

# Vanguard's Report on Climate-related Impacts 2023

**Vanguard Asset Management, Limited**  
**Vanguard Investments UK, Limited**

In alignment with the Task Force on Climate-related Financial  
Disclosures (TCFD) and in accordance with the Financial  
Conduct Authority's *Environmental, Social and Governance sourcebook*

## VANGUARD'S CORE PURPOSE

To take a stand for  
all investors, to  
treat them fairly,  
and to give them  
the best chance for  
investment success.

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This report has been prepared by The Vanguard Group, Inc., in alignment with the guidelines of the Task Force on Climate-related Financial Disclosures. Disclosures in relation to Vanguard UK subsidiaries, Vanguard Asset Management, Limited, and Vanguard Investments UK, Limited, are in accordance with the requirements set out in the Financial Conduct Authority's *Environmental, Social and Governance sourcebook*. Unless otherwise specified, the data used for this report are as of December 31, 2023.

The TCFD recommends disclosures in four areas: governance, strategy, risk management, and metrics and targets. See "2023 TCFD disclosure status" on page 44 for a summary of our plans and progress in each area.

# CEO letter



I'm pleased to present Vanguard's third annual report in line with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD). This report highlights our global efforts—as investment manager, investment steward, and corporate actor—in response to climate-related risks and opportunities.

We believe that disclosure is critical to the fair and efficient function of our capital markets. We are proponents of disclosure by companies on the material risks that climate change—and the ongoing global response—can pose to their businesses so that investors can make fully informed decisions. Our TCFD reporting is one important way we demonstrate our own commitment to disclosure. We also remain committed to providing investors with the information and products they need to make sound investment choices considering climate-related risks and opportunities.

Vanguard serves individual investors who have entrusted us to manage and steward their investments. Our actions and our reporting will always be grounded in our deep commitment to investors and their financial well-being.

Tim Buckley

Vanguard Chairman and Chief Executive Officer

# Introduction

# About Vanguard

Vanguard was founded in 1975 on the basis of a simple but revolutionary idea: An investment company should manage its funds in the best interests of its clients. Today, we are one of the world's leading asset management companies, offering investment products, advice, and retirement services to individuals, financial professionals, and institutions.

What sets Vanguard apart in the industry is our unique mutual ownership structure. Vanguard is owned by our U.S.-domiciled funds, which in turn are owned by their investors. Our owners are at the heart of every decision we make, which is reflected in our core purpose: **To take a stand for all investors, to treat them fairly, and to give them the best chance for investment success.**

As a steward of our clients' assets, we engage with portfolio companies to better understand how material risks, including material climate risks that could affect the value of our clients' investments over the long term, are evaluated by their boards and reflected in their disclosures to the market. We view such stewardship activities as a natural extension of Vanguard's core purpose.

## A focus on the individual investor

Vanguard serves more than 50 million individual investors who have chosen to entrust us with their hard-earned savings to invest for important goals, such as education, the purchase of a home, or retirement.

We manage our funds in the best interests of our clients to help them meet these financial objectives.

Our investors expect the mutual funds and exchange-traded funds (ETFs) we offer to meet the specific objectives set forth for those vehicles. Each portfolio is managed to meet a specific objective, follow well-defined strategies, and adhere to clear policies.

On behalf of our clients, we have an important role to play in understanding and advocating for appropriate disclosures of material financial risks, such as climate change. Our firm's leadership, as well as the teams that develop, manage, steward, and oversee our investment products, are committed to doing so.

# Vanguard's approach to climate risk

Climate change—and the ongoing global response—will have far-reaching economic consequences for companies, financial markets, and investors. Vanguard is committed to understanding and attending to material risks that can erode our investors' long-term returns, including climate-related risks. Our approach spans several key areas of focus.

## Research on the market and economic implications of climate change

Vanguard has been conducting research to understand how climate change could affect the global economy. In a 2022 Vanguard Megatrends research paper, [The Economics of Climate Change](#), Vanguard economists used consensus scientific data to assess the impact of climate change on economic activity under four scenarios for greenhouse gas emissions and resulting temperature increases. They found that the net impact on global GDP is negative in all scenarios.

## Product choices for our investors

Our global investment product lineup includes more than 280 index mutual funds and ETFs and more than 120 actively managed funds and ETFs. For clients who seek them, we offer more than 30 investment products globally that have specific environmental, social, and governance (ESG) objectives. For investors who specifically want to limit exposure to carbon-intensive industries, we offer ESG index funds that avoid or reduce exposure to such industries while seeking to achieve a broad market-like return.

Vanguard also offers actively managed ESG funds that seek to generate excess return by allocating capital toward companies that the fund managers deem as demonstrating leading ESG practices consistent with each fund's mandate. Although the investment methodology may vary by product and manager, assessing ESG-related risks and opportunities is central to the investment strategy of each of these actively managed ESG portfolios.

## Introduction

### Investment stewardship

Vanguard’s Investment Stewardship program is responsible for voting proxies and engaging with company boards and management teams on behalf of Vanguard-advised funds.<sup>1</sup> As part of its work, the Investment Stewardship team seeks to understand how boards of directors oversee material risks, including material climate-related risks, to safeguard long-term investor returns. For portfolio companies where climate risk is a material risk, the Investment Stewardship team may engage with them to understand how they disclose, oversee, and mitigate these risks.

Companies’ disclosure of material financial risks is central to the accurate pricing of securities and the fair and efficient functioning of the capital markets. Efficient market functioning is particularly important for the index funds favored by many Vanguard investors since these funds buy and hold the many securities included in the benchmark index.

Proxy voting and related portfolio company engagement for funds that are managed externally by third party investment advisors, including Vanguard’s actively managed equity funds, are handled by these external investment advisors.

### Engagement with policymakers

Vanguard works with global policymakers to support the interests of long-term investors. Government leaders are specifically empowered and charged with considering the competing interests inherent in issues—including climate change—and crafting public policy responses that will address the complex societal impacts and trade-offs. Given the potential impact of climate change on the global economy and investor returns, it is important that policymakers provide clarity to individuals, companies, and the financial markets about government plans and targets to address climate risks.

### Corporate sustainability goals and initiatives

Vanguard has a set of corporate sustainability goals and initiatives to make progress toward reducing carbon emissions and reaching carbon neutrality in our global operations by 2025.

<sup>1</sup> Vanguard’s Investment Stewardship program is responsible for proxy voting and portfolio company engagement on behalf of the quantitative and index equity portfolios advised by Vanguard (together, “Vanguard-advised funds”). Vanguard’s externally managed portfolios are managed by unaffiliated third-party investment advisors, and proxy voting and engagement for those portfolios are conducted by their respective advisors.

# Governance

In this section, we discuss Vanguard's approach to governance of climate-related risks and opportunities.



Vanguard addresses climate-related impacts and clients' best interests through an integrated structure of boards, committees, and functions.

# Board oversight of climate-related risks and opportunities

The Vanguard Group, Inc. (VGI), is owned by our U.S.-domiciled funds, which in turn are owned by their investors. As of December 31, 2023, the VGI Board of Directors (VGI board) comprised 12 directors, 11 of whom were independent. Members of the board also serve as the U.S.-domiciled funds' Boards of Trustees (fund boards). The directors bring to each of these boards a wealth of executive leadership experience derived from their service as senior executives, board members, and leaders of diverse public operating companies, academic institutions, government agencies, and other organizations. The VGI board and fund boards meet regularly throughout the year to fulfill their functions and obligations.

The VGI board is responsible for, among other matters, setting broad policies for the company as well as overseeing risk management relating to Vanguard's corporate operations. Where applicable, the execution of these responsibilities includes consideration of material ESG-related risks, such as climate-

related risks and opportunities. In addition, the VGI audit committee reviews management's risk governance frameworks and discusses policies with respect to risk assessment and management, including any relevant framework or policy relating to ESG risks.

The VGI board also oversees Vanguard's corporate sustainability goals and initiatives aimed at reducing our carbon emissions and reaching carbon neutrality in our global operations by 2025.

The fund boards engage on ESG and sustainability matters and communicate with management to help inform an effective course of action, as appropriate. The fund boards also oversee the funds' risk management, including consideration of material climate-related risks, where appropriate. The level of ESG risk evaluation varies by investment style and fund objective.

The VGI board and fund boards oversee the various Vanguard functions that conduct day-to-day risk management as applicable, including compliance, fund services and oversight, enterprise investment services, investment management, investment stewardship, legal, product, and risk management. In addition, the VGI board and fund boards have regular interactions with internal and external auditors.

Outside the U.S., the boards of our international businesses and fund entities exercise similar oversight responsibilities in their respective regions. The management teams of our international businesses share relevant ESG developments through Vanguard's global management committees. For a regional example, see "In focus: European ESG governance framework" on page 14.

IN FOCUS

**Board engagement on climate matters affecting our product lineup**

The U.S. fund boards retain proxy voting authority for the U.S. Vanguard-advised funds and receive regular updates on investment stewardship activities, including voting and portfolio company engagement. The U.S. fund boards discuss key themes and emerging areas of risk identified through stewardship activities (for example, risks related to climate change) and provide guidance to the stewardship team on how to address those risks consistent with the funds' proxy voting policies and guidelines. The U.S. fund boards consider updates to those policies and guidelines annually to address new or evolving issues.

We believe that boards of portfolio companies are responsible for determining risk-mitigation approaches to maximize shareholder value and plan for an uncertain future. To the extent that legally binding or government-specified limits related to the Paris Agreement on Climate Change have been established, we believe that companies should disclose how their targets

and strategies are appropriate in the context of those factors.<sup>2</sup> For example, many companies have set targets aligned with the goals of the Paris Agreement. As shareholders, the Vanguard-advised funds seek to understand the implications of those commitments.

As part of the oversight process for our global investment product lineup, the boards meet directly with the managers of our actively managed funds as appropriate and receive reporting on their consideration of material climate-related issues as part of their ESG integration practices.

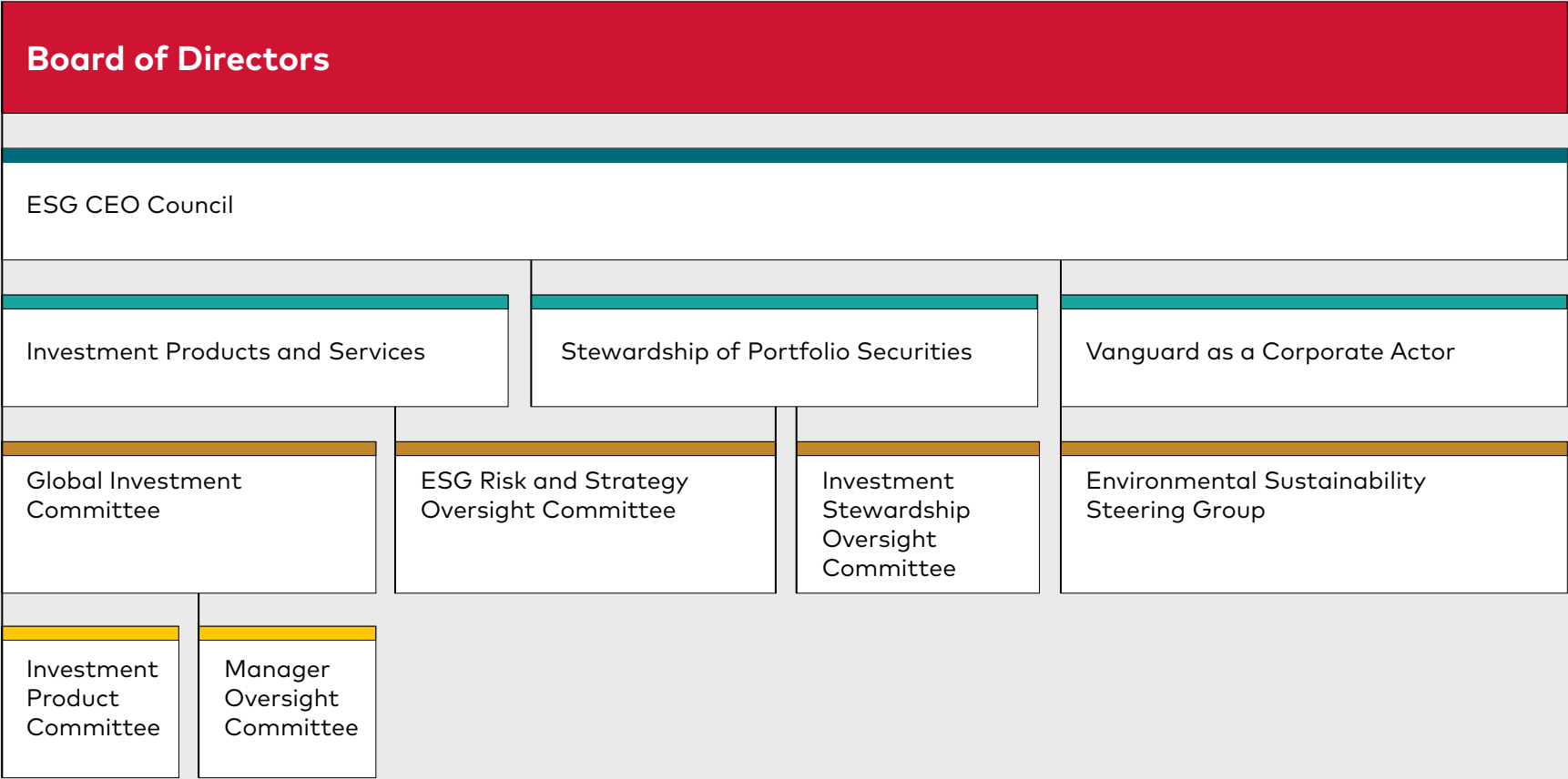
The U.S. fund boards also receive an annual report on the external advisors' proxy voting and approve their proxy voting policies and procedures. The 2023 proxy voting report for the externally managed funds included a discussion of key themes and material votes in 2023, including significant shareholder proposals regarding climate-related topics, and highlighted certain external advisors' proxy voting on those proposals.

<sup>2</sup> The Paris Agreement sets a goal of holding the increase in global average temperature to well below 2 degrees Celsius above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 degrees Celsius above pre-industrial levels.

IN FOCUS

Vanguard's ESG governance structure

This diagram highlights elements of our current global ESG governance structure that have a specific connection to climate-related risks and opportunities.



# Management's role regarding climate-related risks and opportunities

## ESG CEO Council

Vanguard's ESG CEO Council oversees and coordinates our global strategy on ESG-related matters, including climate-related risks and opportunities, at both the corporate and product levels. Members include a subset of Vanguard's executive team, and Vanguard's chief executive officer serves as council chair. The council meets as needed and reports to the VGI board and the fund boards as appropriate.

The council provides guidance, oversight, and coordination on ESG matters in service of client interests. The framework underlying the council is organized around three pillars: Investment Products and Services, Stewardship of Portfolio Securities, and Vanguard as a Corporate Actor.

## ESG Risk and Strategy Oversight Committee

The ESG Risk and Strategy Oversight Committee, composed of senior leaders across our product, communications, risk, and legal functions, is a subcommittee of the ESG CEO Council that facilitates the council's oversight of global ESG matters by:

- Sharing awareness of global ESG risks, strategic opportunities, and investment perspectives.
- Deciding how to address such risks and opportunities or aligning department resources to do so.

The committee supports two of the three ESG CEO Council pillars: Investment Products and Services and Stewardship of Portfolio Securities. By bridging both pillars, the committee aims to facilitate enterprise strategic alignment and enhance accountability. In the course of carrying out its responsibilities, the committee may escalate risks, issues, or other matters to the ESG CEO Council. In 2023, the committee discussed emerging regulatory trends, our ESG data strategy, and enterprise sustainability-related reporting—including TCFD—among other topics.

### Investment Products and Services

Vanguard takes a disciplined, long-term approach to product development and strategy, and our product governance structure is intended to cover material ESG risks and opportunities, including those that are climate-related. As an integral part of this process, Vanguard's Portfolio Review Department develops our global product strategy, monitors the performance of each Vanguard fund, and oversees the funds and their investment advisors to ensure that they follow defined investment objectives and collectively offer diverse investment exposures consistent with our investment philosophy.

The Portfolio Review Department has regional teams that conduct product research and product management to evaluate local market conditions and assess local client preferences. The department typically convenes Vanguard's Global Investment Committee 11 times a year to engage on key issues relevant to product oversight. The committee's work includes making recommendations to the respective fund boards regarding such matters as new products, risk guidelines, and manager selection. Vanguard's chief executive officer serves as the committee chair, and members include senior leaders from Vanguard's investment, product, business, legal, compliance, and risk functions.

In addition, the Portfolio Review Department convenes the Investment Product Committee and the Manager Oversight Committee, both of which have significant overlap in membership with the Global Investment Committee. The Investment Product Committee periodically provides input and guidance on ESG and non-ESG product topics that are

in the early stages of strategic evaluation, while the Manager Oversight Committee regularly meets with current and prospective managers as part of the oversight and selection process. The work of these committees supports the product-related recommendations made to the Global Investment Committee and, ultimately, to the VGI board and the fund boards for review and approval as appropriate.

### Stewardship of Portfolio Securities

On behalf of Vanguard-advised funds, including both ESG and non-ESG index funds, Vanguard's Investment Stewardship team engages with portfolio companies about material risks, including material ESG risks. This dedicated team of experienced professionals operates globally while employing a regionally focused model. The team engages directly with company executives and boards, votes proxies, and advocates for market-wide adoption of governance best practices.

