

Risk Management

Managing sustainability and climate risks

At UBS, sustainability and climate risk is defined as the risk that UBS negatively impacts, or is impacted by, climate change, natural capital, human rights, and other environmental, social and governance (ESG) matters. Sustainability and climate risks may manifest as credit, market, liquidity and/or non-financial risks for UBS, resulting in potential adverse financial, liability and/or reputational impacts. These risks extend to the value of investments and may also affect the value of collateral (e.g., real estate). Climate risks can arise from either changing climate conditions (physical risks) or from efforts to mitigate climate change (transition risks). Physical and transition risks from a changing climate contribute to a structural change across economies and, consequently, can affect banks and the financial sector through financial and non-financial impacts.

The firm's Sustainability and Climate Risk (SCR) unit (part of Group Risk Control), manages material exposure to sustainability and climate risks. It also advances our firmwide SCR initiative to build in-house capacity for the management of sustainability and climate-related risks.

› **Refer to the "Appendix 3 – Risk management" section of this report for a full description of our sustainability and climate risk policy framework**

Our SCR initiative follows a multi-year roadmap. It is designed to integrate sustainability and climate risk considerations into our firm's various traditional financial and non-financial risk management frameworks, and related policies and processes. This is necessary to meet expectations regarding the management of sustainability and climate risks and to deliver on climate stress-test exercises. Our roadmap is configured to address current and emerging regulations and builds capacity through expertise and collaboration, for example, structured engagement with internal and external stakeholders (e.g., our Group Compliance, Regulatory & Governance (GCRG) function, for non-financial risks) and pertinent experts.

Our SCR initiative has been set up to address risks across our firm's business divisions and legal entities. In 2022, it monitored emerging sustainability and climate risk regulation, engaged with select regulators for deep-dives, further advanced efforts toward the goal of full integration of sustainability and climate risk into our firm's traditional risk management frameworks and stress-testing capacity. Further developments included the introduction of sustainable product guidelines, building new capacity to centrally structure, acquire, and deploy ESG data across the firm, and further refining governance and methodologies driving ESG reporting and disclosure.

Sustainability and climate risk management framework

We currently identify and manage sustainability and climate risks in our operations, balance sheet, clients' assets, and our supply chain.

In 2022, we continued to methodologically integrate sustainability and climate-related risk considerations into the firmwide risk management framework to protect both our clients' and our own assets from climate-related risks. As shown below, this work comprised: (i) risk identification and measurement; (ii) monitoring and risk appetite setting; (iii) risk management and control; and (iv) risk reporting processes.

We are implementing the sustainability and climate risk management framework in line with the multi-year roadmap to integrate sustainability and climate risk into our financial and non-financial risk frameworks and related processes. The development of new and enhanced tools and methodologies in 2022 supports our firm, front-to-back, in these integration efforts.



Sustainability and climate risks are identified and integrated in the Group risk identification process

- Annual sustainability and climate materiality¹ assessment
- Climate risk heatmaps¹
- Climate scenario analysis and stress test exercises, including the development of an in-house framework²
- Sustainability and climate risk scorecard³



Key sustainability and climate risk considerations are included in internal and external reporting

- Expand scope and automation of periodic risk reports⁴
- Further align external disclosures¹ with TCFD



Sustainability and climate risk exposures are monitored and metrics reported internally to enable risk appetite setting

- Disclose and enhance sustainability and climate risk metrics¹
- Qualitative climate risk appetite¹
- Quantitative climate risk appetite³



Management and control processes ensure that material sustainability and climate risks are identified, measured, monitored and escalated in a timely manner

- Integrate sustainability and climate risk into policies and processes⁵
- Build in-house capacity, including training⁵
- Centralize and execute ESG data strategy⁵



Related toolkit

¹ Partially implemented, externally disclosed, further development underway.

² Historic scenario assessments disclosed, scenario analysis and stress test framework development underway.

³ Under development.

⁴ Partially implemented, internally reported, further developments underway.

⁵ Climate risk-specific controls, integration, and capacity building are ongoing with further development underway.

Integrating sustainability and climate risk into other risk categories – our ambition

In 2022, we further embedded physical and transition risks into our climate risk management framework. As part of the integration of climate in credit risk, we are developing a playbook to help the business divisions integrate climate into processes, policies and frameworks. This approach is also under development for market risk.

We also established a data model and a business process for scoring sustainability and climate risk at the company and asset levels, across a range of materially relevant types. These types are included in the table below, describing how sustainability and climate risks may transmit financial and non-financial risks to UBS, across a variety of counterparty and asset types.

Climate risk transmission to financial and non-financial risk				
Overview	Credit risk	Market risk (traded and non-traded)	Non-financial risk (NFR)	Reputational risk
<p>Transmission of sustainability and climate risk drivers, including transition, physical, and nature-related risks, through counterparties, collateral, and macro shocks impacting UBS.</p> <p>Amplified or mitigated sectoral, jurisdictional and/or geographic concentrations or structural product considerations.</p>	<p>Financial impact to UBS from climate policies, low-carbon technologies, and/or demand shifts impacting UBS counterparties' credit worthiness and/or value of collateral held by UBS. Risk drivers may affect:</p> <p>(i) counterparties, including private individuals, corporate entities, investment vehicles or sovereign entities; (ii) counterparties' ability to service and repay debt to UBS; and (iii) market and/or lending value of collateral held by UBS supporting credit agreements and the ability to fully recover potential losses in the event of a default.</p>	<p>Financial impact to UBS from price shocks and/or market volatility, climate policies, low-carbon technologies, demand shifts and/or market perception impacting the value of UBS's positions and/or leading to a breakdown in correlations between risk factors or a change in market liquidity.</p> <p>Includes UBS's positions and/or assumptions held by UBS (correlations) regarding real estate, equities, debt, commodities and FX and their related liquidity.</p>	<p>Non-financial impact to UBS (compliance, operational risk and financial crime) from inadequate or failed internal processes, people and systems and/or externally by physical climate events or stakeholder legal action impacting UBS through increasing business continuity, legal and regulatory compliance risk associated with climate-sensitive investments and businesses.</p>	<p>Risk of unfavorable perception or decline of UBS's reputation from the point of view of clients/industries, shareholders, regulators, employees, or the general public which may lead to potential financial losses and/or market share.</p> <p>Is considered in all business activities, transactions, and decisions and as such regarded as an impact.</p>

The table below outlines UBS's vision on how key sustainability and climate risk considerations may be integrated into financial and non-financial risk frameworks.

Vision of overall approach				
Risk management process	Credit risk	Market risk (traded and non-traded)	Non-financial risk (NFR)	Reputational risk
Systematically integrate sustainability and climate risks into the firm's risk identification processes and stress testing framework				
Risk identification and measurement	<p>Transition and physical risk ratings (including company/asset-level scorecards and industry-level heatmaps) enable UBS to assess and monitor material concentrations of exposure to climate risk, including sensitive geographies, sectors and counterparties.</p> <p>Climate risk scenario analysis and stress testing enables UBS to assess risks along different pathways of climate change. This includes the assessment of a range of scenarios with different severities.</p> <p>The scenarios' climate-related macroeconomic, financial, and other variables reflect different levels of physical and transition risk across time horizons up to 30 years. Climate risk stress models translate the scenarios into capital and risk-weighted asset (RWA) impacts where appropriate.</p>	<p>Progressive study of market-based responses to climate risk drivers enables UBS to identify new transmission channels of market risk impacts.</p> <p>Integration of risk ratings to enable risk identification through monitoring potential impact on the value of UBS's positions that may be materially affected by climate-risk-driven price and/or volatility shifts.</p> <p>Custom climate stress modeling enabling UBS to quantify potential losses from changes in market variables, such as interest rates, credit spreads, equity and commodity prices, as well as correlations and volatility. This could include approaches like applying instantaneous stress shocks for climate-specific scenarios.</p>	<p>Assess NFR implications across compliance, financial crime, and operational risk taxonomies including business continuity risk to enable UBS to identify potential deficiencies in internal processes or vulnerabilities to external events.</p>	<p>Clients, new transactions, products and services go through standard review and decision processes prior to UBS conducting business. These processes, in addition to day-to-day risk management, support the identification, assessment and escalation of potential reputational risk.</p> <p>Design and operating effectiveness of the framework relies on inclusion of climate-related risk management processes embedded in the step 1 frameworks below, examples include:</p> <ul style="list-style-type: none"> – Client onboarding (Financial Crime Prevention / Anti-Money Laundering / Know Your Customer); – Sustainability and climate risks; – Suitability and appropriateness review; – New business and complex transaction approval processes; – Third-party risk management and outsourcing and offshoring processes.

