
Climate Risk Integration Framework

Developed by BSR in collaboration with
member companies



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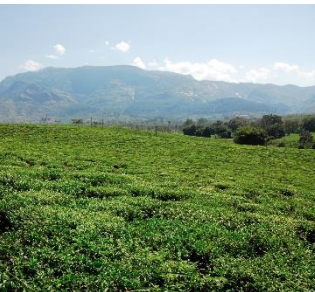
About This Document

BSR is publishing a suite of materials that can be used to support companies to manage climate risks.

The Climate Risk Integration Framework is intended to guide companies through the process of identifying, assessing and prioritizing climate risks, and integrating that process into existing risk management systems.

This document was created by BSR with support from the following companies. These companies came together under a vision to achieve company value chains and communities that sustain each other thrive in the face of climate change; and a mission to build climate resilience for communities, farmers, and workers along value chains by:

- Assessing climate risks and integrating them into business processes
- Developing standard approaches, methodologies and metrics for business action on resilience
- Promoting collaboration among business



Anheuser-Busch InBev

Bayer AG

The Coca-Cola Company

Etsy, Inc.

Mars

McDonald’s Corporation

PepsiCo

Primark

Santam, Ltd.

Target

WWF

Introduction to Climate Risk Management

- As the risks from climate change become more apparent, and with growing investor attention and action, it is increasingly important for companies to understand **how climate change can affect business performance and their capacity to achieve their strategy and goals.**
- The **TCFD recommendations**, issued in June 2017, marked an important turning point for the resilience of global financial markets, providing a foundation to improve the ability of markets to properly report, assess, and price climate-related risks and opportunities. **Voluntary reporting framework and standards**, as well as **jurisdictional requirements** aimed at enhancing and standardizing climate-related disclosures, **have aligned with the TCFD recommendations**, given their widespread support and adoption.
- However, ESG risks - and climate risks in particular - are **still largely not discussed at company Board level**, due to a misunderstanding of how they could present business risks, their financial implications, and the timeline in which they can occur. More generally, **few companies are taking action to identify, assess and mitigate climate risks efficiently.**

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Climate Risk Assessment Framework

Overview, Objectives and Methodology

Background

Climate Change is a Material Risk to Business

The following risks may threaten your bottom-line:

1. Increasing severity and frequency of **extreme weather** events
2. Systemic impacts of **increasing temperatures**, precipitation patterns, and biodiversity loss
3. Increased **regulatory and legal** actions by governments to mitigate GHG emissions and adapt to climate impacts
4. Technological **developments** that disrupt incumbent systems and business models
5. Shifts in the **market supply and demand** of certain commodities, products, and services

Stakeholder expectations for companies to measure, manage, and disclose exposure to climate risks are rapidly increasing.

Climate change can impact several business functions, including:



Strategy

- Limit ability to achieve strategic goals
- Impact relevance / competitive position in the marketplace
- Shift the demand for goods and services
- Impact the level of geographic risk exposure



Finances

- Financial losses
- Prohibit / limit access to capital and insurance
- Changes in food production and real estate could affect asset and commodity prices
- Costly disaster recovery



Operations

- Damage infrastructure / physical assets
- Disrupt logistics, production, and distribution of products
- Change the quantity and quality of raw materials and their transport



Human Resources

- Threat to employee health, safety, and access to work
- Degrade talent attraction and retention
- Threaten 'social license to operate'



Compliance & Legal

- Increase compliance costs for operations and products
- Legal fees
- New reporting obligations
- Increase in the cost of fossil-based fuels and electricity



Sales & Marketing

- Diminish sales
- Impact relevance / competitive position in the marketplace
- Threaten customer loyalty

As stakeholder expectations around climate change rise, it is critical for companies to understand **how climate change can affect business performance and their capacity to achieve their strategy and goals.**

The Task Force on Climate-Related Financial Disclosures

Convened under the G20 and chaired by Michael Bloomberg and Mark Carney, the TCFD has published recommendations on how companies should disclose on climate risks and opportunities.

What are the recommendations?

- The recommendations are intended to provide decision-useful information to lenders, insurers and investors.
- The recommendations are for disclosures in mainstream financial filings (e.g., 10-K), although disclosures typically occur in the sustainability report, a specialized climate report, or the annual report.

Why implement them?

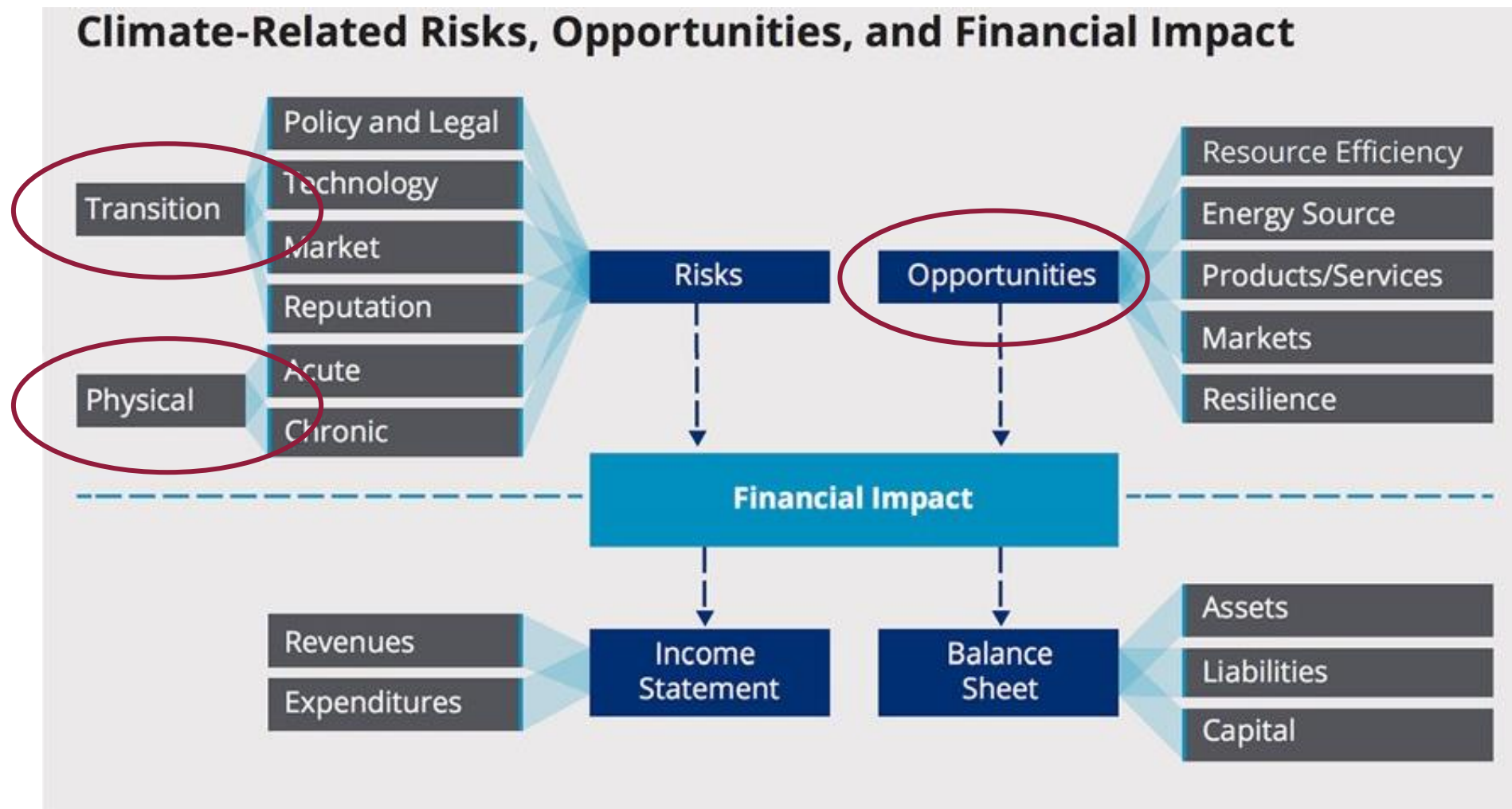
- The TCFD recommendations are [publicly supported by a growing number](#) of investors, companies, and other organizations.
- Climate-related disclosure rules and standards of various jurisdictions, including the United States and European Union, are aligned with the TCFD Recommendations.
- The Climate-related Disclosures Standard of the International Sustainability Standards Board (ISSB) also follows the reporting structure and content recommended by the TCFD.
- Other voluntary disclosure frameworks have coalesced around the TCFD (e.g., GRI, and CDP).



Widespread adoption has made the TCFD recommendations a new norm for the disclosures and management of climate risks and opportunities.

TCFD Climate-Related Risks and Opportunities and Financial Impacts

The TCFD focuses on climate-related transition risks, physical risks, and opportunities—and how they may impact company finances.



Climate-Related Risks



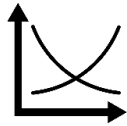
Policy & Legal

- The growing body of climate laws, liabilities, and regulations could increase costs for the private sector. Regulation related to climate-related disclosures require companies to identify, assess, and manage climate-related risks.



Technology

- Technological innovations that accelerate the transition to a lower-carbon economy (i.e. renewable energy, battery storage) continue to shift production and distribution costs, displace products and services, and disrupt legacy business models and infrastructure.



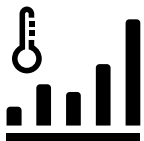
Markets

- Climate change is already affecting the market supply and demand for certain commodities, products, and services in complex and volatile ways – increasing exposure to risk of credit default and asset revaluations.



Reputation

- Companies are scrutinized regarding their contribution to climate change and efforts to enable a just transition to a low-carbon economy. Investor expectations for companies to disclose and manage exposure-to climate change are also rapidly increasing.



Physical

- The physical impacts of climate change may be acute – specific events, such as hurricanes, floods, or wildfires – or chronic – longer-term shifting climate patterns, such as increased temperatures, sea level rise, and drought.



People

- Climate-related events can limit workers' ability to get to work, productivity, and capacity at work. Talent attraction and retention can also be impacted by a company's approach to climate change.

Template | What Climate-Related Risks Apply to Your Company?

Brainstorm potential physical and transition risks as they may apply across the company's operations, products and services, supply chain, and in the communities in which the business operates.



Policy & Legal

Consider the following indicators: Carbon pricing, emissions-reporting obligations, mandates on and regulation of existing products and services, exposure to litigation.



Technology

Consider the following indicators: Substitution of existing products with lower-emissions options, investment in new technologies, costs to transition to lower-emissions technology.



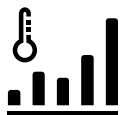
Markets

Consider the following indicators: Changing consumer behavior, market signals (certainty / uncertainty), cost of raw materials, shifts in consumer preferences.



Reputation

Consider the following indicators: Stigmatization of sector, stakeholder concern and feedback, changing customer behavior.



Physical

Consider the following indicators: Increased frequency and severity of acute climate risks (e.g., weather events) and chronic changes in climate variables (e.g., rising sea levels).



People

Consider the following indicators: Weather and climate events that may threaten employee health, safety, and access to work, degraded talent attraction and retention.

Climate-Related Opportunities



Resource Efficiency

- Improved energy and material efficiency across production and distribution processes provides operational cost savings over the medium-to long term and minimizes impact on the climate.



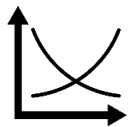
Energy Source

- Organizations that shift their energy usage toward low-carbon sources could potentially save on annual energy costs, while reducing contribution to climate change.



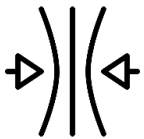
Products and Services

- Organizations that innovate and develop new low-emission products and services may improve their competitive position and capitalize on shifting consumer and producer preferences.



Markets

- Organizations that proactively seek opportunities in new markets or asset types may be able to diversify their activities and better position themselves for the transition to a lower-carbon economy.



Resilience

- Organizations can improve business continuity and competitive positioning by designing, building, and operating in a way that anticipates, adapts, and withstands disruptions caused by changing climate conditions.



Communities

- Organizations that enhance the resilience of vital communities, such as supply chain, vital sourcing, and market communities, also strengthen core business resilience.

Building Climate Resilience for Businesses

- Despite increasing climate impacts and stakeholder pressure, **very few companies are taking action to identify, assess and mitigate climate risks effectively**, given the complexity and uncertainty, a lack of standard frameworks, and an adherence to short-term business cycles.
- Environmental, Social and Governance (ESG) risks - and climate risks in particular - **are still not typically discussed at the Board level**, given misconceptions about their relevance, magnitude, and time horizon.
- It is critical for companies to understand how climate change can **affect business performance** and their **capacity to achieve their strategy and goals**.
- Integrating climate elements into existing risk assessment, management, and governance processes is an effective first step toward **building business resilience to climate change**.

Why Integrate Climate Risks into Enterprise Risk Management?

Enhance Resilience

- A company that is viable and resilient in the medium- and long-term will be able to anticipate and respond to complex and interconnected risks that threaten the company's strategy and operations.

Use a Common Language

- Using an identical process to identify and assess both climate and non-climate risks brings climate issues into mainstream processes and evaluations.

Improve Resource Deployment

- Obtaining robust information on climate risks enables management to assess overall resource needs and helps optimize resource allocation.

