Cambridge Centre for Risk Studies

Systemic Risks Series: Climate Transition

CAMBRIDGE TAXONOMY OF CLIMATE TRANSITION RISKS

Centre for **Risk Studies**

UNIVERSITY OF CAMBRIDGE
Judge Business School

with the support of:

AXA XL Insurance Reinsurance

AXA Research Fund

Acknowledgements

The Cambridge Centre for Risk Studies gratefully acknowledges AXA XL and AXA Research Fund for supporting the research efforts summarised in this report. The Centre is also grateful for the expertise provided by our research team, collaborators and subject matter specialists.

Report Citation

Cambridge Centre for Risk Studies, 2025. *Cambridge Taxonomy of Climate Transition Risks*. Cambridge Centre for Risk Studies at the University of Cambridge Judge Business School

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Cambridge Taxonomy of Climate Transition Risks

Cambridge Risk Framework

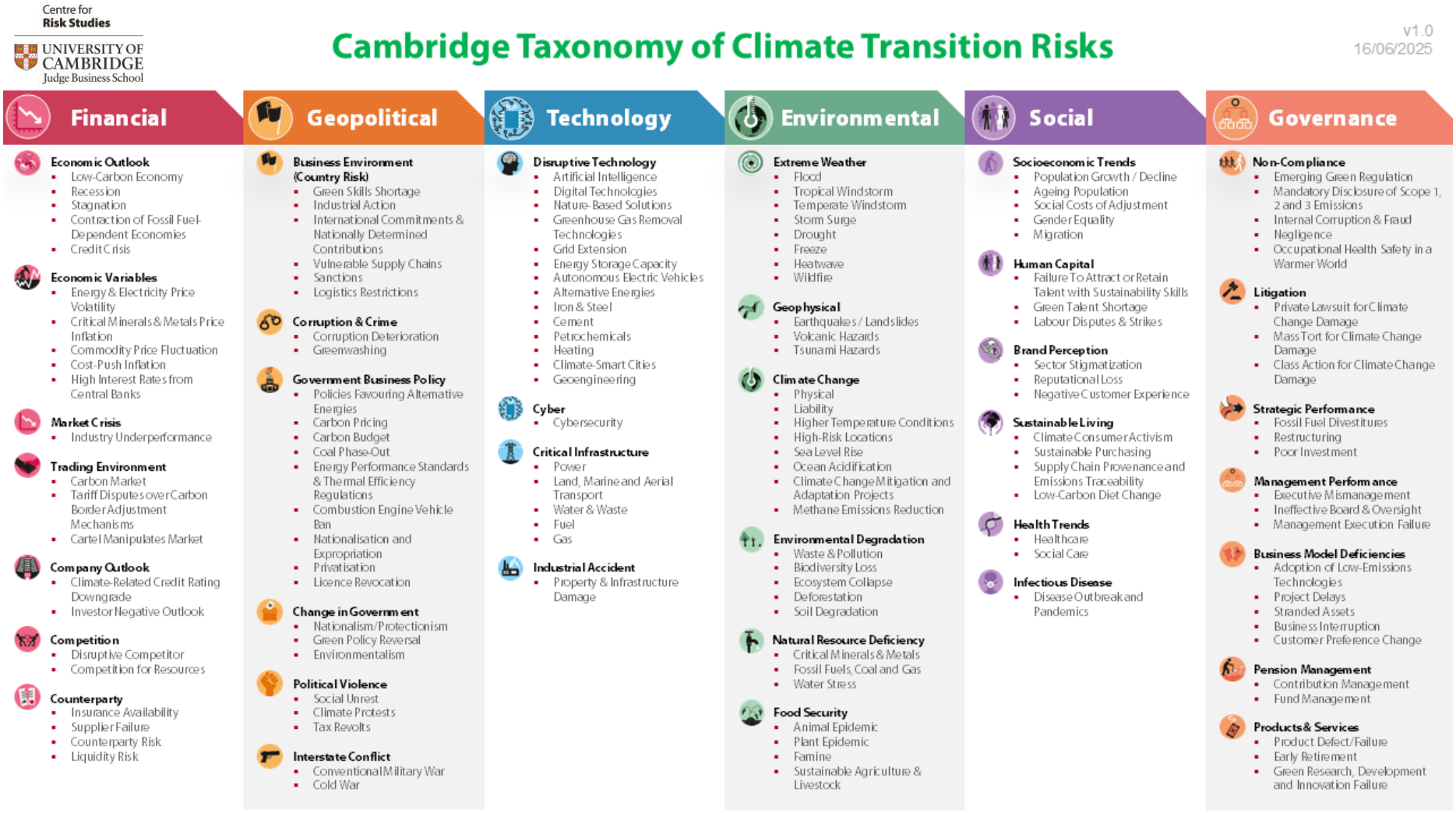
Outline

Abstract

The *Cambridge Taxonomy of Climate Transition Risks* report, developed by the Cambridge Centre for Risk Studies (CCRS) with support from AXA XL and AXA Research Fund, provides a comprehensive framework for understanding and managing the risks associated with the transition to a low-carbon economy. This taxonomy is designed to help businesses identify, categorise and prioritize the various risks they may face during this transition to enhance resilience and promote strategic planning.

The taxonomy is organized into six primary classes, each containing several families and types of risks. This hierarchical structure allows for detailed analysis and prioritization of risks. It builds on previous taxonomies and frameworks, incorporating a broad range of risks to provide a holistic view of the transition landscape.

Cambridge Taxonomy of Climate Transition Risks



Context and objectives

Climate transition

Addressing the climate transition requires acknowledging the end of "business-as-usual," as various sectors of the economy face profound changes in response to a warming world. These changes will disproportionately affect vulnerable populations - heatwaves, for instance, may render certain regions uninhabitable, while civil unrest could emerge as a catalyst for political upheaval. These evolving conditions present a host of challenges, including abatement costs, carbon pricing, reductions in fossil fuel and coal demand, volatility in electricity and crop prices[1] and the financial strain of stranded assets. Organisations caught unprepared risk incurring significant adoption costs.

Despite a geopolitically volatile environment, other systemic forces—such as the reductions in renewable energy production costs - will continue to drive the transition forward.[2] In this context, businesses have much to gain from adopting a proactive approach. By addressing the risks of a low-carbon economy, they can mitigate both the escalating physical impacts of climate change and the inherent challenges of the transition itself.

"In 2024, we've seen climate tech enter its deployment era. [...] Corporate leaders increasingly understand that climate tech is not just about shrinking their carbon footprint. It's also about strengthening their businesses and deploying their capital more efficiently." -Bill Gates

CCRS-AXA Climate Transition Pillar

As part of the CCRS, the Systemic Risks Hub (SRH) explores the financial, economic and social effects of systemic risks by studying the interconnectedness of risks and their drivers to create tangible business tools for resilience-building. The SRH works with a number of business supporters across multiple pillars to cover several systemic threats, from digital technologies to geopolitical risks and natural perils. The Climate Transition Pillar, based on the collaboration between AXA XL and AXA Research Fund with the SRH[3], aims to improve preparedness and risk mitigation by mapping out the risks of transition to major businesses, from a major insurer and reinsurer's perspective. This report is the first deliverable of the Climate Transition Pillar.