Execution of BoD- and GEB-defined risk appetite for sustainability and climate risks, based on identified material risks

Monitoring and risk appetite setting	<p>Integration of climate-related risks (quantitative) into the firm's risk appetite framework, including, but not limited to, climate-related credit limits (considering materiality thresholds), based on risk rating methodologies, at sectoral, geographic and/or divisional levels, and/or carbon budgets and utilization aligned with UBS net-zero implementation targets.</p> <p>Ongoing monitoring of potential new transmission channels of climate-related credit risks to UBS.</p>	<p>Integration into market risk monitoring processes reflecting insights from risk identification and ongoing assessment of exposure developments to industry sectors, sovereign debt, commodity prices, foreign exchanges rates and interest rates.</p> <p>Setting risk appetite against potentially identified material climate-sensitive exposure to sectoral, geographic and/or asset type and timely escalation of potential concentrations.</p>	<p>Monitoring and tracking of global climate-related regulations enabling UBS to understand and anticipate impacts to current operations, such as those addressing greenwashing risks or central bank supervisory expectations. Including dynamic assessment processes to reflect evolving regulatory developments and changes in business activities.</p>	<p>UBS's Risk Appetite Framework ensures that risk-taking at every level of the organization is in line with the firm's strategic priorities, capital and liquidity plans, as well as our pillars, principles and behaviors. The framework takes a comprehensive approach, integrating all material risks across the firm and is designed to protect UBS's franchise and reputation.</p> <p>Established processes within the step 1 frameworks ensure consistent assessment, monitoring and escalation of reputational risk.</p>
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Quantitative and qualitative sustainability and climate risk principles integrated into risk management frameworks and processes

Risk management and control	<p>Integration of climate risk considerations into the credit lifecycle, including onboarding, deal review, collateral valuation and periodic credit processes, enable UBS to mitigate the potential for climate-related credit losses.</p> <p>Driven by standard methodologies (e.g., scorecards), and potential quantitative integration into probability of default, loss given default, risk-weighted asset or qualitative integration into decision-making.</p> <p>Mitigants may include the setting of limits to control or minimize material climate-related credit risks, portfolio management measures (e.g., hedges) and/or of business acceptance criteria.</p>	<p>Integration of climate-related market risk appetite into how UBS controls market risk, which may include assessing climate risk considerations into management systems and processes to mitigate loss potential.</p> <p>Iterative feedback and learning loops between market, credit and liquidity risk management approaches to progressively challenge existing risk control measures.</p>	<p>Embed ESG factors into NFR assessment and control frameworks including enhancements to new business initiatives, client onboarding, oversight of marketing materials related to sustainability, business continuity planning adaptations and/or minimum product standards of sustainability characteristics.</p>	<p>On-going review of the framework design and operating effectiveness and ESG controls embedded in key processes, such as new business controls, suitability, and appropriateness reviews, monitoring and surveillance activities, enables UBS to continuously evolve its reputational risk management capacity.</p>
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Dashboards on climate-driven risk insights, internal and external reporting on climate risk management framework status

Risk reporting and disclosure	<p>Timely reporting of material changes in climate-credit and market-risk identification, quantification, monitoring, utilization of risk appetite, and/or key risk management and control decisions to key decision-makers in UBS (e.g., senior management), reflecting and based on latest-available advanced ESG data and methodologies.</p> <p>Periodic climate-related credit and market risk metrics (e.g., climate-driven delta risk or expected credit loss from climate-sensitive loans) are integrated in standard internal risk reports for example at the Group, significant Group entities, and/or business divisional levels.</p> <p>Automation of risk metrics into external disclosure processes, accompanied by materially relevant information on climate risk identification, monitoring (e.g., new transmission channels), exposure trends and mitigating actions.</p>	<p>Roll-out independent ESG data assurance to our Sustainability Report initially (to be extended to other Sustainability Dashboard metrics on risk-based approach over time) and SOX 302 style certification by senior management on our Sustainability Report.</p>	<p>A consolidated view across the Group of all high inherent reputational risks cases that have been raised through the reputational risk review process is provided as inputs into the Group Risk Report on a quarterly basis.</p>
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Our plan for liquidity risk

We aim to integrate identified material risks into our internal liquidity risk management framework. We recognize climate risk drivers may transmit to liquidity adequacy through our ability to raise funds, liquidate assets, or indirectly through our customers' demands for liquidity (e.g., given a market or physical climate shock).

We plan to assimilate insights gained from our efforts to quantify and integrate climate-related credit and market risks, to collectively determine how liquidity risks may be more accurately captured. We see the integration of climate risk into the liquidity risk management (as with other climate-driven risks) as an iterative, improving the quality of data, analytics and insights over time, as further described in the "ESG data" section below.

Note: As climate risk analysis is a novel area of research, with methodologies, tools and data availability still evolving, we will continue to develop our risk identification and measurement approaches.

Integrating sustainability and climate risk into other risk categories – progress in 2022

Credit risk

As part of the integration of climate considerations in credit risk, we began designing an internal playbook to guide business divisions on UBS-specific best practices for integrating climate into processes, policies and frameworks. We established a baseline of climate-credit impacted processes and procedures for the Group and business divisions and began discussions towards adapting existing controls to reflect climate considerations.

We conceptualized a company-/asset-level sustainability and climate risk scorecard (i.e., a climate and environmental risk rating addressing transition risk, physical risk and nature-related risk) at the level of counterparties and assets (e.g., issuers and real estate collateral, amongst other types). To enable implementation, we further enhanced methodologies for climate risk drivers and began a firm-wide development of supporting IT infrastructure, data process modeling, prototyping with select and material portfolios, and business process integration.

We also identified new climate risks for Personal & Corporate Banking's cash-flow-based lending and the Investment Bank's commercial lending portfolios and modelled additional non-realized credit losses of a minor scale associated with the impact of climate change and climate change policy. By expanding the climate risk heatmap methodology to cover traded products, issuer risk and collateral we identified potential concentrations of climate risk on a broader scope of our firm's balance sheet. We systematically monitored climate-sensitive sectors for the potential increase of exposure to sectors that may be prone to higher default rates and/or devaluation.

In line with the risk appetite set by our Board of Directors (the BoD) pertaining to net zero, we established a quantified risk appetite in key sectors, achieved with a novel carbon budgeting and utilization methodology. The risk appetite was syndicated with the Chief Risk Officers (CROs) of Personal & Corporate Banking and the Investment Bank and ratified by the Group Executive Board (the GEB) for implementation in 2023.

Market risk (traded and non-traded)

A working group of cross-divisional market risk experts is developing methodologies to assess potential for concentration of climate-related market risks and examining our firm's assumptions on market risk correlations and liquidity. We conducted an initial analysis to assess the sensitivity of industry sectors in our firm's balance sheet to transition risk, which helped define data-sourcing requirements vis-à-vis market risk infrastructure. Issuer and methodological coverage of a range of external ESG data providers has been analyzed in relation to climate-related market risk transmission channels. In addition, we gave market-risk-relevant design input for internal baseline and adverse climate stress scenarios. This included a 2023 plan to design instantaneous shocks for market-risk-relevant stress of our firm's balance sheet while accounting for structural product considerations and time horizons.

