**	MSCI Emerging Markets	100%	43.83
P7	**Bond portfolio**	**20.64**	Barclays Euro Aggregate Corporates	56%	2.21
			Barclays USD Corporate Investment	28 %	21,36
			S&P U.S. High Yield Index	8 %	22,63
			Iboxx Euro High Yield	8 %	24,27
			Total	**100%**	**21.62**

The average of the sector scores for all of the FRR's equity portfolios is about 44. This "average" level of risk is for the equity portfolios and highly diversified sectors. While certain sectors and certain securities have a relatively high level of risk, this is often offset by the presence of other securities with low levels of risk. The portfolios and their benchmark index indices tend to have similar scores, but most portfolios have a lower average level of risk than their benchmark index indices. The differences for each portfolio are analysed in the following section.

NB: The score for the corporate bond portfolios is based on the discounted amount on the bond's maturity date. This significantly lowers the portfolio's overall score, reflecting the lower level of risk in this asset class.

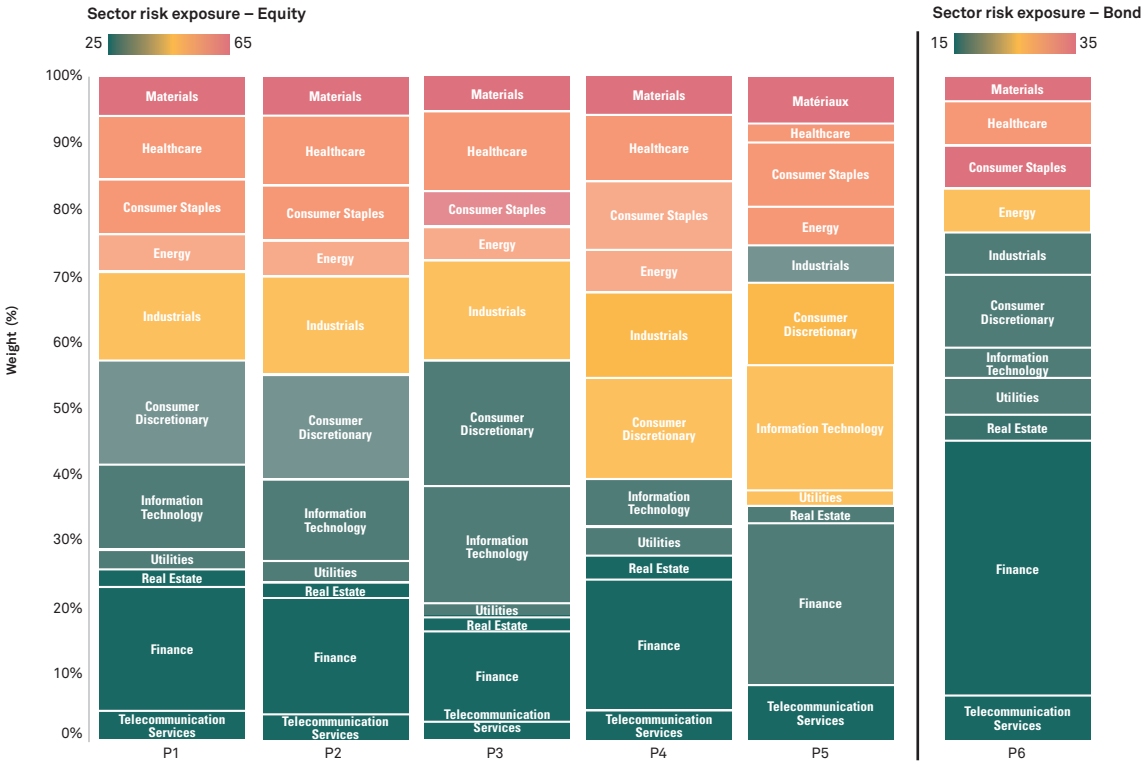
Comparison of the FRR portfolios: Sector risk (portfolios 1, 2, 3, 4 and 5)



The average overall score for the portfolios is very similar for sector risk and each of these constituents, but there are sharp differences in the risk breakdown by sector.

Table legend:
P1: overall equities portfolio;
P2: developed market equities portfolio;
P3: developed market equities portfolio, active management;
P4: developed market equities portfolio, passive management;
P5: emerging market equities portfolio.

Comparison of the FRR portfolios: weighting and scores by sector (portfolios 1, 2, 3, 4 and 5)



Exposure to sectors' climate risk varies from one portfolio to the next based on each sector's weighting and climate risk score. The emerging portfolio, for example, is less exposed to high-risk sectors such as healthcare and industry, and these sectors in turn have a lower risk score than in the other portfolios. In contrast, the actively managed developed equity portfolio has fewer financial sector securities and more securities in the healthcare and industry sectors, and a higher risk score for the consumer staples sector.

Table legend:
P1: overall equities portfolio;
P2: developed market equities portfolio;
P3: developed market equities portfolio, active management;
P4: developed market equities portfolio, passive management;
P5: emerging market equities portfolio.

Results for the equity portfolio

→ SCORES FOR PORTFOLIO 1 AND BENCHMARK INDEX INDICES

	Weight	Country of origin	Natural Resources	Weather sensitivity level	Sector risk exposure
Portfolio					
Developed market equity, active and passive management	84.2%	45.5	38.2	48.5	44.4
Emerging market equity, active and passive management	15.8%	45.9	38.7	46.9	44.3
Total	**100.0%**	**45.6**	**38.3**	**48.2**	**44.4**
Benchmark index					
MSCI Emerging Markets	15.9%	45.1	38.9	46.2	43.8
FTSE Developed All Cap Excluding Eurozone	42.5%	45.6	38.7	48.9	44.7
FTSE Developed Eurozone All Cap	41.6%	47.1	40.6	50.9	46.4
Total	**100.0%**	**46.2**	**39.5**	**49.3**	**45.3**

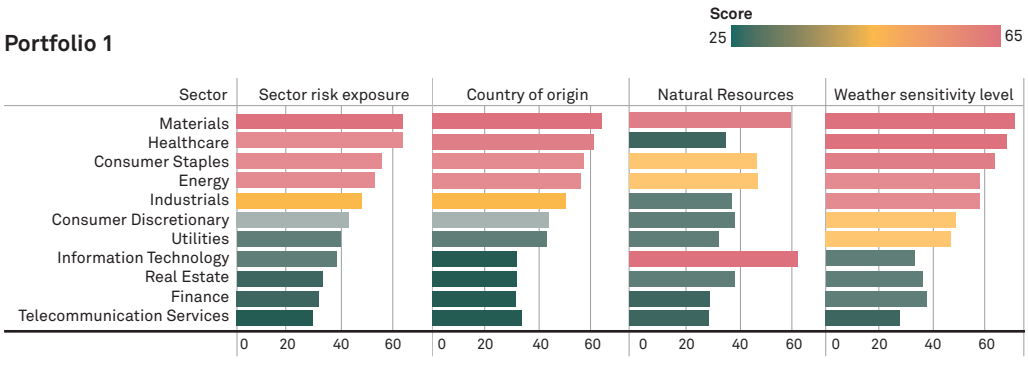
The equity portfolio's physical risk score is slightly below that of the benchmark composite index, and this ratio is constant across the three criteria assessed.

