Our actions are guided by sustainable, long-term value creation and have a tangible link to our financial performance.

Contents

Climate-related financial disclosures (TCFD)

These disclosures provide a foundation to improve investors' and other stakeholders' ability to appropriately assess and price climate-related risk and opportunities.

Swiss Re has a long track record as a responsible company. In our understanding this means a commitment to sustainable, long-term value creation. Through our enhanced Group Sustainability Strategy we have further sharpened this commitment and have clearly defined sustainability as a strategic, long-term value driver.

We adopt this approach throughout our re/insurance value chain, comprising of both the liability and the asset sides of our balance sheet, our own operations and dialogue with our stakeholders.

The 2030 Sustainability Ambitions of our strategy cover three focus areas where we can have a significant positive impact in terms of supporting sustainability and strengthening resilience.

Climate-related financial disclosures
"Mitigating climate risk and advancing the energy transition" is one of these ambitions. This is why we continue to play an active part in the Task Force on Climate-related Financial Disclosures (TCFD, www.fsb-tcfd.org) since it was set up by the Financial Stability Board.

Tackling this issue effectively will be challenging. Therefore, we need a viable and adaptable action plan backed by a true multi-stakeholder effort. This plan will be key to developing orchestrated solutions, directing risk transfer products and investments to those areas with the greatest positive impact on enabling sustainable progress.

Starting from the premise that climate change creates physical, liability and transition risks, the TCFD's aim is to offer consistent and effective financial disclosures that allow investors and other stakeholders to assess the climate risks faced by companies and to take appropriate action.

We began to implement the TCFD recommendations in our 2016 Financial Report and have since continued to expand our climate-related disclosures. The table on page 153 provides an overview of the core elements of these disclosures, which are covered on the following pages.

Achieving net-zero CO_2 emissions[1]:
In 2019, Swiss Re made three important commitments to achieving net-zero CO_2 emissions:
- Across the Swiss Re Group by 2050, by signing the UN Global Compact "Business Ambition for 1.5°C"
- In our investment portfolio by 2050, as a founding partner of the UN-convened Net-Zero Asset Owner Alliance
- In our operations already by 2030

Find out more

To learn more about our Group Sustainability Strategy and for a full account of our recent actions and achievements, we invite you to read our stand-alone 2019 Sustainability Report at: reports.swissre.com/sustainability-report/2019/

[1] Net-zero emissions means that for every tonne of CO_2 that cannot be reduced, a tonne needs to be removed from the atmosphere and stored permanently through so called carbon removal technologies.

Climate governance

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

At Swiss Re's highest governance level, three Board of Directors committees are charged with overseeing the implementation and execution of Swiss Re's Climate Action Plan.

The Chairman's and Governance Committee, presided over by the Chairman, has the overall responsibility of monitoring the Group's Strategic Priorities on enabling sustainable progress, including initiatives and actions specifically addressing climate change.

The Investment Committee reviews Swiss Re's asset management-related activities and, as part of this, receives regular updates on Group Asset Management's Responsible Investing Strategy and implementation, including in the area of climate change.

The Finance and Risk Committee defines the Group Risk Policy, reviews risk capacity limits, monitors adherence to risk tolerance, and reviews all top risk issues and exposures, including those with a specific climate dimension.

The role of the Board of Directors is the oversight of the development and adoption of sustainability policies and strategies, while the Group Executive Committee approves them.

As we move to implement our enhanced Group Sustainability Strategy, we will also introduce a number of key performance indicators at the Group Executive Committee level. One such indicator will align Swiss Re's business actions with the goals of the Paris Agreement to limit a global temperature rise to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5°C.

Group Risk Management is responsible for maintaining a suitable risk policy framework, as well as for coordinating the Group's Sustainability Strategy, mandate and topics. The Business Units drive the strategic implementation within their respective areas, and Group Asset Management is responsible for developing and implementing the Group's Responsible Investing Strategy, which also contains a dedicated approach to climate change.

You can read more about our sustainability governance in our 2019 Sustainability Report, page 20.

Climate-related financial disclosures of the Financial Stability Board

Governance	Strategy	Risk management	Metrics and targets
A) Board oversight	A) 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 emissions
	C) Potential impact of different scenarios	C) Integration into overall risk management	C) Targets

Climate strategy

We regularly assess the actual and potential impacts of climate-related risks and opportunities on our business, strategy and financial planning.

There is clear empirical evidence that the global climate has been changing and a far-reaching scientific consensus that this change has been due to human activity, primarily from the burning of fossil fuels and agriculture. Swiss Re recognises that climate change, if not mitigated, will potentially have disastrous effects on society and the global economy. In view of this, we are committed to playing an active role in the transition towards a low-carbon economy and to supporting our private- and public-sector clients in this transition.

Natural catastrophes are a key risk in our Property & Casualty (P&C) businesses. The damage caused by storms, floods, droughts and other natural catastrophe perils (including wildfires) can affect millions of lives and the economies of entire countries. In 2019, we received USD 2.94 billion of property and casualty reinsurance premiums from our clients for all natural catastrophe covers (for losses larger than USD 20 million). This represents approximately 15% of total premiums in P&C Reinsurance, which shows the importance our clients place on obtaining re/insurance protection against natural catastrophe risks.

On average, insured losses due to natural catastrophes have increased steadily over the past 20 years. The key reasons have been economic development, population growth, urbanisation and a higher concentration of assets in exposed areas. At the same time, the protection gap, ie the difference between insured and total economic losses, has remained substantial in all regions (see graph on page 165).

In view of the high potential relevance of climate change for our P&C businesses, climate change continues to be an essential element in our enhanced Group Sustainability Strategy, which includes "Mitigating climate risk and advancing the energy transition" as one of our three 2030 Sustainability Ambitions. As part of this ambition, we have developed a Climate Action Plan.

