



# Asian Bankers Association

## Environmental Risk Management

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■ ■ ■  
The better the question. The better the answer.  
The better the world works.



# Our speakers today

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# Understanding ESG, Sustainable Finance, and Environmental Risk

“ Sustainable finance represents any form of financial service that incentivises integration of long-term environmental, social and governance criteria into business decisions to provide more equitable, sustainable and inclusive benefit for clients and society

“ The UN 17 SDGs are universal call for action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030



“ Responsible investment as a strategy and practice to incorporate Environmental, Social and Governance (ESG) factors in investment decisions and active ownership

“ It is crucial to keep our focus on environmental issues as they pose clear challenges for our economies and financial systems. It is important for FIs in Singapore to have a good understanding of environmental risk and improve their resilience against environmental-related events, as part of their business and risk management strategies



# Global drive & regulatory agenda: The **Transformation** Journey

*In order to meet the goal of net-zero carbon emissions by 2050, the financial services industry is going to need to transform how they are doing business*



## Finance-led transformation

**Now** - Understanding the reporting frameworks, sourcing data, and building disclosure frameworks

**Next** - Integration of reporting into BAU capabilities, evolution in sophistication of measures and reports



## Risk and Regulatory-led transformation

**Now** - Understanding the impacts climate change has on portfolios, exposures, and how to measure these risks

**Next** - Integration of impacts of climate change into enterprise risk management frameworks, sophisticated modelling and forecasting, robust measurement tools



## Strategy-led transformation

**Now** - Commitments across the industry including sustainable financing, measuring financed emissions, and getting to net zero

**Next** - Bold commitments, longer term goals, and many more engaged companies

# Think about the roadmap to building your ESG strategy

## STEP ONE AMBITION

What are my beliefs and objectives?

Do I have the right balance of ESG knowledge?

## STEP TWO DEFINING JOURNEYS & PATHWAYS

Have I completed an ESG current state assessment?

Am I compliant with ESG regulations?

What are my business strategies and plans?

## STEP THREE ESG INTEGRATION

Have I met my ambition?



**NET ZERO**  
20XX

### What should I concentrate on?

- Forming a cross-management leadership team to assess the ESG factors relevant to your business
- Impact of ESG risk factors on your business and value proposition
- What's important over the long-term and challenge the board to be ambitious
- Peer group and market intelligence
- Check and challenging priorities identified against market direction and barriers
- Upskilling you team and building ESG capacity
- Perfecting talent strategy
- Defining your ESG risk appetite according to your ambition
- Geographic targets in countries operated in
- How top line growth is impacted
- Exploring ESG opportunities
- Meeting regulatory requirements
- TCFD Disclosures
- What targets and emission goals are most important
- Clear board communication on ESG impacts
- Focus on the governance committee tasked with championing integration
- Having clear expectations across your value chain

### What will hold me back?

- Failing to identify and acknowledge ESG issues by Board and Senior Management
- Failing to set up an independent ESG committee
- Setting ambition at wrong level
- Lack of planning, analysis and risk factoring
- Insufficient analysis of competitors, and market drivers
- Inadequate ESG knowledge and subject matter advice
- Lack of consistency between geographic targets and strategies and risk appetite
- Not exploring opportunities presented by ESG in order to become a market differentiator
- Full set of ESG requirements not covered across business lines and geographic sectors
- Inadequate low quality TCFD disclosures
- Greenwashing
- Lack of accountability at Board level
- Unclear ESG ambition throughout the value chain
- Slow progress on development of green products
- Insufficient climate risk analysis and stress testing