Achieve Efficiencies of Scale

- Managing climate-related risks centrally and alongside other company risks helps eliminate redundancies and better allocate resources to address the company's priority risks.

Improve Disclosures

- Improving the company's understanding of climate-related risks can provide the transparency investors expect and to comply with reporting requirements.

Enhance Internal Engagement

- Collaborating to identify and assess risks increases the breadth of knowledge, understanding and experience. Companies should also consider involving senior leadership and business units to support the analysis.

Moving Toward Comprehensive Climate Risk Assessment: Guiding Questions

This assessment can help companies determine their level of ambition and the required next steps towards an improved climate risk management system.

1. Check your organization's understanding of climate-related risks

- How are your strategic objectives impacted by climate risks?
- How is each functional area impacted by climate risks? Specifically, what are the primary supply chain / operational climate risks for the company?
- Does climate change or GHG emissions reductions play a role (directly or indirectly) in these risks?

2. Check your organization's current climate risk assessment process

- Does your company currently assess climate risks? Do you follow a specific process / methodology for doing so?
- Is the Board aware / involved in the climate risk identification / assessment / mitigation process?
- Have you identified any gaps in the identification and assessment process?
- More generally, do you have a business resilience assessment process and methodology?
- Does your strategy address climate risks?
- Are you disclosing your climate risks?

3. Assess the level of climate integration in your ERM system

- Does your company use an ERM system?
- Are climate risks such as physical climate impacts and potential emissions reduction regulations already integrated in your ERM? How so?

Overview

The Climate Risk Integration Framework

Overview

- Builds upon existing research, the TCFD recommendations, and insights gleaned from interviews with corporate sustainability and risk management professionals
- Provides a standardized framework to help companies assess and integrate climate risks into existing risk management systems and governance practices
- Supports the business case for a climate integrated Enterprise Risk Management (ERM) system
- Facilitates the first step in a company's journey towards better understanding and managing its climate risks

How to Use It

- Use the “**Climate Risk Identification**” section of the framework to make sure you have identified all your climate-related material risks
- Use the “**Climate Parameter Definition**” section of the framework to make sure your risk assessment is performed at the right level (e.g.; value chain segment, geography) and is relevant for your business.
- Use the “**Climate Risk Prioritization**” section of the framework to check / enhance your current climate risk assessment process (if any) and prioritize climate risks both amongst them and other company risks
- Use the “**ERM Integration**” sections of this deck to check the current level of integration of climate risks and trigger discussions with your ERM / Risk Management Team.
- Use the “**Governance**” section of the deck to assess and strengthen your company's governance of climate-related issues

BSR's Climate Risk Integration Framework | 4 Key Steps

IDENTIFY

- Determine the key parameters of the risk assessment process (priority focus areas, projections, timeframe)
- Identify the key risks using the TCFD classification

INTEGRATE

- Add new risks into the risk registers
- Revise risk definitions to include a climate dimension

ASSESS & PRIORITIZE

- Use the company's ERM to assess and prioritize climate risks
- Prioritize climate risks against other company risks already factored into the company's ERM system

Build & Strengthen Climate Governance

BSR recommends companies align climate risks with the ERM prior to the risk assessment. Alternatively, companies can integrate climate risks into the ERM system after assessing and prioritizing them, understanding that this will require further work on ERM integration.

Identifying Climate Risks



Objective: Identify the key risks to which the priority focus areas considered are exposed.

Recommended steps:

1. Companies develop a list of potential material risks using the [TCFD](#) classification.
2. Companies conduct a high-level assessment of the potential timeframe and impact of the priority risks, leveraging relevant climate projections.
3. Companies check if priority risks are already incorporated in their ERM system.

Additional considerations:

- Risk analysts can reference common risks for their sector or geography by looking at additional resources (e.g. reports from consultancies, industry associations, local governments). The process may also include surveys, workshops and interviews with risk owners and executives. For some issues, it may be appropriate for sustainability practitioners to perform ongoing monitoring and evaluation as to whether these risks should be elevated to an enterprise level and included in the risk inventory in the future
- When identifying risks, it is important to go beyond simply “listing” the risks. Risks should be articulated precisely in terms of the impact to the company / priority areas. Understanding the nature and root cause of the risk is also critical
- While this framework focuses on risks, companies are encouraged to also identify and assess opportunities created by climate change (as defined in the TCFD recommendations)

Integrating Climate Risks into a Company's ERM System

- Many climate risks fall into conventional enterprise risk categories, as they are operational or financial in nature
- Climate risks often introduce an additional variable, or 'climate multiplier' to an existing risk, affecting its impact or likelihood of materializing
 - For example, climate change impacts often increase cost fluctuations of raw materials, which is already a risk for many companies

The framework offers three complementary approaches for integrating climate risks into a company's existing ERM system. The approaches should be considered a set of options you can choose from and / or combine depending on your company's level of maturity on the topic.

Prioritizing Climate Risks



Objective: Prioritize the key risks to which the priority focus areas considered are exposed

Recommended steps:

- First check whether the current ERM methodology can be used to evaluate and prioritize the identified risks
- If so, companies can proceed with this approach to rank their climate risks against the others
- If not, companies can conduct the evaluation and prioritization of risks using either a quantitative or qualitative methodology to assess the likelihood and impact of each of the risks:
 - A **qualitative methodology** assesses the level of each risk identified for the priority focus areas, based on likelihood, potential impacts and a mitigation factor. Note: A qualitative assessment is beneficial as it can act as a screening tool to then dive further in on the critical or most high-risk focus areas with a quantitative assessment
 - A **quantitative methodology** calculates a score for each risk identified for the priority focus areas, based on likelihood, potential impacts and a mitigation factor. Note: Doing a quantitative assessment is beneficial as it can help convince internal decision-makers, but it should not be required as part of the risk assessment



Building & Strengthening Climate Governance

- Boards play a critical role ensuring that companies are able to navigate an evolving risk landscape
- Directors need to consider oversight of these issues as part of their fiduciary responsibility (“duty of care”)
- Although the potential impacts of climate change are widely recognized, the uncertain magnitude and long-term nature of the problem means it is often not discussed as a financial risk in boardrooms, which tend to focus on short-term business cycles

To address this gap in governance oversight, the Initiative developed climate governance models (next slide) that companies can use to assess its current level of integration and identify next steps towards climate governance leadership.

Implementing the Framework | Two Options

BSR recommends companies to move forward with option A if internal engagement allows. Companies can alternatively start their climate risk integration journey with option B, understanding that this will require further work on ERM integration.

Option A

Align Climate Risks with ERM Prior to Risk Assessment

- The process starts with an alignment of climate risks with the company's ERM system. The company can then perform the risk assessment on a specific scope.
- **Good for:**
 - Companies willing to involve their ERM teams early in the process and to develop a more comprehensive approach
 - Companies willing to streamline their approach to risks
- **Limitations**
 - Companies might eliminate a risk at the beginning because of misalignment with the ERM system and miss assessing it (even though it is a material risk).

Companies may benefit from different approaches depending sector, organizational structure, risk appetite, and maturity

Option B

Adjust ERM System Following Assessment of Climate Risks

- The process starts with an assessment of climate risks. The company can then use the results of the assessment to adjust its ERM system.
- **Good for:**
 - Companies that are not ready to update their ERM system with climate risks prior to the risk assessment
 - Companies willing to pilot a very thorough risk assessment on a specific priority area
- **Limitations:**
 - As the focus areas, projections and timeframe are defined early in the process, it can influence the way companies identify their material risks in step 2, and they may miss risks that are material for the company but not for the scope of the assessment.
 - Similarly, climate risks incorporated into the ERM system would be those specific to the scope of the assessment. The company will have to update its ERM system again with additional climate risks identified in a subsequent assessment performed for another scope.
 - Additionally, companies may have difficulties merging the results of the climate risk prioritization into their current ERM system

02

Climate Risk Assessment Framework

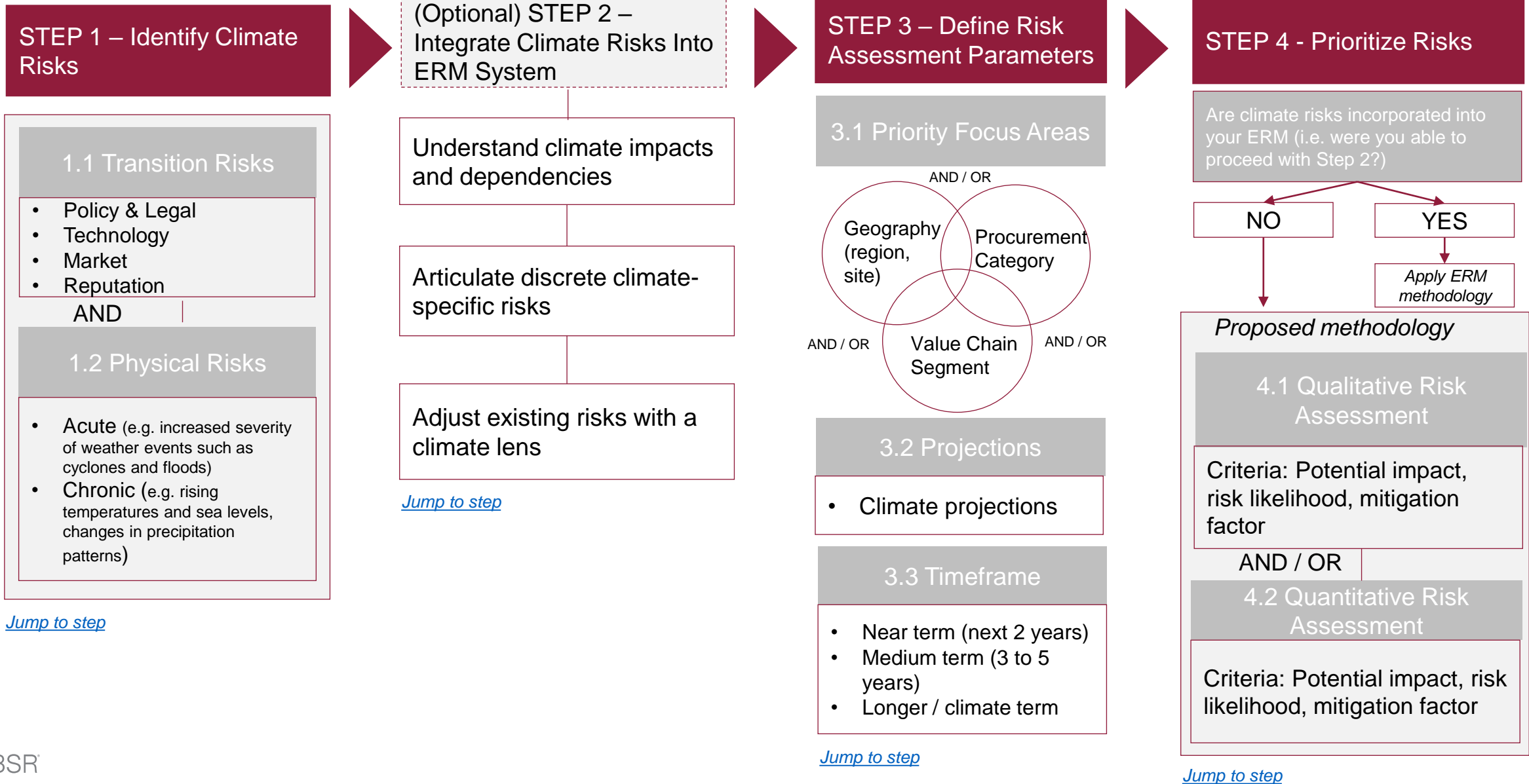
Detailed Framework Steps

Option A

Align Climate Risks with ERM Prior to Risk Assessment

1. IDENTIFY → 2. INTEGRATE → 3. ASSESS & PRIORITIZE

Build & Strengthen Climate Governance



Option B

Adjust ERM System Following Assessment of Climate Risks

1. IDENTIFY

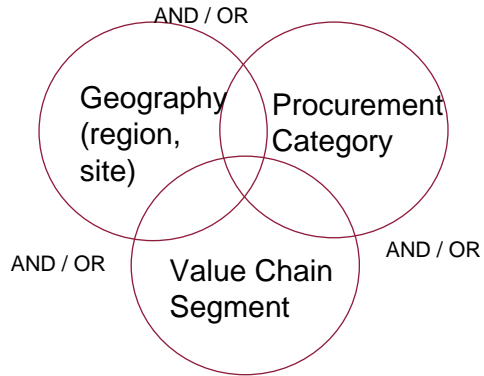
2. INTEGRATE

3. ASSESS &
PRIORITIZE

Build & Strengthen Climate Governance

STEP 1 - Define Risk Assessment Parameters

1.1 Priority Focus Areas



1.2 Projections

- Climate projections

1.3 Timeframe

- Near term (next 2 years)
- Medium term (3 to 5 years)
- Longer / climate term

[Jump to step](#)

STEP 2 – Identify Climate Risks

2.1 Transition Risks

- Policy & Legal
- Technology
- Market
- Reputation

AND

2.2 Physical Risks

- Acute (e.g., increased severity of weather events such as cyclones and floods)
- Chronic (e.g., rising temperatures and sea levels, changes in precipitation patterns)

[Jump to step](#)

STEP 3 - Prioritize Risks

Can you use the company's ERM to evaluate climate risks identified in Step 2.1 and 2.2?