A comparison between the portfolio and its benchmark index shows that the benchmark composite index has a higher risk in the consumer staples sector, with the weighting and score both higher than those of the portfolio. This is partially offset in the portfolio by a higher coefficient and score in the consumer discretionary sector.

The high score for the portfolio's benchmark index seems to be concentrated in the FTSE Developed Eurozone All Cap index. A comparison between this index and the FTSE Developed All Cap ex Eurozone index shows that the risk comes from the consumer discretionary, materials and industry sectors, with higher average coefficients and scores, while the FTSE Developed Eurozone is more concentrated in information technology shares, which have a lower risk.

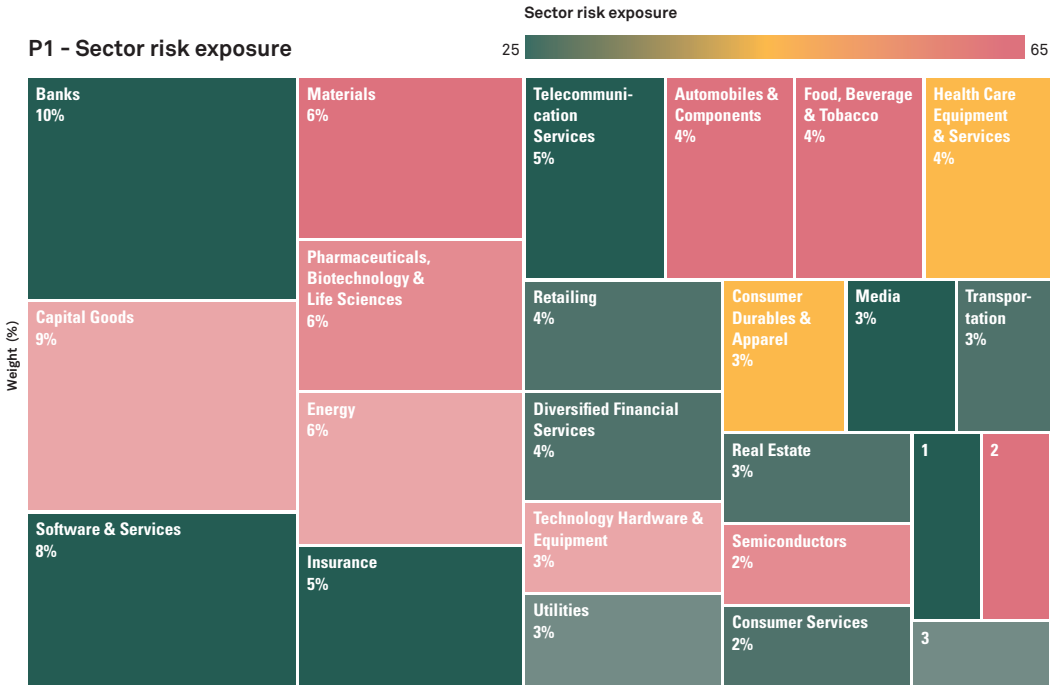
→ PHYSICAL RISK SCORES BY SECTOR AND BY INDICATOR, FOR THE EQUITY PORTFOLIO

Portfolio 1



All the graphs (except where clearly indicated, in particular for bonds) use the same colour scale.

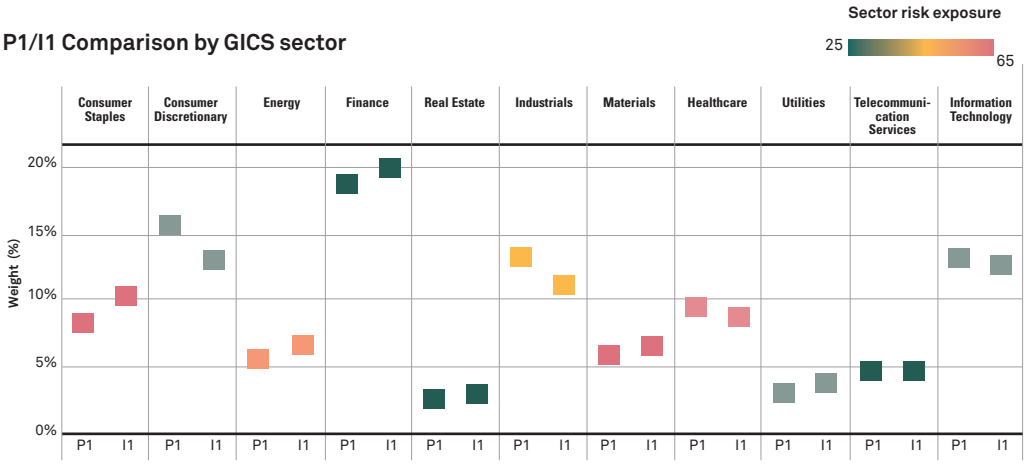
MAP OF EQUITY PORTFOLIO HOTSPOTS



1. Food & Staples Retailing 2%
2. Household & Personal Products 2%
3. Commercial & Professional Services 1%

This graph shows the breakdown of the risk by sector (three-digit GICS) for the equity portfolio. The size of the boxes reflects their relative value within the portfolio (also expressed as a percentage), while the colour reflects their risk level. Sectors are assigned a score ranging from 0 to 100, where 100 represents the highest level of risk. **This map of hotspots indicates that the portfolio has only limited exposure to high-risk sectors such as materials and consumer staples.**

COMPARISON BETWEEN THE EQUITY PORTFOLIO AND THE BENCHMARK COMPOSITE INDEX BY SECTOR



This diagram shows the relative weighting of each sector in the equity portfolio and its benchmark composite index (vertical axis). The risk score is shown by the colour of the squares. Within each column, the equity portfolio is on the left (P1) and the index on the right (I1).