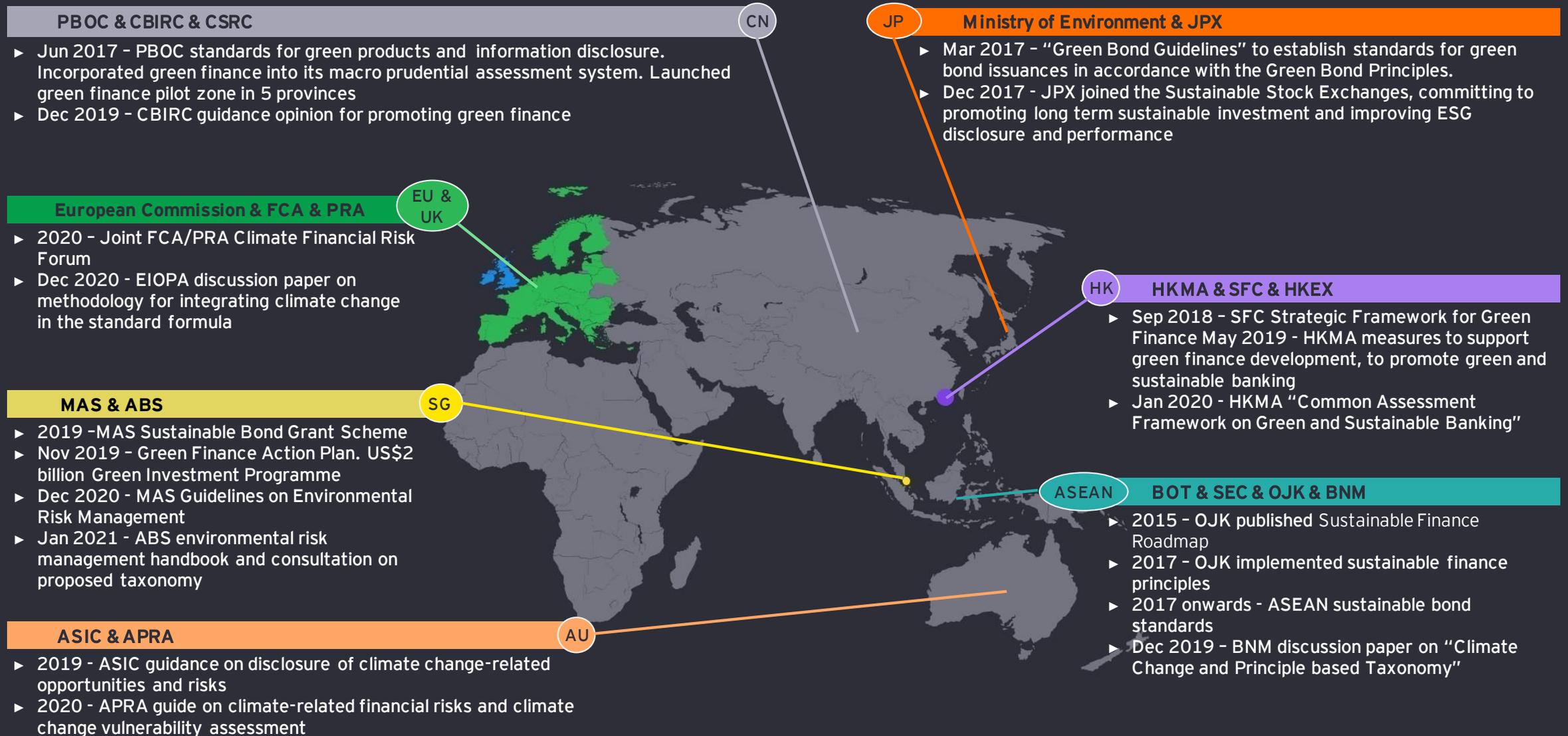


# ESG Strategy: **Polling question**

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- ▶ **What is the status of your bank's ESG strategy?**
  - a) Developed and rolled out across the bank
  - b) Developed at group-level but not yet fully rolled out across the organisation
  - c) In the process of being developed this year
  - d) Not yet developed but will do so by end of 2022
  - e) Not a priority - no plan for development of an ESG strategy

# APAC regulators are actively introducing new regulations, at measured pace



# Climate Risks: **physical and transition risk** channels

Climate risk is ultimately the change in revenue, cost and risk that results from climate change. Climate risk is typically divided into two categories:

- ▶ **Physical risk:** Arise from weather events and longer-term shifts in climate
- ▶ **Transition risk:** Arise from the process of shifting towards a low-carbon economy

## Physical

### Acute impacts



Storms and flooding



Extreme heat



Bushfires

### Chronic impacts



Prolonged and more severe drought



Water stress due to shifts in seasonal rainfall patterns



Increased heat

## Transition



Markets

Shifts in supply and demand for certain commodities, products, and services



Policy & Legal

Policy actions that attempt to constrain actions that contribute to the adverse effects of climate change or policy actions that seek promote adaptation to climate change



Technology

Technological improvements or innovations that support the transition to a lower-carbon, energy efficient economic system



Reputation

Changing customer or community perceptions of an organization's contribution to or detraction from the transition to a lower-carbon economy

# MAS introduced its Environmental Risk Management Guidelines in 2020

The Guidelines apply to locally-incorporated banks and subsidiaries of foreign banks as well as to their downstream subsidiaries and branches in Singapore and overseas. Moreover, MAS intends for the asset management specific guidelines to also apply to firms involved in investment activities.

		Banks	Insurers	Asset Managers
	<b>Governance</b>	Appoint Board and senior management to put in place an environmental risk framework	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	<b>Risk Management</b>	Integrate environmental risk monitoring into the firm's enterprise risk framework	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	<b>Disclosure</b>	Periodic disclosures (at least annually for banks and insurers) on firms' environmental risk information	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	<b>Underwriting</b>	Incorporate environmental risk considerations into the underwriting process	<input checked="" type="checkbox"/>	
	<b>Investment</b>	Ongoing monitoring of environmental risk at an individual investment level, and at the portfolio level	<input checked="" type="checkbox"/>	
	<b>Research and Portfolio Construction</b>	Integrate environmental risk considerations into AMs' research and portfolio construction processes		<input checked="" type="checkbox"/>
	<b>Stewardship</b>	Support investee companies' efforts in their transition to more sustainable practices		<input checked="" type="checkbox"/>

# A closer look at MAS EnRM requirements for Banks: Governance, Risk Management and Disclosures



## Governance and Strategy

Board and senior management to incorporate environmental considerations into the bank's **risk appetite, strategies and business plan**.

- ▶ Maintain **effective oversight** of climate risk management, including policies and processes to assess, monitor and report such risk
- ▶ Have an **institution-wide view of bank's climate risk** exposures and oversee integration of it into risk management framework
- ▶ **Periodically review adequacy and effectiveness** of bank's climate risk management framework

Where risk is material, bank should **designate senior management member** to oversee environmental risk



## Risk Management

Risk management framework, policies and processes to **identify, assess, mitigate and monitor** material Environmental Risk.

When carrying out customer assessments FIs should consider:

- ▶ Internationally recognized **sustainability standards** and **certification schemes**, as well as the **customer's strategy** to manage its environmental risk
- ▶ **Analysis** of the severity of the environmental risk, as well as **capacity, commitment, willingness and track record** of the customer in managing such risk

FIs should consider outcome of regular and relevant **scenario analysis and stress testing**, incorporating forward-looking information, to assess the impact of material environmental risk, and explore resilience to financial losses



## Disclosures

Meaningful disclosure of a bank's environmental risk information improves the ability of stakeholders to factor in environmental risk considerations in their financial decisions.

MAS proposes that a bank should:

- ▶ Disclose the approach to managing environmental risk at least annually
- ▶ For reporting take reference from international reporting frameworks ("TCFD"), to guide environmental risk disclosure
- ▶ Review disclosure regularly to improve **comprehensiveness, clarity and relevance**

## EY insights



- ▶ Clear allocation of responsibilities **below the Core Management Functions** and clear roles and responsibilities across all three lines of defence
- ▶ Focus on creating robust and effective **capacity building programmes** (business values and culture) to incorporate emerging issues relating to EnRM
- ▶ Establish a **coherent framework** for consistently and reliably disclosing and communicating climate-related information

# A closer look at MAS EnRM requirements for Banks:

## Customer and Portfolio Risk



### Customer Risk

At the **customer level**, MAS proposes for the bank to undertake an environmental risk assessment of each customer as part of its assessment process for credit facilities or capital markets transactions, particularly for sectors with higher environmental risk.

- ▶ Apply risk criteria to identify sectors with high climate risks and develop **sector-specific policies** that articulate expectations towards existing and prospective customers
- ▶ Assess each customer's climate risks **as part of its assessment for credit facility or capital market transactions**
- ▶ Do **enhanced due diligence** on high environmental risk transactions and **document** all decisions appropriately
- ▶ Engage customers that pose higher risk to **improve their environmental risk profile** and **support their transition** towards sustainable business and encourage customers to provide **environment-related disclosures**
- ▶ For customers not managing climate risk adequately, banks should consider **mitigating measures** (e.g. reflecting the additional risk in loan pricing, apply limits on loan exposures, re-assessing client relationship)



### Portfolio Risk

At the **portfolio level**, MAS proposes for the bank to develop tools and metrics to monitor and assess its exposures to environmental risk.