NO

YES

Apply ERM methodology

Proposed methodology

3.1 Qualitative Risk Assessment

Criteria: Potential impact, risk likelihood, mitigation factor

AND / OR

3.2 Quantitative Risk Assessment

Criteria: Potential impact, risk likelihood, mitigation factor

[Jump to step](#)

STEP 4 – Manage Risks Through ERM System

Understand climate impacts and dependencies

Articulate discrete climate-specific risks

Adjust existing risks with a climate lens

[Jump to step](#)

Step: Identify Climate Risks

Option A	Option B
<i>Step 1</i>	<i>Step 2</i>

Step: Identify Climate Risks

Objective: Identify the key risks to which the priority focus areas considered are exposed.

Recommended steps:

1. Companies develop a list of potential material risks using the [TCFD](#) classification.
2. Companies conduct a high-level assessment of the potential timeframe and impact of the priority risks, leveraging relevant climate projections.
3. Companies check if priority risks are already incorporated in their ERM system.

Additional considerations:

- Risk analysts can reference common risks for their sector or geography by looking at additional resources (e.g. reports from consultancies, industry associations, local governments). The process may also include surveys, workshops and interviews with risk owners and executives. For some issues, it may be appropriate for sustainability practitioners to perform ongoing monitoring and evaluation as to whether these risks should be elevated to an enterprise level and included in the risk inventory in the future.
- When identifying risks, it is important to go beyond simply “listing” the risks. Risks should be articulated precisely in terms of the impact to the company / priority areas. Understanding the nature and root cause of the risk is also critical.
- While this framework focuses on risks, companies are encouraged to also identify and assess opportunities created by climate change (as defined in the TCFD recommendations).

Step: Identify Climate Risks

	Option A Risk Identification	Option B Risk Identification
Inputs	<ul style="list-style-type: none"> – TCFD risk classification: <ul style="list-style-type: none"> ▪ Transition risks: policy & legal, technology, market, reputation ▪ Physical risks: acute, chronic 	<ul style="list-style-type: none"> – TCFD risk classification: <ul style="list-style-type: none"> ▪ Transition risks: policy & legal, technology, market, reputation ▪ Physical risks: acute, chronic – List of Priority Focus Areas (output from the <i>Define Risk Assessment Parameters</i> step)
Activity	<ul style="list-style-type: none"> – Step 1.1 – Identify impacts of transition risks – Step 1.2 – Identify impacts of physical risks 	<ul style="list-style-type: none"> – Step 2.1 – Identify impacts of transition risks under both scenarios for each Priority Focus Area – Step 2.2 – Identify impacts of physical risks under both scenarios for each Priority Focus Area
Outputs	<ul style="list-style-type: none"> – List of transition and physical risks for company and description of expression and potential impact – You are ready to proceed with the next Step! 	<ul style="list-style-type: none"> – List of transition and physical risks for company and description of expression and potential impact for each priority focus area – You are ready to proceed with the next Step!
Tools/ Resources	<ul style="list-style-type: none"> • TCFD Recommendations (2017) 	<ul style="list-style-type: none"> • TCFD Recommendations (2017)

Option A | Step 1.1 – Identify Transition Risks

Output: List of Transition Risks for company

Risk	Indicators (source: TCFD , 2017)	High-level assessment of potential impacts for company*	Potential overlap with risks factored into company's ERM (yes / no and how)*
Policy & Legal	Carbon Pricing		
	Emissions-reporting obligations		
	Mandates on and regulation of existing products and services		
	Exposure to litigation		
Technology	Substitution of existing products and services with lower emissions options		
	Investment in new technologies		
	Costs to transition to lower emissions technology		
Market	Changing customer behavior		
	Market signals (certainty / uncertainty)		
	Cost of raw materials		
Reputation	Shifts in consumer preferences		
	Stigmatization of sector		
	Stakeholder concern and feedback		

Option A | Step 1.2 – Identify Physical Risks

Output: List of Physical Risks for company

Risk	Indicators (source: TCFD , 2017)	High-level assessment of potential impacts for company*	Potential overlap with risks factored into company's ERM system (yes / no and how)*
Acute	Increased severity of extreme weather events such as cyclones and floods		
Chronic	Changes in precipitation patterns and extreme variability in weather patterns		
	Rising mean temperatures		
	Rising sea levels		

Option B | Step 2.1 – Identify Transition Risks

Output: List of Transition Risks for company under selected projection

Risk	Indicators (source: TCFD , 2017)	Evolution under selected projection	Implications for priority focus area	Potential overlap with risks factored into company's ERM system (yes / no and how)
Policy & Legal	Carbon Pricing			
	Emissions-reporting obligations			
	Mandates on and regulation of existing products and services			
	Exposure to litigation			
Technology	Substitution of existing products and services with lower emissions options			
	Investment in new technologies			
	Costs to transition to lower emissions technology			
Market	Changing customer behavior			
	Market signals (certainty / uncertainty)			
	Cost of raw materials			
Reputation	Shifts in consumer preferences			
	Stigmatization of sector			
	Stakeholder concern and feedback			



Option B | Step 2.2 – Identify Physical Risks

Output: List of Physical Risks for company under selected projection

Risk	Indicators (source: TCFD , 2017)	Evolution under selected projection	Implications for priority focus area	Potential overlap with risks factored into company's ERM system (yes / no and how)
Acute	Increased severity of extreme weather events such as cyclones and floods			
Chronic	Changes in precipitation patterns and extreme variability in weather patterns			
	Rising mean temperatures			
	Rising sea levels			

Step: Incorporate Climate Risks into ERM / Manage Climate Risks through ERM

Option A

Step 2
(optional)

Option B

Step 4

Option A | Step 2: Incorporate Climate Risks into ERM System

Objectives & Activities

Objective: Incorporate climate risks into the company's ERM system (alongside other company risks).

Depending on where they are in their climate risk integration journey, companies can choose to follow one or several of the following recommendations:

- Understand climate impacts and dependencies to identify at a high-level how climate risks can impact their business (without necessarily updating their ERM)
- Articulate discrete climate-specific risks in ERM system
- Adjust existing risk definitions with a climate lens

At the end of Step 2, companies will have included their climate risks into the company's ERM system and will be able to manage them through the ERM system alongside other risks.

This step is optional as not all companies will be able to input their climate risks identified in Step 1 into their ERM system. If the company is not able to do so, please proceed directly to Step 3.

Option B | Step 4: Manage Climate Risks through ERM System

Objectives & Activities

Objective: Incorporate climate risks into the company's ERM system, **and prioritize** against other company risks already factored into the company's ERM system.

Depending on where they are in their climate risk integration journey, companies can choose to follow one or several of the following recommendations:

- Understand climate impacts and dependencies to identify at a high-level how climate risks can impact their business (without necessarily updating their ERM)
- Articulate discrete climate-specific risks in ERM system
- Adjust existing risk definitions with a climate lens

At the end of Step 4, companies will have prioritized their climate risks against other company risks for the considered priority areas and will be able to manage them through the ERM system.

Important note: As the risks considered (Step 2) and their prioritization (Step 3) depend on the scope of the assessment, companies may have to repeat the process for new risks and focuses.

Step: Integrating Risks into the ERM System

The Risk to Resilience Platform identified three complementary approaches to incorporate and prioritize climate risks against other company risks in the company's ERM system.

1. Understand climate impacts and dependencies

Leveraging a variety of sustainability and climate-specific resources enhances the understanding of climate-related impacts and dependencies and how the operating context may change/evolve in the future.

Recommendation: Companies could review reports issued by governments, insurers, think tanks, consultancies, non-profit organizations, industries associations, specialized tools (e.g., [location-based data providers](#), etc.)

2. Articulate discrete climate-specific risks

A company's risk inventory provides categories and definitions of the risks and associated impacts the company faces. Certain types of climate-related risks may be identified by the company as independent risks (e.g. carbon price) and would need to be treated as such by the ERM.

Recommendation: Companies can directly add them into the company's ERM system inventory. Enumerated risks may have specific individuals assigned to assess and manage those risks.

3. Adjust existing risks with a climate lens

Many climate-related risks are not entirely new but rather introduce an additional variable to an existing risk, affecting its impact or likelihood of materializing.

Recommendation: Identify which company risks may be amplified by climate risks and a) revise current risk definitions to add a climate "component" where relevant; or b) define a climate multiplier for each risk based on potential impact and apply it to current ERM system risks.

*Towards a
Climate-
Integrated
ERM*

Step: Define Risk Assessment Parameters

Option A

Step 3

Option B

Step 1

Step: Define Risk Assessment Parameters

Objectives & Activities

Objective: Determine the key parameters of the risk assessment process (priority focus areas, projections, timeframe).

In this step:

- Companies will **define priority focus areas**. This means selecting one or several geographies, procurement categories and / or value chain segments to be included in the scope of the assessment based on several criteria **Option A, Step 3.1 | Option B, Step 1.1**
- Companies will select (at least) two different **climate projections** reflecting the future business operating environment, with dependent variables material to the company **Option A, Step 3.2 | Option B, Step 1.2**
- Companies will define the **relevant timeframes** for their risk assessment based on their business decision cycles and climate risks as defined in the projections **Option A, Step 3.3 | Option B, Step 1.3**

At the end of this Step, companies will have defined the different parameters of their assessment, in order to understand the risks they are (and will be) exposed to.

Define Priority Focus Areas

Companies will select one or several geographies, procurement categories and / or value chain segments to be included in the scope of the assessment based on the following criteria.

	Geography	Procurement Category	Value Chain Segment
Inputs	<ul style="list-style-type: none"> – Highest spend/volume/revenue regions or sites (i.e., that could lead to greater shift in costs or revenues caused by climate disruption) – Regions / sites expected to be highly impacted by highly uncertain climate disruptions (based on local climate projections) 	<ul style="list-style-type: none"> – Procurement categories that have already suffered due to weather-related climate disruption (e.g., price hikes, or reductions in yield, quality, and/or availability of raw materials) – Procurement categories expected to be highly impacted by highly uncertain climate disruptions (based on studies / research on crops) – Procurement categories dependent on single or few origins with limited alternatives 	<ul style="list-style-type: none"> – Company value chain mapping – Direct impacts of past weather-related disruptions on raw material production, processing, storage locations, and/or transportation routes – Value chain segments expected to be highly impacted by highly uncertain climate disruptions
Good for	<ul style="list-style-type: none"> – Business models that are regionalized 	<ul style="list-style-type: none"> – Business models based on procurement categories dependent on single or few origins with limited alternatives (e.g., aluminum), or vulnerable to weather-related climate disruption (e.g., rice) 	<ul style="list-style-type: none"> – Business models with highest risks expected to be concentrated in only a few segments of the value chain – Business models with segments of the value chain already identified as highly vulnerable (e.g., storage locations in areas prone to weather events)
Outputs		<ul style="list-style-type: none"> – List of priority regions / sites – And / or List of priority procurement categories – And / or List of priority value chain segments 	
Tools / Resources	<ul style="list-style-type: none"> – Procurement data by region, sales / revenue by regions – Location-based databases 	<ul style="list-style-type: none"> – Consult local suppliers and producers on where and when yields, price, or quality were affected due to weather-related events – Procurement data by category and supplier 	<ul style="list-style-type: none"> – Studies / High level risk assessment performed by operations teams – Impacts of past climate events on specific value chain segments

Guidance for Projection Parameters

- **Apply at least 2 climate projections** that capture different temperature pathways:
 1. A projection that is aligned with 1.5°C temperature rise
 2. A projection that is aligned with high temperature rise (3+°C)
 - *Optional:* A third, “middle-of-the-road” projection. For example, one that is aligned with ~2°C of warming
- Use **time horizons** that allow for **short-, medium-, and long-term** business planning
- **Tie risk assessment timeframes to capital expenditure decisions** (i.e. useful life of assets purchased (or twice useful life if assets are to be sold to another buyer))
- **Incorporate industry best practices** in terms of projection selection
- Consider **applying scenario analysis** to further analyze business resilience and identify risks and opportunities in the face of climate projections. See Section 5 Climate Scenarios.

Choose Projections

BSR recommends selecting at least two different projections to carry out the risk assessment analysis. The categorization below groups scenarios by temperature pathways.

