# Climate risk disclosures 2023



## 1. The governance of climate risk in the fund

**A. Climate risk in the fund's management mandate**
The management mandate for the fund, given to Norges Bank by the Ministry of Finance, includes requirements for respon-sible investment and climate risk management. The mandate states that Norges Bank's responsible investment efforts are to be based on a long-term goal that portfolio companies align their operations with global net zero emissions in line with the Paris Agreement. It also requires financial climate risks to be managed and reported, in accordance with international standards.

Under the Ministry's guidelines for observation and exclusion, the fund must not be invested in companies that base their operations on coal, nor in companies whose conduct contributes to violations of fundamental ethical norms, including acts or omissions that on an aggregate company level lead to unacceptable greenhouse gas emissions.

Changes to the mandate or the guidelines are subject to parliamentary scrutiny. The Ministry publishes an annual white paper on the management of the fund which discusses the further development of the investment strategy and the fund's work on responsible investment and climate risk.

**B. Oversight of climate risk management by the Executive Board**
The Executive Board has issued principles for responsible investment management and risk management, which explicitly address climate risk. It oversees the implementation of the fund's responsible investment strategy, and reviews the annual responsible investment report. The Executive Board decides which companies are to be placed under observation or excluded from the fund, based on specific criteria.

The Executive Board has established an Ownership Committee with a preparatory and advisory role when it comes to the fund's responsible investment activities and decisions on observation and exclusion.

In 2022, the Executive Board approved our 2025 Climate action plan, which outlines actions to address climate risk in the management of the fund. In 2023, the Executive Board was updated on progress in achieving the plan's objectives at a board seminar and approved the updated expectation document on climate change, sharpening the expectations to the companies in the fund's portfolio.

**C. Role of management in managing climate risk**

The Chief Executive Officer (CEO) of Norges Bank Investment Management has overall responsibility for implementing the requirements set by the Executive Board. The CEO issues mandates and job descriptions for members of the Leader Group and sets policies, including on responsible investment and climate risk management.

The Chief Governance and Compliance Officer (CGCO) and Chief Risk Officer (CRO) both report directly to the CEO. The CGCO is responsible for the fund's work on responsible investment management, including developing the fund's expectation document on climate change and is supported by the Active Ownership department. The CRO is responsible for analysing, measuring and reporting investment risk for the fund, including climate risk, and managing risk-based divestments, and is supported by the Risk Monitoring department.

The investment mandates issued to all the fund's internal and external investment managers require investment decisions to consider environmental, social and governance (ESG) information, including on climate risk.

Our Climate Advisory Board, consisting of members with extensive knowledge about climate risk, market standards and finance is supporting us in implementing our 2025 Climate action plan. In 2023, we held three meetings with the Climate Advisory Board.

## 2. Strategy to manage climate risks and opportunities

The fund is invested broadly across sectors and markets, with a long time horizon and with limited room for benchmark deviations. We invest in listed equities, tradable bonds, unlisted real estate and unlisted renewable energy infrastructure. Climate change has implications for economic growth and is relevant across markets and sectors. All our investments will be affected in some way through energy prices, consumer demand, regulatory requirements, and changes to the physical environment that may disrupt supply chains, affect prices, and reduce the availability of natural resources.

Climate change represents a financial risk for the fund, and is one of several risk factors that we track systematically. Given the fund's mandate and investment strategy, the overall climate risk largely depends on adequate government policies in support of the global climate goals, and that the companies we invest in reach their climate targets. We stand to benefit from an orderly transition to a low-carbon economy, as that will provide for a predictable, efficient and necessary large-scale redeployment of investment and resources away from carbon-intensive activities over time.

Our investments are exposed to two types of climate risk:

**Physical climate risk** relates to the physical effects of climate change, either the temperature increases themselves or associated changes in

weather patterns, sea levels, ecology or human habitation. There is also uncertainty around tipping points in the climate system that could lead to irreversible changes. The need for climate adaptation may also create new investment opportunities.

**Transition risk** relates to the economic and societal shift towards a low-carbon economy, including policy changes, new technologies and changing consumer behaviour. Producing and consuming goods and services in ways that re-duce greenhouse gas emissions also create investment opportunities.

These risks interact with each other and will vary over time and geographies. The frequency and intensity of natural disas-ters in recent years have exceeded many predictions. New regulatory schemes in key markets have provided significant support for the development and use of green technology. Meanwhile, geopolitical events have moved energy security up the agenda in many countries.

The overall financial risk to the fund from climate change is driven by the uncertainty about the rate and scale of climate change, the nature of the economic, technological, regulatory and corporate response, and asset pricing. Our exposure is also affected by changes in the cumulative effects of our active management.

**A. Our 2025 climate action plan**

The plan sets out the actions we aim to take over the period 2022-2025 to address financial climate risks and opportunities relevant to the fund. These actions include improving market standards, increasing portfolio resilience and engaging effec-tively with our portfolio companies. We are also expanding our reporting on the fund's exposure to climate risk, and the re-sults of our ownership work. At the heart of our efforts is driving portfolio companies towards net zero emissions by 2050 through credible interim targets and transition plans for reducing their scope 1, scope 2 and material scope 3 emissions.

***At the market level***, our goal is to support the development of improved global, science-based standards for managing climate risk that create a level playing field for companies. We aim to contribute to more sustainable and efficient financial markets by supporting better corporate climate reporting, the development of methods for credible transition pathways, and promising academic research on financial climate risk.

***At the portfolio level,*** we will use quantitative tools to better understand climate-related risks and opportunities and how these are valued by the market. Our processes and data interfaces ensure that these insights are shared widely across the organisation. Analysis of climate risk is integrated into our investment decisions and informs our divestments. By investing in unlisted renewable energy infrastructure, the fund can contribute to the low-carbon transition while diversifying risk.

***At the company level***, we will be an owner of companies through the climate transition. We will consider sector- and company-specific climate information when evaluating ownership and investment cases. We aim to use increasingly specific climate-related data to support our investment decisions, and to hold net zero dialogues with companies representing 70 percent of financed scope 1 and scope 2 emissions in the equity portfolio.

