

cardano

**Task Force on
Climate-Related Financial
Disclosures (TCFD)
report for Cardano Risk
Management Limited**

For the year ended 31 December 2024

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1.

Introduction



1.1 Foreword from our Chief Executive Officer

Our purpose and its connection to climate change

Welcome to our Task Force on Climate-related Financial Disclosures (TCFD) report, covering the twelve-month period to 31 December 2024.

The problem

Current economic behaviour is putting the planet and society at risk. Climate change, increasing inequalities, security concerns, environmental degradation and resource scarcity are major global challenges faced by society and economies worldwide. Society can only be sustainable if it produces and consumes within the boundaries of what the planet can sustain. However, we are already overshooting most of the planetary boundaries, including green-house-gas emissions which are contributing to global warming, creating not only direct risks for many businesses but also increasing longer-term systemic risk. Other systemic environmental risks include water usage and biodiversity loss driven in part by deforestation, all of which are highly intertwined with climate change. Tackling these challenges will require a major re-tooling of the global economic system as we move away from fossil fuel and use a renewable energy based circular economy.

A sustainable society must also be underpinned by strong social foundations, which are highly interrelated with the planetary boundaries. For example, areas most impacted by climate change could become uninhabitable. Similarly, deforestation and environmental degradation would be exacerbated by natural forest land being cleared for subsistence or industrial scale monoculture agriculture. This degrades soil quality, exacerbates further poverty and perhaps even results in societal collapse in some countries. That could create the knock-on effects of mass-migration that are already causing political stresses in many industrialised nations.

Our role in the transition

We believe in a society in which people and businesses can prosper, while operating within the planetary boundaries and respecting social foundations, now and in the future. Governments and NGOs are encouraging businesses to reduce their greenhouse gas emissions and take steps to deal with water scarcity and environmental pollution. Consumers are gradually switching to more sustainable products and businesses are becoming more transparent about their consideration of environmental, social and human rights issues in supply chains.

Unfortunately current progress is too slow. Left unchecked, runaway climate change will lead to substantial environmental, social and financial consequences. This is a systemic risk that will affect all portfolios and cannot be diversified away. Hence, more must be done to speed up a global economic transition towards a sustainable society to prevent irreversible impacts on the planet, people and businesses. Businesses that anticipate this transition can reap the benefits of new market opportunities – but those that fail to act could be subject to increasing financial risk.

Our role is to help our clients manage these risks and take advantage of the opportunities that may arise. Our approach is rooted in the belief that we need to help our clients achieve a financial return commensurate with the risks they are exposed to and, through their investments, to contribute to the transition to a more sustainable society. This is referred to as a “double materiality” approach.

We think there are many compelling investment reasons to focus on sustainability, and climate change in particular. The evidence suggests that integrating environmental, social and governance (‘ESG’) issues (including climate change) in investment decisions tends to lead to better risk-adjusted investment returns and helps identify new investment opportunities.

But in the long-term, the systemic risks of climate change can only be avoided through real-economy change that limits global warming. This is what we emphasise in our approach to stewardship. This involves engaging with companies to understand their strategies and supporting them in developing commitments to decarbonise and plans to deal with the transition. Where companies fail to act, we can use various tools to escalate including voting against management and directors, filing shareholder resolutions, and ultimately disinvestment. Companies may not make the necessary transition in the absence of supportive policy; hence we also engage with policy makers and regulators about adopting the policies and approaches necessary to drive real change.

Our climate commitment

We support the Paris Climate Agreement objective to hold the increase in the global average temperatures to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels. We do this by committing our investment portfolios to support the transition to net zero greenhouse gas (GHG) emissions by 2050, known as ‘net zero’.

We aim for an emissions reduction for our own managed strategies of 50% by 2030 and 75% by 2040, with the baseline year set at December 2019. This implies an average 7% reduction in GHG emissions every year, which informs our asset-class decarbonisation targets. These targets will be monitored and reviewed periodically for realism against the pace of real-world decarbonisation

We support the concept of 'fair share' decarbonisation targets: countries with historically higher emissions (which tend to be developed markets) should decarbonise more rapidly than countries with historically lower emissions (which tend to be emerging markets). This is our default position in our fiduciary management, our asset management, our advice, and our liability-driven investments.

Sustainability beyond climate change

As set out in our [sustainable investment policy](#) we believe that the transition to a sustainable society requires multiple transitions in human activity affecting planetary boundaries and social foundations. Planetary boundaries include climate change, biodiversity loss, water usage and materials usage. Social foundations include basic needs, a fairer society and good governance.

To support these transitions, we also incorporate two additional targets:

- 1. Net zero deforestation.** Deforestation is a major cause of biodiversity loss and impacts climate change through the release of sequestered carbon. As a result, we are focused on reducing deforestation and we support reaching net zero deforestation by 2030, with any deforestation replaced with reforestation of similar or higher quality.
- 2. Water neutrality.** It is predicted that, by 2030, 40% of the world's population will not be able to meet their need for water if water is not used more efficiently, in part due to climate change. In our directly managed strategies, we support achieving water neutrality by 2030, where businesses in water-scarce areas consume no more water than nature can replenish.

How we will achieve these various commitments is still a work in progress. The climate targets applied to our direct equity portfolios were approved by the Science Based Target initiative (SBTi) in November 2022. For other directly managed and third-party manager strategies we rely on our Sustainable Investment Framework which we describe later in this document. We will continue to develop appropriate methodologies which may vary from strategy to strategy as data and methodologies improve.

1.2. Scope of this report

This is an entity level TCFD disclosure report applying to Cardano Risk Management Limited (CRML) which is regulated by the Financial Conduct Authority (FCA) in the UK.

In June 2024, Marsh McLennan announced that it reached an agreement to acquire Cardano and the transaction completed in November 2024. Following this transaction, Cardano is part of Marsh McLennan Group and is being integrated in Mercer, one of the four businesses of Marsh McLennan. Mercer, a global leader of investment services, helps clients with a resilient investment strategy, supported by experts in strategic asset allocation and management, manager selection and monitoring, performance and risk monitoring, responsible investments and sustainability, financial modelling and fiduciary management.

As this TCFD report relates to the 2024 activities of Cardano, we will mostly not mention the integration with Mercer as little change happened in that year since the acquisition only officially closed in November. Where we mention Cardano in this report, this applies to Cardano pre-acquisition by Mercer. Where relevant we will indicate how the acquisition may change our 2025 activities. Mercer legal entities produce their own TCFD reports separately. We will look to further integrate into Mercer reporting in 2026.

The approach we describe here is applied across the broader Cardano Group of companies. The Cardano Group publishes an Annual Sustainability report which covers our progress on Sustainability topics as a group across both climate and other key areas. We are also signatories of the UK Stewardship Code and our application to that code goes into detail regarding our approach. We encourage reading of both of those reports, in conjunction with our Sustainable Investment Policy, alongside this report.

CRML's clients are predominantly UK defined benefit or defined contribution pension schemes.

This report focuses on those CRML clients for which we manage a portion or all of their balance sheet on a discretionary basis under our Sustainable Investment Framework. This includes both assets managed directly by the Cardano group and assets where we have the discretion to allocate to third-party managers. The policies described in this report cover 100% of these discretionarily managed assets and should be read in conjunction with the portfolio level disclosures we share with clients for whom we manage investments. Because of the varied nature of client portfolios, we do not find it helpful to disclose aggregate climate metrics across all of the assets covered

in this entity level report. Instead, we focus in this report on those on reporting metrics and progress in respect of the key common building blocks which constitute those client portfolios.

CRML also has advisory clients and clients for whom we have been appointed as sub-investment manager who do not wish to have their assets managed using our Sustainable Investment Framework. These are clients for which Cardano provides investment advice on strategy, manager selection and may provide some forms of investment management or implementation but where we may not have discretion over how the mandate is implemented or how it meets our Net Zero and other commitments. The ultimate decision and commitments are made by the clients themselves, and such clients are out of scope for this report.

1.3. Compliance Statement

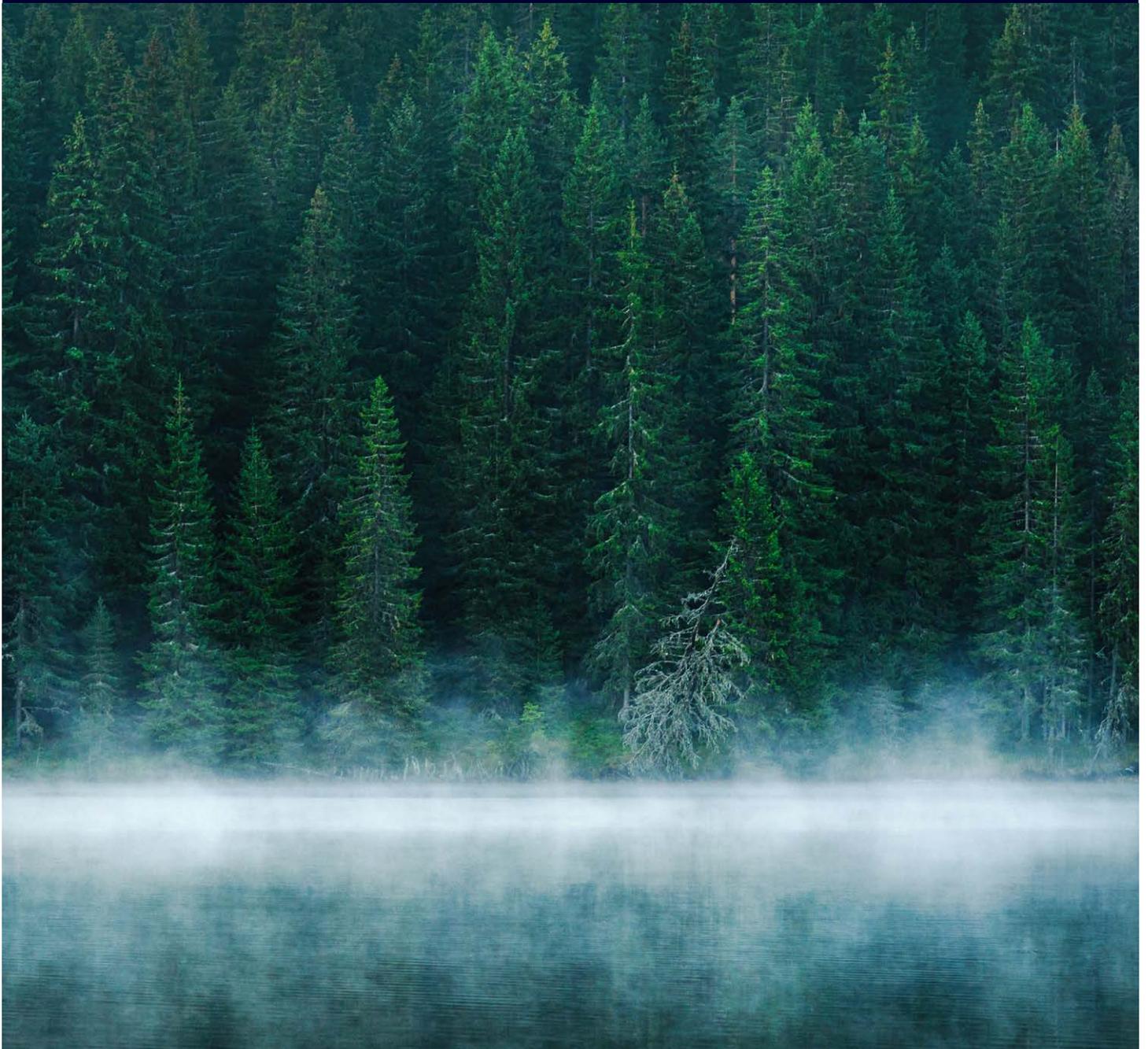
I confirm that the disclosures in this entity level report for CRML, including any third-party and group disclosures referenced here, comply with the, Chapter ESG 2.2 TCFD Entity Report requirements of the FCA Handbook.



Kerrin Rosenberg
CEO, Cardano Risk Management Limited

2.

Background to this report



2.1. The need to achieve “net-zero”

Climate change refers to global warming caused by the greenhouse gas (GHG) emissions of human activity. GHGs include carbon dioxide (CO₂) but also other gasses associated with human industry and agriculture such as methane (CH₄) and nitrous oxide (N₂O). These trap energy from the sun in the Earth’s atmosphere, warming the planet. We’ve already warmed the Earth by at least 1.1°C above preindustrial levels¹.

According to NASA 2024 was the warmest year on record with average global temperatures 1.47°C above preindustrial levels². NASA’s data is backed up by similar findings at other institutes: The European Copernicus Climate Change Service estimated that global average temperatures in 2024 were 1.6°C above preindustrial levels, making it the first year to exceed the 1.5°C threshold.³

Climate is measured over longer periods and individual years exceeding 1.5°C threshold do not mean the threshold is permanently breached but the recent trend is very worrying. Each of the past 10 years have been the warmest 10 years since modern recordkeeping began in 1880.⁴

While these may sound like small numbers, at a global level, the impact of this warming is expected to be severe. This leads to the increased frequency and severity of weather events, such as droughts, sea-level rise, floods, heatwaves, hurricanes and wildfires. In 2024, the Los Angeles fires caused unprecedented property damage in the US and flash floods in Valencia claimed over 220 lives in Spain. While it is not possible to attribute individual instances to climate change, the frequency and severity of such incidents is clearly on the increase.

Globally, we emit around 54 billion tons of GHG a year.⁵ While many human activities contribute to greenhouse gas emissions, our use of fossil fuels are the largest single contributor. Most of our emissions come from transport, industry (in particular cement, steel and plastic), energy (including electricity, heating and cooling) and agriculture. To stop human activity contributing to further global warming, we need to stop emitting new GHGs beyond nature’s ability to absorb these emissions – we need to get to “Net Zero” emissions.

The challenge is that even if policy is well coordinated across the globe and changes are rapid, it will take until 2050 at the earliest to reduce GHG emissions to Net Zero.