Non-financial risk

We enhanced the Group-wide regulatory tracking process to incorporate relevant coverage for sustainability- and climate-related changes to laws, rules and regulations across global jurisdictions. Sustainable product guidelines (for bonds, lending and investments) and greenhouse gas (GHG) emissions trading guidelines were provided for implementation in 2023. We also implemented new environmental crimes dimensions in the financial crime prevention (FCP) country risk model, which feeds into processes such as client risk rating and risk appetite monitoring. Updates to our New Business Initiative process included ESG / sustainable investing product considerations in business submission and associated control function assessments. Additionally, we assessed the impact from climate-related operational disruptions (e.g., physical climate disruptions) into our business continuity management (BCM) and operational resilience framework.

Reputational risk

We assessed the design of the reputational risk framework to be generally robust in terms of roles and responsibilities, escalation requirements, as well as review and approval authorities for sustainability-related risks. The reputational risk dashboard now captures the key risk indicators on a quarterly basis including Financial Crime Prevention, Sustainability and Climate Risks, Client Complaints, New Business, Reputational Risk Cases metrics.

ESG data

To support the SCR initiative's efforts on risk management adaptation, and the firm's broader business interests in sustainable products and services, we established a centralized governance and related process for ESG data procurement and management. A newly formed team is mandated to ensure consistency and controlled deployment throughout the Group. To support these efforts, the SCR initiative managed the comprehensive range of ESG data requirements across risk methodology. We did this by engaging relevant model owners and vetting data providers against a rigorous rubric and were therefore able to reduce redundancies and streamline inputs for credit, market, treasury, and liquidity risk stress models. This effort culminated with most major data providers coming online towards the end of 2022, with some procurement processes in late-stage sign-offs.

Sustainability and climate risk identification and measurement

UBS considers sustainability and climate-driven risk drivers from changing climate and/or environmental conditions (physical and/or nature-related risks). These risk drivers expose banks and the broader financial system to climate and environmental change through both micro- and macroeconomic transmission channels.

By combining expert and industry-based views of how sustainability and climate risks may transmit into financial (e.g., credit losses) and non-financial impacts (e.g., operational disruptions), and with UBS-specific product information, we developed an in-house materiality-driven approach to climate risk identification and applied it across all products, services and operations.

On an annual basis, our SCR unit coordinates and updates a systematic materiality assessment of sustainability and climate-driven risks, in accordance with the ISO 14001 standard. In 2022, our SCR unit further advanced the materiality assessment methodology, leveraging internal and external expert guidance (e.g., by the Basel Committee on Banking Supervision). The assessment was designed to include climate and nature-related risk considerations, incorporate quantitative measurements (e.g., heatmap outcomes), and adapt to transmission channels identified as of December 2022. This includes income and wealth impacts on our own assets and/or counterparties, such as households, corporate clients or sovereign clients, subsequently affecting their value and/or creditworthiness; and science- and business-based ratings of transition, physical, and nature-related risks (e.g., climate-risk-driven scoring of our own assets and counterparties and heatmapping).

› Refer to the “Appendix 2 – Strategy” section of this report for details about our climate-related materiality assessment

UBS approaches climate risk identification by integrating climate risk drivers, expert-based views on their transmission channels, and climate risk methodologies (e.g., risk scores and heatmaps). This enables a materiality-driven approach to climate risk management.

We aim to systematically identify sustainability and climate risks at divisional and cross-divisional levels, both through the sustainability and climate risk-driven materiality assessment described above, and increasingly through their integration into the firm-wide traditional risk identification process. This is also applied to significant Group entities under UBS Group AG. These climate risk methodologies help us take a materiality-driven approach, directly structuring our climate risk management strategy by:

- identifying concentrations of climate-sensitive exposure that have higher than average vulnerability to climate risk drivers;
- allowing UBS to prioritize resources with respect to detailed risk analysis and management actions;
- supporting the delivery of a client-centric business strategy where our firm supports clients with climate transition (i.e., adaptive) finance, identifying clients that could benefit from related UBS products and services; and
- providing information to senior management to support decision making at all stages of credit granting, market making, and investment selection processes, along with decision-useful information in our external disclosures to stakeholders.

Transition risk heatmap

Transition risk covers the adjustment to an environmentally sustainable economy, including changes in public policies, disruptive technological developments and shifts in consumer and investor preferences.

Our transition risk heatmap methodology is based on a risk-segmentation process, dividing and rating economic sectors and industry sub-segments that share similar risk vulnerability characteristics.

These are then scored and rated according to their vulnerability to climate policy, low-carbon technology risks and revenue or demand shifts under an immediate and ambitious approach to meeting the well-below-2°C Paris goal. We are able to use these risk ratings to support identification of potential climate-sensitive concentrations. The ratings in the heatmap are bands of scores (from 0 to 1), and reflect the levels of risk that would likely occur under an ambitious transition (in a short-term time horizon).

The current transition risk heatmap shows that our exposure to activities rated as having high, moderately high or moderate vulnerability to climate transition risks is relatively low (as a percentage, in 2022 compared with 2021). Most year-on-year fluctuations (2021 to 2022) were in the energy sector, specifically in oil and gas midstream and downstream segments, caused by rising energy prices, as the Russia–Ukraine war tightened global energy supply. Despite these fluctuations, we have continued to reduce our exposure to climate-sensitive sectors.

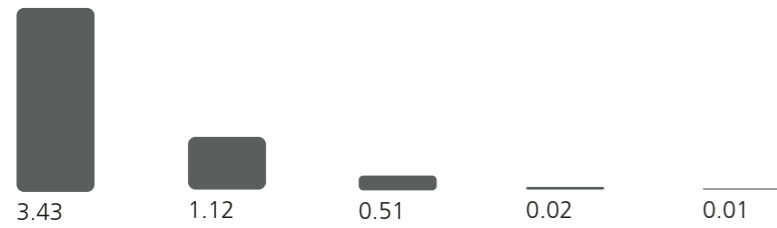
Climate risk heatmap (transition risk)^{1,2}

In USD billion

5.08

Moderately high

Industrials Fossil fuels Utilities Real estate Agriculture



Industrials

1.90	Pharmaceuticals
1.02	Chemicals
0.51	Cement or concrete manufacture

Fossil fuels

0.54	Wholesale/trade: crude oil and natural gas
0.40	Integrated oil and gas
0.11	Conventional oil (on-/offshore)
0.08	Gas processing (incl. LNG)

Utilities

0.51	Electricity from high-carbon fuels (regulated)
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Real estate

0.02	Commercial real estate
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Agriculture

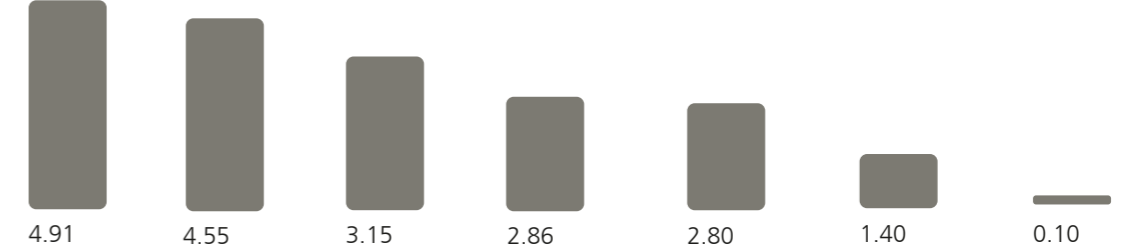
0.01	Livestock – beef extensive grazing
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0.02
High
Fossil fuels
0.02 Shale gas
0.00 Refining and marketing