Cambridge Taxonomy of Business Risks through a transition lens

The CCRS previously published the *Cambridge Taxonomy of Business Risks* v2.0 (CCRS, 2019). In it, the CCRS presented a structured way of mapping a range of risks across six classes – Financial, Geopolitical, Technology, Environmental, Social and Governance - that could impact a business. As part of the Climate Transition Pillar work, we explored the possibility to thematically frame the taxonomy according to specific projects and subjects; in this particular case, through the 'lens' of transition.

This work consolidated as the *Cambridge Taxonomy of Climate Transition Risks*, v1.0. The new taxonomy provides a useful framework and checklist of potential causes of business distress during the transition, that organisations can review to determine their own prioritization and relevance of these risks.

Risk terminology

Risk definitions. The following are risk definitions used throughout the document, based on literature research:

[1] ClimateWorks 2024
[2] The question will be the speed and coordination of adoption for different stakeholders.
[3] AXA XL 2023

Systemic risks: "The risk of a breakdown of an entire system rather than simply the failure of individual parts."[4]

Physical risks: "Risks resulting from climate change can be event-driven (acute) or longer-term shifts (chronic) in climate patterns."[5]

Transition risks: "Potential costs to society of evolving to a low carbon economy to mitigate climate change."[6]

Transition risks – a broader consideration

There were two possible approaches to build the *Cambridge Taxonomy of Climate Transition Risks*: The first was to delimit the risk types by the definition of transition risks as the "risks related to the transition to a lower-carbon economy",[1] thus focused on policy, legal, technology, market and reputational risks and excluding, for example, physical risks. The second was to take on a broader systemic approach, showcasing all potential risks happening during or accompanying the transition. Upon evaluation, we realized physical risks – *e.g.* extreme weather events and land degradation - could be either catalysts for the transition or, alternatively, exacerbate other transition risks - *e.g.* geopolitical ones. For this reason, we decided to build the taxonomy using the second approach. This taxonomy therefore does not aim to list transition risks under a narrow definition; rather, our approach aims to encompass all trends occurring during the transition and which are useful for businesses to track and make decisions on.

Transition pathways. The adoption of different transition pathways - based on the "nature, speed and focus of these changes"[7] - will have varying levels of severity for different risk categories. The Network for Greening the Financial System's (NGFS) Scenario Framework[8] creates four transition pathways, based on high or low transition and physical risks levels:

Orderly transition: Early, gradual and coordinated introduction of climate policies and activities, which become more stringent over time. Transition risks: low. Physical risks: low.

Disorderly transition: Introduction of climate policies is delayed or uncoordinated across countries or industries. Transition risks: high. Physical risks: low.

Hot house world transition: A limited number of policies is implemented but unable to materially reduce the speed of global warming. Transition risks: low. Physical risks: high.

Too little, too late transition: A late and uncoordinated transition is not enough to address physical risks. Transition risks: high. Physical risks: high.

A transition pathway defined by a social and environmental justice approach is worth exploring in terms of the achievement of the Sustainable Development Goals (SDG):

Just transition: "Greening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities, and leaving no one behind."[9] As part of the just transition, community-led transition includes community-based projects and actions that address the challenges of transition to a low-carbon economy, cleaner energy systems and economic instability by building resilience at a local level.[10]

[4] CFA Institute 2022
[5] TCFD 2017
[6] NAIC 2024
[7] TCFD 2017
[8] NGFS 2019
[9] ILO 2024 (1)
[10] Rozite *et al.* 2023; Transition Network 2021

Impact

How to use the taxonomy

The taxonomy is a hierarchical structure to categorize risks; as such, it is a useful tool to identify, assess and manage risks. Accordingly, the *Cambridge Taxonomy of Climate Transition Risks* provides a comprehensive framework to help businesses identify, categorise and prioritize the risks associated with the transition to a low-carbon economy; enhance resilience and promote strategic planning.

Transition-related risks are thus listed in one of six primary classes - Financial, Geopolitical, Technology, Environmental, Social and Governance -, each of which is subdivided into several families and types of risks. This hierarchical structure allows for a detailed analysis, clustering and prioritization of risks.

Potential applications

Blind spot analysis – The Green Swan. Bolton *et al.*, when speaking of climate-related financial risks in their 2020 report for the Bank for International Settlements (BIS), defined "green swan" risks as "potentially extremely financially disruptive events that could be behind the next systemic financial crisis."[11] This report warns about the context of uncertainty complicating the full appreciation of the interaction between physical and transition risks, along with their unpredictable, systemic consequences. By outlining a broad range of risk categories, one of the potential applications of the *Cambridge Taxonomy of Climate Transition Risks* is for businesses to identify blind spots in their transition-related strategies.

Idea generation. Our goal with the taxonomy was to provide a broad list of risks that portrays the systemic nature of transition risks. Therefore, this list of transition risks may also be employed by companies as a platform for ideas generator, *e.g.* for the creation of new insurance products and scenario designs, that incorporate multi-sectorial aspects of the transition into their considerations.

Roles and leverage point. This taxonomy also provides an opportunity for different sectors to promote a just transition by reflecting on their role and leverage points in an interconnected world.

Strategic and systemic risk mitigation. The systemic nature of transition risks represents an opportunity, as a carefully planned risk strategy can also mitigate several risks simultaneously; for example: A policy risk mitigation strategy might involve a business responding to carbon markets (under the "Financial" class), carbon budgets ("Geopolitical"), energy performance standards ("Geopolitical") and the rate of coal phase-out ("Geopolitical") through an adjustment in their business model deficiencies ("Governance"). In this way, businesses may utilize the interconnectedness of these systems to their advantage through a pro-active approach.

Opportunities. Based on literature review, some of the main areas of opportunity for businesses during the climate transition included resource, production and distribution efficiency; low-emission energy sources, products and services; capitalising on shifts in consumer preferences and novel markets; a local approach to transition based on "inclusion, agency and accountability"[12] and efforts to build resilience.[13]

[11] Bolton *et al.* 2020
[12] Johnston 2025
[13] TCFD 2017; Intel 2023

Methodology

The literature review for the definition of business risks during the transition to a low-carbon economy included both academic and grey literature, exploring academic journals, newspapers, business insights, reports and transition taxonomies, among others. Below are enlisted some of the main taxonomies consulted during this work, which were used to identify transition risks and the vulnerability of different sectors to the transition.

A Taxonomy of Threat for Complete Risk Management, 2014

In *A Taxonomy of Threat for Complete Risk Management* (2014), the CCRS presented a taxonomy of macro-catastrophe threats to the global economy. This work was based on an extensive historical review of social and economic disruptive events, together with the review of catastrophe catalogues and databases, a precedent review, a study of counter-factual theories and a peer-review process.

Cambridge Taxonomy of Business Risks, 2019

Based on the previous taxonomy on macro-catastrophes, the CCRS's *Cambridge Taxonomy of Business Risks* v2.0 (CCRS, 2019) focus the analysis of a second taxonomy on the different threats that could potentially impact a business. This work involved the review of risk registers, observation of examples of corporate distress, literature review and review of previous threat taxonomies.

