



Analysis of carbon footprint of proprietary assets

NN Group N.V.
Report 2019



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Introduction

NN Group discloses its investments' carbon footprint since 2017. The December 2019 analysis covers 80% of NN's total asset portfolio and includes government bonds, corporate fixed income investments, listed equity, and residential mortgages.

“ We believe that measuring the carbon footprint of our investments helps us understand carbon and climate change-related risks.

Climate change represents an urgent and potentially irreversible threat to livelihoods and the well-being of society. NN Group therefore supports the 2015 Paris Agreement in which governments around the world committed to setting long-term policies with the aim of holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C.

As an insurer and investor, our business faces both risks and opportunities as a result of climate change. To effectively measure and evaluate the potential impacts of climate change, we need consistent, comparable and reliable information. To this end, NN endorsed the recommendations set out by the Financial Stability Board's (FSB) Task Force on Climate-related Financial Disclosures (TCFD) that seeks to improve and harmonise financial disclosures on climate change. NN has integrated the TCFD recommendations in our Annual Report since the 2017 financial year.

One of the recommendations of the TCFD is for companies to disclose their carbon footprint. NN measures and discloses the carbon footprint of the asset portfolio on our balance sheet, which comprises general account assets of the insurance entities, and the assets of NN Bank and NN Group (hereafter called proprietary assets). We provide an annual update on the outcomes of our carbon footprint measurement in the NN Group Annual Review. This report provides a more detailed explanation of the carbon footprint results and methodology.

We believe that measuring the carbon footprint of our investments helps us understand carbon and climate change-related risks. This in turn enables us to better prepare our portfolio for the transition to a low-carbon economy. At the same time, we recognise the limitations of using carbon footprint information on its own to support investment decision-making. Besides carbon footprint analysis, we therefore continue to explore other metrics and more forward-looking tools.

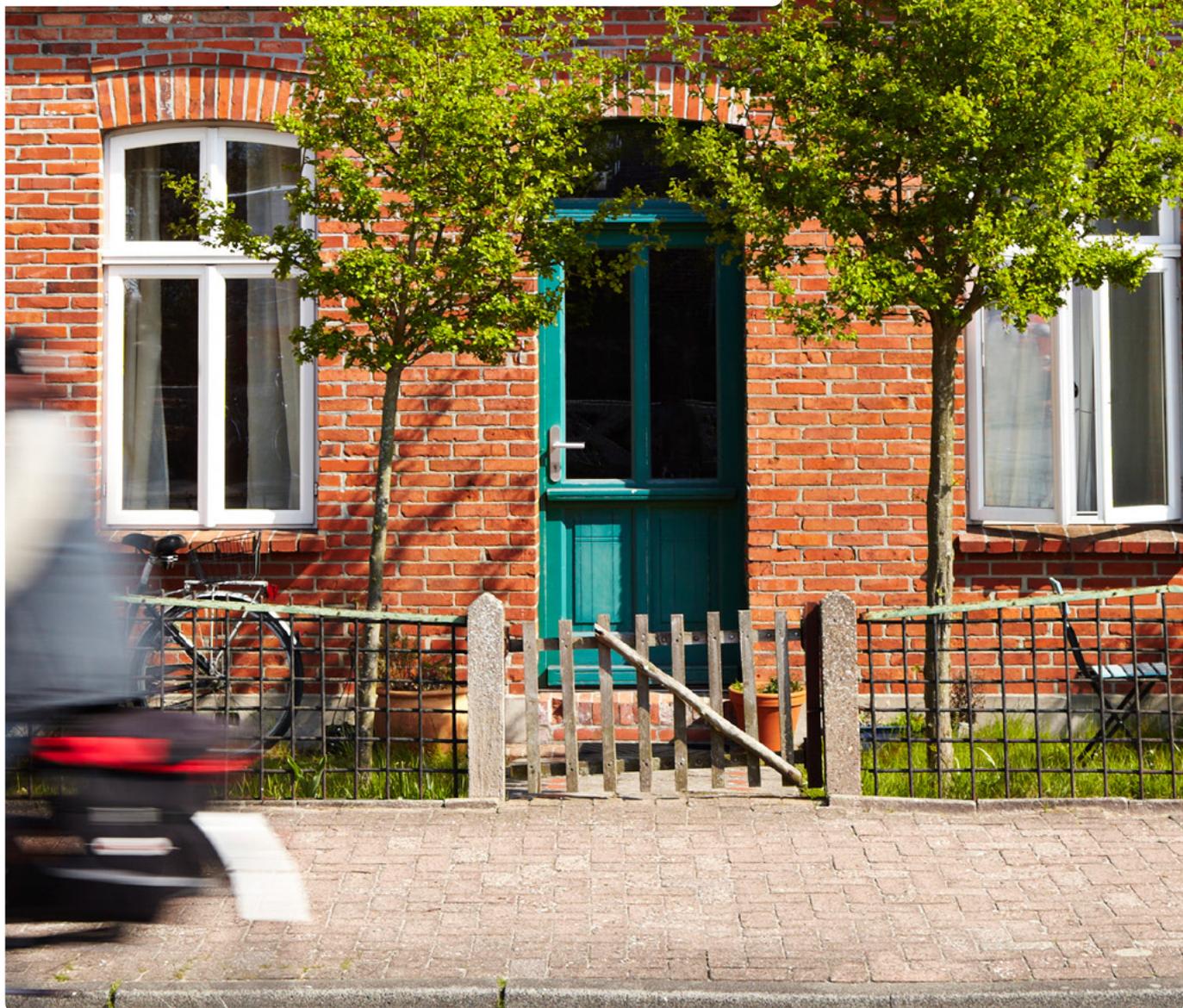
The first part of this report summarises the results and insights from our analysis. The scope of our analysis has been extended to cover the residential mortgage portfolio. Since the methodology for carbon footprint measurement of mortgages is very distinctive from the fixed income and equity investments, we discuss the results separately.