At the direction of the fund boards, our Investment Stewardship Oversight Committee oversees the proxy voting and stewardship activity with respect to the equity securities held in portfolios advised by Vanguard. The committee typically meets at least quarterly and regularly reviews stewardship practices and proxy voting policies, including those concerning material climate risks. Those reviews encompass such topics as changes to proxy voting policies, proxy season engagement and voting activities, and risk control processes. The committee recommends any appropriate proxy voting policy changes to the fund boards, which review and assess those changes. The committee includes fund officers and senior executives from

relevant functions. The Investment Stewardship team provides regular reports to the VGI board, fund boards, and boards of our international entities, as appropriate.

Since 2019, the proxy voting responsibilities for externally managed Vanguard funds have been delegated to the investment advisors for those funds, creating greater alignment of investment management and investment stewardship. A Proxy Oversight team, which includes members of Vanguard's legal team and the Portfolio Review Department, conducts ongoing oversight to ensure that external advisors are consistently exercising their obligation to vote proxies. The Proxy Oversight team also provides annual updates to the fund boards. The fund boards are required to review and approve each external advisor's proxy voting policies and procedures at least annually.

### Vanguard as a Corporate Actor

Vanguard has established goals and targets for operational sustainability to help responsibly manage and reduce our own environmental footprint. Our corporate sustainability efforts are led by the Global Workplace Experience (GWx) department, which reports to Vanguard's chief financial officer. GWx's Environmental Sustainability Steering Group sets both short- and long-term goals and priorities, incorporates sustainability activities into business planning, and monitors and tracks progress toward targets. Oversight of Vanguard's own sustainability goals and progress on the corporate level resides with the VGI board. See "Vanguard as a company" on page 37 for more information.

### IN FOCUS

#### European ESG governance framework

In addition to our global governance structure, we have regional structures in place to navigate the market and regulatory environments of each of the jurisdictions in which we operate. The Vanguard companies in Europe include our U.K. entities, Vanguard Asset Management, Limited (VAM), and Vanguard Investments UK, Limited (VIUK), as well as other affiliates, including Vanguard Group (Ireland), Limited, and Vanguard Group Europe GmbH (collectively, Vanguard Europe).

The Vanguard Europe boards oversee risk management in their respective jurisdictions, including ESG-related risks, within Vanguard Europe's overall business strategy, regulatory and governance frameworks, and risk appetite. The Vanguard Europe boards oversee risk management of various functions, including compliance, fund accounting, financial reporting, fund administration, investment management, investment stewardship, legal, product, and regional risk management. The boards typically meet at least five times per year. They consider issues affecting Vanguard Europe's evaluation of ESG risk and strategy matters and engage with Vanguard's management to help determine an effective course of action. Management arranges for periodic relevant training to the boards on ESG matters.

The following climate and other ESG-related subjects have been considered by the VAM board, the VIUK board, or both, during 2023:

- Training on ESG regulatory developments, including the U.K. ESG policy environment.
- Training on climate-related financial risks.
- Overview of the key decisions made by the European ESG Management Oversight Council, including the approval of the Sustainability Risk Policy and the establishment of the European ESG Program Steering Committee.
- Updates to the TCFD report and the approach to compliance with the FCA's ESG Sourcebook requirements applicable to the TCFD report.
- Updates on the progress of the implementation of Vanguard Europe's ESG governance framework.

#### European ESG Management Oversight Council

The European ESG Management Oversight Council (ESG MOC) provides oversight of ESG risks and strategy in relation to Vanguard Europe that may impact the broader Vanguard enterprise and its investment products and services. The ESG MOC reports to Vanguard's European Leadership Team and the managing director of Europe.

The European head of the Portfolio Review Department chairs the ESG MOC, and the council's voting members include European management representatives from investment management, risk management, finance, and legal. Its remaining members are ESG subject matter experts from across our European business. The council meets or considers matters at least monthly and reports quarterly to the European Leadership Team and the European boards as necessary. Members of the council meet periodically with Vanguard Europe boards and other Vanguard European councils and forums, as appropriate.

The ESG MOC has the following responsibilities:

- Acting as the designated forum for oversight, harmonization, and direction-setting on ESG risk and strategy matters related to Vanguard's European business.
- Overseeing the integration of ESG considerations into Vanguard Europe functions and processes within the context of Vanguard's global approach to ESG investing and risk appetite.
- Reviewing U.K. and European Union sustainability regulations and the implementation of applicable requirements by Vanguard's European business.

# Strategy

In this section, we discuss how Vanguard considers climate-related risks and opportunities across our business.

## Strategy

We manage our business with the goal of creating long-term value for our clients.

## Our client-centric strategy

Vanguard's strategy as a corporate actor and asset manager is grounded in our investor-owned structure.

In support of our strategy, we have an important role to play in understanding and responding to risks and opportunities that impact our ability to serve clients and help them meet their financial goals.

At Vanguard, climate risk is not considered a discrete risk. Instead, climate change and the resulting global response is viewed as a potential root cause or driver of the principal near-term and long-term risks facing the organization, namely financial, operational, regulatory, reputational, extended enterprise, strategic, technology, and investment management risks.



We identify and seek to mitigate short- and medium-term top risks to the enterprise while conducting longer-term horizon scanning to evaluate and prioritize action planning for future risks.

# Climate-related risks and opportunities

Consensus market expectations—as well as Vanguard's own economic analysis—indicate that changes to the climate and the resulting global response will have far-reaching economic consequences for companies and financial markets, and therefore for investors.

In general, organizations face both physical and transition risks from climate change. Physical risk involves the tangible impacts of climate change, including extreme weather events such as flooding, wildfires, and droughts. Transition risk involves the move to a low-carbon economy through policy, preferences, technology, and market changes.

Vanguard seeks to understand and monitor physical and transition risk drivers that may present material risks to our ability to serve our investors. We conduct ongoing investment, expense management, and operational oversight to modernize and maintain the resiliency of core infrastructure (such as computer systems and buildings) and to implement evolving regulatory and reporting requirements.

**Figure 1** highlights examples of climate-related risks that Vanguard could face. We actively monitor these potential risks and remain confident in our time-tested approach for effectively managing risks that could affect our clients' long-term investments.

**FIGURE 1**  
**Summary of climate-related risks**

	Risk category	Risk description	Illustrative risk impacts	Driver type
Investment product and management	Investment management risk	Market, credit, and liquidity risks that impact returns or impede our ability to manage assets on behalf of clients	Mass market movements and decreased liquidity driven either by transitioning too suddenly and rapidly or too slowly	Transition and physical
			Market repricing for climate risks as well as volatility may be seen in certain companies, sectors, and geographies	Transition and physical
			Investors overallocate capital to climate-focused companies too quickly, leading to valuation anomalies that could increase volatility and impact long-term returns	Transition
	Operational risk	The risk to operations due to human error, or inadequate or failed processes, systems, or service providers	Reputational damage related to holding securities that are not aligned to the ESG objectives of an ESG product because of data errors	Transition
			Business interruptions to Vanguard and third parties stemming from climate-related physical impacts	Physical
	Regulatory risk	The risk of noncompliance with new or existing laws and regulations	Regulatory breach and legal costs associated with inaccurate disclosures related to climate objectives	Transition
	Strategic risk	Risks related to management's ability to make appropriate business decisions to prepare for and react to the broader economic or regulatory environment	Investment product range fails to align with changing investor sentiment	Transition
			Government and political views on climate change and sustainable investing impact Vanguard's ability to attract investors and the success of products	Transition
Business operations and financial health	Financial risk	Risks related to the organization's ability to manage its financial resources efficiently and responsibly	Loss of revenue from fund drawdowns as clients shift away from investment approaches lacking clear climate risk-mitigation strategies	Transition and physical
	Regulatory risk	The risk of noncompliance with new or existing laws and regulations	Increased financial costs because of complex global regulatory requirements	Transition
	Strategic risk	Risks related to management's ability to make appropriate business decisions to prepare for and react to the broader economic or regulatory environment	Employee skill sets prove inadequate to address climate-related challenges (e.g., failing to meet requirements or misinterpreting data and client needs)	Transition
			Regulations on climate change and sustainable investing interfere with Vanguard's ability to conduct business	Transition

While such risks are possible, efforts to adapt to climate change and encourage innovation may also present Vanguard with opportunities, such as those outlined in **Figure 2**.

Transition-related corporate and investment risks

In the near term, Vanguard considers transition risks to be a greater driver of enterprise risk than physical risks, as climate-related regulations and reporting requirements are evolving at different paces—and with varying degrees of complexity—in markets around the world.

We also consider transition risks to be a more pressing driver of risk in the short-term and medium-term for companies held in our products, with physical risks generally acting as a driver of longer-term risk. As governments and sectors diverge in climate policy approaches, and global markets approach key dates outlined in the Central Banks and Supervisors Network for Greening the Financial System (NGFS) scenarios, there is greater potential for transition risks driven by the emergence of disorderly transition scenarios.

FIGURE 2  
Summary of climate-related opportunities

	Opportunity	Opportunity description	Illustrative opportunity impact	Driver type
Investment product and management	Operational	Innovations that stem from addressing climate change foster increased efficiency	Availability of improved data sets leads to enhanced oversight and client reporting	Transition
	Strategic	Investor demand for investment products and advice focused on climate change, ESG, or both	Meet client needs through a selection of ESG products that we believe have enduring investment merit and are consistent with our time-tested product design principles	Transition and physical
Business operations and financial health	Financial	Greater understanding of operational resiliency	Enhancing risk identification, mitigation, and operational resilience associated with climate-related challenges will allow for greater capital efficiencies and cost savings from right-sized risk management and risk transfer (e.g., insurance) activities	Transition and physical

## Meeting investment needs of clients

Vanguard has an opportunity to meet the evolving investment needs of our clients, including through products that consider climate-related risks and opportunities.

Our product lineup includes both index and active funds. Our index funds enable investors to construct broadly diversified portfolios and frequently serve as the core building blocks underlying our extensive array of multi-asset products. Our non-ESG equity index funds seek to track the performance of broad market indexes. Material ESG risks, including material climate-related risks, are considered when our Investment Stewardship team evaluates proxy proposals and engages with portfolio company boards and management. See “Investment stewardship” on page 25 for more information.

Some of our investment products are designed to pursue specific ESG goals and objectives for investors who prefer such an approach. Our exclusionary ESG index products, for example, avoid or reduce exposure to specific business practices and industries, including many that are carbon-intensive, while still seeking to achieve market-like returns.

Our actively managed funds include several ESG-focused funds that aim to generate excess return by allocating capital to companies with leading or improving ESG practices. In each instance, these actively managed ESG funds account for climate considerations and also have specific net zero objectives.

We also offer many actively managed products that do not have ESG-specific mandates. The managers of these products have their own approaches to integrating material ESG risks, including material climate risks, into their investment processes.

# Resilience of our strategy

Our U.S. mutual fund ownership structure enables us to continually invest in people and technology to ensure that we can serve our clients and remain operationally resilient at all times.

We are confident in our approach to managing risks that could affect our clients' long-term investments, including material risks resulting from climate change. Our engagement with portfolio companies as part of our Investment Stewardship program, our rigorous processes for selection and oversight of the managers of our actively managed funds, and our thoughtful approach to product development remain core components of our approach.

Vanguard's focus on long-term returns, rather than quarterly results, keeps our business resilient, even during challenging macroeconomic environments. We have captured positive net cash flows into our funds for 45 consecutive years, and our asset base is diversified across product type, asset class, and management style. We maintain a strong balance sheet and liquidity position, which are regularly monitored through stress testing to ensure that we can withstand the financial implications of significant, unexpected events, including those resulting from climate change.

## IN FOCUS

### Vanguard U.K. stress and scenario testing

A key component of Vanguard U.K. (VAM and VIUK) risk processes is a material risk assessment of harms.

The assessment's objectives are to:

- Identify material harms that could result from the ongoing operation and winding down of Vanguard's U.K. business.
- Determine the material risks facing Vanguard's U.K. business, clients, and financial markets over varying time horizons.
- Assess the probability and potential impact of identified risks, including stress testing where appropriate, to inform strategic and financial planning.
- Assess and identify mitigating management actions and internal controls.
- Provide assurance to stakeholders as to the effectiveness of management actions relating to the level and nature of risks faced.

The material risk assessment of harms supports Vanguard U.K.'s overall risk life cycle and provides assurance that:

- Vanguard U.K. is able to remain financially viable throughout the economic cycle, with the ability to address any material potential harm that may result from its ongoing activities.
- Vanguard U.K.'s business could be wound down in an orderly manner, minimizing harm to customers and other market participants.

Vanguard U.K. has identified a series of severe but plausible risk scenarios, including ESG risk exposures, with which to stress test our business. Stress testing involves adjusting specific parameters that affect the financial position of Vanguard U.K., including capital and liquid resources, income, and profit.

Our ESG stress test considers "greenwashing" risks, U.K. client demand for ESG products, and how resilient Vanguard U.K.'s strategies are in terms of climate-related risks and opportunities.<sup>3</sup> We take into consideration different climate-related scenarios, including a temperature rise of 2 degrees Celsius above pre-industrial levels (consistent with a transition to a low-carbon economy). We refine our stress tests every year along with our scenario analysis best practices, both of which enhance our ability to assess associated ESG risks.

<sup>3</sup> Greenwashing is the making of false or misleading claims about the environmental benefits of a product or service.

# Risk management

In this section, we discuss how Vanguard identifies, evaluates, and manages climate-related risks and opportunities on behalf of our investors.

Vanguard has a long history of thoughtfully managing risk to safeguard our clients' assets and best interests.

# Identifying and assessing climate-related risks

As a matter of course, we seek to identify, assess, and mitigate risks from both a corporate and investment product management perspective, taking impact, probability, and urgency into account. In our experience, it is critical to continually evolve and refine the way each risk is considered.

Vanguard's risk-management life cycle has four key components: identification of risk, assessment of risk, management of risk, and monitoring and reporting of the risk environment. We see risk management as an ongoing process and mindset moving continuously through each stage.

Vanguard embeds relevant ESG considerations into existing functions to ensure that ESG factors are considered alongside, not separately from, other matters important to serving our clients. Within our investment processes, we integrate material climate and broader ESG considerations where appropriate.

Our overall risk-mitigation approach is founded on three core lines of defense:

- **Vanguard's business units**, which include areas ranging from client-facing teams to shared service functions, such as technology and finance. We assess risks within the respective purview of each area and develop processes and control frameworks to mitigate potential impacts on our clients.
- **Vanguard's corporate risk functions**, which include Global Risk and Security and the Office of the General Counsel. We incorporate risk prevention across areas of our operations and businesses.
- **Vanguard Internal Audit**, an independent and objective team directly accountable to the VGI board, assesses the adequacy of internal controls to enhance the governance and oversight of enterprise risks and risk management.

**Business continuity**

As a company dedicated to helping clients build and preserve wealth, Vanguard plans carefully and methodically to ensure a quick and smooth recovery from a potential emergency or disruptive event, including climate-related events.

Vanguard’s Enterprise Resiliency and Business Continuity Management group, within Global Risk and Security, oversees enterprise resilience and partners with business continuity teams in every division at Vanguard sites globally. The group independently assesses and monitors business continuity to ensure that we can continue operations and serve our clients during natural disasters, weather-related events, and other potential disruptions.

Our integrated business continuity program oversees enterprise resilience and provides crisis management, governance, and oversight to ensure employee, supplier, technology, and workspace resilience. The process has three major components:

- Identifying and mitigating risks.
- Documenting detailed business contingency plans.
- Executing comprehensive contingency tests.

In addition to regular planning, maintenance, and testing, we use several routine business strategies to ensure flexibility and resilience in our operations. For example, Vanguard runs key business functions from multiple geographic locations, which in turn reduces the risk of regional climate-related events and other disruptions.

Our portfolio managers and investment analysts in different regions work as one team. This approach enables us to collaborate across multiple time zones to extend the number of hours in a trading day and ensure business continuity. We have trading desks in two of our U.S. locations (Pennsylvania and Arizona), as well as in the U.K. and Australia.

**Managing climate-related risks within our investments**

Relevant teams monitor material climate-related risks across our funds through our investment stewardship activities, ESG integration within the Vanguard-advised active strategies, and oversight of our external managers’ ESG integration and engagement practices.



## Investment stewardship

Vanguard-advised equity funds provide broadly diversified access to the global markets at a very low cost. Broad market diversification can include exposure to material risks, including climate risk. On behalf of the Vanguard-advised equity funds and their investors, Vanguard's Investment Stewardship team monitors and promotes disclosure of material risks, including material climate-related risks.

All aspects of Vanguard's Investment Stewardship program are focused on safeguarding and promoting long-term shareholder returns at the companies in which the Vanguard-advised funds invest.

The team engages with portfolio company directors and executives to learn about each company's corporate governance practices and to share our perspectives on corporate governance practices associated with long-term shareholder returns. In 2023, the global Investment Stewardship team engaged with 1,334 companies representing 69% of the Vanguard-advised funds' total assets under management.

Each fund's proxy voting policies and procedures are designed to promote long-term shareholder returns by supporting effective corporate governance practices. The proxy voting policies for each of the Vanguard-advised funds detail the general positions of the Vanguard-advised funds on proxy proposals that appear frequently at public companies (for example, proposals to approve executive pay plans). The Vanguard-advised funds have also developed country- or region-specific policies for markets where the funds have significant portfolio company holdings. These regional policies reflect local market nuances on regulatory requirements and governance practices. When we encounter a ballot item for which specific policies are not defined in the funds' proxy voting policies, the vote is determined on a case-by-case basis consistent with the principles articulated in the funds' proxy voting policies and each fund's investment objective.

On behalf of the Vanguard-advised equity funds, the Investment Stewardship team looks for portfolio company boards to effectively oversee material climate-related risks and disclose

those risks using widely recognized investor-oriented reporting frameworks. The team supports the framework created by TCFD for disclosing governance, strategy, risk management, and metrics and targets. Where climate change is a material risk for a company, the team looks for a company's board to disclose the specific risks and the strategies in place to oversee and mitigate those risks. Vanguard views such disclosure as central to the healthy and efficient functioning of capital markets. The team also evaluates the company's reporting on any climate-related goals they have set and disclosed.

