

Aviva's Climate-Related Financial Disclosure

2020



Foreword

Climate change and extreme weather trends have been recognised as key risks facing the insurance, savings and investment industry and many regard the climate crisis as the greatest risk currently facing humanity. We are seeking to do our part in tackling the climate crisis we all face, first and foremost because it is the right thing to do for our customers, society and for our own business. We believe that unmitigated climate-related risks present a systemic threat to societal and financial stability over the coming decades. As Amanda Blanc, our Group Chief Executive Officer, has said: “The COVID-19 crisis has shown the world can act with speed and determination. We need to match this resolve in tackling climate change. Our window of opportunity is closing. Aviva is working towards a 1.5-degree world.”

The coronavirus pandemic has brought human suffering and economic hardship on a global scale. The impacts of the climate crisis have the potential to be even more extreme. The world must not use the economic impact of COVID-19 as an excuse to pull back from its ambitions to act on carbon emissions, but rather as an opportunity to build back better.

Aviva has been in existence for 325 years. We have survived and thrived for over three centuries because we understand the nature of risk and how to manage it. We also recognise the importance of thinking for the long-term. Our responsibility as leaders is to ensure we understand the fast-changing world around us and we are taking actions today to identify, measure, manage, monitor and report climate-related risks and opportunities. We are eager to help build a long-term sustainable future for our customers and investors and we believe that our actions will contribute to climate risk mitigation and adaptation.

Aviva is committed to supporting a low carbon economy through a [just transition](#) that will improve the resilience of our economy, society and the financial system in line with the 2015 Paris Agreement target on climate change. We were one of the first insurers to sign up to the United Nations convened Net Zero Asset Owner Alliance. We target a reduction in the carbon footprint of our investments by 25% by 2025 and by 60% by 2030, and we aim to transition all assets¹ to Net-Zero by 2040. We have also joined the Net Zero Asset Managers initiative and we are working with others to develop an underwriting methodology in order to help accelerate our ambition to become a Net Zero company by 2040.

We welcome and fully endorse the recommendations of the Financial Stability Board’s Taskforce on Climate-related Financial Disclosures ([TCFD](#)) and the increased regulatory focus on climate change from the Prudential Regulation Authority, Financial Conduct Authority, European Insurance and Occupational Pensions Authority and the Network for Greening the Financial System. Collectively, these will enable the potential business impacts of climate-related risks and opportunities to be assessed by investors, lenders, insurance underwriters, investment managers and others.



Jan-Hendrik Erasmus
Group Chief Risk Officer



Kirstine Cooper
Group General Counsel
and Company Secretary



1. Scope of our target will be core markets, all main asset classes (credit, equities, direct real estate, and sovereigns; when methodology developed this year: including both active and passive funds), and shareholder assets and those policyholder assets where we have decision making control and we have carbon emissions data.

Background

Aviva is an asset owner with £535 billion of assets under management and an insurer with IFRS gross written premiums of £29 billion². We provide 31.6 million customers around the world with insurance, savings and investment products. For our customers, our communities and our business, addressing climate change and supporting the transition to a low carbon future represents the largest combined health, life, liability and general insurance contract that the world could sign up to. The risks and uncertainty resulting from us not doing so are immense.

Aviva has reported on climate change in our Annual Report and Accounts since 2004. This disclosure sets out how Aviva incorporates climate-related risks and opportunities into governance, strategy, risk management, metrics and targets (in line with the recommendations of the TCFD, published in June 2017) and how we are responding to customer expectations and regulatory requirements. It also provides a 'roadmap' for our stakeholders, highlighting useful information for decision making. It builds on the summary Climate-related Financial Disclosure in the 2020 Strategic Report. These pages and our climate dashboard are available at <http://www.aviva.com/TCFD>.

The ways in which the insurance sector could be affected by the climate crisis³ are diverse and are interconnected with other sustainability issues. This disclosure focuses primarily on the transition, physical and litigation risk factors and related opportunities. These were described in the Prudential Regulation Authority (PRA) 2015 report "[The impact of climate change on the UK insurance sector](#)" and are defined by Aviva as follows:

- **Transition** risks and opportunities relate to the business impact resulting from the transition to a low carbon economy. This may entail extensive policy, legal, technology, and market changes designed to mitigate climate change. As a result, depending on the nature, speed and focus of these changes, transition risks may pose varying levels of financial and reputational risk to organisations.
- **Physical** risks and opportunities relate to the business impact arising from acute, abrupt, disruptive impacts such as more frequent and intensive storms, extreme heat and cold, floods, droughts and fires, as well as chronic gradual impacts such as higher than average temperatures, rises in sea levels and the spread of vector-borne diseases⁴. The risk includes the effects directly resulting from events, such as damage to property, and those that may arise indirectly through subsequent events, such as the disruption of global supply chains or resource scarcity.
- **Litigation** risks relate to the business impact that could arise from parties who have suffered loss and damage from climate change and seek to recover losses from others who they believe may have been responsible. Where such claims are successful, those parties against whom the claims are made may seek to pass on some or all of the cost to insurance firms under third-party contracts.

The materiality and horizons over which climate-related risks and opportunities affect our business depend on the specific insurance products, geographies and investments being considered. For example, our general insurance business considers risks in the underwriting and pricing processes and in setting the reinsurance strategy based on a relatively short time horizon (one to three years). Aviva recognises that the increased severity and frequency of weather-related losses have the potential to negatively affect our profitability. Consequently, large catastrophic losses are already explicitly considered in our economic capital modelling to ensure resilience to such catastrophic scenarios.

In contrast, when developing our new product strategy and updating Aviva's overall business plan, the impact of these risks and opportunities is considered over a medium time horizon (three to five years). With respect to life and pensions, in areas such as setting premium rates and reserves for annuities in payment as well as our investment strategy to back those liabilities, the impact of these risks and opportunities needs to be considered over a much longer time horizon (five years plus).

In general, transition risk is likely to materialise more rapidly than the most extreme physical impacts from climate change. Aviva can mitigate the transition risk and grasp opportunities by investing in the transition to a low carbon economy. Sectors or subsectors particularly exposed to transition risk are closely monitored and the risk to Aviva's investments is analysed. Conversely, the most extreme physical risks present a fundamental threat to the insurance business model. The physical effects of climate change will result in more risks and perils becoming either uninsurable or unaffordable.

It is important to note, however, that many commonly used climate scenarios assume a gradual path, in which temperatures slowly rise and climate policy is ramped up with a fairly high degree of global co-ordination. This does not consider the transition risk in a more chaotic policy environment, where there is lack of global co-ordination and policy action is taken too late. See for example the Network for Greening the Financial System (NGFS) publication- [Climate Scenarios for central banks and supervisors](#).

We continue to develop our tools and approaches as well as our metrics to assess the potential business impacts of climate-related risks and opportunities over a range of different time horizons. In particular, we continue to enhance our Climate Value-at-Risk (Climate VaR) measure. This measure enables us to assess the potential business impacts of climate-related risks and opportunities taking into consideration different scenarios and assumptions regarding policies, technologies, demand and various other macroeconomic factors as well as extreme weather.

2. Aviva Investors has assets under management of £366 billion.

3. Climate crisis is a term describing global warming and climate change, and their consequences. The term has been used to describe the threat of global warming to the planet, and to urge aggressive climate change mitigation. Aviva Investors' client publication [AIQ: The climate crisis](#), examines challenges posed by climate change and explores potential solutions.

4. Vector-borne diseases are human illnesses caused by parasites, viruses and bacteria that are transmitted by vectors.

£11.7 billion invested in
Green Assets*



(* Low carbon infrastructure debt & equity, such as Solar photovoltaics (PV), offshore & onshore wind, new energy centres reducing users' demand for energy, waste to energy, green hydrogen generation, battery storage, low carbon public transport & electric vehicle charging infrastructure and energy efficient buildings. Green bonds that meet Climate Bonds Initiative's requirements, Social bonds and Sustainability bonds, Green loans and specific climate-related funds (such as the Climate Transition fund range). To determine the scope of our green assets, we have used "our and our customers assets" this includes all shareholder, with-profits and unit linked assets but excludes Aviva Investors third party client mandates.

Credit: Pixabay



Aviva provides insurance for Caithness Shepherds Flat, Oregon – the largest wind farm in the USA – deploying 338 wind turbines across 32,100 acres to generate 845 megawatts of clean energy – enough to power **227,000 homes.**

We have committed to the ‘Powering Past Coal’ Finance Principles, ceasing support for thermal coal power investments and underwriting by 2030 or before.



Governance

Aviva has a strong system of governance, with effective and robust controls. This governance is proportionate to the nature, scale and complexity of the operations across Aviva businesses. It allows the Boards, management committees and senior management to integrate climate-related risks and opportunities into strategy, decision making and business processes.

The following sections summarise the Boards', committees' and senior management's climate-related responsibilities and provide examples of key decisions made to ensure these risks and opportunities are embedded into our governance, risk management and reporting frameworks. An overview of our climate training programme is also provided.

Boards' and committees' purpose

Our [Plc Board's](#) role is to provide leadership of Aviva within a framework of prudent and effective controls which enables risks (including climate-related risks) to be assessed and managed. Together with the [Group Executive Committee](#) the Board sets our values and shapes our culture.

Our [Risk Committee](#) assists the Board in its oversight of risks, including climate-related risks and opportunities, by assessing the effectiveness of the Group's risk management framework, risk strategy, risk appetite and risk profile as well as compliance with prudential regulatory requirements. This Committee assesses the Group's exposure in managing financial risks from climate change in conjunction with the Customer, Conduct and Reputation Committee.

Our [Audit Committee](#) is responsible for assisting the Board in the review and approval of the summary of the Climate-related Financial Disclosure incorporated in the Strategic Report before its publication.

Our [Customer, Conduct and Reputation Committee](#) assists the Board in shaping the culture and ethical values of the Group.

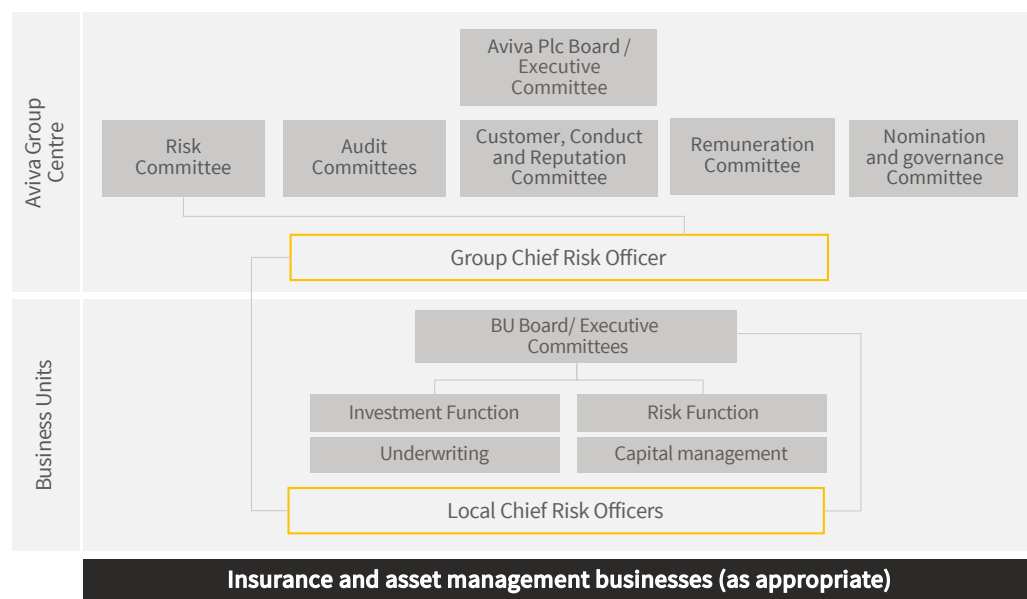
Our [Remuneration Committee](#) assists the Board in its oversight of remuneration including consideration of climate metrics and targets as relevant.

Our [Nomination and Governance Committee](#) ensures the Board has strong and responsible leadership together with a wide range of skills, knowledge and experience.

Our local Risk, Investment and Underwriting Committees as appropriate oversee the management of climate-related risks and opportunities in our businesses. They ensure these are managed in line with our risk management framework, risk strategy, risk appetite and risk profile as well as compliance with local regulatory requirements.

[Aviva Investors Global Responsible Investment](#) approach helps build sustainable investment solutions that are fit for today and for the future. Through commitment, passion, partnership with our clients and genuine collaboration we bring our sustainable aspirations to life. By acting collaboratively across asset classes, locations and our multiple stakeholders, we are able to drive change through continual active and escalating engagement, voting and market reform initiatives. The global responsible investment teams facilitate internal and external training for investment teams on current and emerging Environmental Social and Governance (ESG) trends, risks and opportunities

Figure 1: Aviva's climate governance structure. Source: Aviva.



Activity during 2020 and early 2021

The Plc Board reviewed and approved the 2021–2023 business plan, which incorporates our climate metrics, operating risk limits and tolerances. This allows climate-related risks and opportunities to be further embedded in our day-to-day decision making in line with our wider risk appetite. In 2021, the Plc Board also reviewed and approved our new climate change plan⁵ as well as our UN-convened Net Zero Asset Owner Alliance (NZAOA) target.

The **Remuneration Committee** approved in 2021 the new metric definitions and variables for the 2021–2023 Long Term Incentive Plan for Senior Management roles, including metrics aligned to delivery of our climate change plan and public commitments.

The **Risk Committee** met eleven times in 2020 to review, manage and monitor all aspects of risk management; climate-related risks were noted in three of those meetings. Climate risk is classified as one of the most material long-term risks to our business model and is assessed for its proximity and significance to Aviva as part of our emerging risk processes. In 2020, a paper was presented to the Risk Committee to further highlight the ways in which climate change may affect our business and to invite the Committee's views on the actions taken and planned. In addition, to integrate climate-related risks into our risk appetite framework, the Committee reviewed and approved our climate risk preference. We are averse to climate risk. We seek to reduce the impact on our business that is likely to arise from the extensive policy, technology and market changes resulting from the transition to a low carbon economy. We seek to limit our investment and net underwriting exposure to the more acute and chronic physical effects of climate change, while recognising that we have capabilities to manage these risks, support adaptation and build resilience. In January 2021, the Committee also approved the changes made to the relevant business standards to further integrate climate-related risks and opportunities across all risk and control activities (e.g. strategy, investments, underwriting and operations).

The **Customer, Conduct and Reputation Committee** met five times in 2020 to oversee how Aviva meets its corporate and societal obligations. For example, this Committee challenged the Group to review and align its underwriting policies and investment decisions in respect of climate change in key areas where it had the power/mandate to do so. In 2021, this Committee approved the changes to the Group's Corporate Responsibility and Climate Change Business Standard, which ensures alignment with the Group's new climate change plan.

The Risk Committee and the Customer, Conduct and Reputation Committee reviewed the appropriateness of the summary of the Climate-related Financial Disclosure in the 2020 Strategic Report before its approval by the Audit Committee. The Group Chief Risk Officer and the Group General Counsel and Company Secretary have reviewed and signed-off the content of this report.

Our **local Boards and Risk Committees** consider the ways in which climate change may affect our business. In 2020, these Committees reviewed and approved the new climate risk preference statement to support ongoing business decision making, and the 2021–2023 business plan. For the first time, the 2021–2023 business plan included climate metrics, targets and operating limits as well as proposed actions to meet these targets; (such as further development of investment and insurance climate conscious products and services; and ongoing reduction in the environmental impact of our operations). Our businesses are also responding to local climate disclosure regulations. For example in 2020, the Aviva France Board reviewed and approved the [Article 173 disclosure](#). In 2020, Aviva Investors has also established an ESG Leadership Team to lead Aviva's approach to ESG investing. This includes ensuring that ESG considerations are integrated into the investment processes across all fund managers and investment teams at Aviva.

Our directors' climate roles and responsibilities

The [Group Chief Executive Officer](#) is accountable for:

- The development and execution of the group strategy (including climate change plan) in line with the policies and objectives agreed by the Board.
- The operational effectiveness and profitability of the Group.
- The leadership of the Group through the executive directors and senior management team.
- The compliance by the Group with legal, regulatory, corporate governance, social, ethical and environmental principles.

The **Chief Executive Officers of our businesses** are accountable for:

- Compliance with legal, regulatory, corporate governance, social, ethical and environmental principles.
- Ensuring that climate is considered as part of the investment, underwriting, product design, pricing and claims processes.

“Doing the right thing for our people, customers and the planet is not just the right thing to do, it's simply good business”

Colm Holmes, Global CEO General Insurance

“The climate crisis is the single largest risk facing our society and economy, but it also represents great opportunity.”

Mark Versey, CEO of Aviva Investors

5. <https://www.aviva.com/newsroom/perspectives/2021/03/taking-climate-action/>

In line with the [PRA's Supervisory Statement 3/19](#) "Enhancing banks' and insurers' approaches to managing the financial risks from climate change", the **UK regulated entities' Chief Risk Officers (CROs)** have the Senior Management Function (regulatory) responsibilities for:

- Ensuring climate-related risks and opportunities are identified, measured, monitored and managed through our risk management framework and in line with our risk appetite.
- Advising the Board on our exposure to the financial risks arising from climate change (including how these risks impact our strategy and business model) and assisting the Board with addressing and overseeing these risks.
- Assisting the Board with developing and maintaining an appropriate approach to disclosure and regulatory reporting of the financial risks from climate change.

The **Group CRO** is responsible for:

- Oversight at a Group level of Aviva's approach to embedding climate-related risks and opportunities into governance, strategy, risk management and reporting processes.
- Scrutinising (and where necessary, challenging) Aviva's regulated businesses in relation to their management of climate-related risks and opportunities.
- Advising the Plc Board in relation to the above and related corporate and regulatory reporting requirements.

