

# Climate-related financial disclosures

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Swiss Re's climate-related financial disclosures help stakeholders to properly assess its climate-related risks and opportunities. These disclosures demonstrate how Swiss Re plans to deliver on its commitments towards net-zero emissions for its operations, underwriting activities and investment portfolio.

# Summary

Swiss Re's climate-related financial disclosures aim to improve investors' and other stakeholders' ability to appropriately assess and price climate-related risk and opportunities in Swiss Re's re/insurance business, investment activities and operations.<sup>1</sup>

Swiss Re has a long-standing commitment to sustainable, long-term value creation. The Group Sustainability Strategy applies to the entire re/insurance value chain with actionable goals and ambitions for the short and mid term (2030) as well as for the long term (2050).<sup>2</sup> "Mitigating climate risk and advancing the energy transition" is one of three pillars of the Group's sustainability efforts. The Climate Action Plan (see page 155) guides Swiss Re in the implementation of the climate change mitigation ambition through re/insurance solutions.

Swiss Re has been actively contributing to advancing the net-zero<sup>3</sup> transition for several years through its participation in various industry-wide and cross-industry forums that are shaping CO<sub>2</sub> measurement standards and climate commitments. Additionally, Swiss Re's Group CEO Christian Mumenthaler acts as a [co-chair of the WEF Alliance of CEO Climate Leaders](#).

The Alliance is made up of over 100 CEOs from the world's largest corporations who have committed to net-zero emissions in their own operations and across their value chains by 2050. Christian Mumenthaler represented the Alliance at COP26, where he met with public sector decision makers and reiterated the business community's willingness to support more ambitious government targets to tackle climate change.

## Managing risks related to climate change

- **Property re/insurance against natural catastrophes** is one of Swiss Re's core business areas and is exposed to **physical risk** from climate change. As policy terms and pricing are renegotiated annually, Swiss Re continuously adapts its pricing models to the most recent loss experience and scientific evidence relating to all major risk factors. This includes the impact of climate change, but it is not the most dominant risk factor.
- **Other re/insurance portfolios** of Swiss Re such as life & health or agriculture are also exposed to physical risk from climate change. However, only certain sub-segments of the **agriculture** reinsurance book are affected and are controlled through annual renewal of assumptions, pricing and policy terms. In **life & health**, more frequent and intense heatwaves, air pollution from wildfires and vector-borne diseases are the most pronounced risks related to climate change. However, climate change is only one of many risk drivers, some of which can contribute to lower mortality and morbidity rates. The risks are mitigated through systematic review processes for mortality assumptions based on the latest available scientific evidence.
- It is Swiss Re's view that the **transition to a low-carbon economy** is not likely to present a significant financial risk for its **re/insurance business**. Swiss Re expects that the associated risks can be managed effectively, primarily through the annual renewal of contracts and formal processes to review underwriting assumptions based on the most recent historic loss experience. Furthermore, the climate-related policies of Swiss Re's advanced ESG Risk Framework ensure that risks associated with transactions are identified, assessed and addressed.
- Swiss Re's dedicated approach to managing **investment-related climate risk** involves the systematic monitoring of the carbon intensity of its government bond, corporate bond, listed equity and parts of the real estate portfolio. For the corporate bond and listed equity portfolios as well as parts of the real estate portfolio, Swiss Re also tracks related forward-looking indicators, such as temperature scores.
- In 2021, Swiss Re initiated a pilot study to assess the **impact of different climate change scenarios on underwriting and investment activities**. This pilot is still ongoing. The results for property natural catastrophe re/insurance suggest that the projected increases of annual expected losses by 2050 do not exceed the increase of insured weather-related losses over the past three decades, which have already been shaped by the ongoing climate processes (including anthropogenic climate change and natural climate variability). The focus for property and other short-tail lines of business remains unchanged: Swiss Re ensures that current risk views reflect all relevant risk drivers including climate change.

<sup>1</sup> The following quantitative disclosures in the TCFD Report have been audited by KPMG AG: Annual expected losses (AEL) of the weather-related perils reporting and carbon footprint calculation of Swiss Re's investment portfolio. The Assurance Report is included on pages 191–194. Additional links and references within the externally audited content were not part of the limited assurance engagement.

<sup>2</sup> You can read more about the Group Sustainability Strategy in the [Sustainability Report 2021](#)

<sup>3</sup> Net-zero emissions means that for every tonne of CO<sub>2</sub> that cannot be avoided, a tonne needs to be permanently removed from the atmosphere through so-called carbon removal approaches.

## Opportunities related to climate change

Climate-related **physical and transition risks** also present opportunities for **underwriting and investment activities**:

- Swiss Re’s **natural catastrophe re/insurance** covers support its insurance and commercial clients with effective protection against **current physical climate risks**. This segment is expected to grow strongly over the coming decades due to economic growth, urbanisation and the expected rise in climate-related risks.
- Its proprietary models help Swiss Re to provide **innovative solutions against the physical risks** of climate change. In 2021 for example, Swiss Re designed and reinsured crop cover for six million

farmers in India, created a simplified flood insurance product for US homeowners and structured the first catastrophe bond for the island nation of Jamaica.

- The **transition to a net-zero emissions economy** offers business opportunities across a range of sectors such as power and energy, materials and processes, logistics and transport, as well as agroforestry and food. Swiss Re is well positioned to support this transition with re/insurance cover and it is particularly active in the power sector. In 2021, for example, Swiss Re wrote re/insurance for more than 9100 renewable energy generation facilities, which will help to avoid around 31 million tonnes of CO<sub>2</sub>

emissions. Swiss Re provided parametric insurance solutions against revenue shortfall of solar and wind farms in Vietnam. In Germany, Swiss Re wrote re/insurance for the construction of the 476 MW **offshore wind farm Baltic Eagle** and the new transmission line **SüdLink**. The latter is key to transfer renewable energy from the north to the industrialised south.

- Green, social and sustainability bonds play a key role in **financing the transition to a net-zero economy**. By the end of 2021, Swiss Re has reached around 96% of its USD 4 billion target for such bonds.

## Accelerated path to net-zero CO<sub>2</sub> emissions

Tackling climate change and advancing the energy transition is challenging. In line with the Paris Agreement, Swiss Re is committed to achieving **net-zero emissions** in its **underwriting and investment** activities as well as for **operations**:

- Climate change is an element of the Group Sustainability Strategy and covers several of the additional assessment dimensions for determining the Group Annual Performance Incentive pool.
- Standards to measure and disclose emissions are needed to advance the transition. Swiss Re is therefore a founding member of the UN-convened **Net-Zero Insurance Alliance (NZIA)** and

the **Net-Zero Asset Owner Alliance (AOA)**, and is taking a leading role in some of their working groups.

- Swiss Re has tightened its underwriting policies relating to thermal coal as well as oil and gas and is committed to **transition its underwriting portfolios to net zero by 2050**.
- Swiss Re aspires to **transition its investment portfolio to net-zero emissions by 2050**. For its corporate bond and listed equity portfolio as well as parts of the real estate portfolio, Swiss Re has set intermediate targets for 2025 on the base year 2018 and aims to fully exit from coal-based assets by 2030.

- Swiss Re has committed to **net-zero emissions in its operations by 2030**. To achieve this target, the company will “Do our best, remove the rest” under the new CO<sub>2</sub>NetZero Programme. The focus of the programme is on emission reductions that are incentivised by a Carbon Steering Levy – an internal carbon price of USD 100–200 per tonne of CO<sub>2</sub>. The levy also provides the funds to compensate any unavoided emissions through carbon removal solutions. For example, those provided by Swiss Re’s new partner **Climeworks**.

### Task Force on Climate-related Financial Disclosures of the Financial Stability Board (TCFD)

Swiss Re has played an active role in the TCFD since its creation by the Financial Stability Board, and began to implement the TCFD recommendations in the 2016 Financial Report. Since then, Swiss Re has continued to expand its climate-related disclosures structured along **four pillars and seven principles for effective disclosure**.

Governance	Strategy	Risk management	Metrics and targets
A) Board oversight	A) Description of climate-related risks and opportunities	A) Processes for identifying and assessing climate-related risks	A) Metrics to assess climate-related risks and opportunities
B) Management’s role	B) Impact of climate-related risks and opportunities	B) Process for managing climate-related risks	B) Scope 1, 2 and 3 greenhouse gas (GHG) emissions
	C) Resilience of strategy in climate-related scenarios	C) Integration into overall risk management	C) Targets to manage climate-related risks and opportunities

Source: TCFD

# Climate governance

Swiss Re's governance around climate-related risks and opportunities.

Climate-related governance is embedded in the Sustainability Governance Framework. This framework includes developing, enhancing, implementing and monitoring the Group Sustainability Strategy. In 2021, Swiss Re further embedded climate change considerations in the Business Units and Group Functions and worked on quantifying its climate performance. For a detailed overview of the Board of Directors' oversight and the management's role in sustainability-related risks and opportunities, including climate change, see the Corporate Governance section of the Financial Report on page 78. Sustainability and climate-related governance in particular is covered on page 83.

Climate-related topics are discussed at various governance levels. See pages 84–85 of the Financial Report for climate-related focus areas of the Board of Directors and the Group Executive committees in 2021. Selected climate-related focus topics addressed during the year include:

#### Board of Directors committee meetings:

- The Finance and Risk Committee reviewed the impact of climate change on the various underwriting portfolios with a focus on natural catastrophes and secondary perils for natural catastrophe insurance, and climate change litigation for casualty. They also assessed new risk transfer opportunities arising from climate change and the associated underwriting risks.
- The Investment Committee received an update on the Responsible Investment climate action approach highlighting the Engagement Framework for listed equity, emissions reduction targets for Swiss Re's sub-portfolio and forward-looking indicators to measure the alignment of Swiss Re's portfolio to a 1.5°C world.

#### Group Executive Committee (Group EC) meetings:

- During COP26, Swiss Re leaders met with the [Swiss Re Strategic Council](#), a body of renowned external advisors, to discuss the challenges of climate change and the implications of governments', investors' and clients' respective net-zero strategies. Seven external subject matter experts joined the Swiss Re Strategic Council for two days of exchange.

#### Group Sustainability Council (GSC) meetings:

- Climate-related discussions and endorsements in the GSC in 2021 included: the question of how to deal with insurance for hard-to-abate sectors across lines of business; addressing data limitations for measuring the carbon footprint of the underwriting portfolios, including Swiss Re's engagement with the NZIA on this topic (see "Several steps to align the underwriting portfolio with the Paris Agreement", page 181); and Swiss Re's approach for re/insurance of nature and technology-based carbon removal and storage solutions.

#### Climate change and sustainability-related KPIs linked to compensation

Climate criteria are assessment dimensions for determining Swiss Re's Group Annual Performance Incentive pool.



Find out more on page 138 in the Compensation chapter of the Financial Report

# Climate strategy

Swiss Re regularly assesses the actual and potential impacts of climate-related risks and opportunities on its business, strategy and financial planning.

Swiss Re has long recognised that climate change, if not mitigated, will potentially have very significant effects on society and the global economy. Mitigating climate risk and advancing the energy transition is therefore a core pillar of its sustainability strategy. Swiss Re is committed to reducing its carbon footprint and becoming net-zero in its operations by 2030. For underwriting and investment activities, Swiss Re is committed to reach net-zero emissions by 2050.

Re/insurance protection against natural catastrophes is one of Swiss Re's core businesses and key risks. In 2021, premiums for natural catastrophe covers amounted to USD 3.9 billion, or about 22% of total premiums written.<sup>1</sup> This shows the importance clients place on obtaining re/insurance protection against natural catastrophes. The market is expected to see strong growth due to general economic growth, urbanisation in emerging markets as well as increased physical risks arising from climate change (see Opportunities related to physical risks, page 163). In addition, the difference between insured and total economic losses remains elevated, not only in emerging markets.

In view of the significance of climate change for the re/insurance business, Swiss Re has developed a Climate Action Plan to support private and public-sector clients, while profitably growing its business. The Climate Action Plan serves as Swiss Re's climate strategy.

## Swiss Re's Climate Action Plan

Building on the Group Sustainability Strategy and commitments and initiatives of recent years, the Climate Action Plan combines three objectives:

1. Become the leading re/insurance company on physical climate risk.
2. Become a leading provider of re/insurance solutions for low-carbon transition opportunities.
3. Build partnerships to develop scalable solutions to mitigate and adapt to climate change.

As the Climate Action Plan indicates, understanding the risks posed by climate change as well as identifying the potential to create and adapt suitable products and services for clients continue to be priorities for Swiss Re.

<sup>1</sup> For losses exceeding USD 20 million. Net of external expenses such as brokerage and commissions. In previous years, premiums including external expenses were reported, but this is now aligned with the methodology used elsewhere in the Financial Report. See Climate metrics and targets, page 180 for previous years' data.

## Re/insurance activities and operations

### Physical risks

Although the physical risks arising from climate change can have significant economic consequences over time, especially from a wider societal perspective, they represent a limited and manageable risk for Swiss Re.

Physical risks posed by climate change could potentially affect three areas of Swiss Re's business. They can:

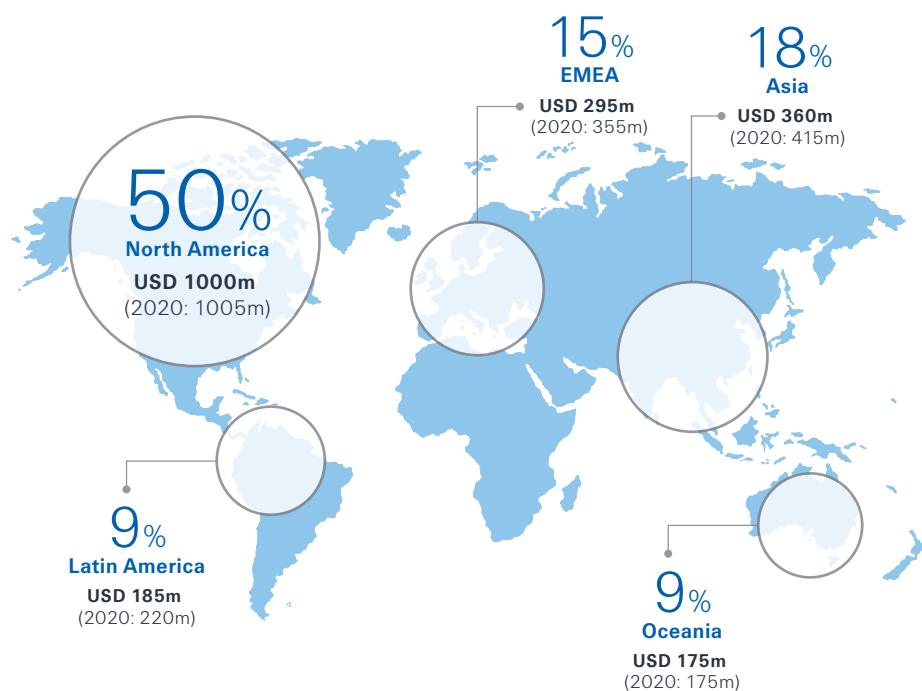
- Influence modelling and pricing of weather-related natural perils
- Impact the insurability of risks exposed to extreme weather events
- Reduce/disrupt operations

### Pricing of weather-related perils in property re/insurance

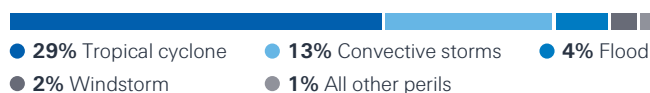
Climate change will impact the frequency and severity of weather-related natural catastrophes. Consequently, Swiss Re's modelling and pricing of insurance risks need to be adjusted on a regular basis. Based on its proprietary loss modelling framework, Swiss Re is investigating how long-term scenario analysis can inform risk views for underwriting decisions today (see page 165).

This framework allows Swiss Re to calculate the annual expected losses (AEL) and loss-frequency distributions of major natural catastrophes. The weather-related perils with the largest AEL for property re/insurance at present are disclosed on page 180 (North Atlantic hurricane, US tornado, Japanese cyclone, European windstorm and European flood). Furthermore, the geographic distribution and peril split of Swiss Re's annual expected natural catastrophe losses for property insurance are shown in the figure on the right. The largest contribution to Swiss Re's AEL for the most material weather-related perils comes from the North America region (50%), mainly dominated by hurricane risk. Asia accounts for 18% of the AEL, with a significant contribution from typhoon risk. EMEA, where the major driver is European winter storms, and Latin America contribute with 15%, and 9%, respectively.

### Gross annual expected property re/insurance loss for weather-related natural catastrophes



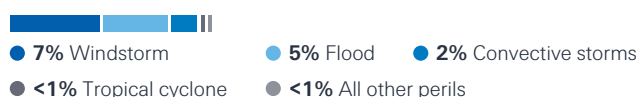
#### North America



#### Latin America



#### EMEA



#### Asia



#### Oceania



As a percentage of most material perils in North America, Latin America, Europe, Asia and Oceania (all numbers have been rounded).





Confidence about observed and future climate trends is highest for risks related to the **increase in global temperatures**. For example, the melting of glaciers and ice caps as well as thermal expansion of water in warmer temperatures are leading to **rising sea levels**. In turn, this can directly **increase the magnitude of storm surges**, a long-term risk for coastal regions. To date, the rise in sea levels has been relatively slow and will likely remain so in the near future, allowing time for measures to mitigate the risk of coastal flooding.