The funds will support proposals whose provisions, in our assessment and on balance, serve the long-term financial interests of the funds and their investors. The funds will not support proposals that include elements we view as dictating company strategy or operating decisions that, in our view, should be the purview of the company's board of directors and management teams.

CASE STUDY

Shareholder proposal regarding disclosure of methane emissions at Coterra Energy Inc.

At the annual meeting of Coterra Energy Inc. (Coterra), a U.S.-based oil and gas producer, the Vanguard-advised funds voted in support of a shareholder proposal requesting that the board produce a report analyzing the reliability of its methane emission disclosures.

At the 2023 annual meeting, Coterra received a shareholder proposal requesting that the board analyze the reliability of the company’s methane emission disclosures, explain whether there is likely to be a material difference between direct measurement results and the company’s reported methane emissions, and assess the degree to which any differences would alter estimates of the company’s Scope 1 emissions.<sup>4</sup> We assessed the proposal as reasonable and relevant to a material risk for the company given its operations as an oil and gas producer, the financial materiality of methane emissions to the company, and the company’s settlement of criminal charges last year related to water contamination resulting from methane leakages by Coterra’s corporate predecessor.

The proposal further requested that the company conduct the direct measurement using a recognized framework and suggested Oil and Gas Methane Partnership (OGMP) as a possible framework. However, the proposal was not prescriptive as to which framework should be used. Coterra’s disclosures described methane emissions as a percentage of natural gas produced using an interpretation of Environmental Protection Agency (EPA) methodology that some critics consider outdated. We also observed that the company provides less disclosure of its emissions than its peers.

During our engagement with Coterra leaders, they acknowledged the importance of disclosure and described issues with the company’s testing of direct measurements of methane emissions. Coterra leaders acknowledged gaps in the current EPA methodology and expressed that they perceived value in projects such as OGMP. They explained that their direct-measurement sampling results showed inconsistencies that they perceived to be the result of limitations in the available direct measurement technologies. Coterra leaders described their desire to see consistency in the company’s testing results before disclosing an updated emissions inventory and would not commit to a timeline for disclosure.

In our assessment, the proposal granted the board sufficient flexibility to disclose the company’s methane impacts through multiple calculation methodologies. The example framework suggested by the proponent provided guidance and flexibility (on both timing and calculation methods).

Risks associated with climate change are material for energy companies, and we observed that climate-related risks had materialized at Coterra as evidenced by its recent legal settlement. A misalignment between company and peer disclosure practices hinders the market’s ability to accurately price the risks (and opportunities) associated with the company’s strategy.

As a result, the Vanguard-advised funds voted in support of the proposal, which passed with majority support. The funds did not support a separate shareholder proposal asking for a report on whether and how Coterra’s lobbying activities and political influence aligned with the goals of the Paris Agreement. We found the proposal to be overly prescriptive and not germane to the company considering that Coterra had not expressed any position on the Paris Agreement. The proposal failed to receive majority support.

<sup>4</sup> Scope 1 refers to all direct greenhouse gas (GHG) emissions. Scope 2 refers to indirect GHG emissions from consumption of purchased electricity, heat, or steam. Scope 3 refers to other indirect emissions not covered in Scope 2 that occur in a company’s value chain, including both upstream and downstream emissions.

### CASE STUDY

#### **Say on Climate proposal at Woodside Energy Group Ltd.**

Woodside Energy Group Ltd. (Woodside), an Australian-listed global energy company, put forward a Say on Climate proposal at its 2022 annual meeting.<sup>5</sup> The Vanguard-advised funds did not support the proposal. We engaged with Woodside leaders ahead of the 2023 annual meeting to discuss the company's approach to managing material climate risks, how the board oversees those risks, and the enhancements made to the company's climate disclosures following high levels of shareholder dissent on the company's 2022 Say on Climate proposal.

During the engagement, Woodside leaders shared details about the process for improving the company's reporting—including hosting an investor roadshow to better understand investor feedback—and outlined the changes made. We provided feedback on the importance of decision-useful disclosure and the difficulties we had in identifying and understanding the main changes to Woodside's report. We suggested that a summary of changes may be helpful to shareholders. Woodside leaders also provided additional examples of areas where steps were being taken to address material climate risks that were not included in the report; we explained that this information would be helpful to disclose in order to give shareholders a more complete picture of enhancements made to Woodside's most recent climate report.

Woodside's initial Say on Climate proposal at its 2022 annual meeting was as an advisory vote; the plan was to allow shareholders to vote every three years on the report unless material changes were made. Although a vote was not required, given the high level of shareholders that did not support the report, we questioned why Woodside had elected not to put a Say on Climate proposal forward at the 2023 annual meeting, which would allow shareholders an opportunity to express their views on the updated report. We explained our view that such an action would demonstrate that shareholder input was being appropriately considered.

Following the engagement, and in advance of Woodside's 2023 annual meeting, we received communication from Woodside that provided a clear summary of the changes made to its most recent report; it highlighted the improvements made by directly comparing the 2022 disclosures with those published in the 2023 climate report. Woodside also announced that the next iteration of the climate report would be put up for shareholder vote at the 2024 annual meeting.

We were encouraged to see the board and management's responsiveness to shareholder feedback.

<sup>5</sup> Say on Climate management proposals seek an advisory vote from shareholders on a company's approach to climate strategy.

CASE STUDY

Board oversight of climate risk at Thungela Resources Ltd.

We first engaged with Thungela Resources Ltd. (Thungela), a South African thermal coal company, in 2022, and noted its stated confidence in the fundamentals of coal demand and recognition of the long-term implications of climate risk on its business. We encouraged the company to continue developing effective disclosures of board-level oversight of climate risks and opportunities and risk mitigation plans. Thungela committed to publishing its first TCFD report in early 2023.

In 2023, we engaged with board directors and company leaders to discuss the board's oversight of climate-related risks. In our conversation, we explored oversight of Thungela's climate change goals—greenhouse gas targets in particular—and strategy of pursuing geographic diversification of its coal assets. Thungela leaders were able to provide helpful context for changes made to board composition that served to further strengthen the board's capabilities with respect to oversight of risk and strategy at the company.

Additionally, we discussed Thungela's response to an environmental incident in 2022. In part due to illegal mining activities, toxic water from a mine in the Mpumalanga province of South Africa spilled into nearby rivers, negatively impacting aquatic life in the region. Thungela leaders shared the company's remediation approach, which included efforts to restore the biodiversity of affected rivers at a cost to the business.

We observed that Thungela provided effective disclosures in its annual report and was able to clearly articulate the board's role in overseeing the mitigation of this incident. We will continue to monitor the board's oversight and disclosures of climate-related risks and opportunities.

2023 Investment Stewardship activity at a glance

1,334	1,659	13,490	182,641
companies engaged	total company engagements	companies where a proposal was voted on	proposals voted on

Additional resources on investment stewardship at Vanguard

- [Investment Stewardship 2023 Annual Report](#)
- [Global proxy voting policy](#)
- [Vanguard's approach to climate risk governance](#)
- [Proxy voting disclosures for Vanguard funds](#)

Piloting investor choice for an expanded set of investors

In 2023, Vanguard launched a voluntary pilot program to give investors in certain equity index funds the ability to select from a menu of policy options that direct how shares associated with their fund holdings should be voted. Vanguard has expanded this investor choice program by introducing proxy voting choices to investors in additional funds and to additional investors in early 2024. Expanding proxy voting choices is a continuation of Vanguard's effort to give investors the information and options they need to help ensure that their investment portfolios reflect their investment goals and preferences.

# Investment management

## Integration of climate risks and opportunities by our external advisors

The majority of Vanguard's active equity funds and active multi-asset funds are managed by external firms. In fact, 24 external asset management firms serve as investment managers and investment stewards for Vanguard's externally managed active funds. Vanguard recognizes that each firm brings a different perspective to the way it assesses and oversees climate risk, including in funds that do not pursue explicit ESG objectives.

We work closely with each of our active managers to understand how they integrate ESG considerations into their investment processes. This approach has enabled us to observe how much the ESG landscape has changed over time and how much the reliability of ESG data has improved.

More broadly, we are responsible for assessing how each manager's approach aligns with its investment process, which is designed to deliver strong investment outcomes for our clients. Our approach to fund manager selection centers on what we believe to be the key drivers of investment success—firm, people, philosophy, and process. This approach provides our investors

with diversity of thought and broader access to top investment talent. It also provides us with a unique perspective on the ways in which different active managers approach the investment process.

A team from Vanguard's Portfolio Review Department regularly engages with current and prospective external fund managers. As part of these engagements, the team examines how managers incorporate financially material considerations, including climate change, into their security selection processes. The team considers how managers gather information, how their research efforts are structured to account for climate considerations, the extent to which they consider both quantitative and qualitative factors in their analysis, and how they engage with portfolio companies. The team regularly reports on its findings and discussions to the Manager Oversight Committee and the fund boards.

The Portfolio Review Department holds these external investment managers to the highest standards to ensure that they remain focused on maximizing investment performance for our investors. Included in our ongoing assessment is the appropriate consideration and management of material financial risks, such as those posed by climate change.

CASE STUDY

Wellington Management

**Driver type:** Transition risk

*Wellington Management Company LLP oversees the largest amount of Vanguard assets among our external investment advisors, managing more than \$400 billion globally on behalf of Vanguard clients.*

Wellington hosted a series of engagements with companies in the rail industry during the fourth quarter of 2023 to assess the transition and decarbonization strategies in place in the industry.

In November, Wellington met with Union Pacific, the second-largest railroad operator in the U.S., to better understand the material climate transition risks to the company and discuss its transition strategy. The company is targeting a 26% reduction in Scopes 1 and 2 emissions by 2030 and has set a low-carbon fuel target of 20% by 2030.

Union Pacific generally expects policy and regulation to become more stringent over time, and the company may face increased operational costs due to increasing carbon prices, which can be mitigated by reducing company emissions. Wellington was encouraged to learn that Union Pacific has committed to spend

more than \$1 billion on modernizing locomotives to reduce Scope 1 emissions by an additional 2%. The company believes these investments will improve reliability and operational efficiency, which should provide financial benefits. Furthermore, reducing emissions may represent an opportunity for the company to become a supply chain partner of choice for potential customers who seek to reduce value chain emissions.

Wellington also met with Westinghouse Air Brake Technologies (Wabtec), a locomotive, freight car, and passenger transit-vehicle manufacturer, to discuss its decarbonization strategy. Emissions, regulation, and the cost of carbon are key components of the company’s ongoing strategy and budget-planning dialogue. Wabtec’s products and technologies enable rail customers to improve reliability and operational efficiency and reduce emissions, which enable its customers to achieve operational goals and mitigate regulatory and policy risk. Wellington believes this positions the company to capture both replacement demand and modernization growth spurred by rail operators’ decarbonization efforts.

These engagements provided Wellington greater clarity on the steps the companies are taking to reduce risk and take advantage of opportunities. Wellington will continue to engage with these companies and monitor their future transition plans.

CASE STUDY

Ninety One: Waste Management

**Driver type:** Physical and transition risk

*Ninety One is an active, global investment manager managing more than \$150 billion in assets. Ninety One manages the Vanguard Global Environmental Opportunities Fund, which aims to achieve long-term total returns by investing in the equities of companies expected to contribute to the transition to a lower-carbon global economy.*

Waste Management is the largest waste-collection and processing company in the United States. By improving resource efficiency, Waste Management is helping to deliver real world decarbonization. A key component of this is the permanent sequestration of carbon and other greenhouse gases through its extensive landfill network. The company employs methane capture technology on an increasing portion of its landfill sites, using the gas to make automotive fuel and generate electricity. In addition, Waste Management is a significant player in the recycling industry, which reduces the requirement for raw materials. Overall, Waste Management’s innovative model results in significant carbon reduction.

As part of its Ninety One Sustainable Equity team’s investment process for the Global Environment Strategy, the team identified annual engagement goals for Waste Management regarding the company’s management of material ESG risks and opportunities. For example, in 2023, the team engaged with Waste Management on carbon risk management through science-based targets.

Waste Management’s decarbonization goals are now validated by the Science Based Targets initiative (SBTi).<sup>6</sup> A continuation—and increase—of its landfill site gas collection efforts will be the primary driver of achieving its emissions reduction target. This decarbonization goal is strongly linked to the company’s strategy and directly supports the expansion of its renewable energy businesses, as there is a revenue opportunity from the collection of more landfill gas that can be converted into renewable energy and sold.

<sup>6</sup> SBTi is a corporate climate action organization that develops standards, tools and guidance which allow companies to set greenhouse gas (GHG) emissions reductions targets.

Integration of climate risks in fixed income

All of Vanguard’s fixed income index funds and the majority of its actively managed fixed income funds are managed by Vanguard Fixed Income Group (FIG).

Where appropriate, and in accordance with a fund’s mandate, FIG integrates ESG considerations into its investment process by assessing the financial materiality of ESG risk factors along with investment risks to complement standard credit assessment. FIG tailors its approach within applicable sub-asset classes to address nuances in material ESG risk factors across fixed income.

FIG’s ESG integration process applies to most fixed income mandates, excluding money market mutual funds. FIG continually refines its ESG integration process to consider financial markets’ adaptation to societal and environmental risk factors, regulatory requirements, and the availability of ESG data.

Engagements with issuers are among the many informational inputs that FIG may use to integrate risk considerations into its investment process. FIG credit research analysts regularly meet with issuers to discuss a range of topics that may pose a financial or reputational risk to an issuer, including material ESG risk.

CASE STUDY

Company: Aurizon Holdings Ltd.

Aurizon Holdings Ltd. is a leading Australian integrated rail operator and a top 100 company listed on the Australian Securities Exchange (ASX).

Aurizon provides large-scale, supply chain solutions to a diverse customer base, including the operation of one of the world’s largest coal haulage networks in the state of Queensland. This network supports 90% of Australian metallurgical coal exports. Around 70% of the volume hauled across Aurizon’s network is metallurgical; the remaining 30% is thermal coal. Our credit researchers’ investment thesis on Aurizon takes into consideration the company’s commitment to diversify and de-risk its earnings base.

Aurizon held an investor day in 2023 to articulate the company’s earnings diversification and decarbonization strategy. At this meeting, Aurizon discussed its One Rail acquisition and the “land-bridging” strategy (which is intended to improve freight rail service between the northern port of Darwin and key Australian markets),

both of which are aimed at increasing earnings diversity. Aurizon’s rail network plays an important role in Australia’s transition to a low-carbon economy, and the shift from road-to-rail transportation improves ESG credentials, with 95% less carbon emissions per metric ton transported by rail compared with roads.

A successful execution of the land-bridging strategy could reduce thermal coal contribution to company revenues from 33% in fiscal 2023 to 20% in 2030. This would support the company’s decarbonization plan to achieve net zero operational emissions (Scopes 1 and 2) by 2050.

Engagements with Aurizon have enabled our credit research team to gain a better understanding of the company’s level of risk related to climate and other ESG matters. The information gained provided our credit research analysts with a measure of comfort regarding key risk information being reported. The critical nationwide infrastructure network that Aurizon operates and the ongoing strong financial support from Aurizon’s banking panel contributed to our assessment that the company has an improving ESG profile.



# Metrics and targets

In this section, we discuss the metrics and targets we use to assess climate-related risks and opportunities.

## Metrics and targets

One of our most important responsibilities to our clients is clear, accurate, and useful disclosure about risks in Vanguard funds.

# Measuring climate-related risks and opportunities

Climate data and metrics remain a rapidly evolving area. We are exploring the benefits and limitations of various climate metrics for our investors. We also acknowledge the growing global scrutiny and regulation of climate-related disclosures as well as the increasing demand for ESG data among a subset of our clients. Vanguard continues to build out its data and reporting capabilities to meet regulatory reporting obligations and evolving client requirements.

In terms of our investment processes and stewardship activities, we focus on material climate-related risks as they relate to the overall risk exposure of our underlying portfolio companies. Vanguard views corporate disclosures—including disclosures pertaining to climate matters—through the lens of materiality to the firm's long-term value. We focus on the risks that are most relevant to specific companies while acknowledging that those risks might evolve over time. Disclosure and assessment of material risks, including material climate-related risks, are important for price discovery and returns. As disclosure of material climate-related risks improves, we believe that security prices will more accurately reflect these risks and that all investors will benefit.

For our equity index products, our Investment Stewardship team uses climate metrics disclosed at the company level to inform its engagements and proxy votes on material climate risk matters. We undertake these activities with a long-term perspective and with the objective of safeguarding and enhancing shareholder returns over time. The Investment Stewardship team in some instances supplements disclosed company metrics with climate metrics provided by third parties.

For our actively managed funds, corporate disclosures about climate risks and opportunities can inform the investment decisions of portfolio managers. The managers incorporate such disclosures into their investment processes and engagement strategies. Each manager's approach to the use of climate metrics is part of our Portfolio Review Department's ongoing oversight of our investment advisors.

IN FOCUS

In response to the evolving regulatory environment in Europe, we continue to consider how to integrate sustainability risk data into our enterprise and investment risk-management frameworks. In our 2021 TCFD report, we described our first climate change scenario analysis exercise, which was designed to help us obtain a deeper understanding of climate impact in different sectors of the capital markets. Since then, we’ve employed scenario analysis in our climate-related research and in the ESG stress testing of our U.K. business, which is required by regulation (and highlighted on page 21 of this report). These use cases are sharpening our understanding of the various tools and methodologies and will inform our future approach to scenario analysis. Additionally, climate metrics are disclosed in our 2023 U.K. TCFD entity-level and product disclosures report.