The CROs are supported in meeting their regulatory responsibilities by a groupwide climate-related risks and opportunities project. The aim of this project is to integrate the assessment of these risks and opportunities into our strategy, decision making, risk management and reporting frameworks. An inter-disciplinary team with representation from across the business is delivering this project. The Group CRO is the executive sponsor of this project, supported by a Steering Group. The project is managed day-to-day by a Working Group. An Expert Panel, with internal and external membership, is responsible for reviewing and challenging key expert judgements and outputs from the project.

In addition to the CEOs and the CROs' responsibilities, other directors and management teams across Aviva are responsible for managing those areas of the business which may affect or be affected by climate change. For example:

The **Group General Counsel and Company Secretary** is co-sponsor of this disclosure and accountable for the development of the groupwide climate change plan, influence and advocacy as well as non-financial reporting.

The **Group Chief Operating Officer** is accountable for ensuring that procurement practices are in line with the Science Based Targets initiative⁶ and that our operations are in line with our climate targets.

"Given that the Risk Function works with all parts of the business, we are in a unique position to help 'join the dots' of the various climate-related initiatives taking place within different teams and to help share expertise built up in one business area with others."

Mark Chaplin, Aviva UK Life Chief Risk Officer

"It's vital that businesses in all industries put words into action when it comes to tackling the climate emergency."

Nick Amin, Chief Operating Officer, Aviva

Figure 2: Our businesses as at 31/12/2020. Source: Aviva.



6. The Science Based Targets initiative is a collaboration between United Nations Global Compact, CDP (a global disclosure system), World Resources Institute and Worldwide Fund for Nature. It supports companies to set emission reduction targets in line with the decarbonisation required to limit global temperature increases to 1.5°C.

Figure 3: Illustrative examples of Aviva's functions' climate-related roles and responsibilities. Source: Aviva.

<p>Business planning</p> <p>Set up the business plan in line with the risk appetite and identify mitigation actions.</p>	<p>Asset and liability management (ALM)</p> <p>Ensure the ALM position is effectively managed and the Strategic Asset Allocation is in line with the business planning objectives including climate.</p>	<p>Underwriting</p> <p>Incorporate climate change considerations e.g. flood risk profiling for equity release and commercial mortgage lending.</p>	<p>Actuarial function</p> <p>Develop climate methodology, risk appetite and calibrations.</p>
<p>Financial reporting</p> <p>Produce the climate-related financial disclosure.</p>	<p>Capital management</p> <p>Ensure Climate-related risks are considered in the assessment of market and credit risks and exposures as well as performing scenario analysis.</p>	<p>Pricing and Product development</p> <p>Incorporate climate change considerations in product pricing and development.</p>	<p>Compliance</p> <p>Meet our standards and frameworks.</p>
<p>Strategy</p> <p>Consider climate change in strategy development.</p>	<p>Investment</p> <p>Ensure the end-to-end investment process factors in longer term physical and transitional climate risk considerations.</p>	<p>Reinsurance</p> <p>Incorporate climate change considerations in reinsurance arrangements.</p>	<p>Enterprise risk management</p> <p>Risk opinion, ORSA, Internal Model validation.</p>
<p>Procurement</p> <p>Ensure procurement practices are in line with Science Based Targets Initiative.</p>	<p>Asset management</p> <p>Incorporate ESG considerations into investment management.</p>	<p>Sales</p> <p>Incorporate climate change considerations into how our products are marketed to customers.</p>	<p>Internal Audit</p> <p>Assess and report on the effectiveness of the design and operation of the controls with respect to climate.</p>
<p>Public policy and corporate responsibility</p> <p>Define climate strategy, influence and advocacy as well as non financial reporting.</p>		<p>Operations</p> <p>Ensure our emissions are in line with our targets.</p>	<p>Claims</p> <p>Incorporate climate change considerations in Claims e.g. 'build back better'.</p>

Climate training

In 2020, we continued developing the skills of our Boards and our people with respect to climate considerations. As part of our regular Board and senior management training programme, we delivered tailored climate training to the Group and local Boards/ Risk Committees as relevant. This included coverage of; Aviva's climate-related risks and opportunities, new climate change plan, Board responsibilities, performance against our long-term reduction targets, progress made in embedding climate-related risks and opportunities into our risk management and reporting frameworks, emerging regulations, reputational and legal obligations. This training equips our Boards to give appropriate direction to the company and ensures challenge, guidance and support are given to the executives so that actions are taken to identify, measure, monitor, manage and report these risks and opportunities.

In addition to training our Boards and senior management, a detailed training plan has been developed and will be deployed in 2021. This training plan aims to ensure appropriate resources, skills and expertise are developed across Aviva to inform and manage the risks from climate change and creates climate cultural awareness. It will give all of our employees, across the three lines of defence⁷, the opportunity to learn about the implications of climate change for our planet and our business and envisages at least annual training to all relevant employees. It includes coverage of the regulatory requirements, Aviva's climate change plan and how Aviva is embedding this risk into our governance, risk management and reporting frameworks. More in-depth training is being deployed to those who hold direct responsibilities for the identification, management, measurement and reporting of climate-related risks and opportunities.

In 2020, Aviva Investors also provided "ESG Know How" training to investment advisers. This training programme was designed to provide practical support and guidance to advisers to help them navigate the ESG landscape, understand the regulatory changes that may affect business, and provide guidance on advising their clients about ESG.

Remuneration

It is proposed (subject to shareholder approval at the Annual General Meeting (AGM) in May 2021) that Aviva Plc's senior management 2021-2023 Long Term Incentive Plan for Senior Executives incorporates targets aligned to delivery and performance of our climate change plan and related public commitments. 10% of the incentive plan is based on ESG metrics, split across separate measures (one climate and two diversity & inclusion metrics). We are proposing to retain the flexibility of the current Directors Remuneration Policy for up to 20% of the LTIP to be based on strategic performance metrics although would engage with shareholders before changing the weighting in future years.

Aviva Investors was one of the first large asset managers to integrate ESG factors as part of the pay criteria across the firm, including for its investment desk heads. Through its Global Reward Framework, all investment employees should support responsible investment and integrate ESG considerations into their investment processes, including the consideration of sustainability risk. ESG metrics and research are embedded in the investment process and form part of the investment scorecard and annual risk attestation. The Aviva Investors Chief Investment Officers and investment desk heads consider how investment employees demonstrate their commitment to ESG processes as part of the determination of performance and pay outcomes.

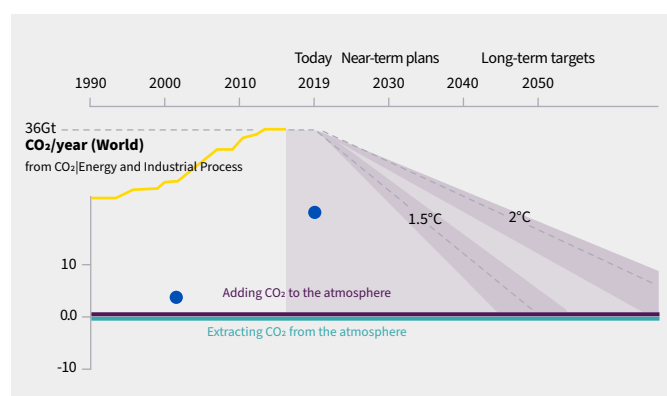
7. This model clearly sets out the risk management responsibilities across the business and is consistent with the current regulatory climate around corporate governance, systems and controls.

Strategy

Aviva is a trusted climate leader. Tackling the climate crisis is at the core of our business. The revision of our climate change plan is based on the fact that climate change is more pressing, and the window of opportunity is rapidly shrinking. We have focused our efforts through ambitious, pragmatic, and commercially smart actions. This is aligned to our Company Purpose ‘With you today for a better tomorrow’ and our Group Business Strategy.

The [Intergovernmental Panel on Climate Change’s \(IPCC\) 1.5°C report](#) highlights that, if the Paris 1.5°C target⁸ is to be met, then “global net anthropogenic CO₂ emissions must decline by about 45% from 2010 levels by 2030, reaching Net Zero by around 2050”. This report also indicates that the 2°C target implies that CO₂ emissions will need to reduce to Net Zero by around 2075.

Figure 4: Global net anthropogenic CO₂ emissions
Source: Based on IPCC.



Where do we want to go?

The Paris Agreement set the long-term target of keeping a global temperature rise this century well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5°C.

From climate physics, we know that reaching these targets implies limiting the cumulative CO₂ emissions to a very tight carbon budget. The latest IPCC report has shown that therefore the 2°C target implies that CO₂ emissions have to be reduced to zero around 2075. For limiting warming to 1.5°C, CO₂ emissions have to be reduced to zero around 2050.

Our new climate change plan resets the scope and level of our climate ambition to create a broader, joined-up approach covering all material areas of our business including investments, insurance, operations, accountability and leadership.

We aim to align our business to a 1.5°C world, and influence others to do the same

Primary levers:

1. Net Zero company by 2040⁹
2. Reduction in the carbon footprint of our investments by 25% by 2025 and 60% by 2030, and aim to transition all assets¹⁰ to be Net Zero by 2040.
3. Launch new Climate Engagement Escalation Programme¹¹ strategy in 2021
4. Develop investment and insurance ‘climate conscious’ products and services to support our customers
5. Operations and supply chain Net Zero by 2030

8. The 1.5°C target was set by the global Paris climate change deal in 2015 to limit the damage wreaked by acute events such as extreme weather and chronic events such as sea level rise.

9. ‘Net Zero company’ target covers all material ‘Scopes 1, 2 and 3’ carbon emissions (including investment, operations, supply chain); we are also developing a methodology for Net Zero underwriting.

10. Scope of our target will be core markets, all main asset classes (credit, equities, direct real estate, and sovereigns when methodology developed this year, including both active and passive funds), and shareholder assets and those policyholder assets where we have decision making control and we have carbon emissions data.

11. Where Aviva has the discretion to make divestment decisions.

Investments

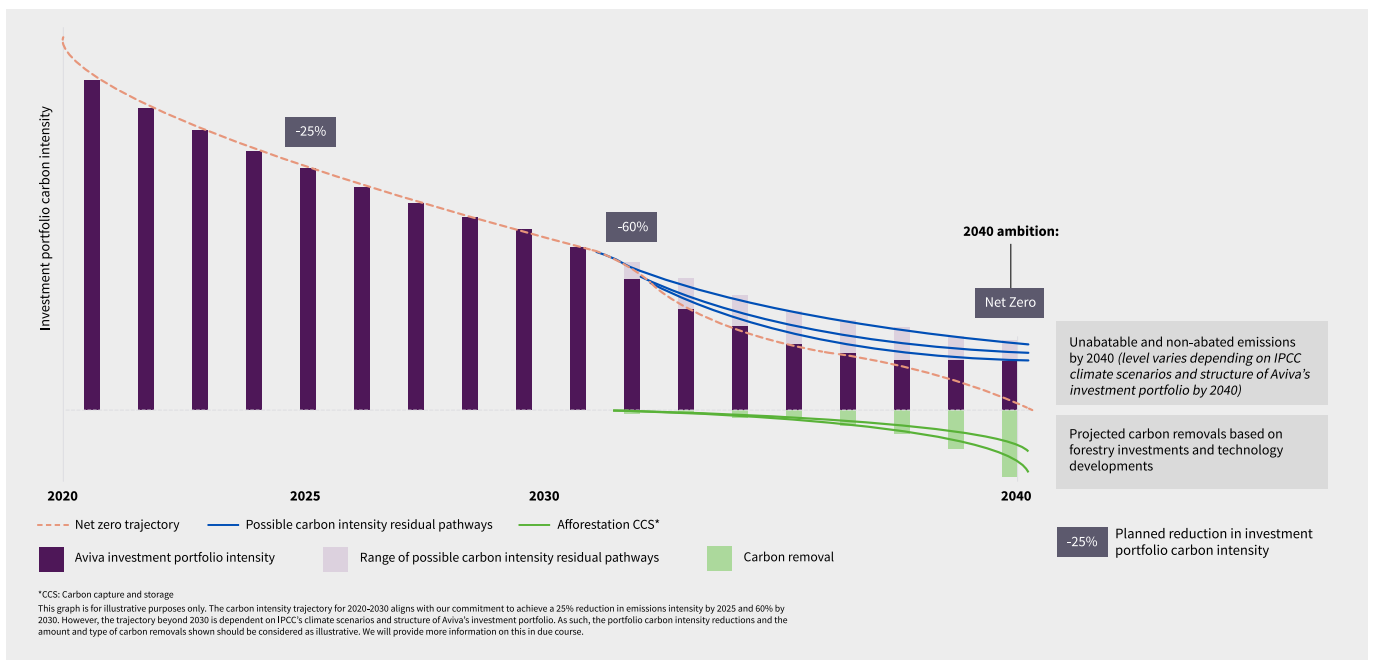
We seek to align our investments with a pathway towards Net Zero carbon emissions and ensure consistency with the 1.5°C Paris ambition. We are setting targets for how we will transition our portfolios and will publish updates on our progress. We signed up to key global targets such as the NZAOA. We target a reduction in the carbon footprint of our investments by 25% by 2025 and by 60% by 2030, and we aim to transition all assets¹⁰ to Net Zero by 2040. We are also planning further investments in green assets¹² by 2025.

The following figure 5 is for illustrative purposes only. The carbon intensity trajectory for 2020–2030 aligns with our target to achieve a 25% reduction in emissions intensity by 2025 and 60% by 2030. However, the trajectory beyond 2030 is dependent on IPCC’s climate scenarios and structure of Aviva’s investment portfolio. As such, the portfolio carbon intensity reductions and the amount and type of carbon removals shown should be considered as illustrative. We will provide more information on this as we confirm our Science Based Targets and 2030–2040 approach.

There are three ways in which Aviva is involved in investments i.e. as an asset owner, as a long-term savings and pensions provider and as an asset manager.

- As an asset owner, we are the decision maker about where the investment is made. We have signed up to key global targets such as the [Powering Past Coal Alliance Finance Principles](#) (PPCA) in 2019¹³. We use our influence as a shareholder and an investor to engage with and encourage companies to transition to a low carbon economy, we limit our exposure to carbon intensive sectors and companies, divesting from highly carbon intensive fossil fuel companies where we consider they are not making sufficient progress towards the engagement goals set.

Figure 5: Aviva’s Net Zero trajectory for Scope 3 (investment).
Source: Aviva.



- For long-term savings and pensions products, we are investing policyholders’ money and they are the decision maker as to where their funds are invested. To assist our customers, we integrate consideration of long-term climate-related issues into the products and services we offer. We continue to develop our customer ESG strategy, both in terms of strengthening our climate engagement, voting and offering climate conscious and ethical funds such as the stewardship fund range. For example, in the UK we have added these funds as a default strategy option for our corporate pension customers¹⁴. In October 2020, we announced a [Net Zero target for our UK auto-enrolment default pension funds](#).

- As an asset manager, we are investing clients’ money and they are the decision maker as to where their funds are invested. Aviva Investors integrates wider considerations of ESG factors into the investment process. We believe this will deliver long-term sustainable and superior investment outcomes for customers while adhering to their mandate. Aviva Investors is building out a Climate Transition fund range that helps investors support the transition to a low carbon economy across all core asset classes and is strengthening its [climate engagement plan](#).¹⁵

Insurance

We seek to grasp opportunities to support the transition to a low carbon economy and promote activities that will secure a better future for our customers and wider society. To meet these objectives, we seek to ensure that consideration of climate-related risks and opportunities is part of our business development. We continue to develop climate conscious products and services, which reward customers for environmentally responsible actions and provide some element of adaptation/resilience or additional cover for those customers at risk of extreme weather impacts. In line with our existing approach to reduce the impact of our claims process, we continue to consider how we repair and dispose of vehicles in line with our Net Zero ambition.

12. Low carbon infrastructure debt and equity; such as Solar photovoltaics (PV), offshore & onshore wind, new energy centres reducing users’ demand for energy, waste to energy, green hydrogen generation, battery storage, low carbon public transport and electric vehicle charging infrastructure and energy efficient buildings. Green bonds: that meet Climate Bonds Initiative’s requirements, Social bonds and Sustainability bonds, Green loans and specific climate-related funds (such as the Climate Transition fund range). To determine the scope of our green assets, we have used “our and our customers assets” this includes all shareholder, with-profits and unit linked assets but excludes Aviva Investors third party client mandates.

13. The UK and Canadian Governments created a national commitment for countries to ‘Power Past Coal’ which was launched at the UN Climate Change Conference (COP23) in 2017. We have signed up to these principles to cease supporting thermal coal power investments and underwriting by 2030.

14. For example, in the UK we have added these funds as a default strategy option for our corporate pension customers. In France we offer Socially Responsible Investment (SRI) options. Both our French and UK business have added AI Climate Transition European Equity and Global Equity Funds to savings and investment platforms.

15. See [“Why asset managers cannot be passive on climate change”](#) FT article – requires a subscription.

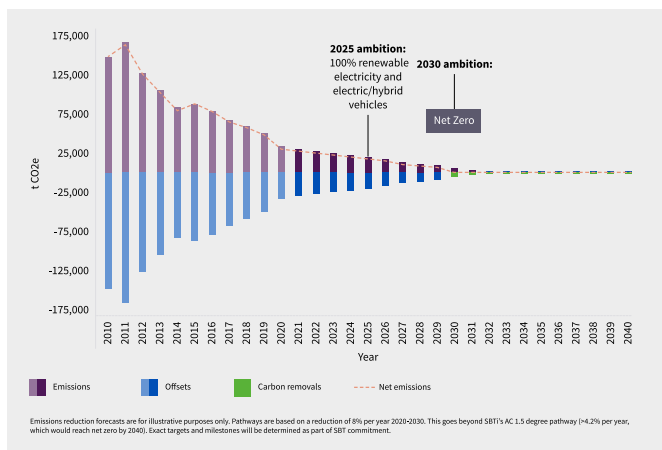


Aviva Investors acquires **low carbon, zero fossil fuel stylus office** building in London's tech city district.