The second part sets out other steps and initiatives to address risks and opportunities associated with climate change, in the context of our proprietary assets.





Carbon footprint of our proprietary assets



Carbon footprint of our proprietary assets

Total scope and results

In 2019, we measured the carbon footprint of the residential mortgage portfolio for the first time. Combined with the already established analysis of government bonds, corporate fixed income investments and listed equity, the total assessed amount is now EUR 165 billion. This represents 80% of our total asset portfolio which comprises general account assets of the insurance entities, and the assets of NN Bank and NN Group.

Refer to the pie chart for the breakdown of assessed assets. The main asset categories that were not in scope of this carbon footprint analysis included private real estate, private equity, and cash. Note that for our real estate portfolio, carbon footprint data is reported through GRESB. For this, please refer to chapter II. We will work to capture this data as part of the total asset portfolio analysis as an improvement for next year.

The table below shows the results of the analysis. Since the methodology for carbon footprint measurement of fixed income and equity is very distinctive from the mortgage portfolio, we discuss the results separately in the next two sections.

Carbon footprint of fixed income and listed equity

The carbon footprint of the fixed income and listed equity holdings was measured as per 31 December 2019, and is based on the latest available emissions data for governments and companies. This data is retrieved from ISS-Ethix Climate Solutions, an external provider that primarily uses the

data for all the greenhouse gases in accordance with the Greenhouse Gas Protocol (GHG Protocol) converted to carbon dioxide equivalent (CO₂e).

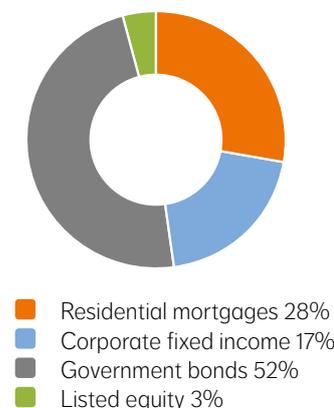
The graph in Appendix 1 provides an illustration of how the GHG Protocol categorises emissions in three scopes. The figures for corporate emissions in this report do not include scope 3 emissions. This is because data quality is still largely based on estimations making consistent reporting not yet possible. We do however look into scope 3 data for certain industries which typically have large scope 3 emission exposure. Please also read on the next page.

The coverage, or the percentage of (assessed) portfolio assets for which (actual or estimated) emissions and financial data were available is: 89%. The data availability however differs between security types. At current, the data availability is the lowest for asset-backed securities and loans. However, these asset classes represent a relatively small portion of the corporate fixed income portfolio (the majority of which is corporate bonds).

Change in footprint calculation

As best practice methodologies are still developing, we continue to assess the best ways to consistently measure and aggregate carbon footprint for our portfolio.¹ In 2019, we made a change in the way we calculate the portfolio carbon footprint metric. We now use a company's enterprise value (a measure of a company's total value) as a denominator to attribute emissions to both equity and debt

Breakdown assessed assets



positions within our portfolio. The new methodology is in line with recommendations made by the Platform Carbon Accounting Financials (PCAF)² as it better represents the share of a total company value that has been financed by investors with both equity and bond positions, and avoids double counting.