**Figure 3** illustrates climate-related metrics that are used in our U.K. TCFD disclosures or are being considered for integration into sustainability risk disclosures in Europe.

**FIGURE 3**  
**Summary of climate-related metrics reported in European disclosures**

Metric	Helps to answer the question	Definition
Total carbon emissions	How many metric tons of carbon dioxide equivalent (tCO <sub>2</sub> e) emissions is the portfolio responsible for?	Greenhouse gas (GHG) emissions (Scopes 1, 2, and 3) multiplied by the current value of investment divided by the issuer's enterprise value including cash (EVIC). The calculation is based on the absolute GHG emissions associated with a portfolio, expressed in tCO <sub>2</sub> e.
Total carbon footprint	How much tCO <sub>2</sub> e in emissions is the portfolio responsible for per \$1 million invested?	Total carbon emissions for a portfolio normalized by the market value of the portfolio, expressed in tCO <sub>2</sub> e per \$1 million invested.
Weighted average carbon intensity (WACI)	What is the portfolio's exposure to carbon-intensive companies?	A portfolio's exposure to carbon-intensive companies, expressed in tCO <sub>2</sub> e per \$1 million in revenue; reflects the carbon intensity of a portfolio across asset classes.
Climate Value-at-Risk (Climate VaR)	How is the portfolio impacted in different climate scenarios?	A forward-looking climate risk metric that assesses how a company's valuation could be impacted by climate policy risks and physical climate risks and could benefit from a low-carbon technology transition.
Implied Temperature Rise (ITR)	How well do public companies align with global temperature goals?	The ITR estimates the global implied temperature rise (in the year 2100 or later) if the entire economy had the same carbon budget overshoot or undershoot as the portfolio in question. The portfolio-level ITR compares the sum of "owned" projected GHG emissions, including Scope 3, against the sum of "owned" carbon budgets for the underlying fund holdings.

**Notes:** For U.K. product-level disclosures, as mandated by the Financial Conduct Authority effective in 2022, we adopted the Climate VaR and ITR metrics given their wide adoption within the financial sector. At the same time, we acknowledge the limitations of both metrics, including the static nature of the assessment and the heavy reliance on multiple assumptions.

**Metrics and targets**

**ESG products and net zero objectives**

Vanguard has been thoughtful and deliberate in building out our ESG product lineup by ensuring that each new fund can address enduring needs for investors. Our product development approach relies on a rigorous set of design principles. These principles require assessment of each product proposal based on investment merit, client needs, any competitive advantage, and any legal, regulatory, or operational constraints. Only after a multi-tier approval process, as outlined in “Management’s role regarding climate-related risks and opportunities” on pages 12 and 13, do we proceed with the introduction of a new fund for investors.

The ESG funds we have launched in recent years include a number of actively managed equity products that are aligned with a temperature rise of less than 2 degrees Celsius above preindustrial levels, meaning that, as part of the fund design, they are constructed to meet net zero objectives. The external managers of these active funds each determine their own interim targets and methodology for alignment, consistent with the fund’s strategy. Their approach is disclosed in the fund’s prospectus, and the targets are monitored by both the manager and Vanguard.

**IN FOCUS**

**Information on Vanguard ESG index funds**

Vanguard reports information on certain Vanguard ESG index funds’ asset-weighted average of holdings with Scopes 1 and 2 emissions data from MSCI ESG Research LLC (MSCI). Vanguard also reports information on certain ESG index funds’ total carbon footprint and weighted average carbon intensity from MSCI.

MSCI collects publicly available emissions and intensity data from company-reported sources, government agencies, nongovernmental organizations, and media sources. To Vanguard’s knowledge, MSCI does not receive third-party assurances regarding the accuracy of the underlying information. Vanguard relies on the accuracy of the data provided by MSCI. Vanguard does not independently review the accuracy of MSCI’s data and does not retain independent third-party verification services to review that data.

# Vanguard as a company

In this section, we discuss our goals and progress regarding corporate sustainability in our business operations.

With more than 20,000 crew members around the world, Vanguard is committed to reducing our global carbon footprint and managing climate-related risks in our business operations.

## Measuring progress on operational climate risks

Vanguard's corporate climate strategy seeks to reduce our firm's own climate impact, pursue sustainable business operations, and engage our crew.

In early 2020, we established a pair of goals to curb emissions and reduce the global carbon footprint of our operations.

In 2023, we continued to use 100% renewable electricity globally in owned and leased properties where Vanguard has operational control, an outcome we first achieved in 2021.

Where possible, our buildings are powered by on-site renewable electricity, direct renewable electricity from the utility supplier, or purchasing Green-e certified renewable energy certificates (RECs) by a third-party provider.

We offset our remaining footprint with high-impact carbon offset projects that increase economic development.

Climate-related goals for our global operations

Goal	Date established	Target completion	Status
Achieve 100% renewable energy in our global operations	January 2020	2021	Achieved 100% renewable energy in 2021, 2022, and 2023.
Reach carbon neutrality throughout our global operations	January 2020	2025	84% carbon neutral by year-end 2023.

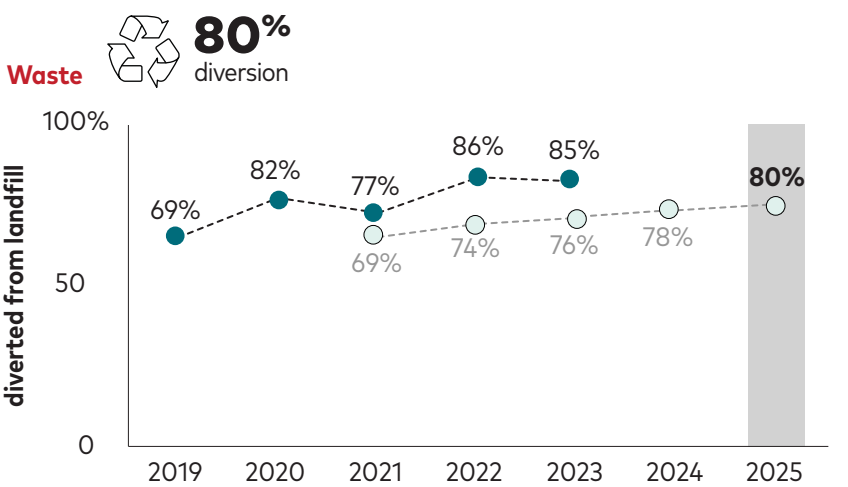
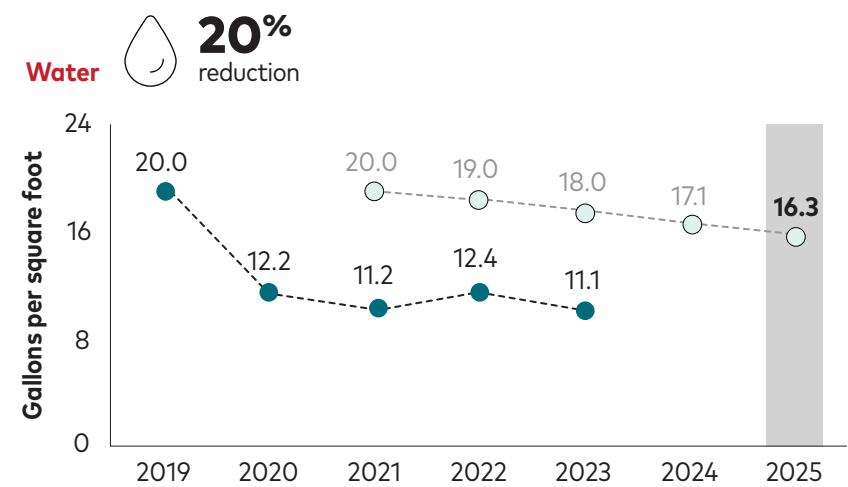
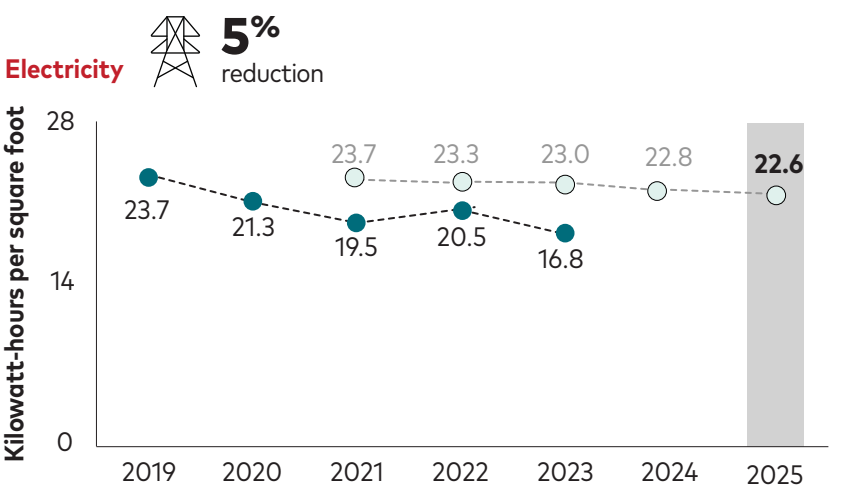
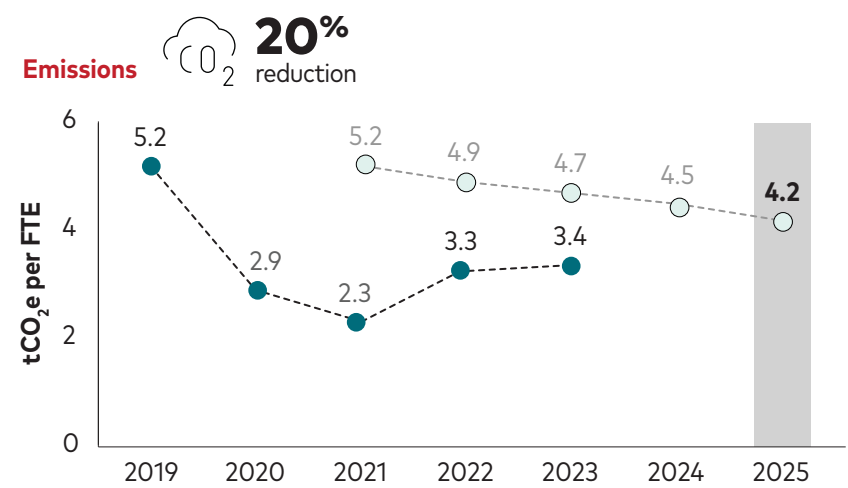
**Notes:** Vanguard's greenhouse gas (GHG) emissions reporting follows the Greenhouse Gas Protocol corporate standard. The company has a goal of reaching carbon neutrality throughout its global operations by 2025. We aim to achieve this goal by reducing Scopes 1, 2, and select Scope 3 GHG emissions (not including Vanguard Fund investments) at least 20% as compared to 2019 by assessing annual GHG emissions as well as offsetting remaining emissions in those categories through the use of REC and carbon offset purchases. Using this criteria, we determined that Vanguard reached 84% carbon neutrality in 2023. Vanguard's Scopes 1, 2, and 3 GHG emissions for 2021, 2022, and 2023 have been assured by a third-party provider. This limited assurance is based on the International Standard on Assurance Engagements ISAE 3000 (revised).

Update on 2025 reduction targets

We have adopted four reduction targets for 2025, based on 2019 baseline levels:

- Reduce carbon emissions by 20%, measured in tCO<sub>2</sub>e per full-time equivalent (FTE).
- Reduce electricity usage by 5%, measured in kilowatt-hours per square foot of space under operational control.
- Reduce water usage by 20%, measured in gallons per square foot of space under operational control.
- Divert 80% of waste from landfills.

The adjacent charts show actual results through 2023 and targets through 2025.



○ Target ● Actual result

Sustainable business operations

Green building criteria and certifications are integral to our corporate building design standards. Twenty-two buildings (or 37%) of Vanguard’s total square footage across our global locations were either LEED, BREEAM, or WELL certified.<sup>7</sup> Of the 22 buildings, four were new certifications for Vanguard in 2023. For example, our Manchester, U.K., leased office space is BREEAM ‘Excellent’ certified, with all electricity supplied from renewable sources, electric car charging ports, LG7-compliant LED lighting with automatic sensors, and photovoltaic panels that generate on-site electricity.

As part of a multi-year plan to update our lighting, we upgraded the exterior lighting for our Scottsdale, Arizona, campus to LED in 2023. This resulted in an estimated savings of more than 313 megawatt-hours (MWh) of electricity annually.

Additionally, we are a member of the U.S. Environmental Protection Agency’s Green Power Partnership, which seeks to increase voluntary use of electricity produced from renewable energy resources.

Engaging our crew

We offer programs for our crew to encourage their use of low-carbon transportation, including 122 free electric vehicle charging ports adjacent to our U.S. buildings, shuttles between campuses and to and from public transit, and pre-tax

deductions for public transit costs. Additionally, we have begun to add electric vehicles to our U.S. maintenance fleet.

In 2022, we introduced a program offering U.S. crew an incentive toward the lease or purchase of a hybrid or electric vehicle. As of December 31, 2023, more than 1,180 crew had taken advantage of this incentive.

As a result of the adoption of electric vehicles, Vanguard reduced approximately 463 tCO<sub>2</sub>e from commuting emissions and contributed to saving approximately 81,400 gallons of gasoline, as estimated using data provided by ChargePoint, a third-party electric vehicle charging provider.

Our U.S. dining services focuses on sustainable food purchasing practices and diverting waste from landfills. We implement waste and recycling programs, as well as cooking demonstrations for crew by Vanguard’s community garden team. Established in 2012, the Malvern, Pennsylvania, campus community garden is maintained and harvested by crew volunteers. The community garden donated over 1,500 pounds of produce to local food banks, pantries, and centers in 2023.





Globally, crew participate in various educational events such as our speaker series, Earth Day activities, and crew-led Green Teams throughout the year.

IN FOCUS

A LEED project

The Victory building on our Malvern, Pennsylvania, campus is our second Vanguard-owned building to achieve LEED Interior Design and Construction Silver certification.

Its sustainable features include:

-  Water-efficient faucets, toilets, and showers, which reduced water usage by approximately 46% compared to previous systems.
-  Energy-efficient lighting, which is estimated to reduce electrical usage by 57%, saving approximately 212 MWh annually compared to previous fixtures.
-  Diverted 78% of the demolition and construction waste from the landfill by sending 246 tons of waste to a recycling facility to be repurposed.
-  Over 40 materials with reports or certifications that verify their impact on installer and occupant health were used in Victory.

The Victory project also used only low-emission paints, coatings, flooring, insulation, and ceiling products to ensure greater safety for construction workers and building occupants.

<sup>7</sup> LEED (Leadership in Energy and Environmental Design) is administered by the U.S. Green Building Council. BREEAM (Building Research Establishment Environmental Assessment Methodology) is administered by BRE Global, a subsidiary of the U.K.-based BRE Group. WELL is administered by the International Well Building Institute (IWBI).



Renewable energy and carbon offsets

In 2023, Vanguard purchased over 94,000 MWh of renewable energy, which resulted in a reduction of more than 30,000 tCO<sub>2</sub>e.

As a company, we supported three cost-efficient and diversified carbon-offset projects in 2023 that offset 41,472 tCO<sub>2</sub>e. These projects represent both U.S. and global efforts with multiple benefits.

UNITED STATES

Clinton Landfill Gas Collection and Combustion Project

Registry: Verra Verified Carbon Standard

Project type: Landfill gas

The project supports a landfill gas collection and utilization project at the Clinton Landfill in DeWitt County, Illinois. The project includes methane capture and destruction with two generators to convert the methane to biofuel. As a direct result, the surrounding community benefits from improved air quality and reduced odor.

UNITED STATES

Greater Lebanon Refuse Authority Landfill Gas Collection

Registry: Verra Verified Carbon Standard

Project type: Landfill gas

The project supports a landfill gas collection and utilization project at the Greater Lebanon Refuse Authority Landfill in Lebanon, Pennsylvania. The project includes methane capture and destruction with two generators. As a direct result, the surrounding community benefits from improved air quality and reduced odor.

KENYA

BioLite Improved Cookstoves Programme

Registry: Gold Standard

Project type: Improved cookstoves

The project distributes fuel efficient cookstoves to replace wood and charcoal stoves, which will cut toxic pollution emissions by up to 90%, reduce fuel use by 50%, and generate electricity for mobile phone charging and home lighting. Other benefits include protecting forests, reducing indoor air pollutants, and improving home safety.

Vanguard’s carbon offset projects, 2021-2023

These carbon offset projects were part of Vanguard’s total carbon emissions reductions for 2021, 2022, and 2023.

We purchased carbon offsets exclusively from providers that require independent third-party verification of projects and corresponding emission reductions or removals achieved.