19.77

Moderate

Fossil fuels Industrials Real estate Transportation Metals and mining Agriculture Utilities



Fossil fuels

4.70	Wholesale/trade: refined petroleum products
0.21	Downstream oil and gas distribution
0.00	Transportation and storage (gas)

Industrials

2.62	Machinery and related parts manufacturing
1.00	Consumer durables manufacturing
0.93	Plastics and petrochemicals manufacture

Real estate

1.76	Construction of buildings and related activities
1.39	Commercial real estate

Transportation

1.70	Airlines – cargo
0.49	Land-based shipping (trucks)
0.48	Transportation parts and equipment supply
0.10	Autos, high-carbon (few EVs, many SUVs)
0.06	Airlines – commercial
0.02	Sea-based shipping, high-carbon

Metals and mining

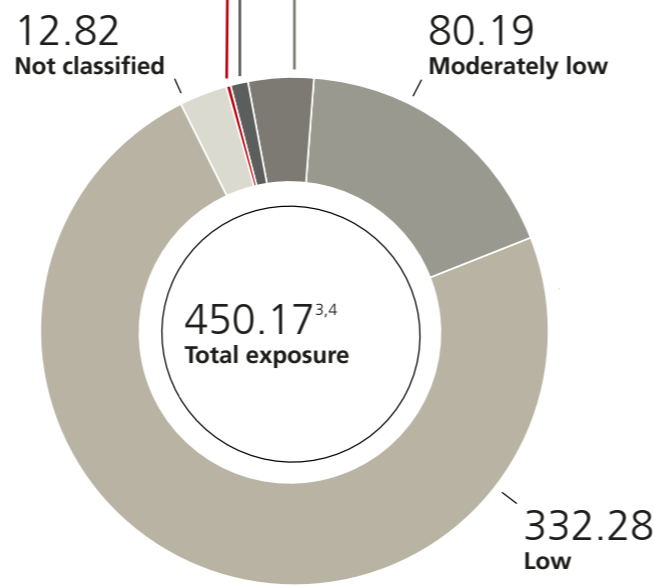
2.44	Conglomerates (incl. trading)
0.26	Production of other mined metals and raw materials
0.09	Production of steel/iron

Agriculture

1.40	Food and beverage production
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Utilities

0.08	Wastewater treatment
0.02	Electricity from moderate-carbon fuels (regulated)



¹ Consists of total loans and advances to customers and guarantees, as well as irrevocable loan commitments (within the scope of expected credit loss), and are based on consolidated and standalone IFRS numbers.

² Climate-related risks are scored between 0 and 1, based upon sustainability and climate risk transmission channels, as outlined in the Methodology Appendix. Risk ratings represent a range of scores across, 5 risk rating categories: low, moderately low, moderate, moderately high, and high. Climate-sensitive exposure metric is determined based upon the top 3 out of 5 rated categories: high to moderate. Sectors, such as fossil fuels, are further segmented to categories reflecting a range of risk vulnerabilities from high to moderate, within the sensitive sector.

³ Total exposure calculation is subject to rounding to two decimal places, hence potential deviation from actual.

⁴ Methodologies for assessing climate-related risks are emerging and may change over time. As the methodologies, tools, and data availability improve, we will further develop our risk identification and measurement approaches, including updated geospatial analysis of properties securing financing with UBS (real estate) and better understanding how private lending (e.g., Lombard) activities may result in direct financial impacts to UBS. Not classified represents portion of UBS business activities where methodologies and data are not yet able to provide a rating. Lombard lending rating is assigned based on the average riskiness of loans.

Physical risk heatmap

Physical risk arises from the impact of weather events and long-term or widespread environmental changes.

Our physical risk heatmap methodology groups corporate counterparties based on exposure to key physical risk factors, by rating sectoral (sectoral average risk distribution), geographic (vulnerability and adaptive capacity) and value chain (sectoral average risk distribution) vulnerabilities in a climate change trajectory, in which no additional policy action is taken. These are then scored for the potential for financial loss in the short-term time horizon.

Ratings from low to high are based on a weighted average score (from 0 to 1), given by double-weighting sector and geography, and single-weighting value chain. Scores are given by the following inputs:

- the counterparty's sectoral activity (e.g., primary energy extraction presents higher physical risks than banks due to its average geographic footprint and vulnerability to financial losses in the short term from physical risk hazards);
- the counterparty's geographical location (e.g., countries in Southeast Asia tend to be higher risk than those in Western Europe, with some exceptions reflecting the potential for national economic resilience and subsidy to economic activities threatened by climate change); and
- the potential disruption to a counterparty's value chain, where relevant, (both its supply chain and distribution channels again reflecting the sectoral average geographic footprint and vulnerability).

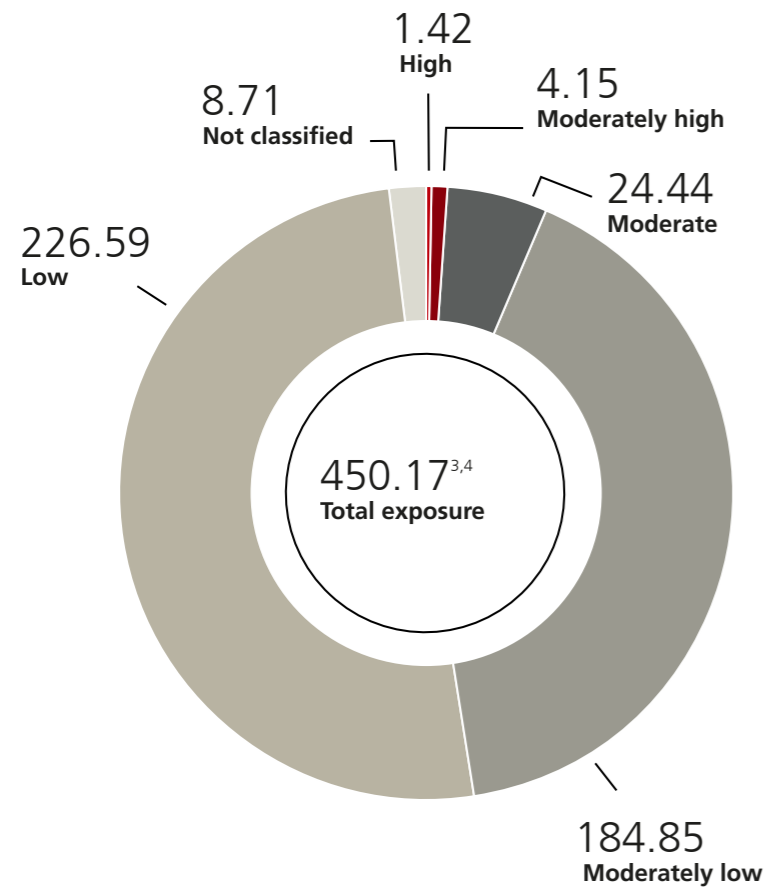
We will continue to enhance our methodology in 2023, with relevant subject matter experts (e.g., country risk experts) and enhanced vendor data sources (e.g., systematic integration of geospatial tools and data).

Our current physical risk heatmap shows that we have relatively low exposure to activities rated as having high, moderately high or moderate vulnerability to physical climate risks. Key concentrations of exposure include high volumes of real estate lending in Switzerland. Most of our lending is to the financial sector, which by its nature has a lower physical climate risk. Key exceptions are lending to property insurance companies or lending in higher-risk regions, such as South Asia.

The chart below shows the location-specific risk distribution compared with the spread of physical risk across sectoral risk ratings versus country (risk domicile, see above) risk ratings. The size of the circle indicates the relative lending exposure.