Swiss Re manages its exposure to sea level rise by developing up-to-date risk models and by managing its risk accumulation in the most exposed areas to ensure a well-diversified underwriting portfolio. Thanks to high-resolution data, Swiss Re's Global Storm Surge Zones help the company and its clients to pinpoint storm surge risks globally in a quantitative manner. The insurance impact for the property line of business is evaluated to be low to medium and localised in coastal and flooding zones (see the case study on sea level rise in the [Swiss Re TCFD report 2020, page 156](#)).

Another outcome of climate change for which there is high confidence is **increased temperature extremes**, which have brought longer and/or more frequent heatwaves, droughts and periods of water scarcity. Heatwaves affect agriculture, workforce productivity, infrastructure, water resources, health and mortality. In addition, **hot and dry conditions exacerbate drought and wildfire risk**, as seen in different regions in recent years, including California, Southern Europe and Australia. These perils have severe consequences for exposures in the wildland-urban interface.

In general, wildfire risk and other so-called frequency perils mostly affect direct insurers. Losses from such events often remain below the retention levels of property reinsurance programmes. Reinsurers are exposed to frequency perils mainly through aggregate excess of loss structures, event excess of loss structures that have a low attachment point and proportional treaties. Swiss Re has actively de-risked its portfolio of aggregate excess of loss covers in the last two years because of inadequate pricing. Overall, Swiss Re considers the natural catastrophe re/insurance market a healthy risk pool, and a growth opportunity subject to risk commensurate pricing (see Opportunities, page 163).

Rising temperatures allow the **atmosphere to hold more moisture**, thus (on average) increasing the severity and frequency of rainfall events (including tropical cyclone-induced rainfall), which in turn is expected to amplify the flood risk. However, the rainfall-flood link is complex. Furthermore, flood risk is also impacted by other factors such as soil sealing, urban flood protection, land-use changes and seasonal dependencies such as snow melt and soil moisture. Regional trends are already observable, but the property insurance impact for flood-related losses is limited due to the large protection gap for this peril.

There is lower confidence in the understanding of trends in **modes of climate variability**, which encompasses atmospheric and oceanographic circulation changes. These modes affect, for example, the frequency and intensity of tropical cyclones or European winter storms. While warmer sea surface temperatures will increase the probability of tropical cyclone formation and intensification, higher wind shear can offset this. These complex interactions introduce a confidence barrier that renders any insurance-related quantification of climate-change effects on high-severity perils like hurricanes very uncertain. Given their material impact, Swiss Re performs internal research and collaborates with leading scientists to tackle this challenge (see Resilience under different climate scenarios, page 165).

While several climate change factors are beginning to affect the natural catastrophe risk landscape, Swiss Re expects **weather risks to remain assessable by scientific methods**. This means that loss models can continue to be updated in the future to assure adequate risk assessment of extreme weather events. The in-house development of risk models for weather-related perils ensures full modelling transparency and the ability to efficiently assess and update models if new scientific evidence becomes available (see Climate risk management, page 175).

Furthermore, since most property re/insurance contracts have a duration of one year, updated risk views are quickly reflected in the pricing of natural catastrophe risks.

Regarding the long-term time horizon to 2050, Swiss Re expects a need for adjustments to some weather risk models, based on evolving scientific knowledge.<sup>1</sup> Confidence is high that future research will provide sufficient guidance on the magnitude and direction of these adjustments.

<sup>1</sup> In climate science, long-term often refers to a time horizon until 2100. However, to align with Swiss Re's net-zero commitments and the Paris Agreement, "long-term" has been chosen to mean the period until 2050.

### **Impact on the insurability of risks exposed to extreme weather events**

An increase in the frequency and severity of extreme weather events requires a rise in premium and can therefore restrict the affordability of property re/insurance in certain regions, especially in coastal areas.

While there is significant uncertainty associated with climate projections, especially when it comes to storms making landfall, increases in the frequency and severity of **tropical storms** are likely. Climate variability is expected to remain the dominant factor in the near term. In the longer term (2050), a rise in sea levels will lead to non-linear increases in storm surge risk for coastal areas. Additionally, warmer temperatures will increase the severity of rainfall events that may increase flood risk.

Affordability of insurance is an issue arising from climate change. It is expected that re/insurance premiums will need to rise to cover extreme weather risks. If this rise remains modest, then re/insurance protection remains economically viable and the overall premium volume will potentially grow. Larger increases, however, may be pushing re/insurance prices for certain highly exposed risks beyond the limits of economic viability. This is particularly relevant for areas with inadequate construction planning and development. In addition, the timing of actions against increased climate-related claims is of crucial importance. For example, if measures to exclude a particular risk are taken too early, viable business opportunities will be missed. If measures are taken too late, the consequence may be higher-than-expected claims.

Insurability depends on the random nature of a risk. If risks increase to a level at which losses are certain and predictable, then insurance is not the right instrument to address such systematic changes to a landscape. For example, if there is permanent flooding due to rising sea levels, insurance is not the appropriate financing mechanism to protect assets.

Finally, the overall size of the re/insurance market will depend on future economic growth rates.

In line with independent external studies, Swiss Re's assessment through its Economics of Climate Adaptation studies have shown that climate adaptation measures need to be taken in many regions to limit expected increases in natural catastrophe damage, thereby, ensuring the economic viability of re/insurance in the future. The implementation of cost-effective adaptation measures against climate change requires active collaboration between public and private sector actors, including re/insurers.

### **Impact on other lines of business**

**Agriculture insurance** typically covers against perils like hail, drought, excess rain and frost, but the extent of covers provided diverges across markets. Climate change will impact agriculture insurance, but this is limited to the sub-portfolios of crop and forestry, which are mostly exposed to hail and drought. As global climate models show clearly increasing trends for drought and frost, but not for hail and excess rain, less than half of Swiss Re's total agriculture book and only around 45% of its total agriculture AEL are susceptible to climate change.

While hail is also an important peril for Swiss Re's agriculture insurance book, constituting roughly 40% of premiums, there is low confidence on future changes on hail activity driven by climate change in most regions.

The impact on Swiss Re's agriculture book will be mitigated by several factors:

- Agriculture insurance is a short-tail business, which allows costing and portfolio composition to be adjusted annually.
- Climate change that has manifested itself to date is reflected in historical losses, which are the main basis for costing business, and Swiss Re is observing increasing rates in re/insurance pricing.
- Swiss Re will continue efforts to enhance forward-looking modelling.

Nevertheless, from 2010 to 2020, realised losses have exceeded expectations in almost every year. Very likely, part of this gap can be attributed to trend effects due to climate change. In 2020, Swiss Re took corrective actions to better account for climate change-driven trend effects in the costing methodology. This involved adjusting deal-specific historical performance to today's climate, aiming for a much more accurate and representative risk assessment.

**Life and health re/insurance** is also influenced by climate change. The most pronounced risks for health are heatwaves, air pollution from wildfires and vector-borne diseases. Without mitigation action, mortality rates and healthcare costs could rise, leading to higher claims costs than anticipated. More severe heatwaves can increase mortality, particularly among persons with cardiovascular diseases. Heatwaves will extend to regions previously not affected. This will increase the share of the world's population impacted by such conditions.

The general rise of temperature and increased humidity is another area of concern. This combination enables vector-borne diseases to enter new areas. Climate change will extend the transmission season and geographical range for many infectious diseases. Lyme disease, avian influenza, meningitis, dengue fever and other tropical bacterial and viral infections are therefore projected to rise.

Severe drought conditions can lead to more wildfires, which cause air pollution. Such air pollution can extend to regions far from the fire itself and lead to deteriorating health conditions and increasing mortality experience.

Scientific evidence quantifying the impact of climate-related heatwaves, air pollution and vector-borne diseases on health and mortality outcomes is still limited. Swiss Re follows the scientific discussion and incorporates new evidence into its mortality assumptions on a regular basis (see Climate risk management, page 175). Available research suggests that in Swiss Re's main Life & Health markets, extreme cold is currently a more substantial driver of mortality than extreme heat. Seasonal patterns in Swiss Re's mortality claims show a significantly higher burden in winter months compared to summer months. This suggests that a net adverse impact from climate change on mortality may only arise in the more distant future.

Furthermore, the availability of mitigation measures (eg air purifiers, air cooling, increased hydration) that would be affordable for the insured population of Swiss Re's key mortality portfolios in the US, UK, Canada and Australia will limit the effects of warmer temperatures and extreme heat. How climate change will play out in conjunction with other key adverse trends such as increases in unhealthy behaviours or obesity is an area of uncertainty.

There are many other risk factors to consider that could be secondary consequences of other activities undertaken to adapt to climate change. For instance, action to limit air pollution could lead to improving mortality and morbidity outcomes; but conversely, the increased usage of air cooling could place greater stress on electricity grids in times of extreme heat and lead to excess mortality when power failures occur. These secondary consequences are particularly difficult to model and predict, suggesting that a more broad-brush approach, utilising Swiss Re's existing framework around long-term mortality trend assumptions, is more appropriate and avoids spurious accuracy.

### **Swiss Re's own operations**

According to Swiss Re's in-house catastrophe loss models, severe weather risks are potentially of importance for some operations, mainly in Florida and on the northeastern coast of the US. However, even assuming an extreme climate change scenario, Swiss Re does not expect any of these office locations to be exposed to risk levels that would undermine their economic viability. Additionally, robust and regularly tested business continuity plans covering all locations are in place to mitigate the risk of climate-related disruptions (see Climate risk management, page 175).

## Transition risks

Overall, it is Swiss Re's view that the transition to a low-carbon economy is not likely to present a significant financial risk for its re/insurance business. It is expected that the associated risks can be managed effectively, due to the formal processes to review underwriting assumptions based on the most recent historic loss experiences and annual renewal of contracts.

Transition risks may arise as a result of the extensive policy, legal, technological and market changes that are required to make the transition to a low-carbon and, ultimately, a net-zero economy. For a re/insurer, financial risks arising from the transition to a low-carbon economy are mainly linked to the potential re-pricing of carbon-intensive financial assets (see Investment activities, page 169), and the speed at which any such re-pricing might occur. To a lesser extent, re/insurers may also need to adapt to potential impacts on the liability side of their business.

Swiss Re has assessed the most relevant transition risks that may potentially affect the re/insurance business:

- Policy and legal risks
- Technology risks
- Market and reputational risks

## Policy and legal risks

As the move towards achieving a net-zero emissions economy by mid-century or earlier gains momentum in both the public and private sector, material policy-triggered changes are expected for the real economy in areas such as power and energy, materials and processes, logistics and transportation, and agroforestry and land-use practices. Such policy changes may include regulations to increase energy and material efficiency, mandates to rapidly scale up renewable energy and clean mobility, the removal of fossil fuel subsidies, the introduction of carbon pricing, policies addressing land-use change and agricultural practices, as well as the scaling up of carbon removal technologies. This requires a solid understanding of the related policy and legal risks as well as the proactive management of related risks and opportunities. Certain policy risks might also influence the risk quality of some insured assets in the mid to long term, due to factors such as increased cost pressure and reduced asset maintenance.

### Risks related to climate change litigation (CCL)

Swiss Re identified CCL as an emerging risk over a decade ago and assessed its relevance. Since the adoption of the Paris Agreement in 2015, the number of CCL cases has more than doubled. The activities are currently focused on the US, Europe and Australia, but they are spreading to other jurisdictions as well. While most of the cases are directed against governments and public entities, private companies are also increasingly being targeted. However, the majority of decisions in those litigation cases potentially relevant for insurers were made in favour of the defendants. Therefore, they have not led to significant claims for the re/insurance industry to date.

Swiss Re has not faced any significant CCL claims in the past. Swiss Re expects the above trends to continue, and actively monitors and assesses CCL risks in its underwriting and research units. In particular, Swiss Re tracks advances in climate attribution science, CCL cases, regulatory changes and developments in legal concepts for different geographies, industries and lines of business in order to assess potential exposures under different scenarios.

## Technology risks

The re/insurance sector is likely to be impacted by the technological transition in two ways:

1. New or rapidly developing technologies by definition do not have loss histories and thus may be challenging to price accurately. Insurers need to develop possible loss scenarios and the related expenses. Once these are developed and tested, new technologies are likely to present the sector with an opportunity for growth. Offshore wind projects, for example, have developed into such growth opportunities (see Climate-related opportunities, pages 163–164).
2. New low-carbon technologies are likely to gradually displace traditional, fossil fuel-based ones. Power generation, for example, will shift to wind and solar farms delivering intermittent power. This could affect other elements of power systems that had originally been designed for stable base load electricity delivered by fossil fuel power plants.

As another example, the global motor vehicle inventory is currently shifting away from internal combustion engines towards electric engines to reduce carbon emissions. This development entails the implementation of a variety of new technologies, from new lightweight materials to advanced battery systems. This will likely change loss patterns for re/insurers.

However, while the automotive industry is undergoing significant change, the impact on re/insurance portfolios is expected to be gradual. It will take years for new technologies to penetrate the motor fleets. In addition, as motor insurance contracts are renewed annually, pricing can be adapted as re/insurers gain experience in underwriting, loss adjustment and claims handling. Swiss Re's Automotive and Mobility Solutions team is creating a comprehensive framework for vehicle risk scoring. The framework covers all specific aspects of vehicle technology from mechanical components such as tires, suspensions and brakes, to advanced driver assistance systems. It also includes the topic of risk assessments for different types of electric and autonomous vehicles.

The motor transition does not affect insurers and reinsurers to the same extent. According to Swiss Re's *sigma* database, in 2020 motor insurance represented approximately 41% of global property and casualty direct premiums written, but for the reinsurance sector and Swiss Re the share is well below 20%.

To address some of the residual transition risk, Swiss Re has started to develop a carbon risk steering mechanism. Its key component will be a carbon risk model designed to measure the carbon intensity and associated risks embedded in the re/insurance business. For further

information about the mechanism and related policies, see Climate risk management, page 176, and Climate metrics and targets, page 181.

### Market and reputational risks

With policy, legal and technological changes as a backdrop, consumer and investment preferences will further shift toward less carbon-intensive products and services over time. Changes in market volumes will be reflected in the demand for insurance. In addition, to support their decision-making, investors and other stakeholders will expect greater transparency and more information

regarding re/insurers' exposure to emission-intensive sectors as well as their contribution to low emissions-related risk transfer solutions.

Companies whose disclosures are misleading or overstate their climate efforts – so-called greenwashing – can also sustain reputational damage that could affect Swiss Re directly or through its liabilities through CCL. Finally, particularly in fossil fuel-dependent societies, a late and sudden transition without appropriate mitigation measures may result in setbacks such as social unrest, leading to an overall market decline.

## Non-investment transition risks for the real economy and their relevance for the re/insurance industry

Transition risks	Financial impacts on real economy	Impacts on insurance liabilities
<b>Policy and legal</b>		
<ul style="list-style-type: none"> <li>• Removal of fossil fuel subsidies and introduction of CO<sub>2</sub> taxes</li> <li>• CO<sub>2</sub> regulation and mandates</li> <li>• Exposure to litigation for historical and current CO<sub>2</sub> emissions</li> <li>• Emission disclosure requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Write-offs, asset impairment, and early retirement of existing assets due to policy changes (ie stranded assets)</li> <li>• Increased operating costs (eg higher compliance costs, increased insurance premium)</li> <li>• Increased costs and/or reduced demand for products and services resulting from fines and judgments against CO<sub>2</sub>-intensive sectors</li> <li>• Increased regulatory pressure for decarbonisation and disclosure</li> </ul>	<ul style="list-style-type: none"> <li>• Climate policy-induced economic effects may lead to higher claims for certain lines of business (eg credit insurance)</li> <li>• Increased operating risk and lower risk quality for impaired assets may impact property insurance (eg due to increased cost pressure and reduced asset maintenance)</li> <li>• Increased litigation activity may become relevant for casualty insurance (eg general liability, directors &amp; officers insurance)</li> <li>• Requirements to disclose climate-related impacts of insurance business activities</li> </ul>
<b>Technology</b>		
<ul style="list-style-type: none"> <li>• Substitution of existing products and services with lower emissions options</li> <li>• Costs to transition to lower emissions technology</li> </ul>	<ul style="list-style-type: none"> <li>• Write-offs, early retirement of existing assets</li> <li>• Research and development expenditures in new and alternative technologies</li> </ul>	<ul style="list-style-type: none"> <li>• Shift in predominant energy technologies could lead to a change in the liability structure and diversification for insurers</li> <li>• New technologies without established loss histories may increase uncertainties in property and engineering insurance</li> </ul>
<b>Market and reputation</b>		
<ul style="list-style-type: none"> <li>• Uncertainty in market signals and in client behaviour</li> <li>• Decarbonisation efforts required by business partners</li> <li>• Increased stakeholder concern</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced demand for goods and services due to shift in consumer preferences</li> <li>• Change in revenue mix and sources, resulting in decreased revenues</li> <li>• Increasing costs for decarbonising business models</li> <li>• Reduction in capital availability</li> <li>• Increased reputational risk for high-emission sectors</li> </ul>	<ul style="list-style-type: none"> <li>• Premium volume in engineering and property insurance will shift from CO<sub>2</sub>-intensive assets and activities to CO<sub>2</sub>-efficient ones</li> <li>• Reputational risk for insurers via insured emissions (eg insurance of thermal coal) may further intensify</li> <li>• Potential societal backlash due to transition in fossil fuel-dependent societies causing market decline (eg due to political unrest)</li> </ul>

Source: Swiss Re, adapted from TCFD



## Opportunities

Climate change does not only create risks, but also presents significant new opportunities. Developing corresponding products and services is a core part of the Group Sustainability Strategy and Climate Action Plan. Through its products, services and risk insights, Swiss Re pursues two complementary objectives: adapting to the effects of climate change and supporting the transition to a low-carbon economy.