Inventory year	Name of project	Project ID number	Seller	Verification program*	Protocol	Type	Country	State
2021	Greenville County Landfill Gas Utilization Project	CAR495	3Degrees Group, Inc.	Climate Action Reserve	CAR Landfill Project Protocol, Version 3.0	Avoided Emissions - Landfill Gas	United States	South Carolina
2021	GS1247 VPA 164 EcoZoom Improved Stove Programme, Uganda	GS7153	3Degrees Group, Inc.	Gold Standard VER	Gold Standard Methodology Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 1	Avoided Emissions - Clean Cookstoves	Uganda	N/A
2021	Guanare Forest Plantations on Degraded Grasslands under Extensive Grazing	VCS959	3Degrees Group, Inc.	Verified Carbon Standard	AR-ACM0001 Version 5.2.0	Removals - Afforestation	Uruguay	N/A
2022	Clinton Landfill Gas Collection and Combustion Project	VCS318	3Degrees Group, Inc.	Verified Carbon Standard	ACM0001, "Flaring or use of landfill gas", Version 19	Avoided Emissions - Landfill Gas	United States	Illinois
2022	Davidson County Landfill Gas Destruction Project	VCS2414	3Degrees Group, Inc.	Verified Carbon Standard	CAR U.S. Landfill Project Protocol, Version 5.0	Avoided Emissions - Landfill Gas	United States	North Carolina
2022	Paradigm, Kenya Clean Cookstove Project	VCS1918	3Degrees Group, Inc.	Verified Carbon Standard	AMS-II.G., "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass", Version 10	Avoided Emissions - Energy Efficiency, Clean Cookstoves	Kenya	N/A
2023	Clinton Landfill Gas Collection and Combustion Project	VCS318	3Degrees Group, Inc.	Verified Carbon Standard	ACM0001, "Flaring or use of landfill gas", Version 19	Avoided Emissions - Landfill Gas	United States	Illinois
2023	BioLite Improved Cookstoves Programme, Kenya	GS11193	3Degrees Group, Inc.	Gold Standard VER	AMS-II.G., "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass", Version 3.0	Energy Efficiency, Avoided Emissions	Kenya	N/A
2023	Greater Lebanon Refuse Authority Landfill Gas Collection	VCS5	3Degrees Group, Inc.	Verified Carbon Standard	ACM0001, "Flaring or use of landfill gas", Version 18.1	Avoided Emissions - Landfill Gas	United States	Pennsylvania
2023	BioLite Improved Cookstoves Programme, Kenya	GS11194	3Degrees Group, Inc.	Gold Standard VER	AMS-II.G., "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass", Version 3.0	Energy Efficiency, Avoided Emissions	Kenya	N/A

\* Vanguard does not have separate and additional third-party assurance for its carbon offset project verification programs for its 2025 carbon neutrality goal or for its statement as to interim progress of 84% carbon neutrality by year-end 2023.

# Disclosure of Scopes 1, 2, and 3 greenhouse gas emissions

	Greenhouse gas emissions (tCO <sub>2</sub> e)	2021	2022	2023
Scope 1	Emissions	3,683	4,375	2,699
Scope 2	Electricity emissions–location-based*	37,271	34,361	30,047
	Total electricity emissions–market-based**	0	0	0
Scope 3	Emissions	16,251	44,699	52,683
Total Carbon Emissions	Scopes 1, 2, and 3*	57,205	83,435	85,429
Renewable Energy Certificates		–37,271	–34,361	–30,047
Carbon Offsets		–6,000	–24,500	–41,472
Total reported emissions**		13,934	24,573	13,910

\* Emissions from electricity before we purchased renewable energy certificates.  
\*\* Emissions from electricity after we purchased renewable energy certificates.  
\* Total emissions before any purchased renewable energy certificates and carbon offsets.  
\*\* Total reported emissions = (Scope 1 + Scope 2 location-based + Scope 3) – renewable energy certificates – carbon offsets.

## Assurance

Vanguard’s Scopes 1, 2, and 3 GHG emissions for 2021, 2022, and 2023 have been assured by a third-party provider. This limited assurance is based on the International Standard on Assurance Engagements ISAE 3000 (revised).

By 2025, we intend to avoid, reduce, or offset all Scopes 1 and 2 emissions, as well as emissions from a number of Scope 3 categories, which include:

- 3.3 Fuel and energy-related activities
- 3.4 Upstream transportation and distribution
- 3.5 Waste generated in operations
- 3.6 Business travel
- 3.7 Employee commuting
- 3.8 Upstream leased assets

Scopes 1, 2, and 3 are as defined by the Greenhouse Gas Protocol standard. Scope 1 refers to all direct greenhouse gas (GHG) emissions. Scope 2 refers to indirect GHG emissions from consumption of purchased electricity, heat, or steam. Scope 3 refers to other indirect emissions not covered in Scope 2 that occur in a company’s value chain, including both upstream and downstream emissions.

Scope 3 data do not include Scope 3 categories 3.1: Purchased goods and services, and 3.2: Capital goods or Vanguard fund investments.

# 2023 TCFD disclosure status

2023 TCFD disclosure status

The TCFD recommends disclosure in four primary areas: governance, strategy, risk management, and metrics and targets. This table is a summary of our plans and progress in each of the relevant areas.

	Pillar/recommendation	Summary
<b>Governance:</b> Disclose the organization’s governance around climate-related risks and opportunities.	(a) Describe the board’s oversight of climate-related risks and opportunities.	The Vanguard Group, Inc., board of directors is responsible for broad company policies, including consideration of material climate-related risks and opportunities. The boards of trustees of our U.S. domiciled funds oversee fund-related matters, including environmental, social, and governance (ESG) considerations and material climate-related risks. Outside the U.S., the boards of our international businesses and fund entities provide similar oversight and have decision-making authority in their respective regions. See “Board oversight of climate-related risks and opportunities” on page 9.  Our global ESG governance structure includes an integrated network of committees and functions with a specific connection to climate-related risks and opportunities. See “Vanguard’s ESG governance structure” on page 11.
	(b) Describe management’s role in assessing and managing the climate-related risks and opportunities.	Our ESG CEO Council, chaired by the chief executive officer, has global oversight of climate-related risks and opportunities. The council is structured around three pillars—Investment Products and Services, Stewardship of Portfolio Securities, and Vanguard as a Corporate Actor. The ESG Risk and Strategy Oversight Committee, a subcommittee of the council, facilitates its oversight of the Investment Products and Services and Stewardship of Portfolio Securities pillars. See “Management’s role regarding climate-related risks and opportunities” on page 12.  In Europe, Vanguard’s European ESG Management Oversight Council oversees ESG risks and strategy for the company’s European businesses. See “European ESG governance framework” on page 14.
<b>Strategy:</b> Disclose the actual and potential impacts of climate-related risks and opportunities on the organization’s businesses, strategy, and financial planning where such information is material.	(a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	In the near term, Vanguard expects transition risks to outweigh physical risks as a driver of risk both for our organization and the companies held in our product portfolios. With climate-related regulations and reporting requirements evolving at varying paces around the world, there is greater potential for impacts from transition risks driven by the emergence of disorderly transition scenarios. We anticipate that physical risks will act as a driver of longer-term risks. See “Climate-related risks and opportunities” on page 17.
	(b) Describe the impact of climate-related risks and opportunities on the organization’s businesses, strategy, and financial planning.	The potential impacts of climate-related risks include higher operational costs related to complying with complex global regulatory requirements. Potential opportunities include meeting client needs through a selection of ESG products that we believe have enduring investment merit and are consistent with our time-tested product design principles. See “Summary of climate-related risks” on page 18 and “Summary of climate-related opportunities” on page 19.
	* For asset managers: Describe how climate-related risks and opportunities are factored into relevant products or investment strategies.	Climate-related impacts are considered in the management of our funds through engagement with portfolio companies and integration of ESG risks as appropriate and in some instances specifically as part of the product design. See “Meeting investment needs of clients” on page 20.
	* For asset managers: Describe how each product or investment strategy might be affected by the transition to a low-carbon economy.	We consider transition risks to be a greater driver of enterprise risk than physical risks in the near term, as climate-related regulations and reporting requirements are evolving at different paces—and with varying degrees of complexity—in markets around the world. We also consider transition risks to be a more pressing driver of risk in the short-term and medium-term for companies held in our product portfolios, with physical risks acting as a driver of longer-term risk. See “Transition-related corporate and investment risks” on page 19.
	(c) Describe the resilience of the organization’s strategy, taking into consideration different climate-related scenarios, including a 2 degrees Celsius or lower scenario.	We manage our funds and business in the interests of our clients and with a long-term perspective. See “Resilience of our strategy” on page 21.  In the U.K., we have conducted ESG stress testing to assess our ability to remain financially viable throughout the economic cycle. See “Vanguard U.K. stress and scenario testing” on page 21.

(Continued on next page)

2023 TCFD disclosure status

	Pillar/recommendation	Summary
<b>Risk management:</b> Disclose how the organization identifies, assesses, and manages climate-related risks.	(a) Describe the organization's processes for identifying and assessing climate-related risks.	As a matter of course, we seek to identify, assess, and mitigate risks from both a corporate and investment product management perspective, taking impact, probability, and urgency into account. Vanguard's risk-management life cycle has four key components: identification of risk, assessment of risk, management of risk, and monitoring and reporting of the risk environment. We see risk management as an ongoing process and mindset moving continuously through each stage. See "Identifying and assessing climate-related risks" on page 23.
	* For asset managers: Describe, where appropriate, engagement activity with investee companies to encourage better disclosure and practices related to climate-related risks in order to improve data availability and asset managers' ability to assess climate-related risks.	On behalf of the Vanguard-advised equity funds, the Investment Stewardship program looks for portfolio company boards to effectively oversee material climate-related risks and disclose those risks using widely recognized investor-oriented reporting frameworks. For Vanguard's externally managed funds, investment stewardship activities are carried out by the funds' respective managers. We support the disclosure framework created by the TCFD. See "Investment stewardship" on page 25.
	* For asset managers: Describe how material climate-related risks are identified and assessed for each product or investment strategy. This might include a description of the resources and tools used in the process.	Vanguard's Investment Stewardship team engages with portfolio companies and oversees proxy voting and stewardship activity on behalf of Vanguard-advised funds, including Vanguard equity index funds and ETFs. See "Investment stewardship" on page 25.  Our external advisors serve as investment managers and investment stewards for the majority of our actively managed equity funds, each bringing a different perspective to assessing and overseeing climate risk, including in funds that do not pursue explicit ESG objectives. See "Integration of climate risks and opportunities by our external advisors" on page 29.  Vanguard Fixed Income Group (FIG), which manages most of our fixed income funds, integrates ESG considerations into its investment process by assessing the financial materiality of ESG risk factors alongside, and in the context of, other investment risks to complement standard credit assessment. See "Integration of climate risks in fixed income" on page 32.
	(b) Describe the organization's processes for managing climate-related risks.	Across the enterprise, Vanguard incorporates relevant ESG considerations into existing functions to ensure that ESG factors are considered alongside, not separately from, other matters important to serving our clients. Across our funds, relevant teams monitor material climate-related risks through our investment stewardship activities, ESG integration within the Vanguard-advised active strategies, and oversight of our external managers' ESG integration and engagement practices. See "Managing climate-related risks within our investments" on page 24.
	* For asset managers: Describe how the organization manages climate-related risks for each product or investment strategy.	The majority of Vanguard's active equity funds and active multi-asset funds are managed by 24 external asset management firms. We hold these managers to the highest standards to ensure that they remain singularly focused on maximizing investment performance for our investors. The appropriate consideration and management of material financial risks, such as those posed by climate change, are part of our ongoing assessment of these firms. See "Identifying and assessing climate-related risks" on page 23.
	(c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	Vanguard's overall risk-mitigation approach is founded on three core lines of defense: our business units, our corporate risk functions, and our independent Internal Audit team. See "Identifying and assessing climate-related risks" on page 23.

(Continued on next page)

2023 TCFD disclosure status

	Pillar/recommendation	Summary
<b>Metrics and targets:</b> Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.	(a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk-management process.	For our equity index products, our Investment Stewardship team uses climate metrics disclosed at the company level to assess potential material risks to long-term investments and to inform its engagements and proxy votes. The team undertakes these activities with the objective of safeguarding and enhancing long-term investor returns. In some instances, the team supplements disclosed company metrics with climate metrics provided by third parties. For the Vanguard-advised active funds, corporate disclosures about climate risks and opportunities inform the investment decisions of portfolio managers. The managers incorporate such disclosures into their investment processes and engagement strategies, including their use of scenario analysis. See “Measuring climate-related risks and opportunities” on page 34.
	* For asset managers: Describe metrics used to assess climate-related risks and opportunities in each product or investment strategy. Where relevant, also describe how these metrics have changed over time. Where appropriate, provide metrics considered in investment decisions and monitoring.	In Europe, we’ve employed scenario analysis in our climate-related research and in U.K. ESG stress testing as required by regulation. These use cases are sharpening our understanding of the various tools and methodologies and will inform our future approach to scenario analysis. Additionally, climate metrics are disclosed in our 2023 U.K. TCFD entity-level and product reports. See “Summary of climate-related metrics reported in European disclosures” on page 35.
	* For asset managers: Where appropriate, provide metrics considered in investment decisions and monitoring.	Climate data and metrics remain a rapidly evolving area. We are exploring the benefits and limitations of various climate metrics for our investors. We also acknowledge the growing global scrutiny and regulation of climate-related disclosures as well as the increasing demand for ESG data among a subset of our clients. Vanguard continues to build out its data and reporting capabilities to meet regulatory reporting obligations and evolving client requirements. See “Measuring climate-related risks and opportunities” on page 34.
	* For asset managers: Describe the extent to which the organization's assets under management and products and investment strategies, where relevant, are aligned with a well-below 2 degrees Celsius scenario. Also indicate which asset classes are included.	Vanguard has been thoughtful and deliberate in building out our ESG product lineup by ensuring that each new fund can address enduring needs for investors. This includes actively managed equity ESG products that are aligned with a temperature rise of less than 2 degrees Celsius above preindustrial levels, meaning that as part of the fund design, they are intended to meet net zero objectives. The external managers of these active funds each determine their own targets and methodology for alignment, consistent with the fund’s strategy. Their approach is disclosed in the fund’s prospectus, and the targets are monitored by both the manager and Vanguard. See “ESG products and net zero objectives” on page 36.
	(b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	As a company, we disclose Scopes 1 and 2 GHG emissions and several Scope 3 emissions. Our operational carbon footprint in 2023 was 85,429 metric tons of carbon dioxide equivalent (tCO <sub>2</sub> e), which was reduced to 13,910 tCO <sub>2</sub> e through the purchase of carbon offsets. See “Disclosure of Scopes 1, 2, and 3 greenhouse gas emissions” on page 43.
	* For asset managers: Disclose GHG emissions for assets under management and the weighted average carbon intensity (WACI) for each product or investment strategy, where data and methodologies allow. Also consider providing other carbon footprinting metrics the organization believes are useful for decision-making.	Vanguard continues to build out its data and reporting capabilities to meet regulatory reporting obligations and evolving client requirements. In the U.K., we are disclosing GHG emissions and WACI for funds meeting specified data coverage thresholds, as mandated by the Financial Conduct Authority. See “Measuring climate-related risks and opportunities” on page 34.
	(c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.	Vanguard seeks to reach carbon neutrality in our global operations by 2025. We also have four reduction targets for 2025, based on 2019 baseline levels. We have made progress on each of those targets: <ul style="list-style-type: none"><li>• Reduce carbon emissions by 20%, measured in tCO<sub>2</sub>e per full-time equivalent.</li><li>• Reduce electricity usage by 5%, measured in kilowatt-hours per square foot of space under operational control.</li><li>• Reduce water usage by 20%, measured in gallons per square foot of space under operational control.</li><li>• Divert 80% of waste from landfills.</li></ul> See “Update on 2025 reduction targets” on page 39.  We also have a number of actively managed ESG funds constructed to meet net zero targets. See “ESG products and net zero objectives” on page 36.

\* Supplemental guidance for asset managers, from Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures, published October 2021.

# Vanguard UK supplementary entity-level and product disclosures



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## Introduction

This Appendix contains Vanguard UK's supplementary entity-level and product disclosures in accordance with the Environmental, Social and Governance sourcebook published by the Financial Conduct Authority (FCA).

It is intended as a supplement to *Vanguard's Report on Climate-related Impacts 2023*, The Vanguard Group, Inc., report in alignment with the Task Force on Climate-related Financial Disclosures (TCFD).

Unless otherwise stated, all climate-related disclosures relevant to Vanguard UK in-scope entities are contained in this Appendix or within *Vanguard's Report on Climate-related Impacts 2023*. The carbon-related data disclosures contained in this Appendix have been prepared using third-party data provided by MSCI ESG Research LLC (MSCI).

Neither Vanguard UK nor the products disclosed in this supplement have set specific climate-related targets over and above those disclosed within *Vanguard's Report on Climate-related Impacts 2023*. For investors who specifically want to limit exposure to carbon-intensive industries, we offer ESG index

funds that avoid or reduce exposure to such industries while seeking to achieve a broad market-like return.

Vanguard offers third-party actively managed ESG funds in the UK that seek to generate excess return by allocating capital toward companies that the fund managers deem as demonstrating leading ESG practices consistent with each fund's mandate.

We continue to enhance our capabilities for integrating financially material sustainability risk considerations and data into our investment and stewardship processes. For example, Vanguard incorporates a range of financially material security-level environmental, social and governance (ESG) metrics and data into these processes. However, the specific, aggregate fund-level and entity-level metrics cited in this Appendix are not utilised in internal investment decision processes. For

information on metrics and data used by our internal and external investment managers, refer to "Measuring climate-related risks and opportunities" on page 34 of *Vanguard's Report on Climate-related Impacts 2023*.

**Note to Vanguard investors:** Climate data reporting continues to remain a fluid and evolving area. Considering the nascency of the data set and corresponding data limitations, including challenges in interpreting the data, we caution investors who seek to use this information as the sole basis for investment decision making. Investing requires the consideration of many factors, including, but not limited to, investment goals, risk tolerance and time horizon. The availability of climate data does not change the importance of these foundational considerations for long-term investors.

Methodology

Our reporting is aligned to the TCFD’s 2021 implementation guidance and the methodology of the Partnership for Carbon Accounting Financials (PCAF).

Coverage

We define “coverage” as the percentage of eligible securities within our funds for which we have obtained carbon data. The availability of carbon data remains a challenge. We have continued to apply the reporting threshold we established last year to prevent incomplete data sets from being presented that may not accurately reflect the carbon credentials of a fund.