## 3. Risk management

**A. Identification and assessment of climate risks and opportunities**
Companies have different levels of exposure to climate risks and opportunities depending on the markets and sectors they operate in, and the nature of their business models and operations. We use a number of tools to measure the fund's exposure to climate risk.

We estimate the carbon intensity of the equity portfolio and equity benchmark index annually by aggregating the greenhouse gas emissions profile of each company we invest in. We screen our portfolio for companies with particularly carbon-intensive business models and poor climate risk management practices. We monitor the portfolio continuously for ESG-related incidents, including those related to climate risk. We look at companies' climate risk governance, strategy, disclosures, targets and emissions trajectories. This information informs our investment and ownership processes.

We use forward-looking risk metrics, such as implied temperature rise and climate scenario analysis, to estimate climate risk across our portfolio in the long term. Although we are sharing the results of these assessments in this review, we also recognise that the methodologies behind them are inherently subjective, often based on strong assumptions, and still under development. The results are therefore associated with considerable uncertainty and may vary significantly from year to year, complicating their application in traditional risk management activities.

The fund's real estate investments are directly exposed to both physical risks and transition risks. For our investments in unlisted real estate, we compare current building emissions with a 1.5°C pathway developed by Carbon Risk Real Estate Monitor (CRREM). By the end of 2022, 41 percent of the unlisted real estate portfolio by value was aligned with the CRREM de-carbonisation pathway compared with 26 percent of the portfolio in 2021.

**B. Tools for monitoring and managing climate risks**
***Standard setting:*** We engage with standard setters and regulators to strengthen rules and standards on corporate reporting on climate change, and to ensure that companies provide the information that we need to manage and report on climate risk for the fund and monitor companies' progress towards net zero. We also participate actively in initiatives such as CRREM and the Transition Pathway Initiative (TPI), and we support research on climate risk.

***Engagement:*** Engaging with companies is a core part of our approach to managing climate risks. We want to support and challenge our portfolio companies in delivering long-term financial value, adapting their business models, and achieving net zero emissions. We set clear objectives for all engagements, based on our public expectations of companies.

***Voting:*** If companies do not meet our core expectations, we will in some cases vote against the re-election of board members or file our own shareholder proposals. We also vote on proposals filed by other shareholders or "say on climate" proposals from the management.

***Risk-based divestments:*** We may divest from companies which we believe are particularly exposed to climate risk while not managing it well. We also systematically assess ESG risks at companies entering the fund's equity benchmark index, including climate risk.

***Real estate:*** We have begun implementing decarbonisation plans based on opportunities for retrofits and energy efficiency investments for specific assets and will continue to expand this work throughout the portfolio. To address the risk of material flooding, we evaluate current and future flood risk for our most exposed markets, and have taken steps to protect buildings in flood zones with temporary flood barriers, by moving equipment to higher floors, and through insurance arrangements. To address the regulatory risk, we measure emissions from our unlisted real estate investments and work on reducing them in line with our targets of net zero emissions in 2050 and 40 percent reduction in operational emissions intensity by 2030. Many of our tenants are international companies that have targets for reducing their carbon footprint. This may lead them to look for offices in energy-efficient buildings with low emissions.

***Other exclusions:*** Some companies may be excluded from the fund's investment universe under the ethically motivated guidelines for observation and exclusion. These include mining companies and power producers that base their operations on coal, and companies that contribute to severe environmental damage or unacceptable greenhouse gas emissions, following a specific engagement process. The final decision on exclusion is taken by the Executive Board and published. Separately, the Ministry of Finance, as the owner of the fund, has removed oil and gas exploration and production companies from the fund's equity benchmark index based on an assessment of the Norwegian national wealth's oil and gas exposures. This has reduced the fund's overall exposure to fossil fuels.

## 4. Climate-related metrics and targets

We are gradually expanding our capacity to measure the fund's climate risk exposure in accordance with international best practices. In 2023, we formally joined the Partnership for Carbon Accounting Financials (PCAF), a global coalition of financial institutions working on a harmonised approach to assessing and disclosing the greenhouse gas emissions associated with their loans and investments. Our sourcing of emissions data and

assessment of data quality are aligned with guidance from PCAF. The carbon footprint figures we publish consist of reported and estimated emissions data from a single source – S&P Global Trucost – to ensure internal consistency in the data set.