It therefore appears inevitable that the Earth will continue to warm to at least 1.5°C over preindustrial levels. The question is how much we can do to prevent it from warming beyond this level. The longer it takes us to get to Net Zero, the more global warming will exceed the 1.5°C level.

Governments are starting to address the problem. Through the UN convened International Panel on Climate Change, the Paris agreement in 2015 committed to limiting global warming to “well below 2 degrees” and to work towards the goal of limiting global warming to “1.5°C with limited or no overshoot.” If current policies continue as is and there is not further progress, we will be on track for around 3°C of global warming. Global governments have made commitments that will bring us closer to 2°C but a lot depends on them following through on those commitments. The policy choices we make over the coming decade will do a great deal to determine the future path we are on.

Even if there is an increase in commitments and policy, there are still many unknowns, including what scientists call “tipping points” – various natural phenomena, for example, the thawing of arctic-permafrost, which may release further GHG, which could dramatically accelerate climate change. Because such tipping points are inherently hard to predict, scientists are conservative and these potential tipping points are not fully allowed for in the global warming projections.

Science warns us that the consequences of such global warming will be very severe for humans, economic activity and nature. For these reasons it is imperative that we do everything we can to limit global warming to, if possible, 1.5°C. This is what informs our approach to climate change-related risk management and real-world engagement.

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Even if there is an increase in commitments and policy, there are still many unknowns, including what scientists call “tipping points”.

1 <https://www.ipcc.ch/2021/08/09/ar6-wg1-20210809-pr/>

2 <https://climate.nasa.gov/vital-signs/global-temperature/?intent=12t>

3 Copernicus Global Climate Highlights 2024 - National Centre for Earth Observation

4 <https://climate.nasa.gov/vital-signs/global-temperature/?intent=12t>

5 <https://ourworldindata.org/greenhouse-gas-emissions>

2.2. What is TCFD?

The Taskforce on Climate-related Financial Disclosures (TCFD) was established in 2015 by the Financial Stability Board (FSB). It is an industry-led reporting framework setting out recommendations for companies and investors to organise and standardise their climate disclosures.

It was set up because the TCFD considered:

- corporate and financial institutions are not prepared for the transition to a low-carbon economy
- the financial risks and opportunities posed by climate change are not fully understood or priced by financial markets
- this will lead to misallocation of assets and creates the risk of asset stranding, and market volatility – in other words, costs to long-term savers.

The TCFD has since been adopted by regulators, including the FCA that requires asset managers regulated by them to disclose their climate strategy in line with TCFD recommendations.

The regulations include the following requirements, across four themes of: Governance; Strategy; Risk management; and Metrics and target setting. Each of these is covered in our report.

3.

Governance



3.1. Our climate change-related risks and opportunities governance

Sustainability governance

We take a holistic view of sustainability that includes planetary boundaries and social foundations and the necessary transitions to create a sustainable society. Climate change is one of the key planetary boundaries that is covered by our approach and is highly inter-related with other transitions.

Our governance structure provides oversight of sustainability related topics across the group taking into account the views of the different businesses and clients. By including representatives of different teams, we enhance internal communication, and consider different perspectives, which leads to better decision making.

Our approach to Sustainable Investing is set out in our Sustainable Investing Policy and supporting appendices found here: [Sustainability Policies - Cardano - UK](#)

Our three sustainability committees



The Sustainability Policy Committee is responsible for setting overall sustainability strategy and approving sustainability policies and frameworks, prepared by Cardano Sustainability Group.

The Sustainability Investment Committee, a part of the Investment Committee, is responsible for implementation of sustainability policies and frameworks into investment strategies and decision-making.

The Sustainability Categorisation Committee is responsible for determining how entities (companies and governments) are classified under our sustainability policies and frameworks, as well as the detailed methodologies that determine ESG scores, exclusions and our approach to stewardship.

The activities of these committees which typically each meet at least once a quarter are supported by the Cardano Sustainability Group (CSG) which is described in more detail below.

- **The Sustainability Policy Committee (SPC)** oversees our sustainability policies, both for Cardano Group and for our investment client portfolios. It includes representatives from the Cardano Group Board, the Cardano Sustainability Group, investment teams and commercial business. Decisions made by the SPC are discussed separately in the Board meetings of Cardano Group affiliates. Members from the stewardship team will attend the committee meetings when required (for example to present the voting policy updates).
- The SPC approves any changes to the group Sustainable Investment Policy as and when these are made. This includes the sustainable investment framework, targets such as the Net Zero commitment, the stewardship policies, strategies on climate, biodiversity, and water etc.
- The SPC approves the annual update to the voting policy. We update our voting policy every year to keep it in line with market best practice and to incorporate our evolving views on how to effectively use our votes as a stewardship tool.
- The SPC approves the annual process of the voting audit, which ensures that the vote decisions have been applied in line with the policy.
- **The Sustainability Categorisation Committee (SCC)** decides on the classification of all direct investments, in line with Sustainable Investment Policies agreed at the SPC, which results in decisions on what different portfolios can and cannot invest in. This is at the heart of our approach to the management of sustainability risks including climate change and is explained later in this document.
- The committee includes representatives from our Sustainability Group, Investment teams, Risk Management and Product Management teams, and meets at least quarterly.

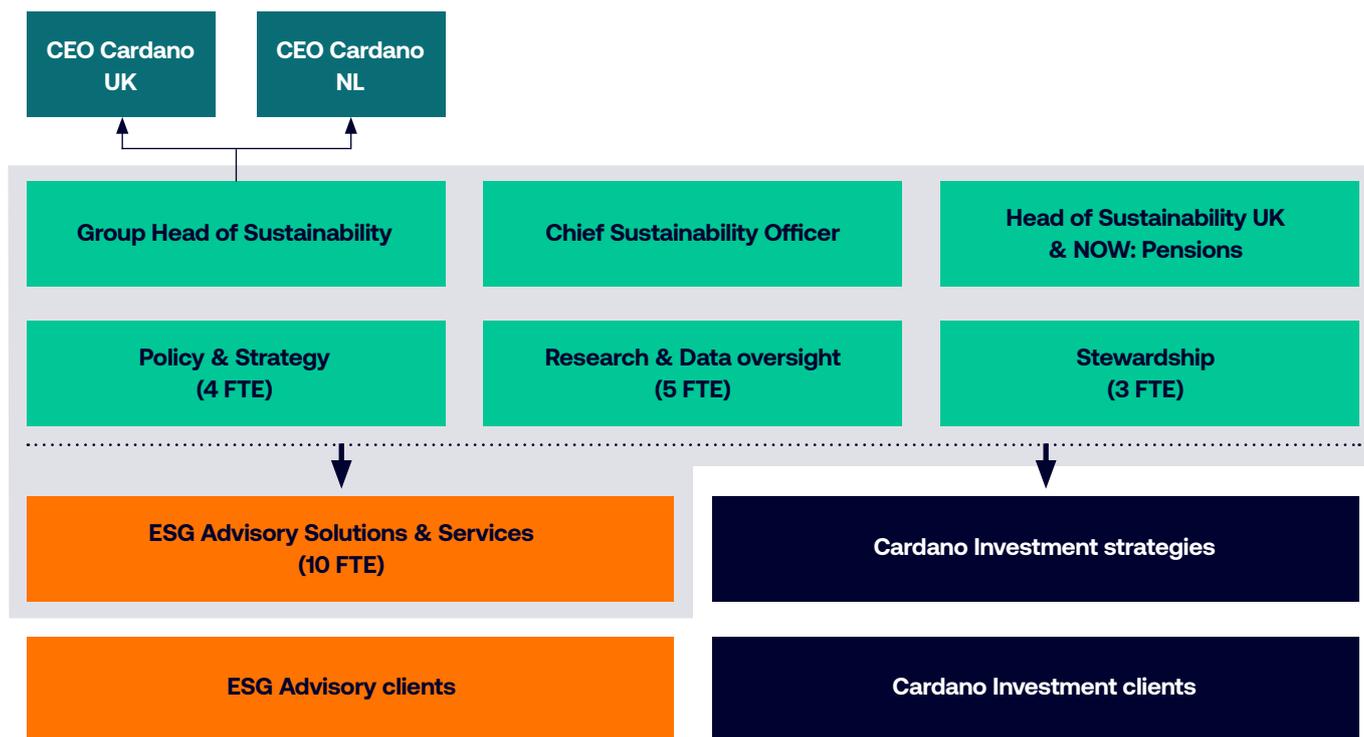
- The chair of the committee is the head of the stewardship team. This allows for stewardship activities and points of view to be integrated in the investment portfolio decision process that determines whether positions are allowed in our direct portfolios.
- This committee considers proposals for the reclassification of investments between categories based on sustainability assessments produced by the Sustainability Group.
- **The Sustainability Investment Committee** focuses on the implementation of the sustainability policies in investment decision making by our investment teams in line with our Sustainable Investment Policy. It includes representatives from the Sustainability Group and our Investment teams.

Kerrin Rosenberg, CEO, Cardano Investment, is the Cardano Group Management Board member with overall responsibility for Sustainability and hence climate risk management and TCFD compliance.

Cardano Sustainability Group (CSG)

While sustainability is a part of the objectives of every employee in the group and embedded into all of our investment processes, the Cardano Sustainability Group (CSG) provides core Sustainability expertise, thought leadership and oversees sustainability activities (e.g. policy development, research, screening, engagement and voting). The below graph shows the make-up of the CSG:

Cardano Sustainability Group



International team of over 25 sustainability professionals with diverse backgrounds and subject matter expertise

The CSG builds vision, intelligence and propositions for our internal sustainability strategies and external sustainability servicing. The CSG prepares our sustainability policies for approval at the SPC. It performs research around the systemic sustainability transitions, organises and manages collaborative and individual engagements, implements our voting policies, and prepares shareholder resolutions. The team also provides advisory services to our clients.

Our stewardship activities for our direct investments are carried out by dedicated stewardship professionals with-in the CSG and supported by an external provider, Sustainability. The stewardship individuals can draw on the experience of members of the research of policy groups when engaging businesses on a particular topic.

The CSG operates at Cardano Group level. The Group Head of Sustainability reports to the CEOs of Cardano Risk Management Ltd and Cardano Nederland BV. The Chief Sustainability Officer (CSO) is responsible for thought leadership and developing innovative sustainable finance-related content for Cardano.

Investment Teams role in Sustainability and Climate Change

The Sustainable Investment Policy outlines our approach to investing sustainably ([Sustainability Policies - Cardano - UK](#)).

Every Cardano investment team is tasked with incorporating this policy into their approach and works closely with the CSG, the CSO and the Investment Committee on Sustainability (ICS) to formulate specific implementation of our sustainability-related policies in their area.

This includes assessing climate change risks and opportunities specific to their strategy. The approach does vary substantially from strategy to strategy. For example, a Liability Driven Investment strategy typically invests exclusively in UK government bonds and may, from a sustainability point of view, be limited to considering only Green Gilts and issuer and counterparty engagement. In contrast, an equity or credit strategy uses our Sustainable Investment Framework to determine which companies qualify for the portfolio and work with the stewardship team to engage companies in the portfolio on climate change and other sustainability topics.

We hold a monthly research meeting that involves our Sustainability Team and the Investment teams. The meetings cover rotating sustainability topics and how these impact our assessments at the company, issue and sector level. The goal of these meetings is to exchange views and systematically integrate our approach across the firm.

Third party manager allocations

For our indirect investments via third-party managers, engagement is undertaken by our Manager Research team. This includes an annual assessment of the ESG approach of third-party managers including their approach to climate change risks and opportunities. This work is overseen by the Manager Research Committee. These teams will also draw on the expertise of the CSG if they need it on specific topics, but because other investment management organisations will have different approaches and priorities, they follow a separate process articulated under our Sustainable Investment Policy.

Separately the Operational Due diligence team will assess third-party managers from an operational risk and resilience perspective.

3.2. Our data sources

We rely on data from various data providers in our assessments. We supplement this quantitative data with our own teams' inhouse qualitative research. The data providers are regularly reviewed with new data sources added where data is missing. Our primary data providers for sustainability data include MSCI and Sustainalytics. We have extensive additional data sources including, for example, satellite and supply chain data from our deforestation engagement programme with Satelligence.

For third-party manager portfolios we request and rely on the data from third-party managers. The quality of data available varies substantially across managers and asset classes.

While we make efforts to ensure the validity of the data, we note that data changes from year to year can be substantial driven by changes in methodology, estimations produced by data providers and changes in reporting quality by the underlying companies or third-party managers.

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We're committed to reducing our operational emissions wherever possible and have done so since 2021.

3.3. Our own operations

We are committed to reducing our operational emissions wherever possible and have done so since 2021. We expect to do this in line or ahead of the national commitments towards Net Zero made by the United Kingdom and the Netherlands, the two countries where our operations are based.

We do this by:

- Managing business travel, avoiding it when we can and – where travel is necessary – taking the train wherever feasible. It is notable in recent years that economic incentives remain misaligned, with train travel between our offices typically being significantly more expensive than air travel. Nonetheless this is a cost we are willing to bear.

- Promoting environmentally friendly ways of working, including working from home
- Choosing greener infrastructure, office space and equipment
- Selecting sustainable suppliers
- Reducing our waste and improving our recycling processes
- Purchasing CO2 compensation schemes

In the renovation of our Rotterdam office in the Netherlands in 2022, for example, we re-used existing furniture as much as possible. Where extra items were needed, we bought them second-hand or refurbished. We also re-used TV screens, monitors and other hardware as much as possible, with any spare equipment donated elsewhere. We also opted for recycled fabrics, wherever new materials were needed.

Our electricity supply in our Netherlands office has come 100% from green energy suppliers for several years. In recent years we have worked with our London office landlord and were recently able to ensure that from April 2024 onwards the London office was also 100% from green energy suppliers.

Where we are unable to reduce emissions further, we purchase voluntary carbon offsets targeting 10% in excess of our operational emissions. We recognise there are a wide range of quality in the voluntary carbon offset markets. We endeavour to find projects that we believe make real contributions to a more sustainable society balancing that off against the budget that we have to purchase these credits. We do not use carbon offsets to reduce Scope 3 Portfolio emissions of the assets we manage.