Operations

As a business it is important that we lead by example, focusing on [reducing the environmental impact of our operations](#) through energy efficiency, clever use of technology and communications, using renewable energy sources and minimising the carbon intensity of our car fleet. For over twenty years Aviva has focused on reducing the environmental impact of our business, becoming the first major insurer to be carbon neutral¹⁶ in 2006. Our ambition over time is that our business operations should have a positive climate impact. We aim to have Net Zero carbon operations¹⁷ by 2030. We are also committed to using 100% renewable electricity by 2025 (aligned to the RE100 commitment¹⁸). Through the adoption of the Science Based Targets, we will work with our supply chain to reach Net Zero by 2030. The following figure 6 is for illustrative purposes only.

Figure 6: Aviva's Scope 1 and 2 emissions (operations). Source: Aviva.



Accountability and Leadership

We are strong advocates of the need for listed companies to publish consistent information to inform better decisions and promote the transition to Net-Zero carbon emissions by 2050 or sooner. More accurate information will help financial institutions manage climate-related risks and opportunities to support the transition. It will also help our customers and investors understand how their money is invested and what activities we underwrite, leading to more informed decisions. We welcome the increased regulatory focus on this area and we strongly support the need for companies to report in line with the TCFD recommendations. At the 2021 AGM, we are providing the opportunity for our own shareholders to vote on the summary Climate-related Financial Disclosure in the 2020 Strategic Report.

We continue to provide strong and vocal support for capital market reform, to mobilise the trillions of pounds required to transition to a low carbon economy and correct existing market failures with respect to climate change. We are advocating for a just economic recovery from the pandemic driven by a reduction in emissions and climate adaptation. We are supporting the integration of biodiversity impacts and associated mitigation strategies. In line with [Aviva's Marshall Plan for the Planet](#), we are proposing a new institutional mechanism – the International Platform for Climate Finance¹⁹ to be created at the 26th UN Climate Change Conference of the Parties (COP26) in Glasgow.

As an employer, an active member of our local communities and with a significant customer base, we can amplify individual impacts to create a joint legacy that we can all be proud of (for example electric vehicle charging points for employees, car sharing support and the use of low carbon public transport for commuting) partnering with others to provide climate resilient community projects.

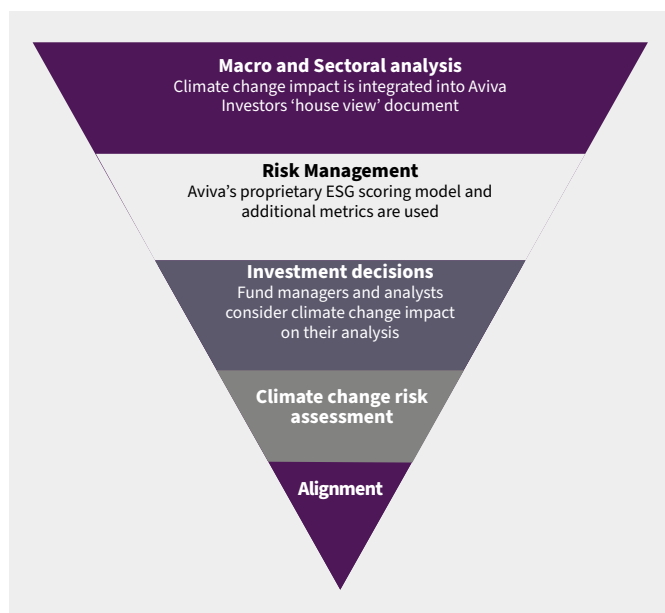
16. Carbon neutral: the amount of carbon released is offset by a reduction in emissions or a removal of carbon. These carbon savings could come in the form of carbon credits that do not represent removals of carbon from the atmosphere, but instead emissions that have been reduced from a business as usual baseline. These types of carbon credits are not technically 'removals' which they would need to be to conform with the IPCC definition.
 17. Net Zero carbon operations: any carbon dioxide released into the atmosphere is balanced by an equivalent amount being removed.
 18. RE100's purpose is to accelerate change towards zero carbon grids, at global scale. Aviva has signed up to the commitment pledging to purchase or generate 100% of our global electricity from renewable sources by 2025.
 19. The UN Climate Change Framework Convention Conference Presidency should create this platform to help UN member states ensure that their public and private finance flows become consistent with the pathway towards low greenhouse gas emissions and climate resilient development set out within the Paris Agreement.

Embedding our Climate Change Plan

Integrating ESG in our investment considerations

Aviva Investors recognises the benefit of integrating ESG factors including climate-related risks and opportunities into our decision-making processes as these factors provide an additional level of insight to make better decisions. When integrating the management of climate-related risks and opportunities into our liquid asset portfolios, Aviva Investors considers several layers: macro and sectoral analysis; risk management; investment decisions; climate change risk assessment and alignment as set out in figure 7.

Figure 7: Integrating climate-related risks and opportunities into investment considerations. Source: Aviva Investors.



Climate change impact is considered in Aviva Investors' House View along with other macro-economic factors and is the foundation for strategic allocation decisions across all portfolios and multi-asset funds. The House View highlights the key trends that could affect our investment portfolio. Aviva Investors' analysts and responsible investing teams perform rolling deep dives by sector to establish the key climate-related risks and opportunities, where relevant to a sector.

Under our new internal 'Elements' ESG data model (developed in 2020), climate change – being a component of the overarching Environmental Pillar score – and exposure to risks arising from climate change, is taken into account uniformly across the entire investment universe, i.e. across all industries. The new scoring model benefits from a greater selection of underlying ESG factors, in addition to climate change, which improves the score's overall predictive ability of future returns. The combination of both quantitative and qualitative ESG assessments, via ESG Elements and our ESG Corporate Research team respectively, gives us a comprehensive view of corporate ESG credentials and how they impact the investment case. Our investment professionals leverage the ESG Elements score in their processes, where the score is integrated in portfolio management systems and is therefore widely accessible.

In the following example, Company A has an "ESG Elements Score" of zero, which is underpinned by a low "ESG Controversy" and "Environmental Pillar" score as well as our voting record which shows a lower voting percentage cast in favour of management. By contrast, Company B stands out for better environmental performance measures, stronger governance, backed up by a positive voting record. As a result, Company B's "ESG Elements Score" is considerably higher and therefore more strongly correlated with future outperformance.

Figure 8: Example of Aviva's ESG data model comparison between two companies (the higher the number, the better the performance relative to the peer group). Source: Aviva Investors.

Factor	Company A	Company B
ESG Elements Score	0	5.1
Environmental Pillar	3.2	6.2
Social Pillar	4.1	4
Governance Pillar	3.2	5.9
Corporate Governance	5.9	8
Biodiversity & Land Use	4.5	5.1
Toxic emissions & waste	3.2	6.2
ESG Controversy	F	E
Product Safety & Quality	5.4	2.5
Chemical safety	0.2	3.2
Privacy & Data security	7.8	10
Opportunities in nutritional health	4.4	4.6
Access to Finance	3.4	3.5
Financial Systems Instability	5.6	5.0
Litigation percentile	1	2
Bankruptcy percentile	34	82
Voting action in favour of Management	30	100

Fund managers take this scoring into account in their investment decisions. Fund managers, risk managers and Aviva's Chief Investment Officers have access to a growing suite of tools to assess climate-related risks and opportunities at a portfolio level. This includes, for example, MSCI's ESG Ratings²⁰ and carbon footprinting information, which is embedded in Aviva and Aviva Investors' risk systems, as well as analysis provided by MSCI. In July 2019, Aviva Investors launched the Climate Transition European Equity Fund and we followed this up in June 2020 with the launch of the [Climate Transition Global Equity Fund](#). Aviva Investors is building out a Climate Transition fund range that helps investors support the transition to a low carbon economy across all core asset classes. Both the European and Global funds will take a long-term, high-conviction investment approach, targeting global companies that derive material revenues from goods and services addressing climate change mitigation and adaptation as well as investing in companies aligning their business models to a low carbon economy while excluding those companies with material exposure to fossil fuels.

The investment teams in our businesses are also actively engaged in our endeavour to manage climate-related risks and opportunities. For example, in 2020, Aviva France published its fourth ESG and [Climate report](#) in line with the requirements of the French law (Article 173) for energy transition and green growth. As part of this exercise, Aviva France demonstrated how, through its asset manager (Aviva Investors France), it incorporates ESG requirements into its investment process and manages climate-related risks and opportunities affecting its investments. The report also covers how Aviva France aims to accelerate its ambition to be aligned to the 1.5°C Paris Agreement target.

The UK Life investment team is actively engaged in the management of climate-related risk and opportunities. During 2020, we have been monitoring the carbon intensity of our core portfolios and have taken actions to manage the carbon intensity through new asset investment constraints and green asset targets.

20. MSCI ESG Ratings helps investors identify ESG risks and opportunities within their portfolio. Companies are rated on a 'AAA' to 'CCC' scale according to their exposure to industry-specific ESG risks and their ability to manage those risks relative to peers.



Aviva provides products and services that **support customers' choices** such as bespoke electric vehicle policies (Aviva France).

Aviva's active stewardship on ESG

[Aviva Investors' Corporate Governance and Corporate Responsibility Voting Policy](#) expects companies to begin reporting climate-related risks, strategy, policies and performance against the TCFD's recommendations. This includes stress testing of business models and assets against various climate policy scenarios. For example, we continued our dialogue with the Chief Executive Officer of BP to build on the momentum following the 2019 shareholder proposal co-filled by Aviva Investors to push for stronger climate action. BP had responded positively earlier in 2020 with the launch of its 'Reimagining Energy' strategy, which committed the company to Net Zero emissions for most of its business by the middle of the century. We also met with Barclays to follow up on a commitment made at its 2020 AGM to transition the business to 'Net Zero' for all financing activities. Aviva Investors will vote against directors of companies in high- and medium-impact sectors that are climate laggards and against directors of companies in the Climate Action 100+ investor initiative that have not committed to the Science Based Targets.

Figure 9: Active voting on resolutions related to climate issues (2015- 2020) as at 31/10/2020. Source: Aviva Investors.



In addition to our voting activities (as highlighted in figure 9), we also engage with companies both individually and collaboratively (members of [Climate Action 100+](#), [Institutional Investors Group on Climate Change](#), [Transition Pathway Initiative](#) etc.) on climate change

related issues. Aviva Investors engage with businesses we lend to (via the debt markets), as well as those where we are shareholders, with a particular focus on in-depth engagement with companies strategically exposed to climate-related risks due to their significant carbon impact and exposure to transition risks. In February 2021, we published our latest [escalation process](#), which focuses on carbon intensive companies and entails goal setting and a time-bound engagement and escalation process.

Figure 10: Overview of engagement held either individually or collaboratively on climate change-related issues. Source: Aviva Investors.

Year	1-on-1	Collaboration
2015	75	60
2016	55	21
2017	33	65
2018	74	17
2019	65	8
2020	118	53

Workplace pensions

The Aviva Staff Pension Scheme Board revised its Statement of Investment Principles in 2019 to take account of climate-related risks and opportunities as well as wider ESG issues. In this regard, they are fully engaged with Aviva Plc and the approach it takes as an asset owner.

In 2019, Aviva UK launched the '[Stewardship lifestyle strategy](#)' - a workplace pension default investment strategy that incorporates ethical and ESG considerations. This option was extended in 2020 to include additional funds and means scheme members can be reassured that ethical and ESG considerations are integrated all the way through to their selected retirement date. The funds exclude companies that do not meet certain ethical standards or that harm society or the environment. Workplace pension scheme members making active investment decisions can choose the Climate Transition Global Equity Fund, and the Sustainable Income and Growth Fund available on one of our three workplace pensions offerings.

The [Aviva Master Trust](#)²¹ Trustees have adopted My Future Focus as the default investment strategy for the Aviva Master Trust, a key reason for which was the integration of ESG factors in its design, which is aligned with the Trustees' ambition for the Aviva Master Trust to be at the forefront of ESG integration.

21. Aviva Master Trust is a contribution, occupational pension scheme which is set up under trust.

Retail investments

The above funds, along with the Aviva Investors Climate Transition Funds and the [Sustainable Income and Growth Fund](#) (awarded the [Sustainable and Responsible Investments](#) (SRI) designation²²), are now available to individual customers via our UK Life insurance business's Adviser platform. Our investment approach was further enhanced in November 2020 when Aviva Investors launched the Multi Asset Fund Core range for the UK intermediary market which is available on the Aviva Adviser platform, in response to our customers' need for value for money with environmental responsibility and sustainability built in.

In 2018, our [Robo Investment Subsidiary Wealthify](#) launched an ethical investment option, focused on five ethical plans. Interest from customers has grown steadily, with 32% of new accounts in 2020 selecting the ethical option. This now accounts for 23% of total assets under management for Wealthify and growing. As Wealthify continues its mission to make investing more accessible, 2020 also saw the proportion of female investors increase further in both ethical plans (39% up from 35% in 2019) and original plans (28% up from 24% in 2019).

In September 2018, together with Index Initiative and the United Nations Foundation, we launched the [World Benchmarking Alliance](#) (WBA) on the eve of the General Debate of the 73rd session of the UN General Assembly. The WBA publishes free and transparent benchmarks ranking companies on contributions towards achieving the UN Sustainable Development Goals (SDGs). The aim is to increase transparency and accountability for businesses in relation to the SDGs as well as empower consumers, investors, governments and civil society organisations by providing them with free and publicly available data that shows a company's SDG performance, which they can use when deciding where to spend their money, allocate their investments or direct their policy and advocacy efforts. The WBA will develop a range of corporate benchmarks by 2023 to comprehensively assess the progress of 2,000 companies across major areas of transformation required to achieve the SDGs. The first set of [climate benchmarks for the automotive and electricity utilities](#) sector (30 companies and 50 companies respectively) were published in 2020.

Decarbonising our portfolio

We use our influence as a shareholder and an investor to encourage companies to transition to a low carbon economy, limiting our exposure to carbon intensive sectors and companies and divesting from highly carbon intensive fossil fuel companies where we consider they are not making sufficient progress towards the engagement goals set. The carbon footprinting intensity of our portfolio has reduced over the last two years in line with the 25% NZAOA reduction target by 2025. We believe the highest-emission fuels are not part of a low carbon future. We will therefore not be investing in or insuring coal (generation or mining). By the end of 2022, we will have divested all companies making more than 5% of their revenue from thermal coal unless they have signed up to Science Based Targets or the funding is for ring-fenced green project finance. This applies to all shareholder funds and policyholder funds where possible. We will divest the equities, put the bonds into run-off and put the companies on our Stoplist. Further, in line with the PPCA Finance Principles, we commit to avoiding exposure to equity and debt instruments of companies that plan to generate electricity from unabated coal beyond the PPCA timeframe²³.

In April 2020, we added a further 42 thermal coal mining and power companies to our investment Stoplist and removed one which met our engagement criteria. This took the total number of companies with revenue from coal on the Stoplist to 59. We have divested any equity holdings we had in the Stoplist and expect to run-off existing fixed income where there may be detrimental financial impact of doing so immediately.

Aligned with the groupwide stance, Aviva France continues to monitor and improve the carbon intensity and ESG scores of their investments. In addition, they performed an impact analysis to implement the French Insurance Federation's (FFA) guidelines in terms of thermal coal. Since November 2019, Aviva France has committed to not invest in companies developing new coal mining projects or are planning a substantial increase of their annual (thermal) coal production volume; companies with 20% of their revenue coming from coal-related business (production/exploitation of coal mines or production of electricity from coal for energy producers) and companies where their annual coal production exceeds 10M tons and those whose coal-fired capacity exceeds 5000MW. For the positions already held, engagement is underway with issuers that have coal-related businesses. This activity resulted in divestment from eight thermal coal companies (between 2018 and 2020) with an aggregate value of €229 million.

Aviva Investors Real Assets approach

Aviva Investors has £47 billion Real Assets under management (AUM) which comprises equity and debt investments in both real estate and infrastructure, with a concentration of assets in Europe and a growing interest in emerging markets. In equity, the platform is focused on creating opportunities for clients through long lease, refurbished and development in real estate, and has a diversified portfolio of low carbon, renewable and social infrastructure projects including onshore wind, solar and energy from waste. In debt, the platform has a range of interests in hospitals, schools and utilities as well as financing trade and the development of new roads and rail in emerging markets.

In December 2020, the [Real Assets platform](#) published a [pathway to reach Net Zero emissions by 2040](#). This extends to assets under management across real estate, infrastructure and private debt, and is supported by five ambitious short-term investment goals which will be delivered in the next four years to 2025. The scope and boundary of this Net Zero pathway extends to direct investments, such as directly owned and managed equity assets, and financed emissions, which are loans and other debt instruments made to third parties.

1. Invest £2.5bn in low-carbon and renewable energy infrastructure and buildings by 2025
2. Increase low-carbon and renewable energy generation capacity to 1.5GW
3. Deliver £1bn of climate transition-focused loans
4. Create at least 50% of new pooled strategies with sustainable or impact labels until 2025
5. Reduce real estate carbon intensity by 30 per cent and energy intensity by 10%

22. Label backed by the French Ministry of Finance.

23. Noting that coal power phase-out is needed by no later than 2030 in the OECD and EU, and no later than 2050 in the rest of the world.