- ▶ Develop capabilities in **scenario analysis** and **stress testing** to assess the impact of climate risk and resilience to financial losses
- ▶ Use the results of scenario analysis and stress testing to review environmental risk management policies, maintain documentation of key features of scenario analysis
- ▶ Provide training to staff, and regularly **review capacity building** program to incorporate emerging issues relating to climate risk management

### EY insights



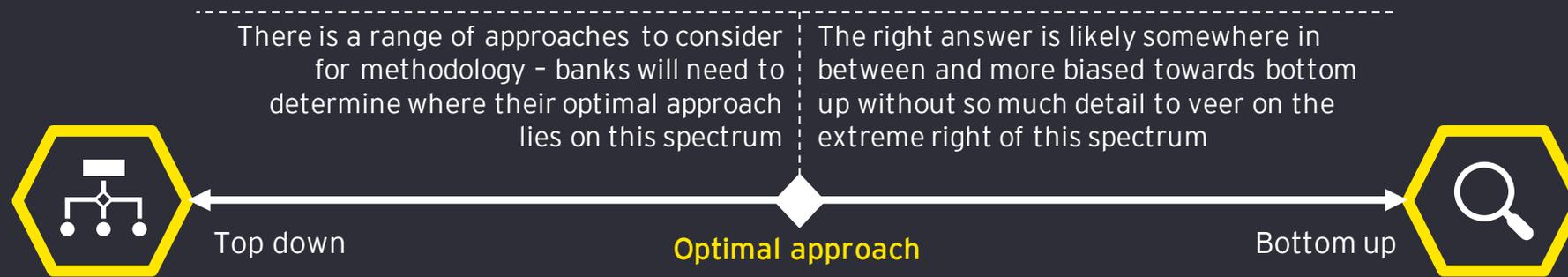
- ▶ Design **sector strategy** for improving customer risk profile and incorporate lessons learnt from one sector to another where possible
- ▶ Create **easy to adjust framework** considering evolving nature of potential financial (through physical and transition risk channels) and reputational impact on Banks
- ▶ **Gather relevant data of Environmental Risk impacts** during client on-boarding or during annual reviews to develop proprietary MI frameworks to better understand and manage physical and transitional risk

## Scenario analysis and stress testing: **Polling question**

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- ▶ What are the top three concerns you have about implementing climate risk into your existing stress-testing capabilities? (Choose top 3)
  - a) Integrating environmental risk data
  - b) Calculating company level climate exposure
  - c) Understanding climate risk scenarios
  - d) Securing resources (budget, technology) to adapt stress-testing tools
  - e) Building internal talent capabilities
  - f) None - not aware this is a priority for the bank

# Scenario analysis and stress testing: Range of **methodological approaches**



A top down approach will rely heavily on existing stress testing models to capture climate related risk through macroeconomic variables and use the questionnaire for a simple industry or sectoral climate overlay on top of stressed risk parameters

## + Pros

- ▶ Simple to operationalise
- ▶ Easy to explain methodology and impact to senior management
- ▶ Less additional information needed from counterparties

## - Cons

- ▶ Likely not detailed enough to meet regulatory expectations
- ▶ Inability to fine tune risk sensitivity below an industry or sectoral level, e.g. counterparty level

A bottom up approach will use the questionnaire on the individual counterparty level to capture detailed information that can be used to model and stress the individual inputs of counterparty ratings based on idiosyncratic economic and climate factors

## + Pros

- ▶ More granular risk sensitivity driven at the counterparty vs. sector level
- ▶ More detailed data to inform management actions

## - Cons

- ▶ Time and resource intensive to gather information in questionnaires and build new models
- ▶ Increased complexity for operationalisation
- ▶ Data for such detailed analysis may be limited

# Scenario analysis and stress testing: Core climate scenario approaches

## Scenario data

Determine availability of scenarios in different dimensions:

- **Physical risk and transitional risk:** Assess whether the scenarios cover both types of risk, and their level of interaction
- **Assessment of different scenarios:** Use plausible scenarios, including a 2°C scenario, and a no-policy scenario
- **Outcome granularity:** Assess applicability of scenario outcomes by sector, geography, etc.

### Option 1: Public Scenarios

- Developed by scientific community and NGOs to assess climate change from different perspectives, e.g. CD-Links, EIA
-  ▪ Credibility, low cost, transparency
-  ▪ Granularity of sectors or flexibility

### Option 2: Internal Scenarios

- In-house development to obtain risk factors associated to specific sectors and climate metrics
-  ▪ Customization to organization
-  ▪ Complex development of assumptions

### Option 3: Vendor Scenarios

- Robust scenarios to accommodate multiple scenarios and applicability to various sectors
-  ▪ Detailed outputs and visualization tools
-  ▪ Low standardization, vendor costs

## Scenario sources

## Scenario Examples

Most climate scenarios have been developed by government agencies and academics. Some vendors have developed their own scenarios, whereas others consolidate available scenarios and data to develop modeling and reporting capabilities. Below are some examples:

- **NGFS:** Scenarios were made available in June 2020, and these will be leveraged for the Bank of England 2021 biennial exploratory scenario
- **IPCC:** Public scenarios from the UN Intergovernmental panel on climate change. Scenarios start from projections of global greenhouse gas emissions to derive climate and socioeconomic projections. Data includes atmospheric composition, land use, sea level, among others.
- **IEA:** The international energy agency provides scenario data for different energy sources on a geographical granular level

# Scenario analysis analysis and stress testing: Leveraging existing vs net-new capabilities for stress testing

Financial institutions have spent several years developing robust methodologies and processes for enterprise stress testing. The scenario analysis required for assessment of climate change risk builds upon these investments up to a point. New capabilities will be required to extend to long-dated transition pathway and temperature alignment considerations to understand impact on lending portfolios, other financial assets and bank's strategy, risk appetite and so on.