## Opportunities related to physical risks

A recent *sigma* report by the Swiss Re Institute projects that the global property insurance market is to grow more strongly than the overall economy until 2040.<sup>1</sup> While economic growth and increasing urbanisation in emerging markets will contribute the majority of additional premiums over the next two decades, 20% are due to increased physical risk because of climate change. At the same time, the share of uninsured losses, remains high.<sup>2</sup>

Swiss Re's re/insurance products against natural catastrophes help our clients to cope effectively with current climate risks. The same applies to Swiss Re's weather insurance solutions. In addition, Swiss Re undertakes special efforts to help expand re/insurance protection by focusing on non-traditional clients (in particular from the public sector), underdeveloped markets and innovative risk transfer instruments.

### Business solutions that tackle physical climate risk

Examples of recent deals that tackle physical climate risk include:

**Providing crop insurance for six million farmers in India:** More than 6 million farmers in West Bengal, India, can now look forward to having better coverage for their crops, as the state launched its first fully subsidised technology-driven crop insurance scheme. The Bangla Shasya Bima scheme is unique in that it adopts the Crop Health Factor as the underlying parameter: it uses remote sensing technology to measure and combine various indicators such as rain and vegetation to assess the health of the crop. Swiss Re helped review the product design and is also the lead reinsurer of the scheme.

**Partnering to monitor flood risk:** Swiss Re's Rapid Damage Assessment (RDA) supports claims managers to take faster and more accurate decisions in events such as tropical cyclones and floods. RDA uses a combination of event data, natural catastrophe models, data enrichment and AI algorithms on high resolution aerial and synthetic aperture radar satellite imagery to derive property-level damage insights, ultimately improving the loss-adjustment process. Swiss Re continuously enriches its existing datasets through partnerships. One such partnership made in 2021 is with ICEYE, whose radar-based technology satellites can peer through cloud cover, volcanic ash and hurricanes to measure how floods and other natural catastrophes are impacting specific regions as they occur. Swiss Re's experts can then use the

RDA enriched with ICEYE data to calculate the impact of the flooding across clients' portfolios within days.

**Providing flood protection for US homeowners:** Swiss Re has worked with actuarial consultant Milliman and the firm's insurance advisory and rating organisation, Appleseed, to develop QuickFlood — a simplified flood insurance product for lower risk flood zones in the US — based on Swiss Re's proprietary flood models. Appleseed obtains state-by-state regulatory approval for QuickFlood on behalf of Swiss Re clients, reducing regulatory risk and helping them to adopt and deploy the product quickly. To date, the overall flood solution supports up to 220 000 flood policies, helping to mitigate climate risk.

**Protecting China's farmers from weather risks:** Located in South China, Guangdong Province cultivates a large variety of agricultural products, but is exposed to heavy rainfall and typhoons. Swiss Re's Agriculture Insurance Risk Monitoring Platform (AIRMP) leverages big data and machine learning to support local insurers with product design, actuarial analysis, pay-out calculations and product management. As of the end of 2021, Swiss Re developed insurance for 20 new agricultural products. The cover includes perils such as typhoons, extreme temperatures, strong winds and droughts. Additionally, Swiss Re provides reinsurance capacity for products developed via the platform, thus further helping to close the protection gap and boost high-quality development of agricultural insurance in Guangdong.

**Helping Jamaica become more resilient to natural catastrophes:** Swiss Re Capital Markets acted as structuring agent and bookrunner for the first catastrophe bond issued to solely benefit the island nation of Jamaica. The bond provides accelerated economic relief of up to USD 185 million in the case that Jamaica is impacted by a tropical cyclone that meets certain parametric minimum central pressure thresholds. The collateral, meanwhile, is held by the International Bank for Reconstruction and Development, thereby funding development projects for middle and low-income countries.

**Helping corporate clients quantify their physical climate risks:** Many of Swiss Re's corporate clients increasingly need to assess their exposure to physical climate risks in order to safeguard their long-term business interests and answer to stakeholders, investors, customers and regulators. By combining Swiss Re's forward-looking climate models for precipitation and sea level rise with flood and storm surge zones, Swiss Re's Climate Risk Solutions can help clients quantify their exposure to physical climate risks, supporting their long-term planning and decision-making. The offering includes in-depth analysis of natural catastrophe impact for a customer's identified peril scenarios as well as mitigation and risk transfer options.

Read more about these solutions in the Sustainability Report, pages 22–27 or on the [Swiss Re Corporate Solutions website](#).

<sup>1</sup> Swiss Re Institute *sigma* No 4/2021, *More risk: the changing nature of P&C insurance opportunities to 2040*.

<sup>2</sup> See Swiss Re Institute, *Resilience Index 2021: a strong growth recovery, but less resilient world economy* and [www.sigma-explorer.com](http://www.sigma-explorer.com).

### Opportunities related to transition risks

The transition to a net-zero emissions economy offers business opportunities for a re/insurer across a range of sectors such as power and energy, materials and processes, logistics and transport, and agroforestry and food. New capital spending for low-emission assets is estimated to be 3% of global GDP, or a cumulative USD 105 trillion, until 2050 to achieve net-zero. This is on top of current spending of USD 170 trillion.<sup>1</sup> For the power sector alone, the International Energy Agency estimates that achieving net-zero emissions could create a cumulative

USD 27 trillion market opportunity for manufacturers of wind turbines, solar panels, lithium-ion batteries, electrolysers and fuel cells.<sup>2</sup> Realising the potential will require a strong contribution from private capital providers. While the announcement of the Glasgow Financial Alliance for Net Zero (GFAFANZ) in 2021 to commit USD 130 trillion<sup>3</sup> reflected an increasing engagement of the financial sector, more will be needed.

Swiss Re is re/insuring renewable energy projects across all lines of business. In 2021, Swiss Re wrote property and engineering

cover for more than 9 100 renewable energy generation facilities which will help to avoid around 31 million tonnes of CO<sub>2</sub> emissions. Swiss Re Corporate Solutions is a recognised market leader for offshore wind risks. Reinsurance engineering premiums from renewable energy power generation grew strongly by 17% per year over the past decade and accounted for 58% of total engineering premiums for power generation in 2021. Furthermore, through [nature-based solutions](#), Swiss Re supports and enables investments in natural assets that support climate adaptation and mitigation.

### Business solutions that tackle energy transition risks

Examples of recent deals that tackle energy transition risks include:

**Facultative casualty reinsurance for a global client:** For the past decade Swiss Re has supported a global insurance company with facultative reinsurance cover for its renewable energy portfolio. This enabled the client to extend its market-leading property, engineering and marine renewable energy insurance covers to include casualty and thus become a one-stop-shop for renewable energy insurance. Initially, the portfolio consisted primarily of European wind farms, but over the last five years the scope has broadened to include other regions as well as photovoltaic solar farms and battery storage systems. In 2021, Swiss Re reinsured over 290 installations. For simpler projects, Swiss Re automatically provides construction and operation-related covers, while more complex risks are underwritten individually.

**Advancing the energy transition in India:** Swiss Re helped a renewable energy provider in India to consolidate insurance cover for its entire portfolio of solar (80%) and wind (20%) energy plants across India, supporting its ambition to build 25 GW of renewable energy generation capacity by 2025. The scope of the coverage is to provide operational cover (property damage and business interruption) for all of its existing solar

and wind power plants. Plants that are currently under construction will also be covered once they become operational.

**Connecting offshore wind energy to consumers in Germany:** Swiss Re provides construction insurance to SüdLink, the largest renewable energy infrastructure project in Germany. An electrical superhighway, also called a high-voltage direct current (HVDC) transmission system, it runs completely underground over a distance of 700 kilometres. With a capacity of 4 GW, the SüdLink brings the electricity of ten large offshore windfarms to 10 million households. The project updates existing infrastructure and advances the renewable energy transition.

**Improving bankability of solar and wind farms in Vietnam:** In 2021, Swiss Re provided several parametric reinsurance programmes that compensate the owners of solar and wind farms in Vietnam – and their investors – in case revenues fall short due to the variability of solar irradiation and wind. The reinsurance programme covers the same time period as the external financing provided by banks or other investors. By ensuring that the owners have stable revenues to meet their financing obligations, the cover enables them to execute the planned expansion of their solar and wind farms while addressing lenders' concerns over the impact of the solar irradiation and wind volatility on revenues. The parametric covers trigger a payment when solar

irradiation or wind conditions fall below a predefined level. This solution is an effective tool to mitigate the owners' and investors' risk exposure to solar irradiation and wind volatility, which to date has not been insurable by conventional insurance products. This in turn can unlock financing for the planned additional 41 GW of solar and wind capacity by 2030, as drafted in Vietnam's latest power development plan to support the country's economic development. Once complete, these reinsured solar and wind power plants will provide electricity to more than 200 000 average households in Vietnam and help to avoid more than 300 000 tonnes of CO<sub>2</sub> emissions each year.

**Enabling a large wind farm in the Baltic Sea:** Swiss Re Corporate Solutions wrote the lead share for the construction of the [Baltic Eagle wind farm](#) 30 km off the island of Rügen in Germany. The arrangement covers the construction phase and losses of revenue due to specific construction delays as well as property damages during the first year of operation. Reinsurance is also participating through several cedents. Manufacturing of the foundations starts in 2022, with the wind farm due to be commissioned in 2024. The 50 monopile foundations will be set into the seabed more than 40 metres below the surface. Each of the turbines will have a capacity of close to 10 MW resulting in a total of 476 GW. Once operational, the infrastructure will provide enough electricity to the German grid to power almost half a million households.

<sup>1</sup> The net-zero transition, McKinsey & Company, 2022.

<sup>2</sup> [World Energy Outlook 2021](#), International Energy Agency 2021, <https://www.iea.org/reports/world-energy-outlook-2021>.

<sup>3</sup> Amount of finance committed to achieving 1.5°C now at scale needed to deliver the transition, GFAFANZ, 2021, <https://www.gfanzero.com/press/amount-of-finance-committed-to-achieving-1-5c-now-at-scale-needed-to-deliver-the-transition/>.



## Resilience under different climate scenarios

Swiss Re does not consider climate change to be a single factor posing a fundamental threat to the resilience of its re/insurance business. For the peak exposures in property natural catastrophe re/insurance, the projected increases of AEL do not exceed historic trends, even for the most severe scenario. Climate change is one of many important risk drivers to take into consideration when shaping Swiss Re's business strategy. Therefore, a purely quantitative scenario analysis focusing on climate only is a limited instrument for driving today's decisions, particularly in short-tail lines of business such as property. A key condition for the ability to continue acting as an ultimate risk-taker is the regular update of natural catastrophe models and diversification with regard to regions, lines of business, sectors and clients.

Below are the results of Swiss Re's pilot scenario analysis for property natural catastrophe re/insurance and the evaluation of the usefulness of the analysis for driving strategic decisions relevant today. For life & health and casualty, the scenario analysis is more qualitative and still in progress.

### Use of external scenarios

Swiss Re uses scenarios of the Network of Central Banks and Supervisors for Greening the Financial System (NGFS) as a common narrative for the analysis for investment and underwriting portfolios. The NGFS scenarios incorporate different degrees of transition risks along different paths of global warming in an **orderly, disorderly and hot house scenario**. The NGFS scenarios are complemented by additional sources, as required. For physical climate risks in the natural catastrophe property portfolio, Swiss Re uses the Representative Concentration Pathway (RCP) and Shared Socio-Economic Pathway (SSP) scenarios adopted by the IPCC.<sup>1</sup> Differences of the projected physical impacts between RCP 2.6, RCP 4.5 and RCP 8.5 in the near- to mid-term (ie until 2030) but also in the long-term (ie 2050) are minor, but a considerable divergence is expected for the second half of the 21st century. Furthermore, there is significant uncertainty within a single scenario (eg RCP 8.5), mainly caused by different modelling assumptions used in various climate models.

### Casualty and life & health

Swiss Re closely monitors the CCL landscape (see page 171), potential loss scenarios and their impact on Swiss Re's casualty book. For life & health, the available scientific research on the impact of climate change on health and mortality outcomes is still relatively limited to reliably inform scenario work. Furthermore, when considering the impact of climate change on health outcomes, other key variables also play a significant role. These include, but are not limited to, age, gender, health comorbidities and socioeconomic status (see Climate strategy, page 160).

### Property natural catastrophe re/insurance

In accordance with TCFD guidelines, Swiss Re has carried out a long-term scenario analysis for property natural catastrophe re/insurance, which is the portfolio most exposed to physical climate risk (see box on the following two pages). The analysis computed the potential effects caused by climate change on the AEL for the two most material weather-related exposures in Swiss Re's property book, ie tropical cyclones in the US (TC US) and in Japan (TC JP). Three RCP scenarios and the latest available scientific insights were considered, while keeping everything else, including insured assets, constant. 2050 was chosen as the time horizon.

One of the goals was to find out if such scenario work can answer relevant current business steering questions, most notably:

1. Has climate change already created physical risk hot spots in the current business landscape?
2. Does the current costing and underwriting practice capture the climate change impact, if material?
3. If so, does the risk appetite need to change in response to the existing physical or transition risks related to climate change?
4. Do any lines of business where the gradually accumulating impact of physical climate change risk over future decades require taking action today?
5. Does Swiss Re's risk management framework capture the impact of climate change adequately for key lines of business?

<sup>1</sup> RCP scenarios represent possible future concentration trajectories of greenhouse gases. The scenarios are named after the resulting radiative forcing at the end of the 21st century, eg 8.5W/m<sup>2</sup> for RCP8.5, where no mitigation measures nor technical innovation will limit temperature increases. SSP narratives describe alternative pathways for future society.

### Quantitative pilot scenario analysis for TC US and TC JP

Swiss Re has conducted a quantitative scenario analysis in line with TCFD recommendations.

#### Transmission mechanism

The general transmission mechanism of physical climate change on property insurance risk includes likely changes of the frequency and/or severity of natural catastrophes, which can then translate into rising damages and property losses. The impact, however, varies across perils and regions and is subject to large uncertainties<sup>1</sup> (see also Climate strategy, page 158). Climate change influences hurricanes through increasing sea surface temperature, adding more energy particularly in the regions of the Atlantic, where hurricanes form and travel towards land. In addition, a warmer atmosphere holds more water vapour, which may increase tropical cyclone-induced rainfall or other extreme precipitation events. Furthermore, sea level rise will exacerbate storm-surge risk.

#### Findings

Swiss Re chose a market portfolio for its analysis because it is a fair approximation of a global reinsurer's portfolio in view of all uncertainties. The portfolio was kept static to isolate the climate change effects from exposure growth due to economic development, insurance penetration or change in coverage conditions. The resulting estimations reveal that the AEL only increases substantially by 2050 in the NGFS "hot house" scenario. See the following for scenario 1a strong warming, severe impact, RCP 8.5,<sup>2</sup> ie assuming the upper boundaries of the four parameters considered (tropical cyclone overall frequency, category 4–5 frequency, intensity and rain rate):

- In scenario 1a, ie the "hot house" scenario with the most extreme assumptions, AEL for TC US increase by close to 90% and 60% for TC JP. This translates into AEL annual growth of 2.2% and 1.6% for TC US and TC JP, respectively.

- In scenario 1b, ie "hot house" scenario parametrisation for TC frequency and severity of the median values under RCP 8.5, TC US and TC JP AEL are estimated to increase by far less with 16% and 9%, or an annual increase of 0.6% and 0.3%. Scenario 1b is considered to be the more realistic RCP 8.5 scenario versus 1a.
- In the more benign scenarios 2 and 3, AEL are also estimated to increase by 16% for TC US and 9% for TC JP.
- The loss-severity level of an event with an annual occurrence rate of 0.5% (200-year event) is estimated to increase by up to 30% for the most severe scenario 1a for TC US and 40% for TC JP, but only by around 7% in the other scenarios for TC US and 20% for TC JP.
- Irrespective of the chosen RCP scenario (1b, 2, and 3), the quantified impacts by 2050 are quite similar, because the scenario uncertainties are overlapping.

<sup>1</sup> Knutson et al. (2020), Tropical Cyclones and Climate Change Assessment: Part II: Projected Response to Anthropogenic Warming, Bulletin of the American Meteorological Society.

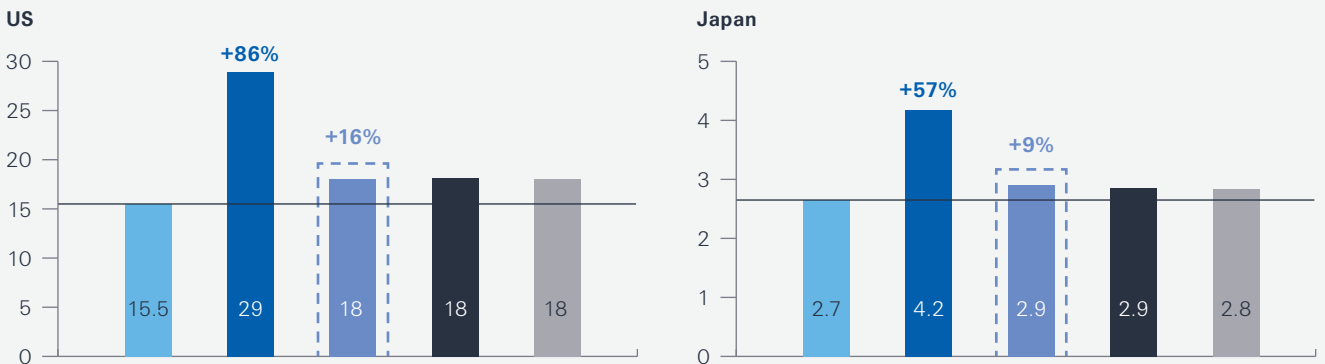
<sup>2</sup> IPCC RCP 8.5, the worst-case scenario (often also called "business-as-usual scenario") while assuming a severe impact on the frequency of category 4 and 5 cyclones. RCPs are future trajectories for greenhouse gas concentration and are labelled after the radiative forcing values in the year 2100 in Watts / m<sup>2</sup>.