Building on our commitments and initiatives of recent years, our Climate Action Plan (which serves as our climate strategy), combines three objectives:

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

You can find out more about our Group Sustainability Strategy, our 2030 Sustainability Ambitions and Climate Action Plan in the 2019 Sustainability Report, pages 9–13. As our Climate Action Plan indicates, understanding the risks posed by climate change and identifying the potential to create suitable products and services are and will continue to be priorities for Swiss Re.

Climate-related risks

Physical risks

Physical risks posed by climate change could potentially affect four areas of our business. They can:

- Reduce/disrupt our operations
- Influence modelling and pricing of weather-related natural perils
- Impact the economic viability of re/insurance for risks exposed to extreme weather events
- Impact real assets exposed to weather-related natural perils

Our own operations

According to our in-house catastrophe loss models, severe weather risks are potentially of importance for some of our operations, mainly in Florida and on the northeastern coast of the US. However, even assuming an extreme climate change scenario, we do not expect any of these office locations to be exposed to risk levels that would question their economic viability. In 2012, Hurricane Sandy in New York showed that some of Swiss Re's offices are already exposed to severe weather risks. In response, we sharpened the Group's business continuity management to minimise property losses and business interruption. Thanks to these investments, we are able to swiftly transfer work to unaffected locations if required and to keep potential financial impacts to a minimum.

Modelling and pricing of weather-related perils

Based on our proprietary loss modelling, we calculate the annual expected losses (AEL) and loss-frequency distributions of major weather-related natural catastrophes. The four perils with the largest AEL at present are disclosed on page 164 (North Atlantic hurricane, US tornado, European windstorm, and Japanese tropical cyclone).

Our models show that with the current climate, the dominant factor is natural variability, affecting both the frequency and severity of extreme weather events in all regions. We expect this to remain the case both in the short and medium term (ie 2025 and 2030), in line with the latest scientific findings (see the IPCC Fifth Assessment Report, chapter 11, and the IPCC Special Report on the impacts of global warming of 1.5°C).

In addition, we expect weather risk to remain assessable by scientific methods, meaning we can continue to update our loss models in the future to assure adequate costing of extreme weather events. Since most of the re/insurance contracts with our clients have a duration of one year, we can adequately price natural catastrophe risks by updating our models to reflect the current climate risks.

Regarding the long-term time horizon (2040), we expect a substantial need to adjust some of our weather risk models, based on current scientific knowledge. We are confident, however, that future research will continue to give us sufficient guidance on the magnitude and direction of these adjustments. The potential impact of climate change, including natural variability, is already being assessed and integrated into our risk view today, eg through regular updates of tropical cyclone frequencies. Furthermore, we conduct internal research and collaborate with academia to study the impact on extreme weather events in the near and medium term.

Impact on the economic viability of re/insurance protection

An increase in the frequency and severity of extreme weather events can restrict the affordability of re/insurance in certain regions, especially in coastal areas, by requiring a rise in premiums. While climate projections are associated with a large range of uncertainty, especially when it comes to storms making landfall, increases in the frequency and severity of tropical storms are likely. Natural variability is expected to remain the dominant factor in the short and medium term (2025 and 2030). In the longer term (2040), a rise in sea levels will lead to non-linear increases in storm surge risk for coastal areas. Additionally, warmer temperatures will lead to more extreme rainfall events that may increase flood risk.

If rises in re/insurance premiums, necessitated by increasing extreme weather risks, remain modest, ie re/insurance protection remains economically viable for our clients, the overall premium volume will potentailly grow. Larger increases, however, will eventually reverse this effect by pushing re/insurance prices for certain exposed risks beyond the limits of economic viability. This is particularly relevant for areas with inadequate construction planning and development. In addition, timing is of crucial importance: if measures to exclude a particular risk are taken too early we may offer our clients less insurance protection; if measures are taken too late, we may end up with increased claims.

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

In line with independent external studies, we have shown through a series of scenario assessments (Economics of Climate Adaptation studies, ECA), that in many regions, climate adaptation measures need to be taken to limit expected increases in natural catastrophe damages and thus to ensure the economic viability of re/insurance in the future. This is a key reason why Swiss Re actively engages with the United Nations, the public sector, clients, industry peers and employees to advocate cost-effective adaptation to climate change.

Impact on real assets exposed to weather-related perils

Real assets such as real estate are exposed to natural perils, eg hurricanes, tropical cyclones and floods. In addition to considering physical risks when acquiring new properties, we analyse these exposures across the portfolio based on our proprietary modelling capabilities used for our re/insurance underwriting. This analysis has been extended and refined recently, with results suggesting a very low exposure to natural perils in general and to climate-related perils in particular.

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

Transition risks in our re/insurance business

Transition risks may arise as a result of the extensive policy, legal, technology and market changes that are required to make the transition to a low-carbon economy. We have assessed the two transition risks that may potentially affect our business:

- Climate-related litigation risks
- Risks from technological and market shifts

Climate-related litigation risks

We identified potential climate-related litigation risks as an emerging risk over a decade ago and assessed its potential relevance through our own research. After years of decline, climate change litigation activities against large greenhouse gas emitters have increased recently. However, associated insurance coverage disputes have remained stable.

As a result, we have not faced any new claims from climate-related litigation in recent years and the results of the litigation, which have remained in favour of the defendants, suggest that this trend will likely continue, but warrants continued monitoring.

Technological and market shifts

The re/insurance sector is likely to experience the technological transition in two ways. Firstly, new technologies by definition do not have loss histories and thus may be challenging to cost accurately. Research and development is thus required 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 to offer new solutions (see "Climate-related opportunities", page 158).