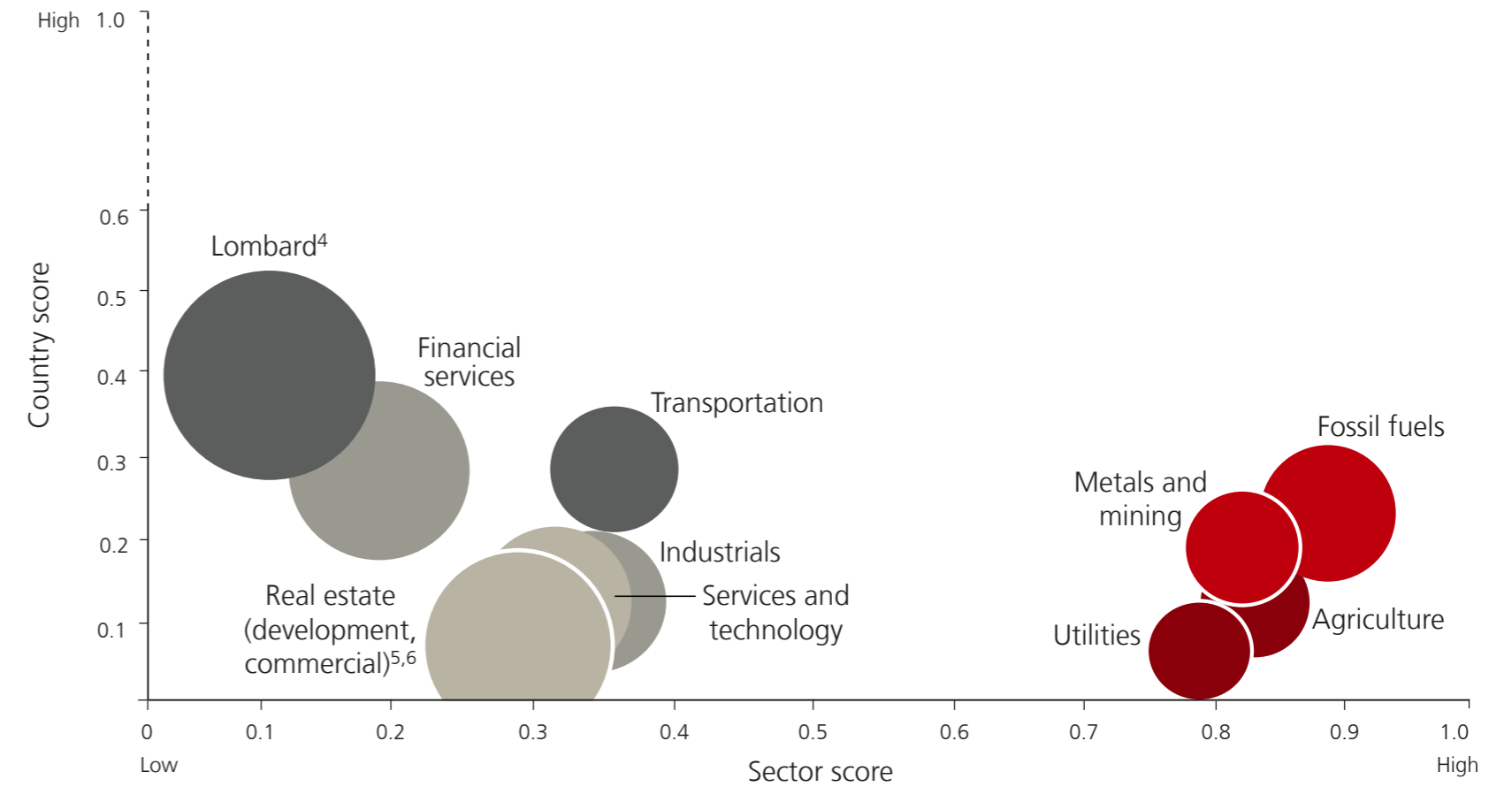
Climate risk heatmap (physical risk)^{1,2}

In USD billion

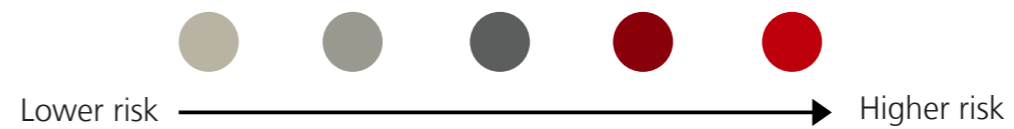


Physical risk by sector and geographic (country) scores

Marker size indicates relative exposure magnitude



Average country and sector score



¹ Consists of total loans and advances to customers and guarantees, as well as irrevocable loan commitments (within the scope of expected credit loss), and are based on consolidated and standalone IFRS numbers.

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⁵ Residential real estate is not given a sector score, therefore not included in this chart, however, is rated "low" based on periodic geospatial analysis.

⁶ UBS has identified select properties in its portfolio that are vulnerable to acute climate hazards, however portfolio-level risks are inherently low, given the integration of such information into UBS's loan underwriting processes.

Nature-related risk

Since 2021, our firm has been a member of the Taskforce on Nature-related Financial Disclosures (the TNFD). The TNFD is a market-led, science-based and government-backed initiative. It was formed to develop a risk management and disclosure framework for organizations to report and act on evolving nature-related risks, with the aim of supporting a shift in global financial flows away from nature-negative outcomes and toward nature-positive outcomes.

Since 2018, we have also been a member of the UNEP-FI working group to develop a natural capital dependency and impact methodology, also known as Exploring Natural Capital Opportunities, Risks and Exposure (ENCORE). In 2022, UBS piloted a new quantification approach for natural capital risk based on nature-related dependency data in the Exploring Natural Capital Opportunities, Risks and Exposure (ENCORE) tool developed by the Natural Capital Finance Alliance (the NCFA) and the World Conservation Monitoring Centre (the UNEP-WCMC). The nature-related risk metric measures our exposure to nature-sensitive economic sectors that are vulnerable to financial impacts caused by the disruption of ecosystem services.