Core Areas	Capital Stress Testing	Climate Scenario Analysis
<b>Overall Objective</b>	<ul style="list-style-type: none"> <li>▶ Understand the impact of stress macroeconomic scenarios on credit losses and capital adequacy in the short to medium term</li> </ul>	<ul style="list-style-type: none"> <li>▶ Understand the potential impact of credit loss due to climate transition and physical risks</li> </ul>
<b>Scenario Development</b>	<ul style="list-style-type: none"> <li>▶ Represent baseline stress macroeconomic conditions for the overall market or specific to particular industries/events</li> <li>▶ Outputs include paths for key macro variables that are direct inputs to stress testing models</li> <li>▶ Scenarios typically developed in-house for large banks</li> </ul>	<ul style="list-style-type: none"> <li>▶ Represent impact of climate risk (e.g., warming scenarios) on emissions cost, capex, and revenue</li> <li>▶ Complex nature of climate change analysis makes in-house climate scenario development less feasible</li> </ul>
<b>Time Horizon</b>	<ul style="list-style-type: none"> <li>▶ Short-term. Typically 1-5 years</li> </ul>	<ul style="list-style-type: none"> <li>▶ Focus on quantifying impact of physical and transition risks over short and long-term</li> </ul>
<b>Methodology</b>	<ul style="list-style-type: none"> <li>▶ Establish statistical relationships between macroeconomic variables and obligor/loan characteristics based on historical time series data</li> <li>▶ Dynamic balance sheet assumptions</li> </ul>	<ul style="list-style-type: none"> <li>▶ Use qualitative overlays vs. new sector level rating transition models vs. new ratings templates that account for climate risks</li> <li>▶ Static vs dynamic balance sheet assumptions focus on climate impact</li> </ul>
<b>Outputs</b>	<ul style="list-style-type: none"> <li>▶ Forecasted balance sheet, income statement and capital metrics over the forecast horizon under stress scenarios</li> </ul>	<ul style="list-style-type: none"> <li>▶ Impact on portfolio credit quality and estimated losses associated with potential climate conditions at specific points far in the future under given climate change scenarios</li> </ul>

# Scenario analysis analysis and stress testing: **Climate scenario narrative, generation and expansion**

Publicly available climate scenarios typically provide **few macroeconomic variables** and thus scenario expansion is required

Scenario expansion is **challenging due to lack of historical relationships**. Firms may refer to published papers (e.g, ACPR) or engage a vendor to assist

In certain cases, **macroeconomic factors will be directly provided by regulators** (e.g., BES21, ACPR, HKMA)

## Scenario Narrative & Assumptions

Climate scenarios are differentiated based on the key assumptions below and elaborated in scenario narratives.



**Greenhouse gas concentration**  
Temperature alignment



**Socioeconomic context**  
Shared socioeconomic pathway  
Consumption patterns



**Technological evolution**  
Higher energy efficiency  
Carbon dioxide removal



**Climate policies**  
Jurisdictions  
Orderly vs. disorderly



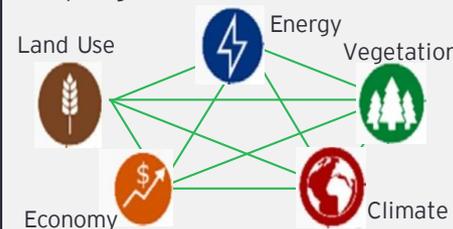
**Regional manifestations**  
Chronic and acute physical risks

## Climate Scenario Modeling

Climate-economy modeling frameworks include integrated climate-economy models (various IAMs and GEMs) and other macroeconomic models.

Computable General Equilibrium (CGE) models are multi-sector and region equilibrium models that optimize behavior assumptions. The Bank of Canada uses a CGE model for climate risk analysis.

Partial (PE) or general equilibrium (GE) models of the energy system and land use are the basis of the NGFS and BOE scenarios. General equilibrium types are linked to a simple growth model.



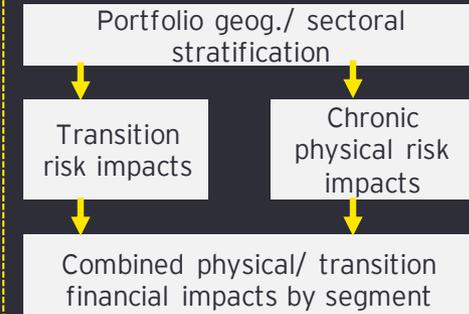
Other models such as Input-Output models can also be modified to assess climate risks.

## Scenario Expansion

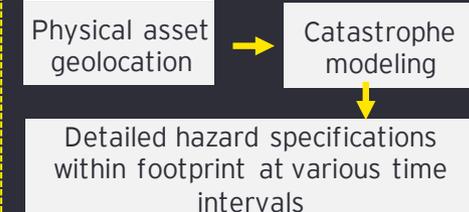
Climate scenarios are expanded to enhance geographic and sectoral resolution and derive macroeconomic variables used by stress testing models.

Sector/ region macroeconomic factors  
Financial market drivers (e.g. spreads)