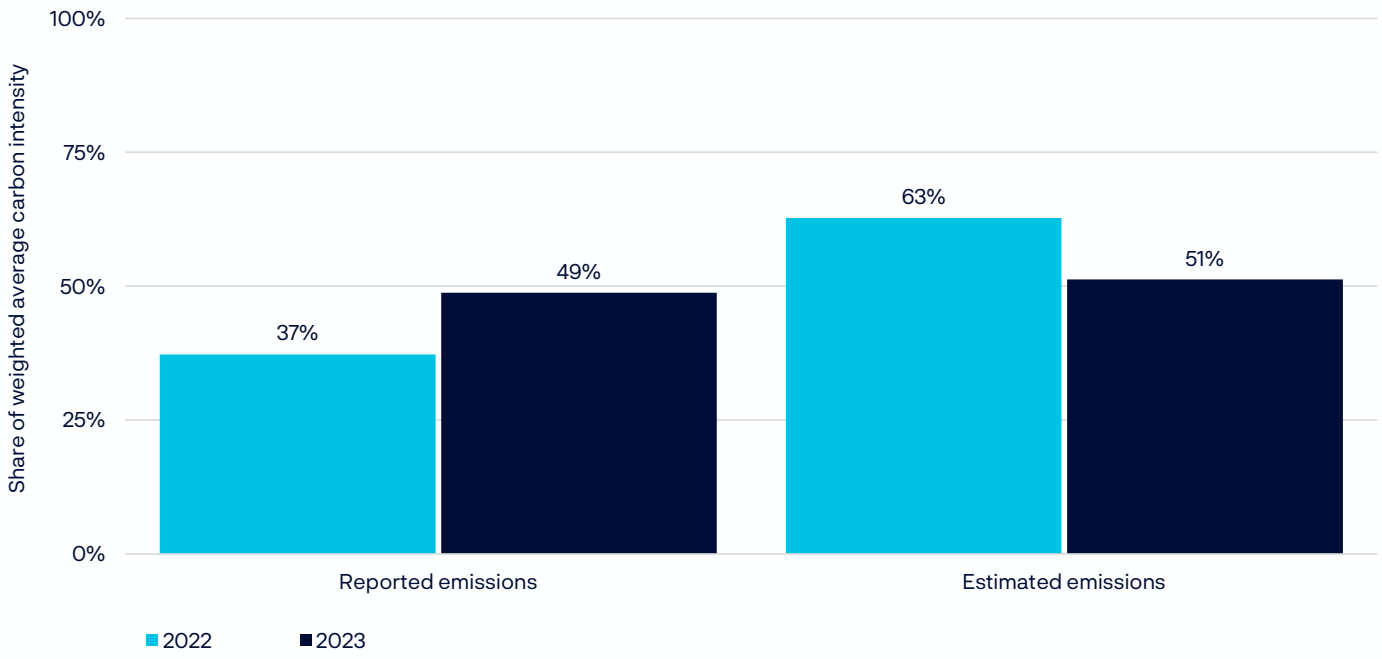
**A. Assessing emissions data quality**

There are challenges related to data availability and quality for any metric for corporate greenhouse gas emissions. Individual emissions data may be taken directly from the company reports or modelled using either other company data or emissions data from other companies in the same sector. Measured as a share of the equity portfolio's carbon intensity, 49 percent of our emissions data for companies is based on reported emissions, an increase of 12 percentage points compared to 2022. The remaining 51 percent are estimated using a variety of information, including energy consumption, production volumes, business activities, and country and sector classifications.

Variations in disclosure between companies, such as differences in reporting periods, and what exactly is covered, mean that reported data need to be reviewed and validated. We often see changes in the emissions attributed to a specific company when we move from estimated to reported figures. In addition, companies' emissions may change significantly if they sell or acquire carbon-intensive assets, implement new technologies, or switch from fossil-fuels to renewable energy sources.

Low emissions data quality adds significant uncertainty to results and has implications for how we interpret and use metrics in our climate risk management. To address data quality, we have internal systems for sourcing, consolidating and reviewing emissions data. Our data providers have built their own estimation models to fill gaps in corporate emissions reporting. In addition, we have developed an internal model to detect unexpected values and replace them with our own estimates. We also engage with data providers to understand and scrutinise their emission estimation models. There is commonly a lag in corporate emissions reporting, The data we collected in 2023 therefore largely reflect emissions for 2022.

**CHART 1**
Emissions data quality. 31 December 2023.




**B. Portfolio carbon footprint**

The carbon footprint of an investment portfolio measures greenhouse gas emissions associated with investments at a given point in time. To measure our listed investments, we use various methods to measure the fund's carbon footprint, aligned with TCFD and PCAF recommendations. We distinguish between financed emissions, which measures our share of a compa-ny's emissions relative to its enterprise value including cash, and weighted average carbon-intensity, which measures each company's emissions per unit of revenue.

We have measured and publicly disclosed the weighted average carbon-intensity of the equity portfolio and benchmark index since 2014, based on reported and estimated data for scope 1 and 2 emissions. These are emissions from direct operations and emissions associated with energy consumption. In 2023, we began estimating scope 3 financed across sectors in the equity portfolio. These are emissions related to each company's value chain.

For our unlisted real estate portfolio, we collect energy data from the buildings we own. We are unable to collect energy data from the logistics joint venture with Prologis, and the Central London joint venture with the Crown Estate due to insufficient data coverage. This means that we use PCAF- aligned estimates for all assets in these specific portfolios. Assets with estimated consumption are classified as not in compliance with the CRREM decarbonisation pathways.

*Financed emissions*

Financed emissions are a PCAF indicator that seeks to give a comparable metrics for financial institutions' reporting on aggregate emissions

**TABLE 1**
Financed emissions, weighted by share of enterprise value including cash, companies' scope 1 and 2 emissions. 31 December 2023.

| Sector | Equity and corporate bonds portfolio, financed emissions, tonnes $CO_2$ - equivalent | Equity and corporate bond benchmark index, financed emissions, tonnes $CO_2$ - equivalent |
|---|---|---|
| Basic materials | 14,928,385 | 17,338,911 |
| Consumer discretionary | 3,418,507 | 3,779,431 |
| Consumer staples | 3,024,126 | 3,444,524 |
| Energy | 10,497,476 | 11,357,065 |
| Financials | 761,791 | 954,609 |
| Health care | 645,708 | 694,507 |
| Industrials | 13,030,705 | 16,196,934 |
| Real estate | 785,935 | 302,393 |
| Technology | 1,871,142 | 1,901,297 |
| Telecommunications | 853,994 | 760,734 |
| Utilities | 9,290,203 | 10,348,832 |
| **Total** | **59,107,972** | **67,079,237** |

weighted by their "financed share" of the companies' total value. Financed emissions are calculated by first dividing the net asset value of all our equity and bond investments in a company by its enterprise value including cash (EVIC). This is then multiplied by the sum of the company's scope 1 and 2 emissions.

Financed scope 1 and 2 emissions in the equity and corporate bond portfolio in 2023 totalled 59 million tonnes of $CO_2$-equivalents. This is 12 percent lower than the benchmark index. Financed emissions were lower in the portfolio than the equity benchmark index in all industry sectors except real estate and telecommunications. The largest contributions to lowering the financed emissions of the portfolio relative to the equity benchmark index came from our investments in the Industrials, basic materials and utilities sectors.

We have begun reporting estimates for financed scope 3 emissions across companies in the equity and corporate bond portfolio. These are the emissions associated with a company's value chain, both upstream and downstream. The Greenhouse Gas Protocol distinguishes between 15 different categories of scope 3 emissions that companies can choose to report on. The relevance and significance of each category will vary across industry sectors. They include emissions from transport and distribution, processing and use of products sold, leased assets and investments, and waste generation. The Greenhouse Gas Protocol provides companies some leeway in how to calculate scope 3 emissions, and which categories to include. This leads to inconsistent disclosures of scope 3 emissions across companies.