1.5°C	2°C	~3°C	~4°C
<ul style="list-style-type: none"> • <u>NGFS Net Zero 2050</u> • <u>IPCC Special Report on 1.5°C</u> • <u>IPCC RCP 2.6 (in AR5 WGII)</u> • “Beyond 80” scenario in the <u>US Mid-Century Strategy</u> • <u>UNPRI Required Policy Scenario</u> • <u>McKinsey Global Energy Perspective – 1.5 Pathway</u> 	<ul style="list-style-type: none"> • <u>IPCC RCP 4.5 (in AR5 WGII)</u> • <u>NDRC: America’s Clean Energy Frontier: The Pathway to a Safer Climate Future (September 2017)</u> • <u>DDPP: Pathways to Deep Decarbonization in the United States</u> • <u>US Mid-Century Strategy (reference scenario)</u> • <u>IEA Sustainable Development Scenario (“fully aligned with the Paris Agreement’s goal of... ‘well below 2C”)</u> • <u>Fourth US National Climate Assessment</u> • <u>UNPRI Forecast Policy Scenario</u> • <u>McKinsey Global Energy Perspective - Achieved Commitments or Further Acceleration</u> 	<ul style="list-style-type: none"> • <u>NGFS Current Policies</u> • <u>IPCC RCP 6.0 (in AR5 WGII)</u> • <u>US EIA Annual Energy Outlook 2018</u> • <u>IEA New Policies Scenario (“measured assessment of where today’s policy frameworks and ambitions...might take the energy sector in the coming decades”)</u> 	<ul style="list-style-type: none"> • <u>IPCC RCP 8.5 (in AR5 WGII)</u> • <u>IEA Current Policies Scenario (“based solely on existing laws and regulations as of mid-2018”)</u> • <u>Fourth US National Climate Assessment</u>

Define Timeframe for Risk Assessment

- The TCFD does not specify timeframes for “short, medium, and long term” given that the timing of climate-related impacts on businesses will vary. Instead, **the TCFD recommends preparers define timeframes according to the life of their assets, the profile of the climate-related risks they face, and the sectors and geographies in which they operate.** Other aspects to consider can include the time necessary to fulfill strategic objectives, product lifecycle, organization lifecycle, changes in technology, risk acceptance and time / financial / information limitation.
- While it is widely recognized that continued emission of greenhouse gases will cause further warming of the planet and this warming could lead to damaging economic and social consequences, the exact timing and severity of physical effects are difficult to estimate. The large-scale and long-term nature of the problem as currently depicted by climate scientists (up to 2100) makes it uniquely challenging, especially in the context of economic decision making (3 to 5 years). Conversely, **the risk assessment process provides a unique opportunity for companies to anticipate those changes and plan accordingly over the different time horizons.**
- Other timeframes can come into play, such as national or sector timeline and could be considered by the company.

TCFD framing	Near Term	Medium term	Long Term	“Climate Science Term”
BSR recommendation	1 to 2 years	3 to 5 years	More to 5 years to end of purchased fixed asset lifetime (if any)	2050 and beyond
Rationale / Timeframe for business decisions regarding:	Day-to-day operations Company annual Profit & Loss Crop rotating cycle	Business strategy lifecycle Financial planning Research & Development Investments at farm level (e.g. irrigation system) ERM / Risk assessment timeframe	Useful lifetime of purchased fixed asset (e.g. manufacturing line, e.g. 15 to 20 years) or twice this lifetime if asset is intended to be sold Investment (e.g. in new factory, 30 years) Infrastructure development (e.g. road) Product development lifecycle (5 years)	Brand reputation Customer loyalty Patents & licensing agreements Proprietary technology
Examples of climate risks that could occur within this timeframe	Transition risk (e.g. policy-related, such as GHG emission reductions law) Acute physical risks (e.g. cyclones and floods)	Transition risks (e.g. policy-related, such as price on carbon) Acute physical risks (e.g. cyclones and floods)	Transition risks (e.g. policy-related, such as upcoming climate policy) Chronic physical risks (e.g. increasing temperatures)	Transition risks Chronic physical risks (e.g. increasing temperatures)

Step: Prioritize Risks

Option A

Step 4

Option B

Step 3

Step: Prioritize Climate Risks

Objective: Prioritize the key risks to which the priority focus areas considered are exposed.

Recommended steps:

- First check whether the current ERM methodology can be used to evaluate and prioritize the identified risks.
- If so, companies can proceed with this approach to rank their climate risks against the others.
- If not, companies can conduct the evaluation and prioritization of risks using either a quantitative or qualitative methodology to assess the likelihood and impact of each of the risks:
 - A **qualitative methodology** assesses the level of each risk identified for the priority focus areas, based on likelihood, potential impacts and a mitigation factor. Note: A qualitative assessment is beneficial as it can act as a screening tool to then dive further in on the critical or most high-risk focus areas with a quantitative assessment.
 - A **quantitative methodology** calculates a score for each risk identified for the priority focus areas, based on likelihood, potential impacts and a mitigation factor. Note: Doing a quantitative assessment is beneficial as it can help convince internal decision-makers, but it should not be required as part of the risk assessment.

Option A | Step 4 – Prioritizing Risks

Are climate risks incorporated into your ERM? (i.e. were you able to proceed with Step 2?)	Yes: Climate risks are incorporated in our company's ERM system (Step 2 completed)	No : Climate risks are not incorporated into ERM system (Step 2 not completed)
Inputs	List of climate risks and potential impacts for priority area considered (output from steps 1 and 3)	List of climate risks and potential impacts for priority areas considered (output from steps 1 and 3)
Activity	Apply current ERM methodology to evaluate the climate risks identified	Use proposed qualitative or quantitative methodology to evaluate the climate risks for the priority focus areas
Criteria for Evaluation	Depends on company's ERM system	<ul style="list-style-type: none"> – Qualitative methodology: risk likelihood and potential impact, mitigation factors – Quantitative methodology: risk likelihood and potential impact, mitigation factors
Outputs	<ul style="list-style-type: none"> – Climate risks prioritization for priority area – Climate risks mapping – Optional: Climate risk owners 	<ul style="list-style-type: none"> – Climate risks prioritization for priority area – Climate risks mapping – Optional: Climate risk owners
Tools / Resources	<ul style="list-style-type: none"> – Company's ERM system and risk assessment process 	<ul style="list-style-type: none"> – Qualitative: Supplier risk assessment / Stakeholder interviews, location-based databases – Quantitative: Risk matrix template, climate projections (attributing probabilities or qualitative assessment of likelihood to an event, current observation of impacts)

Option B | Step 3 – Prioritizing Risks

Can we use the company's ERM methodology to evaluate climate risks identified in Step 2.1 and 2.2?	Yes	No
Inputs	List of climate risks and potential impacts for priority area considered (output from step 2)	List of climate risks and potential impacts for priority areas considered (output from step 2)
Activity	Apply current ERM methodology to evaluate the climate risks identified	Use proposed qualitative or quantitative methodology to evaluate the climate risks for the priority focus areas
Criteria for Evaluation	Depends on company's ERM system	<ul style="list-style-type: none"> – Qualitative methodology: risk likelihood and potential impact, mitigation factors – Quantitative methodology: risk likelihood and potential impact, mitigation factors
Outputs	<ul style="list-style-type: none"> – Climate risks prioritization for priority area – Climate risks mapping – Optional: Climate risk owners 	<ul style="list-style-type: none"> – Climate risks prioritization for priority area – Climate risks mapping – Optional: Climate risk owners
Tools / Resources	<ul style="list-style-type: none"> – Company's ERM system and risk assessment process 	<ul style="list-style-type: none"> – Qualitative: Supplier risk assessment / Stakeholder interviews, location-based databases – Quantitative: Risk matrix template, climate projections (attributing probabilities or qualitative assessment of likelihood to an event, current observation of impacts)

Proposed Methodology for Prioritization of Climate Risks

Prioritize Risks (Qualitative Method)

Risk Assessment	
Inputs	<ul style="list-style-type: none"> List of climate risks for priority areas considered (Option A: output from Steps 1 and 3 Option B: output from Step 2) Potential Impact: low / medium / high / critical Risk Likelihood: rare / unlikely / likely / almost certain Mitigation Factor: none / minimal / moderate / strong, depending on the existence of controls mechanisms covering part or majority of the risk
Activity	<p>Assess risk level for each priority focus area:</p> <ul style="list-style-type: none"> Risk level = Potential impact x Likelihood Residual risk level = Potential impact x Likelihood - Mitigation factor
Outputs	<ul style="list-style-type: none"> Climate risk level and list of priority climate risks based on risk level Climate risk mapping Optional: Climate risk owners
Tools/ Resources	<p>Supplier risk assessment / Stakeholder interviews, location-based databases</p> <p>Notes:</p> <ul style="list-style-type: none"> A best practice to assess potential impacts of megatrends described in the climate projections in the short / medium term is to define possible “microtrends” underlying them and their implications for the industry and the company in the timeframe considered. It can be helpful to consider additional criteria (beyond impact and likelihood) that provide a more complete understanding of the nature and extent of an entity’s exposure (e.g. reputation, speed of onset, persistence, ability to mitigate). Additional considerations can be captured in alternative assessment criteria for understanding the risk severity or by incorporating these considerations into the impact and likelihood assessment during prioritization. This may be done at the enterprise level or for a specific risk.

Prioritize Risks (Qualitative Method)

Input: Potential Impact

Impact		Low	Medium	High	Critical
Financial	Impact on sales	\$	\$\$	\$\$\$	\$\$\$\$
	Impact on expenses	\$	\$\$	\$\$\$	\$\$\$\$
Reputational	Impact on customer behavior	Customers favor the brand unconditionally	Customers continue to favor the brand, but sometimes buy from other brands	Customers buy from the brand only if they have the opportunity to	Customers start avoiding buying from the brand and favor competitors' brands
	Impact on staff	Staff dissatisfaction	Staff disengagement /	Localized staff retention / recruitment issues	Widespread staff retention / recruitment issues
	Impact on external stakeholders' behavior	Some activism with low potential for policy changes	Increasing activism with high potential for policy changes	Strong activism with increased potential for medium term strategy changes	Strong activism and regulations requiring short term changes to business operations

Illustration

Prioritize Risks (Qualitative Method)

Input: Risk Likelihood

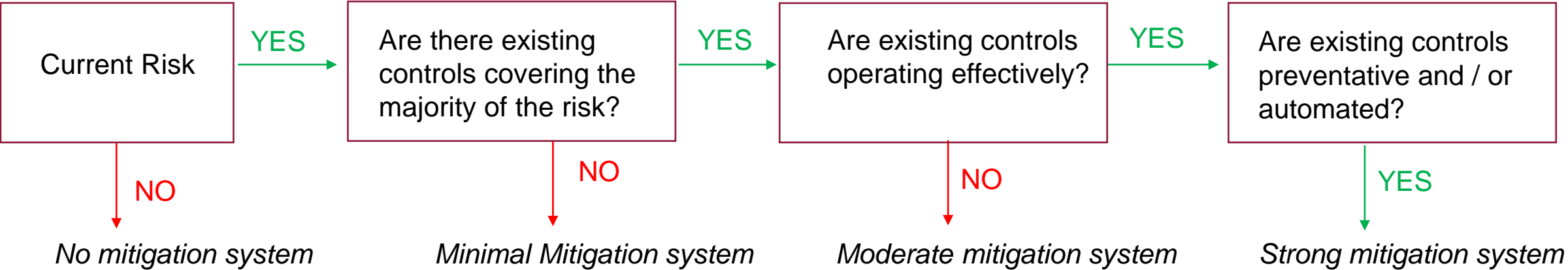
Probability that a risk event will occur within 12 months

Rating	Definition
Rare	Could occur in exceptional circumstances.
Unlikely	Might happen or occur occasionally (e.g. sporadic events).
Likely	Likely to occur. Event will probably occur in most circumstances.
Almost Certain	Almost certain to occur (currently happening or has happened recently). Will be experienced on a continuous basis.

Illustration

Prioritize Risks (Qualitative Method)

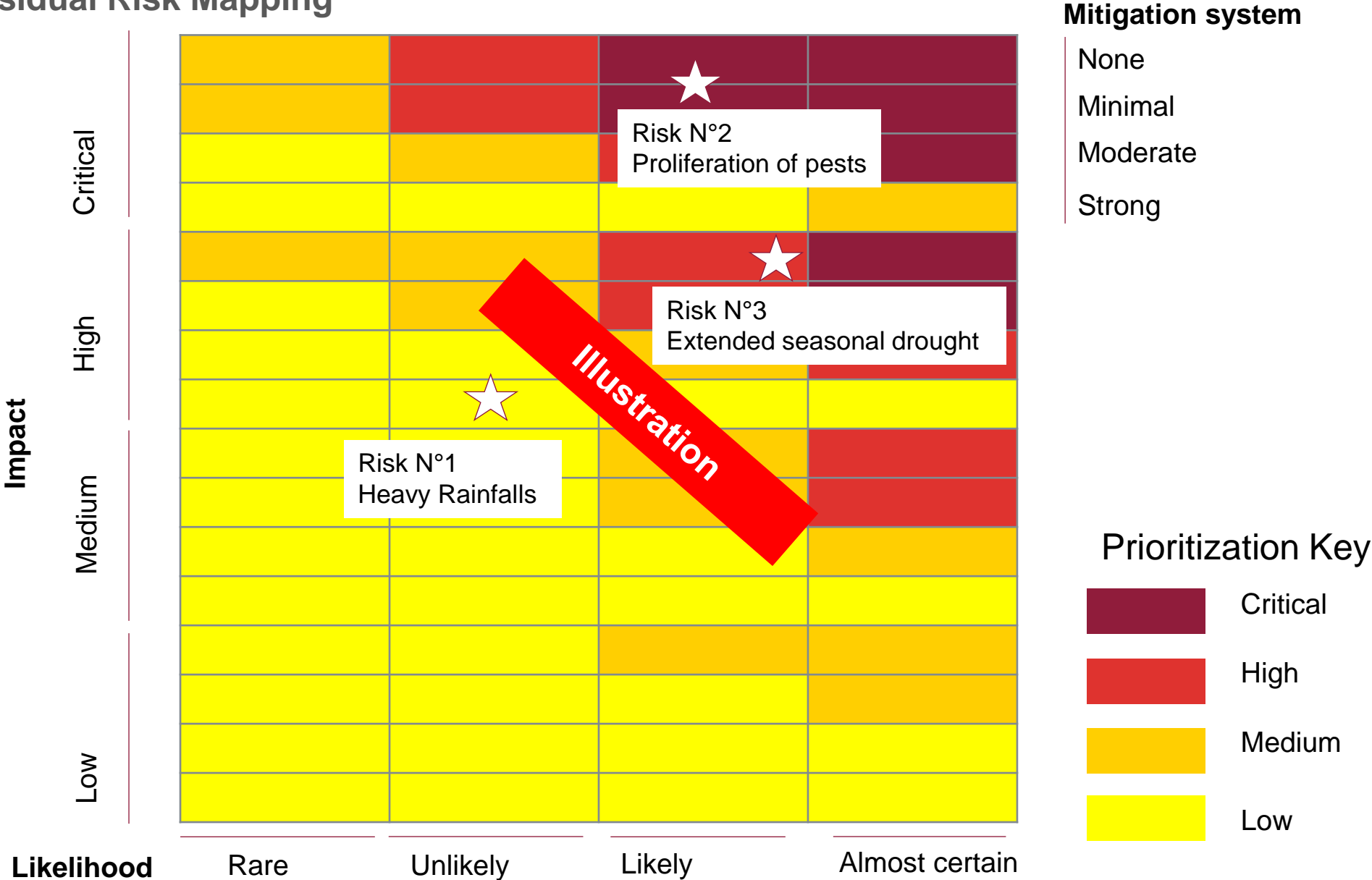
Input: Mitigation Factor



Prioritize Risks (Qualitative Method)