Emissions over recent years are as follows:

Year	2021	2022*	2023
Total Scope 1, 2 and 3 operational emissions (tCO ₂ e)	815.6	1319.7	942.8
tCO ₂ e per employee	1.87	2.50	1.58

Notes

- In 2021, carbon emissions were limited due to restrictions from travel and activities caused by the COVID pandemic
- *From January 2022 Cardano purchased Actiam B.V. an asset manager in the Netherlands. This resulted in an increase in the number of staff and total carbon emissions of the group.

- We report on our emissions one year in arrears after we are able to complete the assessment of our carbon foot-printing.

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From April 2024 onwards the London office electricity was 100% from green energy suppliers.

3.4. Progress over 2024

2024 was a year of consolidation after implementing the new governance structure and Sustainable Investment Policy described above in 2023. Activity focused on the stewardship approach described which is central to our approach to climate change.

On the resource front, we consolidated new joiners to the Sustainability team, extending our Stewardship team to 4 people.

We inform our own approach to climate change through:

- Our inhouse Cardano Sustainability Group, which has extensive expertise and is involved in a range of collaborative stewardship engagements. We have experts focused specifically on climate change alongside other systemically important sustainability issues such as biodiversity and water usage
- Our involvement in external industry initiatives such as the IIGCC, this Institutional Investors Group on Climate Change.

Over 2024 we started a project to create more effective collaboration between investment teams and the stewardship team to begin tracking some of these engagements more formally.

Case Study:

Engagement with a Norwegian oil & gas producer

In September 2024, the portfolio managers engaged a Norwegian oil & gas producer on their response to the assumptions and recommendations made by the Australasian Centre for Corporate Responsibility (ACCR), which in 2024 released research showing that if the company stops exploring for new oil and gas reserves, and halts new projects outside of Norway, it can take material steps towards Paris alignment without diluting shareholder value.

Company's response to the recommendation to stop exploration of new oil and gas reserves worldwide:

The company stated that they do not focus on exploration activities in new areas. They clarified that their definition of exploration sometimes differs from common industry definitions. Typically, exploration activities are classified as exploration in new frontier areas, while drilling additional wells in the same formations or near existing production hubs is classified as brownfield development. Sometimes, these activities fall under maintenance capex, as they help maintain production levels and prevent natural decline. The company, however, classifies brownfield and part of usual maintenance activity as "exploration activity." Further development of existing or near-shore formations also comes at lower costs compared to developing new frontiers and generates higher returns.

Company's response to the recommendation to stop the development of Norwegian fossil fuel projects:

The natural decline rate of oil and gas on the Norwegian shelf is rather high (5-10%), necessitating constant development to compensate. Cash generated from oil and gas activities is used to subsidize the development of renewable energy projects, which are often more costly, have less developed technology, and tend to have lower returns. The company is at the forefront of developing carbon storage projects to mitigate the impact, helping industries that have difficulty decarbonizing due to a lack of viable solutions to offset emissions.

Company's response to the following assumptions:

"[The company] is unlikely to generate positive free cash flow from exploration until the 2050s. [The company] is not likely to be able to reinvest cash flows from exploration activities towards the energy transition due to its track record of taking an average of 13 years from discovery to start of production."

The payback period for brownfield developments that the company focuses on is on average 6 months to 2.5 years. Sometimes producers make discoveries but shelve the projects due to financial or economic factors, prioritizing projects with high internal rate of return (IRR). Some discoveries never get the green light. It is not appropriate to use the methodology ACCR used for analysis. The brownfield exploration/developments tend to be low cost as producers do not have to develop the infrastructure to support the project

Conclusion:

We appreciate the company's clarifications, which broadly align with our expectations.

In addition, through the year, we held various education sessions discussing both investment and sustainability topics that are open to both investment, sustainability and client teams.

Cardano has actively encouraged several employees to undertake formal training in sustainable investing through the CFA. In 2024, one of the stewardship team members completed the Oxford Stewardship and Engagement Leadership Program.

4.

Our strategic approach to climate change



Our clients are mostly UK Defined Benefit (DB) and Defined Contribution (DC) pension funds. We believe incorporating climate risk and opportunity analysis is a crucial part to both managing our clients' financial results over various timeframes as well as the real-world impact of their investments. Below we set out the various aspects that inform our strategy.

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We believe that steady, predictable, and sustainable returns are in our clients' long-term interests, and that these can be achieved through strong risk management...

4.1. Our investment beliefs drive our approach to climate change

2023 we published an updated and rebranded Sustainable Investment Policy and related Appendices, available on our [website](#). Here we summarise some key beliefs relevant to managing climate related risk.

Our mission and purpose

Our mission is to deliver better long-term savings solutions that benefit everyone. We believe that steady, predictable, and sustainable returns are in our clients' long-term interests, and that these can be achieved through strong risk management and by incorporating sustainability into the core of our business, and the products and services we offer our clients.

Our clients are typically asset owners, institutional investors such as pension funds managed by groups of trustees operating on behalf of their member beneficiaries with long-term time horizons. They have a fiduciary interest to act in the best interests of their members. For most of our clients, the financial risk, return and outcomes of their investments is of primary importance. And as a fiduciary manager and advisor we aim to facilitate them achieving those outcomes.

Our investment management services aim to achieve financial returns in line with the risks assumed, and to contribute to the transition to a sustainable society.

Our approach to investing is articulated in detail in our Sustainable Investment Policy, which includes our sustainable investment framework, responsible capital allocation approach and stewardship approach, which aim to create long-term value for our investments, and sustainable benefits for the economy, the environment and society. Below we extract key concepts relevant to our approach to managing climate risks.

Achieving financial returns and contributing to the transition to a sustainable society

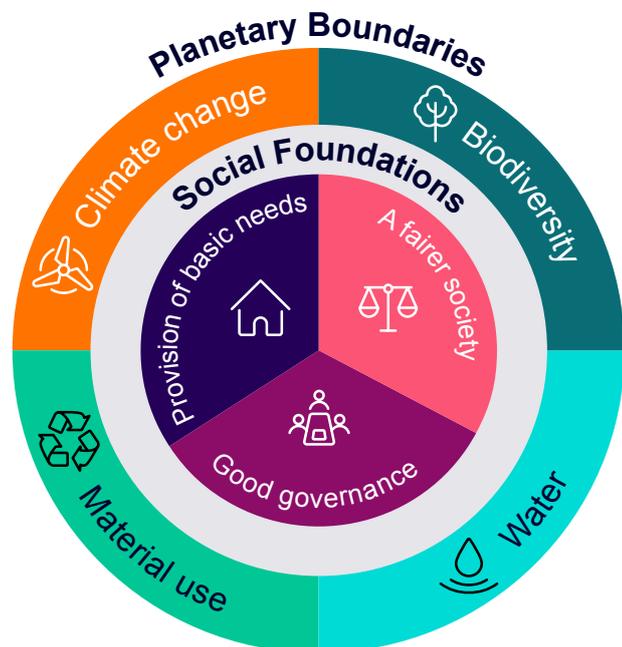
We approach making investments on our client's behalf with “dual objectives” or a double materiality perspective. We believe that we should aim to achieve both financial returns commensurate with the risks that we take, and that we should aim for a specific real-world impact: we should contribute to the transition to a sustainable society (defined below in more detail).

We believe these two objectives are mutually re-enforcing of each other. Specifically:

- Financial risks are best managed by incorporating ESG factors into the risk assessment of each investment. Many ESG risks are financially material to investments. Good stewardship practices have the potential to therefore create long-term value at the individual investment level.
- That at the economy wide level, systemic sustainability risks (both environmental and social) are amongst the most fundamental future risks faced by investors. These systemic risks, such as climate change, will impact economies through direct effects but also through policy, growth and inflation, which will, in turn, impact market outcomes and our client outcomes. Our clients' portfolios are exposed to a wide range of systemic sustainability market risks and are unable to diversify some of these systemic risks away. But through sound stewardship practices we can advocate for real economy changes, that if successfully achieved can lead to lower financial risks in the future for members. Therefore, good stewardship can lead to sustainable benefits for the economy, the environment and society, and hence better financial outcomes of our client portfolios.

Hence our approach to stewardship seeks to both deliver financial outcomes at the individual investment level, and to contribute to the transition to a more sustainable society to the benefit of the economy, the environment and society, that can ultimately deliver better financial outcomes at a portfolio level for our clients. We believe it is therefore in strong alignment with our clients' fiduciary duties to their members.

Our priority transitions



We identify the following priority systemic sustainability themes, which, if tackled in combination, we believe, can contribute to a successful transition to a sustainable society:

Planetary Boundaries:

- Fighting climate change
- Halting biodiversity loss and deforestation
- Using water sustainably
- Managing scarce resources, limiting pollution and the transition towards a circular economy

Social Foundations:

- The provision of basic needs such as clean water, nutritious food, healthcare, housing, energy and financial services which are accessible and affordable.
- Transition to a fairer society addresses inequality through access to education and training, income and work, improved diversity, and gender equality in the workplace.
- Strong governance, which is vital for businesses to maintain their social license to operate and for governments to maintain their democratic legitimacy.

Our investment approach

We believe that the investment outcomes are driven by two key investment processes:

- Capital Allocation
- Stewardship and Engagement

As a fiduciary manager and asset manager we manage some portfolios directly on behalf of clients and others are outsourced to third parties or make extensive use of derivative instruments. Capital allocation therefore includes two channels:

- Direct Capital Allocation: Where we are responsible for making an investment in an issuer – a corporate, a sovereign issuer, or even a specific project across public and private markets in both primary and secondary market allocations..
- Indirect capital allocation: where we gain exposure to investments either through third-party managers or via derivatives executed with counterparties.

Our approach to Capital Allocation and Stewardship and Engagement will differ between these two channels.

- For direct capital allocation we have a Sustainable Investment Framework that determines our classification of every investment we make from a forward-looking sustainability perspective. This classification determines whether a direct investment is eligible for our portfolios and what our stewardship and engagement priorities for that investment will be.
- For indirect capital allocation, we recognise our approach to sustainable investing is only one of many valid sustainable investment approaches. We apply a framework for assessing the approach that third-party managers or counterparties take to integrating ESG risk and sustainability into their processes, determining whether they meet our minimum standards, and we engage with those third-party managers and counterparties to improve their approach over time.

“
We believe stewardship is essential to driving real world change and managing financial risks.”

Our stewardship approach

We believe stewardship is essential to driving real world change and managing financial risks.

Cardano is a signatory to the UK Stewardship Code and a member of stakeholder initiatives that facilitate engagement, such as Climate Action 100+.

We believe that our stewardship can drive change through three channels:

1. At the specific investments (eg companies through our equity or credit investments)
2. Through our allocations to third party managers where we can influence their policies and practice
3. By engaging with the ecosystem of stakeholders who can affect climate policy and outcomes. This includes regulators, policy makers, NGOs and industry groups.

To conduct our engagements, we have adopted the following principles:

- **Collaboration** – engagement is more efficient and impactful when managers collaborate, not just for the investors, but for the companies too (who will field fewer, but higher conviction, engagements from their investors); we collaborate with other investors and market organisations that drive sustainable investment practices.
- **Quality over quantity** – we are interested in meaningful engagements, seeking tangible results with strong reporting.
- **Long-term** – we encourage long-term relationships with companies. Successful stewardship can take many months, maybe even years.
- **Real-world impact** – we are interested in engagement on topics that contribute to positive real-world sustainability impact and address systemic issues (such as, reduction in absolute carbon emissions).
- **Innovation** – we encourage innovation, for example, our satellite-based engagement towards zero deforestation.
- **Integrated** – stewardship contributes to investment decisions.
- **Goal-oriented** – we set objectives and work towards those; if progress is not meaningful, we will consider escalation including voting against board members or changes in capital allocation.

- **Transparency** – some engagements, perhaps even many, will be unsuccessful.

For more information see our Stewardship code application published on our website.

Our risk management tools

We believe in a robust approach to risk management which includes:

- Using **scenario analysis** to consider not only likely outcomes but alternative scenarios and creating portfolios that are robust to a range of potential economic and sustainability/climate scenarios.
- We are sceptical of statistical modelling of many risks and prefer an approach that considers potential outcomes without assigning probabilities of overly relying on statistical models.
- We aim to **hedge unrewarded risks** where it is economic to do so (e.g. liability driven investment (LDI) risks for DB pension funds)
- **Diversification** (focused on fundamental economic scenario diversification rather than statistical diversification) leads to longer-term more stable outcomes
- Deliberate use of “**protective instruments**”, such as options can help protect against some risks.
- **Actively managing the asset allocation** to protect the downside and capture the upside
- Access to diversified **third-party manager skill** can lead to more portfolio diversification where this is consistent with clients’ expense budgets and beliefs
- Influencing risk outcomes can be done through **effective stewardship** and engagement both at the investment level and at the systems or ecosystem level. In the case of systemic risks such as climate change, biodiversity loss or social inequality, this may be the only mechanism to influence risk outcomes.

Managing these risks enables Cardano to practice effective stewardship as it participates in safeguarding the long-term interests of our clients and beneficiaries.

We seek to have as much impact as possible in driving financial and real-world outcomes in different investment situations using different instruments and approaches. To assist in refining the most appropriate approach in each circumstance we have developed a [Model of Influence](#), which guides our teams towards which activities and tools are more or less impactful in different circumstances.

“ Our investment beliefs drive our activities and hence outcomes for our clients in line with our purpose and enables effective stewardship of our clients assets.

Our investment beliefs drive our activities and hence outcomes for our clients in line with our purpose and enables effective stewardship of our client’s assets. In addition to these key high-level beliefs, we have many specific investment beliefs which we have not elaborated on in more detail here.

Our Climate Change strategy

Our approach to climate change is set out extensively in our [Climate Strategy Document](#). This document which is updated periodically sets out our ambitions on tackling climate change.