Secondly, new low-carbon technologies are likely to gradually displace traditional, fossil fuel-based ones. This will alter the market and, as a result, gradually change the nature of re/insured assets.

This transition does not, however, automatically translate into a financial risk for us. For example, motor insurance is the most important business line of the re/insurance sector globally. According to Swiss Re's sigma database, it currently represents approximately 33% of global non-life gross written premiums and is expected to grow further, albeit at a lower rate.

Driven by intensifying efforts to curb climate change, the global motor vehicle inventory will shift from combustion to electric engines. In a Swiss Re study on the casualty risk trends in the automotive industry, we noted that the move from conventional (pure combustion engine) cars to more electrically based mobility is a transition process that is likely to increase in the coming years. This development will entail the implimentation of a variety of new technologies, from new lightweight materials to advanced battery systems.

Consequently, while the automotive industry as a whole is undergoing significant change, the impact on insurance portfolios is expected to be gradual. As motor insurance contracts are renewed annually, re/insurers will be able to develop the appropriate underwriting experience, loss adjustment and claims handling.

To address the residual risk, we have recently started to develop a carbon risk steering mechanism. Its key component will be a carbon risk model designed to measure our carbon intensity and the associated risks embedded in our re/insurance business.

As a first step in 2018, we introduced a thermal coal policy for our underwriting, pledging not to provide re/insurance to businesses with more than 30% exposure to thermal coal utilities or mining. The policy is fully integrated into our Sustainable Business Risk Framework. It applies to both old and new thermal coal projects and across all lines of business. While it is easier to implement this policy in some parts of our business, for others the transition will take some time and require a continued and constructive dialogue with our clients. In 2019, we continued the implementation of the thermal coal policy for treaty business and engaged with over 300 insureds across all regions on this topic.

We also intensified our efforts to decarbonise our business by committing to net-zero emissions by 2050 on the liability and the asset sides of our balance sheet. A further step towards this commitment was the development of a policy to shift away from highly carbon-intense oil and gas production.

From July 2021, we will no longer provide individual/insurance covers for those oil and gas companies that are responsible for the world's 5% most carbon-intense oil and gas production.

From July 2023, we will no longer provide individual insurance covers for those oil and gas companies that are responsible for the world's 10% most carbon-intense oil and gas production.

Transition risks in our re/insurance business conclusion: Overall, it is our view that the transition to a low-carbon economy is not expected to present a significant financial risk for Swiss Re. Mainly due to the annual renewal of contracts, we expect the associated risks can be managed effectively.

Transition risks in our investments

Climate-related risks can impact the value of our investments and are therefore considered a substantial part of our Responsible Investing Strategy. A key risk for asset owners is that a changing 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 or new regulations. With regard to climate change, the market environment could shift to address mitigation and adaptation requirements to limit a global temperature rise to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5°C.

Governments and regulators have started to develop proposals to steer and transition climate change-related market activities to more sustainable alternatives. The European Commission's Action Plan for Financing Sustainable Growth and the UK's Green Finance Strategy, which legislates for net-zero emissions by 2050, are just two examples.

Based on these market developments, we continue to focus on policy and legal risks, as well as technology risks, as we mainly expect changes within these two dimensions to potentially impact asset values. In this way, we aim to capture those industries and groups of companies that are most exposed to these risks and may therefore require adjustments in the near to medium term.

Industries and companies that are particularly exposed to changes in policy and legal, as well as technological developments, show elevated risk exposures either in the production process, in raw materials, in transportation/logistics or distribution and store operations due to high carbon footprints in these areas. Furthermore, industries may face increased costs due to higher or more volatile energy prices, compliance costs in the production and distribution process, and costs from product demand substitution. All these changes may cause increased price volatility of the underlying assets.

Based on our commitment to support the transition to a low-carbon economy, we have been measuring the weighted average carbon intensity[1] of our corporate credit and listed equities portfolios since the end of 2015. Measurement results are presented in the "Metrics and targets" section (pages 164–167). As part of our mitigation strategy, we have stopped investing in companies that use at least 30% thermal coal for power generation or produce 30% or more of their revenues from thermal coal mining.

As of 2018, we also excluded oil sands companies that generate 20% or more of their revenues from such operations from the investment universe. In 2019, we extended our mitigation approach to an absolute coal threshold: we do not invest in mining companies producing at least 20 million tonnes of coal per year and power utility generators with more than 10 gigawatts of installed coal fire capacity.

Transition risks in our investments conclusion: While we expect some policy and legal adjustments in the market environment, we do not consider the transition to a low-carbon economy as a significant financial risk for Swiss Re. This view is formed on the basis of having a strong mitigation strategy in place, which is regularly reviewed and adjusted, as well as the constant monitoring of our portfolio.

[1] Weighted average carbon intensity = (company CO_2 /company revenue) * (investment/portfolio)

Climate-related opportunities

Climate change does not just create risks, but also presents new opportunities. Developing corresponding products and services is a core part of our Group Sustainability Strategy, 2030 Sustainability Ambitions and Climate Action Plan. With our offerings, we pursue two different but complementary objectives: adapting to the effects of climate change and supporting the transition to a low-carbon economy.

Opportunities related to physical risks in our re/insurance business

Since most of our re/insurance contracts are renewed on an annual basis, we can offer our clients effective natural catastrophe protection that can help them cope with current climate risks. The same applies to our weather insurance solutions.

In addition, we undertake 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. You can read about some innovative transactions we have recently completed in our 2019 Sustainability Report, pages 25–31.