### Industry-Level Financial Impacts

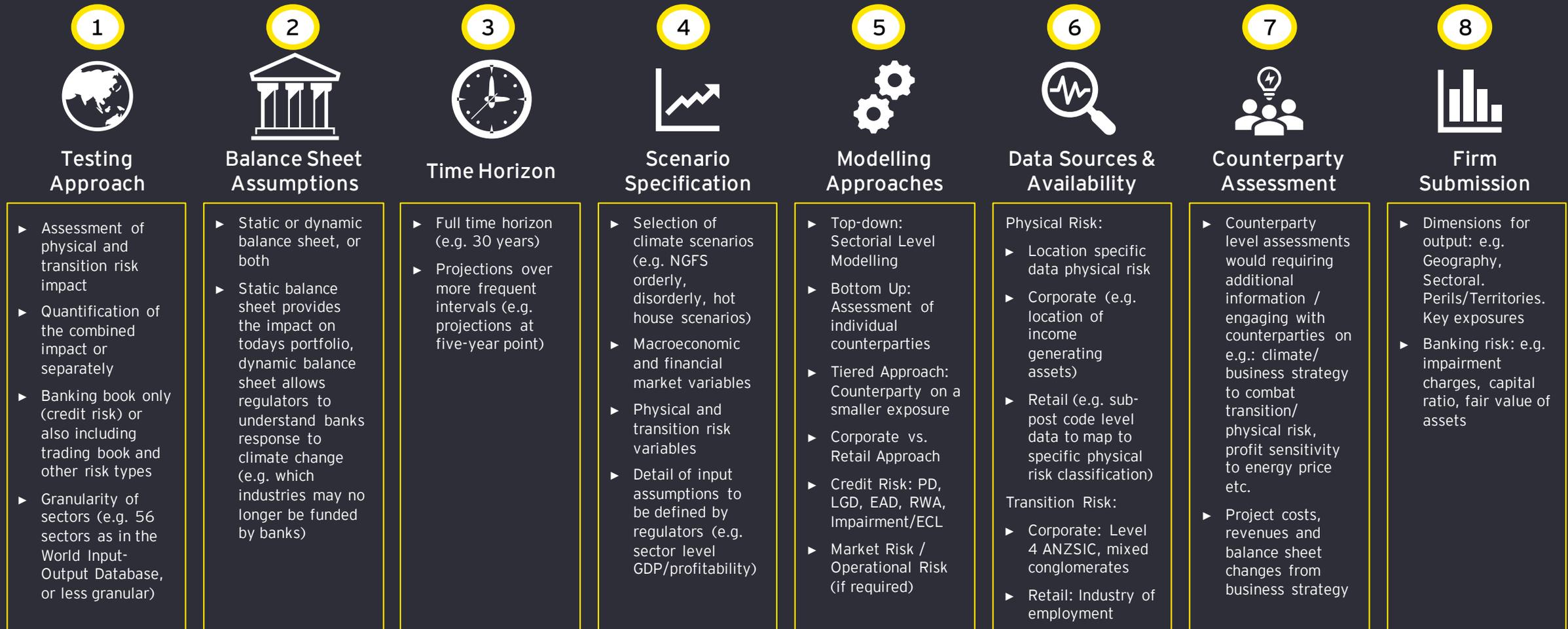


### Acute Physical Risk



# Scenario analysis and stress testing: Considerations for **risk modeling**

Example considerations for a Climate Vulnerability Assessment:



# Preparing and responding to evolving regulatory expectations: a **multi-year journey**

## NOW

Conduct initial impact assessment to identify areas of change, commence early engagement and foster firm-wide awareness

Start the Triage

### Develop Strategy & Vision

- ▶ **Initial impact assessment** of how the MAS EnRM guidelines will impact your bank
- ▶ **Review current governance frameworks**, policies and procedures to identify gaps in order to assess impact and magnitude of change
- ▶ **Liaise with your global sustainability leads**, if relevant, to determine coverage through existing approaches
- ▶ **Create an environmental risk roadmap** and set out realistic timelines in developing the bank's environmental risk agenda
- ▶ **Commence early stakeholder engagement** on MAS EnRM guidelines, and assess the impacts and consider practical next steps
- ▶ **Brief board and senior management** on evolution of EnRM guidelines and any industry developments
- ▶ **Perform current state thematic analysis** to identify environmental risk exposures
- ▶ **Track MAS responses** to EnRM development along with industry steer and behaviour (i.e. GFIT Taxonomy)

## NEXT

Develop a clear path towards sustainability through gap analysis and business adaptation

Navigate the uncertainties

### Mobilise Programme and lay foundations

- ▶ Appoint an Environmental Risk Officer / **designate senior manager or committee** to oversee environmental risk
- ▶ **Start to engage key customers early**, particularly those already identified in high environmental risk sectors
- ▶ **Embed environmental risk** within current risk frameworks and risk assessments. Quantify risk exposure at customer and portfolio level
- ▶ **Perform scenario analysis** across a range of environmental-related scenarios and stress testing to explore and understand firm's level of resilience
- ▶ **Update key risk artefacts** such as risk appetite statement, risk committee Terms of Reference, risk policies, capital management plan, underwriting policies and business continuity plans
- ▶ **Create a strategy to mitigate environmental risks** identified at both the customer and portfolio level and determine the most appropriate customer engagement strategy

## BEYOND

Deliver long-term value creation by promoting a sound organisational culture

The "Reframed Future"

### Achieving Ambition

- ▶ **Develop frameworks for environment risk disclosures** including metrics and targets relevant to climate-related risks for preliminary disclosures
- ▶ **Develop management reporting and dashboards** of environmental risk exposure for Board and senior management
- ▶ **Develop seamless technology** to operationalise ESG and EnRM going forward
- ▶ **Provide training and internal communications to staff** to raise awareness of the bank's agenda and plans for environmental risk management and alignment with broader ESG strategy

## Climate Risks: **Polling question**

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- ▶ What are the factors that are limiting the growth of green-related opportunities in your bank?
  - a) Lack of agreed industry methodologies
  - b) Lack of clarity of regulatory/supervisory expectations
  - c) Lack of customer/client demand
  - d) We have not systematically evaluated the opportunities
  - e) All of the above

# Sustainable Finance solutions



Strategy, Roadmaps and Assessments

Operating Model

Risks and Financial Exposures

Product Strategy and Design

Metrics, Disclosures and Stakeholder Engagement

## SOLUTIONS

- |   |  |  |   |   |
|---|--|--|---|---|
| <ul style="list-style-type: none"> <li>• Governance/leadership model</li> <li>• Sustainable finance/ESG strategy development</li> <li>• Corporate goal-/commitment-setting</li> <li>• Materiality assessment</li> <li>• Stakeholder perception analysis</li> <li>• Market scan and benchmarking</li> <li>• Long-term value</li> </ul> | <ul style="list-style-type: none"> <li>• Operating model                     <ul style="list-style-type: none"> <li>• Three-lines-of-defense for sustainable finance</li> <li>• Risk assessment and control framework</li> <li>• ESG data model/governance</li> <li>• Compliance management</li> <li>• Third-party / supply chain ESG-related risk management (e.g., risk ratings/assessments)</li> <li>• Business and operational resiliency</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Risk management                     <ul style="list-style-type: none"> <li>• ESG/enterprise risk management framework</li> <li>• Enterprise ESG risk definitions and risk inventory</li> <li>• Risk appetite and limits/thresholds</li> <li>• Credit analysis and underwriting standards</li> </ul> </li> <li>• Modeling                     <ul style="list-style-type: none"> <li>• Physical/transition risk modeling</li> <li>• Enterprise stress testing/scenario development</li> <li>• Regulatory capital and liquidity modeling</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Product market scan</li> <li>• Product governance and new product approval</li> <li>• Product strategy</li> <li>• Product design (green and sustainable finance)</li> <li>• Integration of sustainable finance into existing products</li> <li>• Product compliance and marketing</li> </ul> | <ul style="list-style-type: none"> <li>• Performance/risk reporting                     <ul style="list-style-type: none"> <li>• Metrics and targets</li> <li>• Board and management risk reporting and analytics</li> </ul> </li> <li>• Disclosures and reporting                     <ul style="list-style-type: none"> <li>• Reporting standards selection/development</li> <li>• Attestations and assurance (incl. agreed-upon procedures)</li> <li>• Reporting/data production</li> </ul> </li> <li>• Regulatory and rating agency preparation/engagement</li> </ul> |
|---|--|--|---|---|