Our industry involvement

Cardano is a signatory to the Principles for Responsible Investment (PRI), a member of the Institutional Investors Group on Climate Change (IIGCC), and a signatory of the UK Stewardship Code.

Over 2024 we were involved in many such initiatives, we list some here:

- In 2024, we submitted our recommendations to both Glass Lewis and ISS on how to strengthen their policy recommendations and incorporate the principle of ‘universal ownership’ in their voting advice. ISS and Glass Lewis are the most influential proxy advisors and play a large role in determining proxy voting outcomes globally. We believe that advisors should incorporate systemic risk assessments in their voting advice.
- Towards the end of 2024, we signed on to an investor statement opposing the delay and dilution of the EU Deforestation Regulation (EUDR). Deforestation poses material financial and systemic risks that threaten the long-term value of our portfolios.

- Cardano provided feedback to the Science Based Targets initiative (SBTi) consultation on its 2024 Chemicals Sector Guidance, emphasizing the need for stringent emissions reduction targets across the chemicals value chain. Our response strongly supported mandatory scope 3 category 1 emissions targets for purchased primary chemicals, ensuring accountability for feedstock-related emissions. We also advocated for absolute emissions reduction targets for nitrogen fertilizer use, rejecting nitrogen use efficiency (NUE) as a proxy due to its limitations in directly addressing greenhouse gas emissions. Additionally, we backed ambitious thresholds for alternative feedstocks, reinforcing the necessity for transparent transition plans in line with 1.5°C pathways. Our engagement aligns with investor priorities by promoting clear, science-based decarbonization strategies, providing investors with the necessary disclosures to assess companies’ transition plans effectively to reduce systemic risks.

We are extensively involved in a wide range of collaborative engagement initiatives in our Stewardship programs (see section 5.4). We play an active role in many of these initiatives, for example leading on several company engagements with Climate Action 100+ (CA100+).

Cardano is a member of PCAF, ICMA, the TNFD early adopter program, the Net Zero Asset Managers initiative, and we have been involved with various working groups and advisory boards for the Investment Consultants Sustainability Working Group (ICSWG) and the IIGCC. These both help educate us on the latest thinking with regards to climate change and allow us to contribute thought leadership to the industry.

4.2. The short, medium and long-term climate-related risks

Our varied client base has different time horizons. For the purposes of climate change risk and opportunities consideration we consider:

- “Short-term” to be less than 3 years
- “Medium-term” to be 3 to 10 years, (at the moment we focus out to 2030) and
- “Long-term” beyond 10 years out to 2050.

The Long-Term

For many of our pension fund clients their members are ultimately exposed to the effects of climate change over the long-term when the true physical and economic effects of the pathways we are on will become apparent. Defined Contribution clients generally have even longer-term time horizons than Defined Benefit clients, given their typically younger membership profile.

Climate Scenarios are usually defined in terms of their global warming impact as of the year 2100, with either +1.5, +2 or +3°C of warming above preindustrial levels. This compares to +1.1°C of warming today.

We define our long-term investment time horizon as when global green-house-gas emissions are able to reach Net Zero. At this point, global warming itself should stabilise, though the effects of that warming will continue to perpetuate beyond this point. The Paris Agreement and our own real-world objective is to target Net Zero by 2050 in order to reach the +1.5°C goal.

Whether this is achieved in practice is not up to investors, even though we play an important role. It is very dependent on global policy makers and coordinated action across global governments, industry and consumers. Current policies are insufficient to reach this goal by 2050. The world may reach this Net Zero goal only later, for example by 2070, in which case higher temperature scenarios, like +2 or +3°C, are more likely by 2100. Regardless of the timing, the need to achieve Net Zero will remain an imperative.

The Medium Term: 3 to 10 years (Out to 2030) is our primary time horizon

We believe the effects of climate change on our economic systems will be felt far sooner than 2050, not primarily because of the physical effects of climate change, but mostly because of the economic effects of the policies, consumer behaviour and market discounting mechanisms that will drive financial market outcomes over this time horizon. For our climate scenario analysis we focus on the medium-term time horizon from now until 2030.

We consider the potential economic and market paths during this medium-term timeframe rather than predicting an exact outcome at the end point of 2030.

The Short Term

Over short time frames we don't think there is much value in projecting different climate scenarios, as outcomes are highly uncertain and depend on many factors in addition to climate change.

4.3. The climate change-related risks and opportunities that will affect our investment strategy over the short, medium and long-term

We have adapted the table below from The Bank of England's Prudential Regulation Authority.⁶ It is a useful summary of the climate change-related risks over different timeframes.

As illustrated, most investors split climate risks into Physical Risks and Transition Risks. We also find it useful to think in terms of "bottom-up risks", which can be assessed based of the characteristics of a specific investment, and "top-down risks", which are a function of the global economic system and market level outcomes.

Bottom-up risks can be modelled by understanding specific assets in detail and we use data providers like MSCI to help

Climate change-related risk	Short/medium/long term	Main causes of financial impact on savers
Physical		
Acute	Medium/long	Increased frequency and/or severity of extreme weather events
Chronic	Medium/long	Steady increase in global sea levels and changes in precipitation patterns
	Medium/long	Rising temperatures
Transitional		
Policy and legal	Short/medium	Regulation of existing products and services
	Short/medium	Sectors facing penalty incentives could harm current business models
Market demand	Short/medium	Changing consumer behaviour
Technology	Medium	Existing products replaced with lower-emission technology
Reputational	Short/medium	Increased scrutiny following changes in stakeholder's perceptions of climate-related action or inaction

6 <https://www.bankofengland.co.uk/climate-change>

us assess these risks for individual assets. Top-down risks depend on economic outcomes and are more difficult to model. These are often very poorly modelled in current climate scenario quantitative tools, to the degree where we find the results to be unusable.

We therefore break climate related risk into three broad categories:

Physical Risks: The impact of weather and climate on physical assets. For example, the damage to a factory due to coastal flooding and storm damage or exposure to wildfire risks (hazards). This depends on the frequency and severity of hazards, the location of physical assets, and their resilience. This is a “bottom-up” risk applied to each specific asset.

Transition Risks: The impact of implementing climate policies on individual companies, usually modelled by focussing on the “bottom-up” effect on each specific asset:

- The financial risk exposure of a business to the increase in either direct or indirect financial costs of greenhouse gas emissions through its own activities or its supply chain. In 1.5°C scenarios this potential cost is high for high emitters in the short to medium-term. In the 3-degree scenario such costs are lower to begin with and more uncertain as time progresses.
- Financial opportunities - the potential for technological progress and changing policy driven by climate change to create new opportunities for green revenue for certain companies. This opportunity is accelerated by supportive policy that increases demand in the 1.5°C scenario or delayed by less supportive policy in the 3°C scenario.

Systemic Risks: The impact of climate change on broad “top-down” economic activity and financial markets. We believe broad financial market returns are a function of several key variables: expectations of future economic growth, inflation, interest rates and the risk appetite of investors. The systemic risk of climate change refers to the linkage between climate change and these key financial market drivers through the many complex mechanisms that drive our global economies: for example, its impact on productivity, migration, government policies, consumer behaviour, food supply, insurance availability and many other complex interactions. All of these will collectively drive pricing in bond, equity and credit markets and exchange rates.

4.4. Our approach to scenarios analysis

Our approach to scenario analysis combines quantitative and qualitative elements but is based on a narrative approach to scenarios as we believe this is more decision useful than current quantitative approaches which we believe give an unwarranted sense of precision to hugely uncertain outcomes.

Each scenario consists of a degree of warming by 2100 but our focus for scenario analysis is primarily on the medium-term (out to 2030) development towards that longer-term trajectory.

The purpose of our scenario analysis is not to place probabilities on the likelihood of different outcomes. Rather we imagine plausible outcomes and then consider what the implications of such a scenario would be for client portfolios. Our scenario narratives embed not only climate change factors but also a range of geopolitical, policy and consumer behaviours that may arise in the various long-term climate pathways.

The three climate scenarios we use are:

- **1.5°C: Paris-aligned transition scenario.** This is our goal. We hope through our stewardship, engagement with policy makers and investment activity to help accelerate the transition to achieve this outcome.
 - We reference the NGFS Net Zero 2050 scenario climate scenario model which assumes measures are taken that will keep the rise in temperature limited to 1.5°C.
- **2°C: Late transition scenario.** This is what we think is most likely to happen given the current pace of policy change that we observe.
 - The NGFS Delayed Transition assumes new measures are introduced to tackle climate change, but are introduced too late limit warming to 1.5°C. We also use the work of the “inevitable policy response” commissioned by the PRI to inform this scenario.
- **3°C: Slow transition scenario.** This is our hot-house scenario which could happen if policy action stalls. This scenario could also happen because climate tipping points accelerate climate change faster than anticipated in current climate models despite mitigating efforts.
 - We use the NGFS Current Policies scenario which assumes current policies continue as is and there is not further progress (but we assume much worse economic impacts than the NGFS scenario).

To assess the bottom-up asset specific risk (physical and transitional) we can use Climate Value-At-Risk metrics from our data provider MSCI (which we use specifically for equity and corporate credit risks but not other asset classes). However, we believe these metrics at present severely underestimate the systemic risks and fail to discount sufficiently long-term physical risks. As these systemic risks are the largest by an order of magnitude for our clients, we have chosen not to publish the results of this quantitative scenario analysis which we believe may be misleading. Instead, we have developed the qualitative approach outlined above.

4.5. The results of our scenario analysis

The importance of systemic risk and stewardship

As identified earlier we believe there are three categories of climate risk that contribute to portfolio outcomes: Physical risk (asset specific bottom-up risk), Transition risk (asset specific bottom-up risk) and Systemic Risk (top-down economy wide risks).

For stock level, bottom-up risks we analyse our investments and those of the third-party managers held in terms of their exposures to transition or physical risks. But while we integrate climate risk analysis into the bottom-up decision making in our and our client portfolios we must not lose sight of this systemic risk affect.

The key insight from our scenario analysis is that the systemic risks of climate change are substantial and highly unpredictable across asset classes. Furthermore, the systemic risks cannot be diversified away, as traditional diversification across asset classes is no guarantee of protection. Hence systemic risks will be the predominant driver of long-term returns for our clients. This is consistent with the common acceptance that, for diversified investors, strategic asset allocation drives 90% or more of the long-term portfolio outcomes.

What can be done about this? Our answer is to make every effort to contribute to the transition to a 1.5°C scenario. The costs of failing to transition are widely accepted to be much higher in the long-term than the costs of transitioning.⁷ We therefore focus on stewardship, via engagement at both the company and policy maker level, with the objective to achieve alignment with the Paris agreement of a 1.5°C scenario.

This motivates our “dual objectives” approach of focusing on financial outcomes and contributing to the real-world transition towards a more sustainable society – we believe this is the only way to make a contribution towards reducing these systemic risks.

Scenario outcomes

The portfolio impact for a client portfolio is a function of the specific assets held and the combined effect of the top down and bottom-up risks on both assets and liabilities.

The tables below represent the “directional” outcomes for most client portfolios based on our qualitative risk assessment. While client portfolios differ substantially in their asset allocation and specific risks, we think the scenario conclusions below are broadly applicable across equities, government bonds, credit, and private market exposures.

Scenario outcomes: The short term

In some cases, analysis over a short-term timeframe is appropriate. For example, a client looking to move to buyout may seek to hedge many of their investment risks. As previously indicated, we don't think it makes sense to project different climate scenarios over a short-term time horizon, but our risk management tools still use scenario analysis (focused on other factors) to help clients understand their risks over shorter time frames.

Scenario outcomes: The medium term up to 2030

Over the medium-term time horizon of our scenarios, systemic risk is driven not by climate change itself but by the macro-economic impact of changing consumer activity and government policies in response to climate change.

During 2024 we had identified that that geopolitics, policy actions and consumer behaviour over the period between now and 2030 would likely play a very significant role in determining the longer-term trajectory for climate change. These changes can have large effects on overall economic growth and inflation and can drive big variations in broad equity and bond market outcomes over this medium-term time horizon. This is the “top down” effect on markets and economies.

On the positive side China's rollout of renewable energy has accelerated, with China, the world's largest emitter meeting its 2030 renewable energy goals in 2024. However, the geopolitical and policy development particularly in the US over the last year has made it clear that global coordinated policy action will be much less likely over the next few years. Unfortunately, these developments make the 1.5°C scenario much less likely and both the 2°C and 3°C scenarios more probable. This may mean less short-term transition risk for some assets, but higher physical and systemic risks as illustrated in our framework.

From a bottom-up perspective, it is important to include the impacts of transition risks and physical risks on stock selection. These are likely to become more important over time.

⁷ For example see: [A meta-analysis of the total economic impact of climate change - ScienceDirect](#)

The table below summarises our qualitative sense of the size and direction of risk for most client portfolios.

Portfolio Impacts: Medium-Term Time Horizons

Scenario	1.5°C	2.0°C	3.0°C
Physical Risk impact	Moderately negative	Moderately negative	Highly negative
Transitional Risk impact	Negative	Moderately negative	Initially moderate but increasingly uncertain
Systemic Risk impact	Positive	Moderately negative	Negative
Portfolio Impact	Positive	Moderately negative	Negative

Scenario outcomes: The longer term out to 2050

Over the longer-term time horizon, climate change itself increasingly contributes to the systemic outcomes as it will compound and accelerate the policy and consumer responses and hence macro-economic outcomes. It will affect inflation and productivity and drive government policy, consumer behaviour and human activity.

In the longer-term, systemic risks of climate change in warmer scenarios are compounded by the risk of crossing climate tipping points: irreversible climate affects that could accelerate global warming. The effects of climate change will include impacts on agriculture, biodiversity and human activity such as making certain agricultural activity in-feasible in some areas, or sea level changes and desertification forcing relocation of human activity.