These findings are consistent with similar analyses done by other industry players. The relative increases of 0.3%–0.6% per year are relatively small, compared to historic industry insured loss developments. For example, since the 1990s, insured weather-related natural catastrophe losses normalised by GDP (approximating a constant market portfolio) have increased by 80% according to *sigma* data. This is an increase of roughly 3% per year, which is higher than the anticipated increases in the most extreme scenario 1a.

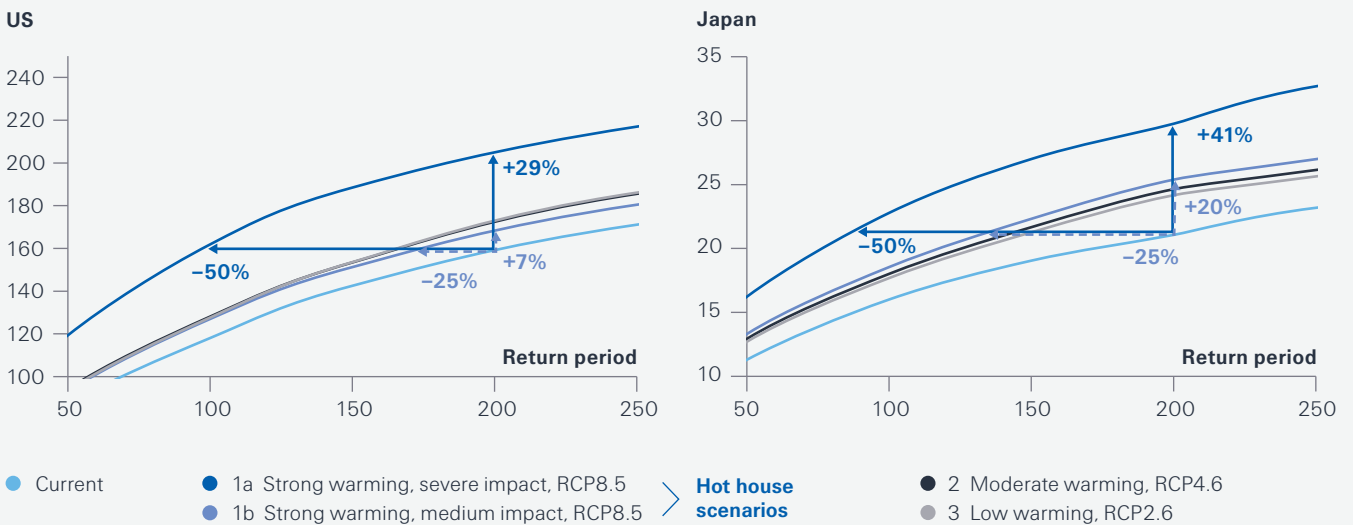
**Challenges and limitations**

The ability to detect and connect weather-related losses to climate change effects remains low for most perils due to a gap in spatial and temporal scales of scientific climate models and insurance models for natural catastrophe risks. Each climate scenario has a large uncertainty range because there is only limited scientific consensus on how an increase in global temperature will translate into changes in frequency and severity of natural hazards. Therefore, the quantifications presented for different climate change scenarios on TC US and TC JP market portfolios should be treated as indicative.

**TC AEL for four scenarios vs today (USD billion and change in %, market portfolio)**



**TC loss frequency curve for four scenarios vs today (USD billion and % changes for 200-year losses, market portfolio)**



Based on today's understanding, the scenario pilot revealed that the expected climatic changes for TC US and TC JP over the next 30 years are manageable for Swiss Re. The company's risk view and risk appetite can be gradually adapted as new scientific insights become available over the investigated time horizon. Even under the most severe scenario, the projected changes do not exceed historic loss experience. However, when it comes to steering the business, such scenario analysis is of limited use in deriving concrete actions.

Looking at climate effects in isolation, as in the scenario pilot above, means ignoring the other factors that will shape Swiss Re's future re/insurance book and thus also future AEL. These factors include, but are not limited to, strategy and underwriting risk appetite which can be redefined during the annual renewal process of property re/insurance business, market conditions, capital costs, insurance penetration, resilience of buildings or infrastructure against storms, and other climate adaptation measures. Since Swiss Re's re/insurance book and current AEL are the result of a complex interaction between all of these factors, any scenario analysis over the 2050 time horizon would have to consider all of them, in the process rendering the impact of climate change on the resulting AEL marginal. The AEL for Swiss Re's weather-related re/insurance book in 2050 will further depend both on its future market share and projections of the overall global property insurance market volume. Independent studies have shown a wide range for future business volumes, thus making long-term projections very challenging.

The complex dynamics become apparent when considering that over the next decades significant population growth is expected in Asia and Africa. At the same time, the population in Europe and North America is unlikely to grow considerably

or may even start to decline, as projected by the United Nations Department of Economics and Social Affairs. Over the same time period, real GDP per capita is expected to increase by more than 45% in the United States and will likely more than double in China by 2050 based on Swiss Re estimates. Global urbanisation will increase from approximately 56% today to almost 70% by mid-century. These socio-economic dynamics will lead to vast changes of insured value distributions and the re/insurance landscape in general. From a re/insurance perspective, socio-economic dynamics will often overshadow slowly evolving climate trends and thus limit the decision-power of quantitative climate scenario analyses and stress tests in which only changes to climatic conditions of natural hazards are considered.

Looking at the decision-relevant questions posed initially, the pilot scenario work has provided limited steering insight due to the limitations mentioned above. In view of the short-tail nature of property natural catastrophe business, there is little urgency to act for Swiss Re on its own already today. This obviously ignores adaptation and mitigation measures, as well as future loss development. While the projected increase of 0.3–0.6% per annum is small (1.6–2.2% in the most extreme scenario), ongoing climate change processes have been shaping today's risk landscape. For decision-relevant analytics, it is important to understand whether today's risk assessment reflects the current climate (irrespective whether the changes are caused by climate change or natural variability) and whether current market prices reflect the risk level. It is also important that the company's risk management sufficiently ensures that the above two factors are respected. In this context, Swiss Re has invested significant effort over the past decade to embed climate change and other relevant risk drivers into key risk models and to model a present day/near future risk landscape rather than relying on an average of the past five decades.

### How Swiss Re ensures resilience of its property business in a changing climate

1. Diversification of insured natural hazards with regard to regions, lines of business, sectors and clients.
2. Flexible management and steering of weather-related exposure through limited duration of re/insurance contracts (typically one-year contracts for property insurance) as well as active portfolio steering (see Pricing of weather-related perils in property, page 156).
3. Regular updates of Swiss Re's in-house natural catastrophe models to ensure adequate costing of natural hazards for the current and near-term climate and socio-economic environment.
4. A *qualitative* scenario process to assess the most material impacts of climatic and socio-economic trends that affect insured risks. This is supported by *quantitative* assessments on the likely range of expected changes to assess their materiality over different time horizons and emission pathways.

Qualitative scenarios help focus attention and modelling improvements on relevant factors that will affect the physical risk landscape. Relevant regional key risks and potential for risk reduction through adaptation were identified by IPCC in the Fifth Assessment Report (AR5).<sup>1</sup>

On a societal level, Swiss Re's Economics of Climate Adaptation studies have shown that climate change can lead to an increase of economic losses in specific locations due to weather risks of up to 30% within the next 25 years. More importantly, economic development, urbanisation, higher population densities and asset concentrations in flood plains are expected to be the dominant factors in increasing weather-related economic losses. As these factors become more pronounced, the models will gradually factor in this trend, since they are updated and refined at regular intervals.

<sup>1</sup> See eg Figure SPM.8 in AR5 Synthesis Report: Climate Change, [Summary for Policymakers](#), IPCC, 2014.

### Investment activities

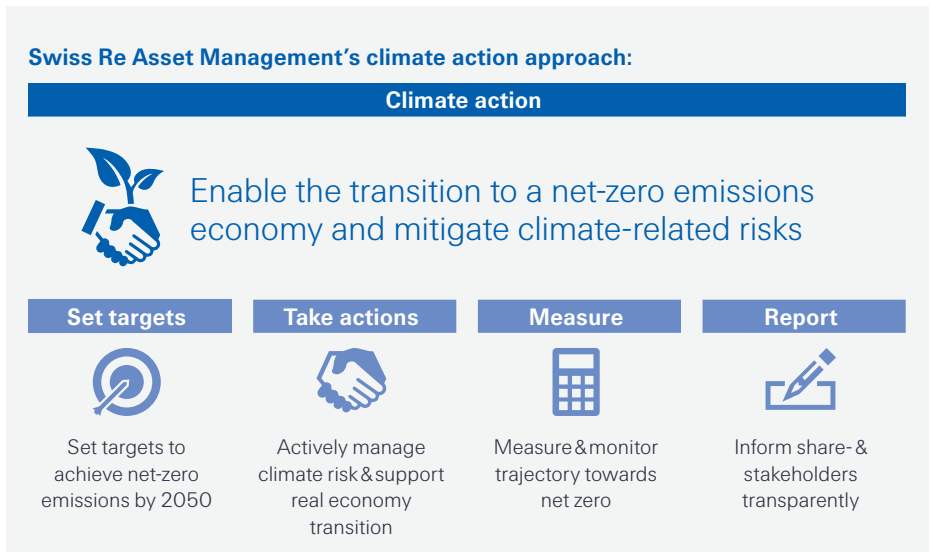
Swiss Re’s investments in real-world activities and businesses are exposed to climate risks and opportunities. Swiss Re has been reporting climate-related information in line with TCFD recommendations and providing insights into these risks and opportunities in its investment portfolio since 2016. The 2021 section includes:

- Enhanced reporting on carbon emissions for the investment portfolio
- Intermediate emission reduction targets aiming to achieve a net-zero investment portfolio by 2050
- Active engagement with key companies across all industries
- Measurement and monitoring of the trajectory to net zero and increasingly active management of potential stranded asset risks

To reflect the increased market focus on climate risks and opportunities, Swiss Re has embedded its approach into the Responsible Investing strategy in a structured manner (see also Sustainability Report, pages 40–48). Swiss Re Asset Management’s “climate action” supports its journey towards a net-zero emissions portfolio by 2050.

It consists of four steps to align the portfolio with a 1.5°C world: set targets, take actions, measure and report. Climate change is a global challenge and should be addressed as such, ie it needs to be mitigated through real-world transition. For this reason, collaborating with investee companies via “Financing transition” and “Engagement” play key roles in Swiss Re’s approach.

As outlined in the 2021 climate publication [Responsible Investments – Our roadmap to net zero](#), achieving a low-carbon emissions portfolio via divestments makes only a limited contribution to the global fight against climate change. When Swiss Re supports its investee companies to tackle the challenge, the benefits are manifold: not only are the investment portfolio and the investee companies better protected, but so are Swiss Re’s underwriting portfolios, as insurance solutions for some of these companies are provided at the same time. Divestments can still be used as a tool to reduce the risk of stranded assets to an acceptable level.



### Transition risk

In the area of transition risks, the key risks faced by asset owners is that a changing policy environment may result in a specific company or a particularly exposed industry becoming a stranded asset in investment portfolios, ie the devaluation of investments driven by unfavourable changes, such as increased taxes and/or new regulations.

In alignment with Swiss Re’s commitment made as a founding member of the [AOA](#), it publicly released intermediate climate targets in March 2021 to be achieved by 2025. These targets aim to align the investment portfolio with a 1.5°C world making the transition to a low carbon economy an implicit part of the investment philosophy. At the end of 2021, Swiss Re’s investment portfolio runs a more limited risk when it comes to an “orderly” scenario. But given the economy itself has not yet aligned to a 1.5°C world, the exposure to transition risk may change over time, in particular in

carbon-heavy industries. Ongoing monitoring and active risk management support Swiss Re in maintaining and improving its status over time.

Under “Sub-portfolio”, Swiss Re provides specific carbon reduction targets for the listed equity and corporate bond portfolio as well as the Swiss and German real estate portfolio. Based on AOA’s latest assessment, the IPCC’s 1.5°C pathway implies an emission reduction range for the targeted asset classes of 22–32% for the period from 2020 to 2025.

Swiss Re has set a 2025 reduction target of –35% for Scope 1 and 2 emissions for the listed equity and corporate bond portfolio with the base year 2018, taking into account its financing transition, engagement and sector targets. This gives Swiss Re the tools to work with the investee companies towards emissions reductions in the spirit of real-world change:

### Swiss Re Asset Management’s climate targets by 2025

Financing transition:	Engagement:
<ul style="list-style-type: none"> <li>• Green, social and sustainability bonds: USD 4bn</li> <li>• Renewable and social infrastructure loans: + USD 750m</li> </ul>	<ul style="list-style-type: none"> <li>• Topic: alignment with 1.5°C target</li> </ul>
Sub-portfolio:	Sector:
<ul style="list-style-type: none"> <li>• Listed equity and corporate bond portfolio: –35% carbon intensity</li> <li>• Swiss and German real estate portfolio: –5% carbon intensity</li> </ul>	<ul style="list-style-type: none"> <li>• Listed equity and corporate bond portfolio: coal phase-out by 2030</li> <li>• Infrastructure loans and private placements: maturity limitation for fossil fuel-related investments</li> </ul>

### Swiss Re Asset Management's fossil fuel-related thresholds

2016	2018	2019	2020
<p><b>Coal production (relative)</b></p> <ul style="list-style-type: none"> <li>Companies that generate 30% or more of their revenues from thermal coal mining</li> <li>Companies that use at least 30% thermal coal for power generation</li> </ul>	<p><b>Oil sands production (relative)</b></p> <ul style="list-style-type: none"> <li>Companies that generate 20% or more of their revenues from oil sands operations</li> </ul>	<p><b>Coal production (absolute)</b></p> <ul style="list-style-type: none"> <li>Mining companies that produce at least 20 million tonnes of coal per year</li> <li>Power generating companies with more than 10 GW installed coal fire capacity</li> </ul>	<p><b>Coal production expansion</b></p> <ul style="list-style-type: none"> <li>Companies that have more than USD 100 million capital expenditure p.a. on coal exploration</li> <li>Power generating companies that plan coal-fired capacity expansion of more than 300 MW p.a.</li> </ul> <p><b>Oil and gas companies</b></p> <ul style="list-style-type: none"> <li>10% most carbon-intensive oil and gas companies</li> </ul>

As part of its risk mitigation, Swiss Re no longer invests in coal mining, coal-fired power generating companies, and oil sands-related companies that are above set thresholds. Investments that are below these thresholds are monitored. Consistent with the Group-wide ESG Risk Framework, Swiss Re avoids investments in the 10% most carbon-intensive oil and gas companies.

For Swiss Re's infrastructure loan and corporate private placement portfolios, the company applies dedicated fossil fuel guidelines, which are reviewed annually. The guidelines further strengthen the risk mitigation strategy in these less liquid asset classes, which is particularly important as both have a longer-term investment horizon.

## Maturity limitation for fossil fuel-related infrastructure loan and corporate private placement investments

### Swiss Re's fossil fuel guideline for infrastructure loan investments as of today

	Coal	Oil	Gas
<b>Upstream</b>	● Full exclusion	● Full exclusion	● Full exclusion
<b>Midstream</b>	● Full exclusion	● Pipeline/distribution and storage	● Pipeline/distribution network and storage
<b>Downstream</b>	● Full exclusion	● Petrochemicals & refinery ● Power generation	● Power generation: peaking plant ● Power generation: base load plant
	<b>N/A</b>	<b>Max maturity until 2030</b>	<b>Max maturity until 2035</b>

- Only finance brownfield projects
- No financing for either brownfield or greenfield projects

### Physical risk

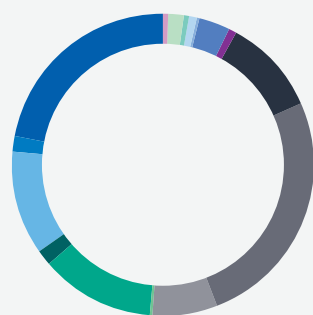
While Swiss Re considers transition risks to be tilted to the short- to mid-term, it regards physical risks as a longer-term risk. Physical risk analytics (see Climate risk management section, page 179) for Swiss Re's real asset holdings suggest manageable risks in the next 30–50 years. The low climate impacts are primarily tied to the portfolio's general exposure to low-risk locations, and cannot be interpreted as physical climate risks being low in general. In a scenario like the hot house world, however, the severity of the outcome may be worse.

## Climate-related opportunities

### Green bonds

Green bond proceeds are used exclusively to finance environmentally sound and sustainable projects that foster a net-zero emissions economy and protect the environment, such as renewable energy, circular economy, biodiversity, sustainable water or climate change adaptation. As of 31 December 2021, Swiss Re held USD 3.0 billion of green bonds. Swiss Re is targeting a green, social and sustainability bond portfolio of USD 4.0 billion by the end

of 2024. Only bonds that meet all four components of the ICMA Green or Social Bond Principles, or the ICMA Sustainability Bond Guidelines in Swiss Re's annual review are considered for target achievement. In 2021, less than 5% did not pass the review and were therefore not included in the reporting of Swiss Re's green, social and sustainability bond holdings.