The Net Zero target is focused on seizing the opportunities created by the climate transition and complements the Real Assets business plan launched in December 2020. The Real Assets platform has already made significant progress toward delivery of the Net Zero target and supporting investment goals. Over the past five years the platform has invested £5.2 billion in low-carbon and renewable energy infrastructure including solar, wind and energy centres, taking their total energy generation capacity to 730MW in the UK and Europe. A sustainable lending strategy was launched in 2020 following £200 million of climate transition focused debt investments placed in utilities and real estate sectors. In 2020, energy saving programmes in real estate delivered over £700,000 in avoided energy costs for occupiers and contributed to a 10% reduction in carbon emissions measured against a 2019 baseline.

Considering the range of geographies and asset classes the Real Assets platform is exposed to, climate-related transition risks and opportunities are relevant to all investments. Climate transition risks are assessed by our origination teams at the point of origination, where opportunities are sourced from the market and analysed for suitability for clients. Through the origination process, the team assesses the asset, activity or counterparty involved in the transaction for exposure to climate transition risk, undertaking a detailed analysis of high risk sectors such as chemicals, utilities and automotive. This could include assessing the risk of exposure to a commercial office occupier or a utility company seeking funding for investment in a power generation plant. Where transition risk is high, we may seek to mandate an [environmental covenant](#) in the transaction agreement or may choose to decline the transaction where transition risk cannot be mitigated.

In terms of legislative climate risks, the Real Assets platform assesses alignment to the draft EU Taxonomy²⁴ at the point of origination. Those activities and asset classes which are not aligned to the climate transition undergo additional due diligence to assess the level of risk. In real estate investing, for both debt and equity, exposure to legislative changes concerning [Minimum Energy Efficiency Standards](#) is assessed quarterly, where the volume of assets with non-compliant Energy Performance Certificate ratings are reported internally.

24. The [EU taxonomy](#) is a classification system, establishing a list of environmentally sustainable economic activities. The EU taxonomy is an important enabler to scale up sustainable investment and to implement the European Green Deal.

We also assess assets that must be refurbished or redeveloped to meet modern energy efficiency standards and occupier expectations.

The Real Assets platform is committed to transparency and submits real estate and infrastructure equity funds' data to the [Global Real Estate Sustainability Benchmark](#) (GRESB) annually. Aviva was a founding member of GRESB and continues to be an active participant and advisor to the benchmark. We will continue to disclose our UK real estate assets to the annual Real Estate Environmental Benchmark (REEB) process and measure the performance of our assets against this on a quarterly basis to guide our refurbishment and divestment decisions.

Figure 11: Aviva Investors 2020 GRESB scores by fund. Source: GRESB.


Fund	2019 GRESB Score	2020 GRESB Score	Change in Score	Management Score (*/30)	Performance Score (**/70)
ALPF	75	68	-7	29	39
20 Gracechurch St	79	80	1	29	51
A214/A215 with profits	69	61	-8	29	32
AIPL	67	65	-2	29	36
Ascot JV	70	65	-5	29	37
ASPS	56	49	-7	29	20
Aviva Insurance Ltd (BD)	58	53	-5	29	24
Aviva Investors UK Property Fund	71	71	0	29	42
DRDC	73	72	-1	29	43
Essex County Council Pension Fund	63	59	-4	29	30
Gobafoss Partnership (Fund)	54	58	4	29	29
Heritage FL With Profits Pooled Property Fund	62	54	-8	29	25
Heritage Friends Prou Unit Linked UK Property Fund	63	58	-5	29	30
Irish Property Fund (J006)	62	57	-5	29	28
Lime Property Fund	67	57	-10	29	28
REALM Commercial Assets	N/A	59	N/A	29	30

In total we submitted £11.7 billion of assets to GRESB analysis in 2020, including three new funds for the first time, achieving 'Sector leader' for our 20 Gracechurch Street Fund. In addition, our Aviva Infrastructure subsidiary fund received 'Most improved' in its category.

Across all funds Aviva Investors achieved 29/30 in the management component, however on balance our scores fell. This was representative of the global average GRESB scores which dropped by two points and represents the challenge of data coverage in our portfolio, which remains low. In 2021, we have put an occupier engagement programme in place to improve our data coverage.

Aviva's Perth 'low carbon hub' features a **1.1MW solar carport**, integrated with 1.8MWh of Tesla battery energy's storage and 50 EV charging points.

Credit: RenEnergy



Aviva mapping data, alongside public information, suggests one in seven properties are at risk from flooding — but only **one in ten (10%)** people in high risk areas asked by Aviva think their property is at high risk (UK).

Offering climate conscious products

We continue to develop climate conscious products and services, which reward customers for environmentally responsible actions and provide some element of adaptation/resilience or additional cover where possible for those customers at risk of extreme weather impacts. For example, Aviva France and [Canada](#) have bespoke electric vehicle (EV) policies, reduced premiums for customers who use public transport and encourage farmers to use bio-waste mechanisation to generate green energy. In the UK, solar panels on residential roofs attract no additional premium. In Canada, our partnership with [Lyft](#) makes it easier for customers to choose car share journeys and we offer endorsements to cover domestic solar panels and wind turbines. When paying out claims, we also have the opportunity to reduce our environmental impact through repair and restoration where possible. In the UK, our improved [drying process](#) after flood claims reduces the associated carbon emissions. We continuously review our claims processes to make sure the actions we take have a lower impact on the environment, for example provision of energy efficient replacement goods.

As the frequency and intensity of extreme weather increases, we have where possible been working to reduce the impact on our customers' lives, livelihoods and build resilience to climate change. We put specific information in the media to help customers minimise the impact of particular storms or floods. In the UK we seek to proactively communicate with as many customers as possible before extreme weather events. In the [UK](#) and [Canada](#), where appropriate we work with customers to help them become more resilient (e.g. offering coverage to install risk mitigation devices after a claim, and to 'build back better'). In Canada, we were also the first insurer to announce comprehensive [water coverage](#) on property policies. We sponsored a [new code of practice](#) for flood resilience released in January 2020.

The code covers all aspects of prevention and resilience to make properties more resilient to flood. We have also been working with Business in the Community supporting an online tool for small business resilience – 'Would you be ready?'

To reduce the impact of our claims process we continue to consider how the climate impact of repairing and disposing of vehicles. We use recycled parts, which can have a role to play in vehicle repairs. This is especially true for older vehicles, or vehicles where parts may no longer be available and would otherwise have to be declared a Total Loss. Working with our customers, we will consider the use of non-safety critical recycled parts in specific vehicle repairs. Safety-critical parts are always replaced with new.

We limit our exposure to the most carbon intensive elements of the economy through our Group Underwriting Boundaries. These include restrictions on toxic waste companies that present a significant hazard to the environment, and carbon intensive industries such as mining, offshore oil and gas extraction. At the start of 2019, we exited the standalone operational fossil fuel power market as part of our commitment to help tackle climate change²⁵. These restrictions have been adopted by our general insurance businesses in the UK, Ireland, Canada, France and Poland. At the end of 2019, we took another important step in our commitment by launching a [specialist renewable energy proposition](#) providing insurance solutions for the full lifecycle of renewable energy risks worldwide. Through this product we currently insure the largest windfarms in the USA and Africa.

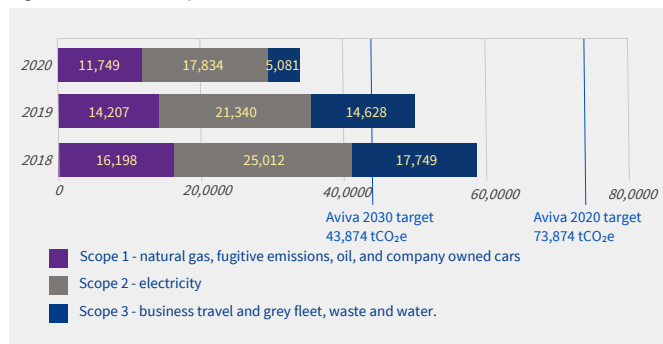
More broadly, we aim to use our underwriting insight to support our investment decisions, to ensure a consistent view of climate-related risks is taken. For example, the issuers on Aviva's investment Stoplist are mirrored as exclusions in the Group Underwriting Boundaries.

25. In line with PPCA Finance Principles.

Aviva's operational carbon emissions

We have measured our operational carbon emissions since 2004 and disclose related metrics on an annual basis in our public filings. We report on the greenhouse gas emission sources on a carbon dioxide emissions equivalent basis. Aviva has been carbon neutral in our business operations since 2006 through the purchase and retirement of carbon offsets from the voluntary carbon market.

Figure 12: Absolute operational carbon emissions tCO₂e. Source: Aviva.



We have already achieved our long-term reduction target of 70% by 2030, set in 2010, by reducing our emissions by 76%²⁶. We are now aiming for our groupwide operations to be Net Zero by 2030. Currently, 62% of electricity used by our global operations is from renewable resources and we are committed to using 100% renewable electricity by 2025 (aligned to the RE100 commitment). Across the UK, more than 400 employees have signed up to our [car share](#) programme and there are 180 active car sharing groups²⁷. In the UK, we have also introduced 20 electric vehicle charging points at eight office locations and moved 48% of our car fleet to hybrid. We have committed to moving our global vehicle fleet consisting of 1,540 vehicles to electric/hybrid by 2025 via EV100²⁸. More details can be found on www.aviva.com/social-purpose.

In 2015 we conducted a carbon footprinting exercise of our wider supply chain in the UK with the Carbon Trust. Using tools created in-house we have refreshed and widened the scope of this analysis in 2020 to cover our direct and claims supply chains for our UK, Canada and Ireland businesses. The estimated associated emissions amounted to 880,000 tCO₂e. We will begin work to decarbonise our supply chain aligning to the Science Based Targets. We will regularly review our progress as part of our climate change plan.

In 2019 we commissioned a 'first of its kind in the UK' [solar carport](#) installation for our Norwich office. Following this success, in 2020 we installed a solar carport array at our [Perth office](#). It's the biggest combination of solar, energy storage and EV charging points in the UK. The Perth 'low-carbon hub' features a 1.1MW solar carport, integrated with 1.8MWh of Tesla battery energy storage and 50 EV charging points, forming the cornerstone of Aviva's ambitious drive to take the office off grid by providing 26% of the site's annual energy needs. Our workplaces were free of single-use plastic containers in our markets, however due to COVID-19 we have had to reintroduce a limited amount for health and safety reasons. It remains a short-term challenge that we continue to address, along with other considerations in light of COVID-19, but we are looking for solutions to eliminate single-use plastic once again in 2021.

Our UK business continues to meet our zero to landfill target. Our Corporate Responsibility pages now include an expanded table featuring our energy use and carbon emissions data to reflect the new requirements of the UK Streamlined Energy and Carbon Reporting (SECR) framework.

Using our influence

Ensuring a smooth transition to a low carbon economy is key. The global economy does not yet fully recognise the potential impact of climate change and the associated impact of transition to a low carbon economy on company valuations. Addressing this requires action throughout the capital markets system. Aviva continues to support momentum towards implementing and tightening climate policy at national, regional and global levels. Aviva has supported multiple key studies and policy reports investigating the connection between climate change, sustainability and finance such as [The cost of inaction: Recognising the value at risk from climate change](#).

We believe that our ideas will have the strongest impact through collaboration with others around the world – from the finance sector to national governments and multilateral institutions. We have therefore been instrumental in calling for and participating in a number of important cross-sector initiatives to encourage sustainable finance, for example the [TCFD](#), the [EU High Level Expert Group](#) on Sustainable Finance and the [UK Green Finance Taskforce](#). Aviva Investors is a founding signatory of the UN [Principles for Responsible Investment](#) (PRI) and has signed up to its Investor statement on deforestation and forest fires in the Amazon. We have been calling for the end to fossil fuel subsidies since 2015 in conjunction with the Overseas Development Institute. We are pleased to see that the UK Government has now announced an end to export finance, aid funding and trade promotion for new crude oil, natural gas or thermal coal projects, with very limited exceptions. The International Energy Agency (IEA) estimates that fossil-fuel subsidies remain around US\$5 trillion. This amounts to over 6% of global gross domestic product.

To promote understanding, consistency, transparency and comparability, Aviva is working collaboratively with external parties. For example, we are participating in exploratory talks to create a UN Net Zero Underwriting Alliance. Aviva Investors has joined the UN Net Zero Asset Managers initiative. We are a member of the NZAOA, UNEP FI's Insurance TCFD pilot, ClimateWise and the joint PRA Financial Conduct Authority [Climate Financial Risk Forum](#) (CFRF). We have participated in the UNEP FI's published [Investor](#) and [Real Estate](#) Changing Course reports. Our UK Life CEO chairs the [CFRF Scenario Analysis](#) working group²⁹, our Group CRO leads the CRO Forum's Sustainability working group and the Aviva Investors CEO chairs the Investment Association's Sustainability and Responsible Investment Committee. We are also a member of the Geneva Association Climate Change and Emerging Environmental Topics Working Group.

Through 2021 and beyond, a core part of our climate change plan is to continue to leverage our leadership position and influence in this area and to continue lobbying for a strong and co-ordinated response to climate change.

26. Assurance on emissions figures is provided by PricewaterhouseCoopers LLP and available at www.aviva.com/CRkpisandassurance2020

27. Due to the pandemic these groups are less active.

28. EV100 is a global initiative bringing together companies committed to switching their fleets to electric vehicles and installing charging infrastructure for employees and customers by 2030.

29. A guide was published in 2020.

Risk management, metrics and targets

Rigorous and consistent risk management is embedded across Aviva through our risk management framework. This framework sets out how we identify, measure, monitor, manage and report on the risks to which our business is, or could be, exposed to (including climate-related risks). It defines the accountabilities of management, the risk function and internal audit with respect to enterprise-wide risk management.

Aviva’s process for identifying climate-related risks

We use our risk identification process to identify potential exposure to climate-related risks via the associated physical and transition transmission channels (for example new climate policies or increases in average temperatures). We then conduct exposure analysis to understand how these risks will impact our most material exposures.

Aviva’s emerging risk spectrum (see figure 13) illustrates the significance of the impact and expected timescale for different external emerging risks. This is primarily a qualitative assessment informed by quantitative indicators. Aviva considers climate change to be one of the most material long-term risks to our business model and its impacts are already being felt. Given its materiality and proximity³⁰, we are acting now to mitigate and manage its impacts both today and in the future. Through these actions, we continue to build resilience to climate-related transition, physical and liability (litigation) risks including the risk of assets becoming stranded.

In 2019 we updated our risk policies (including our Risk Management Framework policy) and our Own Risk and Solvency Assessment (ORSA) policy as well as our business planning instructions to respond to the new climate-related regulatory requirements.

In 2020, we updated our business standards³¹ to further integrate climate-related risks and opportunities across all risk and control management activities. We defined our climate risk preferences and incorporated climate metrics³², targets and operating risk limits into our 2021–2023 business plan, to facilitate risk-based decision making. In doing so, we have taken into consideration the fact that climate-related risks and opportunities do not always easily align with existing risk management processes.

Figure 13: Aviva Group Emerging Risk Spectrum – December 2020. Source: Aviva.



30. Climate change is a trend. While we can already observe some early impacts (physical and transition), we expect these to increase significantly over the longer-term. The potential size and nature of the risk and the time required to fully mitigate the risk as a business and wider society mean we need to take management action now. We therefore consider Climate change to be a proximate risk.

31. These have been approved by the Risk Committee in 2021.

32. E.g. Investment in Green Assets and Carbon footprinting of equities and credit.

Aviva supports the Gyapa project, which promotes clean cooking in Ghana. The Gyapa is an efficient cookstove, requiring **50% less fuel and producing less smoke than unimproved stoves.**



Credit: ClimateCare

Aviva's process to assess, manage and monitor climate-related risks and opportunities

As can be seen in the following table, we use a variety of metrics and tools to manage and monitor our alignment with global or national targets on climate change mitigation as well as the potential financial impact of climate-related risks and opportunities on our business

We have developed an interactive dynamic tool that presents climate risk analytics for different levels of granularity, time periods and allows comparisons over time. We aim to use this to flag emerging issues and support decision making.

Climate Metrics	Risk/Opportunity	Physical/Transition	Measurement	Data Provider
Investment in Green Assets	Green bonds and low Carbon Infrastructure	Transition	Measure Aviva's investment in Green Assets i.e. Green Bonds and Low Carbon Infrastructure and compare to target	Aviva
Carbon foot-printing	Equity and Credit	Transition	Use carbon foot-printing and weighted average carbon intensity data to assess the exposure of our assets compared to 25% reduction target by 2025	Aviva/MSCI
	Operational carbon emissions	Transition	Measure the operational carbon emission tCO ₂ e and compare to target	Aviva
Portfolio Warming Potential	Equity, Credit, Real Estate, Sovereign and Green Assets	Transition	Measure the portfolio temperature pathways and alignment to Paris Agreement target	Aviva/MSCI
Climate VaR	Equity, Credit, Sovereign, Real Estate, life and GI liabilities	Physical & Transition	Assess the potential business impacts of future climate-related risks and opportunities for different IPCC scenarios and in aggregate	Aviva/MSCI
Monitoring of sovereign risk	Sovereign holdings	Physical	Measure our exposure to countries highly or moderately vulnerable to climate change and review sovereigns holdings with Notre Dame-Global Adaptation Index ND-GAIN index below 50	Aviva/ND-GAIN
Weather related losses	GI liabilities	Physical	Actual weather-related losses versus expected weather losses by year and business unit and Weather impact on COR – over/under long-term average	Aviva

While recognising the limitations of the metrics and tools used (e.g. scope of coverage, data availability and extended time horizons as well as the uncertainty associated with some of the underlying assumptions), we believe they are still valuable in supporting our climate-related governance, strategy and risk management.