Output: Climate Residual Risk Mapping

Example -
Focus area:
Rice production
in Thailand



Prioritize Risks (Quantitative Method)

Risk Score	
Inputs	<ul style="list-style-type: none"> List of climate risks for priority areas considered (Option A: output from Steps 1 and 3 Option B: output from Step 2) Potential Impact: low (1) to critical (4) Risk Likelihood: rare (1) to almost certain (4) Mitigation Factor: strong (0.2) to none (1), depending on the existence of control mechanisms covering part or majority of the risk <p>Note: company can choose to weight assessment criteria</p>
Activity	<p>Calculate risk score and residual risk score for each priority focus area :</p> <ul style="list-style-type: none"> Risk score = Potential impact x Likelihood Residual risk score = Potential impact x Likelihood - Mitigation factor
Outputs	<ul style="list-style-type: none"> Climate risks scores and list of priority climate risks based on risk score Climate risk mapping Optional: Climate risk owners
Tools/ Resources	<p>Risk matrix template, climate projections (attributing probabilities or qualitative assessment of likelihood to an event, current observation of impacts)</p> <p>Notes:</p> <ul style="list-style-type: none"> A best practice to assess potential impacts of megatrends described in the climate projections in the short / medium term is to define possible “microtrends” underlying them and their implications for the industry and the company in the timeframe considered. It can be helpful to consider additional criteria (beyond impact and likelihood) that provide a more complete understanding of the nature and extent of an entity’s exposure, e.g. reputation, speed of onset, persistence, ability to mitigate. Additional considerations can be captured in alternative assessment criteria for understanding the risk severity or by incorporating these considerations into the impact and likelihood assessment during prioritization. This may be done at the enterprise level or for a specific risk.

Prioritize Risks (Quantitative Method)

Input: Potential Impact

Impact		Low (1)	Medium (2)	High (3)	Critical (4)
Financial	Impact on sales	\$	\$\$	\$\$\$	\$\$\$\$
	Impact on expenses	\$	\$\$	\$\$\$	\$\$\$\$
Reputational	Impact on customer behavior	Customers favor the brand unconditionally	Customers continue to favor the brand, but sometimes buy from other brands	Customers buy from the brand only if they have the opportunity to	Customers start avoiding buying from the brand and favor competitors' brands
	Impact on teams	Staff dissatisfaction	Staff disengagement /	Localized staff retention / recruitment issues	Widespread staff retention / recruitment issues
	Impact on shareholders / external stakeholders' behavior	Some activism with low potential for policy changes	Increasing activism with high potential for policy changes	Strong activism with increased potential for medium term strategy changes	Strong activism and regulations requiring short term changes to business operations

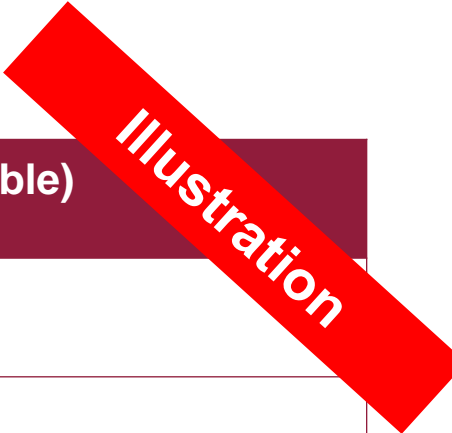
Illustration

Prioritize Risks (Quantitative Method)

Input: Risk Likelihood

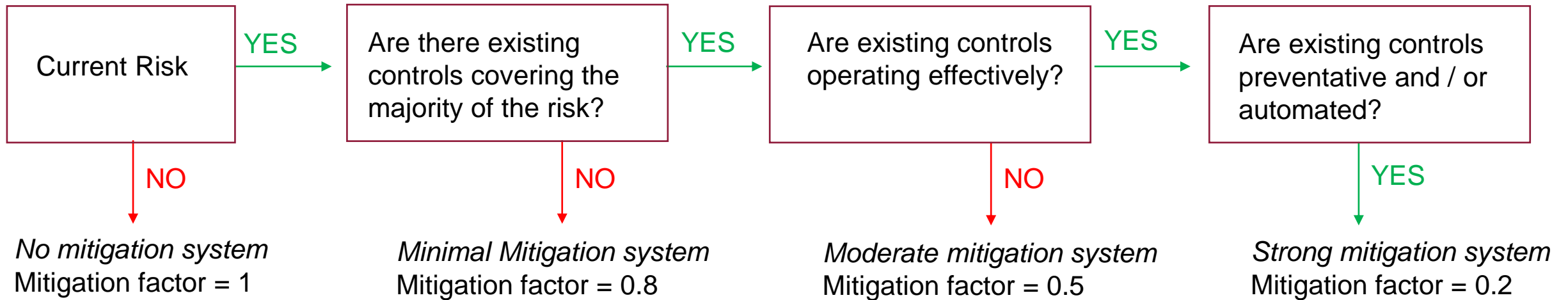
Probability that a risk event will occur within 12 months

Rating	Definition	Probability (if available)
Rare (1)	Could occur in exceptional circumstances.	<10%
Unlikely (2)	Might happen or occur occasionally (e.g. sporadic events).	> 10% and < 50%
Likely (3)	Likely to occur. Event will probably occur in most circumstances.	> 50% and < 90%
Almost Certain (4)	Almost certain to occur (currently happening or has happened recently). Will be experienced on a continuous basis.	> 90%



STEP 4.2 – Prioritize Risks (Quantitative Method)

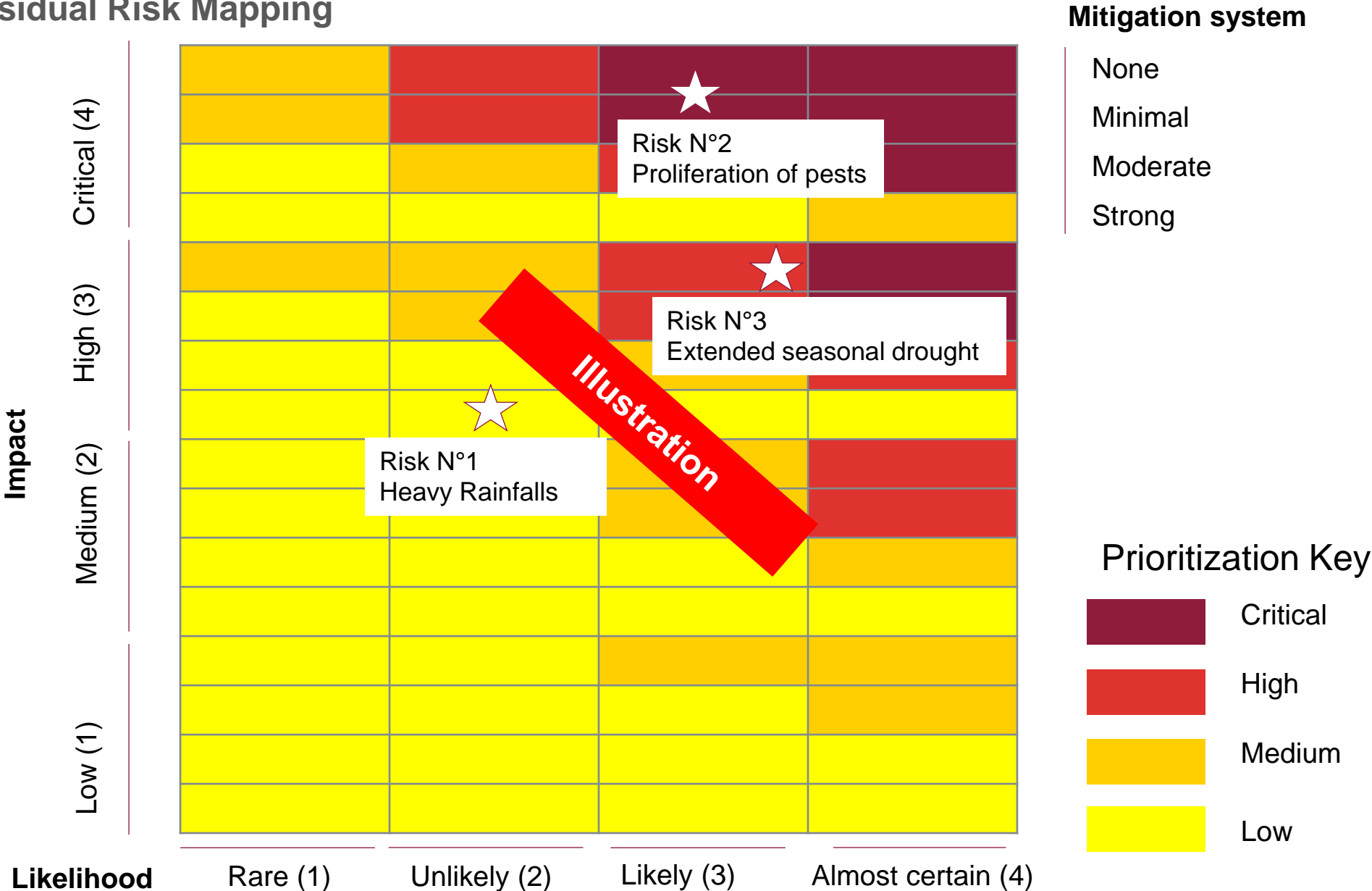
Input: Mitigation Factor



Prioritize Risks (Quantitative Method)

Output: Climate Residual Risk Mapping

Example -
Focus area:
Rice production
in Thailand



03

Towards A Climate-Integrated ERM

Integrating Climate Risks into ERM System

- Typical ERM system categories of risk include strategic, operational, financial and compliance. Some organizations may include a separate category for “sustainability,” “climate,” or “reputational” risks.
- However, these risks can usually be grouped in other risk categories (for example, climate-related risks are often operational or financial in nature). Further, reputational implications are often an impact from another type of risk, rather than a risk in and of itself (for example, reputational damage resulting from severe weather event destroying a factory and causing environmental pollution).
- In addition, many ESG-related risks are not entirely new but rather represent an additional source to an existing risk or increase the risk’s impact or likelihood of materializing. For example, climate change impacts often increase cost fluctuations of raw materials, which is an existing risk for many organizations.

BSR identified three complementary and immediately implementable approaches to incorporate and prioritize climate risks against other company risks already factored into the company’s ERM system.

Integrating Climate Risks into ERM System

The Risk to Resilience Platform identified three complementary approaches to incorporate and prioritize climate risks against other company risks in the company's ERM system.

1. Understand climate impacts and dependencies

Leveraging a variety of sustainability and climate-specific resources enhances the understanding of climate-related impacts and dependencies and how the operating context may change/evolve in the future.

Recommendation: Companies could review reports issued by governments, insurers, think tanks, consultancies, non-profit organizations, industries associations, specialized tools (e.g., [location-based data providers](#), etc.)

2. Articulate discrete climate-specific risks

The company's risk inventory provides categories and definitions of the risks and associated impacts the company faces. Certain types of climate-related risks may be identified by the company as independent risks (e.g. carbon price) and would need to be treated as such by the ERM.

Recommendation: Companies can directly add them into the company's ERM system inventory. Enumerated risks may have specific individuals assigned to assess and manage those risks.

3. Adjust existing risks with a climate lens

Many climate-related risks are not entirely new but rather introduce an additional variable to an existing risk, affecting its impact or likelihood of materializing.