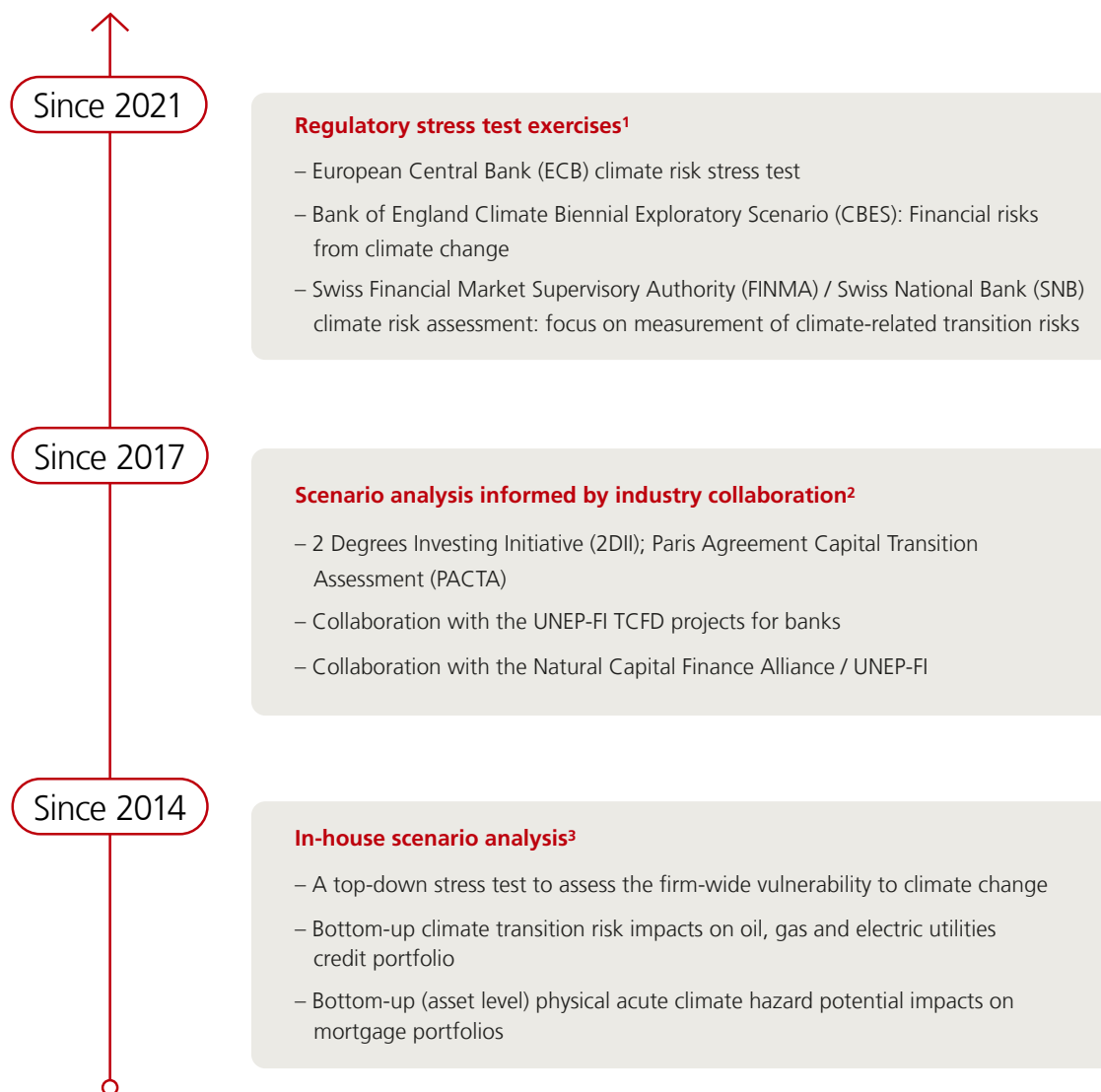
The ENCORE tool assigns a materiality rating to production processes to assess their potential dependencies on ecosystem services. The dependency ratings range from high to low and consider the potential loss of functionality of a production process and financial loss, if an ecosystem service is disrupted. Our SCR unit has assigned each primary industry code (GICS) a mapping to an ENCORE-specific production process (or its closest proximate process), subject to three rounds of subject matter expert review and challenge. The maximum rating of a group of production processes (defined as an ENCORE-specific subsector) then defines the dependency rating for each industry code. Exposure values are then aggregated and summarized by rating. Risk ratings from ENCORE are translated to integral scores and scored based on a normalized cumulative distribution function.

Our pilot nature-related risk metric shows that the Group-wide lending exposure of corporate counterparties to sectors with moderate or high-risk ratings for nature-related risk is relatively low, at 9.8%. The table under climate risk monitoring and risk appetite shows the nature dependency risk ratings and exposure by sector.

› Refer to the “**Appendix 3 – Risk management**” section of this report for more on our approach to nature

Climate scenario analysis

We use scenario-based approaches to assess our exposure to physical and transition risks stemming from climate change. We have introduced a series of assessments performed through industry collaborations in order to harmonize approaches for addressing methodological and data gaps. We have performed top-down balance sheet stress testing (across the Group), as well as targeted, bottom-up analysis of specific sector exposures covering short-, medium-, and long-term time horizons.



¹ Please refer to *Regulatory scenario analysis and stress test exercises*.

² Please refer to *Scenario analysis informed by industry collaboration*.

³ Please refer to *In-house scenario assessments* in our Sustainability Report 2021.

Note: Climate risk analysis is a novel area of research, and, as the methodologies, tools, and data availability improve, we will further develop our risk identification and measurement approaches.

› Refer to the “Appendix 3 – Risk management” section of this report for details on our climate scenario analysis, and to our Sustainability Report 2021, pages 52–53.

Regulatory scenario analysis and stress test exercises

UBS first participated in regulatory scenario analysis and stress test exercises in 2021, namely the Bank of England (BoE) 2021 Climate Biennial Exploratory Scenario (CBES): Financial risks from climate change; and the Climate Risk Stress Test (CST) of the European Central Bank (the ECB).

For the 2021 CBES exercise, the BoE used exploratory scenarios to investigate a range of climate risks stemming from climate change. The CBES exercise consisted of three 30-year climate risk scenarios, with varying degrees of severity (early policy action, late policy action and no additional policy action). It included an assessment of management actions in response to scenario results, as well as a counterparty-level analysis and a qualitative questionnaire. Overall, the scenario analyses showed mild losses and low exposure of climate-sensitive segments for business booked in UBS AG, London Branch. UBS as a firm was not formally required to participate in the exercise (as we are not a UK-headquartered bank), but volunteered to participate in order to learn from the effort given our footprint in the UK.

Throughout 2022, we engaged with a range of regulatory surveys and other requests for information from supervisors around the globe. We also participated in industry efforts to evaluate regulatory exercises to date. We will continue leveraging these learnings, as they improve testing methodologies.

During the first half of 2022, we participated in the CST exercise to assess banks' preparedness for dealing with financial and economic shocks stemming from climate risk. The CST exercise included a self-assessment questionnaire, climate risk metrics and stress test projections. The scope of the exercise covered UBS Europe SE, which contributed starting point data for supervisory top-down assessments. Due to the ECB's proportionality principle, we were not asked to provide bottom-up stress test projections. Overall, the exercise showed that UBS Europe SE has low exposure to climate risks.

We enhanced our capabilities for assessing risks and vulnerabilities from climate change in 2022, fostered by deliveries regarding the aforementioned supervisory stress tests, as well as internal developments in climate risk scenario analysis and stress testing.

We also contributed to the NGFS's work exploring the potential for risk differentials among assets due to climate change. We joined industry efforts to evaluate regulatory exercises to date. This included the IIF report "Navigating Climate Headwinds," which examined learnings from 20 global institutions on regulatory climate scenario analysis and stress test exercises.

In 2022, we also began developing a climate risk scenario analysis and stress testing framework. The framework aims to measure our exposures to climate risks in order to understand the impact of climate change on our business model and manage potential risks to our capital position. To support this, we have been developing internal climate risk scenarios covering transition and physical risks. In addition, we are in the process of developing corresponding climate risk models for major risk types, including credit risks and non-financial risks.

Scenario analysis informed by industry collaboration

In 2020, we were one of the pilot banks testing the Paris Agreement Capital Transition Assessment (PACTA) methodology. This methodology provides an assessment of a bank's credit-financed activities in relation to the global shift to a low-carbon economy. We studied the alignment of select climate-sensitive sectors in our corporate credit portfolio with Paris Agreement benchmarks.

One of the results shown by the PACTA for lending assessment was that the fuel mix in UBS's power utilities credit portfolio was significantly less carbon-intensive than the global corporate economy, as of 2019. As an outcome of the collaboration between UBS and 16 other international banks, academia and experts, a PACTA for Banks Methodology Document was published.

In 2022, we participated in the PACTA climate alignment test focused on assessing listed investments (including equities and bonds), mortgages and direct real estate portfolios. The 2022 PACTA results for this portfolio were compared with the aggregated results of all participating banks' portfolios.

A detailed report of the PACTA 2022 climate alignment test for the Swiss financial market is available from the Swiss Federal Office for the Environment (FOEN). It promotes industry learning and supports information flow on progress made and efforts still needed. Overall, the test results have confirmed findings from our previous in-house assessment on climate risk. So far, we have not identified significant climate-related financial risk on our balance sheet. This is explained by our firm's relatively small lending book in climate-sensitive sectors and the availability of insurance where we have relevant exposures to such sectors (e.g., Swiss mortgage lending book).