Carbon footprint of NN's proprietary assets

	2019	2018	2017	2016
Assessed Assets under Management (in EUR billion)	165	108	103	81
Fixed income	113	104	99	78
Equity	5	3	4	3
Residential mortgages	47	n/a	n/a	n/a
Carbon Footprint (tCO ₂ e/EURm invested)	73	n/a	n/a	n/a
Carbon Footprint (tCO ₂ e/EURm invested) - excl. mortgages	95	146	241	309
Fixed income	93	146	278	316
Equity	130	153	120	146
Residential mortgages	19	n/a	n/a	n/a
Weighted Average Carbon Intensity (tCO ₂ e/EURm of revenue) - excl. mortgages	106	107	231	232
Government bonds	39	42	233	232
Corporate fixed income	284	318	276	238
Equity	228	213	171	260

¹ Note that in 2018 we made a methodology improvement for sovereign bonds, which contributed to the decline in the portfolio carbon footprint and intensity compared to 2017 figures.

² The PCAF is a coalition of Dutch financial Institutions, whose objective is to develop a standard that enables financial institutions to measure carbon emissions consistently.

Carbon footprint of our proprietary assets continued

Types of analysis

We performed two types of analysis:

- The carbon footprint (ownership) approach highlights an investor’s exposure to carbon emissions through its investments. It aims to answer the question: ‘How much of a company’s or country’s emissions have we financed with our portfolio?’
- The intensity approach seeks to describe the carbon efficiency of underlying entities in the portfolio, by linking the emissions to revenue. We used the ‘Weighted Average Carbon Intensity’ metric, which is the main metric recommended by the TCFD. It aims to address the question: ‘What is the exposure of a portfolio to carbon intensive companies?’

For more background on how we calculated the metrics, please see Appendix 2.

Results and insights

A. Carbon Footprint

The results indicate that - excluding mortgages - the portfolio carbon footprint is 95 tonnes of CO₂ per EUR million invested. We assessed the fixed income portfolio and the equity portfolio separately. As can be seen in the chart, the total carbon footprint number is close to that of the fixed income part of the portfolio because it is the large majority. This is because portfolio size influences the financed emissions.

Within the fixed income portfolio, 75% of the portfolio assets are invested in government bonds, and 25% in corporate fixed income securities.

- Within the government bonds portfolio, Germany has the highest amount of financed emissions, followed by the Netherlands and Belgium. This is in line with the relatively large portfolio allocations to Eurozone countries.
- Within corporate fixed income, the highest emitting sectors are Utilities and Basic Materials. Combined, these sectors account for 73% of the corporate fixed income portfolio carbon footprint, whereas in terms of portfolio weight, they only account for 19% of the corporate fixed income portfolio.

The comparison with 2018 carbon footprint figures is distorted due to the continued improvement in methodology, in particular the change to use an issuer’s enterprise value as the denominator. The decline in absolute footprint per EUR million was mainly attributed to that change.

To get some insight into the emissions performance of the underlying companies, we compared the emission of the top 10 holdings of the equity portfolio with 2016 data (the portfolio composition over the time period was largely unchanged). We noted that despite increased weights to some of the holdings, the financed emission remained stable because the underlying companies decreased their absolute emissions since 2016. The top 10 holdings combined have reduced their absolute emissions by 17% since 2016.

Consideration of scope 3

The figures for corporate emissions in this report are based on scope 1 and 2 emissions. ISS-Ethix Climate Solutions also provides estimates for scope 3 emissions using input-output models. This data allows us to consider other emissions-generating activities within a company’s supply chain, as well as the emissions of the products that it sells. These scope 3 emissions represent the majority of total corporate emissions. For example, within our corporate fixed income portfolio, we see that the proportion of scope 3 relative to scope 1 + 2 is the highest for the Energy sector. If we would ignore scope 3 emissions, we may overlook risks in our portfolio and opportunities to help improve the sector’s emissions profile.

B. Weighted Average Carbon Intensity

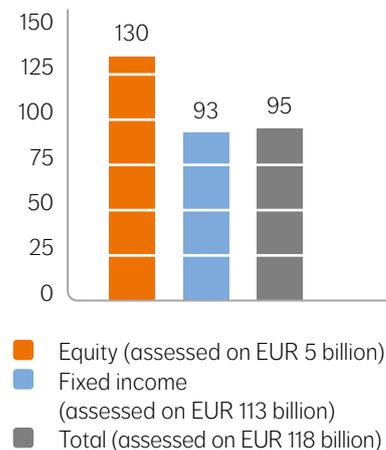
NN Group’s portfolio Weighted Average Carbon Intensity is 106 tonnes of CO₂ per EUR million of revenue. Compared to 2018, the total carbon intensity figure remained stable, although it somewhat declined for corporate fixed income while increased for equities. When looking at individual companies we are seeing a more diverse picture of companies improving carbon efficiency or deteriorating. We use the analysis as a starting point for more in-depth analysis to understand how the companies are positioning themselves for the transition to a low-carbon economy.