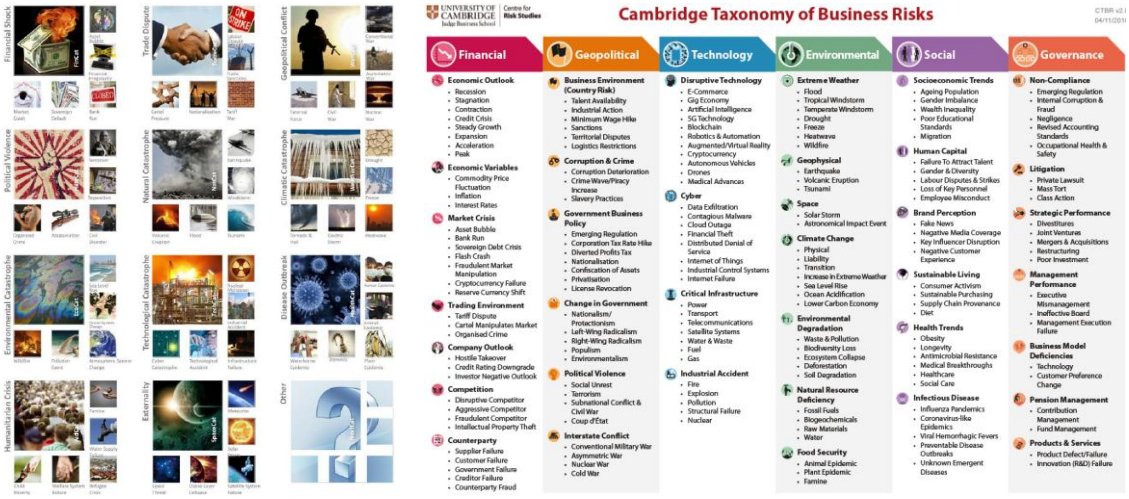


Figure 1: From macro-catastrophe to business risk taxonomies. Sources: CCRS 2014, CCRS 2019

Further taxonomies and frameworks reviewed

Task Force on Climate-Related Financial Disclosures (TCFD) - *Recommendations of the Task Force on Climate-related Financial Disclosures*, 2017

The TCFD, in its *Recommendations of the Task Force on Climate-related Financial Disclosures*,[14] divides climate-related risks into physical and transition risks. The physical impacts of climate change are divided into acute (that is, event-driven) and chronic (long-term shifts in climate patterns). In contrast, risks of transition to a low-carbon economy are divided into policy and legal, technology, market and reputation risks.

[14] TCFD 2017

Cambridge Institute for Sustainability Leadership (CISL) - *Transition risk framework*, 2019

The ClimateWise *Transition risk framework*[15], focused on infrastructure investments, created an infrastructure risk exposure matrix where it measured transition risks by infrastructure and asset type. Transition risks were framed under a Sector : Sub-sector : Asset Type hierarchy, as shown below:

Table 1: Transition risk by infrastructure asset type. Modified from: CISL 2019[16]

Transition risk by infrastructure asset type		
Sector	Sub-sector	Asset type
Power Generation	Coal	Coal-fired power plants
	Gas	Gas-fired power plants
	Nuclear	Nuclear power plants
	Renewables	Utility-scale wind and solar farms
Oil & Gas	Oil	Pipelines and associated midstream infrastructure
	Gas	Gas distribution infrastructure
Transportation	Aviation	Airports
	Roads	Toll roads
	Shipping	Ports
	Mass transit systems	Railways, subways, trams (excludes buses)
Social	Buildings	Hospitals, schools, nursing homes, military
Water	Water utilities	Water treatment, desalination facilities, sewers / tunnels
Telecommunications	Telecommunication infrastructure	Television broadcast towers, wireless communications towers, cable systems, satellite networks

United Nations Environment Programme (UNEP) – *Beyond the Horizon: New Tools and Frameworks for Transition Risk Assessments from UNEP FI's TCFD Banking Programme*, 2020

The UNEP's *Beyond the Horizon: New Tools and Frameworks for Transition Risk Assessments from UNEP FI's TCFD Banking Programme*[17] created a sector transition heatmap for the financial industry to manage transition risks. In this regard, it evaluated Oil & Gas, Agriculture, Real Estate, Power Generation, Metals & Mining, Industrial, Transportation and Services and Technology against direct emissions costs, indirect emissions costs, low-carbon CapEx and revenue.

Network for Greening the Financial System (NGFS) - *NGFS Guide to Climate Scenario Analysis for Central Banks and Supervisors*, 2020 and *NGFS Climate Scenarios for Central Banks and Supervisors*, 2021

The NGFS *Guide to Climate Scenario Analysis for Central Banks and Supervisors*[18] defines transition risks as those that "will affect the profitability of businesses and wealth of households, creating financial risks for lenders and investors. They will also affect the broader economy through investment, productivity and relative price channels, particularly if the transition leads to stranded assets." It lists policy, regulations, technology development and consumer preferences as the main list of transition risks, with physical risks divided in those with acute or chronic impacts. Additionally, the research questions in the *NGFS Climate Scenarios for Central Banks and Supervisors*[19] suggest the exploration of the following transition risks, along with some examples:

- Government policies: Carbon taxes, direct regulation and subsidies
- Technological trends: Renewable energy, carbon capture and storage and electrification of motor vehicles
- Changes to consumer preferences: Transport demand, diets, energy-efficient housing and energy-efficient appliances
- Sectors at risk of policy or technological disruption: Energy sector, agriculture, construction, industry, mobility and freight transport

[15] CISL 2019
[16] CISL 2019
[17] UNEP 2020
[18] NGFS 2020
[19] NGFS 2021

Gambhir *et al.* - Near-term transition and longer-term physical climate risks of greenhouse gas emissions pathways, 2022

In the work funded by ClimateWorks Foundation, Gambhir *et al.*[20] used seven physical and seven transition risk metrics to evaluate scenarios:

- *Physical risks metrics*: Agricultural droughts, maize crop growth duration change, maize heat stress, hydrological drought, heatwaves, major heatwave and river flood
- *Transition risks metrics*: Abatement cost, carbon price, greenhouse gas (GHG) carbon intensity reduction, fossil fuel demand reduction, coal plant capacity reduction, electricity price and crop price

Cambridge Taxonomy of Climate Transition Risks, 2025

Structure

The *Cambridge Taxonomy of Climate Transition Risks*, v1.0, conserves the hierarchical structure and typology of the *Cambridge Taxonomy of Business Risks* v2.0 (CCRS, 2019) of Class : Family : Type. Six broad classes of risks (Financial, Geopolitical, Technology, Environmental, Social and Governance) contain several families of risks, which in turn contain several types of risks. While the classes and families of the Business Risks taxonomy were mostly preserved – with the exception of the family "Space" in the "Environmental" class - to provide a structural framework to categorize transition risks, these in turn are presented as risk types (**Appendix A** for classes, **Appendix B** for families and **Appendix C** for risk types).

Risk types can be further subdivided into sub-types; for example, "carbon pricing" can be subdivided into "carbon taxes" and "emissions trading systems (ETS)." For the purpose of simplicity, this subdivision has not been included in the v1.0 of the taxonomy.

Categorization

The taxonomy sought to reach a balance between having a manageable number of categories - loose enough to capture a broad range of risks - and yet provide enough granularity to render it useful for further analysis. Building on the 6 primary classes and 36 families of risk, we have identified a total of 141 transition risk types in the taxonomy (range: 1-14 in each family).

Versioning

This taxonomy is published here as version 1.0, 2024. There may be further iterations and new versions published as feedback is received and updates made.