Aviva's Climate VaR measure

Climate-related risks and opportunities have the potential to affect insurers' balance sheets as well as the long-term business model. Traditional approaches based largely on backward looking analysis may need to be refined or enhanced to capture these risks going forward. In order to address this challenge, Aviva has developed a Climate VaR measure, in conjunction with the UNEP FI investor pilot project and Carbon Delta³³ as well as Elseware³⁴ to assess the resilience of our business and strategy to different climate scenarios. This measure enables the potential business impacts of future climate-related risks and opportunities to be assessed in different IPCC scenarios and in aggregate (see Appendix for more details of our Climate VaR methodology and MSCI model) as well as providing an indication of the resilience of our strategy.

To support this initiative, an inter-disciplinary team has been created with representation from across the business and an expert panel has been set-up to review and challenge the main assumptions made in the selection, development and modelling of the scenarios.

The panel includes internal experts as well as external experts Dr Simon Dietz, Dr Nick Robins, Dr Swenja Surminski from the Grantham Research Institute on Climate Change and the Environment at the London School of Economics, Dr Paul Pritchard an Independent Sustainability Advisor and Dr Katharina Dittrich from Warwick Business School.

The IPCC has identified four potential future scenarios with respect to climate change³⁵. Each scenario describes a potential trajectory for future levels of greenhouse gases and other air pollutants. These can be mapped to likely temperature rises and levels of mitigation required: 1.5°C (aggressive mitigation), 2°C (strong mitigation), 3°C (some mitigation) and 4°C (business as usual).

The IPCC Global Warming of 1.5°C report, published in October 2018, highlights the need to take dramatic action now to keep warming below 1.5°C and the potential severe consequences if this is not achieved. The scale of change needed to meet the 1.5°C target is unprecedented; industry will have to reduce CO₂ emissions by 65% to 90% by 2050 versus 2010 levels and investments in low carbon energy technology and energy efficiency will need to increase five-fold by 2050 versus 2015 levels. Buildings and transport will also need to shift heavily towards green electricity and tools to remove CO₂ emissions from the atmosphere, such as carbon capture and storage (unproven at scale), will be needed to store 100 to 1,000 gigatons of CO₂ over the century.

33. Carbon Delta is an environmental FinTech research firm that specialises in identifying and analysing the climate change resilience of publicly traded companies which recently became part of MSCI.

34. A risk management and quantification expert consultancy.

35. The [IPCC Fifth Assessment Report \(AR5\)](#) provides an overview of the state of knowledge concerning the science of climate change.



Ahead of COP26, **Aviva unveils one of the largest renewable installations of its kind in the UK at its Perth office**, producing enough power to take the site off the energy grid for five hours each day.

In the IPCC's 4°C scenario, which corresponds to emissions continuing to rise at current rates, the transition risk is clearly more limited, but the potential physical risks are significant, and the likelihood of tipping points being reached is much higher. In particular, one can expect increased precipitation, coastal and river flooding, periods of extreme heat and cold, wildfires and droughts. In addition, sea levels could rise significantly resulting in major displacement of populations as well as spread of diseases, currently typical only in tropical areas, to more temperate areas.

Finally, particularly in the more extreme warming scenarios it is also important to consider whether climate may trigger changes in social attitudes which result in increased litigation against companies for failing to reduce emissions or to disclose climate-related risks transparently.

We calculate a Climate VaR for different IPCC scenarios to assess the climate-related risks and opportunities under different emission projections and associated temperature pathways. A range of different financial indicators are used to assess the impact on our investments and insurance liabilities. These impacts are aggregated to determine the overall impact across all scenarios by assigning relative likelihoods to each scenario. Climate VaR includes the financial impact of transition risks and opportunities. This covers the projected costs of policy action related to limiting greenhouse gas emissions and projected profits from green revenues arising from developing new technologies and patents. The impact of transition risk is based on a range of socio-economic pathways and output from several Integrated Assessment Models. The Climate VaR also captures the financial impact of physical risks from extreme weather (e.g. flood, windstorm and tropical cyclones) and chronic effects (e.g. heat and cold, heavy precipitation and snowfall or wind gusts), although we recognise that the most extreme physical effects will only be felt in the second half of the century. We also recognise there is a growing trend in climate-related litigation and have assessed its potential exposure accordingly.

We have made several methodology improvements to the Climate VaR since YE19. In particular:

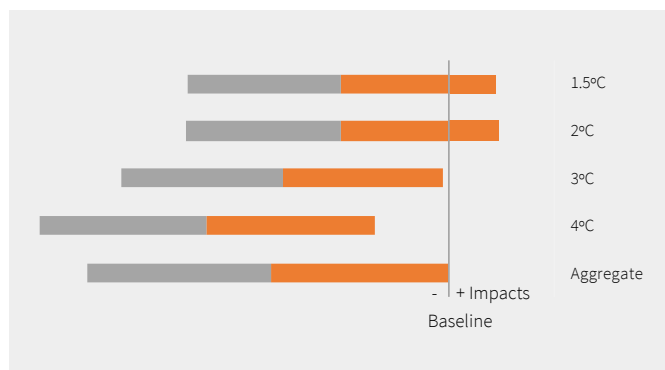
- We have incorporated a number of MSCI methodology improvements (including allowance for Scope 3, energy companies passing on the costs of transition to their consumers and the introduction of fluvial flooding).
- Incorporated assessment of infrastructure assets specifically covering transition risk which builds on the ClimateWise framework.
- We now consider more transition scenarios. These have been used to provide a more data driven approach to assessing transition risk volatility
- We have also started using the output from several Integrated Assessment Models to set base transition risk.
- We performed a review of climate litigation risk including risks associated with the liability products we sell. This concluded that the risk associated with these products was not material relative to transition and physical risk and therefore currently we do not explicitly include this in the modelling.

Figure 14 compares a plausible range of outcomes (5th to 95th percentile) from our Climate VaR analysis for the different scenarios considered. Aviva is most exposed to the business-as-usual (BAU) 4°C scenario where physical risk dominates, negatively impacting long-term investment returns on equities, corporate bonds, real estate, real estate loans and sovereign exposures. The aggressive mitigation 1.5°C and 2°C scenarios are the only scenarios with potential upside. Physical risk impacts are more limited but there is still downside risk on long-term investment returns from carbon intensive sectors (for example utilities) as a result of transition policy actions. This is offset partially by revenues on new technologies from some sectors (for example automotives).

Compared to YE19, the potential opportunities have increased in the 1.5°C and 2°C scenarios. As was the case at YE19, our results also show there is a clear benefit in terms of keeping temperature rises below 2°C, although this year the results for the 1.5°C and 2°C scenarios are more similar than last year. This result illustrates the inherent uncertainty in modelling as well as sensitivity to underlying methods and assumptions. It is also the case that many of the socio-ecological benefits and the reduced risk of reaching climate tipping points in a 1.5°C scenario are not captured in this analysis. Furthermore, maintaining an option on limiting warming to 1.5°C means targeting it now³⁶.

36. [The Economics of 1.5°C Climate Change](#)

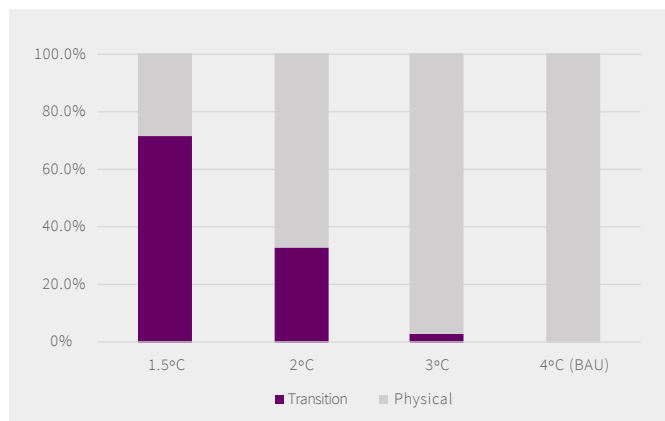
Figure 14: Aviva's Climate VaR output by scenario for shareholder funds as at 31/12/2020. Source: Aviva.



The grey bars represent the range of outputs between the 5th percentile and the central estimate for each scenario and the orange bars represent the range between the central estimate and the 95th percentile.

When aggregated together to determine an overall impact of climate-related risks and opportunities across all scenarios, the plausible range is dominated by the results of the 3°C and 4°C scenarios, reflecting that neither existing nor planned policy actions are sufficiently ambitious to meet the 1.5°C Paris Agreement target. In the 1.5°C scenario transition risk is larger than physical risk (see figure 15) even after taking into account mitigating technology opportunities. In the 2°C scenario, the picture is reversed, whereas in the 3°C and 4°C scenarios physical risk dominates.

Figure 15: Transition versus physical risks by scenario for Aviva's shareholder funds (credit, equities and real estate) as at 31/12/2020. Source: Aviva



Similar to last year, in all scenarios the impact on insurance liabilities is more limited than on investment returns. However, there is potential for some impact on life and pensions business as a result of changes in mortality rates in different scenarios either from physical effects such as more extreme hot and cold weather or transition effects related to changes in pollution levels. The impact on general insurance liabilities is relatively limited because of the short-term nature of the business and the ability to re-price annually and mitigation provided by our reinsurance programme. However, the physical effects of climate change will result in more risks and perils becoming either uninsurable or unaffordable over the longer term.

We will continue to develop and incorporate Climate VaR into our overall strategy, risk management and reporting frameworks.

In particular, we will further refine and improve our Climate VaR approach in the light of new research and data as well as emerging best practice. In addition, litigation risk could be explicitly modelled as could transition risk for sovereign bonds or physical risk modelling extended to cover wider factors such as the supply chain, demand for products or services and access to capital. We could also consider how adaptation measures could be incorporated.

Stress Testing

Aviva is one of ten major insurers participating in the Bank of England's 2021 [Climate Biennial Exploratory Scenario](#) exercise. This exercise will test the resilience of the insurance and banking industries to the physical and transition risks from climate change and examine the scale of adjustment needed in the coming decades for the system to remain resilient.

The bank has specified three exploratory stress scenarios which Aviva will complete at a Group level. This exercise will use an extended 30-year modelling horizon and will also include detailed counterparty analysis based on macroeconomic, physical and transition risk and insurance specific variables linked to the three climate scenarios.

The scenarios build on the reference scenarios being developed by the NGFS and will be a prudent estimate of underlying climate and transition pathways, assuming limited development of carbon capture and storage technologies and a conservative approach to the sensitivity of temperature to increases in emissions. Full details of the final scenarios will be published by the Bank in June 2021 but are described at a high level below:

- Early policy action scenario: Where there is early and decisive action to reduce global emissions in a gradual way, policies are implemented relatively smoothly and financial markets price in the transition in an orderly fashion and take advantage of the opportunities. These actions are enough to limit global average temperature increases to below 2°C but this increase in global temperatures still leads to higher physical risks.
- Late policy action scenario: Where action to address climate change is delayed by ten years a deeper adjustment is required to compensate for the delayed start, evidenced by a steeper increase in global carbon prices, dramatic shifts in company and consumer behaviour and sharp repricing of asset prices, leading to a macroeconomic shock. The climate target is met (global average temperature increases are limited to below 2°C) however achieving this brings significant disruption to the economy. Physical risks rise more quickly than in the early policy action scenario and transition risks are severe.
- No additional policy action scenario: Where no policy action beyond that which has already been announced is delivered. Therefore, the transition is insufficient for the world to meet its climate goal, there is limited technological transition and global average temperature increases substantially by 2080. Under this scenario, there are limited transition risks, but physical risks are significant.

Other metrics and targets

In addition to Climate VaR, Aviva uses a variety of other metrics to identify, measure, monitor, manage and report alignment with global or national targets on climate change mitigation and the potential financial impact on our business.

Transition risks and opportunities

For transition risks and opportunities, the metrics and tools used include:

- Carbon footprinting
- Portfolio Warming Potential
- Green Assets

Carbon footprinting

In line with the TCFD guidelines, we monitor the carbon footprint of our credit and equity portfolio on a regular basis. We use weighted average carbon intensity data (tCO₂e/\$m sales) to assess our investment portfolio’s sensitivity to an increase in carbon prices and our progress to the Paris Agreement target.

Our carbon footprinting intensity has reduced compared to last year in line with our 25% NZAOA reduction target by 2025³⁸. This is due to proactive investing by Aviva into less carbon intensive industries as well as companies reducing their carbon intensity. Our objective over time is to reduce the carbon intensity to align our investment portfolio to the Paris Agreement target. To achieve this, our first goal is to drive change in the companies we invest in through direct engagement. We also reserve the right to reduce our exposure to the intensive companies who are not making the transition to a low carbon economy and move capital towards those who are.

Figure 16: Weighted average carbon intensity (tCO₂e/\$m sales) of credit and equities in Aviva’s shareholder funds as at 31/12/2020 compared to 2019. Source: Aviva/MSCI³⁹.

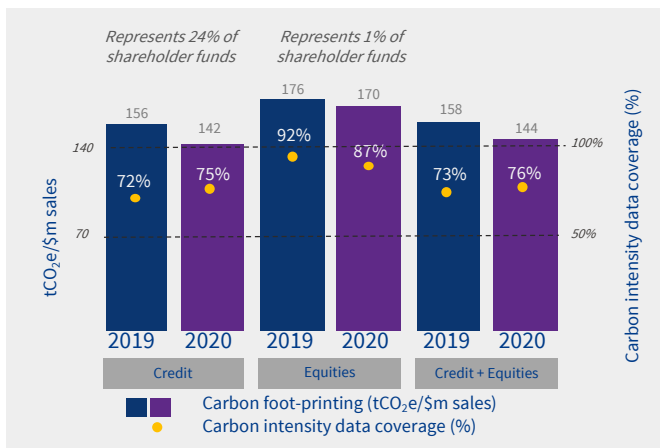
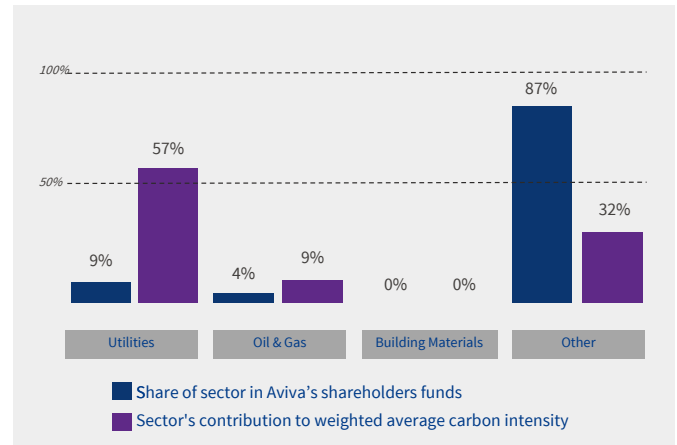


Figure 17 shows that the carbon intensive sectors, such as utilities, oil and gas, and building materials represent 13% of our corporate credit and equities shareholder funds but contribute 66% of the weighted average carbon intensity. The utilities sector is the largest single contributor, representing 9% of the portfolio but contributing to 57% of the weighted average carbon intensity.

Figure 17: Aviva’s exposure to carbon intensive sectors in shareholder funds (credit and equities) as at 31/12/2020. Source: Aviva.

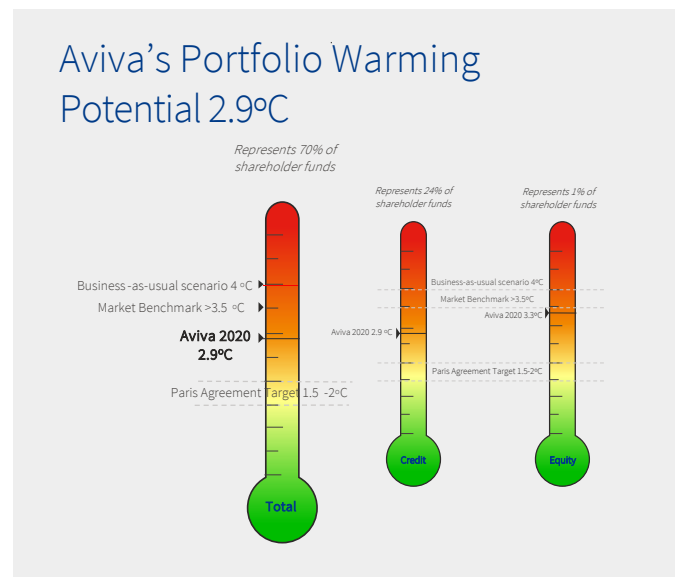


Portfolio Warming Potential

We use a portfolio warming potential metric to assess our shareholder funds’ credit, equity, real estate, green assets and sovereign bond investments’ alignment with the Paris Agreement target. This is calculated as a weighted average of individual issuers’ warming potential. This is based on the alignment of each company within the portfolio to the sectoral greenhouse gas emission intensity needed for each sector to make its contribution to reach the Paris Agreement target.

The portfolio warming potential methodology captures Scope 1, 2 and 3 emissions⁴⁰ and a cooling potential element, to capture avoided emissions, based on low carbon patents and revenues as well as company-reported decarbonisation targets to provide a forward-looking perspective.

Figure 18: Warming potential (in °C) for Aviva’s shareholder funds as at 31/12/2020. Source: Aviva/MSCI³⁹.



37. Scope 1 and Scope 2 emissions.

38. The target is set using carbon intensity by revenue metric (Scope 1 and 2) covering credit, equities and direct real estate holdings.