Uses and limitations

The analysis helps us to understand carbon and climate change-related risks, identifying the high-carbon securities in our investment portfolio. It is also useful to inform our engagement with investee companies. However, we are cautious in using the carbon footprint metrics as a direct investment decision-making tool. Besides limitations with respect to the quality and availability of CO₂ emissions data, carbon footprint relies on historical data. NN Group strives to address this limitation by analysing other metrics and forward-looking tools to evaluate climate strategies beside the carbon footprint.

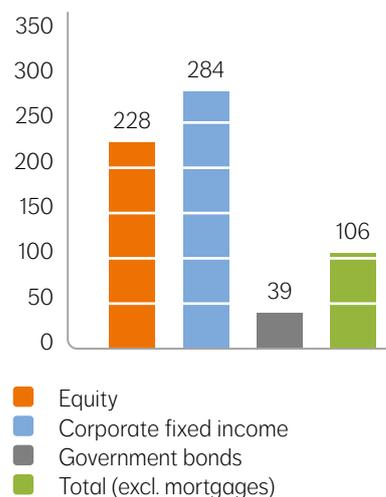
Carbon Footprint (excl. mortgages)

(tCO₂e/EURm invested)



Weighted Average Carbon Intensity

(tCO₂e/EURm of revenue)



Carbon footprint of our proprietary assets continued

Carbon footprint of mortgages

The carbon footprint of NN's mortgage portfolio was measured as per 31 December 2019. The total assessed amount was EUR 46.8 billion, or 221,137 houses. This represents 98% of the total mortgage portfolio on the NN Group balance sheet³. Within the assessed mortgage portfolio, the large majority of mortgages were originated and/or serviced by our own banking business under the Nationale-Nederlanden or former Delta Lloyd brands. Furthermore, NN has approximately EUR 4 billion in off-balance sheet mortgages which are not included in this analysis because the scope of this analysis is assets on the balance sheet.

Methodology and results

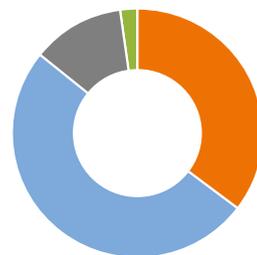
The method we used to calculate the carbon footprint is based on energy efficiency labels (category from A to G, with A being the most efficient) and corresponding theoretical gas and electricity consumption. This is aligned with one of the alternative methods described by Platform Carbon Accounting Financials (PCAF) in its December 2019 Progress Report. We took the following steps (please see also the illustration on page 9 in Appendix 2).

As a first step, we matched the NN mortgage portfolio to addresses in the EP-Online database (managed by the Netherlands Enterprise Agency (RVO)). The figure below shows the energy label distribution of the NN portfolio (in number of houses).

As shown in the pie chart, about 35% of matched addresses has a definitive energy label. If no definitive energy label is present, we looked at the building year of the property. For houses with building year 2002 or later, we assume the energy label is A. For the rest of the mortgage portfolio, we matched the addresses with a provisional label, or if no label exists, we assumed that the energy label is the same as the average of the zip code. For a very small part (0.1%) we could not make a match at all due to missing information. These mortgages were not assessed in this analysis.

In the next step, we calculated the average CO₂ emissions per energy label. The Vereniging WoON (Dutch housing corporation) has researched the average gas and electricity consumption per energy label, and published this in the 'Cijfers over wonen en bouwen 2013', a report by Rijksoverheid. We converted these numbers to CO₂ emissions by multiplying by grid emission factors. Within the Netherlands, www.co2emissiefactoren.nl gives a list of grid emission factors that are regularly updated to reflect changes in the Dutch electricity mix. For 2019 measurements the following emission factors are used: 0.361 kg CO₂/kWh for electricity, and 1.791 kg CO₂/m³ for natural gas. The resulting average CO₂ emissions per energy label are shown in the figure on the next page.