Process of development of the taxonomy

A literature review on transition risks led to the creation of a 'super-list' of related risks. Using the *Cambridge Taxonomy of Business Risks* v2.0's (CCRS, 2019) classes and families as the upper ranks of the hierarchical structure, we clustered and classified the identified transition risks according to 'causal similarity' and a loose labelling.

In defining the risk types, certain risks from the *Cambridge Taxonomy of Business Risks* were kept either integrally or, when possible, were reformulated or adapted from a transition perspective.

[20] Gambhir et al. 2022

Risks classes in the transition

The primary categorisation of risk classes from the *Cambridge Taxonomy of Business Risks* v2.0 (CCRS, 2019) was kept as the main causal dividers. Under the transition lens, each class now contains business risks associated with the transition.

Financial

As economies transition to low-carbon models, those heavily reliant on fossil fuels face complex macroeconomic challenges. Simultaneously, fluctuations in energy, electricity, commodity, and critical mineral and metal prices may impact market stability and industrial performance. Trading conditions could be further influenced by carbon markets and tariffs introduced through carbon border adjustment mechanisms (CBAM). To navigate this landscape, financial stress-testing must account for climate-related credit ratings, emerging competition for resources and counterparty risks stemming from inadequate climate-focused liquidity analysis.

Geopolitical

In an increasingly volatile geopolitical landscape, businesses must navigate risks linked to green skills shortages, sanctions and supply chain vulnerabilities, as well as the potential for renewable project shutdowns due to security concerns.[21] Issues like greenwashing and corruption can undermine trust in green investments, while emerging policies favouring alternative energy, carbon pricing, coal phase-outs and efficiency regulations could give the green sector a competitive edge. Shifts toward nationalization, expropriation or protectionist measures pose additional risks to business interests in certain regions. At the same time, physical climate risks such as water scarcity may heighten political tensions and conflict, further complicated by emissions related to military activities.

Technology

The technological landscape driving the transition has benefited significantly from advances in solar and wind energy. Emerging disruptive technologies—from digitalization and artificial intelligence (AI) to extension of energy grids, storage solutions and decarbonisation strategies for hard-to-abate sectors—promise further progress. Innovations in climate-smart city design, nature-based carbon sequestration (NBS), GHG removal technologies and even geoengineering could accelerate this shift. However, with increased digitalization comes heightened cybersecurity risks to critical systems and infrastructure. Additionally, shifting weather patterns can lead to industrial accidents and costly damage to property and infrastructure.

Environmental

Both acute and chronic physical risks from climate change present significant challenges for businesses during the transition. The increased severity and frequency of extreme weather events, coupled with geophysical hazards[22], heighten risks to physical infrastructure and create new high-risk zones, impacting both homeowner and industrial insurance markets. Rising temperatures bring unique operational challenges, while environmental degradation and resource scarcity threaten food, water and energy security. These pressures are driving the adoption of lower-carbon economies and accelerating climate change adaptation (CCA) and mitigation (CCM) initiatives.

Social

The success and acceptance of transition models will largely depend on managing the social costs of adjustment; failing to do so could intensify existing migration. Businesses may face challenges

[21] De Ruiter 2024

[22] The United Nations Office for Disaster Risk Reduction (UNDRR) defines hazards as "a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation." While climate change might not be the main driver to these geophysical risks, it may still play a role in exacerbating hazards of geophysical nature through the accumulation of small changes – which may in turn lead to the sudden crossing of tipping points.

in attracting and retaining skilled workers amid green talent shortages, while unfavourable working conditions could lead to labour disputes, strikes and reputational damage. Shifts in consumer behaviour towards sustainable lifestyles—fuelled by growing awareness of supply chain origins, consumer activism and preferences for low-carbon diets—could also drive sector-wide stigmatization and reputational risks. Simultaneously, healthcare and social care systems will need to adapt to warmer conditions and evolving patterns in the spread of infectious diseases.

Governance

Non-compliance with emerging green regulations, climate-related litigation and challenges from fossil-fuel divestitures may create significant governance risks for businesses that fail to integrate climate considerations into their governance, portfolios and pension management. Additionally, managerial underperformance and gaps in business models could leave companies unable to identify assets at risk of stranding, leading to project delays, product failures and business interruptions. Without robust monitoring and adaptation to evolving green market regulations, businesses may struggle to mitigate these risks effectively.

Conclusions

A taxonomy for resilience-building during the transition

"There are risks and costs to action. But they are far less than the long-range risks of comfortable inaction." -John F. Kennedy

This report is part of a project, the Climate Transition Pillar, a collaboration between AXA XL and AXA Research Fund with Cambridge's SRH, which aims to pro-actively identify transition risks for businesses within the next ten years, understand their systemic interactions and develop tools that support strategic resilience-building across sectors. Under this scope, the *Cambridge Taxonomy of Climate Transition Risks* offers a list of systemic risks related with the transition to a low-carbon economy, clustered under a hierarchical classification. The aim of this structure is to facilitate strategic risk management, whether through blind spot analysis or as an idea generator for novel risk management products, allowing identification of sectorial leverage points or emerging business opportunities.

Class definitions

Table 2: Class definitions. Source: *Cambridge Taxonomy of Business Risks*, v2.0

Class	Class Definition
Financial	Threats from the macroeconomy, financial markets, global economic value chains, industry or company-specific events lead to underperformance of corporates.
Geopolitical	Political and criminal deterioration in society, change in ideology, leadership and regulation of the authorities, politically charged conflicts within or between nation states threaten business operations and prospects.
Technology	Targeted cyber attacks, critical infrastructure collapse, direct and indirect industrial accidents and the inability to keep up with advances in technology.
Environmental	Risks associated with acute natural hazard events, climate change, and human interactions with and exploitation of the environment.
Social	Socioeconomic trends in society, including evolving preferences, social norms, and demographics, as well as disease prevalence and developments in public health.
Governance	Threats from compliance with existing and emerging regulation, litigation and strategic and tactical management decisions.

Family definitions

Table 3: Financial family definitions. Source: *Cambridge Taxonomy of Business Risks*, v2.0

Family	Family Definition
Economic Outlook	Macroeconomic states alter business prospects of individual corporates.
Economic Variables	Volatility in key economic variables adds to uncertainty in economic value chains and financial markets.
Market Crises	Malfunction or collapse of financial markets propagates wealth losses through the system across individual players including corporates.
Trading Environment	Disruptive policies or illegal activities impede trading in goods or services, inflicting damage to economies and businesses.
Company Outlook	Pending cases or restless investors negatively effect corporate operating and financial performances.
Competition	The activities to establish superiority over others in the industry negatively effects operating performance of companies that are more vulnerable.
Counterparty	Failure or rogue activities from related counterparties, including suppliers, customers, government, creditors, disrupt normal business operations.

Table 4: Geopolitical family definitions. Source: *Cambridge Taxonomy of Business Risks*, v2.0

Family	Family Definition
Business Environment (Country Risk)	Negative impacts from international relations uncertainty or unfavourable domestic political situations deteriorate the environments where businesses operate.
Corruption & Crime	Widespread illegitimate activities in authorities or society suppress business development and growth.
Government Business Policy	New regulation or changing regulation has negative effects on corporate financials typically by disrupting normal operations.
Change in Government	Shift in political and social ideology or change in leadership has disruptive impacts on existing business practices.
Political Violence	Politically charged violence within a nation state harms public safety and order, threatening labour and capital supply as well as business operations.
Interstate Conflict	Armed or unarmed combats among nation states drastically change international relations, doing harm to environments, business operations and prospects, trade and investor sentiment.