39. Certain information ©2021. MSCI ESG Research LLC. Reproduced by permission.

40. In 2019, the methodology was based on Scope 1 emissions only.

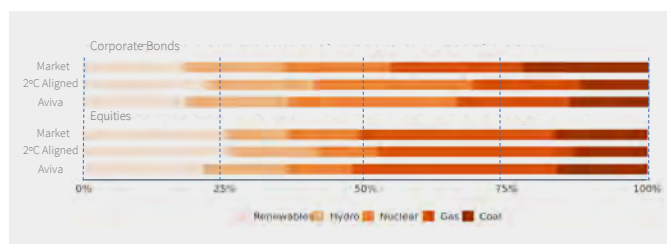
We have derived portfolio warming potential figures for our most material sovereign exposures based on analysis of individual governments' climate action and how it compares against the Paris Agreement's target, taking into account independent analysis conducted by organisations such as [Climate Action Tracker](#).⁴¹

The actions we are taking to reduce our investment exposure to carbon intensive sectors over time should lead to a reduction in the warming potential of Aviva's shareholder funds. On a like-for-like basis taking into account the methodological improvements made, the total warming potential of our shareholder funds remains unchanged from last year at 2.9°C⁴², despite slight reductions in the warming potential of our shareholder funds equity and corporate credit portfolio⁴³. While clearly still above the Paris Agreement's target, it is lower than the warming potential of the market benchmark portfolio⁴⁴ (>3.5°C) and significantly lower than the portfolio warming potential of the business-as-usual scenario (4°C).

In 2019, we have also used the [Paris Agreement Capital Transition Assessment](#) (PACTA) model (developed by 2 Degrees Investing Initiative (2°ii)) to analyse alignment, over the following five years, of our investment portfolio to the International Energy Agency's 2°C scenario⁴⁵ as well as how our investment portfolio compares to the market⁴⁶. This analysis focused on the most carbon intensive sectors for which energy transition risk can be estimated. Our unlisted infrastructure investments in renewables were not captured in this analysis.

Figure 19 provides insight into the transition risk by looking through to the mix of energy sources (for example coal, gas, nuclear, hydro and renewables) used by the utility issuers of the corporate bonds and equity securities that we held. This analysis demonstrates that our investment portfolio of utilities was not fully aligned to the 2°C scenario, but it was generally better or aligned with the market as a whole. The analysis has not been reperformed this year as the PACTA tool was not available at the time of the production of this report.

Figure 19: PACTA analysis as at 30/11/2019 for Aviva's shareholder funds invested in the utilities sector. Source: PACTA.

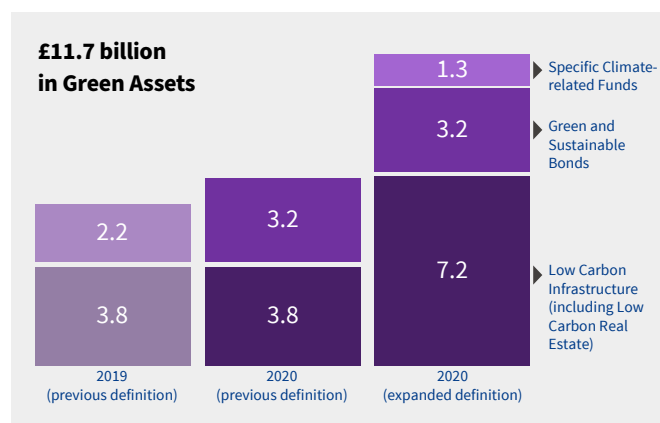


Green Assets

Increasing our investment in low carbon and renewable energy generation capacity is a significant opportunity. In 2020, the previous definition of our green assets has been expanded⁴⁷ to include low carbon real estate and specific climate-related funds (such as the Climate Transition fund range) as well as explicitly excluding external mandates.

Of the £11.7 billion in green assets, £7.2 billion are in low carbon infrastructure (including £3.4 billion in low carbon real estate), £3.2 billion in green and sustainable bonds and £1.3 billion in specific climate-related funds. In 2020, we invested £170 million into wind, solar, energy from waste and energy efficiency projects. This investment in renewable and low carbon energy generation supports the transition to a Net Zero economy.

Figure 20: Green Assets⁴⁸. Source: Aviva.



41. The Climate Action Tracker is an independent scientific analysis tracking government climate action since 2009.

42. Scope 3 emissions data is largely estimated. To account for this, we have applied a credibility weighting to the Scope 3 potential element contribution to our overall warming potential. The sensitivity of our overall warming potential to the credibility weighting applied is ±0.2°C.

43. We do not expect our portfolio warming to drop by a full decimal point every year as we are looking to align our portfolio over the coming decades.

44. MSCI all country world index investable market index.

45. The Sustainable Development Scenario (SDS).

46. The equity market is represented by all securities from publicly listed companies and the corporate bond market by all companies with outstanding debt from Bloomberg at the end of 2018.

47. The initial definition from 2015 was based on the green assets available at that time.

48. Low carbon infrastructure debt as at 30 September 2020, low carbon infrastructure equity as at 31 December 2020, green bonds as at 30 September 2020, UK direct low carbon real estate as at 3 December 2020, French direct low carbon real estate as at 4 December 2020, climate specific funds as at 31 December 2020, Aviva asset origination as at 31 December 2020.

Physical risks and opportunities

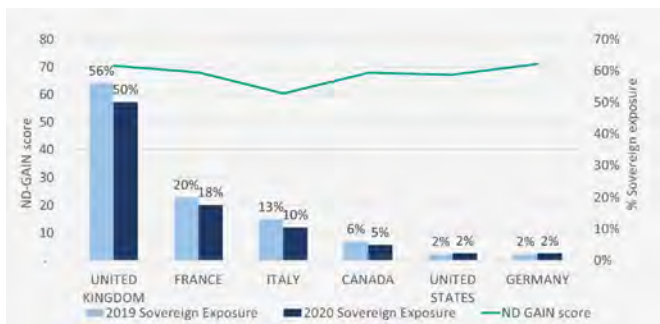
For physical risks and opportunities, the metrics and tools used include:

- Monitoring of sovereign risk
- Weather-related losses

Monitoring of sovereign risk

Aviva uses Notre-Dame University's [Notre Dame-Global Adaptation Index](#) (ND-GAIN) to measure our sovereign holdings exposure to climate-related risks (see figure 21). ND-GAIN measures a country's vulnerability to the physical effects of climate change and its readiness (to adapt to, and mitigate, its effects by considering economic, governance and social readiness). In addition to our risk monitoring, we engage with finance ministries around the world on climate change mitigation and adaptation/resilience and will continue to increase our profile in this regard.

Figure 21: Aviva's top sovereign holdings shareholder funds versus ND-GAIN (ND-Gain index 0-100 Higher is Better) as at 31/12/2020 compared to 2019. Source: Aviva/ND-GAIN 2018.



For sovereign bonds, Aviva is predominantly exposed to sovereigns from developed markets. We have no significant exposure to countries highly vulnerable to the physical effects of climate change and our exposure to moderately exposed countries is captured as part of our risk management and monitoring of sovereign risk. We also have no material exposure to sovereigns whose credit quality is reliant on oil and gas production.

Weather-related losses

Aviva is dedicated to helping our customers protect their properties against devastating floods. For many years, when settling property flood claims we have carried out cost neutral repairs⁴⁹. We also support the Code of Practice for property flood resilience and the recently published Guidance – to provide property owners with independent professional advice and reliable installation to increase confidence with their resilient flood repairs to reduce flood damage, speed up recovery and reoccupation. We also provide our customers with access to reputable and well-established suppliers of property flood resilience products and services through our [Specialist Partner Network](#). Our customers can access these at specially negotiated discounted Aviva rates to help them mitigate the impact of flooding. In addition, we train our in-house field claims teams to advise on property flood resilient measures as part of the repair process. Our Risk Management team provide advice and guidance to customers on the steps they can take to protect their premises to mitigate the impacts of flooding on their property and ensure our business customers have plans in place to enable them to continue to trade.

49. 'Cost neutral repairs' are resilient repairs being built into the cost of reinstatement – e.g. using waterproof plasterboard, raising electric points.

50. From a local regulatory perspective, we require protection for our earthquake exposure for a 1:490 event (the Office of the Superintendent of Financial Institutions, our local regulator, has established a glide path to a 1:500 protection to be achieved by 2022).

We recognise that weather-related events may become more frequent, severe, clustered and persistent. The speed of this change and the ability of society to adopt mitigation strategies may impact our ability to profitably provide products for our customers at affordable levels over the longer term. We build the possibility of extreme weather events into our pricing to ensure it is adequate and monitor actual weather-related losses versus expected weather losses by business (net of reinsurance). Catastrophic event model results are supplemented by in-house disaster scenarios. This year actual losses are broadly in line or better than expected (net of reinsurance).

Our general insurance business exposure is limited by being predominantly in Northern Europe and Canada. We require our general insurance businesses to protect against all large, single catastrophe events by purchasing reinsurance in line with local regulatory requirements or, where none exist, to at least a 1-in-250-year event. The catastrophe reinsurance programmes limit Aviva's losses, depending on territory, from a relatively low retention level (£150m on a per-occurrence basis and £175 million on an annual aggregate basis) up to at least a 1-in-250-year event. Factors determining these decisions include capital efficiency, appetite for general insurance earnings volatility and reinsurance market competitiveness. Aviva Canada currently has reinsurance cover up to a 1-in-490-year event⁵⁰, in line with government requirements. In the medium to longer term, there is potential for the premiums we need to charge to cover our risk exposure to increase in line with intensity and frequency of extreme weather. Looking across all of our property insurance portfolios, the proportion of property insurance premiums attributable to weather-related losses is currently quite small, so the impact on premiums would be correspondingly low. Naturally there are areas at higher risk, which would see disproportionate increases in premiums. In those cases, we consider that the continued presence of industry-wide initiatives like FloodRe in the UK and development of risk mitigation techniques as well as public investment in flood defences would be vital in ensuring widespread access to insurance for all.

Figure 22: Actual weather-related losses versus expected weather losses by year and business unit (net of reinsurance (Canada, UK, Ireland), gross of reinsurance (France)). Source: Aviva.

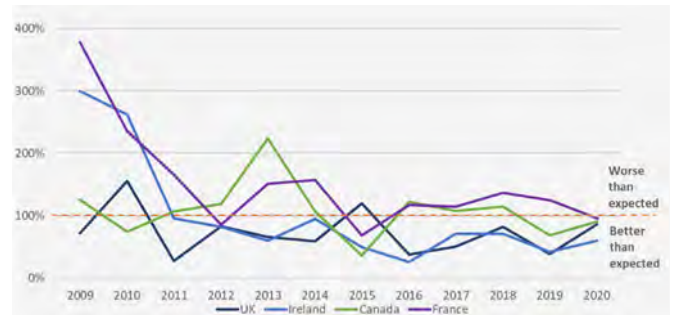
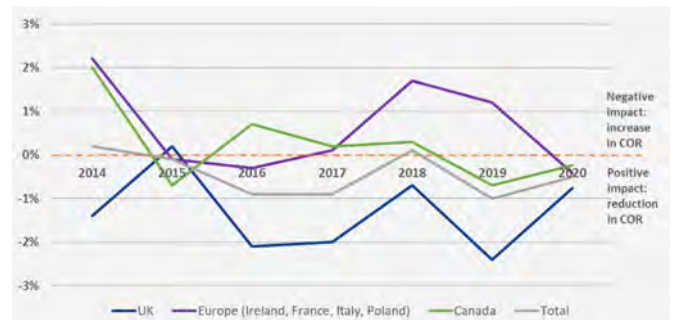


Figure 23: Weather impact on Aviva's Combined Operating Ratio (COR) (net of reinsurance). Source: Aviva.



For our investments in real (property) assets, physical climate-related risks are assessed at the point of origination through technical analysis and due diligence. Our origination teams use flood risk modelling programmes to assess the level of risk to an asset or location as part of the underwriting process for all transactions or use technical advisors to undertake surveys. Where a building or infrastructure asset is shown to have high levels of flood risk, the transaction undergoes additional due diligence, with the outcome informing the investment decision. In addition to assessing historical flood risk in each transaction, the Real Assets team work closely with MSCI, undertaking forward-looking assessments of the flood risks for the transaction and the portfolio. These analyses supplement the assessment of the climate-related risks to the portfolio on a quarterly basis which covers the flood modelling and the chronic climate-related risks such as sea-level rise and heatwaves. In 2019, this modelling was applied to all managed real estate in both private debt and equity, and in 2020 was extended to include private infrastructure debt and equity assets.

A change in climate can also mean that disease may spread to new and expanded geographic areas. Aviva uses external reinsurance for its life business to manage its exposure to life insurance risks and to manage capital in an efficient manner in line with the Aviva Group's risk appetite.

Litigation

Climate-related litigation is a growing trend globally and is increasingly being viewed as an effective tool that could be used by investors and/or shareholders to influence policy decisions and corporate behaviour. Despite there being insufficient evidence that the impacts of climate-related litigation risk are having a major impact on corporate behaviour (see [Global Trends in climate change litigation](#)), we believe Aviva to be proactive in considering the potential impacts that could arise from this risk. Aviva monitors its potential exposure to climate-related litigation alongside other climate-related risks. The two direct litigation trends that are most likely to affect Aviva are:

- Litigation actions that seek to force companies to increase their disclosure of the impact of climate change (physical and transition risks). This could extend to the climate-related risks associated with the assets in which the company invests as well as the projects and companies that are directly, or indirectly, financed.
- Litigation that targets asset owners, such as our insurance businesses or asset managers, such as Aviva Investors, in relation to the climate impact of their investments.

Over the last few years, the vast majority of climate-related litigation risk cases against corporations have been brought in the USA and the majority of these were unsuccessful cases that were primarily focused on public nuisance. However, over the last decade, cases have become more common across Europe too, and in the UK. The nature of these cases has moved towards alleged breaches of corporate law, misleading conduct, fraud, human rights and breaches of disclosure rules in listing and other corporate regimes. Additionally, climate-related claims are increasingly being pursued by investors and activist shareholders. As a result, shareholders, consumers and regulators around the world are showing an increased willingness to challenge companies that are perceived to have failed to take meaningful action in respect of climate change or have misrepresented the risks to which they are exposed and the actions that they are taking.

Aviva believes that the best mitigation against the risk of climate-related litigation claims is the robust governance, due diligence

and disclosure framework that we have put in place around our risk exposures to climate change as set out in the Governance section of this report. Furthermore, Aviva's assessment is that the direct impact from any legal challenges, and any associated fines, is most likely to be limited to specific companies within the Group, and this therefore reduces the overall level of risk to our global portfolio.

In 2020, we performed a review of climate-related litigation risk in two key areas:

- Direct financial impacts arising from risks posed to Aviva via the underwriting of a liability insurance products (i.e. where Aviva provides cover to policyholders who are themselves litigated against); and
- Direct financial impacts arising from failure to apply regulatory requirements and/or disclosures.

All litigation risk output and methodology decisions have been challenged and reviewed by a specially constituted expert panel with internal and external membership.

Risks arising from liability insurance products

In relation to risks arising from the underwriting of liability insurance products, our assessment identified that the majority of climate-related litigation risk relates to the following products:

- Directors and Officers Liability Insurance
- Public Liability Insurance
- Financial Institutions Insurance
- Professional Indemnity Insurance
- Pensions Trustees Liability Insurance
- Environmental Liability Insurance

The climate-related litigation risk associated with each of these products has been assessed and is currently considered to be low, due to a combination of policy wording restrictions, low exposures in high risk sectors and reinsurance arrangements being in place to mitigate exposures.

Risks arising from failure to apply regulatory requirements/disclosures

There are a number of emerging regulatory requirements relating to climate and ESG-related disclosures. For example: TCFD disclosures, the Non-Financial Reporting Directive (NFRD) and MIFID II, as well as the forthcoming Sustainable Finance Disclosure Regulation (SFDR) that is due to come into effect in 2021 for funds based in the EU (this is not mandatory in the UK). We are complying with all current regulatory requirements relevant to Aviva and regularly review any proposals to change these requirements, or to introduce new ones, to ensure that we remain compliant. With reference to SFDR, a specific review has been carried out during 2020 to ensure that Aviva will be compliant with the new regulations by the implementation deadline (the majority of these new requirements are due to come into effect in March 2021 with additional requirements expected in 2022).

As a result of the reviews performed and detailed work carried out in these areas, Aviva has assessed the current risk of a significant direct financial impact arising from failure to apply regulatory requirements relating to climate and ESG-related disclosures as low.

We recognise that litigation risk is still an emerging area and we will continue to monitor and review climate-related litigation risk in 2021 including additional sources of litigation risk outside those considered above (e.g. direct litigation against Aviva).

Conclusion

We believe facing up to the climate change challenge and getting ahead of it is the best thing we can do for our customers, business, shareholders and our future. We must reduce the risks for all of us and seize the opportunities of a new economy. We will embed our new climate change plan in all areas of our business to become a Net Zero company by 2040.

This includes:

- Cutting the carbon footprint of our investments by 25% by 2025 and by 60% by 2030 and aiming to transition all assets⁵¹ to Net Zero by 2040.
- Launching our new Climate Engagement Escalation Programme in 2021.
- Developing investment and insurance 'climate conscious' products and services to support our customers.
- Making our operations and supply chain Net Zero by 2030.

We will fully embed climate-related risks and opportunities into our governance, decision making, risk management and reporting frameworks. This includes:

- Continuing to build the skills of our Boards and our people.
- Further developing our tools and metrics to assess the potential business impacts of these risks and opportunities.
- Participating in the PRA's 2021 Climate Biennial Exploratory Scenario.