Opportunities related to transition risks in our re/insurance business

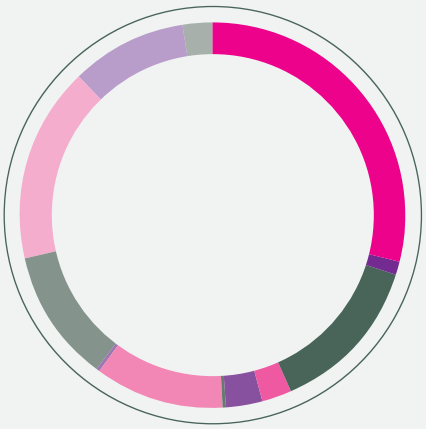
While Swiss Re is active in all types of renewable energy re/insurance, over the years we have become a recognised lead market for offshore wind risks. More than five years ago, Swiss Re Corporate Solutions established a Centre of Competence for Wind Power and through this focused investment, we have built up and refined the technical expertise required to understand and manage these risks. For example, in 2019, we played a key role in several major windfarm projects, including the Parc éolien en mer de St-Nazaire, the first large commerical windfarm project in France. Additionally, we took on the role of lead insurer for a number of large projects in Taiwan – Formosa II and Greater Changhua 1 & 2a. Over the next decade, we expect many new development opportunities to arise, which are likely to create demand for re/insurance protection in numerous lines of business (credit, engineering, property, liability, etc).

You can read about our involvement in some new offshore wind farm projects in our 2019 Sustainability Report, pages 29–30.

Opportunities for our investments

We expect to experience, particularly over the longer term, an improved risk/return relationship in our investment portfolio as part of our consistent and broad-based integration of environmental, social and governance (ESG) criteria along the investment process. We address sustainability risks such as climate change to make the portfolio more resilient against financial market shocks. This is of crucial importance as such risk factors are not yet fully reflected in current market valuations.

As part of our adaptation strategy, we consider investment opportunities that enable a low-carbon economy:



Green bonds

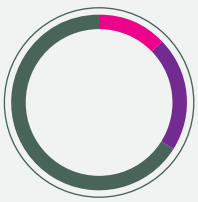
Green bond proceeds are used exclusively to finance environmentally sustainable projects that address key areas of concern, including climate change, but also natural resource conservation, biodiversity conservation, and pollution prevention and control. We support the transition towards a low-carbon economy by investing into green bonds following the ICMA Green Bond Principles. As of 31 December 2019, we held USD 1.8 billion of green bonds and are targeting a portfolio of USD 4.0 billion by the end of 2024. We have embraced the opportunity to participate in the impressive average market growth of 54% p.a. since 2014[1,2].

- **29.0%** Agencies
- **13.6%** Financials
- **2.9%** Municipals
- **10.8%** Regional governments
- **11.3%** Sovereigns
- **9.7%** Utilities
- **1.0%** Basic industries
- **2.4%** Information technology
- **0.4%** Non-cyclical consumer goods
- **0.2%** Resources
- **16.2%** Supranationals
- **2.5%** Non-cyclical services

[1] Moody's, "Sustainable Finance – Global: Green, social and sustainable bond issuance to hit record $400 billion in 2020", 3 February 2020
[2] Moody's – Green bonds: Key numbers and trends, 2018

Infrastructure renewables

For our infrastructure loan mandates, we work with best-in-class managers to gain access to, and provide financing for, renewable energy projects that reflect our risk appetite, generate attractive long-term returns and help build a more sustainable energy supply for the future. Renewables make up approximately 13% of our infrastructure portfolio, whereof 76% are in solar panels and 24% in wind farms.



- **13%** Renewable energy
- **21%** Social infrastructure
- **66%** Others

24%
76%

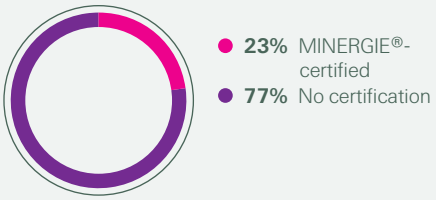
Real estate

Our real estate investment portfolio comprises commercial and residential buildings with a total market value of USD 4.7 billion as of 31 December 2019. These are predominantly located in Switzerland, the US, Germany, Australia, the UK, and Central and Eastern Europe. As ESG criteria are considered a key pillar of long-term sustainable value creation, we incorporate them into decision-making throughout the whole operating model, including external investment manager due diligence.

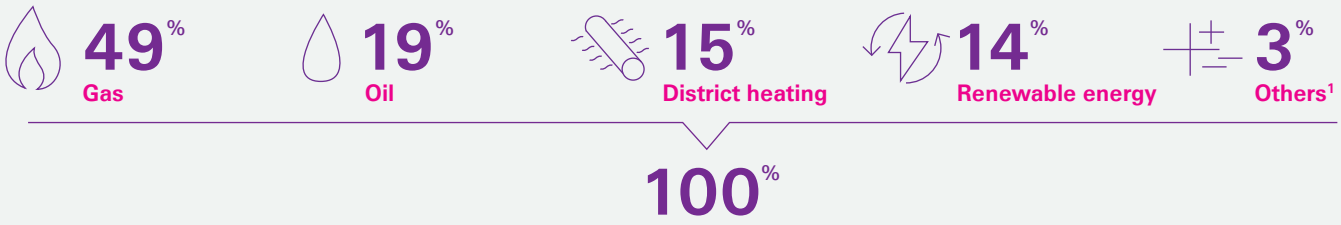
New property investments are evaluated from an ESG perspective, which includes both a property's current and potential future status as it relates to energy efficiency, public transport connectivity, use of sustainable materials, occupier well-being and community engagement. Ongoing business plan execution and asset management of properties already in the portfolio always incorporate different ways to improve ESG characteristics, as economically and financially sensible.