Table 5: Technology family definitions. Source: *Cambridge Taxonomy of Business Risks*, v2.0

Family	Family Definition
Disruptive Technology	Advances in technology that have the potential to disrupt businesses and the economy.
Cyber	Risk of business interruption, data loss, financial theft, or reputational from various external attacks of digital vulnerabilities.
Critical Infrastructure	Failure in supporting infrastructure such as electricity, gas, water, telecommunications that could cause a regional or national crisis.
Industrial Accident	Direct or indirect industrial accidents from fire, explosion, structural failure or nuclear accidents.

Table 6: Environmental family definitions. The family "Space" was removed. Modified from: *Cambridge Taxonomy of Business Risks*, v2.0

Family	Family Definition
Extreme Weather	Acute natural hazard events caused by short- to medium-term anomalies in hydrological and atmospheric processes.
Geophysical	Acute natural hazard events originating from geological processes in the solid earth.
Climate Change	Acute and/or chronic physical hazards associated with long-term changes to the Earth's climate, as well as risks posed by society's responsive transition a low carbon economy.
Environmental Degradation	Deterioration of the physical environment and ecosystems as a result of destructive and exploitative human activities.
Natural Resource Deficiency	Deficiencies in natural resources caused by unsustainable human consumption at a rate exceeding the readily available supply.
Food Security	Shortages of food affecting large populations due to environmental factors and/or disease outbreaks in plant and livestock food sources.

Table 7: Social family definitions. Source: *Cambridge Taxonomy of Business Risks*, v2.0

Family	Family Definition
Socioeconomic Trends	Changes in societal standards and the composition of the labour market, affecting the macroeconomics and productivity of society.
Human Capital	Poor employment practices within an organisation affecting the attitudes of current employees, and limiting the attraction of potential employees.
Brand Perception	Negative information conferencing an organisation or customer dissatisfaction that harms public perception of the brand.
Sustainable Living	Consumers demand an organisation to offer sustainable and transparent practices, products, and services as heir preferences change.
Health Trends	A development in the state of public health with either positive or negative outcomes for a population.
Infectious Disease	Diseases caused by pathogenic microorganisms, that spread, directly or indirectly, within a population.

Table 8: Governance family definitions. Source: *Cambridge Taxonomy of Business Risks*, v2.0

Family	Family Definition
Non-Compliance	The risk of not compiling with existing or emerging regulation, reporting requirements or accounting standards.
Litigation	Risk of legal action against a corporate for negligence, product defects, management decisions, fiduciary duty or inaction.
Strategic Performance	Risks from strategic initiatives such as mergers and acquisitions, divestitures, joint ventures as well as poor investment.
Management Performance	Executive management failures in accomplishing strategic and transformation objectives.
Business Model Deficiencies	Inability to keep up with changing market and technology trends leading to the failure of a business model.
Pension Management	Pension fund and contribution management related risks.
Products & Services	Failure of a key product/service or innovation resulting in a significant financial and reputational loss.

Risk type definitions

Table 9: Financial Risk Type Definitions, *Cambridge Taxonomy of Climate Transition Risks*, v1.0

Family	Risk Type	Risk Type Definition
Economic outlook	Low-Carbon Economy	The financial and reputational risks associated with the nature, speed and focus of policy, legal, technology and market changes as society transitions to a low-carbon economy. These risks will vary according to the ability of actors to coordinate policies and actions and the speed at which the transition occurs.
	Recession	A recession is technically defined as two consecutive quarters of negative Gross Domestic Product (GDP) output growth, with both opportunities for and negative effects on climate action.[23]
	Stagnation	A stagnant or sluggish economy is defined as a period of persistently low economic growth.
	Contractions of Fossil Fuel-Dependent Economies	A contracting economy is defined as a period of lower-than-expected economic output, a drop in personal incomes, declining industrial production and weak retail sales. Fossil fuel dependent economies are particularly vulnerable under net zero scenarios.

[23] Tovar Jalles 2023

	Credit Crisis	A credit crisis is a breakdown in the financial system caused by a sudden and severe disruption to the normal flow of money in an economy.
Economic variables	Energy & Electricity Price Volatility	Sustained increase in the general price level of energy reduces purchasing power of the currency.
	Critical Minerals & Metals Price Inflation	Sustained increase in the general price level of minerals and metals critical for the green transition reduces purchasing power of the currency.
	Commodity Price Fluctuation	Volatile price changes in commodities due to supply or demand shocks disrupt domestic and international supply chains, negatively effecting corporate revenues and operating costs.
	Cost-Push Inflation	Increase in the price of products and services from higher production costs, or from a supply shortage with sustained or growing demand.
	High Interest Rates from Central Banks	Bank rate set by the central bank impacts prevalent overnight rate and consumer lending rates.
Market Crises	Industry Underperformance	An industry's performance is worse than expected, or their stocks are doing worse in the market than their competitors'.
Trading Environment	Carbon Market	Trading markets to buy and sell carbon credits.[24]
	Tariff Disputes over Carbon Border Adjustment Mechanisms	Increase in tariffs between states in response to each other's trade barriers leads to decrease in cross-border economic activities, exerting ripple effects through global supply chains. The Carbon Border Adjustment Mechanisms (CBAM) are fees or tariffs on imported goods, based on GHG emissions during their production.[25]
	Cartel Manipulates Market	A group of independent producers collaborate or conspire to fix market price, limit supply or increase bargaining power against other counterparties for private gains.
Company Outlook	Climate-Related Credit Rating Downgrade	Deterioration in creditworthiness or credit outlook in regard to climate-related scores and assessed by credit agencies negatively effects company's ability to borrow money on the markets.
	Investor Negative Outlook	Unfavourable investor sentiment on corporate prospects, particularly high carbon-emitting ones, influences stock trading and investment growth.
Competition	Disruptive Competitor	Entrants or existing businesses in the industry bring about new technologies, new products, new sources of supply and compete through quality rather than price.
	Competition for Resources	Global competition for resources.
Counterparty	Insurance Availability	Availability of (re)insurance policies for individuals or businesses.
	Supplier Failure	Major suppliers fall distressed or go bankrupt so that business operations are disrupted.
	Counterparty Risk	Counterparties involved in transactions with a company default on their contractual obligations.
	Liquidity Risk	Financial risk from the inability to meet payment obligations.[26]

Table 10: Geopolitical Risk Type Definitions, *Cambridge Taxonomy of Climate Transition Risks*, v1.0

Family	Risk Type	Risk Type Definition
Business Environment (Country Risk)	Green Skills Shortage	Shortage of skilled workers to meet the requirements for a green transition.
	Industrial Action	Usually organised by unions against companies, widespread discontent embodied by strike, riots, civil commotion and protest or slowdown significantly limits corporate productivity and weakens its bargaining position. Industrial action is likely to increase in sectors affected by climate change or those negatively affected by transition regulations.
	International Commitments & Nationally Determined Contributions	Setting bi- or multilateral agreements from shared objectives, in the form of activities or written instruments. These include the Nationally Determined Contributions (NDC): National climate action plans set every five years under the Paris Agreement to reduce greenhouse gas (GHG) emissions.[27]
	Vulnerable Supply Chains	Supply chain exposure to serious disturbance.
	Sanctions	International sanctions regimes, geo-economics, trading blocs, bi/multi-lateral negotiations and disputes, court penalties, trade bans or other coercive