Results for the non-sovereign bond portfolio

→ SCORES FOR THE NON-SOVEREIGN BOND PORTFOLIO AND BENCHMARK INDEX INDICES

	Weight	Country of origin	Natural Resources	Weather sensitivity level	Sector risk exposure
Portfolio					
Consolidated bond portfolio excluding sovereign bond	100.0%	20.8	19.1	21.8	20.6
Benchmark index					
Barclays Euro Aggregate Corporates	56.0%	21.4	19.4	22.6	21.2
Barclays USD Corporate Investment	27.6%	21.4	19.9	22.9	21.4
S&P U.S. High Yield Index	8.4%	23.4	22.1	21.6	22.6
Iboxx Euro High Yield	8.0%	24.6	23.8	24.0	24.3
Total	**100.0%**	**21.8**	**20.1**	**22.7**	**21.6**

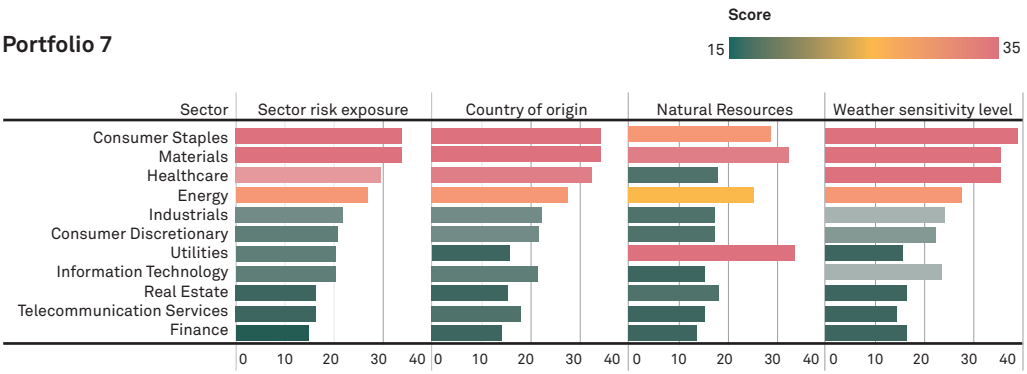
The risk profile of the non-sovereign bond portfolio is slightly below that of its benchmark composite index, and this ratio is constant across the three criteria assessed.

A comparison between this portfolio and its benchmark index points to a higher risk for the benchmark index in the industrial and energy sectors, due to the overweighting of these sectors relative to the FRR's portfolio, as well as a higher score for the industrial sector.

The slightly higher risk for the Iboxx Euro High Yield index is largely due to the longer average maturities of its bonds. This index is also less diversified since it includes fewer securities than the others.

→ PHYSICAL RISK SCORES BY SECTOR AND BY INDICATOR, NON-SOVEREIGN BOND PORTFOLIO

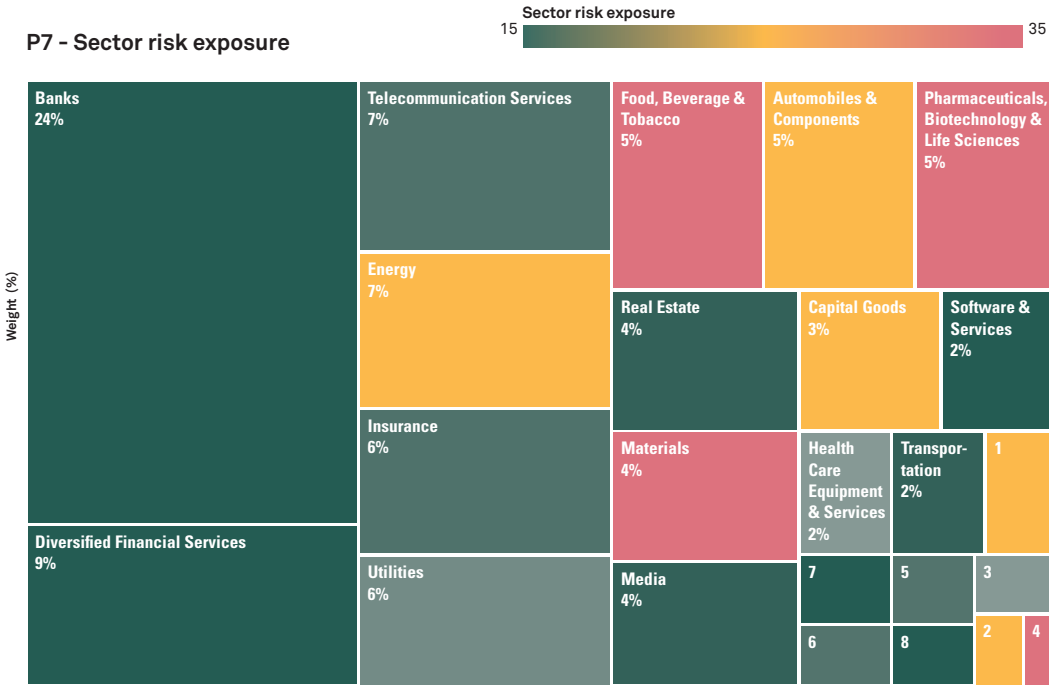
Portfolio 7



NB: the colour scales have been adjusted in the portfolio analysis graphs to depict a lower score range. The colours used in the bond analysis can therefore be compared with each other, but are not directly comparable with the equity portfolio graphs.

MAP OF NON-SOVEREIGN BOND PORTFOLIO HOTSPOTS

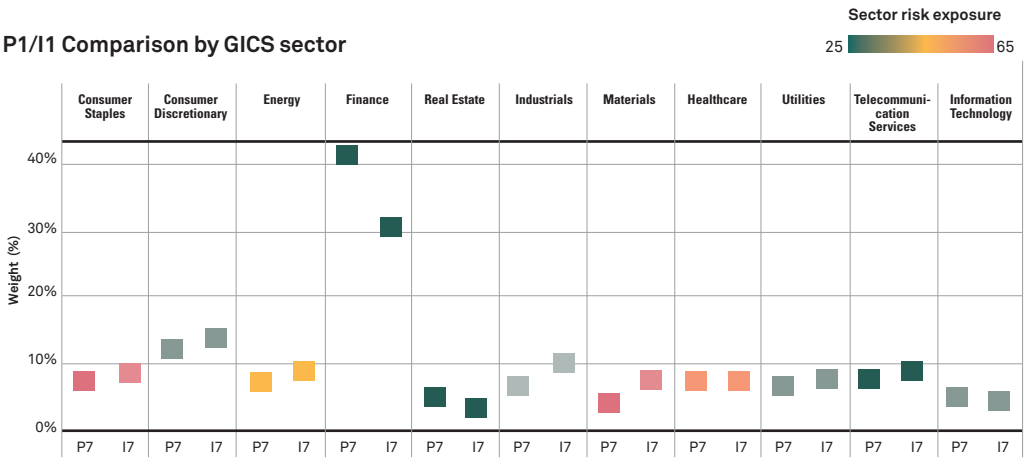
P7 - Sector risk exposure



1. Semiconductors 1%
2. Technology Hardware & Equipment 1%
3. Consumer Durables & Apparel 1%
4. Household & Personal Products 0%
5. Retailing 1%
6. Consumer Services 1%
7. Food & Staples Retailing 1%
8. Commercial & Professional Services 1%