› Refer to bafu.admin.ch/bafu/en/home/topics/climate/info-specialists/climate-and-financial-markets/pacta.html for more information on the PACTA 2022 climate alignment test

Climate risk monitoring and risk appetite

In 2022, we expanded our suite of climate risk metrics in response to evolving industry and regulatory guidance. This included the further enhancement of both transition and physical risk heatmap methodologies, the introduction of a nature-related risk metric, and the expansion of legal-entity-level climate risk metrics.

› Refer to our transition and physical risk heatmaps above

The current inventory of UBS's exposure to climate-sensitive activities (transition, physical and nature-related risks) at the sector level is summarized in the tables below. Exposures may appear either under one or more of the risk types, as the methodologies are distinct in their approach and application and should not be added up as one total exposure figure. Climate risk analysis is a novel area of research, and, as the methodologies, tools and data availability improve, we will further develop our risk identification and measurement approaches.

Risk exposures by sector^{1,2}

Sector / Subsector	Exposure		Transition risk			Physical risk			Nature-related risk ⁶			
	2020–2022 trend	2022 (USD billion)	2022 climate-sensitive exposure ³	2022 risk-rating category ³	2020–2022 trend in risk profile ⁴	In scope of net-zero target (%) ⁵	2022 climate-sensitive exposure ³	2020–2022 trend in risk profile ⁴	2022 nature-related sensitive exposure ³	2022 risk-rating category ³	2020–2022 trend in risk profile ⁴	
Agriculture												
Agriculture, fishing and forestry	↓	0.3	0.0	Moderately low	↑		0.3	Moderate	↓	0.2	Moderate	↓
Food and beverage	↓	3.2	1.4	Moderate	↓		2.3	Moderate	↓	1.3	Moderately low	↓
Financial services												
Financial services	↑	46.9	0.0	Low	↓		7.1	Moderately low	↓	0.7	Low	→
Industrials												
Cement or concrete manufacture	↑	0.5	0.5	Moderately high	↓	98	0.5	Moderate	↓	0.5	Moderately low	↓
Chemicals manufacture	↓	1.0	1.0	Moderately high	↓		1.0	Moderate	↑	0.5	Moderate	↑
Electronics manufacture	↓	1.8	0.0	Moderately low	↓		0.1	Moderately low	↑	0.5	Moderately low	↓
Goods and apparel manufacture	↑	2.1	1.0	Moderate	↓		0.9	Moderately low	↓	1.2	Moderate	↓
Machinery manufacturing	↓	2.9	2.6	Moderate	↓		0.1	Moderately low	↓	2.3	Moderate	↓
Pharmaceuticals manufacture	↑	1.9	1.9	Moderately high	↓		0.2	Moderately low	↓	1.7	Moderate	↓
Plastics and petrochemicals manufacture	↓	0.9	0.9	Moderate	↓		0.8	Moderate	↓	0.4	Moderately low	↓
Metals and mining												
Conglomerates (incl. trading)	↓	2.4	2.4	Moderate	↓		0.4	Moderately low	↓	0.0	Moderately low	↓
Mining and quarrying	↓	0.4	0.0	Moderately low	↓		0.4	Moderately high	↓	0.4	Moderately low	↓
Production	↑	0.4	0.4	Moderate	↓		0.1	Moderate	↑	0.3	Moderate	↓
Fossil fuels												
Downstream refining, distribution	↑	0.3	0.3	Moderate	↑		0.3	Moderate	↓	0.0	Moderately low	↓
Integrated	↓	0.4	0.4	Moderately high	↓	100	0.4	Moderate	↓	0.0	Moderately low	↓
Midstream transport, storage	↑	0.0	0.0	Moderate	↓		0.0	Moderate	↓	0.0	Low	↓
Trading	↑	5.2	5.2	Moderate	↓		5.2	Moderately high	↓	0.0	Moderately low	↓
Upstream extraction	↓	0.1	0.1	Moderately high	↓	95	0.1	Moderate	↓	0.0	Moderately low	↓
Real estate												
Real estate development and management	↓	5.6	1.8	Moderately low	↓		0.8	Moderately low	↓	5.5	Moderately low	↓
Residential ²	↑	158.9	0.0	Low	→	99	0.0	Low	→	0.0	Not Classified	→
Commercial ²	↑	47.1	1.4	Moderately low	↓	97	1.7	Low	↑	21.0	Moderately low	↑
Services and technology												
Services and technology	↓	19.6	0.0	Low	↓		3.0	Moderately low	↓	2.1	Low	→
Transportation												
Air transport	↓	1.8	1.8	Moderate	↓		1.1	Moderate	↓	1.8	Moderate	↓
Automotive	↓	0.4	0.1	Moderately low	↓		0.0	Moderately low	↓	0.4	Moderate	↓
Parts and equipment supply	↓	0.5	0.5	Moderate	↓		0.1	Moderately low	↓	0.4	Moderately low	↓
Rail freight	↓	0.7	0.0	Low	↓		0.2	Moderately low	↓	0.7	Moderate	↓
Road freight	↓	0.5	0.5	Moderate	↓		0.2	Moderately low	↓	0.0	Moderately low	↓
Transit	↓	0.2	0.0	Moderately low	↓		0.1	Moderately low	↓	0.0	Moderately low	↓
Water transport	↓	0.4	0.0	Moderately low	↓		0.4	Moderate	↓	0.4	Moderately low	↑
Utilities												
Other	↓	0.2	0.1	Moderately low	↑		0.1	Moderate	↓	0.2	Moderately high	↑
Secondary energy production	↑	2.0	0.5	Moderately low	↓	91	2.0	Moderate	↓	1.5	Moderate	↓
Secondary energy trading	↓	0.0	0.0	Moderately low	↓		0.0	Moderate	↓	0.0	Moderately high	↑
Private lending												
Lombard ^{2,7}	↓	137.3	0.0	Low	↓		0.0	Moderately low	↓	0.0	Low	→
Private lending, credit cards, other ²	↓	4.1	0.0	Not Classified	→		0.0	Not Classified	→	0.0	Not Classified	→
Total	↓	450.0	24.9	Moderately low	↓		30.0	Moderately low	↓	44.0	Moderately low	↓
<i>of which sensitive exposure (%)</i>			5.5				6.7			9.8		

¹ Consists of total loans and advances to customers and guarantees, as well as irrevocable loan commitments (within the scope of expected credit loss), and based on consolidated and standalone IFRS numbers, in USD billion. Metrics and trends are calculated and restated based on 2022 methodology, across three years of reporting, 2020 to 2022. ² Methodologies for assessing climate- and nature-related risks are emerging and may change over time. As the methodologies, tools, and data availability improve, we will further develop our risk identification and measurement approaches, including further and updated geospatial analysis of properties securing financing with UBS (real estate) and better understanding how private lending (e.g., Lombard) activities may result in direct financial impacts for UBS. For physical climate risks, UBS has identified select properties in its real estate portfolio that are vulnerable to acute climate hazards. However, real estate rating is assigned based on the riskiness of loan counterparties or qualitative estimates leveraging internal studies. ³ Climate- and nature-related risks are scored between 0 and 1, based upon sustainability and climate risk transmission channels, as outlined in the methodology Appendix. Risk ratings represent a range of scores across five risk-rating categories: low, moderately low, moderate, moderately high, and high. Climate- or nature-sensitive exposure metric is determined based upon the top three out of five rated categories: high to moderate. Legend on risk codes: not classified means the respective category of risk rating is not classified and its range of risk profiles scores 0%; low means the category of risk rating is low and its range of risk profiles scores ≤19%; moderately low means the category of risk rating is moderately low and its range of risk profiles scores >19% and ≤39%; moderate means the category of risk rating is moderate and its range of risk profiles scores >39% and ≤59%; moderately high means the category of risk rating is moderately high and its range of risk profiles scores >59% and ≤79%; high means the category of risk rating is high and its range of risk profiles scores >79% and ≤100%. ⁴ A material change in risk profile (discrete risk score, weighted average per sub-sector) is considered as >5% shift up, or down. ⁵ Calculated as % of total exposure to the sub-sector, overall net-zero targets cover 45.6% of UBS lending, as defined in footnote 1. ⁶ Nature-sensitive metric is provided as a proof-of-concept, as part of an ongoing collaboration between UBS and UNEP-FI. UBS continues to collaborate to resolve methodological and data challenges, and seeks to integrate both impacts to and dependency on a changing natural and climatic environment, in how it evaluates risks and opportunities. ⁷ Lombard lending rating is assigned based on the average riskiness of loans.