We will work collaboratively with the UNEP FI, industry associations, sector peers, academics, professional bodies, external consultancies, regulators and international agencies. We will also support engagement with COP26 in Glasgow (November 2021), helping to create a more sustainable world for our customers and society by encouraging climate conscious policy and regulatory measures as well as advocating for the creation of an International Platform for Climate Finance. As the climate changes, we will need to adapt to new conditions, and employ strategies that deliver for humanity, biodiversity, and the climate simultaneously.

51. Scope of our target will be core markets, all main asset classes (credit, equities, direct real estate, and sovereigns when methodology developed this year, including both active and passive funds), and shareholder assets and those policyholder assets where we have decision making control and we have carbon emissions data.

Appendix: Climate VaR Modelling Approach

Aviva has developed a Climate VaR measure that enables the potential business impacts of future climate-related risks and opportunities to be assessed in different IPCC scenarios and in aggregate⁵².

Climate scenarios considered

The IPCC scenarios aim to measure the effect on the energy balance of the global climate system due to changes in the composition of the atmosphere from sources like greenhouse gas emissions, other air pollutants⁵³ and changes in land use. The four IPCC scenarios identified in the IPCC Fifth Assessment Report (AR5) represent different Representative Concentration Pathways (RCPs) which describe the composition of the atmosphere at the end of the 21st century. Figure 24 summarises the link between these RCPs, potential temperature rises by 2100 and the level of mitigation required, which we will use to describe the scenarios in this report.

Figure 24: Mapping for RCPs, potential temperature rises and levels of mitigations. Source:TCFD.

RCP	Temperature rise	Description
RCP2.6	1.5°C	Aggressive mitigation
RCP4.5	2°C	Strong mitigation
RCP6.0	3°C	Some mitigation
RCP8.5	4°C	Business as usual (BAU)

Aggressive mitigation is the only scenario where it is more likely than not that the temperature change in 2100 will be less than 2°C. Since the original AR5 report new RCPs have been developed, such as RCP1.9 which limits global warming to 1.5°C, and pathways are now being considered together with five Shared Socioeconomic Pathways (SSPs). These consider socio-economic characteristics including things such as population, economic growth, education, urbanisation and the rate of technological development. In addition, scenarios can also be selected that represent early policy action or late policy action. The timing of climate action can represent orderly and disorderly transition pathways. The exhibit below illustrates the five different SSPs.

Exhibit 2 – Mitigation and Adaptation Challenges Depicted by Each SSP



52. Aviva was awarded the Climate Risk Initiative of the Year 2020 by InsuranceERM.
 53. Daniel Vallero, in Fundamentals of Air Pollution (Fifth Edition), 2014

Aviva developed this Climate VaR measure in conjunction with the UNEP FI investor pilot project, which developed models and scenario analysis tools to assess the potential impact on corporate bonds, equity securities and real estate of different scenarios in conjunction with MSCI⁵⁴.

MSCI calculates the impact of transition based on a range of Integrated Assessment Models assessments of different combinations of SSPs and temperature changes:

- The AIM/CGE model⁵⁵ from the Japanese National Institute for Environmental Studies (NIES)⁵⁶
- The IMAGE model⁵⁷ (Integrated Model to Assess the Global Environment) developed in conjunction with the PBL Netherlands Environmental Assessment Agency in partnership with the University of Utrecht
- The GCAM model⁵⁸ (Global Change Assessment Model) primarily developed by the Joint Global Change Research Institute (JGCRI) in the USA

MSCI calculates the impact of physical risk in the IPCC business as usual (RCP 8.5) scenario. MSCI calculates both the expected physical impact in this scenario as well as an aggressive physical impact based on a higher 95th percentile. Figures 25 and 26 show large dispersion around the global average temperature change in different RCPs and around the mean from the impact of climate change on coastal flooding.

While the scenarios reflect current scientific research, there clearly remains significant uncertainty regarding future climate trajectories as well as political risk with respect to implementation of the Paris Agreement and Nationally Determined Contributions (NDCs)⁵⁹.

It is also important to note that the four RCP scenarios identified in AR5 all assume a gradual path, in which temperatures slowly rise but climate policy is ramped up at varying speeds with a fairly high degree of global co-ordination. They do not consider the transition risk in a more chaotic policy environment, where there is lack of global co-ordination and policy action is taken too late and too suddenly.

Time horizon modelled for different scenarios

Transition and physical risk are modelled consistently until the end of the 21st century. For physical risk, the longer time horizon is required to capture the worst physical impacts of climate change, as these are not likely to manifest themselves until the second half of the century. If a specific use case is based on a shorter time horizon (e.g. 15 years), the financial impacts can be assessed over this time horizon.

Figure 25: Global average surface temperature change. Source: Based on IPCC.

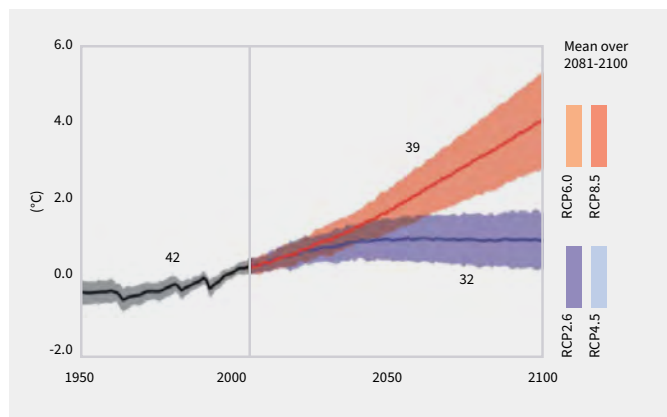
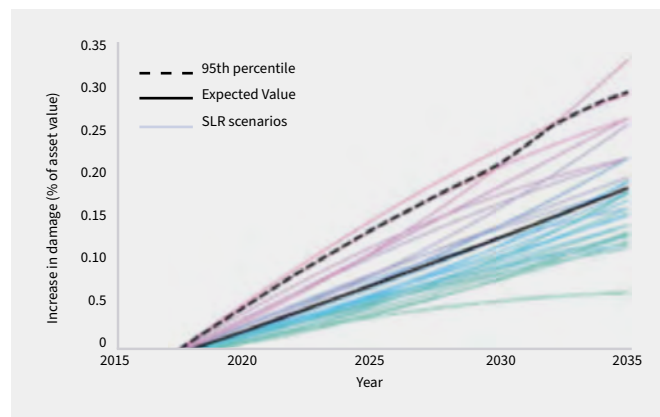


Figure 26: Example of coastal flooding. Source: Based on MSCI⁶⁰.



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

55. The AIM/CGE model is a multi-regional, multi-sectoral, computable general equilibrium (CGE) model.

56. The National Institute for Environmental Studies (NIES) is a Japanese research institute that undertakes a broad range of environmental research in an interdisciplinary and comprehensive manner.

57. The IMAGE model is an ecological-environmental model.

58. The GCAM model is a dynamic-recursive model.

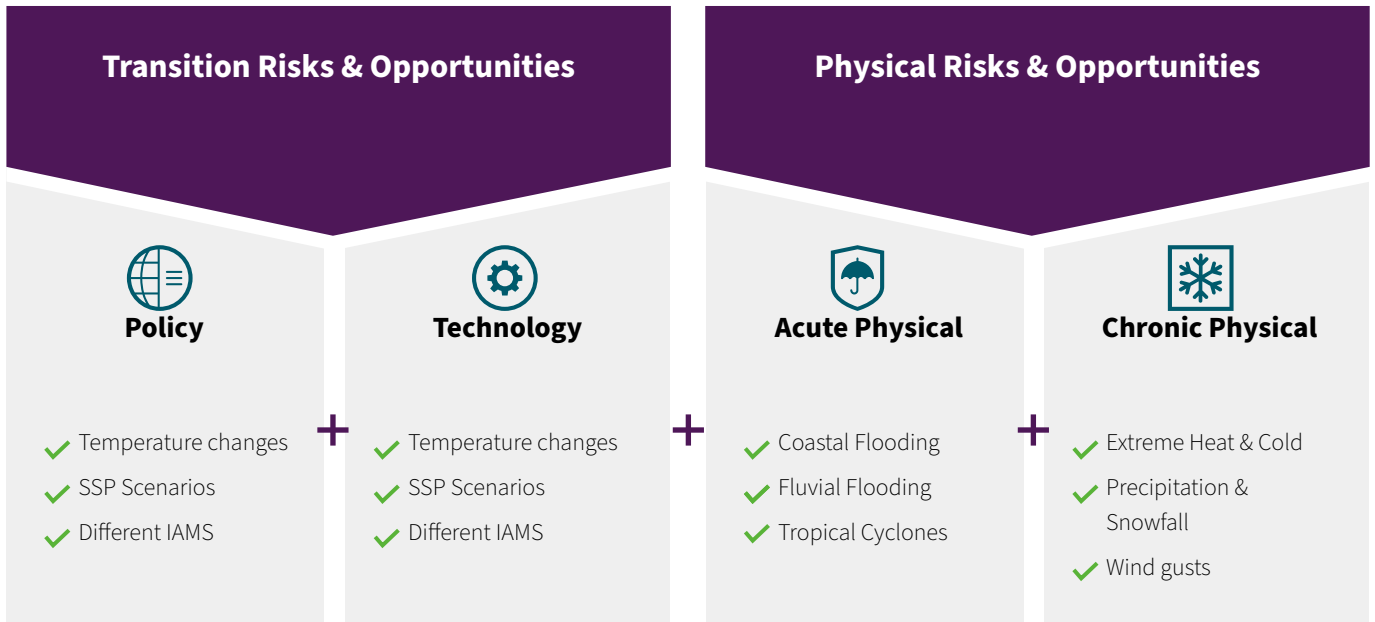
59. Intended Nationally Determined Contributions is a term used under the UN Framework Convention on Climate Change for reductions in greenhouse gas emissions that all countries that signed the UNFCCC were asked to publish in the lead-up to COP21.

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Risks and opportunities covered

The modelling of transition and physical risks and opportunities specifically covers the projected costs of policy action related to limiting greenhouse gas emissions as well as projected profits from green revenues arising from developing new technologies and patents. In addition, it captures acute weather impacts such as coastal and fluvial flooding and tropical cyclones, as well as chronic impacts from gradual changes in extreme heat and cold, heavy precipitation and snowfall or wind gusts. Regional sea level rise is an important input to the risk model and constitutes a key driver of coastal flooding impacts. It is important to note that the changes in acute and chronic impacts can also have a positive as well as negative effect on individual companies or instruments (see figure 27).

Figure 27: Risks and opportunities covered. Source: Based on MSCI⁶¹.



Building Block Approach

To assess these risks and opportunities, a Building Block Approach has been adopted (see figure 28).

Figure 28: Building Block Approach. Source: Based on MSCI⁶¹.



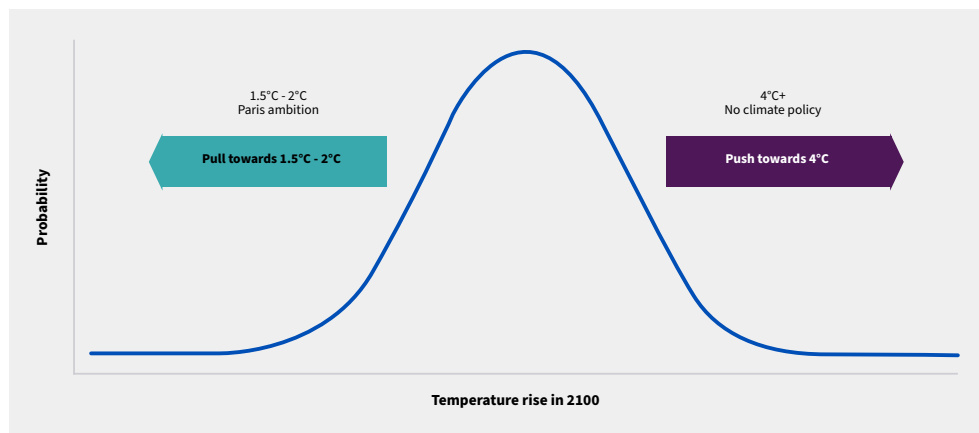
When assessing the impact of climate-related risks and opportunities associated with each scenario, different financial indicators need to be used and assumptions made. To assess the impact on market value of investments and the impact on reserves or premiums, for example, the following assumptions need to be considered:

1. The extent to which asset valuations, reserves and premiums already take account of the climate-related risks and opportunities in each scenario;
2. The likely timing of future changes to asset valuations, where not all of these climate-related risks and opportunities are currently considered;
3. Changes in our asset portfolio over time and the timing of such changes relative to the timing of any future market corrections to take account of these climate-related risks and opportunities;
4. The extent to which in future costs can be passed on to policyholders and/or sales volumes could reduce or increase for specific lines of business; and
5. The impact on reinsurance market capacity and pricing, as well as the creditworthiness of reinsurers, and the implications for our reinsurance strategy.

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Finally, to assess the overall impact of climate-related risks and opportunities across all scenarios, the relative likelihoods or probabilities of each scenario need to be assigned. To do this Aviva considered amongst other things the current scientific analysis of the likely trajectory of emissions as well as policy commitments made by countries to reduce emissions (see figure 29).

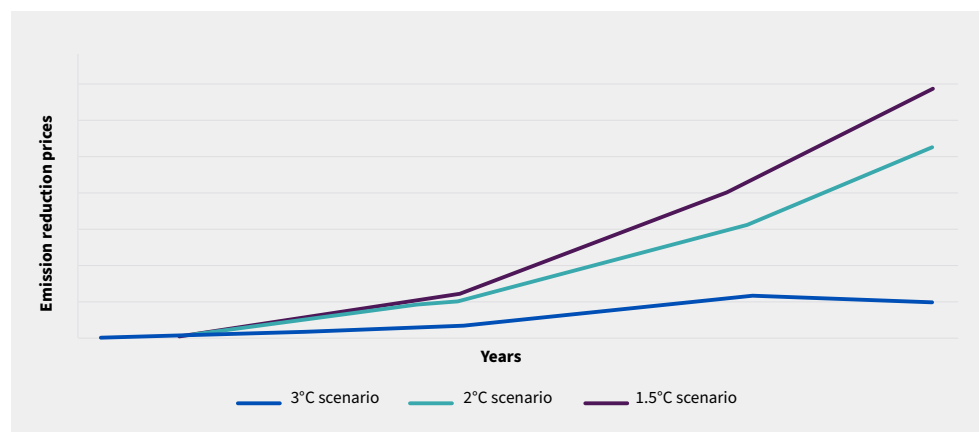
Figure 29: Most likely outcome based on where we are. Source: Aviva.



Transition risks and opportunities

The financial impact of transition risks and opportunities are calculated relative to the BAU scenario (i.e. there are assumed to be no transition costs or opportunities in the BAU scenario, where current emissions are presumed to continue to rise at the current rate). The calculation covers both emission reduction prices (see figure 30) and revenues from new technologies.

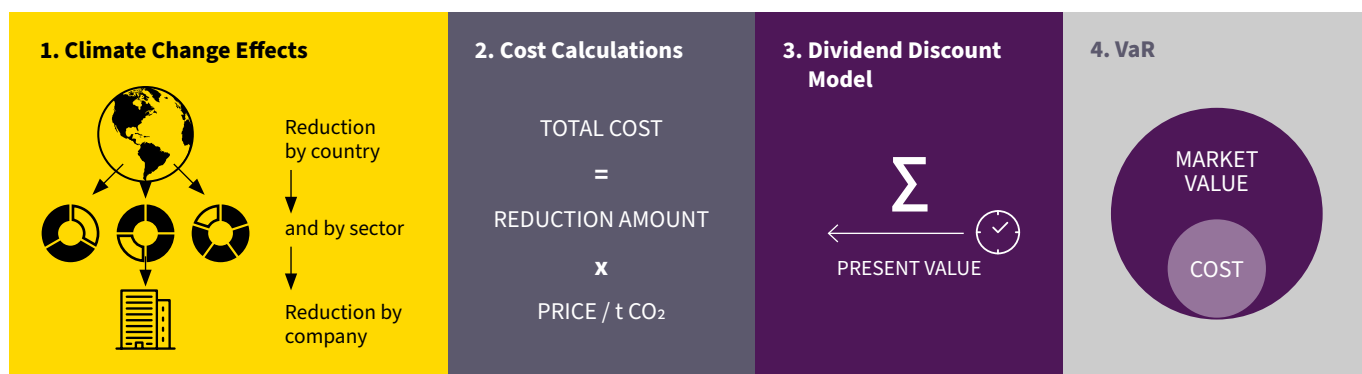
Figure 30: Emission reduction prices (2010 US\$/tCO_{2e}). Source: Based on MSCI⁶².



Investments

The following high level methodology is used to assess the potential downside risk from different transition scenarios on our investments.

Figure 31: High level methodology overview. Source: Based on MSCI⁶².



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For both corporate bonds and equity securities the difference between the market value and the adjusted value after factoring in future climate change costs and/or revenues is measured (i.e. the impact relative to current climate conditions and emissions trajectory). To estimate the impact in a consistent way when a company has issued both shares and bonds, the Merton model⁶³ is used. This model enables the impact on a business as a whole to be translated into a change in value of its corporate bonds and equity securities. As both costs and opportunities are covered, the Climate VaR can be either negative or positive depending on the balance of future anticipated carbon-related costs and revenues for individual companies or instruments.

MSCI has also developed a methodology for estimating the transition exposure of property assets which we have used for both direct real estate and real estate-linked debt holdings. For infrastructure assets, Aviva has used the ClimateWise Transition Risk Framework to identify the key risk exposures across our portfolio of assets, taking into account how transition risk and opportunities vary by geography, sector and sub-sector to assess the potential impact in different climate scenarios.