COMPARISON BETWEEN THE NON-SOVEREIGN BOND PORTFOLIO AND THE BENCHMARK COMPOSITE INDEX BY SECTOR

P1/I1 Comparison by GICS sector



4.

Consequences of incorporating non-financial issues in to the FRR's investment policy

1. EXCLUSION OF COMPANIES INVOLVED IN CONTROVERSIAL WEAPONS

France has ratified the Oslo Convention on Cluster Munitions of 3 December 2008 and the Ottawa Convention of 18 September 1997.

The first stipulates, in particular, that "Each State Party undertakes never under any circumstances to:

- use cluster munitions;
- develop, produce, otherwise acquire, stockpile, retain or transfer to anyone, directly or indirectly, cluster munitions;
- assist, encourage or induce anyone to engage in any activity prohibited to a State Party under this Convention". The second stipulates that "Each State Party undertakes never under any circumstances: to use anti-personnel mines; to develop, produce, otherwise acquire, stockpile, retain or transfer to anyone, directly or indirectly, anti-personnel mines...".

Consequently, and in accordance with the Responsible Investment strategy, the Supervisory Board has decided to exclude from the FRR's portfolios, including passively managed portfolios, securities representing the equity or debt of companies that are involved in the manufacture of cluster munitions and anti-personnel mines[1], but also of chemical and bacteriological weapons.

Each year, the FRR publishes an exclusion list approved by the Supervisory Board's Responsible Investment Committee. This list is updated during the first half of each year, and published on the FRR's website.

The list of excluded companies is as follows:

1 The FRR's management mandates call for the exclusion of issuers involved in activities deemed to be non-compliant with its values framework.

Company	Country
Aerojet Rocketdyne Holdings Inc.	United States
Aeroteh	Romania
Arab Organization for Industrialization	Egypt
Aryt Industries Ltd	Israel
Avibras Industria Aerospacial SA	Brazil
China Aerospace Science & Technology Corporation	China
China National Precision Machinery Import and Export Corporation	China
China North Industries (Norinco)	China
China Poly Corp Group	China
DMD Group	Slovakia
Doosan Corporation	South Korea
General Dynamics	United States
Hanwha Group	South Korea
Heliopolis Company for Chemical Industries	Egypt
Honeywell	United States
IMI Systems Ltd	Israel

Company	Country
Indian Ordnance Factories	India
L3 Communications Holdings	United States
Larsen & Toubro	India
Lockheed Martin	United States
Makina ve Kimya Endustrisi Kurumu (MKEK)	Turkey
Motovilikha Plants JSC/Motovilikhinskiye Zavody	Russia
Myanmar Defence Products Industries	Burma
Orbital ATK Inc	United States
Ordtech Military Industries	Greece
Poongsan	South Korea
Raytheon	United States
Roketsan	Turkey
Rostec	Russia
S&T Dynamics	South Korea
Shahid Bagheri Industries	Iran
SPLAV State Research and Production Enterprise	Russia
Tata Power Company Ltd.	India
Technopol International	Slovakia
Textron	United States
Union of Military Industries	Cuba
Yugoimport SDPR	Serbia

2. WITHDRAWAL FROM COAL

The FRR has been firmly committed to the ecological and energy transition theme **these past three years.** It has signed up to several international initiatives aimed at reducing its portfolio's greenhouse gas emissions. It has also joined a coalition of investors demanding greater transparency in how businesses approach energy transition.

To reflect this commitment, the FRR has implemented an ambitious policy aimed at reducing its portfolio's CO_2 emissions through low carbon management. This is achieved through benchmark indices that reduce CO_2 emissions by at least half relative to standard indices, and by asking passive investment managers on most of the other indices to implement a management process that seeks to reduce the portfolio's carbon footprint.

Going even further, in 2016 the FRR decided to exclude companies whose thermal coal mining or coal-fired electricity, heat or steam generation business exceeds 20% of their revenue, unless they use a carbon capture and storage process.

3. WITHDRAWAL FROM THE TOBACCO INDUSTRY

The FRR decided to join the fight when it elected to divest from tobacco in 2017. Accordingly, **"At its meeting of 1 December 2016, the Supervisory Board of the Fonds de Réserve pour les Retraites (FRR) adopted the Management Board's proposal to exclude from the portfolio investments in tobacco company equities or bonds".**

The FRR used the GICS classification "Tobacco – Manufacturers of cigarettes and other tobacco products".

4. ENGAGEMENT PARTNERSHIP WITH THE FRR'S MANAGEMENT COMPANIES

Out of the 76 identified by Vigeo-Eiris in its portfolio audit, there are **10 companies** with which the FRR would like to initiate a dialogue in collaboration with its investment managers.

These interactions, whether written or verbal, with the FRR's investment managers can lead to a better understanding of the FRR's non-financial risks. In this way, they increase the investment managers' awareness of ESG issues.

However, the FRR's efforts have a minimal impact on its passive mandate managers given the constraints inherent in this type of management.

In contrast, the dialogue on ESG themes between the FRR, investment managers (of passive and active mandates) and companies, although hard to quantify, is positive for risk management. This adds to the "ESG pressure", the effects of which are an overall improvement in companies' ESG performance and therefore better management of their non-financial risks.

5. SHAREHOLDER ENGAGEMENT

OVERVIEW OF ENGAGEMENT IN THE TEXTILES AND APPAREL SECTOR

The Rana Plaza scandal (24 April 2013) highlighted **the significance of the environmental and social risks in the supply chain,** as well as the reputational impacts for companies.