For investment real estate in Switzerland, we apply 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 2019, the combined value of our MINERGIE®-certified buildings reached USD 0.4 billion, or 23% of our Swiss portfolio of direct real estate investments by value, which corresponds to a gross floor area of 82 497 m^2. The Swiss portfolio is gradually shifting away from fossil fuels as a heating source to either renewable energy (14%) or district heating (15%). Whenever this is not possible, gas (49%) is considered as an alternative, given its smaller carbon footprint compared to oil (19%).

Switzerland



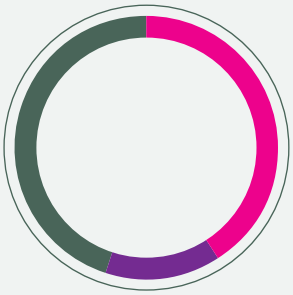
Energy sources



[1] Includes projects under construction, land and non-heated assets.

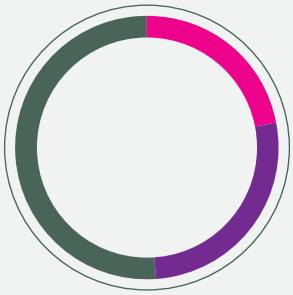
The externally managed real estate portfolio is predominantly invested in Australia, the UK and the US, and contains 47% green buildings based on regional energy labels. The Australian portfolio is the most advanced, followed by the UK portfolio.

Australia



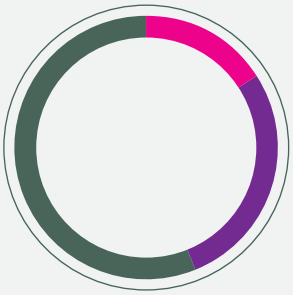
- **41%** NABERS Energy 5
- **14%** NABERS Energy 4/4.5
- **45%** NABERS Energy < 4 or not certified

UK



- **22%** BREEAM "Excellent"
- **27%** BREEAM "Very Good"
- **51%** Not certified

US



- **16%** LEED "Gold"
- **28%** LEED "Silver"
- **56%** Not certified

In the US, our approach to sustainability includes some of the most recognised certificates and guidelines such as "GreenGuide: Sustainable Property Operations", a best-practice guideline for sustainable and efficient real estate operations, as well as the LEED certification of the US Green Building Council (USGBC).

2019 was the third year in a row that the US portfolio achieved four out of five stars in GRESB. The 2019 GRESB score increased by 4 points (+5%) to 82.

82/100
(vs. average GRESB Score of 72)

→ **Implementation & Measurement: 81/100**
(vs. average GRESB Score of 69)

→ **Management & Policy: 86/100**
(vs. average GRESB Score of 80)

Swiss Re's climate resilience under different scenarios

The TCFD requests companies to describe the resilience of their strategy, taking into account different climate related-scenarios including one of, or less than 2°C increase. In principle, it would be possible for us to compute the potential long-term effects caused by climate change on AEL based on today's re/insurance book. However, we do not consider this to be meaningful as a stand-alone exercise, for the following reasons outlined below.

Looking at climate effects in isolation would mean ignoring the other factors that will shape Swiss Re's future re/insurance book and thus also our future AEL. These include our strategy and risk appetite, market conditions, capital costs, insurance penetration, storm hardening and other climate adaptation measures. Since our re/insurance book and current AEL are the result of a complex interaction between all of these factors, any future scenario would have to consider all of them, in the process rendering the effect of climate change on the resulting AEL marginal. Moreover, the future AEL for Swiss Re's weather-related re/insurance book will depend both on our future market share and scenario projections of overall business volume. Independent studies have shown a wide uncertainty range for future market business volumes (see eg Kunreuther et. al., 2012)[3], thus rendering any long-term projections highly uncertain.

On a societal level, our Economics of Climate Adaptation studies have shown that climate change can lead to an increase of economic losses due to weather risks of up to 30% within the next 25 years. More importantly though, 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, our models will gradually factor in this trend, since they are updated and refined at regular intervals.

To summarise, we do not consider climate change to be a single factor posing a fundamental threat to the resilience of our business. It is one of many equally important factors we will need to take into consideration when shaping our future business strategy. A key precondition for our ability to continue acting as an ultimate risk-taker is diversification, with regard to regions, lines of business, sectors and clients. In a world of strong or unmitigated climate change, however, the proportion of weather-related risks we could re/insure would decline and the protection gap would likely increase further. In light of the above, we are developing qualitative scenarios for physical and transition risks to be considered as part of our strategic business planning.

[3] Kunreuther, Howard; Michel-Kerjan, Erwann; and Ranger, Nicola, "Insuring Future Climate Catastrophes" (2012). Published Articles & Papers. Paper 171.

Climate risk management

The processes we use to identify, assess and manage climate-related risks are integrated into our risk management, underwriting and asset management.

Sound risk management, underwriting and asset management lie at the core of the re/insurance business. This enables us to use our existing processes and instruments to address climate-related risks.

Physical risks

To assess our P&C businesses accurately and to structure sound risk transfer solutions, we need to clearly understand the economic impact of natural catastrophes and the potential effect of climate change on their frequency and severity.

Natural catastrophes constitute one of the core risks modelled in Swiss Re's risk landscape. Specifically, they are one of three categories in which we classify and model our P&C re/insurance risks (the other two being man-made and geopolitical risks). These risks arise from the coverage we provide to our clients for property, liability, motor, accident and specialty risks.

We have an internal property risk modelling team that builds, maintains and updates sophisticated models for all relevant natural catastrophe risks (flood, tropical cyclones, wind storms, earthquakes). The models are based on current scientific knowledge and are regularly updated to include new scientific findings – including from our research collaborations with academic institutions – and to make use of advances in computing capabilities. Using statistical data spanning more than 100 years, our models are capable of simulating probabilistic "daughter" events that may have never occurred in reality but that may occur in the future.