Climate risk appetite

Our sustainability and climate risk policy defines the qualitative risk appetite for climate risk and is continuously improved. Details of climate-related standards in the energy and utilities sectors can be found in the sustainability and climate risk policy framework.

- › **Refer to the sustainability and climate risk policy framework in the “Appendix 3 – Risk management” section of this report for further details about our sustainability and climate risk governance**

Climate risk management and control

Our standard financial and non-financial risk processes ensure that we identify, assess, approve and escalate material climate risks in a timely manner. We define key responsibilities, processes and tools applicable to the business divisions and Group Functions as part of our climate risk program.

In 2022, we continued our climate risk-related training for employees. Our SCR unit delivered awareness training that included climate risk aspects to our business divisions and Group Functions. Our SCR specialists also provided education sessions with a specific focus on net zero, while in previous years our Head SCR delivered a quarterly risk speaker series focusing on sustainability and climate risk. In addition, we offered, in collaboration with the UNEP-FI Program, a comprehensive set of training sessions (21 in total) focusing on the Task Force on Climate-related Financial Disclosures (the TCFD) roadmap to our employees.

Climate risk reporting

We automated the climate transition risk heatmap for periodic internal risk reporting and introduced a physical risk heatmap. Since then, the climate risk heatmap has been included in quarterly internal risk reports for the Group, as well as key entities and the business divisions. This fully automated process includes banking products, traded products, issuer risk and collateral exposures to climate risk (transition risk only). During 2023 we expect to extend this internal reporting to cover physical risk. The development of internal and external climate risk disclosures will continue in the coming years in the context of our climate risk program in order to address regulatory expectations and provide leading practice in this space.

Our investment management approach to climate risks

Our approach in Asset Management

Our overall strategy for managing climate risks is to integrate risk data and insights into our investment management processes. In our public markets investments, this begins with assessing ESG issues based on our ESG Material Issues framework, which identifies the most relevant issues per sector making the connection to key value drivers that may impact the investment thesis across sectors. We have updated our ESG Material Issues framework with a sector-based view of exposures to physical and transition climate risks.

To further facilitate the integration of sustainability factors (including climate risks) into investment decisions, Asset Management has a proprietary ESG Dashboard using data sets from a variety of external ESG data providers, which generates a risk signal across several risk dimensions. This is available to investment teams via a dashboard giving a structured, holistic view of ESG risks. During 2022 we onboarded additional climate physical and transition risk datasets. We have enhanced our proprietary ESG Dashboard with this climate physical and transition risk data, and with alerts to highlight the highest risk issuers.

Nature-related risks, such as water and forest risks, are embedded in the methodologies of our underlying data sources, and our investment teams utilize these ESG factors alongside traditional financial metrics and proprietary ESG sector materiality maps to assess the risk-return profile in the investment process. In 2022, we developed an additional due diligence process that triggers a risk signal based on the presence of controversial activities that conflict with the standards in our sustainability and climate risk framework, including deforestation and forest degradation. Leveraging the risk data insights, research analysts complete a qualitative ESG risk assessment encapsulated in an ESG risk recommendation, informing portfolio manager investment decisions.

We view active ownership as an important tool to manage climate risk of issuers. Asset Management has run a dedicated climate engagement program since early 2018 focused on high emitting sectors to drive stronger integration of climate risk management into business strategies.

Asset Management’s Real Estate and Private Markets (REPM) business also incorporates physical and transition risks into its investment and ongoing management processes. We consider key transition risks using our proprietary in-house ESG Dashboard which assesses over 1,500 of our directly controlled real estate assets’ environmental performance against pathways and targets. We are in the process of refreshing our energy/emission/water/waste reduction targets with help from our sustainability consultants across the world which would apply at portfolio level, supported by individual asset-level action plans towards those targets. Our primary emission reduction

strategies focus on implementing improvement measures to minimize energy demand, improve energy efficiency, installing renewables on site where feasible and procuring green energy from third parties where on-site renewables are not sufficient. We may in the future also employ secondary carbon reduction strategies, including the purchase of energy credits to offset any residual emissions as we approach our net-zero targets.

Natural capital risks are also considered within our real estate and private market investments. We enrolled in the Leading Harvest ESG Management Program. This is a comprehensive set of ESG standards for farm management, with 13 principals and objectives, 33 performance measures and 77 indicators. Compliance is evaluated by independent auditors. One of the 33 performance measures is to use an integrated pest management (IPM) system that utilizes regional best practices to achieve the crop protection objective while also protecting people and the environment.

› **Refer to ubs.com/global/en/assetmanagement/capabilities/sustainable-investing/stewardship-engagement for our approach to stewardship**

On the physical risk side, for our direct investments in real estate, we use a third-party location risk intelligence tool to analyze asset-level physical risk. We use another third-party data provider to inform our assessment of physical risk in our indirect real estate investments. Based on each investment's specific location, these tools allow REPM to identify each asset's potential physical risks under a variety of climate change scenarios and timelines.

During 2022, REPM analyzed its direct real estate assets using the location risk intelligence tool. In 2023, we plan to incorporate these physical risk results for all our GRESB-participating direct real estate funds into our proprietary ESG Dashboard that already considers our transition risk data. This next step will establish a composite physical risk score for each asset which will help us to identify the highest risk assets as a priority for further analysis and assessment. It will also enable us to generate a risk profile for each portfolio based on the risk profile of its underlying assets. Currently we are performing physical risk screening prior to the acquisition of any asset, and annually for assets where we are currently invested. Our purpose is to use information from our dashboard and third-party providers to develop physical climate risk mitigation plans, where needed, for existing real estate assets and new acquisitions. In our indirect real estate activities, we will similarly use third-party data to identify key engagement focus areas in our underlying fund holdings.

As part of the second line of defence controls performed by Group Risk Control, we integrate climate risk in the risk control and monitoring process of Asset Management portfolios. We have developed a risk control dashboard to identify, assess and monitor climate risks. Among other sustainability risk metrics such as ESG scores and risk ratings, the dashboard allows us to monitor the weighted average carbon intensity of portfolios against their respective benchmarks. Through this dashboard, Risk Control provides internal reporting of sustainability risk exposures for further assessment and escalation.

› **Refer to the "Appendix 3 – Risk management" section of this report for more information on our environmental risk analysis for Hong Kong and Singapore**

Our approach in Global Wealth Management

The majority of our discretionary portfolios comprises of investment funds from third-party fund managers and Asset Management where appropriate. Generally, Global Wealth Management acts as an asset allocator and manager of these portfolios but does not control portfolio construction and management within the underlying fund investment solutions. To that end, in the past we engaged with fund partners about climate risk issues, including discussions on readiness with relevance to net-zero commitments and the TCFD. We commit to engage in regular dialogue with our fund partners to ensure that industry best practices are being followed on behalf of our clients and stakeholders.

› **Refer to the "Appendix 3 – Risk management" section of this report for a more detailed discussion of our climate risk assessment as applied to discretionary portfolios managed in Singapore**