Despite the efforts made by stakeholders in the various sectors concerned to improve their processes, poor working conditions and violations of human rights are still recurring problems in the supply chain. This affects not only countries such as Bangladesh and China, but also other countries with comparable social contexts.

Realising this, the Mirova engagement platform made up of seven French institutional investors, including the FRR, decided to launch a joint engagement initiative in 2014 for managing risks relating to the supply chain in the textile industry.

Currently 19 institutions, representing EUR 1.36 trillion, are signatories.

The main objectives of this engagement are to:
- **improve transparency;**
- **map social risks;**
- **develop long-term relationships with suppliers; and**
- **participate in sector initiatives.**

SUMMARY OF 2016

The initial results of the engagement showed that supply chain transparency remained a problem for most of the companies contacted. While some were clearly leading the way, the majority have been slow to follow their example. The lack of consistency in the information submitted also made comparison difficult.

The decision was therefore made **in 2016 to emphasise dialogue with various industry organisations** seeking to develop a more sustainable and responsible supply chain in the textile sector.

Among the organisations identified, the Sustainable Apparel Coalition (SAC) emerged as a preferred partner. Unlike the other initiatives, which look at social issues in the supply chain in general, SAC is concerned only with the textile industry and its members represent approximately 40% of that industry. Additionally, in 2007, SAC developed a self-assessment platform aimed at improving the transparency of the various actors in the supply chain, in particular with respect to social and environmental performance. As such, a roadmap was established to allow members to publish their score by 2020.

In July 2016, the engagement platform sent a letter to SAC's CEO, Jason Kibbey, stressing how important it was to investors to have a sustainable supply chain. This led to several conference calls in which it became clear that the right partner had been selected. As a result of these discussions, SAC made a commitment to:
- improve the quality, integrity and robustness of the assessment platform's information;
- standardise the social assessment models used by members.

For 2017, the emphasis will be on the industry's use of standards promoted by SAC (notably those cited above).

- **Corporate climate lobbying – PRI Platform**

Many long-term investors consider corporate pressure on climate policies to be counterproductive to maximising the long-term value of their portfolios. In spite of their claims to support climate policies, numerous listed companies are indirectly involved in lobbying through their professional associations. This engagement focuses on this inconsistency and seeks to improve the transparency of the lobbying activities of listed companies in the United States, Canada and Australia.

Climate lobbying has been addressed, for Europe, through IIGCC.

- **Human rights in the extractive sector – PRI Platform**

This project seeks to understand how policies relating to human rights are applied by extractive companies, especially in the context of partnerships with local companies or governments.

6. DECARBONISATION OF THE FRR'S PORTFOLIOS

The FRR started to decarbonise its passive equity portfolio in 2014 and these efforts continue; decarbonised investments increased by EUR 910 million in 2016 (excluding the market effect). The share of decarbonised assets is thus greater than EUR 5 billion.

7. THE FRR SUPPORTS ACADEMIC AND APPLIED RESEARCH

THE SUSTAINABLE FINANCE AND RESPONSIBLE INVESTMENT CHAIR

The Sustainable Finance and Responsible Investment Chair, managed jointly by Sébastien Pouget (Toulouse School of Economics, Toulouse IAE, Toulouse 1 Capitole University) and Patricia Crifo (Economics Department of the Ecole Polytechnique), was created in 2007, in particular at the instigation of the Fonds de Réserve pour les Retraites. It currently brings together investors such as Allianz Global Investors, Amundi, La Banque Postale Asset Management, Caisse des Dépôts, Candriam, Edmond de Rothschild Asset Management, Groupama Asset Management, HSBC Global Asset Management and Neuflize OBC Investissements.

For several years, **the FRR has been closely involved in a research project on small- and mid-cap companies.** This project proposes an empirical study of factors that affect these companies' performance both financially (economic profitability and stock market valuation) and in terms of social responsibility (environmental, social and governance aspects).

The preliminary results of the data analyses are as follows:

First, family businesses, when they are still owned by their founders or their descendants, appear to perform better in economic terms. This holds true whether economic performance is measured by return on assets (ROA) or return on equity (ROE). Additionally, volatility in daily stock market returns appears to be lower for family businesses still run by their founders or descendants.

Next, it seems that the stock markets factor in the economic outperformance by family businesses run by their founders. The stock market valuation (measured by Tobin's q) of family businesses run by descendants nevertheless appears to be lower while their economic profitability is better than that of non-family businesses. Consequently, there seems to be some inefficiency in the financial markets for this type of company.

Accordingly, and consistent with the assumption that long-term engagement with a company generates a positive financial performance, a company where employees hold a significant proportion of equity seems to have better economic profitability and lower stock market return volatility than other companies. This strong economic profitability nevertheless does not seem to be reflected in stock market valuations. Once again, the markets do not seem to fully understand that employee share ownership has a generally positive impact on corporate performance.

Lastly, family control of a company, when it is run by the founder or an outside manager, is associated with a better non-financial performance. This is also the case for companies that have a high proportion of employee shareholders or of employees on the board of directors.

To conclude, it seems that companies that have a long-term focus, because they are controlled by a family or because employees own a large share of the equity, perform better in both economic and non-financial terms.

2 DEGREES OF SEPARATION[2] – TRANSITION RISK FOR UPSTREAM OIL AND GAS UNDER A 2 DEGREE SCENARIO

The FRR, the Principles for Responsible Investment (PRI), and Carbon Tracker, along with investors AP7, Legal & General Investment Management and PGGM, have worked together to prepare a report for responsible investors. This report provides an analysis of the alignment of 69 companies in the oil and gas sectors with +2°C climate scenarios. It also includes the share of future investment and production expenditure that exceed these companies' carbon budgets.

This report also includes guidelines on how to hold a dialogue with these companies.

2 More information available at: www.2degreeseparation.com.

CARBONE 4

The FRR has contributed to Carbone 4's CRIS project to assess the physical risks affecting portfolios of investments in companies, infrastructure and sovereign issues due to climate change.

This methodology was developed with the support of the AFD (French Development Agency), Caisse des Dépôts et Consignations (CDC), the FRR, Natixis-Mirova, CDG Capital, BNP Paribas, the ERAFP (French public service additional pension scheme) and EDF and with assistance from a high-level scientific board.

This methodology offers risk indices by issuer. At the issuer level, the index is constructed by taking into account the sector and geographic breakdown of its activities and cross-referencing them with the scientific databases developed by Carbone 4.