[24] UNDP 2022
[25] Boocker & Wessek 2024; EC Taxation and Customs Union 2024
[26] UCEM 2024
[27] UNFCCC 2024 (2)

		measures within or between nation states out of political reasons threaten business prospects of affected corporates and shock global supply chains. These include climate sanctions, but also sanctions affecting green industries or products.
	Logistics Restrictions	Bottlenecks or limits of access to key global transport routes due to geopolitical restrictions impact the operational viability and profitability of relevant corporates, as well as carbon emissions from re-routing.[28]
Corruption & Crime	Corruption Deterioration	The abuse of power for personal gain (e.g. bribery, nepotism, kleptocracy) threatens security by enabling crime, compromises decarbonization efforts and allows economic inefficiencies by creating business uncertainty, slowing processes and imposing additional costs.
	Greenwashing	Deceptive practice of making false statements and claims regarding environmentally-sound practices or products, thus misleading other actors and causing mistrust in green investments.
Government Business Policy	Policies Favouring Alternative Energies	News about upcoming regulation or policy changes regarding the green transition creates business uncertainty, typically accelerating corporate capital spending to pre-empt potential unfavourable impacts.
	Carbon Pricing	Market-based approach to assign a price to GHG emissions, capturing their external costs and passing them to the emitters. Two types include carbon taxes and emissions trading systems (ETS).[29]
	Carbon Budget	Maximum amount of CO_2 emissions to limit global warming to a set target.
	Coal Phase-Out	Environmental policies to stop burning coal.
	Energy Performance Standards & Thermal Efficiency Regulations	Specifications for energy and heating performance.
	Combustion Engine Vehicle Ban	Policies to ban new diesel and petrol cars.
	Nationalisation and Expropriation	The government transforms a foreign investor's (nationalisation) or individual's (expropriation) private assets under public ownership, with or without compensating the former owners.
	Privatisation	The government sells state-owned businesses to private investors, or private entities become responsible for implementation of government programmes or services.
	Licence Revocation	The authorities cancel rights of a company to do certain businesses, causing abrupt and severe disruption to normal operations. Licence revocations during the transition may be related to the pursuit of climatic targets and environmental compliance.
Change in Government	Nationalism/ Protectionism	Promoting interests of own nation often to the exclusion or detriment of interests of others, including protectionist policies that restrict trade, results in declining economic growth and welfare as well as damage to producers and consumers.
	Green Policy Reversal	Political reform where environmental, net zero or green policies and targets are reversed, revoked or rolled back.
	Environmentalism	Social movement advocating environmental protection and reducing negative impacts on participants in ecosystems, pushes changes in regulations and policies that disrupt business operations.
Political Violence	Social Unrest	There is a mass act of civil disobedience (e.g. demonstration, riot) where the participants become hostile towards the authorities, and the authorities have difficulties in maintaining public safety and order.
	Climate Protests	Protests against lack of progress to address climate change.[30]
	Tax Revolts	Protests or refusal to pay part of or all taxes.
Interstate Conflict	Conventional Military War	Warfare conducted using conventional weapons and battlefield tactics to target military facilities, population and economic centres, negatively effecting business prospects, investor sentiment and global decarbonization efforts by military and conflict emissions.[31]
	Cold War	Geopolitical tension without large-scale direct fighting but with each side supporting regional conflicts as proxy wars prompts competition for resources and disrupts international trade and business activities.

[28] Willige, A. 2024
[29] Vitello 2021
[30] Carnegie 2024
[31] Global Stocktake 2024

Table 11: Technology Risk Type Definitions, *Cambridge Taxonomy of Climate Transition Risks*, v1.0

Family	Risk Type	Risk Type Definition
Disruptive Technology	Artificial Intelligence	Failure to adapt Artificial Intelligence (AI) techniques into operations could limit growth and consumer engagement with potential for misconfiguration and significant job loss. However, its implementation also faces the challenge of an increased energetic demand for its servers.
	Digital Technologies	Implementation of digital devices, systems and technologies (Internet of Things (IoT), 5G, block chain, robotics and automation) across the organisation.
	Nature-Based Solutions	Actions to face societal challenges through the restoration and protection of ecosystems and human health.[32]
	Greenhouse Gas Removal Technologies	Technologies for greenhouse gas removal (GGR) – *e.g.* afforestation; reforestation; bioenergy; Carbon Capture, Utilisation and Storage (CCUS); direct air capture; enhanced weathering; soil carbon sequestration; biochar; ocean fertilisation and coastal blue carbon - reach their maturity.[33]
	Grid Extension	Network expansion of power transmission system.
	Energy Storage Capacity	Technological innovation and/or increase in the amount of energy storage capacity, along with emissions and cost reduction.
	Autonomous Electric Vehicles	Self-driving vehicles powered by electricity.
	Alternative Energies	Changes to energy systems, transmission and sources with little or no GHG emissions. Alternative energies include, but are not limited to, solar, wind, hydropower, geothermal, tidal, nuclear and green hydrogen. [34]
	Iron & Steel	Decarbonization efforts across the iron and steel industries.
	Cement	Decarbonization efforts in the cement industry.
	Petrochemicals	Decarbonization efforts in the petrochemical industry.
	Heating	Technology to decrease energy consumption or improve energy efficiency in building heating systems.
	Climate-Smart Cities	Deployment of energy-efficient solutions and investment in climate-resilient and low-carbon infrastructure for urban development.[35]
	Geoengineering	Large-scale technological manipulation of the ocean, soil and atmosphere to reduce the effects of climate change.[36]
Cyber	Cybersecurity	Practices and systems to protect organisations, governments and individuals against cyber-attacks.
Critical Infrastructure	Energy security	Uninterrupted availability of energy sources at affordable prices.[37]
	Land, Marine and Aerial Transport	Decarbonization efforts taking place across the land transport, shipping and aviation industry, including (air)port and traffic management, green fuels and vehicle efficiency.
	Water & Waste	Restricted water or waste and sewage disposal leads to limited operations at key facilities.
	Fuel	National or global fuel supply restrictions, asset stranding and transition / phase-out policies limits the movement of goods.
	Gas	National or global gas supply restrictions, phase-out policies or gas system outages limits access to this key utility.
Industrial Accident	Property & Infrastructure Damage	Damage to key properties and infrastructure directly affects operations or impacts supply chain.