Funds that have total carbon footprint data for less than 60% of eligible securities have not been included in product reports for UK-domiciled funds. However, these have been included in the aggregated carbon metrics in the UK entity-level report. As more data becomes available, we may reassess our threshold. For more information, please refer to “Data and metrics limitations” starting on page 55.

One element that impacts coverage is the exclusion of certain asset classes from carbon reporting. This is either because of a lack of standards set out by PCAF or because, as of the time this report was being prepared, MSCI had limited data availability for some asset classes. As a result of these asset-type exclusions, 3.15% of assets for Vanguard Investments UK, Limited (VIUK) and 2.00% of assets for Vanguard Asset Management, Limited (VAM) are excluded from entity-level metrics.

Specifically, the following asset types are in scope for the report:

- Corporate equity
- Corporate bonds
- Sovereigns

The following asset types have been excluded from the report:

- Derivatives
- Equity-linked notes
- Warrants
- Municipal bonds
- Securitised products (asset-backed securities, mortgage-backed securities, collateralised loan obligations, commercial mortgage-backed securities)
- Cash

Carbon metric definitions

Core metrics

- **Scopes 1 and 2 greenhouse gas (GHG) emissions:** Scope 1 emissions are emissions that occur from sources owned or controlled by the reporting company, such as emissions associated with fuel combustion in boilers, furnaces and vehicles. Scope 2 emissions are indirect emissions from the generation of purchased or acquired electricity, steam, heating or cooling consumed by the reporting company. Scope 2 emissions physically occur at the facility where the electricity, steam, heating or cooling is generated.

- **Scope 3 GHG emissions:** Scope 3 emissions include all other indirect emissions not covered in Scope 2 that occur in the value chain of the reporting company, including both upstream and downstream emissions. Scope 3 emissions include the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g. transmission and distribution losses), outsourced activities and waste disposal.
- **Total carbon emissions:** Emissions (Scopes 1, 2 and 3) multiplied by the current value of investment divided by the issuer’s enterprise value including cash (EVIC). The calculation is based on the emissions associated with a portfolio, expressed in metric tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e).
- **Total carbon footprint:** Total emissions for a portfolio normalised by the market value of the portfolio, expressed in tCO<sub>2</sub>e per \$1 million invested. We do not currently report on a combined Scopes 1, 2 and 3 basis and instead calculate Scopes 1 and 2, and Scope 3 separately for total carbon footprint.
- **Weighted average carbon intensity (WACI):** A portfolio’s exposure to carbon-intensive companies, expressed in tCO<sub>2</sub>e per \$1 million in revenue; reflects the carbon intensity of a portfolio across asset classes. We do not currently report on a combined Scopes 1, 2 and 3 basis and instead calculate Scopes 1 and 2, and Scope 3 separately for WACI.

Approach to UK supplementary disclosures

For corporate constituents, WACI measures a portfolio's exposures to carbon-intensive companies, defined as the portfolio-weighted average of companies' carbon intensity (emissions divided by sales).

For sovereign constituents, WACI measures a portfolio's exposures to carbon-intensive economies, defined as the portfolio-weighted average of sovereigns' GHG intensity (emissions divided by gross domestic product [GDP]).

Additional metrics

We use MSCI's proprietary methodology to report on Climate Value-at-Risk and Implied Temperature Rise.<sup>8</sup>

- **MSCI Climate Value-at-Risk (Climate VaR):** Climate VaR is a forward-looking climate risk metric that assesses how a company's valuation could be impacted by climate policy risks and physical climate risks (from extreme weather events) and could benefit from a low-carbon technology transition. The metric is expressed as a positive or negative percentage to reflect change from a company's or portfolio's

current valuation. The aggregated Climate VaR is the sum of the aggregated policy risk Climate VaR,<sup>9</sup> the technology opportunity Climate VaR<sup>10</sup> and the physical risk Climate VaR<sup>11</sup> associated with the selected transition and physical risk scenarios.

- **MSCI Implied Temperature Rise (ITR):** The ITR metric provides an indication of how well public companies align with global temperature goals. The ITR estimates the global implied temperature rise (in the year 2100 or later) if the entire economy had the same carbon budget overshoot or undershoot as the company or portfolio in question. The portfolio-level ITR compares the sum of "owned" projected emissions, including Scopes 1, 2 and 3, against the sum of "owned" carbon budgets for the underlying fund holdings. The portfolio's total estimated carbon budget overshoot/undershoot is then converted to a degree (Celsius) of temperature rise using the transient climate response to cumulative emissions.<sup>12</sup> The allocation base used to define ownership is EVIC, to enable the analysis of equity and corporate bond portfolios.

<sup>8</sup> Source: MSCI ESG Research methodologies published May 2023 (Climate Value-at-Risk: Transition Risk), December 2023 (Climate VaR Part 4: Physical Climate Risk) and September 2022 (Implied Temperature Rise).

<sup>9</sup> Aggregated policy risk Climate VAR is a company's downside or neutral exposure expressed as a percentage of the company's market value that may arise because of climate change policies that countries enact to enable transitioning to a low-carbon economy.

<sup>10</sup> Technology opportunity Climate VAR is a company's upside exposure, expressed as a percentage of the company's market value because of technology opportunities born out of changes required to meet the transition to a low-carbon economy. For example, technology advances are considered through patent analysis and green revenue exposure.

<sup>11</sup> Physical risk Climate VaR is a company's downside or neutral exposure expressed as a percentage of the company's market value that may arise because of asset damage and business interruption as a direct consequence of the physical hazards or perils of climate change.

<sup>12</sup> Transient climate response to cumulative emissions (TCRE) represents the ratio of the global average surface temperature change per unit of carbon dioxide (CO<sub>2</sub>) emitted. It helps to model the carbon budget for given temperature targets.

Approach to scenario analysis

For scenario analysis, we rely on the MSCI Climate VaR model results to analyse the exposure of funds to climate risks and opportunities.

These risks and opportunities are applied to six scenarios produced by the Central Banks and Supervisors Network for Greening the Financial System (NGFS), which are divided into three categories: orderly transition, disorderly transition and hot house world, as described further in the adjacent table.

For this report, we chose to analyse the exposure of each fund to policy risk and technology opportunities through to 2050.<sup>13</sup> We also chose to analyse physical risk through to 2100 under three of the NGFS scenarios: net zero 2050 for an orderly transition, delayed transition for disorderly and nationally determined contributions for hot house world.

The results indicate the potential impact of future climate shocks on the market value of each fund, based on aggregated policy risks, technology opportunities and physical risks.

- **Policy risks:** Using a hybrid top-down and bottom-up methodology, MSCI calculates the potential risks that may arise because of extensive regulatory and policy changes taking place to transition to a low-carbon economy across the globe.
- **Technology opportunities:** MSCI developed a low-carbon technology opportunity model based on a company’s current low-carbon revenue streams and company-specific patent data. Recently published patent databases allow an evidence-based view into the strategic research and development investments of companies.
- **Physical risks:** Physical risk scenarios model how the physical aspects of the climate system change, including variables such as temperature rise, sea-level rise and the frequency and severity of specific extreme weather events.

NGFS scenarios matrix

Category	Scenarios	Description
Orderly transition	<ul style="list-style-type: none"><li>• Net zero 2050</li><li>• Below 2°C</li></ul>	Orderly scenarios assume climate policies are introduced early and become gradually more stringent. Both physical and transition risks are relatively subdued.
Disorderly transition	<ul style="list-style-type: none"><li>• Divergent net zero</li><li>• Delayed transition</li></ul>	Disorderly scenarios explore higher transition risk because of policies being delayed or divergent across countries and sectors. For example, carbon prices would have to increase abruptly after a period of delay.
Hot house world	<ul style="list-style-type: none"><li>• Nationally determined contributions</li><li>• Current policies</li></ul>	Hot house world scenarios assume that some climate policies are implemented in some jurisdictions, but efforts are insufficient to halt significant global warming. The scenarios result in severe physical risk including irreversible impacts like sea level rise.

Source: Climate Financial Risk Forum Guide 2021. Scenario analysis, October 2021.

<sup>13</sup> Time horizon for policy risk and technology opportunity was updated as part of the MSCI Climate Value-at-Risk model update in April 2023.

## Approach to UK supplementary disclosures

### Approach to identifying products with high exposures to carbon-intensive sectors

The FCA's *Environmental, Social and Governance sourcebook* requires the disclosure of quantitative climate scenario analysis for funds with "concentrated exposures or high exposures to carbon intensive sectors."

Most of Vanguard investors' assets are held, by mandate, in index funds, the majority of which track broad stock and bond market indexes. Therefore, most of our funds are broadly diversified and are not concentrated in any one sector. In the absence of an industry standard threshold for defining "high exposures to carbon intensive sectors," we elected to apply a threshold based on WACI.

WACI can be used as a proxy for a portfolio's potential exposure to transition risks. When comparing two portfolios, the portfolio with higher WACI may be more susceptible to transition risk in the event of increased regulation targeting emissions.

To define a threshold for funds with the highest WACI, we first calculated each fund's historical average WACI using 2021, 2022 and 2023 data. We then calculated the average WACI across our UK funds and identified those with a WACI of one standard deviation above the mean. Having identified the funds with the highest WACIs, we subsequently isolated the underlying Climate VaR for policy risk, technology opportunity and physical risk.

While this methodology does not directly describe exposure to high-carbon sectors within our funds, it can be applied across our fund lineup, both index and active, to provide insight into the funds with the highest exposure to carbon-intensive companies. We will refine our approach over time as industry standards and regulatory guidance continue to develop.

### Approach for externally managed funds

Data for externally managed funds within this report have been produced by MSCI. This data may differ from the information that respective managers produce as part of their own TCFD disclosures given variation in data providers and methodologies. The usage of climate data within investment processes and stewardship activities may also vary among our external managers.

For more information, please refer to "Integration of climate risks and opportunities by our external advisors" on page 29 of *Vanguard's Report on Climate-related Impacts 2023*.

#### The following funds are externally managed:

- Vanguard Active U.K. Equity Fund
- Vanguard Global Emerging Markets Fund
- Vanguard Global Equity Fund
- Vanguard Global Equity Income Fund
- Vanguard Global Sustainable Equity Fund
- Vanguard SustainableLife 40-50% Equity Fund
- Vanguard SustainableLife 60-70% Equity Fund
- Vanguard SustainableLife 80-90% Equity Fund

# Data and metrics limitations

We recognise that climate risk metrics are evolving, and standards and methodologies are constantly being developed and refined. Climate metrics are also an area of increased scrutiny as companies disclose new data sets for which assurance standards have been developed. In this section, we discuss some of the key challenges and limitations that we have encountered when preparing this report.

## Data and metrics limitations

### Data availability and quality

Carbon data availability and quality remain a focus area, and efforts are being made by companies and data providers to improve their respective coverage.

#### Reported versus estimated data

Reported emissions are the preferred type of data; however, we recognise that for some companies, particularly small- and mid-cap companies, reporting remains a challenge because of resourcing constraints. Further, emissions disclosures are not mandated in all jurisdictions. Where reported emissions are unavailable, estimated data are used, as per PCAF guidance.

This report discloses third-party data provided by MSCI. MSCI collects emissions data for the companies in the coverage universe. Emissions data are updated on a dynamic cycle throughout the year from the most recent corporate sources available, including annual reports, corporate social responsibility reports and websites. ESG data reporting by companies tends to be produced on a lag relative to their financial data and there may also be a lag between the time when data is disclosed by companies and when it is incorporated into datasets produced by MSCI. In addition, MSCI uses emissions data reported through CDP (formerly the Carbon Disclosure Project) or government databases when data are not available through direct corporate disclosure. As such, data analysed and used for a particular company within a product or entity report may reflect emissions reporting for previous year(s) for some holdings within a given portfolio.

When companies do not disclose data, or data disclosures do not follow the Greenhouse Gas Protocol standards and

guidance, MSCI uses proprietary methodologies to estimate Scopes 1, 2 and 3 emissions, using company-specific data or industry averages, or both.

#### Scope 3 emissions

The measurement and reporting of Scope 3 emissions are fundamentally more complex and challenging than Scopes 1 and 2. The Greenhouse Gas Protocol standard is intended to enable companies to track GHG emissions over time, but it is not designed to support comparisons between companies due to the differences in inventory methodology or differences in company size or structure.

There are several inherent challenges that arise when looking at Scope 3 from a portfolio level:

- **Double counting as value chains overlap.** Within portfolios, there are often multiple companies exposed to the same tonne of GHG emissions, given that one company's value chain emissions are another company's direct emissions. For example, the emissions from driving a car could be counted under multiple companies that one investor is exposed to in a portfolio: the carmaker, the oil and gas company that produces and sells fuel and, potentially, a leasing company or parts manufacturer.
- **Difficulties in capturing data in a systematic and auditable fashion across the value chain.** The longer, more complex or globalised a company's value chain is, the more likely it is that Scope 3 data is estimated or inconsistently calculated between relevant inputters. Scope 3 company data are also more susceptible to restatement than Scopes 1 and 2.

- **There is always a degree of estimation as companies continue to rely on models and use proxy data.** While the data is improving, it will take more time to fully develop consistent and credible reported data across all of a portfolio's constituents and their respective value chain contributors.

As a result of these challenges, Scope 3 emissions can be expected to be several multitudes larger than corresponding Scopes 1 and 2 emissions.

#### Sovereign constituents

Our disclosures do not reflect recent changes to MSCI's Climate VaR and ITR methodologies for sovereign constituents. Therefore, for two of our funds that invest in government securities – Vanguard U.K. Inflation-Linked Gilt Index Fund and Vanguard U.K. Long Duration Gilt Index Fund – only the WACI is reported.

We note that the emissions' scopes set out in the Greenhouse Gas Protocol for corporate constituents do not apply to sovereign constituents, including Scope 3.

#### Use of historical data

Vanguard has provided historical climate data where such data was previously published in our 2022 report. We have therefore not provided historical data for (1) Scope 3 emissions and (2) the following funds: Vanguard LifeStrategy 60% Equity Fund, Vanguard Target Retirement 2025 Fund and Vanguard Target Retirement 2030 Fund. Data for Scope 3 emissions and these funds are published for the first time in this report.

It is noted that absolute financed emissions have increased year-on-year for the majority of our products. We expect that increased AUM and improved coverage of climate data availability will result in an increase to financed emissions.



Carbon metrics

Climate change is a complex issue, and no single climate-related metric can fully represent the position of a product or portfolio. We have disclosed several carbon metrics in line with TCFD recommendations, each of which has their respective strengths and weaknesses.

All backward-looking metrics rely on historical data and do not recognise future plans to reduce emissions. Hence, this could lead to greater focus on short-term reduction of emissions, rather than long-term considerations.

Backward-looking metrics such as total carbon emissions, carbon footprint and WACI are normalised using financial metrics (EVIC or revenue) and are prone to market volatility between reporting periods. Therefore, the carbon credentials of a fund might reflect the sensitivity to market valuation of the issuer rather than changes to its underlying emissions. This can also limit the use of these metrics as a comparator between two portfolios of differing sizes.

Carbon metrics and limitations

Metric	Formula	Limitations
<b>Total carbon emissions, Scopes 1 and 2</b>	$\sum_i^n \frac{\text{Current value of investment}}{\text{Investee company's enterprise value}} \times \text{Investee company's Scopes 1 \& 2 emissions}$	Total carbon emissions is not useful for benchmarking and portfolio comparison as it is an absolute metric.
<b>Total carbon emissions, Scope 3</b>	$\sum_i^n \frac{\text{Current value of investment}}{\text{Investee company's enterprise value}} \times \text{Investee company's Scope 3 emissions}$	Total carbon emissions is not useful for benchmarking and portfolio comparison as it is an absolute metric.
<b>Total carbon footprint, Scopes 1 and 2</b>	$\frac{\sum_i^n \frac{\text{Current value of investment}}{\text{Investee company's enterprise value}} \times \text{Investee company's Scopes 1 \& 2 emissions}}{\text{Current value of all investments}}$	Carbon footprint is only calculated for corporate constituents and is not relevant for sovereign constituents.
<b>Total carbon footprint, Scope 3</b>	$\frac{\sum_i^n \frac{\text{Current value of investment}}{\text{Investee company's enterprise value}} \times \text{Investee company's Scope 3 emissions}}{\text{Current value of all investments}}$	Carbon footprint is only calculated for corporate constituents and is not relevant for sovereign constituents.
<b>WACI, Scopes 1 and 2</b> <i>Corporate constituents</i>	$\sum_i^n \frac{\text{Current value of investment}}{\text{Current value of all investments}} \times \frac{\text{Investee company's Scopes 1 \& 2 emissions}}{\text{Investee company's revenue}}$	WACI does not take into account the difference in carbon characteristics among sectors. WACI is sensitive to outliers. Using revenue (instead of physical or other metrics) to normalise the data tends to favour companies with higher pricing levels relative to their peers.
<b>WACI, Scope 3</b> <i>Corporate constituents</i>	$\sum_i^n \frac{\text{Current value of investment}}{\text{Current value of all investments}} \times \frac{\text{Investee company's Scope 3 emissions}}{\text{Investee company's revenue}}$	WACI does not take into account the difference in carbon characteristics among sectors. WACI is sensitive to outliers. Using revenue (instead of physical or other metrics) to normalise the data tends to favour companies with higher pricing levels relative to their peers.
<b>WACI, Scopes 1 and 2</b> <i>Sovereign constituents</i>	$\sum_i^n \frac{\text{Current value of investment}}{\text{Current value of all investments}} \times \frac{\text{Country's Scopes 1 \& 2 emissions}}{\text{Gross domestic product}}$	WACI does not take into account the difference in carbon characteristics among sectors. WACI is sensitive to outliers. Using revenue (instead of physical or other metrics) to normalise the data tends to favour companies with higher pricing levels relative to their peers.