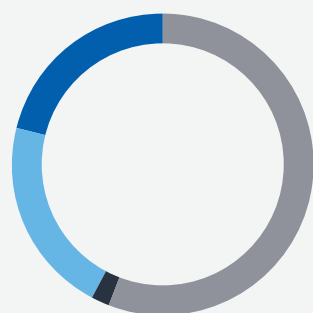


- 21.9% Sovereign
- 1.7% Municipals
- 11.0% Supranational
- 1.7% Agency securitized
- 12.2% Agency
- 0.2% CMBS
- 7.0% Regional governments
- 25.7% Financials
- 10.4% Utilities
- 0.9% Non-cyclical consumer goods
- 3.2% Information technology
- 0.3% Resources
- 0.8% Basic industries
- 0.6% Cyclical services
- 1.8% Non-cyclical services
- 0.5% General industrials
- 0.1% Cyclical consumer goods

### Renewable and social infrastructure loans

For the infrastructure loan allocation, Swiss Re targets to finance renewable energy projects that reflect its risk appetite, generate attractive long-term returns and help build a more sustainable energy supply for the future. As of 31 December 2021, Swiss Re held USD 0.5 billion of renewable energy, making up

approximately 21% of the infrastructure loan portfolio, of which 58% is in solar panels and 42% in wind farms. Additionally, Swiss Re invested around USD 45 million in energy efficiency projects and USD 0.5 billion in social infrastructure, such as hospitals, student dorms or affordable housing projects.



- 21% Renewable energy
  - 21% Social
  - 2% Energy efficiency
  - 56% Other
- 42%

→ 58%



**Real Estate**

As sustainability considerations are an important pillar of long-term sustainable value creation, they are incorporated into Swiss Re’s decision-making throughout the property life cycle, also including external investment manager due diligence. New property investments are evaluated from an environmental and social perspective, which includes both a property’s current and potential future status as it relates to energy efficiency, public transport connectivity, use of sustainable materials, occupier well-being and community engagement. Ongoing business plan execution and asset management of properties already in the portfolio incorporate different ways to improve sustainability characteristics, as economically and financially sensible.

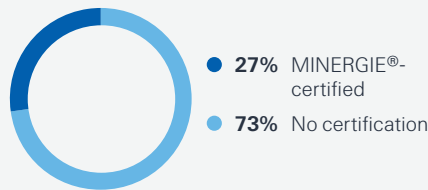
Swiss Re’s real estate investment portfolio comprises commercial and residential buildings with a total market value of USD 5.6 billion as of 31 December 2021.

These are predominantly located in Switzerland, Germany, the US, the UK, and Central and Eastern Europe (CEE).

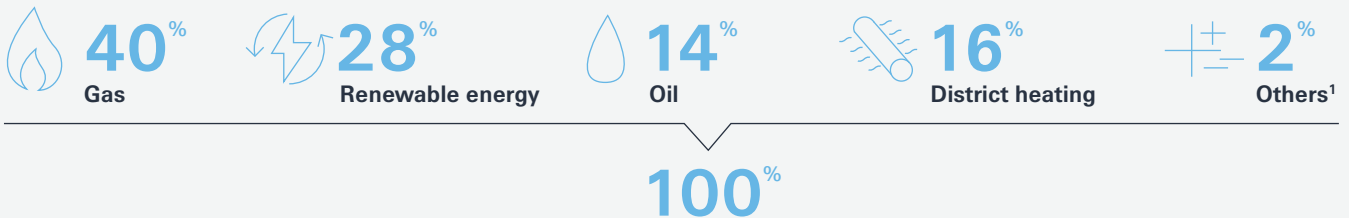
For real estate investments in Switzerland, Swiss Re applies the following sustainability criteria: analysis of energy sources as a percentage of market value and MINERGIE® certifications. MINERGIE® is a Swiss sustainability label for new and refurbished buildings. By the end of 2021, the combined market value of Swiss Re’s MINERGIE®-certified buildings reached USD 0.6 billion, or 27% of the Swiss portfolio of direct real estate investments by value, which corresponds to an energy consumption floor area of 87 075 m².

The Swiss portfolio is gradually shifting away from fossil fuels as a heating source to either renewable energy (28%) or district heating (16%). Whenever this is not possible, gas (40%) is considered as an alternative, given its smaller carbon footprint compared to oil (14%).

**Switzerland**

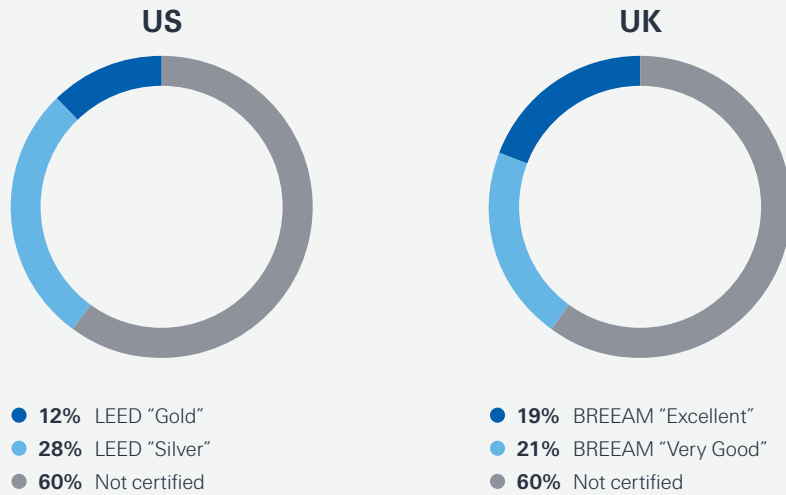


**Energy sources**



<sup>1</sup> Includes wood pellets, projects under construction, land and non-heated assets.

The externally managed real estate portfolio is predominantly invested in the US, the UK and CEE, and contains 37% certified buildings based on regional energy labels. The UK and the US portfolios are the most advanced ones with 40% certified buildings.



In the US, Swiss Re's approach to sustainability includes some of the most recognised certificates and guidelines such as the LEED certification of the U.S. Green Building Council (USGBC). The US portfolio is also benchmarked against GRESB, an industry-driven organisation transforming the way capital markets assess ESG performance of real assets.

2021 is the fourth year that the US portfolio achieved four out of five stars in GRESB. The GRESB score for 2021 is the highest Swiss Re has achieved since it started benchmarking the portfolio. It should be noted that GRESB methodology was refined in 2020, which is why the most recent score cannot be compared with the results of previous years.



**85/100**  
 (versus GRESB average score of 73)

→ **Performance: 55.8**  
 (GRESB possible points 70)

→ **Management: 29.1**  
 (GRESB possible points 30)

# Climate risk management

The processes used to identify, assess and manage climate-related risks are integrated into Swiss Re's risk management, underwriting and asset management.

Sound risk management, underwriting and asset management lie at the core of Swiss Re's businesses. This enables Swiss Re to use existing processes and instruments to address climate-related risks.

## Re/insurance activities and own operations

### Physical risks

#### Property re/insurance

Besides man-made risks, natural catastrophe risks are the key risk category in Swiss Re's P&C re/insurance risk landscape.

Swiss Re has an internal property risk modelling team that builds, maintains and updates sophisticated models for all relevant natural catastrophe risks such as tropical cyclones, floods, winter storms and earthquakes. The models are based on current scientific knowledge and are updated regularly or on an ad-hoc basis within a few months, if required. The updates make use of new scientific findings – including from research collaborations with academic institutions – and advances in computing and modelling capabilities.

Swiss Re's proprietary and fully integrated property natural catastrophe risk models are important tools for managing the business: they are used to determine the economic capital required to support the risks on Swiss Re's books as well as to allocate risk-taking capacity to different lines of business.

Secondary perils, which are smaller natural catastrophe scenarios such as flood, smaller storms, or wildfire, have generated an increasing amount of property losses in recent years. The trend is expected to continue, fostered by a warming climate, urbanisation and asset growth in exposed areas. 2021 has made its imprint with winter storm Uri, and the summer flood and hail events in Europe. Looking back at the last few years, wildfire losses have become a noticeable segment in both the industry and Swiss Re's own loss experience. Swiss Re executes on a broad secondary perils agenda across three pillars, focusing on:

1. Firming and expanding risk views, reflective of macro risk trends (climate change, urbanisation, etc)
2. Inter-peril correlation (research and embed global peril correlations into underwriting risk decisions and risk management)
3. Governance and steering: enhance capturing of secondary perils in pricings to enable rigid monitoring, steering and establishing an enhanced framework for actual vs expected analysis

#### Life and health re/insurance

Climate change is one of many risk drivers for Swiss Re's life and health businesses. Mortality assumptions (base rates and trend) underlying the re/insurance business are formally reviewed at different intervals. Base mortality rates are updated at least once per year for major markets and less frequently for smaller markets based mostly on recent experience data from Swiss Re's portfolio. The trend assumptions for the first 20 years are reviewed annually. For the long-term, they are reviewed on a bi-annual basis. The long-term trend assumption is where climate change (ie heatwaves, air pollution from wildfires and vector-borne diseases) is likely to make a material impact, if at all. Swiss Re Institute Life & Health Research & Development is leading this process in conjunction with the Business Units. In addition to external and internal data and analysis, the latest available scientific evidence regarding the impact of climate change on health outcomes is also considered. The results of this process are reviewed and signed off by the Group Executive Committee.

#### Own operations

For Swiss Re's own operations, robust and regularly tested business continuity plans covering all locations are in place to mitigate the risk of climate-related disruptions. Strategies include transferring work and/or employees to unaffected Swiss Re locations and providing temporary alternative office space. The Own The Way You Work™ Programme, which was introduced in 2013 and offers employees full flexibility in their work arrangements through the use of laptops and seamless access to a Swiss Re Virtual Workplace, is also a viable and effective alternative. The programme enabled a smooth transition to a remote working environment during the COVID-19 pandemic, during which the majority of employees worked from home for many months.

### Transition risks

To ensure appropriate risk identification of transition risks and assess potential impacts on its business, Swiss Re continues to monitor and identify such risks as well as the relevant legal developments, particularly around CCL, in risk management, the Swiss Re Institute and casualty underwriting.

Swiss Re has risk monitoring in place for all types of transition risks described on pages 161–162. Technological developments are monitored through Swiss Re's respective underwriting units and pricing of associated covers is reviewed on an annual basis.

### General sustainability risks in Swiss Re's re/insurance business

Swiss Re's ESG Risk Framework is an advanced risk management instrument that identifies, assesses and addresses social and environmental risks associated with Swiss Re's transactions, both on the underwriting and investment side. Two policies of the ESG Risk Framework are particularly relevant in the context of climate change: the Thermal Coal Policy and the Oil and Gas Policy.

### Thermal Coal Policy

In the Thermal Coal Policy, established in 2018, Swiss Re pledges not to provide re/insurance to businesses with more than 30% exposure to thermal coal utilities or mining. The policy applies to both old and new thermal coal projects and across all lines of business. While it is relatively easy to implement this policy in some parts of the business, for others the transition will take some time and will require a continued and constructive dialogue with clients. Swiss Re continues to implement the

Thermal Coal Policy for treaty business. The approach defines thresholds for coal exposures in treaties across property, engineering, casualty, credit and surety, and marine cargo lines of business. These thresholds for reinsurance treaty business will come into effect in 2023 and will then be gradually lowered until the final phase-out targets for OECD countries by 2030 and non-OECD countries for 2040 are reached.

### Enhanced Oil and Gas Policy

In 2021, Swiss Re stopped providing individual insurance covers for those oil and gas companies that are responsible for the world's 5% most carbon-intensive oil and gas production. From July 2023, Swiss Re will no longer provide individual insurance covers for those oil and gas companies that are responsible for the world's 10% most carbon-intensive oil and gas production.



To learn more about the Swiss Re ESG Risk Framework, carbon risk steering mechanism and thermal coal and oil and gas policies, please visit the [Swiss Re website](#).

Swiss Re recently further strengthened the Oil and Gas Policy, based on Swiss Re's net-zero commitments and in response to new scientific findings published by the International Energy Agency. Swiss Re will no longer re/insure or directly invest in new oil and gas field projects that receive their go-ahead (in the form of a final investment decision) from their parent companies after 2022. Exceptions will apply to projects of companies aligned with net-zero emissions by 2050, as defined by the Science Based Target Initiative (SBTi) or a comparable third-party assessment.

As most of the global expansion of oil and gas exploration and production is insured via company-wide property insurance policies, Swiss Re has taken measures to align these portfolios (in both direct insurance and facultative reinsurance) with its commitment to net-zero emissions by 2050.

Swiss Re will partner with oil and gas clients (up-, mid- and downstream) on the transition to net-zero emissions and will align re/insurance support to companies according to the below ambitions. These ambitions will be translated into net-zero alignment targets once guidance based on science-based target setting becomes available.

- By 2025, half of Swiss Re's oil and gas premiums are to come from companies that are aligned with net-zero by 2050, as per SBTi or a comparable, credible third-party assessment.
- By 2030, Swiss Re's oil and gas re/insurance portfolios are to contain only companies that are aligned with net-zero by 2050, also as per SBTi or a comparable, credible third-party assessment.

Furthermore, from July 2022 Swiss Re will no longer re/insure or invest in companies and projects with more than 10% of their production located in the Arctic AMAP region (Norwegian production is exempt).

Swiss Re is also developing an approach for oil and gas in treaty reinsurance, to be finalised by 2023.

## Investments

Climate-related risks can impact the value of Swiss Re's investments and are therefore considered an important part of its climate action. With the risk analysis presented below, Swiss Re can assess the risks arising from climate change using a structured approach, while the emission reduction framework measures risks and portfolio carbon efficiency, taking into account the actions taken by Swiss Re's investee companies.

Swiss Re's investment portfolio can be impacted by both transition and physical risks from climate change. Swiss Re expects political and legal risks leading to emission restrictions and/or carbon price increases, as well as technology- and demand-related changes to be the main drivers of transition risk in the short to medium term. However, with recent market activities, Swiss Re recognises that litigation risk for companies has increased. Swiss Re aims to identify those industries and groups of companies that are most exposed to these risks and may thus require adjustments in the near to medium term.

The chart shows an overview of the identified transmission channels by asset class and how they link to the NGFS scenarios:

	Climate-related drivers and reactions	NGFS scenarios	Asset class coverage	Risk analytics and tools
Transition risks	<b>Policy and legal:</b> Policy actions, attempting to constrain actions that worsen the adverse effects or seek to promote adoption to climate change Legal actions in form of litigation	Orderly Disorderly	Corporate bonds Listed equity Sovereign bonds Real estate	<ul style="list-style-type: none"> <li>Carbon consumption/pricing</li> <li>Policy monitor</li> <li>Trend identification</li> </ul>
	<b>Technology:</b> Improvement of innovations that support the transition to a lower-carbon, energy-efficient economic system			<ul style="list-style-type: none"> <li>Carbon consumption</li> <li>Trend identification</li> <li>Management monitoring</li> </ul>
	<b>Market:</b> Shift in supply and demand for certain commodities, products and services			<ul style="list-style-type: none"> <li>Trend identification</li> <li>Revenue mix analytics</li> </ul>
	<b>Reputation:</b> Changing customer and community perceptions of an organisation's contribution to or detraction from the transition to a lower-carbon economy			<ul style="list-style-type: none"> <li>Carbon consumption</li> <li>Trend identification</li> <li>Management monitoring</li> </ul>
Physical risks	<b>Acute:</b> Event-driven effects due to global warming  <b>Chronic:</b> Longer-term shifts in climate pattern	Hot house world	Real estate Infrastructure loans CMLs US commercial mortgage-backed securities	<ul style="list-style-type: none"> <li>Weather forecasting/natural catastrophe analytics</li> <li>Economic impact assessment</li> <li>Physical exposures analytics</li> </ul>

### Resilience under different climate scenarios

Climate scenarios deal with forecasting possible future outcomes based on projecting a variety of variables. In 2021, specific NGFS climate scenarios were linked to Swiss Re's investment portfolio to derive the portfolio's sensitivity to these different scenarios.

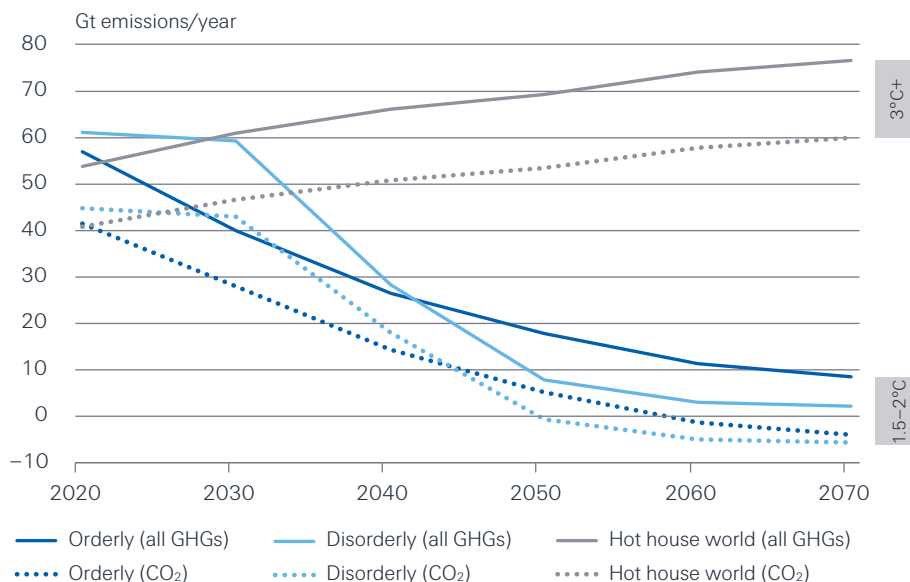
The following NGFS scenarios were selected for the analysis:

- **Orderly:** climate policies are introduced early and become gradually more stringent. Net-zero CO<sub>2</sub> emissions achieved before 2070, giving a 67% chance of limiting global warming to below 2°C. Physical and transition risks are both relatively low.
- **Disorderly:** climate policies are only introduced in 2030. Emissions reductions need to be sharper than in the orderly scenario to limit warming to the same target. The result is higher transition risk.
- **Hot house world:** Only currently implemented policies are preserved. Emissions grow until 2080 leading to 3°C+ of warming and severe physical risks.