Investors will need to increasingly allow for these potential uncertainties as the medium-term unfolds and it becomes clearer which of the long-term pathways we are likely to be on. The longer we leave making a change the more the change will ultimately cost both in terms of mitigation, and in terms of the imperative of more drastic policy reactions required in the 3°C scenario. Because of this in the long-term we believe that the transition risks will be high in all three scenarios as the realities of climate change will increasingly impact policy.

In the long-term we believe the 1.5°C scenario is unequivocally the best economic and environmental outcome for most portfolios and the 3°C scenario will be unambiguously negative.

The table below summarises our sense of directional impact on most client portfolios in these scenarios over the long-term.

Portfolio Impacts: Long-Term Time Horizons

Scenario	1.5°C	2.0°C	3.0°C
Physical Risk impact	Moderate	Highly negative	Highly negative
Transitional Risk impact	Negative	Highly negative	Highly negative
Systemic Risk impact	Positive	Moderately negative	Highly negative
Portfolio Impact	Positive	Negative	Very Negative

Conclusions and Implications from the climate scenario analysis

As a result of this analysis, we prioritise four actions to help manage climate risks and opportunities:

- Stewardship of investments that focuses on increasing the likelihood of achieving Net Zero by 2050, and the resilience of individual assets to transition and physical risks.
- Engagement with policy makers, regulators and other stakeholders to increase the likelihood of achieving Net Zero by 2050 (sometimes referred to as ecosystem stewardship)
- Incorporating the assessment of Transition Risk and Physical Risks into security selection and portfolio construction, both in our own direct portfolios and in those of third-party managers.
- Identifying climate opportunities which offer both financial returns and a positive contribution to a faster transition to a low carbon economy.

Caveats

Any scenario analysis depends heavily on the underlying assumptions. We do not claim that the scenarios we present are more or less likely or indeed that there are not more negative potential economic scenarios consistent with 1.5°C and more positive economic scenarios consistent with 2°C. There are multiple uncertainties in any such analysis: around the speed of global warming and tipping points; around the policy and consumer responses; around the economic effects of those responses; and, around the market reactions to all of the above. The purpose of scenario analysis is to test the robustness of a portfolio against potential future outcomes, not to predict the outcome.

We think this narrative approach to scenario analysis helps us and our clients identify and focus on what's important in analysing climate risks and opportunities. We use this to ensure our portfolio is made more robust when it comes to climate change-related risks and opportunities, regardless of which trajectory we ultimately end up following. In other words, this is a starting point for our investment decision-making and should be considered alongside the metrics and target setting to create more robust portfolios.

We hope in future years to be able to more clearly differentiate the systemic risk exposures of different sectors and geographies and for specific assets.

4.6. Incorporating climate scenario analysis into investment solutions

Our clients are mostly UK defined benefit and defined contribution pension funds. We work with them in various ways:

- As an asset manager, we invest directly in issues from companies and governments (equities and bonds)
- As a fiduciary manager, next to our direct investments, we also invest indirectly via third-party managers and, for derivatives, via counterparties
- As an investment advisor, on pensions and risk management, and as an advisor on sustainability and corporate covenants, we support our clients to set their strategies including climate change

Their investment strategies span a range of asset classes and typically may include exposure to the following building blocks:

1. LDI (Liability Driven Investment) strategies that focus largely on UK government bond exposures and related derivatives

2. Equity portfolios
3. Investment grade credit cashflow driven investments
4. Multi-Asset diversified growth portfolios implemented through both direct investments and derivatives
5. Third party managers pursuing active alpha strategies across public and private markets and a range of strategies.

In each strategy we aim to take what steps are practicable to ensure our investments are resilient to climate change-related risks and opportunities and, where possible, contribute to the transition to a more sustainable society including with regards to climate change (See section 5 for more detail). As such, through our capital allocation, stewardship activities and advice, we not only look to create investment solutions that mitigate sustainability-related risks, we also hope to contribute to the transition to a sustainable society.

Our clients' asset allocations will generally evolve over time, for example, as DB pension funds de-risk or as DC members progress along their journey path to retirement. The aggregate exposures across asset classes are therefore always in a state of flux.

In terms of monitoring our progress against our climate commitments we therefore aim to implement our approach within each building block and our TCFD reporting for the CRML entity will focus on the progress of each building block.

The first four strategies above incorporate direct investments we make on behalf of clients in underlying securities that follow the Sustainable Investment Framework described in section 5. The multi-asset and third-party manager portfolios involve indirect investments to which our external manager ESG process is applied.

4.7. Incorporating climate change into covenant risk assessment

For our Defined Benefit Clients understanding their covenant risk is a key component of their risk management strategy. This includes an assessment of the sponsor covenant from a sustainability and climate change perspective.

This is a service offered by our client covenant advisory business who have developed several models to help with detailed assessment of physical risks and other aspects that can affect covenant.

5.

Risk management



5.1. How we identify, assess and seek to manage climate change-related risks and opportunities

From the scenario analysis above we have identified the following climate related risks and opportunities:

- **Risk 1** – The systemic risk posed by climate change impacting long-term economic growth, inflation and financial market outcomes (top-down).
 - In the long-term the risk is specifically that there is insufficient action to limit global warming to a 1.5°C scenario.
 - As discussed, we think this is a systemic risk that cannot be easily diversified away. The opportunity for us is to help influence real world change that will support the transition.
 - To address this risk, we seek to apply our approach to stewardship across our assets focused on systemically important risks like climate change, biodiversity loss etc. The intention is to influence companies and issuers to reduce their negative impacts, to accelerate their contribution to the transition and to manage their risks.
 - We also seek to engage with policy makers to encourage a focus on climate related policy that will speed the transition.
- **Risk 2** – The systemic risk posed by evolving government policy and consumer reactions to climate change impacting long-term economic growth, inflation and financial market outcomes (top-down).
 - We recognise the potential for such policies to affect macro-economic outcomes, but the precise impact is highly uncertain across the scenarios: the transition could progress more quickly than anticipated or more slowly and chaotically; and growth or inflation could be affected by a multitude of geo-political and policy related outcomes.
 - To address this risk we seek to:
 - > Understand the nature of evolving policy and regulation. We have various specialists within our Sustainability and Multi-Asset Investment teams who monitor these policies and regulation.

- > Create robust portfolios that consider multiple scenarios for growth and inflation and diversify across asset classes and across fundamental economic drivers (we describe these as economically balanced portfolios). This is intrinsic to our approach to portfolio construction and asset allocation.

- **Risk 3** – The Transition risk and Physical risk resulting from climate change on individual assets (bottom up)
 - Our Sustainable Investment Framework drives our stock selection. We explain this in more detail below.
 - This framework allows us to exclude companies that we think are at risk of failing to transition or are exposed to unacceptable risks which they do not have the capacity to manage.
 - It also allows us to identify positive impact opportunities that can help accelerate the transition.

In the sections below we explain how these risks are assessed, managed and mitigated across the various investment strategies we manage for clients.

5.2. How we identify and manage market-wide and systemic sustainability risks including climate change

Sustainability risks are overseen by the Sustainable Policy Committee who set the Sustainable Investment Policy. When implementing the Sustainable Investment Policy, the Sustainability Investment Committee brings the Cardano Sustainability Group together with the investment teams to make decisions which may require input from both areas, such as on climate change.

We deploy all the risk management tools in our toolbox to help mitigate these risks. However, as the systemic risks such as climate change cannot be diversified away, the only way we believe we can help mitigate those risks is to engage in effective stewardship, both at the asset level and the policy engagement level.

To measure progress, we define several portfolio goals which, if achieved, would contribute to mitigating these systemic risks including reaching:

- Net zero green-house-gas emissions by 2050 (with interim objectives)

- Net zero deforestation by 2030
- Water neutrality by 2030
- In addition, although more difficult to monitor quantitatively, we have also set a goal of progress towards a circular economy by 2050 and human rights and social capital goals for our portfolio.

Understanding of these systemic risks is supplemented by the external working bodies we are part of such as the UN PRI, IIGCC etc.

How we make these assessments:

- Our Cardano Sustainability Group consist of experts in many sustainability related risks, including climate change, and monitors ongoing policy and regulatory developments.
- We are members of external industry groups such as the IIGCC and UN PRI. These provide valuable frameworks, industry context and access to experts on climate change. We are involved in several working groups and collaborative engagements led by these groups.
- Our multi-asset team monitors developing policy that may affect growth and inflation outcomes
- Bottom-up assessment of corporate exposure and risk is completed by our Cardano Sustainability Group following our Sustainable Investment Framework.
- Our Manager Research Team have a formal process to assess third-party managers approach to integrating ESG risk into their investment policies.

5.3. Our Sustainable Investment Framework drives our direct portfolio risk management

Our Sustainable Investment Policy relates to our investment and advisory activity and sets out how we integrate Environmental, Social and Governance (ESG) issues and real-world sustainability impact insights into our investment decision-making, stewardship and policy engagement activities.

Our Sustainable Investment Policy draws on over 30 years' sustainability-related experience at the Cardano Group. It incorporates our Group-wide beliefs, sustainability targets and an overview of the policy's implementation for our internally and externally managed assets. This policy is

underpinned by a series of documents, which apply to our directly managed assets:

- Our Sustainable Investment Policy, elaborates on our Sustainable Investment Framework which includes how we assess:
 - investee entity compliance with international standards
 - investee entity involvement in activities deemed too harmful for society
 - the capacity of investee entities to transition towards a sustainable society
 - whether investee entities make a positive contribution to a sustainable society
- For more detail see the Cardano Sustainable Investment Framework in appendix A and the Impact Investing Policy in appendix B
- Our approach to stewardship, engagement and voting (see our Engagement Policy and Voting Policy – appendices C and D)
- Our priority sustainability themes (see thematic strategy documents on climate change, biodiversity and water – appendices E1 to E3)
- Asset class-specific policies and proprietary measurement methods (see appendices F and G)

All documents mentioned above are available [here](#).

Our Sustainable Investment Framework

Our Sustainable Investment Framework is based on our belief that the world needs to transition towards a sustainable future. This transition provides opportunities for companies and sovereigns but also brings risks.

Our Sustainable Investment Framework is based on the priority systemic risk themes (climate change, biodiversity loss etc) and classifies each entity on its ability to transition towards a sustainable society. Where entities fit on this framework is determined by the sustainability-related risks and opportunities and the entities' real-world impacts and determines whether we should invest in them. It also determines to what extent engagement can mitigate remaining sustainability-related risks or advance their transition.

Classification of each entity in the framework is based on a two steps procedure (below figure). Each step is summarised below and described in more detailed in the Sustainable Investment Policy document.

- **Step 1:** Evaluate if the entity’s behaviour and the activities fit within a sustainable society. We assess if the entity violates international standards or is involved in activities considered too harmful for society such that it would cause too much harm to the social foundations or planetary boundaries. These entities are excluded from direct investment.
- **Step 2:** Classify the entity based on its ability and likelihood to contribute to, or adapt to, the transition to a sustainable society and on how sustainable its operations are. If the entity adapts and contributes, either through reducing negatives or accelerating positives, we may invest. If it is unlikely to adapt and, therefore, represents unacceptable risk to our portfolios and creates unacceptable negative impacts to society, we usually avoid investing.

Sustainable investment framework	
	Positive impact
	Sustainable
	Adapting
	At risk
	Non-adapting
	Harmful
	International standards

The classification into these categories begins with a process that incorporates quantitative screening based on sustainability data from various data providers including MSCI and Sustainalytics. This may then be supplemented with qualitative analysis performed by our research team in the Cardano Sustainability Group research team to come to a final recommendation on each investment’s classification.

Classification is ultimately approved by our Sustainability Classification Committee.

5.4. Applying the sustainable investment framework to manage climate risks in our direct investments

Managing funding risk for pension fund clients through Liability Driven Investment strategies

LDI strategies represent a very substantial risk management tool to manage defined benefit pension funds in the face of the systemic risks of climate change. Our approach is typically to hedge the pension fund liabilities up to cover the full value of the assets. This means that the funding ratio (the ratio of the value of assets over the value of liabilities) is largely immune to the changes in interest rates or inflation expectations which are very uncertain under different climate scenarios.

Equities

In 2023 we introduced a new enhanced index equity strategy that forms the core equity exposure in all of our fiduciary client portfolios. These portfolios are managed according to our sustainable investment framework which involves.

1. excluding companies that we believe are at risk of failing to adapt to the necessary transitions including climate change
2. investing in, and supporting through active stewardship, those companies that are willing and able to adapt, already operate sustainably or are even positively contributing to the transition.

At a portfolio level we monitor carbon emissions and the pathway of progress of this portfolio over time. This targets a reducing carbon pathway ahead or in-line with our commitments. The climate targets applied to our direct equity portfolios was approved by the Science Based Target initiative (SBTi) in 2023.

Key to influencing the transition in our investments is our approach to stewardship (expanded on below). This is explained in detail in our stewardship policy. We are UK Stewardship Code signatories and our UK Stewardship Code submission ([Cardano-Stewardship-Report-2023.pdf](#)) demonstrates our approach in detail. An updated version for 2024 will be published in September.

In particular with regards to Climate Change and the related topics of biodiversity loss, water usage and materials usage, Cardano are active participants in a range of collaborative engagement initiatives:

Planetary Boundary	Initiative	Sector/Topic
Climate	Dutch Climate Coalition	Oil & Gas, Chemicals: Climate transition
	Sustainalytics Net Zero program	Metals, Utilities, Airlines, Oil & Gas: Climate transition
	IIGCC Net Zero Engagement Initiative (NZEI)	Utilities: Climate transition
	ShareAction: Chemicals decarbonisation program	Chemicals: Climate transition
	ShareAction: EU banking program	Banks: Climate transition
	Climate Action 100+	Agriculture: Net Zero and climate transition
	FAIRR Protein Diversification	Food & agriculture supply chain: Climate transition strategies
Biodiversity	Satellite-based deforestation program (Cardano-led)	Consumer Goods: Deforestation in the supply chain
	PRI Spring	Agriculture, Mining: Lobbying related to public policy to prevent deforestation and biodiversity loss
	Nature Action 100	Specialty Chemicals: Biodiversity
	Sustainalytics Biodiversity & Natural Capital program	Banks: Biodiversity oversight and transition
	Share Action Pesticides initiative	Chemicals: Pesticide production and biodiversity loss
	FAIRR Waste & Pollution	Packaged Foods & Meats: Biodiversity risks from waste
Water	Valuing Water Finance Initiative	Restaurants: Water scarcity and water quality
Materials use	Nature Action 100	Specialty Chemicals: Biodiversity
	Investor Initiative on Hazardous Chemicals (IIHC)	Chemicals: Phase-out of hazardous chemicals
	Plastic Solutions Investor Alliance (PSIA)	Consumer Goods: Plastic reduction
	VBDO plastics initiative	Consumer Goods: Plastic reduction

Bond investments

We invest in a wide range of bond asset classes including corporate credit, government bonds, LDI strategies and use of proceeds bonds (Green, Blue, Sustainable and Social bonds). Our approach in each differs according to the needs of the specific sub-asset class.