## Data and metrics limitations

Forward-looking climate metrics provide an estimate of the company's impact on, and exposure to, climate change. These metrics are also subject to certain limitations.

### Climate Value-at-Risk

Climate VaR is reliant on assumptions made under the various scenarios. Climate VaR models assume no change or adaptation from companies over time, which can limit any analysis around investment opportunities. Climate VaR results can also be overestimated when costs are already priced into the market and can be underestimated when opportunities are already priced in.

While our in-house investment strategists continue to research this topic, Vanguard takes no view on which climate scenario, if any, is currently priced in by financial markets. Similarly, Vanguard makes no assumption on the likelihood of each climate scenario eventually becoming a reality and acknowledges that these scenarios are not an exhaustive set of all possible outcomes.

One of the key limitations of modelling high emissions scenarios like the hot house world scenarios is the need to consider complex interactions within the earth's climate system. Such modelling is still in its nascency and does not capture the full potential magnitude of those impacts. Because such impacts are most likely to manifest in hot house world scenarios, the models skew toward transition risks present under orderly and disorderly scenarios. This limitation helps explain why the

hot house world scenario contained in our product reports represents the lowest total Climate VaR across all three scenarios.

In 2022, a Vanguard Megatrends research paper, [\*The Economics of Climate Change\*](#), indicated that the net cost to the economy increases meaningfully as temperatures rise to more than 3 degrees Celsius above preindustrial levels. This research is in line with the latest Intergovernmental Panel on Climate Change (IPCC) report, which states that the "global economic benefit of limiting global warming to 2°C is reported to exceed the cost of mitigation in most of the assessed literature."<sup>14</sup>

It is noted that Climate VaR model updates carried out by MSCI in April 2023 resulted in an increase in policy risk for Orderly and Hot house world NGFS scenarios over the legacy model for the same scenarios. For the Disorderly NGFS scenario, these changes resulted in less negative values because the removal of the cost extrapolation had a major impact. These changes also resulted in less positive values for technology opportunity when taken at the portfolio level.

### Scenario analysis

Scenario analysis is a dynamic exercise that is meant to help demonstrate potential future outcomes, as opposed to a prediction of the future. The climate scenario analysis conducted here is an iterative process intended to provide Vanguard and its investors with a mechanism to evaluate climate-related risks and opportunities in both a quantitative and qualitative manner.

The NGFS scenarios rely on assumptions concerning policy, technology and society made by NGFS itself and in formulating these scenarios may not fully capture compounding effects of climate change or the impact or scale of potential monetary and fiscal policy responses to climate change. Investors should, therefore, not infer that the figures reported represent a definitive prediction of future climate impact.

### Implied Temperature Rise (ITR)

ITR is a forward-looking metric that relies on projected emissions and estimated data. The stated company-level reduction targets that inform this metric might not reflect companies' real-world transition.

### Next steps

We anticipate that, over time, the data limitations outlined in this section will be reduced as data availability continues to improve in response to increasing regulatory disclosure requirements, such as the anticipated introduction of ISSB (International Sustainability Standards Board) and CSRD (the Corporate Sustainability Reporting Directive) standards. In addition, as compared to financial metrics, the methodologies for estimating and calculating emissions are in their early stages of adoption. These methodologies are likely to be further refined and improved over time because of the increasing application of regulatory requirements.

<sup>14</sup> IPCC, 2022. *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. (P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz and J. Malley, eds.).

# Entity-level report

This report contains disclosures for our FCA regulated entities, Vanguard Asset Management, Limited and Vanguard Investments UK, Limited.

Entity-level report

This report contains entity-level disclosures for two entities:

- Vanguard Asset Management, Limited (VAM), in its capacity as an asset manager in relation to portfolio management services it provides and as an asset owner in relation to its operation of the Vanguard Personal Pension.<sup>15</sup>
- Vanguard Investments UK, Limited (VIUK), in its capacity as an asset manager for Vanguard's UK UCITS funds.

The carbon metrics in the adjacent table are set out in accordance with the methodology in the "Carbon metrics and limitations" table on page 57.

We note that financed emissions have increased year-on-year across VAM and VIUK and expect that increased AUM and improved coverage of climate data availability will result in an increase to financed emissions.

<sup>15</sup> As at 31 December 2023, total assets under administration within the Vanguard Personal Pension were \$6.713 billion in US dollars. The Vanguard Personal Pension is the UK self-invested personal pension scheme operated and administered by VAM.

Carbon metrics

Reporting period: 1 January 2023 to 31 December 2023

	VAM		VIUK	
	2022	2023	2022	2023
Assets under management (\$ billions)	\$319.35	\$397.46	\$74.20	\$120.23
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	24,554,638,158	26,558,349,881	23,636,202,782	25,471,888,508
Coverage (%)	67%	68%	69%	87%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	122,660,905,643	—	118,562,609,510
Coverage (%)	—	68%	—	86%
Total carbon emissions Scopes 1 and 2 (tCO <sub>2</sub> e)	19,602,904.73	22,734,579.62	4,580,395.37	6,511,257.43
Coverage (%)	61%	63%	66%	85%
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	155,236,394.13	—	51,994,605.30
Coverage (%)	—	63%	—	85%
Total carbon footprint Scopes 1 and 2 (tCO <sub>2</sub> e per \$1 million invested)	62.40	57.20	63.74	54.16
Coverage (%)	61%	63%	66%	85%
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	390.57	—	432.45
Coverage (%)	—	63%	—	85%
Weighted average carbon intensity for corporate constituents Scopes 1 and 2 (tCO <sub>2</sub> e per \$1 million revenue)	151.72	116.11	146.92	110.67
Coverage (%)	67%	68%	69%	87%
Weighted average carbon intensity for corporate constituents Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	743.69	—	762.07
Coverage (%)	—	68%	—	86%
Weighted average carbon intensity for sovereign constituents (tCO <sub>2</sub> e per \$1 million GDP nominal)	248.66	244.99	199.30	189.49
Coverage (%)	29%	28%	12%	12%

Source: MSCI.

**Notes:** Asset figures are in US dollars as at 31 December 2023. GHG = greenhouse gas. tCO<sub>2</sub>e = metric tonnes of carbon dioxide equivalent. Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

# Compliance statement

The disclosures contained within the TCFD entity-level report for Vanguard Asset Management, Limited, and Vanguard Investments UK, Limited, including any third-party or group disclosures cross-referenced therein, are in compliance with the applicable requirements for the disclosure of climate-related financial information set out in Chapter 2 of the FCA's *Environmental, Social and Governance sourcebook*.

Date: 26 June 2024

Signed:

  
Sean Hagerty

Managing Director of Vanguard Europe

# Product reports

This report contains product disclosures in relation to VAM and VIUK.

## Product reports

Vanguard's 35 UK UCITS funds are in scope for the product reports. Because five funds fall short of the 60% coverage threshold described on page 51, we have excluded these funds from our product reports and included product reports for the other 30 funds. All 35 funds are included in the entity-level report for both VAM, in its capacity as an asset owner in relation to its operation of the Vanguard Personal Pension, and VIUK, in its capacity as an asset manager for UK UCITS funds.

The five funds excluded from our product reports are:

- Vanguard LifeStrategy 20% Equity Fund;
- Vanguard LifeStrategy 40% Equity Fund;
- Vanguard Sterling Short-Term Money Market Fund;
- Vanguard Target Retirement 2015 Fund and
- Vanguard Target Retirement 2020 Fund.

Product reports

Vanguard Active U.K. Equity Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund is an active fund investing primarily in shares of UK companies, that are incorporated, domiciled or conduct a significant portion of their business in the UK.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard Active U.K. Equity Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	238,191,348	220,642,769	89%	95%	76.80%	88.64%	12.50%	6.16%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	2,543,886,001	—	92%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	1,937.30	1,610.85	88%	95%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	19,568.38	—	92%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	47.86	37.16	89%	95%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	451.43	—	92%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	77.32	54.80	89%	95%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	638.40	—	92%	—	—	—	—

Source: MSCI.

Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	−15.15	−13.98	−8.35

Source: MSCI.

\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.2°C

Source: MSCI.



Vanguard ESG Developed World All Cap Equity Index Fund (UK)

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund seeks to track the performance of the FTSE Developed All Cap Choice Index, a market-capitalisation weighted index representing the performance of large-, mid- and small-size shares covering developed markets around the world.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Under the disorderly transition scenario, policy and physical risk are on par as the biggest drivers of impact. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard ESG Developed World All Cap Equity Index Fund (UK)		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	2,048,076,674	2,176,613,536	98%	99%	79.80%	84.73%	18.60%	14.62%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	15,568,315,538	—	99%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	14,267.42	25,035.44	98%	99%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	203,684.65	—	99%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	20.24	21.03	98%	99%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	171.13	—	99%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	59.88	51.06	98%	99%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	462.70	—	99%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	−7.62	−6.31	−5.44

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

1.9°C

Source: MSCI.

Product reports

Vanguard FTSE 100 Index Unit Trust

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Trust seeks to track the performance of the FTSE 100 Index, a market-capitalisation weighted index representing the performance of the 100 largest companies traded on the London Stock Exchange that pass screening for size and liquidity.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Under the disorderly transition scenario, the Trust is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard FTSE 100 Index Unit Trust		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	355,489,011	311,987,661	99%	100%	94.30%	98.44%	4.60%	0.72%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	3,041,809,425	—	100%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	96,496.42	110,289.76	98%	100%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	1,262,333.82	—	100%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	87.06	69.89	98%	100%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	799.91	—	100%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	125.11	89.61	99%	100%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	1,001.93	—	100%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	−24.09	−21.65	−11.78

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.3°C

Source: MSCI.

Vanguard FTSE Developed Europe ex-U.K. Equity Index Fund

Reporting period: 1 January 2023 to 31 December 2023  
Domicile: United Kingdom

The Fund seeks to track the performance of the FTSE Developed ex-U.K. Index. The Index comprises large- and mid-size shares providing coverage of developed markets around the world, excluding the UK.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard FTSE Developed Europe ex-U.K. Equity Index Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	1,318,645,313	1,129,820,494	98%	98%	93.20%	89.62%	4.70%	8.77%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	7,008,388,617	—	98%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	251,585.66	305,730.02	98%	98%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	1,834,373.91	—	98%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	67.16	67.07	98%	98%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	402.40	—	98%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	105.69	86.99	98%	98%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	690.89	—	98%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	−15.49	−13.50	−8.63

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.0°C

Source: MSCI.

Vanguard FTSE Developed World ex-U.K. Equity Index Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund seeks to track the performance of the FTSE Developed ex-U.K. Index. The Index is comprised of large- and mid-size shares providing coverage of developed markets around the world, excluding the UK.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard FTSE Developed World ex-U.K. Equity Index Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	5,174,043,008	5,129,459,445	98%	99%	84.10%	88.32%	14.40%	11.18%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	28,826,890,192	—	99%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	678,253.82	756,523.34	98%	99%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	5,209,860.82	—	99%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	49.85	43.73	98%	99%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	301.18	—	99%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	143.20	107.37	98%	99%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	682.39	—	99%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	−12.06	−10.20	−7.35

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.3°C

Source: MSCI.

Product reports

Vanguard FTSE Global All Cap Index Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund seeks to track the performance of the FTSE Global All Cap Index, a market-capitalisation weighted index representing the performance of large-, mid- and small-size shares covering developed and emerging markets around the world.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard FTSE Global All Cap Index Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	12,252,172,313	12,827,315,063	98%	99%	78.70%	84.44%	19.50%	14.82%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	57,201,408,959	—	99%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	150,216.98	223,772.25	98%	99%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	1,358,765.39	—	99%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	64.12	60.44	98%	99%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	367.03	—	99%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	169.00	137.97	98%	99%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	761.86	—	99%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	-14.38	-12.15	-8.97

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.5°C

Source: MSCI.

Product reports

Vanguard FTSE U.K. All Share Index Unit Trust

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Trust seeks to track the performance of the FTSE All-Share Index, a free-float market-capitalisation weighted index representing the performance of all eligible companies listed on the London Stock Exchange's main market, which pass screening for size and liquidity.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Trust is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard FTSE U.K. All Share Index Unit Trust		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	9,820,675,039	10,192,277,182	96%	97%	89.40%	93.89%	5.60%	2.18%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	49,890,657,727	—	97%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	1,125,870.59	1,103,063.95	95%	97%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	12,934,933.71	—	97%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	81.09	67.54	95%	97%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	791.96	—	97%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	122.19	90.04	96%	97%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	1,036.10	—	97%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	−23.48	−21.06	−11.99

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.3°C

Source: MSCI.

Vanguard FTSE U.K. Equity Income Index Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund seeks to track the performance of the FTSE U.K. Equity Income Index. The Index consists of common shares of companies listed on the London Stock Exchange's main market that are expected to pay dividends that generally are higher than average.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard FTSE U.K. Equity Income Index Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	307,777,393	285,344,141	100%	100%	96.30%	99.20%	3.40%	0.65%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	2,902,009,457	—	100%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	141,875.46	134,970.46	100%	100%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	1,545,666.43	—	100%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	92.28	83.73	100%	100%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	958.85	—	100%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	140.06	123.86	100%	100%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	1,264.28	—	100%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	−29.23	−24.16	−13.75

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.4°C

Source: MSCI.

Vanguard Global Emerging Markets Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund is an active fund investing primarily in shares of companies located in emerging market countries.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Under the disorderly transition scenario, the Fund is most exposed to physical risk while also experiencing high policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk. We have disclosed the disaggregated Climate VaR for this Fund given its high WACI, which is driven by exposure to energy and utilities sectors, as well as industrial sectors, like cement and steel.

Carbon metrics

	Vanguard Global Emerging Markets Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	975,581,584	1,043,143,585	96%	97%	84.10%	87.75%	12.30%	9.18%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	5,435,058,441	—	96%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	69,253.30	94,601.97	96%	97%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	278,183.74	—	96%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	219.91	184.88	96%	97%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	543.65	—	96%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	395.59	322.37	96%	97%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	931.26	—	96%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly				2°C NGFS disorderly				3°C NGFS hot house world*			
	Total Climate VaR	Physical risk	Policy risk	Technology opportunity	Total Climate VaR	Physical risk	Policy risk	Technology opportunity	Total Climate VaR	Physical risk	Policy risk	Technology opportunity
Aggregated Climate VaR	-31.62	-14.01	-18.14	0.53	-25.50	-14.01	-11.75	0.26	-21.93	-17.54	-4.49	0.09

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.9°C

Source: MSCI.



Vanguard Global Equity Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund is an active fund, and its multi-manager structure uses two independent sub-investment advisers, managing approximately equal portions of the Fund’s investments. The Fund seeks to achieve its investment objective by investing primarily in shares of companies which may be located anywhere in the world.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard Global Equity Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	405,602,832	482,108,251	98%	100%	75.40%	82.85%	22.30%	16.97%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	4,096,372,548	—	99%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	17,478.55	28,139.36	97%	99%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	128,099.15	—	99%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	44.79	54.71	97%	99%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	249.05	—	99%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	132.79	133.51	98%	100%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	600.43	—	99%	—	—	—	—

Source: MSCI.

Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	–14.98	–12.23	–7.70

Source: MSCI.

\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.0°C

Source: MSCI.

Product reports

Vanguard Global Equity Income Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund seeks to provide an annual level of income (gross of fees) greater than that of the FTSE Developed Index together with an increase in the value of investments over the long term (more than five years).

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk. We have disclosed the disaggregated Climate VaR for this Fund given its high WACI, based on our methodology for identifying products with high exposures to carbon intensive sectors.

Carbon metrics

	Vanguard Global Equity Income Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	1,045,697,056	1,138,861,584	100%	100%	90.90%	88.83%	9.10%	11.17%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	9,810,631,952	—	99%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	22,661.13	35,280.25	100%	99%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	254,296.13	—	99%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	89.28	93.11	100%	99%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	671.16	—	99%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	204.53	171.01	100%	100%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	1,064.72	—	100%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly				2°C NGFS disorderly				3°C NGFS hot house world*			
	Total Climate VaR	Physical risk	Policy risk	Technology opportunity	Total Climate VaR	Physical risk	Policy risk	Technology opportunity	Total Climate VaR	Physical risk	Policy risk	Technology opportunity
Aggregated Climate VaR	-24.44	-6.05	-19.86	1.48	-20.17	-6.05	-14.83	0.71	-12.65	-8.11	-4.77	0.23

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.7°C

Source: MSCI.

Vanguard Global Sustainable Equity Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund is an active fund whereby the investment adviser uses their expertise to pick investments to achieve the Fund’s objectives. The Fund seeks to achieve its investment objective by investing almost exclusively (at least 90% of the Fund’s assets) in equity securities issued by large- and mid-size companies located throughout the world, selected in accordance with the Fund’s Sustainability Policy.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard Global Sustainable Equity Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	56,546,900	62,683,429	98%	100%	94.70%	89.85%	3.70%	10.15%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	544,919,447	—	100%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	747.69	1,653.65	98%	100%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	14,158.91	—	100%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	11.04	14.73	98%	100%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	126.10	—	100%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	46.43	46.87	98%	100%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	453.20	—	100%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	−6.92	−5.47	−3.97

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

1.7°C

Source: MSCI.