# An overview of our EnRM Solution Set

Detailed **impact assessment** across your business to identify materiality of compliance and gaps for enhancement and remediation

### Risk based visualisation dashboard

Tools to visualize degree of compliance and navigate impact assessment providing end-to-end regulatory traceability

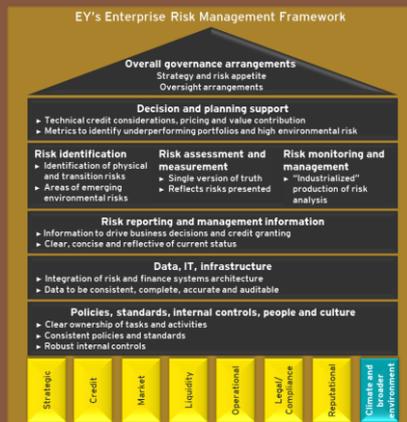
### Tailored impact assessment focused on MAS expectations

Undertaking an EnRM impact assessment framework based on your end-to-end business model

Determine impact on portfolio credit quality and estimated losses associated with potential climate conditions at specific points far in the future under given **climate change scenarios**

Findings from our **Climate Risk Disclosure Barometer**, PowerBI interfaced database providing insight on global benchmarking and roadmap to improve your disclosures to satisfy regulatory expectations

## Incorporating EnRM within existing enterprise risk management framework



## Developing scenario analysis and stress testing to assess ER



Understanding impacts of physical and transition risks on your business

## Global benchmarking on climate risk disclosures

**EY PowerBI resource**

Physical risk disclosures fall behind transition risk

The use of climate scenarios continues to be a major gap in companies reporting. Less than 10% of the assessed companies disclosed the use of climate scenarios (similar to 2018), with most using a using a 2°C scenario (2020), aligned with the international.

EY PowerBI interfaced database offers the ability to compare your company against international peers and helps companies to better understand global sector trends and what represents leading practice.

EY global benchmarking on climate risk disclosures - example

Example charts showing Quality (%) and Quantity (%) for various sectors and companies.



# Questions?

## **Appendices**

**Our EnRM Solution Set**

**Our Tools/ Accelerators**

**ESG Data Provider Landscape**

## **Our EnRM Solution Set**

# We **collaborate** globally with industry bodies and trade associations

## Leading Initiatives

- EPIC** Build out of non-financial metrics including innovation and human capital 
- LTV** Helping companies understand and articulate how they generate shareholder value 
- WEF** ESG Scorecard: Proposal recommending a common set of universal ESG metrics / disclosures on non-financial factors 
- IIF** Developed and published an annual global annual bank risk management survey 

## Alliances

- EY certifies **Green Bonds** against the **Green Bond Principles** (developed by ICMA) and/or the **Climate Bonds Standards** (developed by the Climate Bonds Initiative). 
- EY is an approved verifier under the **Climate Bond Standards** of the **Climate Bond Initiative**. 
- EY is an active member of the **AICPA Assurance Services Executive Committee Sustainability Assurance and Advisory Task Force** covering AICPA standards development and technical guidance. 

## Trade Associations

- AFME Sustainable Finance Working Group** 
- TheCityUK, UK Finance and Innovate Finance** industry bodies in the UK  
- IFoA Resource and Environment Board and Climate Change Taskforce** 
- Scottish Financial Enterprise Wealth Management Group** member with specific discussions around ESG 

## What differentiates EY?

- ▶ We work with many of the leading sustainability organizations and standard-setters, such as the **WBCSD, IIRC, GRI, SASB, AICPA** and the **TCFD**<sup>1</sup>
- ▶ We are an official supplier for the **World Bank Green Climate Fund** and a member of **UN Global Compact**
- ▶ EY was the first professional services firm to sign as a stakeholder endorser of the **UN PRB**
- ▶ We have been selected by the **Climate Action 100+** for the Benchmarking Project Phase I. EY will build a robust benchmarking framework that will be used to assess and evaluate climate performance of 161 key firms globally who together account for c. 80% of greenhouse gas emissions
- ▶ We engage with ranking and rating agencies such as **MSCI, Sustainalytics, ISS, Refinitiv** and **Bloomberg**
- ▶ As a result, we gain valuable knowledge on emerging trends, develop new frameworks and address major sustainability challenges as part of our membership and collaboration with these organizations

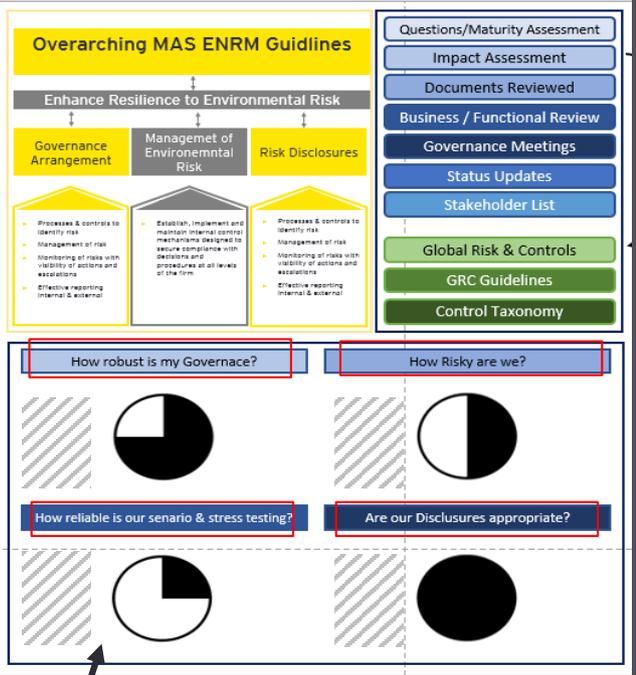
“  
**EY scored highest among consulting firms for the strongest capabilities to advise clients on global sustainability strategy. Overall, EY’s brand awareness is above 50% and we are the only Big Four firm included in the survey.**  
 Verdantix Global Leaders Sustainability Survey

<sup>1</sup> World Business Council for Sustainable Development (WBCSD), International Integrated Reporting Council (IIRC), Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), American Institute of Certified Public Accountants (AICPA) and the Financial Stability Board’s Task Force for Climate-related Financial Disclosures (TCFD).