Swiss Re's full, proprietary integrated risk model is an important tool for managing the business: we use it to determine the economic capital required to support the risks on our books as well as to allocate risk-taking capacity to our different lines of business.

Transition risks in our re/insurance business

To ensure appropriate management of transition risks and assess potential impacts on our business, we have set up a monitoring system that combines expertise in risk management and casualty underwriting, as well as for relevant legal developments.

For the other types of transition risks described on pages 156 and 158, we also have risk management systems in place. 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 our re/insurance business

We use our Sustainable Business Risk Framework to identify and address potential sustainability risks in all our underwriting and investment transactions (see 2019 Sustainability Report, pages 35–37). This framework continuously evolves to reflect scientific knowledge and internal standards. With respect to climate change, this framework prevents us from offering any re/insurance cover to businesses with more than 30% exposure to thermal coal utilities or mining and for offshore drilling activities in the Arctic.

In 2019, we continued the implementation of our thermal coal policy for treaty business with over 300 engagements with insureds across all regions. We also intensified our efforts to decarbonise our business by committing to net-zero emissions by 2050 on the liability and the asset side.

Investments

Swiss Re is a long-term investor. Therefore, it is important that we also take a long-term view on the risk factors that may have an adverse impact on our portfolio, such as climate change. Hence, sustainability and climate change are essential topics for our Asset Management.

Our Sustainable Business Risk Framework enables us to identify and address environmental and human rights concerns throughout our business. Its criteria are fully applied to our investments. For further details, see above and our 2019 Sustainability Report, pages 35–37.

Swiss Re is committed to investing its assets responsibly via a controlled and structured investment process by integrating ESG criteria. In 2017, as part of our continuous improvement, we switched to benchmarks composed of higher ESG-rated companies for our active corporate credit and listed equities portfolios. For more information about our approach to ESG integration, see our publication "Responsible investments – The next steps in our journey", published in 2018 and available at swissre.com (www.swissre.com/ri-next-steps), as well as our 2019 brochure "Responsible investing – Our approach" (www.swissre.com/ri-our-approach).

At the 2019 UN Climate Summit in New York, the UN-convened Net-Zero Asset Owner Alliance (AOA) was launched. As a founding member of the AOA, we have committed to having a net-zero greenhouse gas investment portfolio by 2050 (www.swissre.com/un-climate-action-summit). We also joined the global Science Based Targets initiative and will develop science-based emission reduction targets (www.sciencebasedtargets.org). Our commitment also includes advocacy for measures aimed at a low-carbon transition of economic sectors.

As part of our dedicated approach towards climate risk management, we review our corporate credit and listed equities portfolios on an ongoing basis to track the development of our carbon footprint, as well as related forward-looking indicators. Additionally, we monitor our coal and oil sands-related investments that are below the set thresholds. As part of our active risk management, we stopped investing in coal and oil sands-related companies that are above the thresholds (for details, see page 157).

Further actions to support the transition to a low-carbon economy are described in the section "Opportunities for our investments" on pages 158–160.

Climate metrics and targets

We use a number of metrics and targets to assess and manage relevant climate-related risks and opportunities.

We assess and manage climate-related risks and opportunities in our re/insurance business (the liability side of our balance sheet), our own operations and our investments (the asset side of our balance sheet).

Re/insurance

Annual expected losses (AEL)

AEL for weather-related natural perils can be used as an indicator for our 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 intense natural catastrophe losses like in eg 2019, 2018 and 2017 (below table indicates our risk exposures to four major natural catastrophe scenarios, ie single-event losses with a 200-year return period). The AEL figures are the result of expected weather activities, the vulnerability of insured objects, their values and the volume and structure of our insurance products. Changes in the AEL figures will show the evolution of our climate risk exposure. This could be due to climate change, but also due to changes in the vulnerability of insured objects, their values or changes in our business strategy. AEL figures are updated on an annual basis.

The four weather-related perils with the highest gross AEL for our business as per the end of 2019 are indicated in the table to the right.

Weather-related catastrophes: insured vs uninsured losses

There is a substantial protection gap between total economic losses from weather-related catastrophes and insured losses in all regions. This data does not represent a company-specific metric but is an important overall risk indicator (see upper right table on page 165).

Climate protection offered to (sub-)sovereigns

In 2019, cover against natural catastrophes accounted for approximately 15% of premiums in our P&C Reinsurance business. As we regularly update our risk models to reflect any changes in the underlying parameters and renew contracts annually, we are in a position to offer our clients re/insurance protection against current climate-related risks.

Reflecting our efforts to help expand re/insurance protection by working with public-sector clients, we made a commitment to the United Nations to advise up to 50 sovereigns and sub-sovereigns on climate risk resilience and to offer them USD 10 billion of insurance cover against this risk by 2020. You can see the progress we have made against this goal in the middle table on page 165. We also made a commitment to the Insurance Development Forum (IDF), in line with the InsuResilience Vision 2025 goals. This includes delivering climate and other natural hazards risk modelling, developing risk transfer solutions as well as offering capacity for climate risk insurance to increase insurance protection for selected climate-exposed countries.

Aligning our carbon intensity

We have recently started to develop a carbon business steering mechanism. The introduction of our coal policy formed the first part of this. Additionally, in 2019, we began to work on a carbon footprint methodology, which was also conducted through the CRO Forum. Once finished, this will help us steer the overall carbon footprint embedded in our re/insurance businesses. Ultimately, it will support us in decarbonising our business model and in reaching net-zero emissions by 2050 on the liability side of our balance sheet, a goal that we committed to in 2019 by signing the UN Global Compact Business Ambition for 1.5°C, building on our earlier Paris Pledge for Action.