This means that bond issuers that are deemed to be non-adapting, at-risk, harmful or in violation of international standards are normally excluded from our credit portfolios. It means that those issuers included in our portfolios are managing their transition risks in a sufficient way to adapt to the climate transition.

Investment grade credit

Our investment grade credit portfolios use the same sustainability framework applied to equity portfolios.

We have not yet set a portfolio level carbon pathway for these portfolios.

Bond issuers will also be subject to the same engagement process described above for our equity portfolios, with priority companies identified based on the systemically important transition themes. The CSG Stewardship team will lead on many of these systemic engagements with involvement from the Investment Team at times raising certain sustainability concerns with companies.

Sovereign bond exposure

The majority of our sovereign bond exposure comes through our LDI strategies and is particularly focused on UK government bonds. In these portfolios we are not able to disinvest should governments fail to transition. Instead, our focus is on engaging with and encouraging governments to commit to and increase their ambitions towards Net Zero.

For **sovereign bonds** we adopt a different framework from corporate issuers but the objectives and principles are similar: understand the risk exposures, understand what sovereigns are doing to align themselves to a more sustainable society including their climate transition ambitions, and engage where possible. Because no sovereigns are currently operating as “sustainable” or “positive impact” most fall into our Adapting category. However, several sovereigns in certain emerging markets are excluded from our direct investment portfolios because they do not comply with our policies on human rights or other relevant issues under our investment framework.

We are regular responders to government and regulator consultations and work together with like-minded investors in engaging on government policy.

Case Study:

Engagement with policy makers and the industry

- Institutional Investors Group on Climate Change (IIGCC) – We participate in the Derivatives and Hedge Funds Working Group (co-chaired by Cardano) which finalised its findings and published guidance in early 2024. We participated in the Investor Strategies Programme Advisory Group.
- Investment Consultants Sustainability Working Group (ICSWG) – We participate in the Steering Committee, and from 2024 the Influence workstream. Over 2024 we contributed to the Influence workstream through developing specific position papers on the objectives of the group focused on achieving simplification of reporting burdens on trustees, allowing time for more effective and impactful sustainability focused actions and aligning the governments productive finance

agenda with the sustainable economic transition needs. We participated in regular quarterly conversations with regulators including the Department for Works and Pensions, The Pensions Regulator, the Financial Conduct Authority and the Financial Reporting Council.

- Partnership for Carbon Accounting Financials (PCAF) – We participated in the Sovereign Bonds Working Group.
- ICMA: Cardano participated in the green enabling activities and impact reporting working groups.
- In November 2024, we endorsed a letter directed to the Member States of the European Union, and Members of the European Commission, opposing the delay and dilution of the EU Deforestation Regulation (EUDR). Deforestation poses material financial and systemic risks that threaten the long-term value of our portfolios. The EUDR represents a critical regulatory step in mitigating systemic biodiversity loss and climate change by ensuring that supply chains become free from deforestation-linked products. Delaying and weakening the regulation undermines global efforts to protect forests. This letter was aligned with the discussions we have with companies via our collaborative engagement program using Satelligence data (described later in the document)

Green Bonds / Use-of-Proceeds Bonds

One of the more direct ways to contribute to the transition is through investing in Green Bonds or “Use of Proceeds” Bonds. These can directly finance climate related initiatives. We encourage the use of these bonds in our Multi-Asset, Credit and LDI strategies where appropriate.

We have a detailed approach to the selection of Green Bonds, Blue Bonds and Sustainable -Use of Proceeds or Sustainability linked bonds detailed in [this Sustainable Bond Methodology document](#). This process does not accept that any bond with a green label will qualify for our portfolios, rather it needs to meet our own internal criteria for sufficient ambition in promoting the transition to a more sustainable economy.

Multi-asset portfolios

In multi-asset portfolios we emphasise diversification across asset classes and fundamental economic drivers as a primary tool for managing long-term risks including climate change. We also incorporate protective instruments such as options that may protect against shorter-term risks. Many of these exposures are taken through derivatives where, from a stewardship perspective and in line with our model of influence, we believe our ability to have an influence on issuers is more limited.

We therefore focus our multi-asset sustainability efforts on:

- Green Social and Sustainable Bond exposures where the use of proceeds can directly contribute to making a real-world impact
- The core equity portfolio holdings in the multi-asset funds managed as described above
- Commodity exposures: we will not invest in direct fossil fuel commodities but do have exposure to commodities (via derivatives) that we believe support the transition to a low carbon economy such as industrial metals and EU carbon allowance certificates
- Third-party funds discussed below

5.5. Our approach to risk management with third party managers

In addition to our direct investments, we help our clients invest in more than 60 external investment managers and monitor over 120 external funds across most major markets, asset classes (public and private), and geographies. We have a flexible approach to account for different strategies, underlying asset classes and geographies without compromising on ESG focus, which we believe drives the best outcomes.

We recognise there are many valid sustainable and responsible investing approaches, and we do not apply our in-house sustainability framework or stewardship policies to external managers. Instead, we expect external investment managers to:

- Be aware of financially material ESG issues associated with an investment including climate
- Take ESG issues into account where they have the potential to materially affect the financial risk and/or return
- Engage strategically on ESG issues, where possible within the portfolio and externally
- Exercise their voting rights where possible
- Weigh substance over form – we look for the genuine integration of ESG issues
- Provide case studies and practical examples of their approach and performance

Our ESG assessment framework for external investment managers is deliberately detailed and assesses external managers across people and policies, investment integration, stewardship and engagement, and reporting.

With regards to climate risks it goes into a detailed assessment of their approach to climate risk assessment and integration including questions such as:

- Does your organisation publicly support the Task Force on Climate-Related Financial Disclosures (TCFD)?
- During the reporting year, did your organization publicly disclose climate-related information in line with the TCFD recommendations?
- Has your organization identified climate-related risks and opportunities affecting your investments?
- Which industry initiatives are you signed up to?
- Does this fund monitor/consider absolute emissions, emissions intensity and alignment metrics?
- Have you set a decarbonization target for this fund? If no, please explain why not.
- Please describe the process & people involved in identifying climate-related risks and opportunities in the portfolio and how this is incorporated into investment decisions?
- Does your organisation use scenario analysis to assess climate-related investment risks and opportunities?
- Are you able to provide reporting on the look through carbon footprint of the portfolio in accordance with TCFD?
- Do you track the number of portfolio companies that have science-based targets in place?
- Do you encourage your portfolio investments to disclose against Science-Based Targets Initiative (or equivalent)?

Manager engagement

We believe manager engagement is one of our most powerful forms of influence in the industry.

We engage with external investment managers across strategy, geography and size and we regularly discuss sustainability topics including climate change as part of our ongoing monitoring of external investment managers, including challenging individual stocks and stewardship activity.

We send a letter each year identifying the key issues we want to see progress on. This has included encouraging managers to sign up to the UNPRI and Net Zero initiatives. We treat managers as partners, feeding back assessments and using these to set specific, time-based milestones for managers to make progress. We regularly discuss ESG related topics as part of our ongoing monitoring throughout the year.

We make a distinction between Low Focus managers where we believe ESG risk management is important but their strategy has relatively limited ability to influence outcomes or engage with companies (for example high frequency quant or derivative based strategies) and High Focus managers (in equity, private equity, corporate credit) where we expect their influence to be significant.

For both groups of managers we expect our appointed asset managers to be responsible investors and in particular:

- Disclose GHG emissions metrics. As a minimum, disclose how climate change risks and opportunities are incorporated into investment processes
- Join the PRI (or equivalent). As a minimum, disclose how broader ESG risks and opportunities are incorporated into investment processes
- Vote at AGMs on all matters arising

For high focus managers we believe they are often able to exert significant influence on the companies in which they invest. In this regard, we encourage them to:

- Engage companies with specific measurable objectives to improve financial or real world-impacts including with regards to climate risks, opportunities and impacts
- Vote at company AGMs on all matters arising including ESG consistent with their engagement activities and fiduciary duty
- Escalate where engagements are less successful
- Collaborate with industry engagement initiatives where aligned with their beliefs to drive the necessary change
- Become signatories of the UK (or equivalent) stewardship code.

Where our asset managers do not meet our expectations, we create engagement plans to engage with them to drive improvement. Where this has not been forthcoming this will result in downgrades and potential divestment.

Examples of our engagements with managers

In our 2024 letter to all external managers, we encouraged them to:

- Provide improved detail on their stewardship activities across the key topic areas that are important to our clients. These key thematic areas included topics within Climate, Environment and Human Rights. Our expectation is that Managers incorporate these themes into their engagement and voting activities.
- Outline their climate-orientated stewardship goals. Specifically, we are interested to understand their approach and what they prioritise within these engagements. For example, we want to understand which Managers are prioritising disclosure vs. specific action from companies when they are engaging with their portfolio companies.
- Private Markets. We highlighted examples of best practice to Managers. This covered best practice within ESG reporting, commitments on Science Based Targets and how Managers could improve their stewardship activities

During 2024, we had several discussions with third-party managers on the effectiveness of their voting and engagement approach. This includes discussions on voting activity, by discussing voting record, collaborative engagement, escalation avenues, prioritisation, voting performance and most significant votes on behalf of our various pension fund clients. One example this year included engaging with some of our Equity managers, where we noticed less support for ESG-related shareholder proposals. This was also an industry trend highlighted by several reports. The conclusion from the engagement was that we were satisfied that our Equity Managers continue to review the individual merits of each shareholder proposal and that they will vote in accordance with their established policies, which focus on financial materiality.

One other issue identified was the issue of “Anti-ESG” resolutions. In one case we noticed a manager with a strong track-record in ESG voting, had voted in favour of an “Anti-ESG” proposal. It appeared that the manager missed several anti-ESG resolutions and mistakenly voted in favour of these. As a result, the third-party manager collaborated with their proxy advisor and the Corporate Governance Forum to understand how they and the industry can be better equipped to identify anti-ESG proposals.

Progress of Third Party Managers on climate

We are monitoring our managers progress on developing policies around climate change.

On climate change and Net Zero commitments specifically:

- We assessed more than 120 funds on ESG in 2024; public and private strategies across US, Europe and the Rest of the World.

- We saw a material improvement in our assessments across some managers versus prior years on several fronts. Notable improvements were made around climate:
 - 63% of managers now publicly support TCFD (vs 54% last year),
 - More than 65 are tracking their portfolio’s carbon footprint (vs 50% last year).
 - Approximately 50% of funds encourage portfolio investment to disclose against Science-Based Targets (unchanged).
 - Just over 30% of funds have signed up to Climate Action 100+ (unchanged),
 - Approximately 13% of funds have set formal decarbonisation targets. This is down from 20% last year and echoes a trend in the industry.

While we would like all to sign up to Net Zero commitments the reality is that most managers are not yet ready to do so. It is also an unfortunate reality that many asset managers, particularly those with large US operations are reconsidering their commitments and, in some cases, have stepped back from commitments and initiatives. At the same time we have seen others re-enforce their commitments. We recognise the realities of these political challenges alongside the reality that the world is not decarbonising as quickly as we would have liked. At this stage we are focused on engagement and education. Our emphasis is on consistency between their approach to stewardship, engagement, voting, escalation and portfolio actions which will drive real world decarbonisation.

In the longer-term we will have to consider how we will evolve our manager line-up if managers fail to make progress, particularly on engaging effectively with portfolio companies around the transition.

Case Study: Engagement Activities of a Third-Party Credit Manager

Reason/Objective of the Engagement:

The focus of this engagement was to understand the climate transition plans of one of the manager’s bank holdings in the portfolio. As providers of capital, banks have a major role to play in enabling the transition to a low-carbon future. Also, banks themselves are facing increasing climate-related risks and opportunities through their lending and other financial intermediary business activities. Their engagement objectives focused on the

four TCFD recommendations: Governance, Strategy, Risk Management, Targets & Metrics.

What they did:

- Directly engaged with the bank to drive change.
- These engagements have been both directly from them but also through collaborative engagement groups such as the IIGCC.

Outcomes of the Engagement:

- Positively, following these engagements, the bank is phasing out the financing of thermal coal by 2030 in OECD countries and the EU, and by 2040 in the rest of the World.
- The bank will also no longer finance new oil and gas field projects, and the bank will rapidly reduce their existing financing to the fossil fuel industry.

Case Study: Engaging with a Private Equity Manager

Reason/Objective of the Engagement:

We recognised that the manager was behind peers on ESG. Our key focus areas were: (i) more granular reporting from the manager; (ii) ESG accountability at the company level; and (iii) TCFD carbon footprint reporting on the portfolio.

Why

Our identified key focus areas would improve ESG risk management and enhance ESG reporting.

How

We voiced our concerns at the Limited Partner Advisory Committee (LPAC). This is a group of select investors tasked with providing oversight and guidance to the Investment Manager.

Outcome

The manager has significantly bulked up their ESG reporting (including signing up to the ESG Data Convergence Project – an industry transparency initiative sponsored by the Boston Consultancy Group), enacted ESG deep dives for every new investment and begun formerly collecting data from portfolio companies.