SIF PRI AWARDS

The *Forum pour l'Investissement Responsable* was created in 2001 by fund managers, experts in social and environmental analysis, consultants, trade unionists, academics, citizens and investors with the aim of promoting socially responsible investment (SRI) and ensuring that more investments incorporate social cohesion and sustainable development issues. Along with other Sustainable Investment Forums (SIFs), the *Forum pour l'Investissement Responsable* (FIR – the French SIF) is a founding member of the European Eurosif network.

The Principles for Responsible Investment (PRI) are a network of international investors working together to implement six Principles for Responsible Investment.

These Principles were developed by the investor community. They reflect the idea that environment, social and corporate governance (ESG) aspects can affect the performance of investment portfolios and that investors must therefore take them into consideration.

The Principles provide a voluntary framework whereby all investors can incorporate ESG issues into their decision-making and thus better align their objectives with those of civil society. The PRI now has 1,400 signatories representing more than USD 59 trillion in assets under management.

In 2011, the FIR and the PRI joined forces to create the European Finance and Sustainability Research Award. The FRR has supported this award from the outset.

8. INCORPORATION OF ESG IN THE INVESTMENT MANAGER SELECTION PROCESS

The investment manager selection process fully incorporates ESG aspects and the FRR's ESG policy. These topics are covered in a number of questions in the investment manager candidate selection questionnaires, as well as in the proposal questionnaires. During their onsite visits, the FRR's teams systematically assess the inclusion of ESG criteria in management, the exercise of voting rights and shareholder engagement.

In addition, the FRR's standard mandate includes ESG requirements, and the FRR's responsible investor strategy constitutes an appendix to the mandate.

5.

Application of the FRR's voting guidelines and measure of the governance of the developed market equity portfolio

The FRR is a long-term investor with an interest in **actively helping to improve the governance** of the companies in which it invests.

In accordance with its founding texts, the FRR's voting rights are exercised by the asset managers it has selected and they do so in the best interests of the Fund. The portfolio management mandates awarded to these investment managers incorporate this dual obligation to exercise voting rights and independently analyse the draft resolutions submitted to general meetings in light of the instructions included in the FRR's voting rights guidelines (document available on the FRR's website[1]).

The FRR **never holds more than 3% of the equity of a single issuer.** Its intention is therefore always to remain a minority shareholder. This level of ownership changes in response to the management decisions made by its investment managers. This means the FRR is never represented on the governing bodies of the companies in which it invests.

To effectively monitor the governance of the companies in its developed market equity portfolio, the FRR uses the QualityScore[2] analytical tool and measures offered by Institutional Shareholder Services. This tool establishes a score for the portfolio as a whole and provides a consolidated view of the main components of a company's governance.

In this section of the report, the FRR provides readers with the results of its voting policy for 2016 and with the major relevant trends. These results relate solely to the developed market equity portfolio. The FRR is exposed to emerging market assets through stakes in open-end funds covered by the UCITS regulation. For this specific asset class, and unlike the rules set by the FRR in portfolio management mandates for developed market financial assets, the FRR is subject to the rules of the funds in which it invests, and in particular to the fund's voting policy.

With coverage of 80.4% of the stocks and 87.1% of the portfolio's assets, the score generated by the QualityScore tool shows **the trend in the quality of the governance of the FRR's developed market equity portfolio.** Due to insufficient coverage of the emerging market equities in the FRR's portfolio, and hence the limited relevance of the results likely to emerge from such an analysis, the FRR has decided not to disclose the score for this portfolio at this time. The bond portfolio is also not included in the scope of this analysis.

The first part of this section presents the results of the 2016 voting season. The second part seeks to present an estimated score for the quality of the governance of the FRR's developed market equity portfolio using the QualityScore methodology, on a global scale and, more locally, for France.

1 *Voting rights guidelines: http://www.fondsdereserve.fr/documents/politique-en-matiere-de-votes-du-FRR.pdf.*

2 *https://www.issgovernance.com/solutions/iss-analytics/qualityscore/.*

1. SERVICE PROVIDER SELECTED BY THE FRR

The FRR used its own internal resources and the QualityScore service developed by **Institutional Shareholder Services (ISS)** to establish a governance score for its equity portfolio.

2. RESULTS OF THE 2016 VOTING SEASON

OVERALL DATA ON VOTES CAST BY THE FRR DURING THE 2016 SEASON

The FRR voted on 2,175 shares in 36 countries during 2016.

This represented 72,314 resolutions at 2,610 general meetings.

The FRR **attended 99.4% of general meetings,** being absent from just 16, which equates to 0.6% of the total.

The difficulties encountered by the FRR's managers, and any lack of attendance, mostly resulted from the specific characteristics of the regulations applicable in each country, in particular the blocking of shares before a general meeting, or in the event of split voting[3]. It is also worth remembering that although the investment managers are systematically required to vote on shares held in the portfolio, owing to a periodic "rebalancing" of indices through index-linked management, it may be that they are unable to vote on a share due to it being blocked several days before the general meeting. The main countries giving rise to rejected votes were:

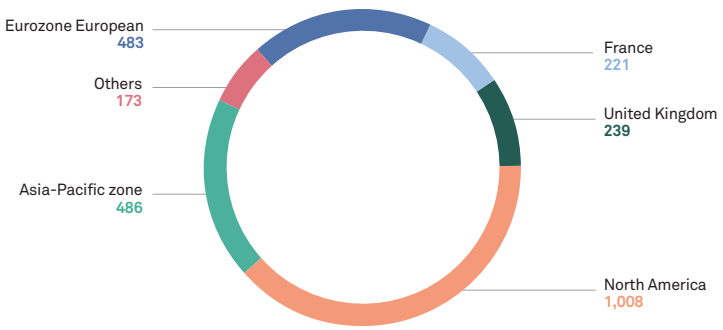
- Germany (blocking share);
- Italy (blocking share);
- Norway (blocking share);
- Luxembourg (blocking share);
- Switzerland (blocking share);
- Portugal (split voting);
- Spain (another reason).

Although the FRR's investment managers are required to avoid not voting, their attendance at general meetings is subject to the rebalancing and holding of the share in benchmark index indices. This is the main reason for the high percentage of these mandates in the votes rejected.