Product reports

Vanguard LifeStrategy 60% Equity Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund seeks to hold investments that will pay out money and increase in value through exposure to a diversified portfolio comprised of approximately 60% shares and 40% bonds and other similar fixed income instruments.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard LifeStrategy 60% Equity Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	—	23,766,642,455	—	73%	—	62.47%	—	9.95%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	114,565,493,882	—	72%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	—	1,056,516.37	—	68%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	7,897,001.54	—	68%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	—	57.79	—	68%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	431.93	—	68%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	—	124.34	—	73%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	783.35	—	72%	—	—	—	—
Weighted average carbon intensity for sovereign constituents (tCO <sub>2</sub> e per \$1 million GDP nominal)	—	215.92	—	25%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number. 2022 reporting is not provided due to coverage being below 60% threshold, for further information refer to "Coverage" on page 51.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	-14.25	-12.19	-8.26

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to "Data and metrics limitations" starting on page 55.

MSCI Implied Temperature Rise

2.4°C

Source: MSCI.

Vanguard LifeStrategy 80% Equity Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund seeks to hold investments that will pay out money and increase in value through a portfolio comprising approximately 80% shares and 20% bonds and other similar fixed income investments.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard LifeStrategy 80% Equity Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	20,806,012,825	22,138,213,045	71%	85%	58.50%	74.66%	11.90%	10.56%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	109,425,166,170	—	85%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	623,793.38	740,533.38	68%	83%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	5,735,366.68	—	83%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	65.48	57.66	68%	83%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	446.58	—	83%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	155.59	120.50	71%	85%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	796.55	—	85%	—	—	—	—
Weighted average carbon intensity for sovereign constituents (tCO <sub>2</sub> e per \$1 million GDP nominal)	220.62	220.80	12%	13%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	-15.19	-13.06	-8.88

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.4°C

Source: MSCI.

Vanguard LifeStrategy 100% Equity Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund’s investment objective is to hold investments that will pay out money and increase in value through exposure to a diversified portfolio comprising approximately 100% by value of shares.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard LifeStrategy 100% Equity Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	12,737,844,897	13,043,104,734	80%	99%	78.70%	87.90%	19.50%	10.78%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	63,289,507,028	—	99%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	368,902.25	460,185.36	80%	99%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	3,618,755.52	—	99%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	65.59	57.27	80%	99%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	450.33	—	99%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	155.97	117.95	80%	99%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	799.11	—	99%	—	—	—	—
Weighted average carbon intensity for sovereign constituents (tCO <sub>2</sub> e per \$1 million GDP nominal)	220.23	238.14	0.013%	0.02%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	-15.72	-13.56	-9.25

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.4°C

Source: MSCI.

Vanguard SustainableLife 40-50% Equity Fund

Reporting period: 1 January 2023 to 31 December 2023  
Domicile: United Kingdom

The Fund is an active fund whereby the investment adviser uses their expertise to pick investments to achieve the Fund’s objectives. The Fund uses an independent sub-investment adviser which follows a distinct approach in managing the Fund’s investments to maintain a balance between its investments in shares and bonds.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard SustainableLife 40-50% Equity Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	1,130,173,680	1,256,027,979	80%	86%	65.50%	72.70%	14.40%	13.17%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	9,630,573,616	—	85%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	1,783.78	3,341.85	74%	80%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	32,496.07	—	80%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	37.41	43.76	74%	80%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	425.55	—	80%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	136.60	147.09	80%	86%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	810.97	—	85%	—	—	—	—
Weighted average carbon intensity for sovereign constituents (tCO <sub>2</sub> e per \$1 million GDP nominal)	267.76	283.35	16%	11%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	-14.75	-11.44	-6.59

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.3°C

Source: MSCI.

Vanguard SustainableLife 60-70% Equity Fund

Reporting period: 1 January 2023 to 31 December 2023  
Domicile: United Kingdom

The Fund is an active fund whereby the investment adviser uses their expertise to pick investments to achieve the Fund’s objectives. The Fund uses an independent subinvestment adviser which follows a distinct approach in managing the Fund’s investments to maintain a balance between its investments in shares and bonds.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard SustainableLife 60-70% Equity Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	1,578,015,123	1,618,889,430	89%	90%	75.60%	77.92%	13.50%	12.32%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	12,163,427,462	—	89%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	18,508.23	41,718.83	85%	86%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	436,560.50	—	86%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	37.76	43.76	85%	86%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	457.97	—	86%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	132.17	128.29	89%	90%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	809.41	—	89%	—	—	—	—
Weighted average carbon intensity for sovereign constituents (tCO <sub>2</sub> e per \$1 million GDP nominal)	255.57	271.28	9%	8%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	−17.14	−13.48	−7.83

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.3°C

Source: MSCI.



Vanguard SustainableLife 80-90% Equity Fund

Reporting period: 1 January 2023 to 31 December 2023  
Domicile: United Kingdom

The Fund is an active fund whereby the investment adviser uses their expertise to pick investments to achieve the Fund’s objectives. The Fund uses an independent subinvestment adviser which follows a distinct approach in managing the Fund’s investments to maintain a balance between its investments in shares and bonds.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard SustainableLife 80-90% Equity Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	1,122,139,647	1,266,756,465	96%	97%	84.00%	84.93%	11.80%	12.13%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	8,350,574,395	—	96%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	4,903.15	5,459.45	94%	95%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	59,090.27	—	95%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	39.26	44.30	94%	95%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	479.52	—	95%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	137.82	120.73	96%	97%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	818.66	—	96%	—	—	—	—
Weighted average carbon intensity for sovereign constituents (tCO <sub>2</sub> e per \$1 million GDP nominal)	255.68	277.00	3%	2%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	-18.49	-14.69	-8.57

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.4°C

Source: MSCI.

Vanguard Target Retirement 2025 Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund seeks to achieve an increase in value and, consistent with a gradually changing investment allocation, hold investments that will pay out money for investors planning to retire in or within approximately five years after 2025.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard Target Retirement 2025 Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	—	22,864,570,430	—	68%	—	57.88%	—	9.55%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	110,537,812,104	—	67%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	—	21,424.99	—	63%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	160,746.82	—	63%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	—	58.26	—	63%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	437.12	—	63%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	—	127.31	—	68%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	790.03	—	67%	—	—	—	—
Weighted average carbon intensity for sovereign constituents (tCO <sub>2</sub> e per \$1 million GDP nominal)	—	220.99	—	30%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number. 2022 reporting is not provided due to coverage being below 60% threshold, for further information refer to "Coverage" on page 51.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	-14.02	-11.97	-8.04

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to "Data and metrics limitations" starting on page 55.

MSCI Implied Temperature Rise

2.4°C

Source: MSCI.

Vanguard Target Retirement 2030 Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund seeks to achieve an increase in value and, consistent with a gradually changing investment allocation, hold investments that will pay out money for investors planning to retire in or within approximately five years after 2030.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard Target Retirement 2030 Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	—	22,864,570,430	—	74%	—	64.05%	—	10.15%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	110,537,812,104	—	74%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	—	24,237.48	—	70%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	184,400.22	—	70%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	—	57.87	—	70%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	440.31	—	70%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	—	123.95	—	74%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	792.39	—	74%	—	—	—	—
Weighted average carbon intensity for sovereign constituents (tCO <sub>2</sub> e per \$1 million GDP nominal)	—	225.17	—	23%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number. 2022 reporting is not provided due to coverage being below 60% threshold, for further information refer to "Coverage" on page 51.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	-14.36	-12.30	-8.28

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to "Data and metrics limitations" starting on page 55.

MSCI Implied Temperature Rise

2.4°C

Source: MSCI.

Vanguard Target Retirement 2035 Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund seeks to achieve an increase in value and, consistent with a gradually changing investment allocation, hold investments that will pay out money for investors planning to retire in or within approximately five years after 2035.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard Target Retirement 2035 Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	21,300,656,062	22,864,570,430	66%	78%	54.10%	67.12%	11.80%	10.29%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	110,537,812,104	—	77%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	16,140.06	22,582.51	62%	74%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	172,987.67	—	74%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	65.54	57.85	62%	74%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	443.17	—	74%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	155.30	122.89	66%	78%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	795.22	—	77%	—	—	—	—
Weighted average carbon intensity for sovereign constituents (tCO <sub>2</sub> e per \$1 million GDP nominal)	222.40	224.91	19%	20%	—	—	—	—

Source: MSCI.

Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	−14.63	−12.54	−8.46

Source: MSCI.

\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.4°C

Source: MSCI.

Vanguard Target Retirement 2040 Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund seeks to achieve an increase in value and, consistent with a gradually changing investment allocation, hold investments that will pay out money for investors planning to retire in or within approximately five years after 2040.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard Target Retirement 2040 Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	21,300,656,062	22,864,570,430	68%	81%	56.10%	70.21%	12.00%	10.42%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	110,537,812,104	—	81%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	13,141.92	18,665.72	65%	77%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	143,961.96	—	77%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	65.64	57.80	65%	77%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	445.79	—	77%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	155.30	121.88	68%	81%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	798.04	—	81%	—	—	—	—
Weighted average carbon intensity for sovereign constituents (tCO <sub>2</sub> e per \$1 million GDP nominal)	222.60	225.21	16%	17%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	-14.86	-12.75	-8.62

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.4°C

Source: MSCI.

Vanguard Target Retirement 2045 Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund seeks to achieve an increase in value and, consistent with a gradually changing investment allocation, hold investments that will pay out money for investors planning to retire in or within approximately five years after 2045.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard Target Retirement 2045 Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	20,806,012,825	22,138,160,184	71%	84%	58.20%	73.24%	12.20%	10.58%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	109,413,563,660	—	84%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	11,781.55	16,671.86	68%	81%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	129,194.01	—	81%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	65.66	57.82	68%	81%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	448.04	—	81%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	155.40	121.12	71%	84%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	800.59	—	84%	—	—	—	—
Weighted average carbon intensity for sovereign constituents (tCO <sub>2</sub> e per \$1 million GDP nominal)	222.78	225.26	13%	14%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	-15.06	-12.95	-8.76

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.4°C

Source: MSCI.

Vanguard Target Retirement 2050 Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund seeks to achieve an increase in value and, consistent with a gradually changing investment allocation, hold investments that will pay out money for investors planning to retire in or within approximately five years after 2050.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard Target Retirement 2050 Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	20,806,012,825	22,137,956,688	71%	86%	59.10%	75.26%	12.20%	10.67%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	109,409,462,114	—	86%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	7,757.66	12,117.60	69%	84%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	94,174.68	—	84%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	65.75	57.89	69%	84%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	449.92	—	84%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	155.44	120.69	71%	86%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	803.38	—	86%	—	—	—	—
Weighted average carbon intensity for sovereign constituents (tCO <sub>2</sub> e per \$1 million GDP nominal)	222.78	224.84	11%	12%	—	—	—	—

Source: MSCI.

Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	−15.21	−13.08	−8.86

Source: MSCI.

\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.4°C

Source: MSCI.

Vanguard Target Retirement 2055 Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund seeks to achieve an increase in value and, consistent with a gradually changing investment allocation, hold investments that will pay out money for investors planning to retire in or within approximately five years after 2055.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard Target Retirement 2055 Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	20,806,012,825	22,137,956,688	72%	86%	59.20%	75.25%	12.20%	10.68%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	109,409,462,114	—	86%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	4,848.58	7,564.98	69%	84%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	58,794.65	—	84%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	65.73	57.79	69%	84%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	449.18	—	84%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	155.56	120.50	72%	86%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	801.72	—	86%	—	—	—	—
Weighted average carbon intensity for sovereign constituents (tCO <sub>2</sub> e per \$1 million GDP nominal)	222.77	225.02	12%	12%	—	—	—	—

Source: MSCI.  
Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	−15.18	−13.06	−8.85

Source: MSCI.  
\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.4°C

Source: MSCI.



Vanguard Target Retirement 2060 Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund seeks to achieve an increase in value and, consistent with a gradually changing investment allocation, hold investments that will pay out money for investors planning to retire in or within approximately five years after 2060.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard Target Retirement 2060 Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	20,806,012,825	22,138,153,605	71%	86%	59.10%	75.22%	12.20%	10.68%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	109,413,351,058	—	86%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	1,508.23	2,523.24	69%	84%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	19,604.18	—	84%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	65.74	57.87	69%	84%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	449.59	—	84%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	155.61	120.64	71%	86%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	802.55	—	86%	—	—	—	—
Weighted average carbon intensity for sovereign constituents (tCO <sub>2</sub> e per \$1 million GDP nominal)	221.84	224.91	12%	12%	—	—	—	—

Source: MSCI.

Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	−15.20	−13.08	−8.86

Source: MSCI.

\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.4°C

Source: MSCI.

Vanguard Target Retirement 2065 Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund seeks to achieve an increase in value and, consistent with a gradually changing investment allocation, hold investments that will pay out money for investors planning to retire in or within approximately five years after 2065.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard Target Retirement 2065 Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	20,806,012,825	22,138,153,605	71%	86%	59.10%	75.25%	12.20%	10.66%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	109,413,351,058	—	86%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	1,328.15	2,142.50	69%	84%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	16,647.55	—	84%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	65.61	57.91	69%	84%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	449.96	—	84%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	155.53	120.78	71%	86%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	803.73	—	86%	—	—	—	—
Weighted average carbon intensity for sovereign constituents (tCO <sub>2</sub> e per \$1 million GDP nominal)	221.31	225.48	12%	12%	—	—	—	—

Source: MSCI.

Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	−15.22	−13.09	−8.87

Source: MSCI.

\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.4°C

Source: MSCI.

Vanguard U.K. Inflation-Linked Gilt Index Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund seeks to track the performance of the Bloomberg U.K. Government Inflation-Linked Float Adjusted Bond Index, a float-adjusted market-capitalisation weighted index representing the UK government inflation-linked securities market, offering exposure to inflation-linked gilts with maturities greater than one year.

Carbon metrics

	Vanguard U.K. Inflation-Linked Gilt Index Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	—	—	—	—	—	—	—	—
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	—	—	—	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	—	—	—	—	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	—	—	—	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	—	—	—	—	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	—	—	—	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	131.74	131.74	72%	100%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	—	—	—	—	—	—	—

Source: MSCI.

Note: The coverage percentage is rounded to the nearest whole number.

Product reports

Vanguard U.K. Long Duration Gilt Index Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund seeks to track the performance of the Bloomberg U.K. Government 15+ Years Float Adjusted Bond Index. The Index is a float-adjusted market-capitalisation weighted index representing a segment of the UK government bond market, offering exposure to gilts with maturities greater than 15 years.

Carbon metrics

	Vanguard U.K. Long Duration Gilt Index Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	—	—	—	—	—	—	—	—
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	—	—	—	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	—	—	—	—	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	—	—	—	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	—	—	—	—	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	—	—	—	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	131.74	131.74	100%	100%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	—	—	—	—	—	—	—

Source: MSCI.  
Note: The coverage percentage is rounded to the nearest whole number.

Product reports

Vanguard U.S. Equity Index Fund

Reporting period: 1 January 2023 to 31 December 2023

Domicile: United Kingdom

The Fund is an active fund investing primarily in shares of UK companies, being those which are incorporated, domiciled or conduct a significant portion of their business in the UK.

Scenario analysis

Under the orderly transition scenario, policy risk is the biggest driver of impact. This scenario assumes that policies are introduced early and become gradually more stringent. Likewise, under the disorderly transition scenario, the Fund is most exposed to policy risk, which is exacerbated by the delayed introduction of high carbon prices. The hot house world scenario has the lowest policy risk, which is in line with scenario assumptions on limited policy action, and the highest physical risk.

Carbon metrics

	Vanguard U.S. Equity Index Fund		Coverage		Reported emissions		Estimated emissions	
	2022	2023	2022	2023	2022	2023	2022	2023
Scopes 1 and 2 GHG emissions (tCO <sub>2</sub> e)	2,476,061,532	2,561,607,333	98%	99%	76.70%	82.11%	21.40%	17.38%
Scope 3 GHG emissions (tCO <sub>2</sub> e)	—	15,732,213,737	—	99%	—	—	—	—
Total carbon emissions Scope 1 and Scope 2 (tCO <sub>2</sub> e)	617,548.98	609,291.88	98%	99%	—	—	—	—
Total carbon emissions Scope 3 (tCO <sub>2</sub> e)	—	4,467,819.54	—	99%	—	—	—	—
Total carbon footprint Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million invested)	43.12	34.89	98%	99%	—	—	—	—
Total carbon footprint Scope 3 (tCO <sub>2</sub> e per \$1 million invested)	—	255.87	—	99%	—	—	—	—
Weighted average carbon intensity Scope 1 and Scope 2 (tCO <sub>2</sub> e per \$1 million revenue)	147.99	105.42	98%	99%	—	—	—	—
Weighted average carbon intensity Scope 3 (tCO <sub>2</sub> e per \$1 million revenue)	—	639.83	—	99%	—	—	—	—

Source: MSCI.

Notes: Scopes 1, 2 and 3 GHG emissions are rounded to the nearest whole number. All coverage percentages are rounded to the nearest whole number.

MSCI Climate Value-at-Risk (Climate VaR)

	1.5°C NGFS orderly	2°C NGFS disorderly	3°C NGFS hot house world*
Aggregated Climate VaR	−9.59	−7.98	−5.70

Source: MSCI.

\*For more information on the limitations of using aggregated Climate VaR in modelling hot house world scenarios, refer to “Data and metrics limitations” starting on page 55.

MSCI Implied Temperature Rise

2.4°C

Source: MSCI.

# Important information

This document is designed for use by and is directed only at persons resident in the UK.

For further information on the funds’ investment policies and risks, please refer to the prospectus of the UCITS and to the KIID before making any final investment decisions. The KIDs for these funds are available, alongside the prospectus via Vanguard’s website <https://global.vanguard.com>.

All investing is subject to risk, including the possible loss of the money you invest. Diversification does not ensure a profit or protect against a loss.

Be aware that fluctuations in the financial markets and other factors may cause declines in the value of your account. There is no guarantee that any particular asset allocation or mix of funds will meet your investment objectives or provide you with a given level of income.

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