NN Portfolio: Basis of label choice



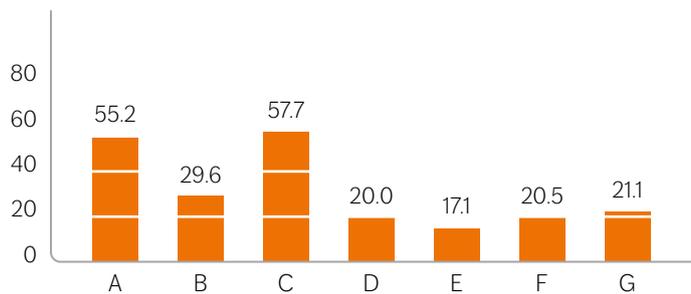
- Definitive label 35%
- Provisional label 50%
- Building year >=2020 12%
- Zip code 2%

Background energy labels in Netherlands

An energy label shows the energy performance of buildings and provides insight into the potential for sustainability measures. The label classes run from A to G, with A being the most energy-efficient buildings and G being the least energy-efficient buildings. All homeowners received a provisional energy label from the Dutch government in 2015. This provisional label is based on general characteristics of the house within the public record (such as the building year, type of home, floor area, and location). A homeowner can request a definitive label. This is mandatory when the home is going to be sold or leased.

NN Portfolio: Energy label distribution

(Number of houses x 1.000)



³ The 2% of mortgages on our balance sheet not assessed are sourced from third party originators; at present, we do not have all the relevant data of these individual mortgages.

Carbon footprint of our proprietary assets continued

Finally, we calculated the portfolio emissions by multiplying the number of houses per energy label by the average CO₂ emissions per energy label. In line with the PCAF approach, this method attributes 100% of the emissions to NN as the provider of the mortgages, even though NN may not be the only mortgage provider for the homeowner. In addition, the method does not use the size of the mortgage loans or loan-to-value ratios to correct if part of the mortgages are paid back.

Based on these calculations, the NN mortgage portfolio emissions totalled 886,976 tonnes CO₂. The total amounts to 19 tonnes CO₂ per EUR million invested and 4 tonnes CO₂ per house.

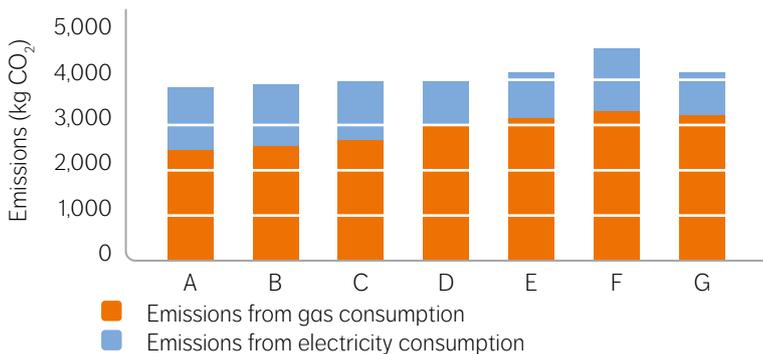
Limitations

The method we used is based on theoretical average energy consumption per energy label. These theoretical consumptions will differ from actual consumption because they are based on physical housing quality and not on household use. Similar houses may show large differences in energy consumption depending on the number of occupants and their behaviour. As such, working with actual energy consumption data, for instance directly from grid operators, is the preferred method of the PCAF. However, this data is currently not available. Furthermore, a difficulty with actual consumption data is that part of the consumption may not be for the house but, for instance, charging an electric car. Whilst we may change or refine our methodology in the future, we believe the current methodology provides us with a good starting point. It helps to create internal awareness of the profile of our portfolio and the measures we can take to help customers improve energy efficiency measures.

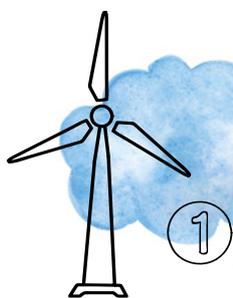
Contributing to a low-carbon society

NN wants to actively contribute to a low-carbon society. In 2019, we launched a web-based platform to help users make houses more sustainable. The platform, called Powerly, provides customers with tailored advice on energy efficiency measures, and helps with the execution of these measures by connecting them to partners. NN's banking business, which sources most of the loans, provides borrowers with the opportunity to finance energy-saving refurbishments by allowing them to borrow above the 100% LTV limit. NN will continue to research new propositions and explore ways in which we can support our customers in this area.

CO₂ emissions per house per energy label



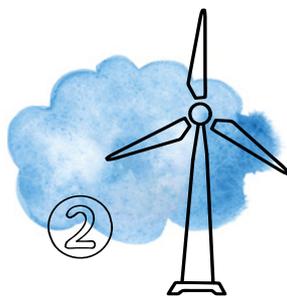
Methodology for residential mortgages



Match NN portfolio with energy label (EP database)

Choose label by prioritising:

1. Definitive label
2. Building year \geq 2002 is label A
3. Provisional label
4. Average label within same zip-code



Calculate theoretical average CO₂ emissions per energy label



Number of houses per energy label

\times
average CO₂ emissions per energy label

$=$
Portfolio emission

Addressing climate change in our investment process

This section provides an overview of NN Group's efforts to address climate change risks and opportunities in our investment process and how we aim to contribute to a low-carbon economy through our investment activities.