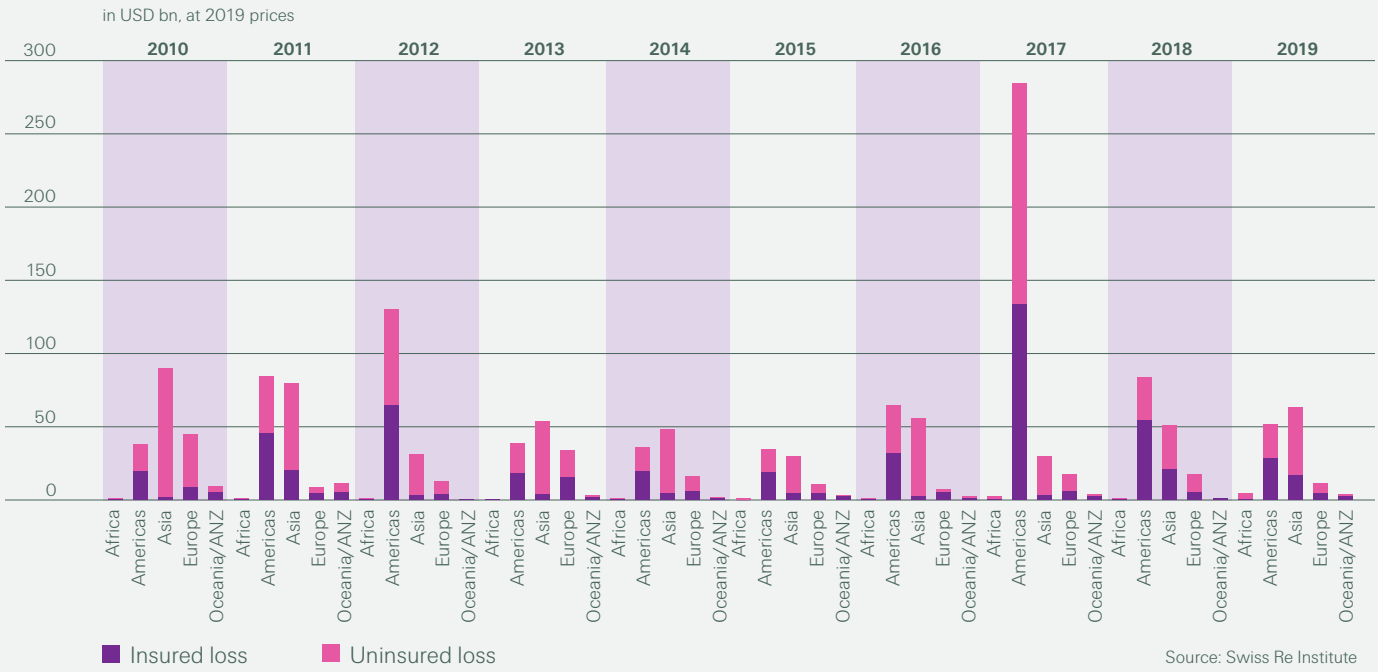
In 2019, we also took another important step in our carbon steering mechanism and developed a policy to shift away from high carbon intensity oil and gas production.

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

Weather-related perils: Annual expected losses, Swiss Re Group

As of 31 December 2019	In USD millions
North Atlantic hurricane	680
US tornado	220
European windstorm	150
Japanese tropical cyclone	140

Insured vs uninsured weather-related catastrophe losses, per region



Total climate protection offered to (sub-)sovereigns since 2014

	by 2017	by 2018	by 2019
Number of (sub-)sovereigns advised	66	96	120
Amount of climate protection offered (in USD)	5.3 billion	8.2 billion	10.0 billion

From July 2023, we will no longer provide individual insurance cover for those oil and gas companies that are responsible for the world's 10% most carbon intensive oil and gas production.

Investments

We measure and monitor the level of integration of our climate-related investment activities.

Green bonds

Green bond proceeds are used to finance environmentally sustainable projects and facilitate the transition towards a low-carbon economy.

By the end of 2019, we held USD 1.8 billion in green bonds. As part of our adaptation strategy, we expanded our mandate to also consider social and sustainability bonds. This enables us not only to support the environment, but also underserved groups or populations, thus generating a positive impact on society. Additionally, we increased the specific investment target to USD 4 billion, to be achieved by the end of 2024.

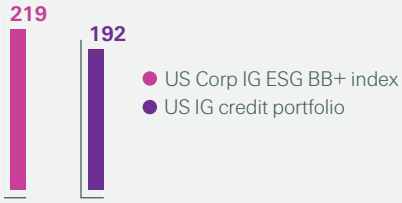
Absolute coal threshold

Coal assets are particularly carbon-intensive and susceptible to stranded asset risk given the long life of these assets, as well as the evolving regulations on carbon emissions. To ensure we actively manage such risks, we implemented an absolute coal threshold to identify large carbon emitters with a diversified business mix, where relative thresholds may provide inadequate guidance. Our willingness to tackle climate change challenges is reflected in our new, 2019 commitment to not invest in mining companies producing at least 20 million tonnes of coal per year and power utility generators with more than 10 gigawatts of installed coal fire capacity.

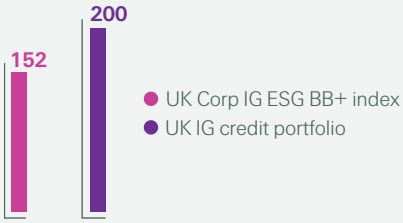
Carbon footprint of our investment portfolio

In line with TCFD guidelines, we monitor the carbon footprints of our corporate credit and listed equity portfolios on an ongoing basis as we have extended our internal tools to allow for interactive day-to-day analysis. We also monitor any coal-related activities in our private equity investments. For the carbon footprint, we use the metric "weighted average carbon intensity", which defines the portfolio carbon intensity based on relative investment share.