We calculate the fund's financed scope 3 emissions to be 61 million tonnes of $CO_2$-equivalents in 2023, which is 8 percent lower than the benchmark index. Overall, we assume actual financed emissions are considerably higher. For example, we observe likely, potentially significant,

underestimation of scope 3 emissions among companies in the financials sector given the difficulty in estimating emissions across the full range of investments made by financial institutions. In accordance with guidance from PCAF, we do not add scope 3 emissions to our estimates of financed scope 1 and 2 emissions, as this would lead to significant double counting of emissions, without adding to the understanding of the risk exposure of the fund.

To prepare for reporting scope 3 emissions, we conducted an internal study of data from three different providers of data. We observed large deviations in scope 3 emissions data across the selected emissions data providers. We also found that these variations are more pronounced in some sectors than others. For estimated scope 3 emissions, we found that models based on production data perform the best among alternative models. Deviations between data sets can arise from data providers using different data collection methods, or differences across estimation models used to cover data reporting gaps. At this point, we believe an estimation model that uses high quality data inputs will give more consistent and credible results than an approach which combines scope 3 emissions data reported by companies with data points from an estimation model.

**TABLE 2**
Financed emissions, weighted by share of enterprise value including cash, companies' scope 3 emissions. 31 December 2023.

| Sector | Equity and corporate bonds portfolio, financed emissions, tonnes $CO_2$ - equivalent | Equity and corporate bond benchmark index, financed emissions, tonnes $CO_2$ - equivalent |
|---|---|---|
| Basic materials | 7,460,294 | 8,042,053 |
| Consumer discretionary | 9,491,812 | 10,606,934 |
| Consumer staples | 11,101,210 | 12,438,587 |
| Energy | 11,203,103 | 11,703,051 |
| Financials | 1,449,191 | 1,472,557 |
| Health care | 2,166,894 | 2,309,510 |
| Industrials | 10,930,389 | 11,768,203 |
| Real estate | 383,706 | 269,823 |
| Technology | 3,741,422 | 4,137,971 |
| Telecommunications | 1,154,187 | 1,088,847 |
| Utilities | 1,998,025 | 1,920,256 |
| **Total** | **61,080,233** | **65,757,792** |

We have assessed the financed emissions of the unlisted real estate portfolio in accordance with guidance from PCAF. Financed emissions are estimated by multiplying each building's emissions associated with energy consumption, with our ownership share in the building. Financed emissions for the unlisted real estate portfolio in 2023 was 249,000 tonnes. We also estimate the carbon-intensity of the unlisted real estate portfolio. This is done by dividing the energy consumption-related emissions of each building with its floor area. To aggregate to portfolio level, we weight each building's carbon-intensity by its share of the net asset value of the portfolio. The carbon-intensity of the unlisted real estate portfolio was 35 kg $CO_2$ per square meter in 2023. As there are significant delays in our

receipt of energy consumption data for the individual assets in the portfolio, we report greenhouse gas emissions in the unlisted real estate portfolio with a one-year lag to ensure as complete a data set as possible.

**TABLE 3**
Carbon intensity, unlisted real estate portfolio, by sector. 31 December 2022.

| Sector | Carbon intensity (kg $CO_2$/m², 2019 Baseline) | Area estimated, percent | Sector contribution to emissions, percent | Carbon intensity (kg $CO_2$/m², 2022) | Area estimated, percent | Sector contribution to emissions, percent |
|---|---|---|---|---|---|---|
| Office | 50 | 7 | 33 | 44 | 6 | 29 |
| Life sciences | n/a | n/a | n/a | 132 | 0 | 1 |
| Retail | 48 | 80 | 4 | 41 | 24 | 3 |
| Logistics | 31 | 100 | 63 | 32 | 100 | 67 |
| **All** | **36** | **68** | **100** | **35** | **70** | **100** |

**TABLE 4**
Carbon intensity, unlisted real estate portfolio, by market. 31 December 2022.

| Country | Carbon intensity (kg $CO_2$/m², 2019 Baseline) | Area estimated, percent | Country contribution to emissions, percent | Carbon intensity (kg $CO_2$/m², 2022 | Area estimated, percent | Country contribution to emissions, percent |
|---|---|---|---|---|---|---|
| UK | 72 | 50 | 10 | 63 | 32 | 8 |
| France | 16 | 0 | 1 | 15 | 0 | 1 |
| Germany | 55 | 0 | 1 | 58 | 0 | 2 |
| US | 51 | 0 | 22 | 44 | 0 | 18 |
| Japan | 153 | 0 | 1 | 88 | 0 | 2 |
| Switzerland | 25 | 0 | 2 | 26 | 0 | 2 |
| Logistics US | 36 | 100 | 36 | 36 | 100 | 40 |
| Logistics Europe | 27 | 100 | 27 | 27 | 100 | 27 |
| **All** | **36** | **68** | **100** | **35** | **70** | **100** |

### *Weighted average carbon intensity (WACI)*

We also measure the weighted average carbon intensity of the fund's equity and corporate bond portfolio. This means dividing each company's scope 1 and 2 emissions by its total revenue for the year and aggregating to portfolio level using each company's relative weight of the portfolio's net asset value. The WACI calculations do not include scope 3 emissions.

The companies in our equity portfolio emitted an estimated 104 tonnes of $CO_2$-equivalents for every million US dollars of revenue in 2023, which is 8 percent lower than that of the equity benchmark index. Our selection of stocks within industry sectors over time has contributed to lowering the carbon-intensity of the equity portfolio relative to the equity benchmark index by 7 tonnes $CO_2$-equivalents for every million US dollars of revenue (selection effect). The main contribution factor to the deviation between the equity portfolio and the equity benchmark index is the cumulative effect of risk-based divestments. The allocation of capital across industry sectors - in particular utilities sector – has contributed to lowering the carbon-intensity of the equity portfolio relative to the equity benchmark index by 3 tonnes $CO_2$-equivalents for every million US dollars of revenue (allocation effect).

We estimate that the weighted average carbon-intensity of the corporate bonds portfolio is 124 tonnes of $CO_2$-equivalentsfor every million US dollars of revenue in 2023, which is 2 percent higher than the benchmark index. This marginal difference in carbon-intensity between the portfolio and the equity benchmark index is mainly explained by our selection of investments in Industrials and Utilities sectors, which have a higher carbon-intensity than those in the equity benchmark in the same sectors, and allocation of capital across industry sectors, in particular between utilities sector and other sectors.