Addressing climate change in our investment process

NN takes climate change risks and opportunities very seriously. We are improving our understanding of the impacts climate change could have on our investment portfolio, and define actions we can take to contribute to a low-carbon economy in a way that is consistent with our investment mandate and beliefs. We continuously enhance our approach, and are working on initiatives to further develop goals and targets.

ESG integration

When investing insurance premiums and own funds, we strive to identify companies that are well positioned to manage risks associated with climate change, in addition to numerous other environmental, social and governance (ESG) risks and opportunities. We believe the consideration of ESG factors ensures better informed investment decisions and helps to optimise the long-term risk-return profile of our assets. Our asset manager, NN Investment Partners (NN IP), which manages the majority of NN Group's proprietary assets, has been a signatory of the UN-backed Principles of Responsible Investment (PRI) since 2008. This demonstrates our commitment to integrating material ESG factors, such as climate change, into the investment process. Also for externally managed proprietary assets, notably real estate and private equity investments, we encourage all of our managers to consider ESG factors when they are making investment decisions.

Climate-related scenario analyses

To get more insight into specific drivers of climate-related risks and opportunities that may impact investment performance, NN has worked on scenario analyses for our proprietary assets. Supported by external sustainability consultant ERM, we have developed various distinctive analysis and models, focused on the largest asset categories on the NN Group balance sheet: government bonds, residential mortgages, and non-financial corporate securities. A high-level description is included in the NN Group Annual Report. We plan to report on the analyses in more detail in a publication later this year.

Active ownership approach

NN Group believes that engagement is essential in the transition to a lower-carbon economy. As an active investor, we vote at general meetings, and initiate dialogue with companies on ESG issues to instigate change in companies' policy commitments and corporate practices. As an example, NN IP is leading the engagement with a few companies in the Climate Action 100+ engagement initiative, and published a holistic engagement strategy for the oil and gas sector and the utility sector. Furthermore, as an investor signatory of CDP's climate change, water and forests programmes, we encourage companies to report on their environmental performance through these programmes.

Selective divestments

Although engagement is our preferred approach for stimulating the transition to a low-carbon economy, in some cases, engagement is deemed unfeasible and unlikely to change a company's conduct or involvement in specific business activities. In those cases, NN takes the decision to restrict investment in certain activities. In 2019, we expanded our environmentally focused exclusion criteria to include, in addition to oil sands, thermal coal mining. In addition, NN Group has announced it will phase out all thermal coal exposures for its proprietary investment portfolio (refer to box on the right).

Investing in low-carbon assets

Climate change and the energy transition can also provide opportunities for investment portfolios that enable mitigation and adaptation efforts. For instance, we invest in green bonds, and finance infrastructure debt projects in the area of renewable energy and resource efficiency (specifically: solar and windfarms, district heating projects, and water and wastewater treatment facilities). In total, these investments amounted to EUR 821 million at year-end 2019. We also continue to make our own private real estate portfolio more sustainable, for instance by investing in measures that increase the energy-efficiency of our buildings (see also box on the next page).

Phasing out investments in thermal coal

In 2019, NN Group further developed its RI Framework policy by adopting a Statement on Coal, including a phase-out strategy for our proprietary assets. This means that NN will reduce its investments in thermal coal mining and/or coal power to close to zero (defined as between 0 and 5%) by 2030. This decision affects a portfolio of bonds in the mining and utility sectors of approximate EUR 2 billion. Whilst most of these bond holdings will mature before 2030, we have some longer-dated exposures. These will be closely monitored, and if by 2030 the companies have not reduced their coal-related business to 5% or lower, they will be sold. Through this policy, NN aims to give a strong signal to companies of the need to phase out coal in order to achieve climate targets in line with the Paris Agreement.

Finally, we made new commitments in the area of renewable energy within infrastructure equity. These complement other alternative investments that seek positive impact in addition to financial return, such as our investment in a private equity fund focused on environmental solutions. We will work on defining a total measure of 'green investments' on behalf of NN's proprietary assets to provide more transparency and stimulate further growth.