Recommendation: Identify which company risks may be amplified by climate risks and a) revise current risk definitions to add a climate "component" where relevant; or b) define a climate multiplier for each risk based on potential impact and apply it to current ERM system risks.

*Towards a
Climate-
Integrated
ERM*

Why Integrate Climate Risks into Enterprise Risk Management?

Enhance Resilience

- A company that is viable and resilient in the medium- and long-term will be able to anticipate and respond to complex and interconnected risks that threaten the company's strategy and operations.

Use a Common Language

- Using an identical process to identify and assess both climate and non-climate risks brings climate issues into mainstream processes and evaluations.

Improve Resource Deployment

- Obtaining robust information on climate risks enables management to assess overall resource needs and helps optimize resource allocation.

Achieve Efficiencies of Scale

- Managing climate-related risks centrally and alongside other company risks helps eliminate redundancies and better allocate resources to address the company's priority risks.

Improve Disclosures

- Improving the company's understanding of climate-related risks can provide the transparency investors expect and to comply with reporting requirements.

Enhance Internal Engagement

- Collaborating to identify and assess risks increases the breadth of knowledge, understanding and experience. Companies should also consider involving senior leadership and business units to support the analysis.

What Makes An ERM System Climate-Ready

What is Needed

- Board awareness and consideration of climate-related risks
- Management ownership of climate-related risks, for example by a specific individual or ESG committee
- Internal collaboration throughout the organization to identify and prioritize climate risks and opportunities
- Transparency about assumptions made and potential uncertainties
- Understanding of potential impacts and dependencies on the organization (strategy and operations) in the short, medium and long-term
- Aligned with the company's strategy, objectives and risk appetite
- Periodically updated to account for emerging risks

What Needs to Change

- Siloing management of climate risks with the sustainability team
- Assuming that the existing ERM system already identifies, assesses and manages climate risks
- Ignoring medium- and long-term timeframes on which climate risks are material

Once Climate is Integrated, When Does it Make Sense to Update the ERM System?

ERM system revision is not a “one and done” activity. It is a dynamic process that requires ongoing review and revision of both individual risks and the ERM process overall.

- **Climate-related risks have emerged or substantially changed.** Changes in the business context may give rise to a new risk or exacerbate or reduce the potential impact of an existing risk, consider if action is warranted.
- **New data or methodologies become available.** Risk management and sustainability practitioners should consider whether the selected assessment approach is still the most appropriate. The company may also take the opportunity to either raise or lower the priority of identified risks.
- **Deployment of a new ERM system technology.** New software may offer the opportunity to compile additional sources of data in a centralized system (e.g. data monitored through satellites or social media platforms).
- **Organizational change.** Expanding operations into new markets or mergers / acquisitions may result in the emergence of new risks and offer the opportunity to revise the ERM system.
- **Following a review of climate management.** Reviewing performance of existing climate mitigation or adaptation programs can increase management’s confidence in the fact that climate risk management is both necessary and effective.
- **Following a peer benchmark.** Benchmarking industry peers can help a company determine how it performs compared to competitors and identify new risks or business opportunities.
- **Historical shortcomings.** Companies that have failed identify or manage climate risks in the past may learn from experience on how better integrate climate throughout the risk management process.

04

Governance of Climate Risks



Building & Strengthening Governance of Climate Risks

- Boards play a critical role ensuring that companies are able to navigate an evolving risk landscape
- Directors need to consider oversight of these issues as part of their fiduciary responsibility (“duty of care”)
- Although the potential impacts of climate change are widely recognized, the uncertain magnitude and long-term nature of the problem means it is often not discussed as a financial risk in boardrooms, which tend to focus on short-term business cycles

To address this gap in governance oversight, the Initiative developed climate governance models (next slide) that companies can use to assess its current level of integration and identify next steps towards climate governance leadership.

4.1 Structuring Governance of Climate Risks

Why Should Board / Management Consider Risk Oversight to Climate Risks?

- Boards have a critical role in ensuring that companies are aware of and able to navigate an **ever-evolving risk landscape**.
- **Growing understanding of the climate-related impacts to business** and increasing attention from the public and investors.
- Directors need to consider oversight of these issues as part of their fiduciary responsibility (“**duty of care**”).
- ESG risks - and climate risks in particular - are **still largely not discussed at Board level**, due to a misunderstanding of how they could present business risks, when they can occur (not only in the long term) and how their role must evolve to include those new risks.
- **Risks management standards are evolving** to include oversight of environmental and social factors (e.g. COSO).

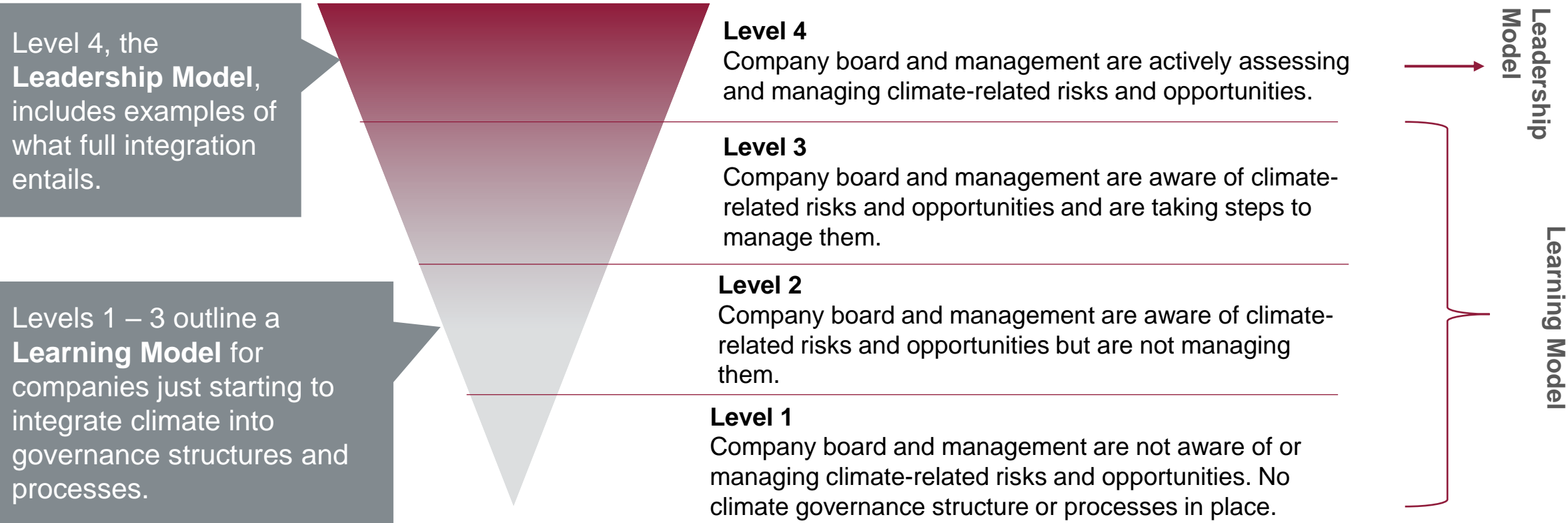
HOWEVER...

- **Climate competes with many other emerging and strategic risks** that must be addressed by the Board.
- Climate risks are **diverse, uncertain and often not (yet) visible**. Besides, the extent of the impacts will depend on other external factors such as regulations or new technologies.
- Companies are under pressure to deliver short-term results and meet investor expectations on a quarterly basis. Conversely, **climate poses long-term risks that extend beyond the traditional business cycle (3 to 5 years)**.

Learning Model for Addressing Climate Risk in Governance

Building Climate Governance Structure & Processes

The Learning and Leadership Governance Models help a company assess its current level of climate integration and identify next steps towards climate governance leadership.



Building Climate Governance at Board Level

Level 1

- Board and/or Board committees do not have mandate to manage climate-related risks
- Board and/or Board committees do not have needed competency to manage climate-related risks
- Board and/or Board Committees are not periodically informed about climate-related risks
- Board and/or Board Committees do not consider climate-related risks when carrying out strategic planning

Level 2

- Board and/or Board committee charter(s) are amended to include mandate to manage climate-related risks
- Board and/or Board Committees are informed at least annually about climate-related issues affecting the company
- Board is aware of TCFD recommendations

Level 3

- Board and / Board Committees are informed on climate-related risks at least semi-annually at board meetings
- Board monitors progress against climate-related goals and targets
- Board has assigned climate-related responsibilities to management, whether to sustainability lead or cross-functional committee
- Board competency is augmented, for example, by including climate in skills list
- Board considers seeking external expertise from climate experts or targeting development of internal experts

Level 4

- Board is accountable for the company's long-term adaptation and resilience with respect to potential systemic shifts in the business landscape that may result or be amplified by climate change
- Board ensures that metrics related to material climate risks are incorporated into incentive structures for management
- Board considers material climate risks when carrying out strategic planning and risk oversight
- Board is promoting effective climate change disclosures further to TCFD recommendations

Learning Model

Leadership Model

Examples: Building Climate Governance at Board Level

Level 1

- An **FBA company's** board receives quarterly updates on sustainability, including public climate goals and progress made. However, climate risks are not discussed.
- **Alibaba** does not report how sustainability issues are governed and managed.

Sources: [Report from Ceres – Running the Risk, 2019-TCFD-Status-Report-FINAL-053119](#), CDP Climate Change 2019 reports

Level 2

- **General Motors** identifies sustainability within their “Director Orientation and Continuing Education” section as a topic that new directors need to understand.
- **Keurig Dr. Pepper's** Board of Directors reviews matters of the Company's corporate sustainability efforts bi-annually, including climate-related issue
- An **FBA company's** board receives quarterly updates on sustainability, including public climate goals and progress made. However, climate risks are not discussed.

Level 3

- **Prudential Financial** and **Canadian Natural Resources Limited** include environmental / climate expertise within its mix of experience and knowledge needed by its boards.
- **Nike's** Corporate Responsibility, Sustainability and Governance Committee receives regular updates from senior executives to discuss how sustainability and business strategies are aligned.
- **AbbVie's** public policy committee monitors and oversees progress against goals and targets for addressing climate-related issues and targets.

Level 4

- **Xcel Energy's** board links a portion of its long-term incentive plan for corporate executives to performance targeted to deliver a 26% average reduction in CO2 emissions over a three-year period
- **Walmart's** Chief Merchandising Officer and SVP of Global Sourcing have sustainability objectives on their annual evaluations which include targets for emission reduction in the supply chain.
- **JetBlue** uses the TCFD framework to disclose its board committee involvement in oversight of the company's financial exposure to ESG risks.

Learning Model

Leadership Model

Building Climate Governance at Management Level

Level 1

- Management is not tracking climate-related risks affecting the company
- There are no climate-related responsibilities assigned to management-level positions

Level 2

- First climate risk assessment completed
- Climate-related risks are individually owned and monitored by relevant manager (e.g. supply chain interruption by procurement; energy cost volatility by operations)
- Consideration of consolidating climate-related responsibilities within individual lead (e.g. sustainability lead), or within cross-functional committee (e.g. sustainability committee)
- Management is aware of TCFD recommendations

Level 3

- Climate-related responsibilities are assigned to a specific manager or committee, with support from functions or regions
- Relevant management function reports to Board at least semi-annually
- Climate risks are assessed on an ongoing basis, and mitigation plans are developed for material risks
- External training is provided to maintain and enhance the management's command of climate issues
- Management defines climate strategy / related goals

Level 4

- Assigned managers collaborate with risk teams to ensure climate risks are integrated into ERM activities
- Assigned managers liaise with operations and supporting teams to oversee implementation of climate strategy and management and mitigation of material climate risks
- Assigned managers monitor implementation and performance against climate goals and targets
- Achievement of climate-related goals and targets are part of the incentive structure for executives
- Management is contributing to effective climate change disclosures further to TCFD recommendations

Learning Model

Leadership Model

Examples: Building Climate Governance at Management Level

Level 1

Level 2

- **Constellation** established a CSR Committee that meets biannually with members from the environmental, legal, communications, external affairs and operations teams.

Level 3

- **Diageo's** CEO and CFO have ultimate responsibility for climate related issues and environmental strategy.
- **Mondelez** includes climate change factors in the risk universe for its ERM process, which is ongoing and conducted across the company.
- **Heineken's** Global Sustainable Development team coordinates the implementation of the sustainability strategy, supported by many functional experts.

Level 4

- **Walmart** addresses climate issues within the risk management process at the enterprise, segment, and function level.
- **Diageo's** individual markets and functions undertakes an annual risk assessment, establishes mitigation plans and monitors risk on a continual basis.
- **Mondelez** business unit (BU) are responsible for integrating sustainability into their strategic plans, including its operational CO2 reduction goals.
- **ScotiaBank's** climate risks are identified, assessed and managed through the Bank's credit risk and environmental risk due diligence and adjudication processes.