**TABLE 5**

Carbon intensity, weighted by market value of fund holdings, companies' scope 1 and 2 emissions. 31 December 2023.

| Sector | Equity portfolio tonnes $CO_2$ - equivalent per million dollars in sales revenue | Benchmark index tonnes $CO_2$ - equivalent per million dollars in sales revenue | FTSE Global all cap tonnes $CO_2$ - equivalent per million dollars in sales revenue |
|---|---|---|---|
| Basic materials | 23 | 24 | 25 |
| Consumer discretionary | 7 | 7 | 6 |
| Consumer staples | 4 | 4 | 4 |
| Energy | 10 | 11 | 16 |
| Financials | 3 | 3 | 3 |
| Health care | 2 | 2 | 2 |
| Industrials | 21 | 26 | 26 |
| Real estate | 5 | 3 | 2 |
| Technology | 7 | 7 | 7 |
| Telecommunications | 2 | 1 | 1 |
| Utilities | 20 | 25 | 45 |
| **Total** | **104** | **113** | **137** |

**CHART 2**

Weighted average carbon intensity (WACI) of the equity portfolio and equity benchmark index.

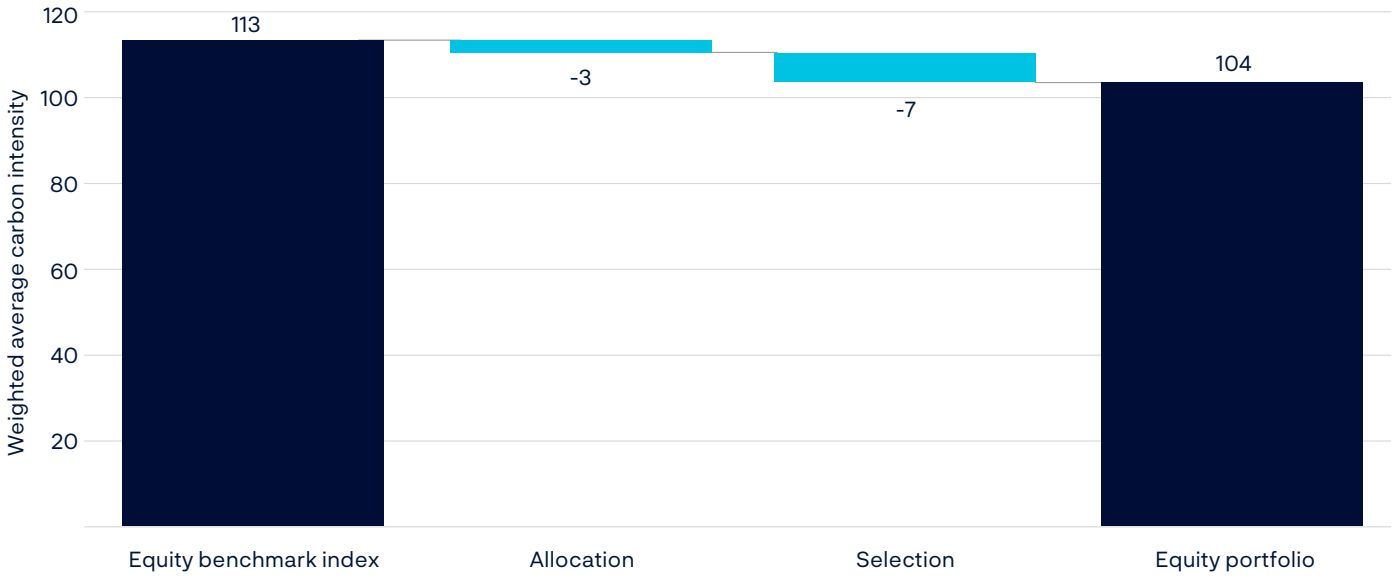



**TABLE 6**

Carbon intensity, corporate bonds portfolio and benchmark index, scope 1 and 2 emissions. 31 December 2023.

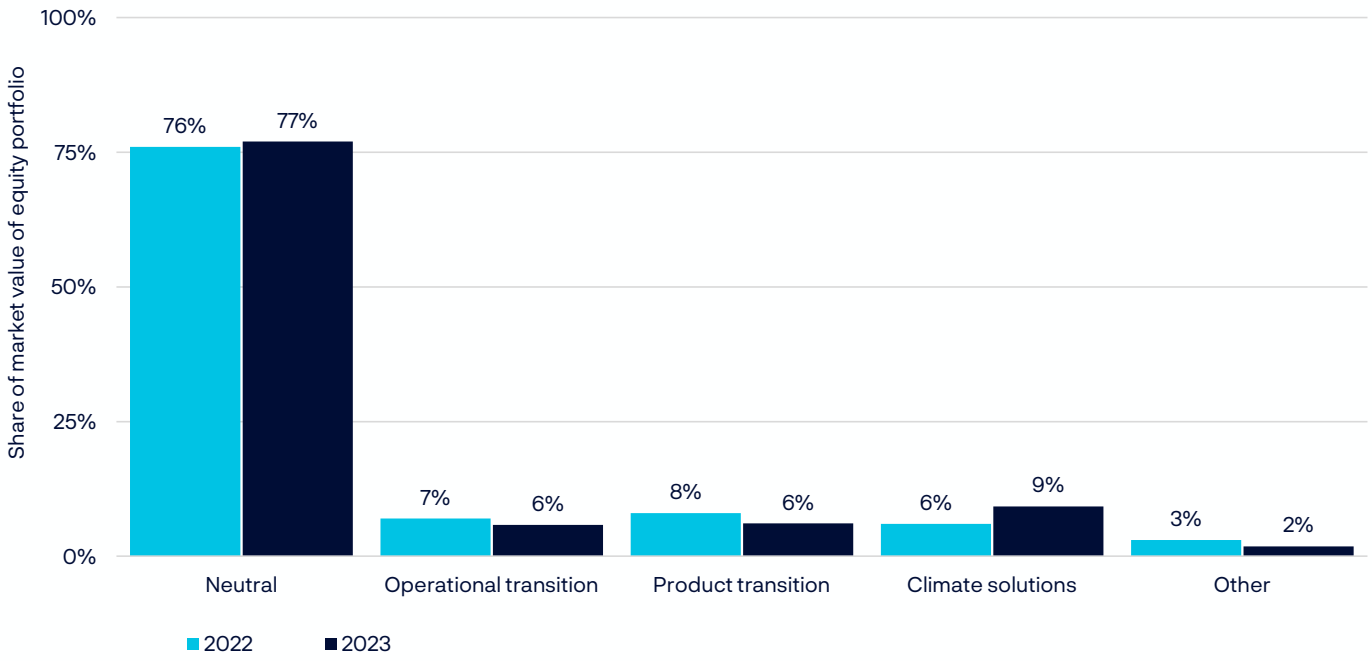
| | Tonnes $CO_2$ - equivalent per million dollars in sales revenue |
|---|---|
| Fixed income corporate portfolio | 124 |
| Benchmark index | 121 |
| Difference | 4 |