Addressing climate change in our investment process continued

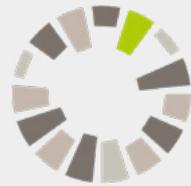
Transparency, commitments and advocacy

By endorsing and being actively involved in international sustainability initiatives, we underline our commitment to addressing climate-related risks. NN Group signed the Paris Pledge for Action in 2015. Furthermore, NN Group endorsed the recommendations of the FSB Task Force on Climate-related Financial Disclosures (TCFD). In line with this endorsement, NN Group has been implementing the TCFD recommendations in its annual reports, whilst NN IP has encouraged investee companies to do the same in their reporting, for instance via its participation in the Climate Action 100+ programme. In the Netherlands, the financial sector has developed a commitment to actively contribute to the Dutch climate agreement. NN Group is signatory of this commitment (2019), pledging that we will (continue to) disclose carbon emissions of our investments, and announce action plans that contribute to the achievement of climate goals by 2022 at the latest.

To learn about further actions that we could take to support the objectives of the Paris Agreement, NN joined the Paris Aligned Investment Initiative of the Institutional Investor Group on Climate Change (IIGCC). The Initiative aims to help develop a common understanding of concepts relating to alignment with the Paris Agreement, explore options for approaches and methodologies that investors can use to align their portfolios to the Paris Agreement, and test these approaches for different asset classes. The focus is on identifying actions that contribute to real world decarbonisation.

Benchmarking our Real Estate portfolio

Creating a sustainable real estate portfolio is an important focus. NN invests in real estate properties directly and indirectly via private real estate funds, all longer term. The portfolio is spread over sectors and regions in Europe. We use the reporting framework GRESB to measure our progress in sustainability. In the 2019 GRESB Real Estate Assessment, 93% of the portfolio (valued at EUR 7 billion) was measured in the reporting tool. The portfolio's (value-weighted) score increased by 5 points to 85 (on a scale of 1 to 100), while the European private real estate benchmark average was 77. NN improved its own score for the fifth year running. The portfolio was granted 4 stars in the GRESB Rating, which is a relative evaluation of the overall GRESB score among global participants (with 5 stars being the highest).



G R E S B
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Energy consumption for heating, cooling, lighting and other uses represents the greatest source of carbon and environmental impact from real estate properties. We have the greatest opportunity to exert influence to reduce the environmental impact of the individual properties we directly own. For the 'direct' part of our real estate portfolio (accounting for around 33% of the total real estate portfolio value), the emissions reported in the 2019 GRESB Real Estate Assessment amounted to 32,125 tonnes of CO₂ in 2018 (87% data coverage). On a like-for-like basis, the emissions declined by 10% compared to 2017. Steps to improve energy efficiency have contributed to this reduction.