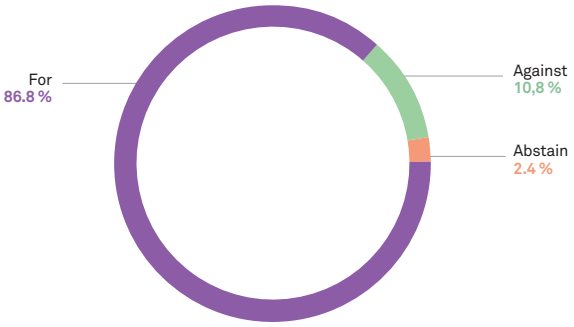
In terms of voting breakdown, the **number of votes "for" resolutions** has been relatively stable over time, at **86.8% in 2016.** This figure can be explained by the regional diversification of the FRR's investments. Therefore, even if one country has a stormy general assembly season, the other countries would not necessarily be affected, which explains the relatively stable percentage of votes "for" within the FRR's portfolio.

3 Situation in which more than one investment manager must simultaneously vote on the same share. Only a few countries ban split voting.

→ BREAKDOWN OF GENERAL MEETINGS BY GEOGRAPHIC REGION



BREAKDOWN OF VOTES



BREAKDOWN OF THE FRR'S PORTFOLIO WITHIN THE CONTEXT OF GENERAL MEETINGS IN 2016

As an institutional investor, the FRR is invested in the world's leading markets, and therefore attends local issuers' general assemblies in the portfolio's 36 countries. Governance practices for small and mid-cap companies are different from those for large caps. This diversification of investments automatically makes it harder to compare one company with another, for example regarding the composition and diversification of the board of directors. Various trends may therefore be taken into account: at an overall portfolio level, where they are not very suggestive but reflect global macro trends likely to be shared by the markets; and locally, where they are more similar.

Different trends appear if we look at the situation from a small or large-cap perspective. Disagreement over small caps is often clearer. This is because they are often less transparent, especially for determining the performance criteria that will unlock variable remuneration (award of stock options or bonus shares). This category of resolutions also happens to be the most disputed. Resolutions concerning limits on capital increases are hotly debated as small and mid-cap companies often want more flexibility. Also, regulated agreements between companies and any holding structures may seem opaque, and prompt a "no" vote from investors. Yet small and mid-cap companies are increasingly taking governance standards into account.

Some countries, such as Germany, have seen votes against rises in remuneration become much more commonplace, with a rejection rate close to that of 2010.

Unlike small and mid-caps, the average approval rate for large caps' say-on-pay resolutions was up in 2016 (CAC 40 index).

With the amendment to the Sapin 2 act aimed at limiting director pay, voting by shareholders attending the general meeting will now be binding on the board of directors. This constitutes real progress and a proper restraining influence by shareholders. We will just have to see how things pan out in 2017.

The incorporation of environmental issues also seems to be taking root, and companies are showing an increasing tendency to highlight their environmental and social responsibility. The integration of these new issues into a company's global strategy reflects the beginnings of performance based on sustainable criteria, perhaps showing greater awareness of the risks associated with ecological and energy transition. This is another positive move worth highlighting.

The tendency towards greater equality on boards of directors also continues. Although the FRR supports this, it has not forgotten that a board of directors must be staffed by competent, available directors.

3. SCORE FOR THE GOVERNANCE OF THE FRR'S DEVELOPED MARKET EQUITY PORTFOLIO

PRESENTATION OF ISS'S QUALITYSCORE METHODOLOGY

QualityScore is an analytical tool used to identify risks associated with the governance of companies in a portfolio. The analysis covers only:

- composition of the board of directors;
- compensation practices;
- shareholder rights;
- audit.

QualityScore's four pillars are based on governance indicators; **more than 220 criteria** are collected in relation to their relevance and the specific factors relating to governance in the countries covered. Each criterion is weighted for the impact of governance practices and standards specific to each region. The methodology is based in particular on the ISS voting policy, which accounts for local good governance practices codes.

Once the analysis is completed, each of the four categories is assigned a score ranging from 1 (maximum) to 10 (minimum).

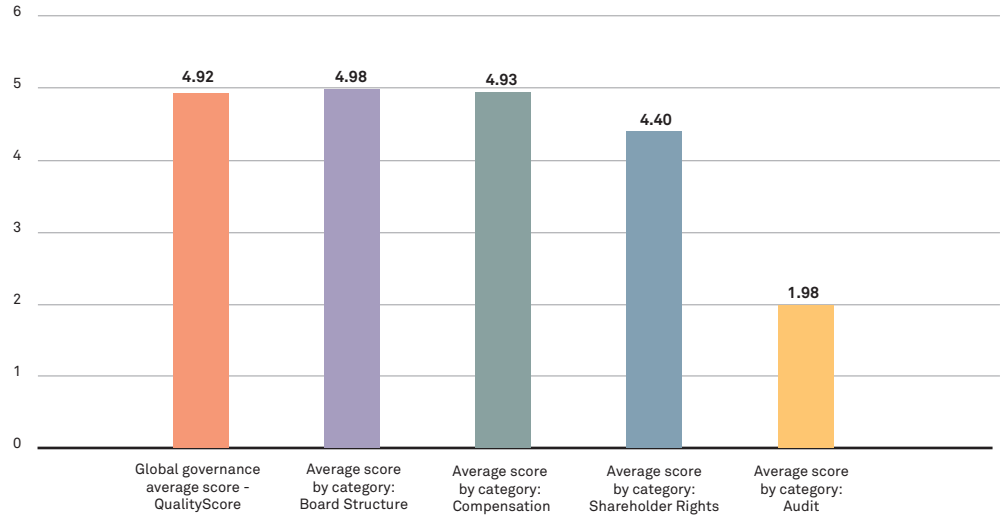
Issuers are invited to review and verify the data included in the ISS system.

Board structure	Compensation practices	Shareholder rights	Audit
Board structure	Pay for performance	One share one vote	External auditor
Composition of committees	Non-performance based pay	Takeover defences	Auditing and accounting controversies
Board practices	Equity risk mitigation	Meeting and voting related issues	Other audit issues
Board policies	Communications and disclosure	Other shareholder rights issues	
Related party transactions	Termination		
	Controversies		
	Other compensation issues		

The QualityScore analysis covers just over 5,600 companies listed in 30 markets. The analysis also covers the main regional indices.

NB: The FRR reminds readers that all methodologies contain biases. The methodology used by QualityScore is not free from bias. There is a geographic bias related to local regulations applicable to governance and specific to each country. For example, it is easy to show that regulation applicable to governance in each EU country is not uniform and that it is even less so worldwide.