### C. Portfolio exposure to climate solutions and green technologies

We use two different indicators to estimate the fund's exposure to companies with green business models. One indicator tracks the share of our equity portfolio that is invested in companies included in the FTSE Environmental Opportunities index. To be included in the index, companies are required to derive at least 20 percent of their revenues from environmental products and services, such as renewable and alternative energy, energy management and efficiency, water infrastructure and technology, and waste and pollution control. We estimate that 14 percent of the net asset value of the equity portfolio was invested in companies included in the FTSE Environmental Opportunities Index at the end of 2023. This is an increase of one percentage point since 2022.

**CHART 3**

Exposure of equity portfolio to climate transition risks and opportunities. Source: MSCI Low Carbon Transition Score. 31 December 2023.




We also track the share of our equity investments classified by MSCI [1] as providing "climate solutions". These companies pursue business models with low emissions and climate-related revenue streams. Based on MSCI's methodology, we estimate that 9 percent of the market value of the fund's equity portfolio is invested in companies providing climate solutions, while 77 percent have neutral exposure to transition risk, 6 percent require operational transition, 6 percent require product transition, and 2 percent are unclassified.

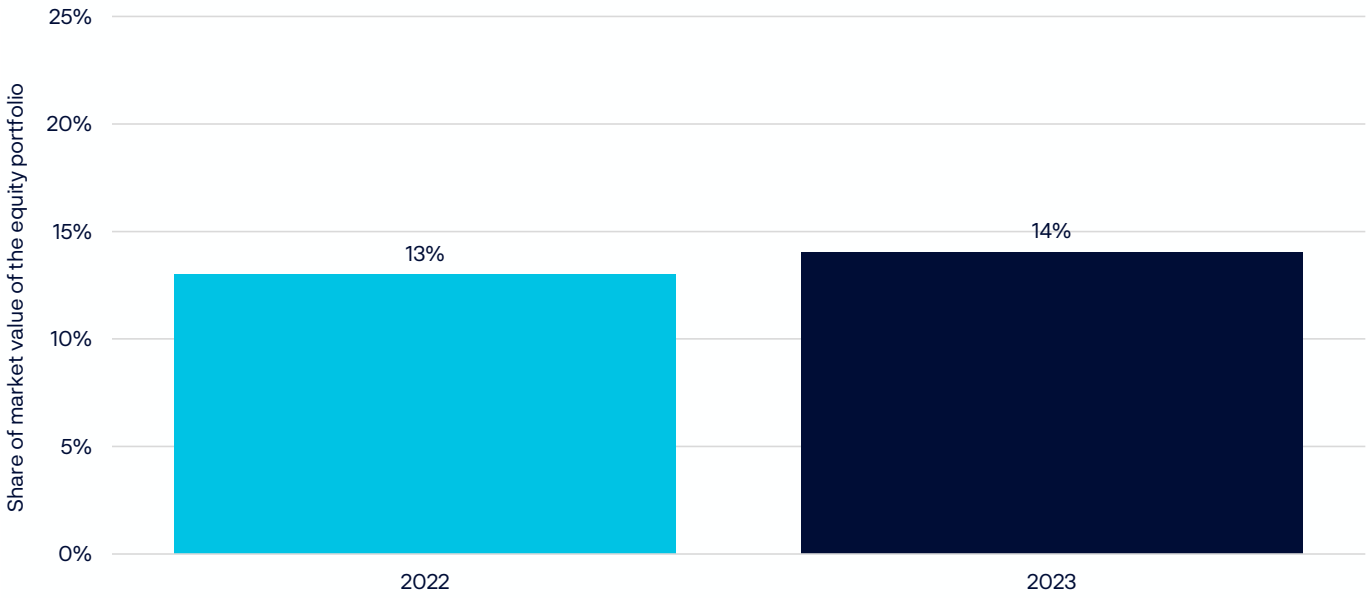
[1] This disclosure was developed using information from MSCI ESG Research LLC or its affiliates or information providers. Although NORGES BANK (NBIM)'s information providers, including without limitation, MSCI ESG Research LLC and its affiliates (the "ESG Parties"), obtain information (the "Information") from sources they consider reliable, none of the ESG Parties warrants or guarantees the originality, accuracy, and/or completeness, of any data herein and expressly disclaim all express or implied warranties, including those of merchantability and fitness for a particular purpose. The Information may only be used for your internal use, may not be reproduced or redisseminated in any form and may not be used as a basis for, or component of, any financial instruments or products or indices. Further, none of the Information can in and of itself be used to determine which securities to buy or sell or when to buy or sell. None of the ESG Parties shall have any liability for any errors or omissions in connection with any data herein, or any liability for any direct, indirect, special, punitive, consequential, or any other damages (including lost profits) even if notified of the possibility of such damages.

The fund's exposure to climate solutions increased by 3 percentage points from the end of 2022 to the end of 2023. Changes in this exposure can be driven by a number of factors. First, companies may be reclassified between categories as a result of changes in their business operations. This effect was negligible in 2023. Second, companies can move in or out of the sample covered by our data provider. A large number of previously unclassified companies were added to the neutral classification in 2023, reducing the share of companies classified as providing climate solutions. Third, the share of companies in the vari-ous categories is affected by changes to their relative weight in our equity portfolio. The main reason for the increase in the fund's exposure to climate solutions from 2022 to 2023 is that the underlying companies – some of which are in the technology sector – significantly increased their relative portfolio weights as a result of changes in the market pricing.