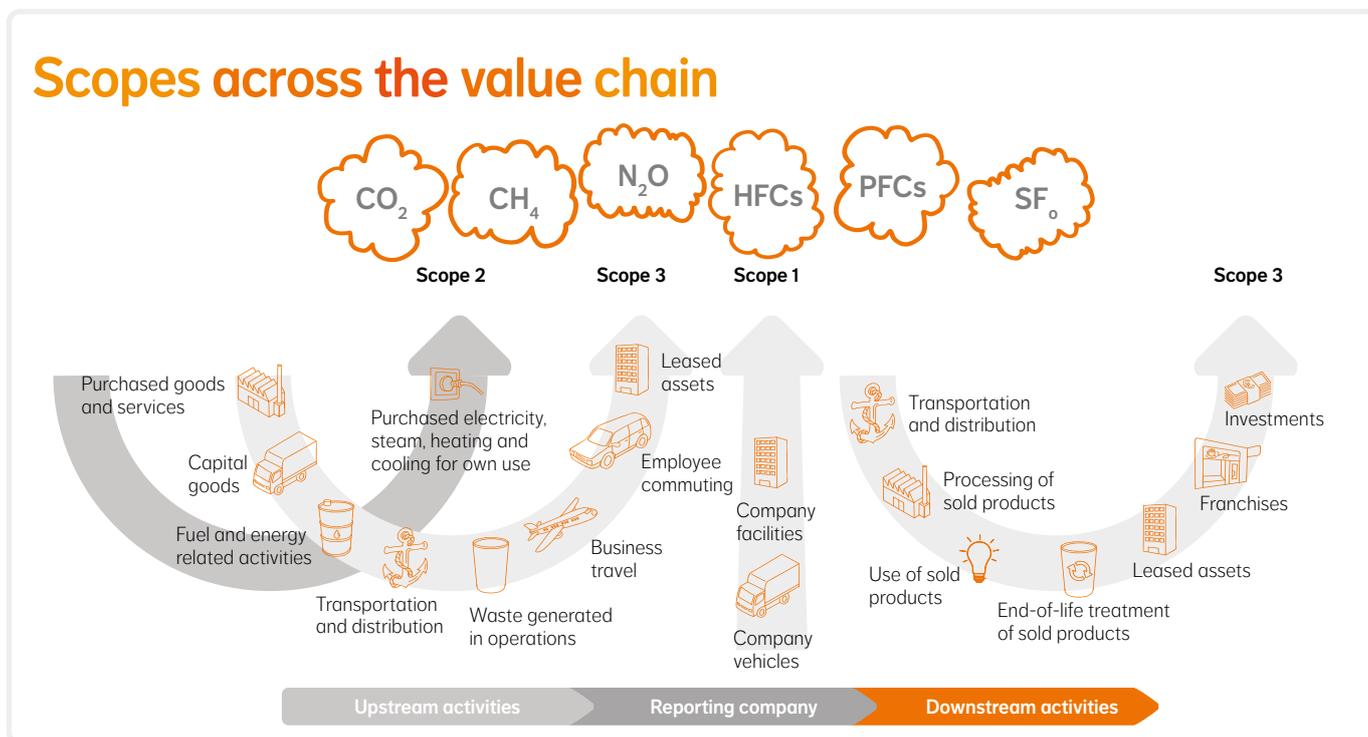
Appendix



Appendix 1: GHG Protocol scopes 1, 2 & 3

The Greenhouse Gas Protocol (GHG Protocol) defines three emission scopes, as illustrated in the graph below:

1. Scope 1 emissions refer to all direct greenhouse gas emissions from sources that are owned or controlled by the organisation itself.
2. Scope 2 emissions are all indirect greenhouse gas emissions stemming from the consumption of purchased electricity, steam, or other sources of energy generated upstream.
3. Scope 3 emissions are all other indirect greenhouse gas emissions resulting from an entity's operations. This includes both upstream and downstream supply chains, such as the extraction and production of purchased materials and fuels, flight emissions, waste disposal, investments, etc. Scope 3 forms the largest part of most corporate carbon footprints.



Source: GHGProtocol.org

Appendix 2: Methodology for listed equity and fixed income

Constructing the data

At NN Group we measure and report on the carbon footprint and carbon intensity of the proprietary assets. Data is provided by ISS-Ethix Climate Solutions on an issuer level. ISS-Ethix derives the data from the CDP reporting of the corporations directly or uses an estimation model for missing data. If a company in our invested universe is not covered by ISS-Ethix, we apply an inhouse estimation model for emissions.

Carbon Footprint

The Carbon Footprint metric, also referred to as portfolio financed emissions, is based on the ownership logic. This means that it follows the reasoning that if an investor has 1% of a company's market value, 1% of the company's emissions are allocated to the investor. However, this overlooks the position of the debt holders. For that reason, we prefer the current company's enterprise value as denominator to attribute emissions to both equity and debt positions within our proprietary portfolios. Enterprise value is defined as a company's total market capitalisation plus total debt outstanding (based on book value).

By aggregating the investor-financed emissions across all companies in the portfolio, we obtain the total carbon footprint for the portfolio. Next, we divide this outcome by the portfolio's value to arrive at the carbon footprint in tonnes of CO₂ per EUR million euro invested.

Formula:

$$\frac{\sum_n^i \left(\frac{\text{current value of investment}_i}{\text{issuer's enterprise value}_i} \times \text{issuer's Scope 1 and Scope 2 GHG emissions}_i \right)}{\text{Current portfolio value (EUR million)}}$$

For the government bonds portfolio, the amount of carbon emissions of an individual government that we 'financed' as an investor was calculated based on how much of the country's debt we own, relative to the total debt outstanding of the country. We allocate emissions to a government bond by looking at the emissions it generates by the public sector. This means that we reflect the emissions that are directly caused by the government's own activity (scope 1, 2 emissions as defined by the GHG Protocol), as well as the emissions from government financing in other sectors within a country (scope 3).

Carbon Intensity

The Weighted Average Carbon Intensity metric seeks to describe the portfolio's exposure to carbon-intensive companies, expressed in tonnes of CO₂ per EUR million in revenue. Each company's emissions are divided by its revenues to obtain the carbon intensity of each holding. The results are averaged using company weights in the portfolio to obtain the overall carbon intensity of the portfolio.

Formula:

$$\sum_n^i \left(\frac{\text{current value of investment}_i}{\text{current portfolio value}} \times \frac{\text{issuer's Scope 1 and Scope 2 GHG emissions}_i}{\text{Issuer's EUR million of revenue}_i} \right)$$

For the government bonds portfolio, the same approach is applied, but instead of revenues we use Gross Domestic Product (GDP) as the denominator. We note that the denominator reflects all domestic production of goods and services within a country, while the nominator reflects a more narrow scope of emissions allocated to the government. We are looking into improvements, but have not yet found a good alternative approach.



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