[32] IUCN 2024
[33] Bui & Mac Dowell 2022
[34] Hassan *et al.* 2024
[35] UNFCCC 2023
[36] Geoengineering Monitor 2024
[37] IEA 2022

Table 12: Environmental Risk Type Definitions, *Cambridge Taxonomy of Climate Transition Risks*, v1.0

Family	Risk Type	Risk Type Definition
Extreme Weather	Flood	The temporary overflow of water that inundates normally dry land: On floodplains (riverine flood), along coasts (coastal flooding) or at the location of intense rainfall (flash flooding).
	Tropical Windstorms	A rapidly rotating storm system formed over warm, tropical seas and characterised by a low-pressure centre, spiral bands of intense rainfall and strong winds. Depending on their location, they are referred to as hurricanes (Atlantic, Northeast Pacific), typhoons (Northwest Pacific) or cyclones (South Pacific and Indian Ocean).[38]
	Temperate Windstorms	A generic term for extreme weather phenomena, formed under a variety of meteorological conditions that bring some combination of heavy precipitation (including rain, hail or snow), high winds and lightning.
	Storm Surge	Abnormal rise in seawater level caused by a storm.[39]
	Drought	A prolonged period of below-average precipitation that produces a shortage of water for an ecosystem. Drought is not solely a physical phenomenon because its impacts can be exacerbated by human activities and water demands.
	Freeze	A period of abnormally cold air temperatures over a widespread area typically lasting two or more days. A 'freeze' occurs when the air temperature is below (32˚F/0˚C). The defined temperature threshold varies by location and climate.
	Heatwave	A period of abnormally hot and/or humid weather over a widespread area, typically lasting two or more days. The defined temperature threshold varies by location and climate.
	Wildfire	An uncontrolled and unintentional fire in a natural setting of combustible vegetation that spreads based on environmental conditions (including wind and topography). Wildfires can be triggered by lightning or human actions.
Geophysical	Earthquakes / Landslides	Earthquakes are a sudden movement of a block of the Earth's crust along a geological fault and associated ground shaking, while landslides are the movement of rock, debris or earth masses down a slope. Global warming is expected to increase earthquake and landslide hazards through reduced fault stability from ice melting and permafrost thaw, changes in low air pressure, rising sea levels and heavy rainfall.[40] Large earthquakes can produce tsunamis.
	Volcanic Hazards	A discharge of lava, ash and gas from a volcanic vent in the Earth's surface. Volcanic hazards and mudflows are expected to be exacerbated by global warming through stress changes on the Earth crest from melting glaciers, additional water bodies near slopes, rising sea levels and heavy rainfall.[41]
	Tsunami Hazards	A series of waves, typically in an ocean or large lake, generated by a displacement of a massive volume of water through underwater earthquakes, volcanic eruptions or landslides. Climate change is projected to aggravate tsunami hazards and its triggers through rising sea level, landslides and collapsing ice shelves.[42]
Climate Change	Physical	Longer-term shifts (chronic) in climate patterns. For acute physical risks, see the Extreme Weather family.
	Liability	The state of being legally responsible for something, or the financial obligation to another party. In particular, emerging liability claims may arise under three broad categories: Failure to mitigate impacts of climate change, failure to adapt to the impacts of climate change and claims for failure to disclose climate-related risks to shareholders.
	Higher Temperature Conditions	Increase in global land and ocean conditions that exceed the average global temperature.
	High-Risk Locations	Change in hazard exposure results in a redefinition of high-risk areas, thus potentially affecting operations, insurance premiums and coverage.
	Sea Level Rise	The average long-term global rise of the ocean surface as a result of climate change.

[38] For the impact of climate change on hurricane severity, see CCRS 2024
[39] NOAA 2024
[40] Bohnhoff *et al.* 2024; GeoHazards International 2024; Cunneen 2022; Masih 2018
[41] Aubry et al. 2022; Cunneen 2022; Farquharson & Amelung 2022
[42] Australian Climate Service 2024; Frost 2024; Cunneen 2022

	Ocean Acidification	The process by which the increasing atmospheric carbon dioxide concentration causes a decrease in the oceanic pH level, with significant consequences for marine ecosystems.
	Climate Change Mitigation and Adaptation Projects	Changes to behaviours, systems and activities to reduce GHG emissions (climate change mitigation (CCM)) and respond (climate change adaptation (CCA)) to climate change impacts.[43]
	Methane Emissions Reduction	Strategies and projects to limit, reduce and remove methane emissions.
Environmental Degradation	Waste & Pollution	The introduction of undesirable or hazardous substances to the environment with temporary or irreversible adverse impacts. Hazardous wastes comprise biological, chemical and radioactive substances.
	Biodiversity Loss	A reduction in the variety of species (plant or animal) on Earth or in a certain habitat.
	Ecosystem Collapse	A drastic, possibly sudden and/or irreversible, transition of an ecosystem beyond a bounded threshold. Collapse often involves a mass extinction and loss of defining features, a transformation of identity, and/or replacement by a new ecosystem.
	Deforestation	The permanent destruction of forests from land which is then made available for other uses, with impacts on the global climate and regional hydrological and ecological systems.
	Soil Degradation	The loss of soil or degradation of soil quality, resulting in loss of fertile land, increased pollution and sedimentation in waterways, and/or more severe flooding.
Natural Resource Deficiency	Critical Minerals & Metals	A deficit in the critical minerals and metals used in the production of transition-related goods and services, where consumption exceeds the available supply of high-quality materials.
	Fossil Fuels, Coal and Gas	A deficit in fossil fuel, coal and gas resources where consumption exceeds the readily available supply, with this supply affected by emerging green regulations, climate targets, sector stigmatization and market shifts towards alternative sources of energy and heating.
	Water Stress	A deficit in access to water resources where consumption exceeds the available supply, posing major challenges for water-intensive sectors.[44]
Food Security	Animal Epidemic	An outbreak of an infectious disease in an animal population, which already exists in the region or population concerned; or appears in a previously unaffected region. Climate change can exacerbate disease development and spread diseases into new areas, amongst others.[45]
	Plant Epidemic	An outbreak of an infectious disease in a plant population, which already exists in the region or population concerned; or appears in a previously unaffected region. Climate change increases the risk by creating favourable conditions for the spread of diseases, altering pathogen evolution and/or host-pathogen interaction.[46]
	Famine	A catastrophic food shortage affecting a large population, with climate change as one of its major drivers.
	Sustainable Agriculture & Livestock	Changes to agricultural and cattle-raising practices to increase productivity, decrease GHG emissions and improve food security through climate change mitigation and adaptation practices.

Table 13: Social Risk Type Definitions, *Cambridge Taxonomy of Climate Transition Risks*, v1.0

Family	Risk Type	Risk Type Definition
Socioeconomic Trends	Population Growth / Decline	Changes in global population, with different growth rates according to the demographic landscape.
	Ageing Population	The increase in the share of older people in a population holds significant implications for public services – including increased vulnerability to worsening climate conditions and extreme weather events - and economic productivity from labour shortages.
	Social Costs of Adjustment	Negative economic and social effects of adjusting to new economic models; in this case, the transition to a low-carbon economy. Mitigation measures aim to protect marginalized and/or vulnerable groups; for example: Indigenous