The value of our green bonds in the fixed-income portfolio amounted to 75 billion kroner at the end of 2023, based on the definition for the MSCI Bloomberg Green Bond Index.

**CHART 4**

Equity investments in companies with climate- and environment-related revenues. Source: FTSE Environmental Opportunities Index. 31 December 2023.




### D. Forward-looking climate risk metrics

We use forward-looking climate metrics to estimate future emissions trajectories in the equity portfolio and assess potential portfolio losses in different climate scenarios. Forward-looking metrics can be helpful to assess long-term risks under conditions that are expected to change in ways that are highly unpredictable, and where historical trends are not necessarily predictive of future outcomes. They allow us to identify a range

of plausible outcomes resulting from the interplay of different input factors. In the case of climate change, the scale of future climate change and the associated climate risk are highly uncertain. In broad terms, they depend on future emissions and the impact of growing atmospheric concentrations of greenhouse gas emissions on the Earth's climate and economy. Future emissions are dependent on a range of factors that are themselves highly uncertain, such as the ambition and design of government policy, the rate and scale of technological inno-vation and deployment, population growth, and trends in the supply and use of renewable energy and green technologies. These factors will be influenced by geopolitics, trade and investment patterns, migration flows, pandemics, and other events.

*Climate scenario analysis*

Climate scenario analysis has emerged as the primary tool for stress-testing investment portfolios against a variety of plausible long-term emission paths and their impacts on physical climate risk and climate transition risk. Climate scenarios emissions, technological innovation, physical climate change and adaptation. They allow us to estimate potential long-term losses under different climate scenarios. However, climate models designed to stress-test investment portfolios are still in their infancy, and so it is difficult to conclude categorically which scenario would result in the largest and smallest portfolio losses.

In the information presented here, we use MSCI's Climate-Value-at-Risk (CVaR) model to stress-test the equity portfolio against climate scenarios published and regularly updated by the Network for Greening the Financial System (NGFS). The CVaR model we use is based on version 3 of the NGFS scenarios released in 2021. In broad terms, the result for each scenario is the discounted sum of portfolio losses until 2080 associated with climate policy risk, technological opportunities and physical climate risk. There are four climate transition risk scenarios with different warming end points and transition paths, and a physical climate risk scenario drawing on a worst-case scenario known as Representative Concentration Pathways 8.5 (RCP 8.5). Discounted losses associated with each company are estimated on the basis of climate policy and technological risk assessments and aggregated to portfolio level. The model is frequently updated to take into account new data sets, insights and assumptions, which means that changes to the results over time may not necessarily reflect changes to the underlying climate risk that is measured.

The Value-at-Risk for the fund's equity portfolio across the selected climate scenarios is estimated at between 2 and 12 percent. The results for 2023 are not directly comparable to previous years, as the underlying model was substantially modified in 2023. A backtest of the revised model confirms that most of the change from 2022 to 2023 can be explained by model updates, such as revised sector decarbonisation pathways, changes in the calculation of emissions reductions and green revenue streams, and changes to other input data.

The results suggest a transition to global net zero emissions in line with a 1.5°C scenario represents a Value-at-Risk for the equity portfolio of 9 percent. Measured temperature rise relative to the pre-industrial age is currently at 1.2°C and is predicted to surpass 1.5°C during the next decade unless emissions are drastically cut. In the absence of additional technological progress and continued cost improvements for net zero solutions, transitioning to a 1.5°C scenario will become increasingly costly the closer we get to that warming milestone. If we look at a 2°C scenario, an orderly transition entails lower portfolio losses than a disorderly transition. This bears out our assumption that the fund stands to benefit from an orderly transition in which climate policy is gradually tightened in ways that markets can anticipate and plan for.

When interpreting the results of climate transition scenarios, it is important to remember that the economic viability of low-carbon solutions is improving rapidly. This means that climate models will tend to over-estimate transition costs. The NGFS scenarios used in the current CVaR model are based on projections, made in 2021, at the height of the pandemic and before the energy market volatility that began in 2022. Regulatory initiatives in key markets designed to accelerate the low-carbon transition have reduced the cost of deploying renewable energy and green technologies. Some recent economic modelling suggests that transitioning to an energy system dominated by renewable energy by 2050 would be beneficial for the global economy, even without the climate objective. Our scenario models have yet to incorporate such recent changes in the underlying economic assumptions.

We cannot rank different scenarios definitively on the basis of Value-at-Risk, since the underlying model only partially reflects the total Value-at-Risk. The underestimation of risks and opportunities caused by omissions to the model is not equally distributed across scenarios. For example, the estimated losses of 12 percent for the physical scenario known as RCP 8.5 scenario appear very modest given that is implies warming in excess of 4 degrees Celsius. We believe physical climate risk is underestimated across all climate scenarios, and perhaps severely underestimated. It leaves out indirect effects of physical climate change that are likely to materialise but hard to quantify, such as migration, food shortages, changes to ecosystems, disruptions to trade patterns, and political instability. The model ignores the potential exponential losses if warming triggers tipping points in the climate system, such as the melting of the Greenland ice sheet or thawing of permafrost. It also analyses transition risk and physical risk independently, thereby neglecting the dynamic relationship between them.

From an investment perspective, the CVaR model has some additional characteristics that influence how we interpret the results. The results say little about whether the market has already priced in climate risk to some extent. Nor do they take account of individual companies' climate plans or historical changes in their emissions. Given that the estimated losses are expressed in terms of present value, and the greatest losses from physical climate change in particular are expected to materialise well into the future,

the discount rate used will have a significant impact on the results. Although we use leading methods and scenario tools, our climate stress tests remain a work in progress.

**TABLE 7**
Climate scenario analysis, equity portfolio. 31 December 2023.

| Scenario | Estimated Reduction in value, percent by 2080 | Estimated reduction in value, billions of kroner by 2080 |
|---|---|---|
| Transition risk: 1.5°C Net zero, orderly (NGFS) | 9 | 995 |
| Transition risk: 2°C , orderly (NGFS) | 2 | 221 |
| Transition risk: 2°C , disorderly (NGFS) | 6 | 663 |
| Transition risk: Nationally determined contributions (NGFS) | 2 | 221 |
| Physical risk: RCP 8.5 | 12 | 1,326 |

*Implied temperature rise*

Implied temperature rise is a forward-looking metric that measures the warming associated with a company's future emissions profile. It is calculated by taking a company's current carbon intensity and using its emission reduction targets to project its future emissions pathways, and comparing this to a reference pathway estimated for the relevant country and sector. We then add up the results in each sector, and for the entire equity portfolio. A lower implied warming means lower climate transition risk.