# EY can help you diagnose and assess compliance maturity across your organisation; deploying a comprehensive methodology to create accelerated visualisation of current state maturity, areas for change and path to MAS compliance

## Impact Assessment

Our EnRM Dashboard and impact assessment framework utilised as an accelerator targeted to your needs to identify climate risk maturity and current gaps to meet MAS compliance



Dashboard to visualize degree of compliance and navigate impact assessment providing end-to-end traceability

MAS: "It is important for FIs in Singapore to have a good understanding of environmental risk and improve their resilience against environmental-related events, as part of their business and risk management strategies"

	Expectations	Risk Tagging	Governance	Enhancements
<b>Team/Function</b>			<b>Evidence</b>	<b>Score</b>
<b>Board Governance and Committees</b>	<p><b>Business Plan and Firm Strategy</b></p> <ul style="list-style-type: none"> <li>Environmental considerations incorporated in risk appetite, strategies and business plan</li> <li>Evidence of short term and long term considerations in business plan.</li> </ul> <p><b>Policies and Procedures</b></p> <ul style="list-style-type: none"> <li>Effective oversight of ENRM through policies and processes to assess, monitor, and report risks</li> <li>Internal escalation process and trigger point for board updates</li> <li>Institution wide heat map (view) of ER exposure</li> <li>Integration of ER in Enterprise Risk Management Framework with tools and metrics to monitor exposures</li> <li>Periodic reviews on adequacy and effectiveness: ERMF</li> <li>Designated CMF and committee to oversee ER</li> <li>Establish a qualitative risk appetite statement that includes ENRM</li> <li>Quantitative limits on aggregated exposures to sectors/custs</li> <li>Clear ToR</li> </ul>	<b>Reputational Operational</b>	<p><b>Governance:</b></p> <ul style="list-style-type: none"> <li>EY observed the bank's business plan included both short term and long term considerations of ER. These included identification of environmental risks and opportunities along with evaluation of the actual and potential impact of the risk on the business strategies and planning.</li> <li>EY observed tailored training for the Board to enable them to oversee ENRM, however lack of evidence of clear allocation of responsibilities below the CMF(s) and clear roles and responsibilities across all three lines of defence.</li> <li>EY observe an enterprise wide view of the bank's environmental risk exposure and oversight of ER into the bank's enterprise risk management framework in meeting agendas and minutes.</li> <li>EY observed evidence of a designated environmental sustainability officer in place with responsibility of ENRM governance and oversight. An ENRM committee is in place that meets monthly chaired by the Chief ENRM officer. Committee ToR included the following key ENRM areas:</li> </ul>	8
<b>Credit Risk</b>			<b>Risk Management</b>	
<b>Team/Function</b>			<b>Evidence</b>	<b>Score</b>
<b>Credit Risk</b>	<p><b>Policies and Procedures</b></p> <ul style="list-style-type: none"> <li>Robust credit risk policies and procedures that include ER considerations</li> <li>Risk statement of ER for the credit risk function</li> <li>Clear roles and responsibilities of individuals responsible for environmental risk</li> <li>Sector specific policies with embargo criteria</li> </ul> <p><b>Risk Identification and Assessments</b></p> <ul style="list-style-type: none"> <li>Evidence of tools and assessments to identify ER at customer and portfolio level</li> <li>Internal controls to manage ER with clear escalation channels to the ENRM committee and board</li> <li>Credit risk assessment includes analysis on severity of ER, capacity and commitment and track record of customer in managing ER as well as ability and willingness to introduce measures to manage ER.</li> <li>Use of external ratings and/or internal risk assessment to formulate a ER score card</li> <li>Clear approach to refer high ER transactions to enhanced due diligence with trigger points for further escalation to internal committees/designated individuals for credit approval (with clear documentary evidence of analysis, findings and decision).</li> </ul> <p><b>Risk Management and Monitoring</b></p> <ul style="list-style-type: none"> <li>Process of feedback/referral to coverage/designated team to assist higher ER customers</li> <li>Use of financing conditions or covenants in credit agreements for financing of high risk customers to manage/reduce ER within agreed</li> </ul>	<b>Credit Risk Market Risk</b>		5

### Governance - Board Governance and Committees

- Provide tailored training for the Board to enable them to oversee EnRM appropriately
- Identify the skills required throughout the organisation, evaluate and plan for resources to close any gaps...

### Risk Management - Credit Risk

- Sector specific policies with embargo criteria
- Internal controls to manage ER with clear escalation channels to the EnRM committee and board
- Clear approach to refer high ER transactions to enhanced due diligence with trigger points for further escalation to internal committees/designated individuals for credit approval (with clear documentary evidence of analysis, findings and decision)...

Dashboard Questions-Maturity Assessment Impact Assessment Documents Reviewed Stakeholder Interviews General Meetings

Functional maturity assessment underpinned by interviews, questions and desktop review



# In parallel, you need to assess and adapt effective risk **governance** for organisation wide environmental policy making



## 1. Governance

### Enterprise-wide initiation and setup:

MAS expectations can be satisfied by performing **stakeholder analysis**, having dedicated workshops and by standing up **training for board and senior management**. It is important to **enhance board understanding** of environmental risk and the need for business resilience.

### Environmental Risk Framework:

Developing a **thematic framework and roadmap**, setting up an **effective governance structure**, including roles and responsibilities, organisational resource and skill analysis as well as assisting in incorporating Environmental Risk into incentive structures, to drive the right progress are steps needed to ensure compliance.