Insurance liabilities

Aviva has assessed the impact on life insurance reserves from the potential reduction in mortality rates resulting from less air pollution in the aggressive and strong mitigation scenarios. This reflects an anticipated reduction in carbon emissions and an increase in electric vehicles replacing vehicles with internal combustion engines. For each transition scenario, there is potential for fewer deaths relating to air pollution. Although we note that this is very much dependent on the fuel mix generating electrical power for the grid. While waste-to-energy plants have similar particulate outputs to gas-fired power stations, biomass plants such as wood pellet-fired facilities, for their many positives, produce significantly more particulates than gas-fired power stations, for example⁶⁴.

On the general insurance side, transition risks and opportunities may also arise. For example, the wider adoption of electric vehicles and the rise of car-sharing and automated cars might decrease the pool of vehicles to be insured, leading to a decrease in claims frequencies but also premiums. However, these effects have not been included to date. We plan to extend our modelling to cover general insurance transition risks and opportunities over time.

Physical risks and opportunities

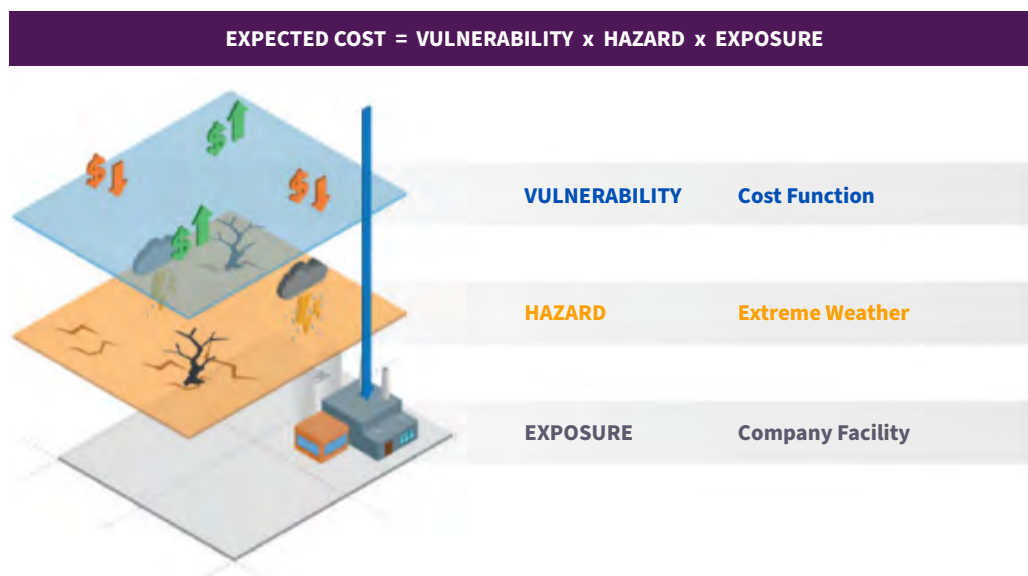
The financial impact of physical risks and opportunities is based on an assessment of both the expected costs in the BAU scenario and the costs at a higher 95th percentile arising from hazards such as: extreme heat and cold, heavy precipitation and snow, coastal flooding, fluvial flooding, wind gusts and tropical cyclones. We use the expected costs and the costs at a higher percentile to define a distribution of physical risk outcomes for each scenario and thus capture some of the more extreme potential physical effects of climate change while using a time horizon until the end of the century to maintain consistency with transition risk.

Investments

The physical risks on investments are generally going to be driven by the exposure of the facilities (buildings, plant, infrastructure) owned or used by the company that has issued the financial instrument, their “facilities”, and the supply chain they rely on for producing their end product. We use the following high-level methodology to assess the potential physical risk from different scenarios on our investments in this regard.

The cost (in figure 32) is built up by mapping the facilities onto a world map, with measures that define the facility’s exposure to different extreme weather hazards, and then combining this with a vulnerability function that converts the exposure and an assessment of the physical hazard impact in each scenario into an estimated monetary cost, per facility.

Figure 32: Impact modelling and expected cost estimate. Source: Based on MSCI⁶⁵.



63. Analysts and investors utilise the Merton model to understand how capable a company is at meeting financial obligations, servicing its debt, and weighing the general possibility that it will go into credit default.

64. Shakoor Hajat and others, in [Climate change effects on human health projections of temperature-related mortality for the UK during 2020s, 2050s and 2080s](#), February 2014.

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For both corporate bonds and equity shares, the difference between the market value and the adjusted value after factoring in aggregated facility costs and/or revenues is measured. The costs and/or revenues to a business are measured relative to an assessment of physical risks under current conditions as these are assumed to be already factored into the market value. This business impact is then translated into a change in the value of its corporate bonds and equity securities using the Merton model.

Aviva recognises that the current approach does not capture the impact on companies' supply chains nor necessarily demand for its products and services or potential mitigating impact of insurance. For example, in the case of a major car manufacturer their real assets will mainly include their factories and machinery and possibly their dealerships.

Their supply chain will be broad, complex and potentially geographically diverse and if disrupted it could adversely impact companies' costs and/or revenues. We will continue to work internally and with external partners to develop best practice in this area. For directly held real estate assets, real estate loans and infrastructure assets, we use the same approach described above. For directly held real estate the impact is carried directly against the property valuation. For real estate loans, we assess the physical climate change risk impact by running the stressed property value through our debt valuation models.

For sovereign bonds, the impact on the market value of a security is measured by assessing how a sovereign's rating could change as a result of the occurrence of different extreme weather hazards in each scenario. The following climate-related factors may impact sovereign debt: exposure and vulnerability to climate change; readiness and adaptation; ability to raise money for mitigation and post-disaster repair; ability to raise money via taxation and debt; reliance on foreign aid and support of the International Monetary Fund and other supra-national bodies. To assess a sovereign's vulnerability to climate change and readiness, the [Notre-Dame University's Notre Dame-Global Adaptation Index](#) (ND- GAIN) measure for country climate change risk has been used. We note that the assessment of sovereign debt is difficult because sovereigns are exposed to climate change via several vectors: government buildings and government-owned infrastructure, cost of emergency relief to areas affected by climate-related disasters, aid and rebuilding costs and the cost of acting as insurer of last resort. So, the ND-GAIN data has been used to help support expert judgements about the appropriate stresses to apply to different sovereign bonds in our modelling at this stage. We will continue to work internally and with external partners to develop best practice in this area.

Insurance liabilities

The Climate VaR for life insurance risks calculates the impact on reserves of a change in mortality rates as a result of the occurrence of different extreme weather hazards in each scenario based on a review of academic literature linking climate change to potential changes in mortality rates.⁶⁶ For higher temperature scenarios, where climate change has dramatically taken hold, the picture is complicated. For example, it is possible that both summers and winters will be warmer or that seasons will in fact be more extreme. The latter is more likely to have an adverse impact and for the UK could plausibly result from the Gulf Stream changing its path and missing the UK.

66. Antonio Gasparri and others, in [The Lancet Planetary Health, Volume 1, Issue 9. Projections of temperature-related excess mortality under climate change scenarios](#), Pages e360-e367 December 2017. [Every breath we take: The lifelong impact of air pollution](#), Royal College of Physicians, 23rd February 2016. Martin William and others, in [The Lancet Countdown on health benefits from the UK Climate Change Act: a modelling study for Great Britain](#), The Lancet, May 2018. Jessica Elkin and others, in [Hot and Bothered report](#), Club Vita, 4th July 2018.



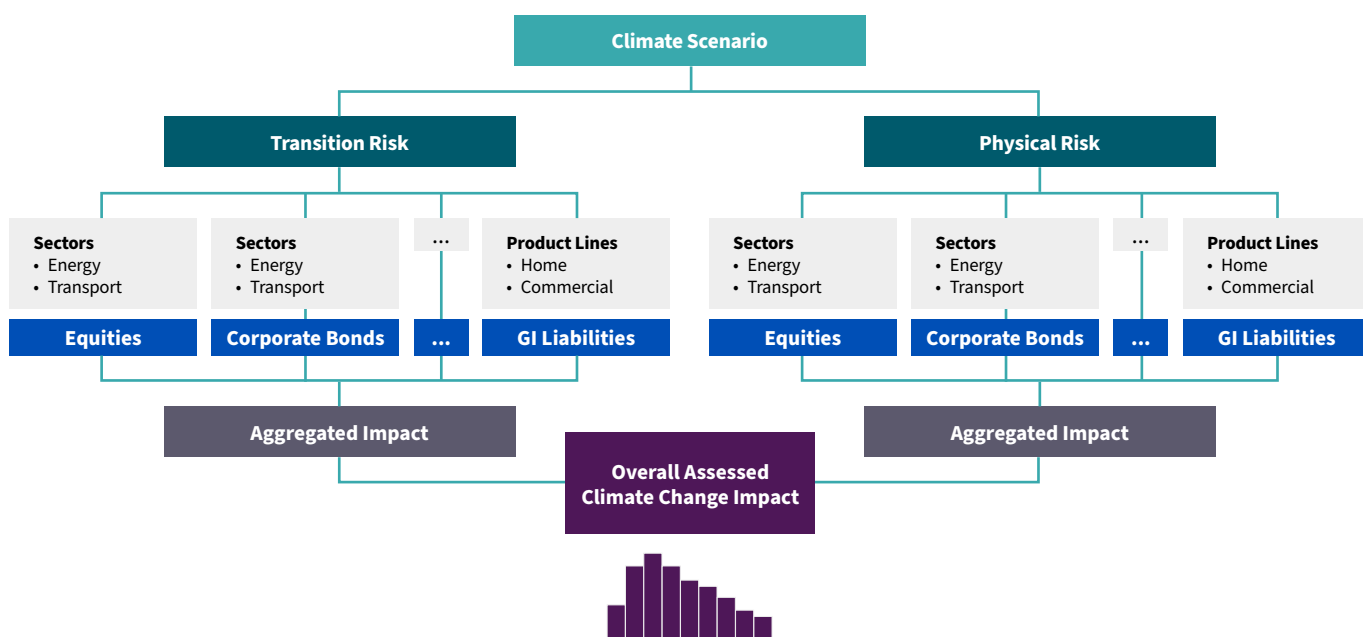
The Climate VaR calculates the impact of the occurrence of different extreme weather hazards in each scenario.

On the general insurance side, the Climate VaR calculates the impact on premiums as a result of the occurrence of different extreme weather hazards in each scenario. The impact on premiums is then used to determine the impact on our business, considering the impact on pricing, sales volumes and our reinsurance strategy. During 2019 we have extended the scope of physical risks covered to different regions (UK, Canada and France) and various perils (flood, freeze, subsidence, wildfire, winter storm, hail and severe convective storm) noting that the precise list of perils is region dependent. We have worked with internal and external experts to consider how climate change could change the frequency and severity of UK flooding and leveraged our existing catastrophe modelling capability to assess the impact of this on premiums.

Aggregation of climate-related risks and opportunities

We aggregate all the component parts of our exposure to derive an aggregate view of the impact of climate-related risks and opportunities, using an approach that is motivated by our approach to modelling operational risk. This approach, which has been developed in conjunction with Elseware, a risk management and quantification expert consultancy, uses a Bayesian Network⁶⁷ methodology. The attraction of this approach is that we can combine a set of beliefs, expert judgements, internal data and external data to assess the potential impact of these risks, on an aggregated basis. We can then determine an overall Climate VaR for each scenario (see figure 33).

Figure 33: Aviva's aggregation process for each scenario. Source: Aviva.



The impact distributions of each climate scenario are then combined to give a fully aggregated result across all four scenarios. This final step of aggregation uses the assigned likelihood given to each scenario taking into consideration amongst other things the current scientific analysis of the likely trajectory of emissions as well as policy commitments made by countries to reduce emissions (see figure 34).

Figure 34: Overall assessed climate change impact. Source: Aviva.



67. Probabilistic graphical model that represents a set of variables and their conditional dependencies via a directed acyclic graph.

Glossary

Aviva Master Trust

This is a contribution, occupational pension scheme which is set up under trust.

Carbon removal

The process of removing carbon dioxide from the atmosphere and locking it away for decades, centuries, or millennia. This could slow, limit, or even reverse climate change. Examples include nature based solutions such as reforestation or capturing and sequestering carbon from biofuel or technology based solutions such as carbon capture and storage from an industrial process or direct air capture.

Carbon neutral

The amount of carbon released is offset by a reduction in emissions or a removal of carbon. These carbon savings could come in the form of carbon credits that do not represent removals of carbon from the atmosphere, but instead emissions that have been reduced from a business as usual baseline. These types of carbon credits are not technically 'removals' which they would need to be to conform with the IPCC definition.

Climate crisis

This is a term describing global warming and climate change, and their consequences. The term has been used to describe the threat of global warming to the planet, and to urge aggressive climate change mitigation.

COP26

The 26th UN Climate Change Conference of the Parties will be held in Glasgow in November 2021. The COP26 summit will bring parties together to accelerate action towards the goals of the Paris Agreement and the UN Framework Convention on Climate Change.

CO₂e

Stands for CO₂ equivalent. There are a number of greenhouse gases which warm the earth at different intensity levels such as water vapour, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrochlorofluorocarbons (HCFCs), ozone (O₃), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). Rather than providing metrics for each gas they are converted into CO₂e for reporting.

Engage and divest

Engagement is where shareholders seek to influence firm behaviour through direct engagement, filing shareholder proposals and voting at AGMs. Divestment is where shareholders sell a firm's shares, typically because engagement has failed to influence the firm's behaviour or the firm does not meet the investor's minimum ESG standards.

Environmental, Social, and Governance

A term typically used in an investment context to denote the non-financial aspects of a company's performance that are key contributors to its bottom line. Environmental (e.g. pollution), Social (e.g. labour standards) and Governance (e.g. board diversity and accountability) are the three factors commonly used to measure the sustainability and social impact of a firm.

Ethical investments

Ethical investing refers to the practice of using one's ethical principles as the primary filter for the selection of securities investing. Ethical investing depends on an investor's views. Ethical investing gives the individual the power to allocate capital toward companies whose practices and values align with their personal beliefs. Choosing an investment based on ethical preferences is not indicative of the investment's performance.

EU Taxonomy

The EU taxonomy is a classification system, establishing a list of environmentally sustainable economic activities. The EU taxonomy is an important enabler to scale up sustainable investment and to implement the European Green Deal.

Green assets

Aviva defines green assets as Low carbon infrastructure debt & equity; such as Solar photovoltaics (PV), offshore & onshore wind, new energy centres reducing users' demand for energy, waste to energy, green hydrogen generation, battery storage, low carbon public transport & electric vehicle charging infrastructure and energy efficient buildings. Green bonds: that meet Climate Bonds Initiative's requirements, Social bonds and Sustainability bonds, Green loans and specific climate-related funds (such as the Climate Transition fund range). To determine the scope of our green assets, we have used "our and our customers assets" this includes all shareholder, with-profits and unit linked assets but excludes Aviva Investors third party client mandates.

Intergovernmental Panel on Climate Change

This is the United Nations body for assessing the science related to climate change.

Paris Agreement target

This is a 1.5°C target set by the global Paris climate change deal in 2015 to limit the damage wreaked by acute events such as extreme weather and chronic events such as sea level rise.

Glossary

Powering Past Coal Initiative

The UK and Canadian Government created a national commitment for countries to ‘Power Past Coal’ which was launched at the UN Climate Change Conference (COP23) in 2017. We have signed up to these principles to cease supporting thermal coal power investments and underwriting by 2030.

Net Zero company

This target covers all material ‘Scopes 1, 2 and 3’ carbon emissions (including investment, operations, supply chain); we are also developing a methodology for Net Zero underwriting.

Net Zero target

A firm targets to make Net Zero carbon emissions by a specific date, at which point having sought to reduce the emissions as much as possible, any carbon dioxide which continues to be released into the atmosphere is balanced by an equivalent amount being removed by offsetting through carbon removals.

Net Zero Asset Owner Alliance

A United Nations convened group of 33 institutional investors who have committed to transitioning their investment portfolios to net-zero greenhouse gas emissions by 2050.

Science Based Targets Initiative

This is a collaboration between United Nations Global Compact, CDP (a global disclosure system), World Resources Institute and Worldwide Fund for Nature. It supports companies to set emission reduction targets in line with the decarbonisation required to limit global temperature increases to 1.5°C.

Scope 1, 2 and 3 emissions

Greenhouse gas emissions are categorised into three groups or ‘Scopes’. Scope 1 covers direct emissions e.g. use of natural gas, company car vehicle emissions. Scope 2 covers indirect emissions from the generation of purchased electricity, steam and heating. Scope 3 includes 15 other categories of indirect emissions in a company’s value chain e.g. business travel and investments.

Social infrastructure

The construction and maintenance of facilities that support social services such as healthcare (hospitals), education (schools and universities), public facilities (community housing and prisons) and transportation (railways and roads).

Sustainability

All activity that can be considered as taking account of profit, people and the planet (also known as the ‘triple bottom line’). A more formal definition is “meeting the needs of the present without compromising the ability of future generations to meet their needs”.

Sustainable Development Goals

These are 17 global goals designed to be a “blueprint to achieve a better and more sustainable future for all”. They were set in 2015 by the United Nations and are meant to be achieved by 2030. Many firms use them to orient their sustainability action.

Task Force on Climate-related Financial Disclosures

The Financial Stability Board created the TCFD to improve and increase reporting of climate-related financial decision useful information. Governments are encouraging firms to make disclosures aligned to the TCFD framework to enable investors to compare them and allocate capital accordingly. The UK Government is making TCFD reporting mandatory for all listed companies and large asset owners in 2022.

Vector-borne diseases

Vector-borne diseases are human illnesses caused by parasites, viruses and bacteria that are transmitted by vectors.

If you have any questions, please contact

crteam@aviva.com