In 2023, the estimated implied warming was 1.94 °C in the equity portfolio and 1.96 °C in the benchmark index. Each company's contribution varies according to its current scope 1,2 and 3 emissions, the ambition of its emission reduction targets, and the size of our investment. Technology, industrials and consumer discretionary are the sectors that made the largest contributions, mainly due to the size of our investments in those sectors. Work on emission pathways and sector allocations is at an early stage, and model updates may account for a significant share of changes in implied temperature rise from one year to the next.

**TABLE 8**
Equity portfolio implied temperature rise. 31 December 2023.

| | Equity portfolio implied temperature rise (degree Celsius) | Benchmark index implied temperature rise (degree Celsius) |
|---|---|---|
| Basic materials | 0.14 | 0.15 |
| Consumer discretionary | 0.28 | 0.29 |
| Consumer dtaples | 0.10 | 0.11 |
| Energy | 0.13 | 0.14 |
| Financials | 0.25 | 0.26 |
| Health Care | 0.19 | 0.19 |
| Industrials | 0.30 | 0.32 |
| Real Estate | 0.10 | 0.05 |
| Technology | 0.35 | 0.35 |
| Telecommunications | 0.05 | 0.05 |
| Utilities | 0.05 | 0.06 |
| **Total** | **1.94** | **1.96** |

Companies' emission reduction targets can also be compared with sector-specific emission pathways showing how their particular sector can achieve net zero emissions by 2050. In 2023, we developed such a model for the global cement industry sector. Each cement company is allocated an emission budget based on its current market share and we use recognised pathways for the cement industry to achieve net zero emissions in 2050. We convert all corporate targets to absolute emissions. By comparing companies' targets with their emission budgets, we gain an insight into whether each company has set sufficiently ambitious long-term targets. This analysis helps us understand different types of net zero targets, the effect of different sector pathways, and ultimately the feasibility of companies' net zero plans.

*Corporate net zero targets*

Corporate net zero targets indicate that companies have a strategy to reduce their emissions. The core of our ownership work is to support companies in setting credible targets and transition plans. We track the number of companies in our portfolio with net zero targets for scope 1 and 2 emissions and try to evaluate the quality of these targets. One important forward-looking risk indicator is the share of our financed emissions covered by net zero 2050 targets, as these emissions are presumed to pose less risk to the fund than unmanaged emissions.

At the end of 2023, 68 percent of our financed scope 1 and 2 emissions were covered by net zero targets for 2050 or sooner, up 12 percentage points since 2022. Weighted by net asset value, the figure was 68 percent in 2023. A total of 2,385 companies had set net zero targets. In 2015, only 1 percent of our portfolio companies had set such targets. Only science-based targets are counted in this analysis. Given the rapid development in both companies adopting net zero targets and recognised methodologies, these figures are subject to uncertainty.[2]

**E. Other climate-related metrics**

*Market level*

We responded to five climate-related consultations from standard setters in key markets in 2023.

*Portfolio level*

***Risk-based divestments:*** We divested from 11 companies in 2023 due to climate risk. We track and publish the impact of risk-based divestments on the return on the benchmark index. Since 2012, risk-based divestments linked to climate change have increased the cumulative return by 0.23 percentage point.

***Unlisted real estate:*** In 2023, we scored 83 out of 100 in GRESB's real estate benchmark, compared with 81 in 2022. We performed 7 percentage points better than comparable investment portfolios reporting to GRESB. Financed emissions from the unlisted real estate portfolio totalled 249

[2] Our analysis relies on target data from the Science-Based Target initiative (SBTi). We accept all companies that have committed to net zero 2050 or have ap-proved long-term net zero targets for 2050 or sooner. We complement SBTi data with corporate net zero target data from MSCI, particularly for sectors for which SBTi has not yet developed a target approval methodology. MSCI research on net zero targets covers approximately 79 percent of the companies in our equity portfolio and 99 percent of the portfolio's net asset value.

thousand tonnes (35 kg $CO_2$/m2) in 2022. By the end of 2022, 41 percent of the unlisted real estate portfolio by value was aligned with the Carbon Risk Real Estate Monitor (CRREM) decarbonisation pathway compared with 26 percent of the portfolio in 2021.

***Unlisted renewable energy infrastructure:*** In 2023, the fund bought a 49 percent stake in a 1.3 GW portfolio of solar plans and onshore wind farms in Spain and a 16.6 percent stake in a 960 MW offshore German wind construction project. In 2023, the wind farm Borssele 1 & 2, our first investment in renewable energy infrastructure, was again ranked first by GRESB among its peers in the European offshore wind power generators, maintenance and operations category.

*Company level*

***Engagement:*** We engaged with 633 companies on climate-related topics in 2023, equal to 70 percent of our financed emissions. These companies account for 37 percent of the market value of the equity portfolio. We engaged with 162 companies as part of specific net-zero dialogues, representing 42 percent of our financed emissions.

***Voting:*** We voted against the re-election of 112 directors at 23 companies in 2023 where companies did not report or man-age climate risk adequately. We voted on 117 shareholder proposals on climate change, and in favour of one third of these. We also filed four climate – related shareholder proposals in the US. None of these passed, but they received significant shareholder support.

***Ethical exclusions:*** Norges Bank did not exclude any further companies under the conduct-based climate criterion in 2023, and no new companies were excluded or placed under observation under the product-based coal criterion.

**F. Climate-related targets**

As stated in our 2025 Climate action plan, our ambition is for our portfolio companies to achieve net zero emissions by 2050. This provides a strategic direction for our climate activities. We expect high emitters to set net zero 2050 targets as a matter of urgency, and all companies in our portfolio to have done so by 2040 at the very latest.

We have set a net zero 2050 target for our unlisted real estate portfolio and an interim target for 2030 to reduce operational carbon emissions intensity by 40 percent from 2019 levels.