[43] EEA 2024; UNFCCC 2024 (1)
[44] CEO Water Mandate 2020
[45] Conn & Soares Magalhães 2024
[46] Singh *et al.* 2023

		groups, elderly population, children, outdoor workers, those employed in emission-intensive sectors and people living in high-risk areas.[47]
	Gender Equality	Equality of rights and opportunities between men and women. Climate change exacerbates existing inequality and has a disproportionate impact on vulnerable groups; for this reason, women empowerment and participation can play a major role in climate action.
	Migration	The movement of people, within or across borders, with the intention of settling, temporarily or permanently, at a new location, with socioeconomic and political consequences. This trend is exacerbated by the impact of climate change on extreme weather events and conditions, food and water insecurity amongst others.
Human Capital	Failure To Attract or Retain Talent with Sustainability Skills	The failure of an organisation to attract or retain top talent with sustainability knowledge and skills, and/or engage existing employees to up-skill in climate-related subjects.
	Green Talent Shortage	Lack of workers with the skills required to fill the jobs created by the green transition, while demand grows faster than supply.
	Labour Disputes & Strikes	Disputes over employee working conditions or compensation, especially those regarding adaptation to new climatic conditions, job security and retention[48] - results in the mass refusal of employees to work, thereby disrupting or stopping an organisation's operations.
Brand Perception	Sector Stigmatization	Harming of public perception of an industrial sector, thus undermining investment and new projects.
	Reputational Loss	Harming of public perception of the brand, in particular from change in consumer attitudes, low Environmental, Social and Governance (ESG) scores and contribution or detraction from climate action.[49]
	Negative Customer Experience	A customer dissatisfied by a service or product's generated waste or carbon footprint and sharing this negative experience in public, particularly via social media, harms the public perception of the brand.
Sustainable Living	Climate Consumer Activism	A social movement by activists that negatively impacts an organisation to protest and influence its actions or inaction to protect people from climate change, often by boycotting products or services.
	Sustainable Purchasing	A shift in consumer purchasing preferences towards sustainable products, services or brands, as consumers grow more aware of environmental, social, and/or economic sustainability issues.
	Supply Chain Provenance and Emissions Traceability	The demand or failure on an organisation to assure the provenance and emissions traceability of products and services, in terms of how they are sourced, manufactured, stored, and delivered to customers.
	Low-Carbon Diet Change	A shift in a population's dietary preferences towards those with a lower carbon footprint.
Health Trends	Healthcare	The deficiency, failure, or collapse of a public health system affects the average health outcomes of a population, while people adapt to and cope with climate-related shocks, and both mental health concerns and eco-distress increase.[50]
	Social Care	The deficiency, failure, or collapse of a social welfare system results in a failure to fulfil basic human needs and affects the well-being of a population, while people adapt to and cope with climate-related shocks. Social care is required to achieve a just transition.[51]
Infectious Disease	Disease Outbreak and Pandemics	Pandemics, epidemics, severe viral infections and preventable disease outbreaks and unknown emergent diseases (*e.g.* from permafrost thaw) become a risk for public health as climate hazards aggravate human pathogenic diseases.[52]

Table 14: Governance Risk Type Definitions, *Cambridge Taxonomy of Climate Transition Risks*, v1.0

Family	Risk Type	Risk Type Definition
Non-compliance	Emerging Green Regulation	News about upcoming green regulation or policy changes creates business uncertainty, typically accelerating corporate capital spending to pre-empt potential unfavourable impacts.

[47] IMF 1987
[48] ILO 2024 (2)
[49] TCFD 2017
[50] Stanford 2022
[51] ILO 2024 (2)
[52] Mora *et al.* 2022

	Mandatory Disclosure of Scope 1, 2 and 3 Emissions	Public disclosure of an organisation's direct emissions, indirect emissions and emissions across its supply chain.
	Internal Corruption & Fraud	Internal corruption or fraud causing violation of key climate-related regulations, especially in contexts with a lack of transparency and accountability measures.
	Negligence	Accidental violation of key or emerging environmental and energy regulations.
	Occupational Health Safety in a Warmer World	Employee and consumer health and safety regulation is continuously evolving and becoming more complex in a warmer planet.
Litigation[53]	Private Lawsuit for Climate Change Damage	Litigation filed by individual consumer or shareholder alleging corporate wrongdoing in its failure to address the climate crisis. Litigation may arise from new liability rules (see the Liability risk type).
	Mass Tort for Climate Change Damage	Litigation filed by a larger group of consumers or shareholders alleging corporate wrongdoing, with plaintiffs treated as individuals, in its failure to address the climate crisis. Litigation may arise from new liability rules (see the Liability risk type).
	Class Action for Climate Change Damage	Litigation filed by a larger group of consumers or shareholders alleging corporate wrongdoing, with plaintiffs treated as a group, in its failure to address the climate crisis. Litigation may arise from new liability rules (see the Liability risk type).
Strategic Performance	Fossil Fuel Divestitures	The risks associated with a partial or full disposal of fossil-fuel-related assets or businesses through sale, exchange, closure or other financial means.
	Restructuring	The risks associated with a complete financial or organisational restructuring as they align with green policies, Sustainable Development Goals (SDG) and decarbonization efforts.
	Poor Investment	Investment strategy failure leading to financial loss.
Management Performance	Executive Mismanagement	Rough executives who are making decisions while failing to consider ESG and transition risks into the business strategy or failing to interpret climate data properly.[54]
	Ineffective Board & Oversight	Risks arising from an ineffective board in terms of experience, understanding of transition risks, climate credentials[55] and CEO presence.
	Management Execution Failure	Failure by management to execute climate and sustainability strategic objective due to lack of communication or motivation.
Business Model Deficiencies	Adoption of Low-Emissions Technologies	Implementation or change to low-carbon energy sources in an organisation.
	Project Delays	Unforeseen events cause deferment or setbacks in a project's planned schedule.
	Stranded Assets	Assets with unanticipated or premature write-down, devaluation or conversion to liability due to changes in their operational landscape.[56]
	Business Interruption	Loss of income when businesses cannot operate as usual due to unforeseen events.
	Customer Preference Change	Failure of the business model to adapt to shifting consumer preferences towards sustainable products and services.
Pension Management	Contribution Management	Poor management of the pension contributions through inclusion or negligence of green investments and climate change in pension funds.
	Fund Management	Poor management of the pension investment fund during portfolio climate alignment.
Products & Services	Product Defect/Failure	Failure of a key product or service.
	Early Retirement	Reduced operation and premature finalization of projects or provision of products and services.
	Green Research, Development and Innovation Failure	Failure of key research, development and innovation (R&D&I) projects or strategies for the green transition.

[53] UNEP 2023
[54] Deloitte Development LLC 2023
[55] Whelan 2021
[56] Caldecott *et al.* 2014

Glossary

AI: Artificial Intelligence

BIS: Bank for International Settlements

CBAM: Carbon Border Adjustment Mechanisms

CCA: Climate Change Adaptation

CCM: Climate Change Mitigation

CCRS: Cambridge Centre for Risk Studies

CISL: Cambridge Institute for Sustainability Leadership

CSH: Centre for Sustainable Healthcare

GDP: Gross Domestic Product

EC: European Commission

EEA: European Environment Agency

ETS: Emissions Trading Systems

GGR: Greenhouse Gas Removal

GHG: Greenhouse Gas

IEA: International Energy Agency

ILO: International Labour Organization

IoT: Internet of Things

NAIC: National Association of Insurance Commissioners

NBS: Nature-Based Solutions

NDC: Nationally Determined Contributions

NGFS: Network for Greening the Financial System

R&D&I: Research, Development and Innovation

SDG: Sustainable Development Goals

SRH: Systemic Risks Hub

TCFD: Task Force on Climate-Related Financial Disclosures

UCEM: University College of Estate Management

UNDP: United Nations Development Programme

UNDRR: United Nations Office for Disaster Risk Reduction

UNEP: United Nations Environment Programme

UNFCCC: United Nations Framework Convention on Climate Change

WEF: World Economic Forum

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