The manager has also laid out a detailed ESG improvement timeline, which we believe will lead to significant positive progression from the manager in the short- to medium-term.

5.6. Using Stewardship and Engagement to manage climate risks

The importance of real world decarbonisation

We focus our engagement efforts on companies who are willing and able to adapt. We believe it is more important to engage with companies and governments and to supply enabling capital to achieve long-term transformation and decarbonisation than it is to hit short-term carbon footprint target metrics.

For example, emerging markets, which have higher carbon footprints, in part because they produce carbon intensive goods consumed by developed markets, require capital in order to transform their economies. We will not shift our allocations away from emerging markets simply because of their high carbon footprint.

Engagement is often a long-term process and, in many cases, has proven unsuccessful. Where businesses are unlikely to change their behaviour, and we consider their adaptive capacity and management of these risks to be weak and unacceptable, we will exclude these companies from our portfolios. For example, we exclude companies with substantial thermal coal revenues who do not have a phase out plan. And many companies in the oil and gas sector have now been excluded because they have failed to produce sensible transition plans or because their actions contradict their stated commitments. Where possible we reallocate this capital towards companies with similar financial characteristics but that do have better sustainability characteristics. The result of these exclusions is that our portfolios tend to have lower carbon footprints than the parent benchmarks.

This informs our approach to climate metrics. While we measure carbon footprint to track the progress of the portfolios and the real-world decarbonisation over time, and we have set headline decarbonisation targets, this is not what should drive portfolio change. Instead, we emphasise alignment metrics, such as the proportion of the portfolio that have set Science Based Targets.

We will resist pressure to modify portfolios to meet headline portfolio level decarbonisation targets at the expense of incentivising the necessary real-world transition. Our goal is net zero greenhouse gas emissions globally – and we seek to maximise our influence to achieve this. In the long-term, this is the only effective strategy to mitigate the systemic effects on markets of climate change.

For these reasons, portfolio decarbonisation targets will continue to be reviewed every few years to ensure they remain appropriate.

Climate change stewardship

Our engagement activities are held at issuer level and cover both equities and bond holdings. In terms of geography, our dialogues tend to be concentrated in Europe and in North America, where the concept and process for companies having engagement dialogues with investors is more developed.

We review our engagement activities on a continuous basis and have made efforts to increase our engagements in other regions. We expect all companies to work towards achieving the same ultimate sustainability goals that are relevant to their business strategies (including net zero, net zero deforestation, and strong human rights due diligence, among others). However, we acknowledge that companies in emerging markets may be at an earlier stage of their sustainability journeys and have less dedicated resources. This means that our engagement efforts here focus on more foundational practices, such as creating policies, creating internal structures, and developing board and management level oversight of sustainability issues.

We make public an overview of our engagement activities here. Climate change tops the list of topics on which we play an active role with 35 (up from 29 in 2024) different company engagements as of December 2024. Engagements in connection Deforestation and Biodiversity (21) and Water use (11) also relate closely to climate change.

We also engage policy makers, regulators and other stakeholders through public consultations and direct conversations. In recent years we have responded to the Transition Plan Taskforce consultation, the International Sustainability Standards Board consultation, the Taskforce for Nature Related Disclosures and the FRC Stewardship Code consultation amongst others that are all relevant to climate change. Please see our policy consultation responses here: [Public policy consultations - Cardano - UK](#).

For more details see our stewardship code submission.

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We focus our engagement efforts on companies who are willing and able to adapt.

Case Study: Engaging the chemicals sector on its climate transition

Introduction

Cardano participates in the Chemical sector decarbonisation program coordinated by ShareAction, engaging the European companies in the sector to implement a 1.5C aligned climate transition plan with short-, medium- and long-term goals.

Why

The chemical sector is responsible for about 6% of the global greenhouse gas emissions.⁸ The sector therefore plays a critical role in enabling the low-carbon transition. Cardano holds a number of chemicals companies in its equity and bond portfolios.

Objectives

The main objectives for this engagement are 1) Set out and disclose a plan over the short, medium and long-term, with intermediate targets, to: a) phase in electrified chemical production processes, with the aim of transitioning to 100 percent electrified processes by 2050; and b) increase energy consumption from renewable energy sources, with the aim of transitioning to 100 per cent renewable energy by 2050. 2) Set and disclose plan to phase in non-petrochemical feedstocks that are emissions-neutral over their entire lifecycle, with the aim of transitioning to 100 per cent emissions-neutral feedstocks by 2050 3) Set scope 3 targets that are aligned with 1.5C with low/no overshoot pathways covering all relevant upstream and downstream emissions. 4) Explicitly commit to align capital expenditure plans with the objective of limiting global warming to 1.5C without overshoot; and disclose future capital spending on new and existing assets broken down by the type of asset, and by plant/facility, across all geographies.

Engagement Activity

A summary of our recent activity is described below and outlines the dialogues and other tools we use to encourage progress on our objectives:

- Company 1 is one of the world's largest nitrogen fertilizer producers. It has demonstrated limited progress on key objectives, particularly in setting a Scope 3 emissions target. Following the filing of a shareholder resolution earlier this year, the investor coalition sent letters to the CEO requesting a meeting. During the CEO-level meeting, the coalition discussed the three core asks and emphasized their expectations for progress.

- Company 2 is one of the world's largest chemical producers. It has made notable progress on our three key objectives and offered our group a meeting with the company's new CEO. Discussions centred on the company's CSRD-aligned transition plan, specifically strategies for transitioning its asset base over the next decade and moving away from fossil fuel feedstocks.
- Company 3: Similar topics were raised with the company, one of the largest industrial gases providers globally. The company has made minimal progress on key objectives. The discussions mirrored those with Company 1, focusing on the company's lagging efforts in aligning with our expectations.

Outcomes

- All three companies cited their transition will be slower because of lagging enabling policies and concerns about losing competitive advantages in the global market.
- To address these concerns, our group addressed the companies' lobbying strategies during the dialogues. Companies were encouraged to adopt greater transparency in their lobbying activities and to actively advocate for ambitious climate policies.
- Cardano believes the companies can do more to transition but also recognises the need for a supportive policy environment. In collaboration with ShareAction, we therefore submitted a response to the EU Delegated Act on Low Carbon Hydrogen consultation, advocating for prioritizing renewable hydrogen over low-carbon -such as carbon capture- alternatives. Follow up letters were sent to the companies, and our engagements will continue in 2025.

6.

Metrics and targets



6.1. Terminology

The GHG Protocol Corporate Standard⁹ classifies a company's GHG emissions into three scopes:

Scope 1: Direct emissions from owned or controlled sources.

Scope 2: Indirect emissions from generating purchased energy.

Scope 3: All indirect emissions not included in Scope 2 in the value chain of the reporting company, including upstream (suppliers to the company) and downstream (customers of the company) emissions.

Tons of Carbon dioxide equivalent (tCO₂e) measures the total emissions in tons from various greenhouse gases on the basis of their warming potential, by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming potential.

Companies are increasingly being required to report on their Scope 1 and 2 emissions. Scope 3 emissions (sometimes split into upstream and downstream emissions) help us better understand a company's sensitivity to climate change-related risks and opportunities, and its ability to transition. It can therefore help to understand relative performance of different companies within industries, but it is a less accurately reported number and often has to be estimated.

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We aim for an emissions reduction in our strategies of 50% by 2030 and 75% by 2040

6.2. Explaining our targets

We support the Paris Climate Agreement of limiting global warming to +1.5°C versus pre-industrial levels with limited or no overshoot. We do this by committing our investment portfolios to net zero greenhouse gas (GHG) emissions by 2050, known as 'net zero'.

We aim for an emissions reduction in our strategies of 50% by 2030 and 75% by 2040, with the baseline year set at December 2019. This implies an average 7% reduction in GHG emissions every year, which informs our asset-class decarbonisation targets. We aim for this reduction to come through “real-world” de-carbonisation by the underlying investments rather than “paper portfolio decarbonisation” whereby we simply sell assets with higher carbon footprints in order to meet this target.

In order to achieve this real-world goal we would like all of the issuers (companies and governments) we invest in to develop Science Based Targets aligned with the Paris Agreement specific to their industry and geography and develop and implement transition plans to achieve this.

We support the concept of ‘fair share’ decarbonisation targets: countries with historically higher emissions (which tend to be developed markets) should decarbonise more rapidly than countries with historically lower emissions (which tend to be emerging markets). Our default position is in our fiduciary management, our asset management, our advice, and our liability-driven investments.

We measure progress towards this using the Carbon Footprint for Scope 1 and 2 emissions, an Intensity emissions based metric explained below, for each strategy or asset class. This is because our assets under management vary over time (as we win new clients or old clients move to buyout) and our clients asset allocation changes over time so the mixture between asset classes also varies over time. By measuring our progress at the strategy and asset class level, an intensity based metric provides the most comparable metric from one year to the next that allows us to track our progress. We report scope 3 emissions but these are not used to track the targets for reasons explained below. For Sovereign Bonds we focus on Consumption Intensity per Capita, explained in more detail below.

We compare our progress in our portfolio to that of the broad market index per strategy. While our focus is on reducing emissions in the real world in the companies we own in our portfolio, we also need to understand the progress that is being made in the broad markets.

We measure forward looking alignment of the portfolio with the Paris agreement by focusing on the alignment metric, the percentage with an approved Science Based Target (SBTi) or equivalent metrics in other asset classes such as sovereign bonds.

9 https://ghgprotocol.org/sites/default/files/standards_supporting/FAQ.pdf

6.3. The metrics we calculate

We calculate and disclose the following metrics to our clients in respect of their portfolios. The metrics in **Bold** are the primary metrics we find most useful in managing our portfolios from a climate change perspective.

Metric	Units	Which assets?	How we use this
Absolute financed emissions (Scope 1+2, 3)	tCO ₂ e	Equities, Credit, Private Markets	Our clients will own a portion of each company they invest in. This metric measures the absolute emissions associated with the proportion of each company they have financed. Absolute emissions tell us the emissions associated with our investments. While an important metric for us – and the regulator – it is difficult to use this metric for comparison purposes, because it is dependent on the number of clients we have, their asset allocation and their size which varies from year to year.
Carbon Footprint (Scope 1+2,3)	tCO ₂ e/£m invested based on Enterprise Value including Cash	Equities, Credit	This is the main metric we monitor over time to measure progress relative to the market in each asset class. If the carbon intensity of each asset class reaches Net Zero by 2050 through real world decarbonisation we will have achieved the objective. At a portfolio level this measures the portfolio carbon emissions adjusting for variations in the size of the portfolio (for example due to changes in asset allocation). It will change when the portfolio changes (selling one company and buying another), and as the underlying company emissions change over time. It is also affected by the underlying company share prices. It measures current emissions and not the future direction. We monitor our portfolio decarbonisation progress against our targets using this measure for scope 1 and 2 emissions.
Weighted Average Carbon Intensity	tCO ₂ e/£m revenue	Equities, Credit	This is another measure of the intensity of a company’s carbon emissions, this time relative to the company’s revenues. It can be more stable than the Carbon Footprint and we use this in some portfolios to measure carbon changes over time.
Data Coverage	% coverage	All	This monitors the proportion of assets for which we are reporting carbon emissions data (either actual or estimated).
Portfolio Alignment	% SBTi approved target	Equities, Credit	This is the percentage of the portfolio exposure having set Science Based Targets to align with either a 1.5°C or 2°C climate scenario. We use the Science-Based Targets Initiative (SBTi) framework which assesses the ambition of a company’s Scope 1 and 2 targets.. This is our primary forward looking metric to assess progress on how many companies are making commitments to reduce their emissions.
Sovereign debt production emissions intensity	tCO ₂ e/\$m PPP adjusted GDP	Sovereign debt	This metric measures the intensity of emissions produced by a country relative to its Gross Domestic Product adjusted for Purchasing Power Parity (inflation differentials between countries). Production emissions are the emissions associated with goods, services and activities within the country.
Sovereign debt consumptions emissions intensity	tCO ₂ e/Capita	Sovereign debt	This is our preferred carbon metric for sovereign debt. It measures the consumption-based emissions of a country (what the county consumes includes both what it produces domestically and what it consumes through net imports) relative to its population size. It adopts a starting point of assuming every individual on earth is entitled to the same impact on global warming.

A note on C-VaR Scenario Metrics: As explained in the section on Climate Scenario Analysis, we have a framework for doing climate related scenario analysis on our portfolios. While we have tools that can help us quantify this scenario analysis for portions of our portfolios (for example calculating the Climate Value at Risk under different scenarios), at present we believe the results of these calculations are misleading, in particular in severely underestimating systemic and physical risks especially in hotter scenarios. As a result, we are encouraging clients not to focus on quantitative results of the scenario analysis. We believe the qualitative approach we have adopted is a powerful tool and there it is not necessary to use inaccurate quantitative climate scenario metrics in-order to complete decision useful scenario analysis of a portfolio.

6.4 In scope assets

AUM across Cardano UK (CRML) clients with an IMA or in Cardano pooled vehicles

Strategy	GBP (m)
Equities	3,777
LDI (ex credit, ex derivative exposure)	7,021
Credit	1,341
MultiAsset**	2,505
Third Party Managers	2,481
Total discretionary AUM	17,127

** This excludes direct equity exposure within MultiAsset portfolios

We will produce TCFD compliant climate metrics for these clients as and when requested.



6.5. The results and our progress

Because every client's portfolio differs and their asset composition will vary over time, we do not report aggregate absolute metrics in this report. Each client can request a detailed report of all of the above metrics in section 6.3 specific to their portfolio.

In this entity level report we focus on reporting progress with regards to Carbon Footprint and Portfolio Alignment across the different main common building blocks used in our client portfolios. Some clients have bespoke portfolios that are not reported on here.

We measure our portfolio emissions over time relative to a baseline of 2019. For strategies that did not exist in 2019 we will either measure from inception or relative to the 2019 market benchmark for the strategy. For our credit strategies the custom benchmarks were only developed in 2022 and 2023 so baseline numbers are not available, we will report progress on these portfolios in future years. Our Multi-asset portfolios are not managed against benchmarks.