OVERALL SCORE FOR GOVERNANCE FOR THE DEVELOPED MARKET EQUITY PORTFOLIO



PRESENTATION OF THE COVERAGE OF THE DEVELOPED MARKET EQUITY PORTFOLIO

The FRR's developed market equity portfolio at 31 December 2016 was composed of 2,175 stocks. QualityScore analysed 1,749 stocks in the FRR's portfolio, **i.e. 80.4% of its stocks,** representing **87.1% of the amount of the portfolio.**

Countries	Portfolio sent to ISS for analysis	Number of stocks covered	Coverage of the FRR portfolio
Australia	83	83	100.0%
Austria	14	12	85.7%
Belgium	20	13	65.0%
Bermuda	42	22	52.4%
Canada	83	80	96.4%
Cyprus	1	0	0.0%
Curaçao	1	1	100.0%
Denmark	15	13	86.7%
Faroe Islands	1	0	0.0%

Countries	Portfolio sent to ISS for analysis	Number of stocks covered	Coverage of the FRR portfolio
Finland	17	16	94.1%
France	186	149	80.1%
Germany	91	82	90.1%
Greece	1	0	0.0%
Guernesey	2	0	0.0%
Hong Kong	35	23	65.7%
Ireland	35	27	77.1%
Isle of Man	4	4	100.0%
Israel	1	0	0.0%
Italy	48	38	79.2%
Japan	275	159	57.8%
Jersey	9	9	100.0%
Liberia	1	0	0.0%
Luxembourg	22	7	31.8%
Mauritius	1	1	100.0%
Netherlands	55	41	74.5%
New Zealand	13	11	84.6%
Norway	9	7	77.8%
Papua New Guinea	1	0	0.0%
Portugal	4	4	100.0%
Singapore	33	19	57.6%
Spain	42	30	71.4%
Sweden	44	26	59.1%
Switzerland	52	37	71.2%
The Cayman Islands	29	7	24.1%
The Virgin Islands	1	1	100.0%
United Kingdom	175	144	82.3%
USA	729	683	93.7%
Total	2,175	1,749	

There are 96 stocks in the small and medium-size companies universe, representing approximately EUR 250 million in assets under management. For example, 28 of the 37 French stocks not covered by QualityScore research are in this universe. This figure could be explained by the lack of disclosure by companies on this type of market. Small and medium-size companies tend to disclose less, or to provide lower-quality information.

RESULTS OF THE SCORING OF THE FRR'S OVERALL DEVELOPED MARKET EQUITY PORTFOLIO BY COUNTRY

Excluding emerging countries and relative to the FRR's benchmark index portfolio analysed by ISS, QualityScore analysed 1,749 stocks.

The best score is 1 and the worst score is 10.

Countries analysed	Global average score	Average score for the category: Board Structure	Average score for the category: Compensation	Average score for the category: Shareholder Rights	Average score for the category: Audit
Australia	4.5	4.52	4.52	3.32	2.36
Austria	6.27	6.64	5.09	3.36	3.55
Belgium	5	5.38	5.31	4.08	2.85
Canada	4.91	5.17	4.29	4.99	1.12
Denmark	4.08	4.77	3.92	3.15	1
Finland	5.19	5.13	6.5	3.56	2.69
France	5.69	5.68	5.64	5.63	2.26
Germany	5.35	5.24	5.65	2.65	2.71
Greece	8	8	5	7	10
Hong Kong	5.19	6.14	4.39	6.42	1.25
Ireland	5.75	6.75	4.25	1	1
Italy	4.53	3.89	4.74	3.37	3.24
Japan	5.01	5.18	4.84	5.04	1.46
Luxembourg	7.14	8.29	7	3	3.29
Netherlands	3.36	3.33	3.5	5.28	1.58
New Zealand	5.82	3.91	8	3.45	1.36
Norway	4	3.71	5.29	3	1
Portugal	4.75	6.75	4.75	7.5	2
Singapore	2.89	3.68	2.58	4.37	1.42
Spain	3.57	4.33	4.6	2.33	1.93
Sweden	6.12	5.73	4.12	5.46	1.69
Switzerland	4.72	4.69	4.59	3.31	2.94
United Kingdom	4.75	4.01	4.76	1.29	2.41
USA	4.9	5.06	5	5.05	184

RESULTS OF THE SCORING OF THE FRR'S DEVELOPED MARKET EQUITY PORTFOLIO FOR FRANCE

For France and relative to the FRR's benchmark index portfolio, QualityScore analysed **149 stocks.**

The best score is 1 and the worst score is 10.

Business sector	Number of stocks studied by sector	Average scores by sector for the category: Board of directors	Average scores by sector for the category: Compensation	Average scores by sector for the category: Shareholder rights	Average scores by sector for the category: Audit	Weighting of the sector for France
Automotive and components	6	4.0	4.3	6.8	Audit	4.0%
Banks	4	2.3	2.0	2.3	3.3	2.0%
Capital goods	19	5.1	4.7	5.8	1.8	12.8%
Trade industry	9	6.8	6.2	6.9	2.8	6.7%
Consumer durables and apparel	10	6.6	7.3	6.7	4.7	6.7%
Consumer services	5	6.2	6.8	5.2	1.8	3.4%
Other financial services	4	6.0	6.8	5.8	3.0	3.4%
Energy	5	3.0	6.2	4.0	1.0	3.4%
Food and consumer goods	2	6.5	6.5	6.0	1.0	1.3%
Beverages and Tobacco	7	6.6	5.9	6.9	2.7	4.7%
Healthcare equip-ment and services	7	6.1	6.9	6.3	1.6	4.7%
Household and personal products	2	7.0	5.5	5.0	1.0	1.3%
Insurance	4	4.3	3.8	4.5	2.0	2.7%
Materials	5	5.8	4.2	5.8	2.6	3.4%
Media	10	5.4	6.3	4.9	1.4	6.7%
Pharmaceuticals, Biotechnology	8	8.1	8.3	5.6	3.0	5.4%
Real estate	7	2.0	4.7	1.3	1.0	4.7%
Retail	3	7.3	6.7	4.7	5.3	2.0%
Software and services	14	6.8	5.4	6.1	2.7	9.4%

Business sector	Number of stocks studied by sector	Average scores by sector for the category: Board of directors	Average scores by sector for the category: Compensation	Average scores by sector for the category: Shareholder rights	Average scores by sector for the category: Audit	Weighting of the sector for France
Equipment and technology	3	5.0	4.3	3.3	1.0	2.0%
Telecommunications	3	5.7	5.3	7.7	1.0	2.0%
Transport	7	6.6	6.0	7.9	2.1	4.7%
Utilities	5	5.4	3.8	6.6	1.0	2.7%
Number of stocks analysed	**149**					

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