Swiss Re's emissions reduction target was based on the IPCC 1.5°C pathway scenario, which puts Asset Management on a decarbonisation pathway consistent with an orderly scenario in the short- to mid-term per end of 2021. However, further reductions in carbon intensity will be needed to remain consistent with the 1.5°C trajectory post 2030/2035. The main part of the ongoing scenario analysis builds on the expertise Swiss Re has already gained. It aims to increase its understanding regarding the three selected NGFS scenarios and their impact on the portfolio, with a focus on a disorderly transition. In the early stages, corporate bonds and listed equity are in focus, striving to build a solid framework that allows Swiss Re to compile meaningful and robust results that can serve both as a tool to improve investment processes and to inform the current status and progress of its climate actions.

### Emissions

Representative scenarios



Source: NGFS

### Transition risk analytics

The market environment has started to shift to address climate change mitigation and adaptation requirements to limit the global temperature rise. Governments and regulators have accelerated the development of (mandatory) reporting requirements and risk assessments to steer and transition climate change-related market activities towards more sustainable alternatives. Swiss Re continues to consider policy and legal risks, as well as technology risks, having mainly seen changes within these two dimensions that potentially impact asset values.

One example is the outcome of COP26 on the phase-down of unabated coal-fired power generation and the phase-out of inefficient fossil fuel subsidies. Swiss Re has already taken action in recent years by introducing thresholds for coal-related investments and moving away from the 10% most carbon-intensive oil and gas companies with the aspiration to proactively manage the now increasing risk of stranded assets.

Swiss Re's dedicated approach to managing climate risk involves the systematic monitoring of the carbon intensity of its government bond, corporate bond, listed equity and real estate portfolio. For the corporate bond and listed equity portfolio, related forward-looking indicators are also tracked. For example, in 2021, Swiss Re further strengthened its approach to assessing the alignment of the corporate bond and listed equity portfolio with a 1.5°C target by evaluating the temperature alignment.

### **Transition risk in corporate bonds and listed equity**

Carbon intensity (WACI, sales-based taking Scope 1 and 2 emissions into account) is seen as a useful measure to quantify the carbon consumption for multi-asset portfolios and remains a measure of choice for comparisons over time, between portfolios and against benchmarks. Swiss Re therefore sets its carbon reduction targets based on this metric.

Temperature alignment methods, on the other hand, have the clear benefit of providing a forward-looking element and thus a high degree of signalling. However, comparability across methodologies/providers is limited at this point, as the temperature alignment methods are still evolving. No global standard for calculating the implied temperature scores has yet been established, and timeliness and stability of data continue to be a key challenge. Swiss Re will continue to use the temperature alignment outputs to identify portfolio leaders and laggards.

### **Transition risk in real estate**

A carbon intensity-based measure is also applied in real estate. The carbon profile of the real estate portfolio is measured against decarbonisation pathways for both 2°C and 1.5°C scenarios, provided by the “Carbon Risk Real Estate Monitor” (CRREM) tool. The CRREM pathways are in line with the Paris Agreement and are based on the breakdown of the global GHG budget into individual country- and property-type specific carbon budgets.

Swiss Re analysis shows that the combined Swiss and German portfolio emission intensity is already at a very low energy consumption level, which is considered consistent with a 1.5°C trajectory per end of 2021 (excluding the effects of embodied carbon emissions). Further reductions in carbon intensity will be needed, however, to remain consistent with the 1.5°C trajectory post-2030/2035.

### **Physical risks analytics**

The physical risk analysis focuses on real assets with clearly identifiable locations mostly within Swiss Re’s private debt (including infrastructure loans and commercial mortgage lending), commercial mortgage-backed securities and real estate holdings. Focus was placed on acute, event-driven impacts due to natural perils, eg tropical cyclones and floods, resulting in direct damage to assets. Based on Swiss Re’s proprietary modelling capabilities used for re/insurance underwriting (see page 156), results were derived and simple stresses were calculated to gain an understanding of what an increase in severity and frequency of climate-related perils could mean. Furthermore, exposure changes under the different warming scenarios were modelled and assessed. The results of both analyses suggest a very low exposure of Swiss Re’s real asset holdings to natural perils in general and to climate-related perils in particular.

# Climate metrics and targets

Swiss Re uses a number of metrics and targets to assess and manage relevant climate-related risks and opportunities and deliver on its commitment to net zero.

Swiss Re uses metrics and targets for climate-related risks and opportunities for its re/insurance business, investments and own operations.

## Re/insurance activities Physical risks

### Premium income related to natural catastrophes (USD billion)

	2019	2020	2021
World	3.1	3.7	3.9

For losses exceeding USD 20 million. Net of external expenses such as brokerage and commissions. In previous years, gross premiums were reported.

### Annual expected losses (AEL)

AEL for weather-related natural perils can be used as an indicator for the average current climate-related risk exposure. However, AEL figures do not, by definition, provide an adequate measure for the potential risk of individual years with exceptionally intense natural catastrophe losses. Adequate metrics for the risk of individual rare natural catastrophes are Value at Risk (VaR) or Tail Value at Risk (Tail VaR). For example, the 99.5% VaR measures the loss likely to be exceeded in only one year out of two hundred, see Financial Report page 71, where the results of insurance risk stress tests are provided for peak insurance risks.


The AEL figures are the result of expected weather activities, the vulnerability of insured assets and operations, their values and the volume and structure of insurance products. Changes in the AEL figures will show the evolution of Swiss Re's climate risk exposure. This could be due to climate change, but also due to changes in the vulnerability of insured assets and operations, their values or changes in the Group's business strategy. AEL figures are updated on an annual basis.

The table on the right shows the AEL by region and peril as well as the highest gross AEL for Swiss Re's business as of the end of 2021.

### Gross AEL for weather-related perils by region and for peak exposures, Swiss Re Group (2019–2021, USD million)

	2019	2020	2021
<b>Total</b>	<b>1 915</b>	<b>2 170</b>	<b>2 010</b>
North America	890	1 005	1 000
Latin America	175	220	185
EMEA	305	355	295
Asia	310	415	360
Oceania	225	175	175
<b>Tropical cyclone</b>	<b>980</b>	<b>1 150</b>	<b>1 055</b>
North America	550	615	580
Latin America	145	180	160
EMEA	0	0	0
Asia	235	310	280
Oceania	50	45	35
<b>Convective storms</b>	<b>300</b>	<b>330</b>	<b>360</b>
North America	220	240	255
Latin America	0	0	0
EMEA	45	45	40
Asia	0	0	0
Oceania	35	45	65
<b>Flood</b>	<b>285</b>	<b>340</b>	<b>320</b>
North America	65	80	85
Latin America	25	30	25
EMEA	95	110	105
Asia	60	85	75
Oceania	40	35	30
<b>Windstorm</b>	<b>190</b>	<b>230</b>	<b>190</b>
North America	45	50	50
Latin America	0	0	0
EMEA	145	180	140
Asia	0	0	0
Oceania	0	0	0
<b>All other perils</b>	<b>150</b>	<b>120</b>	<b>90</b>
North America	10	20	30
Latin America	5	10	0
EMEA	20	20	10
Asia	15	20	5
Oceania	100	50	45
<b>Peak exposures</b>			
North Atlantic hurricane	680	770	720
US tornado	220	240	260
Japanese tropical cyclone	140	210	180
European windstorm	150	180	140
European flood	90	100	100

Regional figures may not add up to the world total due to rounding.

 You can download all the data from the TCFD and the Sustainability Report from the Swiss Re website.



### Transition risk

#### Several steps to align the underwriting portfolio with the Paris Agreement

Swiss Re sought to further refine the assessment of the carbon footprint of its direct insurance business based on the methodology proposed by the CRO Forum. The effort again brought to light that there are significant limitations to data availability at present and that carbon footprint estimates for re/insurance underwriting are thus marked by considerable uncertainty.

Keeping these uncertainties in mind, Swiss Re estimates the weighted average carbon intensity of its direct insurance portfolio for 2021 remained unchanged at 120 tonnes of CO<sub>2e</sub> per million US dollars of revenue. The fluctuations that were observed in the results are not statistically significant.

The thermal coal and oil and gas policies within Swiss Re's ESG Risk Framework (see Climate risk management, page 176) are important steps on the path to reaching net-zero emissions for the re/insurance portfolio by 2050. The Coal Policy puts Swiss Re on course to reach the Group-wide target of completely phasing out thermal coal business in OECD countries by 2030, and in the rest of the world by 2040. The policies are also in line with the commitment made in 2019 by becoming a member of the Powering Past Coal Alliance.

These policies are an initial step towards the development of a comprehensive carbon risk steering mechanism. Such a mechanism is needed to measure Swiss Re's GHG emissions and associated risks related to its re/insurance business. Swiss Re co-founded the UN-convened Net-Zero Insurance Alliance (NZIA). The NZIA is collaborating with the Partnership for Carbon Accounting Financials (PCAF) with the goal to establish a standard to measure and disclose emissions associated with re/insurance underwriting portfolios.

Swiss Re chairs the NZIA working group tasked to develop the insurance-associated emissions standard, which will help bring the insurance sector and the real economy one step closer to a net-zero future. Measuring Swiss Re's carbon footprint in line with the foreseen PCAF standard will provide the basis for its carbon steering towards reaching net-zero emissions on the liability side of the business by 2050.

#### Swiss Re as a founding member of the NZIA

The UN-convened Net-Zero Insurance Alliance (NZIA) brings together twenty-one of the world's leading insurers and reinsurers to play their part in accelerating the transition to net-zero emissions economies. They have committed to individually transition their underwriting portfolios to net-zero GHG emissions by 2050, consistent with a maximum temperature rise of 1.5°C above pre-industrial levels by 2100. Swiss Re is among the founding members of the NZIA, together with AXA (Chair), Allianz, Aviva, Generali, Munich Re, SCOR, Swiss Re, and Zurich.

As risk managers, insurers and investors, the insurance industry plays a key role in supporting the transition to a net-zero economy. The NZIA is building on the pioneering work that the founding signatories have already begun as investors through their membership of the Net-Zero Asset Owner Alliance, where all eight NZIA founding members are already individually setting science-based 2025 decarbonisation targets for their respective investment portfolios in line with a net-zero transition pathway.

Swiss Re's engagement with the NZIA also builds on its efforts to phase out thermal coal exposure by 2030 for OECD countries and the rest of the world by 2040. In addition, Swiss Re gradually started withdrawing insurance support from the most carbon-intensive oil and gas production in 2021.

#### Find out more on the NZIA:



Launch of UN-convened Net-Zero Insurance Alliance – Swiss Re as a founding member | Swiss Re

Net-Zero Insurance Alliance – United Nations Environment – Finance Initiative

#### Climate-related commitments to the United Nations and the Insurance Development Forum

In 2019, the UN Development Programme (UNDP), the government of Germany and members of the Insurance Development Forum entered into a Tripartite Agreement in which they collectively committed to increasing insurance protection in climate-vulnerable countries. As part of their commitment, industry members pledged to offer USD 5 billion of risk capacity for climate risk insurance, benefitting up to 500 million people in twenty climate-vulnerable countries by 2025. The commitment aims to accelerate the implementation of risk management and risk financing solutions as a means to strengthen adaptation measures and the resilience to climate risks in exposed countries. As a member of the IDF, Swiss Re has endorsed this commitment along with several of its industry peers.

To achieve this commitment, Germany's KfW Development Bank has provided funding via the InsuResilience Solutions Fund (ISF) and project teams for sixteen of the climate-vulnerable countries have been established. Swiss Re currently co-leads six of these country project teams (Ghana, Bangladesh, Nigeria, Uzbekistan, Pakistan and Colombia) and contributes to an additional five country project teams by providing risk and modelling insights. To meet the commitments of the Tripartite Agreement, Swiss Re and members of the IDF will continue to collaborate with climate-vulnerable countries by providing risk modelling expertise and working to expand the project pipeline in the respective countries see Swiss Re Sustainability Report, page 29 for more details.

### Investment activities

Through its dedicated climate action, Swiss Re is working to achieve a net-zero emissions investment portfolio by 2050 by setting intermediate targets every five years and regularly reporting on progress. Targets were set in 2020 for 2025 in accordance with the AOA's inaugural 2025 Target setting Protocol (TSP).

### Financing transition targets

Green bond proceeds are used to finance environmentally sustainable projects and thereby facilitate the transition towards a net-zero emissions economy. By the end of 2021, Swiss Re held USD 3 billion in green bonds. As part of Swiss Re's adaptation strategy, its mandate also considers social and sustainability bonds. This enables the company to not only support the environment, but also underserved groups or populations, thus generating a positive impact on society.

The ambition is to achieve an investment target of USD 4 billion for green, social and sustainability bonds by the end of 2024. As part of Swiss Re's climate-positive investments, it has also set a target to increase its renewable energy and social infrastructure loan portfolio, which also includes energy efficiency, by USD 750 million by the end of 2024.

Infrastructure loans are an attractive asset class for Swiss Re's investment portfolio given the spread premium and diversification benefits relative to corporate bonds. Renewable infrastructure loans in particular are used to finance environmentally sustainable infrastructure projects. Social infrastructure loans are used to finance projects such as hospitals, student dorms or affordable housing. By the end of 2021, Swiss Re held USD 1.0 billion in renewable energy and social infrastructure loans, which is an increase of 100 million relative to 2020.

### Engagement targets

Swiss Re believes that engagement with the real economy is an integral component to support the limitation of global warming to 1.5°C. In 2020, it therefore established an Engagement Framework aligned with the sub-portfolio targets. For additional information on Swiss Re's engagement targets and activities, see Sustainability Report 2021, pages 46–49.

### Sub-portfolio targets

Swiss Re committed to have a net-zero emissions investment portfolio by 2050. Informed by IPCC's pathways consistent with the 1.5°C target, Swiss Re established a corporate bond and listed equity portfolio emissions reduction target of –35% for Scope 1 and 2 emissions to be achieved by 2025 and with 2018 as the base year (see below, "Deep dive: Carbon footprint of the corporate bond and listed equity portfolio").

Furthermore, Swiss Re set a carbon intensity reduction target for its Swiss and German real estate investment portfolio of –5% with 2018 as the base year, to be achieved by year-end 2024. This builds on the portfolio emissions intensity analysis described in the section "Transition risk in real estate". The chart below depicts the outcome of the analysis for the Swiss real estate portfolio and confirms the status of being well below a 1.5° decarbonisation pathway, though further improvements in energy efficiency will be needed post-2030. Similar analysis conducted on the German part of the portfolio resulted in a comparable outcome.

The analysis focuses on the combined Swiss and German portfolio's carbon intensity versus the year-end 2024 target and shows that the targeted reductions are likely to be achievable.

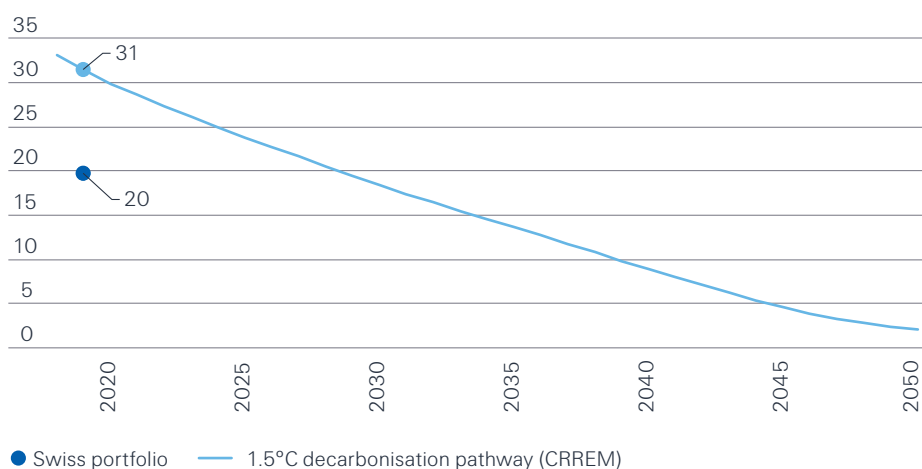
### Sector targets

Coal assets are particularly carbon intensive and susceptible to becoming stranded given the long life of these assets, as well as the evolving regulations on carbon emissions. Swiss Re does not invest in thermal coal-related activities that exceed the set thresholds. The long-term objective for 2030 is to fully exit coal-related assets, such as coal mining and coal-based power generation, for the listed equity and corporate bond portfolio via normal portfolio reallocations.