Sources: [2019-TCFD-Status-Report-FINAL-053119](#), CDP Climate Change 2019 reports

Learning Model

Leadership Model

Assess Current State | Key Questions

- Company's Climate Governance Structure
 - How **structured, hierarchical, centralized, and / or collaborative** is the organization?
 - Is sustainability / climate a standalone function, and is there a **need to integrate goals** into the wider organization?
 - Have **climate-related responsibilities** been assigned to management?
- Company's Climate Governance Processes
 - How does the organization operate and what is the general **decision-making process**?
 - How developed is the organization's **risk culture**? Are risk items such as risk appetite, risk registers, scenario analysis, KRIs, risk mitigation plans already considered / used by the organization?
 - How **familiar and informed are the company board and management** regarding climate-related issues?
 - Does the **Board consider material climate risks** when carrying out strategic planning and risk oversight?
 - Has a **climate risk assessment** been performed already and are climate risks assessed on a regular basis?
 - Has the company defined a **climate strategy and related goals and KPIs**?
 - What **resources** are available to implement climate goals?

Based on the assessment, companies can then determine their level of ambition and the required next steps.

Leadership Model for Addressing Climate Risk in Governance

How Does The Leadership Model Translate into the Board & Management Responsibilities ?

- The board and executive leadership team are **well-informed about climate-related issues** and have **extensive experience** with climate-related issues.
- **Climate awareness** is incorporated in the desired profile for a new board director.
- The board is open to the **advice of external experts** on issues for which its members are not competent
- The board ensures that **management assesses the short-, medium-, long term materiality of climate-related risks** and opportunities on an ongoing basis
- The board **considers climate-related issues** when reviewing and guiding annual budgets, business plans, setting the organization's performance objectives, monitoring implementation and performance
- The board **monitors and oversees progress against goals and targets** for addressing climate-related issues on a quarterly basis.
- The board is **accountable** for the company's long-term resilience.
- The organization has defined a **clear methodology and incentives** to promote management of climate-related issues

Leadership Model - Climate Governance Structure (example)

1. IDENTIFY

2. INTEGRATE

3. ASSESS & PRIORITIZE

Build & Strengthen Climate Governance

Types of Roles

Board & Management Oversight

Core Team

Support

ERM / Risk Team

- Coordinate and consolidate ERM activities
- Lead the process for managing enterprise-wide risks in an integrated, systemic manner
- Should maintain a close relationship with sustainability team

Cross-functional Working Committee

- Develop role related goals
- Implement strategy, measure performance
- Subject matter expertise, provide expertise on particular aspects of climate issues
- *May include: HR, EH&S, Compliance, Legal, Corporate Affairs, Government Affairs*

Board of Directors

- Review position, practices, and progress on climate;
- Provide oversight of specific initiatives (e.g. emission reduction goals)

CEO

Executive Management

- CFO / COO / CRO / CSO...
- Connections to strategic planning and operations
- Support the timely identification and assessment of climate related risks and opportunities

Operations

- Develop and implement climate strategy and programs
- Track goals

CSR Lead at business & regional level

- Oversee implementation of climate strategy and programs
- Track goals
- Advise internal teams, engage employees

Board Committees (e.g. risk, audit, other)

- Review position, practices, and progress on climate;
- Provide oversight of specific initiatives (e.g. emission reduction goals)

Corporate Sustainability & Climate Oversight Committee

- Executive sponsorship
- Approve climate strategy and goals
- Advocate within BUs/functions
- Review performance against climate goals and targets

Head of Corporate Sustainability

- Overall leadership, climate goal-setting and reporting (e.g. CDP, TCFD)
- Monitor performance against climate goals and targets
- Internal and external point of contact, manage external stakeholders and response to surveys

Core Corporate Sustainability Team

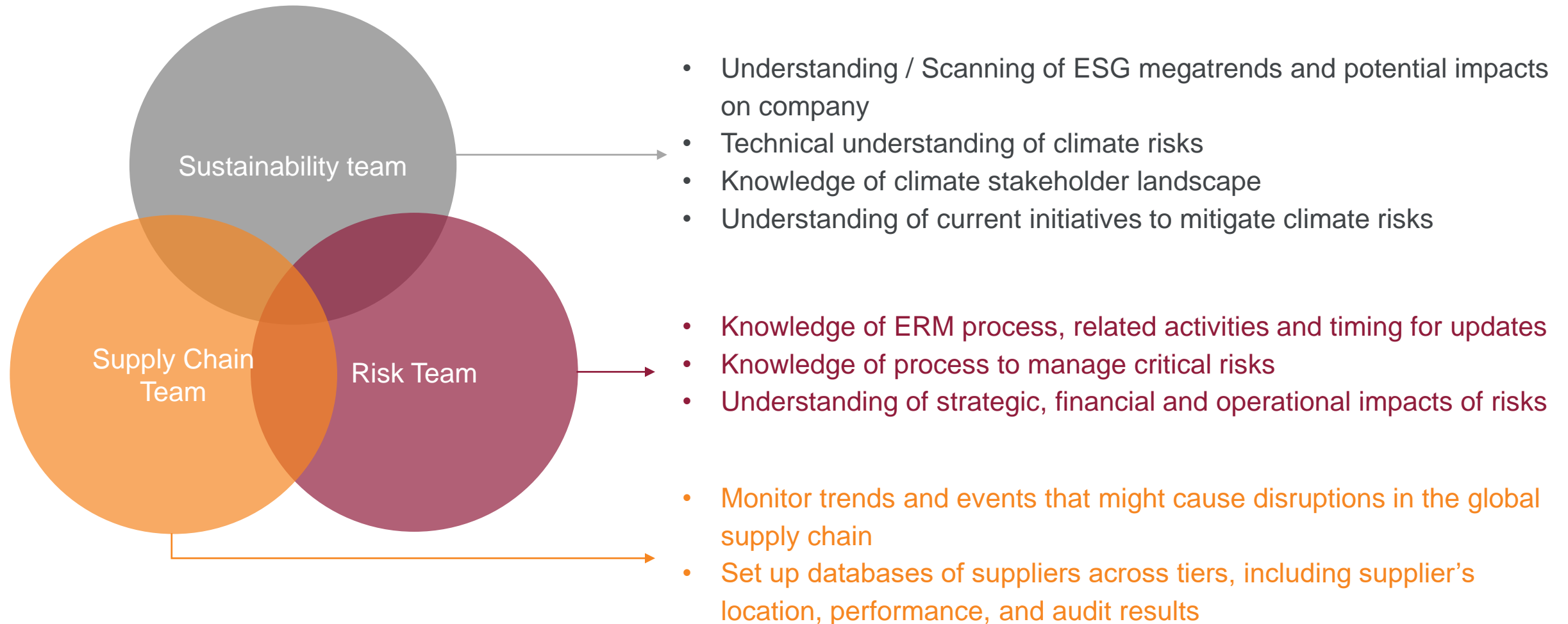
- Develop and implement climate strategy and programs
- Track goals
- Advise internal teams, engage employees

Leadership Model Relies on Clear Responsibilities and Senior Visibility and Oversight

Board Ownership	<ul style="list-style-type: none">• Oversight at the highest levels demonstrates corporate commitment to climate.• Sustainability and climate oversight is increasingly integrated into a formal Board Committee (e.g. Governance, Audit, Risk, EHS Committee).	<ul style="list-style-type: none">• Specific board committees are usually engaged on key issues that need to be raised regularly and discussed in depth, whereas the full board oversees climate risks as part of the strategic planning process.• Board members review climate issues as a regular agenda item.
Sustainability & Climate Senior Executive Oversight	<ul style="list-style-type: none">• Senior level, cross functional group meeting regularly with accountability for approving climate strategy and goals. Provides oversight.• Business divisions fully engaged in senior sustainability / climate committees to help drive internal engagement and market-facing opportunities.	<ul style="list-style-type: none">• Involves both functions (procurement, supply chain, communications, etc.) and business divisions.• Clear communications relationship with the Board or similar internal governance bodies is important.
Dedicated Senior Sustainability & Climate Position	<ul style="list-style-type: none">• Leads a company's sustainability & climate strategy, both in terms of (1) internal operations and (2) market-facing initiatives and stakeholder engagements.• Reports to CEO or Management Committee member and chairs senior internal and external sustainability councils/working groups. Wields significant influence across the business	<div>ERM / Risk Team</div> <ul style="list-style-type: none">• ERM function or Director is responsible for coordinating and consolidating ERM activities and will typically report into CRO or other C-Suite.• Leads the process for managing enterprise-wide risks in an integrated manner
Sustainability Supporting Teams	<ul style="list-style-type: none">• Cross functional group meeting regularly with accountability for planning and implementing sustainability strategy and establish goals.• Sustainability responsibilities an official part of participants' roles.	<ul style="list-style-type: none">• Involves both functions (procurement, supply chain, communications, etc.) and business divisions.

Leveraging Internal Skills Through Collaboration

Sustainability and risk professionals can share and/or transfer risks, knowledge and capability between teams to support integration of climate into the company's ERM system.





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4.2 Holding Management Accountable for Climate Risks

Holding Management Accountable for Climate Risks

In its November 2019 report “[Running the Risk. How Corporate Boards Can Oversee Environmental, Social and Governance \(ESG\) Issues](#)”, Ceres recommends the following practices:

- Boards should **hold executives accountable for ESG risk management** by asking for regular progress updates and assessing new issues.
- Additionally, boards should **tie a portion of executive compensation to performance** on prioritized ESG metrics.
- Having **financial metrics tied to ESG risk mitigation** underscores the strategic importance of these issues to the company and should be a prime area of focus for the board. Measuring, rewarding or penalizing management’s performance gives useful insight to stakeholders.
- Companies should **disclose the ESG issues that are linked to executive compensation**, inform them of the proportion of pay at risk as it pertains to ESG issues, and state whether bonuses are linked to any short or long-term incentive structures.

Key Considerations for Management to Oversee Climate Risks

- How are the company's **strategies and operations at risk**, given expected climate impacts and the drive to a lower-carbon economy?
- Does the company have a process, including metrics and targets, in place to **identify, assess, quantify, and manage** climate-related risks and opportunities?
- What are the **likelihood and impact of changes** in demand for the company's products and services due to climate change, and their implications for its business model?
- What are the **reputational risks** related to the company's approach in dealing with and communicating about climate change issues?
- What **innovation and technology-related opportunities** have been investigated to reduce greenhouse gas emissions or adapt to climate change?
- How does management **assess the difficulty of meeting greenhouse gas emissions reduction targets**, and how is progress monitored and reported?
- How has the **current and potential future impact of climate change issues** (including carbon pricing) been determined on revenues, expenditures, and cash flows?
- How does management ensure that information reported on corporate websites or in voluntary reports is consistent with government filings and **continuous disclosure filings** provided to securities regulators?

Recommendations for Management to Oversee Climate Risks

Risk Identification

- Consider **how climate risks can impact the company**, and how this risk is interrelated to other risks and whether they could become material to the company (individually or collectively)
- Keep in mind that risks categorized as “long-term” (such as climate change) can **start materializing now**
- Check whether the **company’s ERM allows for climate risk identification**, and if climate is already tracked as a risk for the company (note: it may also be tracked as an operational, supply chain or regulatory risk)
- **Strengthen current identification process** by using tools such as SWOT, PESTEL, global risk reports, employee and customer surveys, peer benchmarks, industry collaborations, investor interviews...
- Assess **to what extent the risk identification process is influenced** (if not biased) by the company’s culture
- **Assess whether the company’s ERM process is flexible enough** to continuously identify and incorporate emerging issues

Risk Assessment

- Use **corporate heat maps**
- Acknowledge that climate change risks have very little precedent for evaluation and that the **interrelationships can often multiply their impacts on business**
- **Consider conducting scenario analysis** on the potential impact of climate risks expected to materialize in the long term. These analyses are particularly useful for board discussion on risk prioritization and related actions needed to mitigate or adapt to these risks.
- If the company has not already, **consider performing a materiality analysis** to provide additional context on climate risks. Such analysis can also support the fact that climate risks should be included in the company’s risk inventory and ERM process.
- Consider the **board’s skills** to evaluate climate risks (e.g. recruit directors with climate experience, educate the entire board)

Decision-Making

- Determine the **company’s tolerance to climate risks** (including understanding of financial resources needed to tolerate climate risks)
- Determine **who owns each risk**
- Identify **climate-related business opportunities** and integrate them into discussions on business strategy
- Understand **what strategies are available to mitigate or adapt to climate risks** (e.g. capital allocations decisions M&As, policy advocacy and lobbying, insurance, redefinition of the company’s business model)
- **Hold executives accountable for climate risk management** (e.g. tie a portion of compensation to performance)

4.3 Enhancing Board and Management Climate Skills & Competencies

Ensuring Board's Climate Command and Knowledge

- The board should **ensure that its composition is sufficiently diverse in knowledge, skills, experience and background** to effectively debate and take decisions informed by an awareness and understanding of climate-related threats and opportunities.
- Sufficient awareness at the board level will also **set the tone for the organization and drive greater awareness for senior management and staff**.
- While **non-executive directors** are not operationally responsible for the business, they may bring specific knowledge to certain subject matter or perspectives in relation to the risks and opportunities of climate change.
- **Executive directors**, on the other hand, are operationally accountable and should have greater insight into how climate risks and opportunities are managed within the organization.
- Even once a board has a sufficient composition of directors who bring the required skills to address climate at the company, measures should be taken to **maintain and enhance the board's command of the subject** – to further diversify the perspectives and allow for richer discussions and reviews on climate issues.