Corporate Exposure (Equity and Credit)

Strategy description (Fund Code & Inception date)	% coverage*	Portfolio alignment % with SBTi targets	Carbon Intensity (tCO ₂ e/ EVIC for corporates per £m invested)		% change Scope 1+2 Carbon Intensity	
			Scope 1+2	Scope 3	2024 vs 2013	2024 vs 2019 baseline
Global Equity incl. Emerging Markets (CGSEF – April 2023)	100%	43.7%	34.0	182.2	-17.1%*	-60.8%
Benchmark**	100%	42.6%	58.1	406.9	-7.8%	-33.0%
% Difference vs benchmark	0%	+1.1%	-41.5%	-55.2%	-28.0%	-26.3%
Medium dated Buy-and-Maintain Credit (CCIF1 – March 2022)	90.6%	48.7%	25.0	232.2	-41.2%	n/a
Benchmark***	91.2%	39.8%	46.0	231.0	+0.9%	n/a
% Difference vs benchmark	-0.6%	+8.9%	-50.4%	+0.5%	-42.1%	n/a
Long dated Buy-and-maintain Credit (CCIF2 – Feb 2023)	86.5%	43.9%	68.0	316.8	-18.6%	n/a
Benchmark***	46%	34.6%	52.0	316.8	-14.9%	n/a
% Difference vs benchmark, ****	+1%	+9.3%	+30.7%	0.0%	-3.7%	n/a
MultiAsset Prime (CIPF3 – 2018)	90%	18.8%	56.7	350.0	-18.6%	-40.1%
MultiAsset Vector (CIPF2 – 2016)	92%	25.6%	51.2	350.9	-22.6%	-45.2%

Data represents exposure and fund holding data as at 31/12/23 or the closest available reliable estimate

*CGSEF 31/12/223 carbon footprint has been updated following a carbon data refresh during Q1 2024

% coverage includes exposure to equity and credit, and includes directly reported carbon metrics, estimated metrics for known exposures and estimated metrics for exposures that are proxied where exposures are not available.

** The equity benchmark is the MSCI All Country World benchmark. The 2019 Baseline for UK clients is assumed to be 100% exposure to MSCI All Country World before ESG strategies were implemented for clients.

*** The credit benchmark is a custom buy and maintain credit benchmark. As this benchmark was not available in 2019 there is no baseline data.

**** CCIF2 is a long-dated credit buy and maintain portfolio. Compared to the benchmark the portfolio is overweight utilities which tend to have higher Scope 1&2 emissions, underweight sovereign and securitised debt, which tend to have lower or no emissions data, and underweight the energy sector which has very high scope 3 emissions. As a result, the portfolio has higher Scope 1+2 emissions versus the benchmark but lower Scope 3 emissions.

Sovereign Bond exposures

Strategy (Asset Classes)	Physical Exposure	Derivative Exposure	Consumption Intensity per Capita (tCO ₂ e)	Production Intensity per \$mGDP-PPP (tCO ₂ e)
LDI (UK Sovereign)	UK: £3,200,937,197	UK: £2,878,150,231	UK:7.7	UK:97.6
MultiAsset Prime	US: 0.0%	US: 26.5%	US: 16.8	US: 227.0
	UK: 21.0%	UK: 5.9%	UK: 7.7	UK: 97.6
	Australia: 0.0%	Australia: 6.4%	Australia: 13.2	Australia: 282.0
	Canada: 3.3%	Canada: 0%	Canada: 16.8	Canada: 284.4
	Germany: 0.0%	Germany: 11.0%	Germany: 10.0	Germany: 117.0
	Emerging Markets*: 5.0%	Emerging Markets*: 0%	Emerging Markets*: N/A	Emerging Markets*:384
MultiAsset Vector	US: 0.0%	US: 29.0%	US: 16.8	US: 227.0
	UK: 0.0%	UK: 6.3%	UK: 7.7	UK: 97.6
	Australia: 0.0%	Australia: 6.4%	Australia: 13.2	Australia: 282.0
	Canada: 2.2%	Canada: 0.0%	Canada: 16.8	Canada: 284.4
	Germany: 0.0%	Germany: 12.6%	Germany: 10.0	Germany: 117.0
	Emerging Markets*: 5.1%	Emerging Markets*: 0%	Emerging Markets*: N/A	Emerging Markets*: 384

*Represents a third-party manager primarily investment in government bonds. Manager provided carbon intensity metric

Green and sustainable bond exposure

Green, social and sustainable bond exposures consist of exposures to bonds used to specifically finance green (climate), social or other sustainable objectives. They must meet market quality standards for use of proceeds and the certification and monitoring of the use of proceeds. They must also pass Cardano's more stringent policies. We do not subtract the emissions avoided through the funding of these projects from other parts of the portfolio.

Strategy (Exposure)	Physical Exposure
LDI (UK Green Gilt)	£76,172,923
MultiAsset Prime (Green Bonds*)	13.1%
MultiAsset Vector (Green Bonds*)	8.4%

Data represents exposure and fund holding data as at 31/12/23

Notes:

The emissions data **does not** include our exposure to:

- Cash
- Derivative exposure to commodities (there is no industry standard methodology for measuring carbon impact of commodity derivative exposures)
- Funds that have minimal credit and equity exposures or invest in these securities over a very short time horizon, mostly using derivatives. This also includes fund strategies (mostly hedge fund strategies) we classify as "low focus" and other liquid alternative strategies.

In the above tables we do not include private market exposures because there is no standard portfolio of private market allocations we track. The private market strategies of our clients vary substantially from one to another, clients are at very different stages of maturity (some may be allocating, others are no longer allocating to illiquid strategies). When reporting to clients on their specific portfolios we will report on carbon metrics for their private market portfolios.

6.6. Data collection, quality control and limitations

We recognise the importance of managing climate change-related risks and opportunities – but also the challenges involved in ‘doing it well’ including challenges with data quality. Data quality across the industry continues to improve over time but we still have a long way to go.

We continue to develop and evolve our policies to reflect climate change-related challenges. This reflects the evolution of our thinking on sustainability and the changes underway in the financial services sector, and society more broadly. We do not wait for data to be perfect, rather we work with what is available and get on with the task of supporting the transition.

Our data sources

When measuring at portfolio level, where we aggregate the emissions of investee companies (credit and equity).

In 2020, Cardano appointed MSCI as its external sustainability data provider, for amongst other items Carbon Footprint data (Scope 1, 2 and 3), Climate Scenario Analysis (CVaR metrics) and other climate related data. The appointment followed an RFP process which reviewed the service offerings of different providers. We selected MSCI for a number of reasons, including the extent of its coverage, MSCI’s research process (and as such, data reliability), and portfolio scenario analysis based on degrees of warming, following the acquisition of carbon delta in 2019.¹⁰

The appointment (and reappointment) is overseen by our Cardano Sustainability Group.

This data provides insights into where climate risk may be most acute on a geographic, sectoral and individual security level both from a physical and a transition risk perspective. It is used to understand and discuss risk exposures. It is not particularly useful when considering systemic risks which tend to be underestimated in the models used, where we make use of our more qualitative approach to macro scenario analysis.

We report separately on government bond exposures due to aggregation challenges with government bonds, and differing methodologies. For Government bond data we use data from ASCOR. ASCOR is a public, independent database assessing the climate action and alignment of sovereign bond issuers

We incorporate data from numerous other data providers including Sustainalytics, Urgewald (for fossil fuel related data), and engagement initiatives like the Satelligence based

collaborative engagement initiative that we initiated which tracks and engages on deforestation linked to agricultural commodity production.

Our approach to data from third-party managers and missing data

Our third-party managers are requested to provide climate-related analysis for their portfolios. This is to encourage our managers to carry out their own assessments and gain oversight of the climate-related risks and opportunities from the companies in which they invest.

We are acutely aware that managers’ methodologies can vary and whilst we encourage our managers to follow best practices and complete industry standard templates, there is a limit to the extent we can practically vet the data provided.

Many Private market and hedge fund investments are not currently regulated in a manner that requires them to disclose portfolio holdings and/or portfolio carbon analysis for the purpose of TCFD reporting. In addition, private companies are often in industries where GHG emissions data sets are not readily available. Debt and Real-estate investors sometimes do not have full access to the underlying assets carbon emissions.

For managers who fail to provide data for the purpose of TCFD reporting (for example many of the private market managers in our portfolios are not yet able to produce these statistics), we produce the analysis based on proxy public market indices applied to the managers’ portfolios.

We also use this proxy approach to estimate exposures in other cases where data may be missing, for example relating to derivative exposure, either using a public market proxy or other data available from a manager that represents the best proxy we are able to find.

Notes on our methodologies

The TCFD regulations set out multiple methodologies and metrics to determine corporate and sovereign greenhouse gas emissions metrics. We comply with reporting the key metrics required by the FCA, but our portfolios will use more detailed metrics and assessments in driving portfolio strategy. There remain methodological challenges and data for some asset classes, such as hedge funds, private markets, commodities and derivatives.

Cardano participates in, and contributes to, multiple industry initiatives to develop and evolve metrics and reporting on climate change, in particular, IIGCC and PCAF.

IIGCC is the Institutional Investors Group on Climate Change, and it hosts the Paris-Aligned Investment Initiative and the Net Zero Investment Framework. The initiative sets

10 <https://ir.msci.com/news-releases/news-release-details/msci-strengthen-climate-risk-capability-acquisition-carbon-delta>

out the advantages and disadvantages of the multiple methodologies used to determine a company's, and portfolio's, absolute emissions, emissions intensity, and more recently, environmental alignment

We use "EVIC" (enterprise value including cash) to determine financed emissions. Enterprise value is the sum of the market capitalisation of ordinary & preferred shares, the book value of debt and non-controlling interests and cash. This aligns with the FCAs requirements, MSCI and the recommendations of PCAF – the Partnership for Carbon Accounting Financials initiative.

We have worked with the IIGCC to develop methods and guidance for reporting on emissions associated with our derivative exposures. For simplicity in this report, we have reported on the total long exposures (physical and derivative). We do not allow "netting" of short exposures against long exposures which may mislead with regards to the true real-world emissions associated with the portfolio. Further breakdowns can be made available to clients between physical and derivative exposure.

In line with the FCA guidance we can also provide clients Weighted Average Carbon Intensity which normalises the emissions per unit of sales or revenue.

While we believe companies should disclose their Scope 3 emissions, we note that there are a number of data challenges which will take time to resolve. There are also challenges to aggregating scope 3 data because one company's scope 3 may be another company's scope 1 and 2 emissions. While Scope 3 data is becoming more widely available, it is still often calculated using estimation methods that vary substantially from year to year and the quality of reporting by companies varies substantially. As a result, our primary measure of progress is based on Scope 1 and 2 data, which we believe is more reliable, and we rely on MSCI's estimation methodologies for Scope 3 data.

As illustrated in the tables, data coverage is generally good in equities but still poor in credit. Typically, this means estimating the carbon intensity of the proportion of assets for which there is good data and then extrapolating these metrics as estimate to the portions of the portfolio where we do not receive data. This means that as coverage improves over time metrics are subject to change and possibly revision.

It doesn't make sense to combine the GHG emissions of government bonds and corporate equity, so we report these separately.

There are typically three ways to measure the GHG emissions of a country.

- Absolute Emissions as a percentage of 'issued debt': the percentage we own of a country's debt multiplied by its emissions. This favours countries with large debts.
- Intensity of Production Per GDP: a weighted average of the GHG emissions produced in a country per unit of GDP. This favours countries with large GDPs relative to their emissions, particularly developed market countries with large service orientated economies.
- Intensity of Consumption Per person: a weighted average of the GHG emissions involved in the total consumption of a country per person. Consumption metrics reflect gross domestic product plus net imports, reflecting the fact that many consumers have an impact on global emissions through their imports. While this does not consider historical emissions, we consider this the fairest way to measure sovereign GHG emissions because a ton of GHG emissions has the same contribution to climate change, regardless of where it is emitted, or by whom.

We report sovereign bonds carbon footprint separately from corporate exposures for several reasons:

- There is no comparable measure for sovereign bonds to "financed EVIC"
- Total Sovereign country CO₂e involves substantial double counting of emissions with corporate tCO₂e, and
- We believe adding sovereign numbers to corporate numbers can substantially obscure the dynamics of monitoring the changes to the portfolio's corporate emissions intensity over time.

Internal controls

Cardano has implemented internal controls in the preparation of TCFD metrics and scenarios.

Finally, we note that there will be inaccuracies in the data. In some markets, corporate greenhouse gas emissions disclosures are not regulated, and not subject to audit. The quality of the data is constantly improving but we find still subject to substantial revisions from year to year. We believe that the processes we have implemented mitigate for known limitations in data quality and coverage. We will continue to engage with standard-setters, policymakers, data providers and companies to improve data quality.

7. Glossary

- CA100+: Climate Action 100+, a collaborative engagement initiative seeking to engage with c167 of the largest global GHG emitters
- tCO₂e: Tons of Carbon dioxide equivalent
- DB pension: Defined benefit pension fund
- DC pension: Defined Contribution pension fund
- ESG: Environmental, Social and Governance
- EVIC: Enterprise Value Including Cash, an estimate of the total asset value of a company comprising both equity, debt and cash on balance sheet.
- GHG: Greenhouse gasses, includes carbon dioxide, methane, nitrous oxide, hydrofluorocarbons (and others)
- IIGCC: Institutional Investor Group on Climate Change
- MSCI: Cardano's ESG data provider (Morgan Stanley Capital International)
- NZAMI: Net Zero Asset Managers Initiative
- NZICI: Net Zero Investment Consultants Initiative
- PAI: Paris Aligned Investment Initiative
- PCAF: Partnership for Carbon Accounting Financials
- PRI: UN-supported Principles for Responsible Investment
- TCFD: Task Force on Climate-related Financial Disclosures

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