Additionally, and in line with the Group-wide ESG Risk Framework, Swiss Re divested from the world's 10% most carbon-intensive oil and gas companies in 2020.

For infrastructure loan and corporate private placement portfolios, Swiss Re excludes any coal-related assets. For both asset classes, maturities are limited to 2030 for oil-related exposures and to 2035 for gas-related exposures. These guidelines support an investment universe that is in line with the commitment to a net-zero emissions investment portfolio by 2050. Swiss Re's specific approach to these sectors is outlined in the section "Climate strategy".

**Swiss real estate portfolio carbon intensity vs 1.5°C decarbonisation pathway (kgCO<sub>2</sub>e/m<sup>2</sup>/annum)**

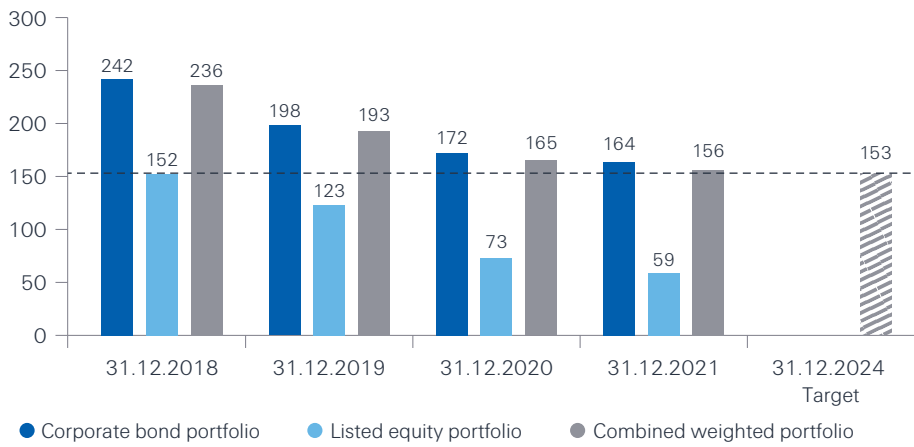


Source: Swiss Re, CRREM

**Deep dive: Carbon footprint of the corporate bond and listed equity portfolio<sup>1</sup>**

Since the end of 2015, carbon intensities in both the corporate bond and the listed equity portfolios decreased substantially as part of asset rebalancing away from fossil fuel investments. Starting in 2018, Swiss Re adjusted the carbon footprint scope of the listed equity portfolio to include ETFs and exclude strategic holdings. The carbon intensity of Swiss Re’s corporate bond and listed equity portfolio decreased by 34%, relative to base year 2018.

**Carbon intensity of the corporate bond and listed equity portfolios (tonnes CO<sub>2e</sub>/USD revenue)**



<sup>1</sup> All carbon intensities from MSCI ESG as of February 2022, based on holdings as of December 2021.  
 Carbon intensity: Weighted average carbon intensity = (company CO<sub>2e</sub> emissions/company revenue) \* (investment/portfolio).

### Carbon reduction drivers<sup>1</sup>

#### Corporate bonds (since end of 2018)

The corporate bond reduction of 78 tCO<sub>2</sub>e/USD m revenue since end of 2018 was driven by the combination of a change in reported intensities (15%) and an effect attributable to portfolio rebalancing

activities (85%). While some rebalancing is required to achieve the formulated carbon intensity profile by 2024, Swiss Re's preference is to achieve the target through security selection rather than sector allocation. However, over the last three years, the portfolio carbon reduction was

driven by a combination of the two. A lower carbon intensity was achieved by reducing the allocation to utilities, but also by overweighting companies with more favourable intensities within the same industry.

### Drivers of carbon intensity reduction from 2018 to 2021: Corporate bond portfolio<sup>1</sup>

Investment portfolio	2018		2021		Sector perspective			Country perspective		
	2018		2021			Sector allocation	Security selection		Country allocation	Security selection
<b>Carbon intensity</b> (tonnes CO <sub>2</sub> e/ USDm revenue)	242		164			-45	-33		+5	-83
Change in reported intensities			-12		Utilities			United States		
Rebalancing			-66		Energy			Canada		
<b>Total</b>			<b>-78</b>		Financials			United Kingdom		
					Transportation			Australia		

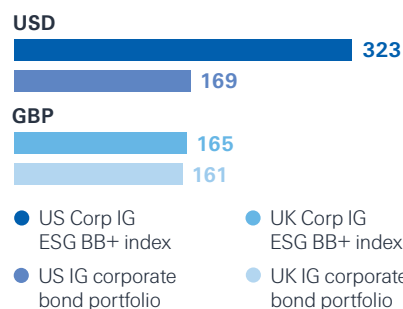
● Decrease   ● Unchanged   ● Increase

#### Corporate bond weighted average carbon intensity per year-end 2021

The corporate bond portfolio's weighted average carbon intensity reduction relative to year-end 2020 was driven by selective reductions in high carbon intensity names. It is well below its corresponding benchmark in terms of carbon intensity, given its continued underweight in high carbon intensity holdings compared to the benchmark.

Comparing the current investment portfolio against the broad market benchmarks on a more detailed level shows that the overall underweight in carbon intensity is largely driven by Swiss Re's security selection, while there is a limited effect due to sector allocation. This shows that there was a broader market trend to reduce weights in carbon-intense sectors.

#### Corporate bond weighted average carbon intensity per year-end 2021 (tonnes CO<sub>2</sub>e/USDm revenue)<sup>1</sup>



### Carbon intensity as per year-end of 2021: Corporate bond portfolio vs benchmark<sup>1</sup>

December 2021	Investment portfolio		Benchmark Corp IG ESG BB+		Sector perspective			Country perspective		
	2021		2021			Sector allocation	Security selection		Country allocation	Security selection
<b>Carbon intensity</b> (tonnes CO <sub>2</sub> e/ USDm revenue)	164		244			-22	-58		-12	-68
					Utilities			United States		
					Energy			Canada		
					Financials			United Kingdom		
					Transportation			Australia		

● Underweight   ● In line with benchmark   ● Overweight
















<sup>1</sup> All carbon intensities from MSCI ESG as of February 2022, based on holdings as of December 2021.  
Carbon intensity: Weighted average carbon intensity = (company CO<sub>2</sub>e emissions/company revenue) \* (investment/portfolio).

### Listed equities (since end of 2018)

The below comparison against 2018 was performed excluding ETFs as some look-through information is missing. An intensity reduction of 61 tCO<sub>2</sub>e/USD m revenue is apparent. Since the equity portfolio is more actively managed than the

credit portfolio, only 5% of the decline is due to reported intensities, while most is due to portfolio rebalancing. Security selection was hence the main driver for the change, while reduction of exposures in some key sectors had only a modest impact:

### Drivers of carbon intensity reduction from 2018 to 2021: Listed equity portfolio<sup>1</sup>

Investment portfolio	2018		2021		Sector perspective			Country perspective		
	Carbon intensity (tonnes CO <sub>2</sub> e/USDm revenue)					Sector allocation	Security selection		Country allocation	Security selection
Carbon intensity (tonnes CO <sub>2</sub> e/USDm revenue)	111		-61	50		-23	-38		+10	-71
Change in reported intensities			-3		Chemicals			United States		
Rebalancing			-58		Energy			United Kingdom		
<b>Total</b>			<b>-61</b>		Transportation			China		
					IT					

● Decrease   ● Unchanged   ● Increase

Excluding ETFs

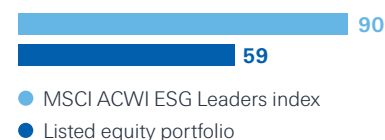
### Listed equities as per year-end 2021

Compared to the market benchmark – the ESG Leader version of the MSCI ACWI Index – Swiss Re’s investment portfolio has a superior carbon intensity profile.
















While industry weights were kept close to benchmark, the selection of companies within indices contributed significantly to the superior carbon profile.

The comparison below focuses on listed equities only. With that, it differs from the scope applied for Swiss Re’s carbon reduction target, which also includes Equity ETFs. Both the underweighting in carbon-intensive industries/countries and the security selection contributed to a lower carbon intensity of the current portfolio.

### Listed equity weighted average carbon intensity per year-end 2021 (tonnes CO<sub>2</sub>e/USDm revenue)<sup>1</sup>



### Carbon intensity as per year-end of 2021: Listed equity portfolio (excluding ETFs) vs benchmark<sup>1</sup>

December 2021	Investment portfolio		Benchmark MSCI ACWI ESG Leaders		Sector perspective			Country perspective		
	Carbon intensity (tonnes CO <sub>2</sub> e/USDm revenue)					Sector allocation	Security selection		Country allocation	Security selection
Carbon intensity (tonnes CO <sub>2</sub> e/USDm revenue)	50		-40	90		-21	-19		-18	-22
					Chemicals			United States		
					Energy			United Kingdom		
					Transportation			China		
					IT					

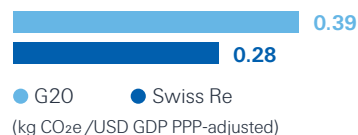
● Underweight   ● In line with benchmark   ● Overweight

<sup>1</sup> All carbon intensities from MSCI ESG as of February 2022, based on holdings as of December 2021.  
Carbon intensity: Weighted average carbon intensity = (company CO<sub>2</sub>e emissions/company revenue) \* (investment/portfolio).

### Government bonds as per year-end 2021

The composition of Swiss Re's government bond portfolio is impacted by the fact that asset-liability management is at the core of its investment approach. In 2021, Swiss Re's government bond portfolio was less carbon intensive than the G20 countries due to its higher allocation to low carbon intensity countries.

### Carbon intensity of government bond portfolio versus G20 per year-end 2021<sup>1</sup>



### Temperature alignment assessment for listed equities and corporate bonds

Swiss Re applied a temperature alignment view on both the listed equity and corporate bond portfolio. The methodology is based on specific intensity targets and emission projections that are dependent on a company's industry and on forward-looking projections of its carbon consumption. This metric has the clear benefit of providing a forward-looking element and thus a high degree of signalling.

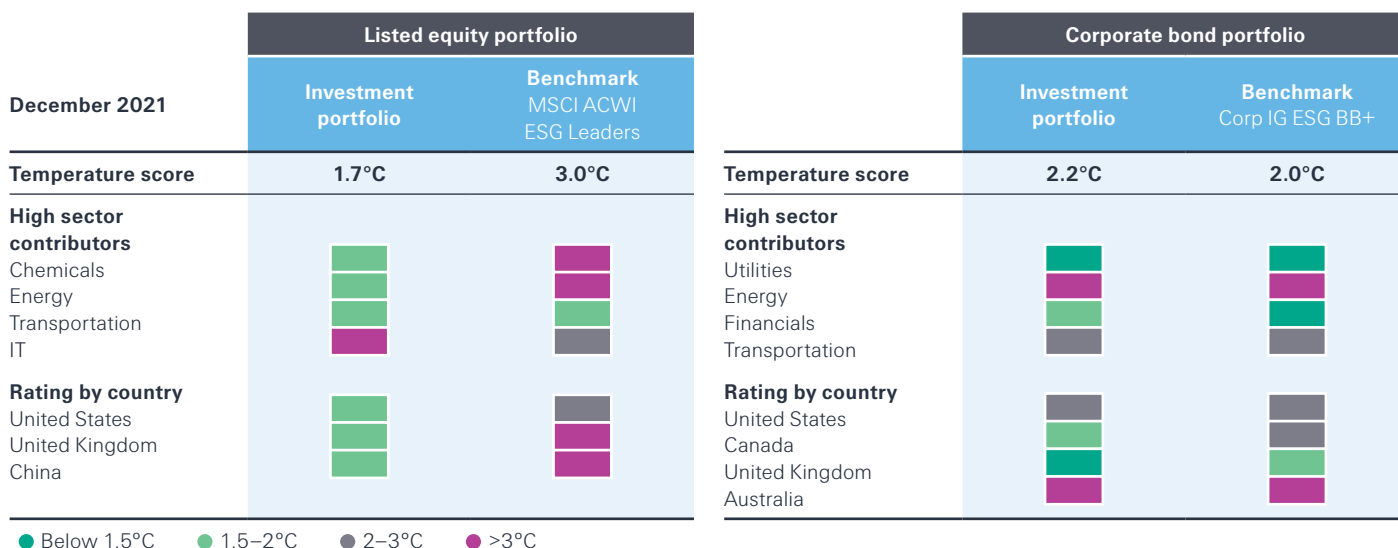
While results and analytics allow for a granular assessment of the carbon risks embedded in Swiss Re's holdings and will help to not only gain a deep understanding of our portfolio positioning, several caveats need to be made: comparability across methodologies/providers is limited at this point in the absence of a recognised global standard and given these methods are still evolving. Hence temperature alignment outputs from different providers are not comparable. The timeliness of data is insufficient: the latest available datapoint for the forward-looking projections relies on end

of 2019 company filings. While this information can be applied to current portfolio holdings, any development from the last two years in terms of forward-looking projections is not yet reflected in the final temperature outcome.

The temperature alignment score for the listed equity portfolio is at 1.7°C while the corresponding benchmark scores at 3.0°C. In line with the reported carbon intensities, the listed equity portfolio scores significantly below its benchmark.

In the case of corporate bonds, the temperature score of the portfolio is 2.2°C. This is slightly higher than the benchmark temperature score of 2.0°C, even though the carbon intensity of the portfolio is lower. The two measures may provide diverging insights as the carbon intensity is based on historical reported emissions while temperature score incorporates forward-looking elements. They also differ in terms of scope, coverage and timing. The temperature score does, however, highlight that more actions are required to align our economy with a 1.5°C pathway.

### Temperature alignment: Comparison of portfolio vs benchmark<sup>2</sup>



<sup>1</sup> All carbon intensities from MSCI ESG as of February 2022, based on holdings as of December 2021.  
Carbon intensity: Weighted average carbon intensity = (country CO<sub>2</sub>e emissions/country GDP PPP-adjusted) \* (investment/portfolio).  
<sup>2</sup> Temperature related data from Trucost as of February 2022, based on holdings as of December 2021.

## Greenhouse gas emissions from Swiss Re's operations (Scope 1, 2 and 3)

Bringing operational CO<sub>2</sub> emissions to net zero by 2030 is Swiss Re's key target under the CO<sub>2</sub>NetZero Programme.

### CO<sub>2</sub>NetZero Programme to reduce operational footprint to net zero

Swiss Re has committed to reducing its operational CO<sub>2</sub> footprint to net-zero emissions by 2030. To achieve this goal, Swiss Re has adopted a “do our best, remove the rest” approach under its CO<sub>2</sub>NetZero Programme.

“Doing our best” means intensifying efforts to reduce emissions. A special focus lies on business travel emissions, which are currently responsible for the bulk of the Group's reported operational carbon footprint. The reduction target for CO<sub>2</sub> emissions from air travel has been tightened to at least 50% for 2022 (relative to the 2018 level) to prevent going back to the pre-pandemic flight levels.

The CO<sub>2</sub> targets are supported by a Carbon Steering Levy introduced in 2021 (see box). While Swiss Re is already using 100% of its power from renewable sources, the amount of energy consumed per full time employee (FTE) is also targeted to decline by 2% per year throughout the decade (baseline 2018).

With “... remove the rest” Swiss Re will gradually move from conventional carbon offsetting to supporting high-quality, ie durable and scalable carbon removal projects. This gradual transition means that Swiss Re will be able to uphold the climate neutrality claim of its former Greenhouse Neutral Programme (see box on page 188), while preparing to balance all remaining emissions through carbon removal by 2030 under the current CO<sub>2</sub>NetZero Programme (see Sustainability Report, pages 60–61 for more details on the CO<sub>2</sub>NetZero Programme).

### Swiss Re's Carbon Steering Levy

In September 2020, Swiss Re was the first multinational company to announce a triple-digit real internal carbon price on both direct and indirect operational greenhouse gas emissions, ie on all Scope 1, all Scope 2 and a significant part of the upstream Scope 3 emissions (business travel, energy transmission and distribution, paper, water, waste) across all business units and countries of operations.

This Carbon Steering Levy will gradually increase from USD 100 per tonne of CO<sub>2</sub> in 2021 to USD 200 in 2030. The latter corresponds to the market price that Swiss Re experts expect for high-quality removals in 2030, based on cost projections in scientific literature and current market intelligence.

The levy is the overarching element of the CO<sub>2</sub>NetZero Programme, as it helps Swiss Re to meet both the “Do our best, ...” and “... remove the rest” objectives simultaneously.

Swiss Re expects that placing a stringent price on carbon and increasing it on an annual basis will help it to achieve further emission cuts by incentivising concrete reduction measures and low-carbon behaviour. To this end, the levy is displayed at all decision-making levels, for instance, in the travel booking tool where different flight options are compared.

At the same time, the levy will secure the funds required to compensate the remaining emissions in line with our net-zero by 2030 target.



Carbon dioxide can be removed from the atmosphere through nature-based solutions like afforestation, which also have substantial co-benefits such as improved biodiversity. However, nature-based solutions are limited by other important types of land-use and are vulnerable to the risk of stored carbon escaping ("storage reversal"). Therefore, technological carbon removal solutions such as direct air capture are needed to keep global warming well below 2°C over the long term. They are more durable and scalable than nature-based solutions, but are currently much more expensive, mainly due to their large energy requirements and early stage of development. To help to bring down the cost of technical carbon removal solutions Swiss Re started a partnership with Climeworks, a leading specialist in direct air capture and storage of CO<sub>2</sub> in 2021 (see Sustainability Report 2021, page 64).