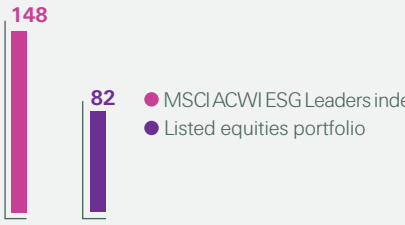
The US credit portfolio remains below its corresponding benchmark in terms of weighted average carbon intensity, given its continued underweight in high carbon intensity names after divestments in the energy and materials sector.

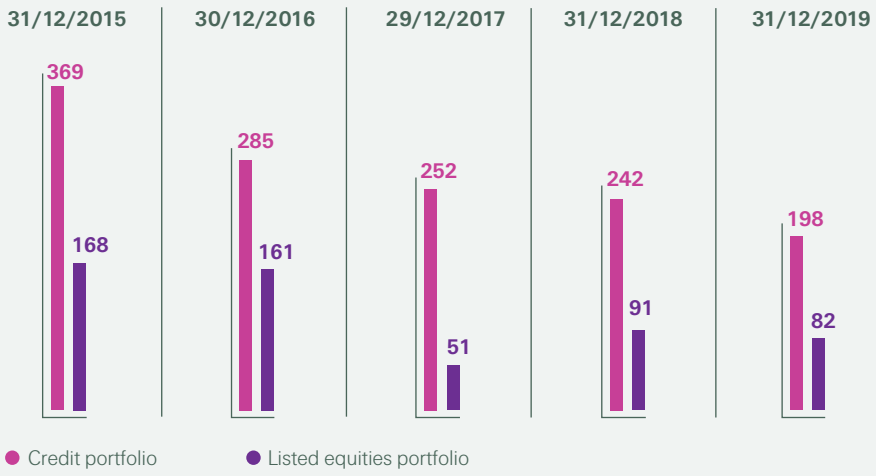


Since 2018, the UK credit portfolio carbon intensity decreased, whereas the index carbon intensity remained approximately stable.



The portfolio of listed equities continues to be significantly less carbon-intensive compared to the corresponding benchmark due to its focus on high quality companies with low-carbon intensity. Moreover, in 2019, the carbon intensity decreased as a result of the portfolio optimisation.





Since the end of 2015, carbon intensities in both the corporate credit and the listed equities portfolios decreased substantially as part of our fossil fuel divestment of more than USD 1.4 billion. In 2019, carbon footprints for both portfolios, the corporate credit and listed equities, further decreased.

Forward-looking carbon indicators
Companies may mitigate exposure to climate risk through adaptation to market forces or adherence to new and evolving requirements. In 2019, we therefore extended our capabilities further to analyse the impact of climate risk on investments, advanced our analytical toolset, and improved our monitoring of related risks and opportunities. For the corporate credit and listed equities portfolios, we focused on the most carbon-intensive sectors that are responsible for the vast majority of the portfolio carbon intensity.

The forward-looking indicators that form the basis of the climate risk analysis have been extended and refined. The extensions and refinements allow us to analyse climate risk-exposed industries down to the issuer level, which provides an important additional dimension to our carbon intensity analysis. These forward-looking indicators inform us about the preparedness of companies for a transition to a low-carbon economy, and identify potential leaders and laggards in such a transition.

Many issuers have set carbon reduction targets and are actively working towards lowering their energy consumption, which we consider an encouraging development. The analysis also shows that a transition to a low-carbon economy may be challenging and costly.

Swiss Re Group Scope 1, 2 and 3 greenhouse gas emissions
Reducing our operational carbon footprint is an important part of our Group Sustainability Strategy. As part of our Greenhouse Neutral Programme, we have publicly reported on our Scope 1 and 2 greenhouse gas emissions, plus a major source of Scope 3 emissions (business travel) since its launch in 2003. From 2013, we have expanded our reporting to include further Scope 3 emissions (see table below).

You can find out more about the Greenhouse Neutral Programme in our 2019 Sustainability Report, pages 58–61.

Additionally, in 2019, Swiss Re committed to reduce its operational CO_2 footprint to net-zero emissions by 2030. In 2020, we will start by reducing our air travel emissions by at least 15%, with further reduction ambitions planned. At the same time, we are moving from buying conventional carbon offsets to supporting carbon removal projects to compensate any unavoided emissions. Carbon removal is a new form of emission compensation that extracts CO_2 out of the atmosphere and stores it permanently. This is a necessary prerequisite for reaching any net-zero emissions target, including the Paris Agreement.

CO_2 emissions per employee (full-time equivalent, FTE), Swiss Re Group

		2013 kg/FTE	2018 kg/FTE	**2019 kg/FTE**	Change in % since 2018	Change in % since 2013
Scope 1	Heating	378	244	**210**	–13.8	–44.4
Scope 2	Power[1]	824	584	**472**	–19.1	–42.7
Scope 3	Business travel	3 713	3 892	**3 842**	–1.3	3.5
	Copy paper	40	16	**13**	–15.7	–66.3
	Waste	50	33	**28**	–13.7	–43.1
	Water	12	11	**8**	–23.7	–30.1
	Technical gases	27	6	**52**	764.3	92.1
	Commuting[2]	1 250	1 000	**1 000**	0.0	–20.0
Total		6 294	5 786	**5 627**	–2.7	–10.6

[1] Calculation based on a market-based approach taking into account the purchase of renewable energy instruments, with the exception of the UK, where the government requires companies to report an average grid factor.
[2] Commuting data are gathered biannually by means of a survey. The figures are rounded and fraught with considerable uncertainty.