Key Recommendations for Board & Management

Board Composition & Agenda

- Ensure robust awareness and understanding of how climate change may affect the company
- Ensure Board composition allows for an informed and differentiated debate as well as objective decision-making on climate issues
- Perform assessment(s) of climate-competence gaps

Maintaining & Enhancing Climate Competence

- Implement process to ensure the Board and management remain sufficiently educated
 - Aware of key industry trends in terms of climate risks and opportunities
 - Updated at least twice a year on climate risks & opportunities for the company
- Consider asking the advice of external experts
- Plan for succession to ensure that climate awareness does not stop if an important individual or a vocal climate champion leaves the organization or the board
- Incorporate climate skills into the desired profile for a new board director or senior manager

4.4 Disclosing Climate Governance

Disclosing Climate Risk Oversight

Voluntary Disclosure

- The **Task Force on Climate-related Financial Disclosures (TCFD)** developed a set of recommendations to communicate climate-related risks to investors. The guidance covers all sectors and recommends that companies disclose these across four topics: governance, strategy, risk management and metrics and targets.
- The **International Sustainability Standards Board (ISSB)** developed sustainability-related standards, including a Climate-Related Disclosures Standard, which includes a set of requirements related to the disclosure of climate risk governance. The ISSB Standards include issue-specific industry-based disclosure requirements, which were adapted from the Sustainability Accounting Standards Board (SASB) Standards. ISSB Standards may be adopted across jurisdictions to build mandatory climate-related disclosure requirements.
- The **Global Reporting Initiative (GRI)** is an international independent standards organization that has worked since 1997 to help businesses, governments, and other organizations report on sustainability performance (including climate change). The majority of the world's largest companies now use the GRI standards to disclose their sustainability performance.
- **CDP** is a nonprofit organization that supports companies and governments to report on climate change risks and emissions, among other topics. CDP publishes an annual survey that includes reporting on water, forests and supply chains as well as climate risks and opportunities. since its founding in 2002, over 6,000 companies have publicly disclosed environmental information through CDP.

Mandatory Disclosure

- Multiple jurisdictions, including the United States and European Union, have issued climate-related financial disclosure requirements that would require companies to disclosure the role of boards and management in the oversight and governance of climate-related risks and

TCFD Overview

Convened under the G20 and chaired by Michael Bloomberg, in 2017 the TCFD published recommendations on how companies should disclose climate risks and opportunities.

What are they?

- The recommendations are intended to provide decision-useful information to **lenders, insurers and investors**.
- The recommendations are for disclosure in **mainstream financial filings** (e.g., 10-K), although disclosure typically occurs in the sustainability report, a specialized climate report, or the annual report.

Why implement them?

- The TCFD **recommendations are widely supported**. As of 2022, over 3,900 organizations have now pledged their support for the TCFD. Supporters span 101 jurisdictions, covering nearly all sectors of the economy, with a combined market capitalization of \$26 trillion.
- Several **national governments support the recommendations**: Belgium, Canada, France, Sweden, New Zealand, Japan and the UK. France and New Zealand have effectively made disclosure mandatory; as of 2022, the UK government is also considering this.



Widespread adoption has made the TCFD recommendations a new norm for the disclosure and management of climate risks and opportunities.

The TCFD Recommendations

The TCFD structured its [recommendations](#) around four pillars—governance, strategy, risk management, and metrics and targets. In Oct 2021, the TCFD released [implementation guidance](#), which outlines sector-agnostic and specific guidance.

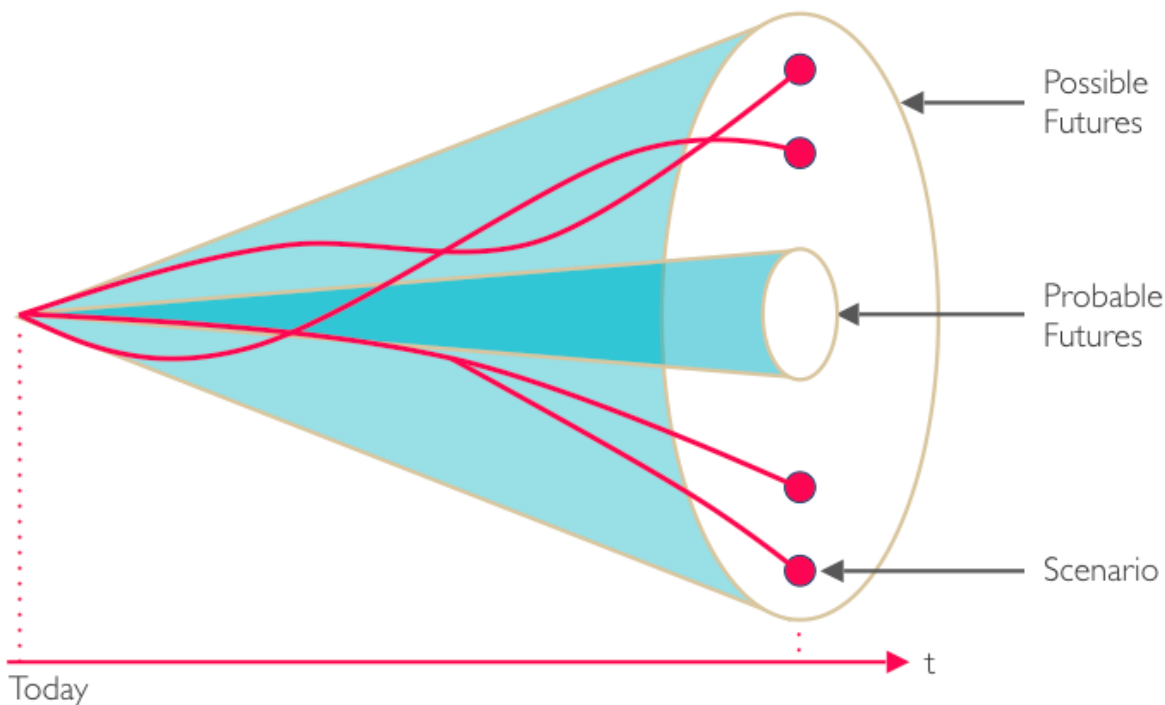


05

Climate Scenarios

Futures scenarios help us engage with uncertainty

A rigorous examination of the future reveals much that is uncertain. Whether we are looking at climate policy, trade relations, or the deployment of autonomous vehicles—we cannot be sure of how key factors reshaping the world will play out in the coming years. What's more, the operating context for business is formed by the complex interactions of many such factors. Scenarios were developed as a tool to constructively engage with such uncertainty, and to enable more strategic and resilient choices in the present.



- **Scenarios are a set (often three or four) of narrative depictions of different plausible futures** for the operating context of the business. They should be plausible, coherent, challenging, and distinct.
- **Scenarios are not predictions.** They are tools that can be used today to explore critical uncertainties about the future, **challenge assumptions** and identify blind spots related to disruptive change.
- **Scenarios create a testbed for strategy.** Resilient strategic ideas are those that work across most or all scenarios.

The TCFD Recommendation on Climate Scenario Analysis

The TCFD recommendations focus on 4 key areas: **Governance**, **Strategy**, **Risk Management**, and **Metrics & Targets**. With regard to **Strategy**, the TCFD recommends that companies undertake **climate scenario analysis** in order to disclose the “resilience of the organization’s strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.”

The Recommendations specify that **disclosure** of this analysis will assist investors, underwriters, insurers and other stakeholders to better understand:

- “the degree of robustness of the organization’s strategy and financial plans under different plausible future states of the world;
- how the organization may be positioning itself to take advantage of opportunities and plans to mitigate or adapt to climate-related risks; and
- how the organization is challenging itself to think strategically about longer-term climate related risks and opportunities.”



The Case for Climate Scenario Analysis

Climate scenarios analysis can help organizations:

1

Identify climate-related risks and opportunities across a range of uncertain future states, which are **highly uncertain**, will play out over the **medium to longer term**, and can have potential **disruptive effects**

2

Enhance **strategic conversations about the future** by challenging business-as-usual assumptions and considering novel, disruptive developments.

It **broadens decision makers' thinking** across a range of plausible scenarios, including scenarios where climate-related impacts can be significant.

3

Promote **internal collaboration among internal stakeholders** around strategic planning for plausible futures.

4

Frame and assess the potential range of plausible impacts from climate change and the associated management actions, leading to **more robust strategies** under a wider range of uncertain future conditions.

5

Identify indicators to monitor the external environment and better recognize when it is moving toward a different scenario state, allowing organizations the opportunity to reassess and **adjust their strategies** and financial plans.

6

Meet disclosure requirements and demand from investors and other stakeholders for information on the organization's significant climate risks and opportunities, resilience of its business strategy.

BSR's Climate Scenarios

BSR has developed three extended climate scenario narratives built upon the Network for Greening the Financial System (NGFS) climate scenario framework and corresponding datasets. BSR's scenario set provides expanded business relevant narratives with decade by decade accounts of plausible socioeconomic, political, and technological developments, grounding in the NGFS data. The three scenarios are:



Current Policies: Only currently implemented policies (as of 2020) are preserved. Absent ambitious government or business action, emissions are on track to reach at least 3.3°C of warming by 2100.



Net Zero 2050: The transition to a net-zero economy requires drastic and coordinated global action, particularly in the 2020s. The cost of action is high but warming peaks at 1.6°C in 2050 then declines.



Delayed Transition: After a decade of inaction, a set of uncoordinated and stringent policies are adopted in the 2030s to rapidly halt GHG emissions. This approach comes at high social and economic costs but ultimately holds warming to a peak of 1.8°C by 2050.

Although each scenario features physical risks from climate change, ambitious climate action is able to moderate these over time. However, the scenarios make clear that delayed action significantly intensifies both physical *and* transition risks for business and society. These scenarios are available for public use and [can be found on the BSR website](#).

06

Resources

Location-Based Risk Data Providers (Public)



Database / Tool	Geographic scope	Description	Climate Risks covered	Format of data provided
Winner Index Project	Global	Weather index-based risk services.	Extreme weather events	-
Think Hazard	Global	Localized climate risk database that helps identify natural hazards in a specific project area and understand how to reduce their impact	River flood, urban flood, landslide, earthquake, wildfire, water scarcity, extreme heat, coastal flood, cyclone, tsunami, volcano	Visual tool
German Watch	Global	The Global Climate Risk Index analyses to what extent countries and regions have been affected by impacts of weather-related loss events.	Storms, floods, heat waves	PDF report
Climate Impact Map	Global / US	Interactive tool focusing on temperatures at global and US level	Temperatures	Visual tool
IPCC Data Distribution Center	Global	The DDC provides climate, socio-economic and environmental data, both from the past and also in scenarios projected into the future.	Climate scenarios based on climate models experiments, statistical downscaling and sea-level scenario construction.	visualization
Climate Wizard	Global	Historic temperature and rainfall maps, state-of-the-art future predictions of temperature and rainfall, and possibility to download climate change maps.	historic temperature and rainfall maps, future predictions of temperature and rainfall, climate change maps	
PREPdata	Global / US	Map-based, open data online platform	Temperatures, precipitation, fires, land slides, extreme heat, sea levels, current and projected water stress	Visual tool
WRI Aqueduct	Global	Interactive tools with GIS data available for download. Map water risks such as floods, droughts, and stress, using open-source, peer reviewed data	Floods, droughts, water-stress	CSV, XLSX
World Bank Climate Change Knowledge Portal	Global	Provides global data on historical and future climate, vulnerabilities and impacts.	Temperatures, precipitation, drought and water indicators	Visual tool
ND GAIN Index	Global	This tool summarizes a country's vulnerability to climate change and other global challenges in combination with its readiness to improve resilience.	Factors on food, water, health, ecosystem services, human habitat, and infrastructure	CSV, visual tool
CORDEX regional climate model	Europe	This dataset provides daily and monthly Regional Climate Model (RCM) data on single levels from a number of experiments, models and time periods computed in the framework of the CORDEX.	Extreme weather events	Visual tool
Climate Impact Explorer	Global	This tool shows how the severity of climate change impacts will increase over time in continents, countries and provinces at different levels of warming, starting with 1.5C	Temperatures, atmospheric pressures, precipitation, wind speed, extreme events (heat waves, wildfires, crop failures, river floods), river discharge, surface runoff	Graphs

Location-Based Risk Data Providers (Private)

Database / Tool	Scope	Description / Output
Climate Service	Global	Helps companies measure, monitor, and manage the financial impacts of climate on business and investments
427	Global	On-demand risk analytics to support investment strategies and climate risk disclosures, and data products their climate risk scores for listed instruments. Examples of outputs: maps, scorecards
Maplecroft	Global	Map global corporate exposure to climate change, natural hazards, water issues and regulatory challenges down to the asset-level. Embeds environmental, industry and commodity risk data.
Jupiter Intelligence	US, Europe	Global models that predict asset-level impact from flood, fire, heat, drought, cold, wind, and hail events at less-than-one-meter resolution. Predictions are available from 1 hour to over 50 years in the future. The company will provide multiple services to the top global metropolitan areas during 2019.

Thank You

BSR™ is a global nonprofit organization that works with its network of more than 250 member companies and other partners to build a just and sustainable world. From its offices in Asia, Europe, and North America, BSR™ develops sustainable business strategies and solutions through consulting, research, and cross-sector collaboration.

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