#### Milestones under Swiss Re's Greenhouse Neutral Programme

Between 2003 and 2020 Swiss Re ran its Greenhouse Neutral Programme, combining major commitments to cut CO<sub>2</sub> emissions, reduce energy intensity, use renewable power and compensate the remaining emissions. These are some of the milestones of the programme:

- Per-capita CO<sub>2</sub> emissions reduced by more than half between 2003 and 2019 (Scope 1, Scope 2 and parts of upstream Scope 3)
- All remaining CO<sub>2</sub> emissions compensated since 2003 (Scope 1, Scope 2 and parts of upstream Scope 3, in particular business travel)
- Only renewable power used by 2020
- More than 33 000 subsidies granted to employees for emissions-cutting investments between 2007 and 2020

#### Greenhouse gas emissions data disclosure

Ever since Swiss Re first launched its Greenhouse Neutral Programme in 2003, the Group has disclosed its operational environmental performance indicators. The disclosure includes greenhouse gas emissions and their relative performance over time, with an expanded reporting scope starting from 2013.

In 2021, at the start of the ten-year reporting cycle of the CO<sub>2</sub>NetZero Programme (2021–2030), Swiss Re undertook a full re-baselining exercise to update the greenhouse gas emission factors and improve the calculation methodology, aligning it with the latest climate science and relevant frameworks. The methodology used to calculate emissions is based on the guidelines of the GHG Protocol – Corporate Standard, the most widely used emissions accounting and reporting standard.

The baseline year for the current reporting cycle is set to 2018. The full disclosure of the Group's operational emissions is presented in the tables on the following pages.

Swiss Re strives to continuously improve the calculation methodology for the emissions in its current reporting boundary. However, a large portion of upstream Scope 3 operational emissions remains unmeasured and therefore is currently not reported. These emissions, mostly stemming from the activities in Swiss Re's supply chain, are roughly estimated as being five to ten times higher than Swiss Re's total reported emissions. This difference has increased significantly in the past two years due to the sharp reduction of emissions from business travel, as a result of COVID-19 pandemic.<sup>1</sup>

The unreported emissions are difficult to quantify accurately because their sources are beyond Swiss Re's direct operational control, and methods and tools to collect the underlying activity data are not yet readily available. In line with Swiss Re's ambition to reduce its operational footprint and achieve the target of net-zero emissions in operations by 2030, the next challenge will be to work in close collaboration with the main suppliers to identify, quantify and develop synergies to address the most material emission hot spots in the supply chain.

<sup>1</sup> Previously, unreported emissions were roughly estimated to be three to five times higher than reported emissions. However, the absolute amount of reported emissions has shrunk significantly in the past thanks to Swiss Re's emissions reduction initiatives described (see box on the right) and, in the last two years, as a result of COVID-19 pandemic. On the other hand, the overall magnitude of unreported emissions is estimated to be relatively stable and not heavily affected by COVID-19 pandemic.



## Data tables

Data are reported on a hydrological year basis (ie 12 months from 1 October to 30 September) except for business air travel data, which are reported on a calendar year basis (ie 12 months from 1 January to 31 December).

GHG emissions figures for the years 2018, 2019 and 2020 have been restated. For more information, see Sustainability Report, pages 109–110.

Absolute GHG emissions	Unit	2018 (base)	2019	2020	2021
<b>Scope 1</b>	<b>CO<sub>2</sub>e tonnes</b>	<b>4 186</b>	<b>4 248</b>	<b>2 901</b>	<b>2 665</b>
Heating fuels	CO <sub>2</sub> e tonnes	2 849	2 435	2 111	2 104
Technical gases <sup>1</sup>	CO <sub>2</sub> e tonnes	922	1 386	537	494
Operational road travel <sup>2</sup>	CO <sub>2</sub> e tonnes	415	427	253	67
<b>Scope 2</b>	<b>CO<sub>2</sub>e tonnes</b>	<b>1 359</b>	<b>984</b>	<b>81</b>	<b>61</b>
Purchased energy (location-based)	CO <sub>2</sub> e tonnes	11 805	11 356	8 575	7 432
Purchased energy (market-based)	CO <sub>2</sub> e tonnes	1 359	984	81	61
<b>Scope 3 (upstream)<sup>3</sup></b>	<b>CO<sub>2</sub>e tonnes</b>	<b>84 158</b>	<b>87 765</b>	<b>16 919</b>	<b>7 481</b>
Business travel <sup>4</sup>	CO <sub>2</sub> e tonnes	69 338	74 290	9 909	4 558
Commuting	CO <sub>2</sub> e tonnes	12 223	11 567	5 660	1 820
Other <sup>5</sup>	CO <sub>2</sub> e tonnes	2 596	1 908	1 351	1 103
<b>Operational emissions</b>	<b>CO<sub>2</sub>e tonnes</b>	<b>89 702</b>	<b>92 996</b>	<b>19 901</b>	<b>10 207</b>
<b>Operational emissions in scope for compensation<sup>6</sup></b>	<b>CO<sub>2</sub>e tonnes</b>	<b>77 479</b>	<b>81 429</b>	<b>14 241</b>	<b>8 387</b>

- <sup>1</sup> Technical gases is reported as Scope 1 as Swiss Re has direct control over the majority of the fugitive emissions. Also included is a smaller amount with indirect control.
- <sup>2</sup> Operational road travel figures include emissions from Swiss Re's own or third-party operated road fleet (eg shuttle buses, pool cars and logistic vehicles).
- <sup>3</sup> Included are upstream Scope 3 emissions from business operations, currently from energy transmission and distribution, paper, water, waste, business travel and commuting. We acknowledge the existence of a large portion of upstream Scope 3 emissions that are currently unmeasured and therefore not reported. For more information, see Greenhouse gas emissions data disclosure, page 188.
- <sup>4</sup> Business air travel (ie commercial flights and business jets) figures are reported on a calendar year basis (ie 12 months from 1 January to 31 December). Personally expensed employee transport (ie private cars and taxis) for business reason is now included in business ground travel along with the centrally booked employee transport (ie trains and rental cars).
- <sup>5</sup> Other currently includes upstream Scope 3 emissions from energy transmission and distribution, paper, water and waste.
- <sup>6</sup> Current emissions in scope for compensation include Scope 1, Scope 2 and part of upstream Scope 3 (business travel, energy transmission and distribution, paper, water and waste). Commuting is not included.

Carbon certificates	Unit	2018 (base)	2019	2020	2021
<b>Total amount of retired carbon certificates</b>	<b>CO<sub>2</sub>e tonnes</b>	<b>69 343</b>	<b>70 303</b>	<b>27 249</b>	<b>9 409</b>
Certificates retired for the compensation of operational emissions <sup>1</sup>	CO <sub>2</sub> e tonnes	69 343	70 303	27 249	8 387
Certificates retired as part of the NetZeroYou2 Programme <sup>2</sup>	CO <sub>2</sub> e tonnes	–	–	–	1 022
Share of carbon avoidance certificates ("offsets")	%	100%	100%	100%	65%
Share of carbon removal certificates	%	0%	0%	0%	35%

- <sup>1</sup> Carbon certificates retired in 2018, 2019 and 2020 do not match the corresponding Operational emissions in scope for compensation because of restatement of those years' figures in 2021. For more information, please see Sustainability data and performance in the Sustainability Report 2021, pages 109–110.
- <sup>2</sup> NetZeroYou2 Programme started in 2021, therefore no certificates have been retired in the previous years.

<b>GHG emissions intensity (per FTE)</b>	Unit	2018 (base)	2019	2020	2021
<b>Scope 1</b>	<b>CO<sub>2</sub>e kg/FTE</b>	<b>301</b>	<b>301</b>	<b>203</b>	<b>180</b>
Heating fuels	CO <sub>2</sub> e kg/FTE	205	173	148	142
Technical gases <sup>1</sup>	CO <sub>2</sub> e kg/FTE	66	98	38	33
Operational road travel <sup>2</sup>	CO <sub>2</sub> e kg/FTE	30	30	18	4
<b>Scope 2</b>	<b>CO<sub>2</sub>e kg/FTE</b>	<b>98</b>	<b>70</b>	<b>6</b>	<b>4</b>
Purchased energy (location-based)	CO <sub>2</sub> e kg/FTE	850	805	601	501
Purchased energy (market-based)	CO <sub>2</sub> e kg/FTE	98	70	6	4
<b>Scope 3 (upstream)<sup>3</sup></b>	<b>CO<sub>2</sub>e kg/FTE</b>	<b>6 060</b>	<b>6 224</b>	<b>1 185</b>	<b>504</b>
Business travel <sup>4</sup>	CO <sub>2</sub> e kg/FTE	4 993	5 269	694	307
Commuting	CO <sub>2</sub> e kg/FTE	880	820	396	123
Other <sup>5</sup>	CO <sub>2</sub> e kg/FTE	187	135	95	74
<b>Operational emissions</b>	<b>CO<sub>2</sub>e kg/FTE</b>	<b>6 460</b>	<b>6 595</b>	<b>1 394</b>	<b>688</b>

<sup>1</sup> Technical gases is reported as Scope 1 as Swiss Re has direct control over the majority of the fugitive emissions. Also included is a smaller amount with indirect control.

<sup>2</sup> Operational road travel figures include emissions from Swiss Re's own or third-party operated road fleet (eg shuttle buses, pool cars and logistic vehicles).

<sup>3</sup> Included are upstream Scope 3 emissions from business operations, currently from energy transmission and distribution, paper, water, waste, business travel and commuting. We acknowledge the existence of a large portion of upstream Scope 3 emissions that are currently unmeasured and therefore not reported. For more information, see Greenhouse gas emissions data disclosure, page 188.

<sup>4</sup> Business air travel figures are reported on a calendar year basis (ie 12 months from 1 January to 31 December). Employees' expensed transport (ie by private cars and taxis) is now included in business ground travel along with the transport that is booked centrally via travel management tools (ie trains and rental cars).

<sup>5</sup> Other currently includes upstream Scope 3 emissions from energy transmission and distribution, paper, water and waste.

<b>GHG emissions intensity (per FTE)</b>	Unit	2018 (base)	2019	2020	2021
<b>GHG emissions intensity</b>	<b>CO<sub>2</sub>e kg/FTE</b>	<b>6 460</b>	<b>6 596</b>	<b>1 394</b>	<b>688</b>
of which from building facilities	CO <sub>2</sub> e kg/FTE	587	507	304	258
of which from business travel <sup>1</sup>	CO <sub>2</sub> e kg/FTE	4 993	5 269	694	307
of which from commuting	CO <sub>2</sub> e kg/FTE	880	820	396	123

<sup>1</sup> Business air travel figures are reported on a calendar year basis (ie 12 months from 1 January to 31 December). Personally expensed employee transport (ie private cars and taxis) is now included in business ground travel along with the centrally booked employee transport (ie trains and rental cars).



# Independent limited assurance report on selected Sustainability Information in Swiss Re Management Ltd's Sustainability Report 2021 and TCFD reporting 2021

## **To the Board of Directors of Swiss Re Management Ltd, Zurich**

We have undertaken a limited assurance engagement on Swiss Re Management Ltd's (hereinafter "Swiss Re") Sustainability Information in the following sections of the Sustainability Report for the year ended December 31, 2021:

- Creating solutions for sustainability;
- Extending our risk intelligence;
- Being a responsible investor;
- Engaging in dialogue with our stakeholders;
- Driving sustainable operations;
- Engaging our people;
- Ensuring good corporate governance and compliance;
- Appendix: Data on "Driving sustainable operations" on pages 106-108
- Appendix: Data on Absences on pages 113 and 114
- Appendix: Life and Health automated underwriting solutions figures disclosed in the "Building societal resilience" section of the "Sustainability Topics: goals and progress" table on page 90. This includes the number of potential customers assessed and the number of automatic covers offered by our solutions.

Furthermore, we assessed data and information disclosed in the chapter "Climate-related financial disclosures (TCFD)" in the Financial Report for the year ended December 31, 2021 (TCFD reporting 2021), including:

- Annual expected losses (AEL) of the weather-related perils reporting on pages 156 and 180
- Weighted average carbon intensity of Swiss Re's direct insurance portfolio on page 181
- Carbon footprint calculation of Swiss Re's investment portfolio on page 183-185
- Data tables on pages 189 and 190

Our assurance engagement does not extend to information in respect of earlier periods or to any other information included in the Sustainability Report 2021 and in the Financial Report 2021 or linked to from the Sustainability Information or from the Financial Report 2021, including any images, audio files or embedded videos.



### **Our Limited Assurance Conclusion**

Based on the procedures we have performed as described under the *'Summary of the work we performed as the basis for our assurance conclusion'* and the evidence we have obtained, nothing has come to our attention that causes us to believe that Swiss Re's Sustainability Information in the above-mentioned sections of the Sustainability Report and the Financial Report for the year ended December 31, 2021 are not prepared, in all material respects, in accordance with the reporting criteria described under *'Understanding how Swiss Re has prepared the Sustainability Information'*.

We do not express an assurance conclusion on information in respect of earlier periods or to any other information included in the Sustainability Report 2021 and in the Financial Report 2021 or linked to from the Sustainability Information or from the Financial Report 2021, including any images, audio files or embedded videos.

### **Understanding how Swiss Re has prepared the Sustainability Information**

The Sustainability Information needs to be read and understood together with the following reporting criteria:

- Relevant references in GRI Sustainability Reporting Standards;
- Swiss Re's Group Sustainable Business Risk Framework;
- Greenhouse Gas Protocol Initiative of the World Resources Institute and the World Business Council for Sustainable Development;
- BEIS 2021 Government Greenhouse Gas Conversion Factors for Company Reporting, Methodology Paper;
- IEA Emissions Factors 2020 Database Documentation;
- Internal Environmental Performance Indicators for the Financial Industry' published by the Verein für Umweltmanagement in Banken, Sparkassen und Versicherungen e.V. (VfU);
- The GHG Protocol Scope 2 Guidance, effective since January 2015;
- Further internal policies and guidelines applied regarding the subject matter.

### **Inherent limitations**

Due to the inherent limitations of any internal control structure, it is possible that errors or irregularities may occur in disclosures of the Sustainability Information and not be detected. Our engagement is not designed to detect all internal control weaknesses in the preparation of the Sustainability Information because the engagement was not performed on a continuous basis throughout the period and the audit procedures performed were on a test basis.

### **Swiss Re's Responsibilities**

The Board of Directors of Swiss Re is responsible for:

- Selecting or establishing suitable criteria for preparing the Sustainability Information, taking into account applicable law and regulations related to reporting the Sustainability Information;
- The preparation of the Sustainability Information in accordance with the reporting criteria described under *'Understanding how Swiss Re has prepared the Sustainability Information'*;
- Designing, implementing and maintaining internal control over information relevant to the preparation of the Sustainability Information that is free from material misstatement, whether due to fraud or error.



### **Our Responsibilities**

We are responsible for:

- Planning and performing the engagement to obtain limited assurance about whether the Sustainability Information is free from material misstatement, whether due to fraud or error;
- Forming an independent conclusion, based on the procedures we have performed and the evidence we have obtained; and
- Reporting our conclusion to the Directors of Swiss Re.

As we are engaged to form an independent conclusion on the Sustainability Information as prepared by management, we are not permitted to be involved in the preparation of the Sustainability Information as doing so may compromise our independence.

### **Professional Standards Applied**

We performed a limited assurance engagement in accordance with the International Standard on Assurance Engagements 3000 (Revised) "Assurance Engagements other than Audits or Reviews of Historical Financial Information" and in respect of greenhouse gas emissions, with the International Standard on Assurance Engagements (ISAE 3410), "Assurance Engagements on Greenhouse Gas Statements", issued by the International Auditing and Assurance Standards Board.

### **Our Independence and Quality Control**

We have complied with the independence and other ethical requirements of the International Code of Ethics for Professional Accountants (including International Independence Standards) issued by the International Ethics Standards Board for Accountants, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality, and professional behavior.

Our firm applies International Standard on Quality Control 1 and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards, and applicable legal and regulatory requirements.

Our work was carried out by an independent and multidisciplinary team including assurance practitioners and sustainability experts. We remain solely responsible for our assurance conclusion.

### **Summary of the Work we Performed as the Basis for our Assurance Conclusion**

We are required to plan and perform our work to address the areas where we have identified that a material misstatement of the Sustainability Information is likely to arise. The procedures we performed were based on our professional judgment. Carrying out our limited assurance engagement on the Sustainability Information included, among others:

- Assessment of the design and implementation of systems, processes and internal controls for determining, processing and monitoring sustainability performance data, including the consolidation of data;
- Inquiries of employees responsible for the determination and consolidation as well as the implementation of internal control procedures regarding the selected disclosures;
- Inspection of selected internal and external documents to determine whether qualitative and quantitative information is supported by sufficient evidence and presented in an accurate and balanced manner;
- Assessment of the data collection, validation and reporting processes as well as the reliability of the reported data on a test basis and through testing of selected calculations;
- Analytical assessment of the data and trends of the quantitative disclosures in the scope of the limited assurance engagement;



- Assessment of the consistency of the disclosures in the scope of the assurance with the other disclosures and key figures in the Sustainability Report 2021 and the TCFD reporting 2021;
- Assessment of the overall presentation of the disclosures through critical reading of the Sustainability Report 2021 and the TCFD reporting 2021.

The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had we performed a reasonable assurance engagement.

KPMG AG

Silvan Jurt

Licensed audit expert

Theresa Tiersch

Zurich, 16 March 2022

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