### Key Areas of Focus

#### Board Oversight

- ▶ Provide tailored training for the Board to enable them to oversee EnRM appropriately
- ▶ Identify the skills required throughout the organisation, evaluate and plan for resources to close any gaps
- ▶ Incorporate climate risk in incentive structures, in order to drive the right progress in the firm. This provides incentives for decision-makers to weigh various considerations around climate risk against other factors when setting strategy

#### Senior Management and Individual Accountability

- ▶ Clear allocation of responsibilities below the CMF(s) and clear roles and responsibilities across all three lines of defence

#### Strategy

- ▶ Consider the organisation's role in supporting their clients and counterparties to meet the MAS EnRM guidelines and timelines

### Target Governance State

#### 1. Chief Executive Officer (CEO)

EnRM Strategy	Tone from the Top	Corporate Governance
Sustainability in the business model	Transparency	Reputation

#### 2. Chief Operating Officer (COO)

EnRM compliance operations	Taxonomy and Data	Guidelines and control systems
Facility Management	IT - Systems and automation	Sustainable procurement

#### 3. Chief Financial Officer (CFO)

Non-Financial Reporting (TCFD)	Risk data via report chain
Investor Relations	Capital Requirements
Investment Policy	Volatile asset prices

#### 4. Chief Risk Officer (CRO)

Risks in business area	Compliance risks
EnRM in enterprise risk management framework	Control framework

#### 4.1. Environmental Risk Officer (ENRO)

New product opportunities	Product Governance
Benchmarks	Regulations for distribution

# Second, you want to demonstrate that you are in control by incorporating EnRM within your Risk Management Framework

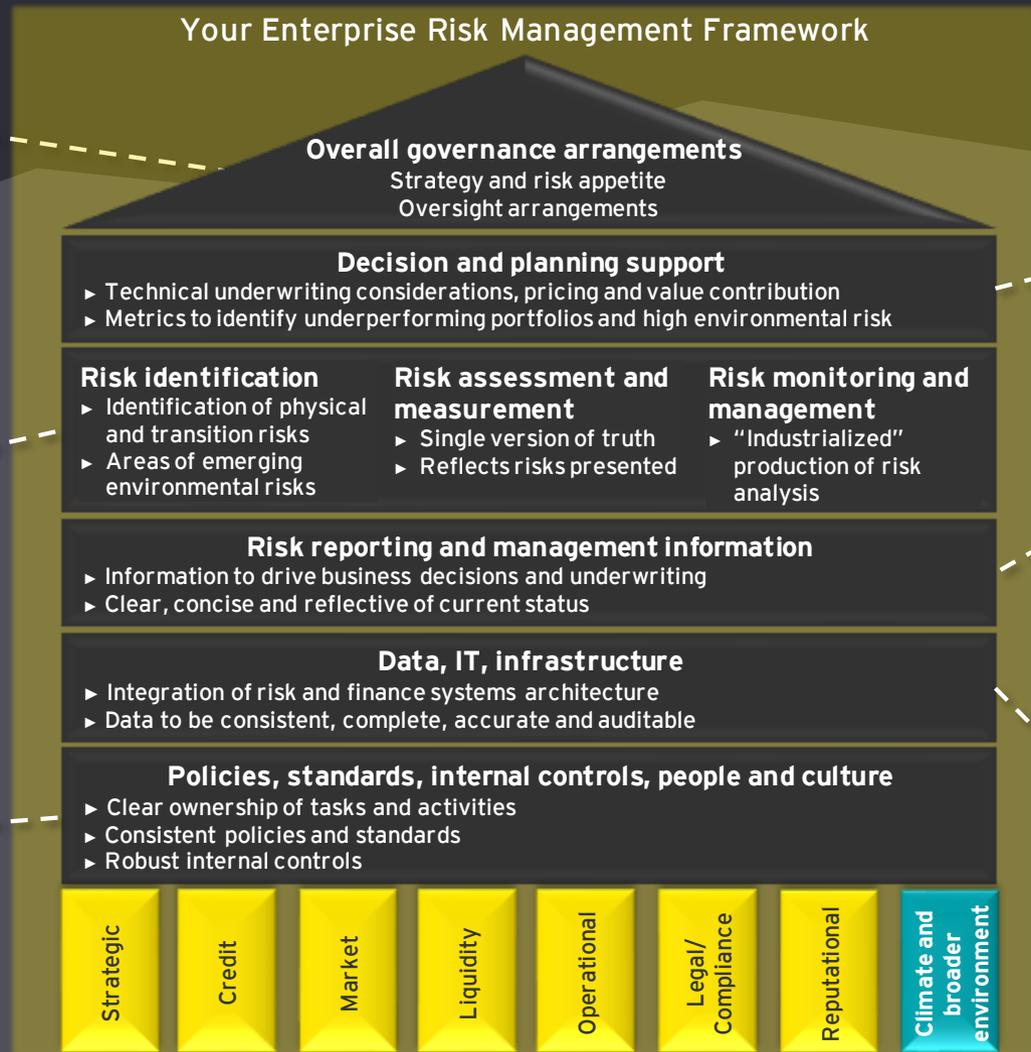
## 2. Risk Management

Firms are required to demonstrate compliance and inclusion of Environmental Risk within their current Enterprise Risk Management frameworks. The following considerations should be adopted:

- ▶ Incorporation of EnRM into the Risk Appetite Statement (RAS)
- ▶ Delineation of clear accountabilities, roles and responsibilities for EnRM across the 3LOD (refer '2 Governance')

- ▶ Embedment of environmental risk into risk identification process, recognizing relationships with other risk categories
- ▶ Assessment of risk exposures across all risk types via RCSA and SST (refer '3. Environment Risk Scenario Testing')
- ▶ Establishment of a suite of key metrics and targets to assess environmental impact on business activities

- ▶ Inclusion of EnRM into sector-specific policies, in line with the RAS
- ▶ Design and implementation of specific EnRM-related internal controls in line with the sector-specific policies
- ▶ Communication and training on the organization's desired "green culture"



- ▶ Linkage of EnRM considerations to pricing, new product design, performance measurement, capital allocation

- ▶ Development and implementation of timely, consistent, aggregated and accurate environmental risk MI linked to demonstrable control activity and key risk indicators

- ▶ Development of environmental risk data collection and management framework ensuring available data of sufficient quality and granularity to support effective performance tracking

# Third, capabilities in environmental scenario analysis & stress testing are needed

## Our approach towards environmental risk assessment using scenario analysis

### 3. Environmental Risk Scenario Analysis

**Why do scenario analysis**

- Support the climate strategy
- Regulatory / industry action

**Challenges**

- Modelling challenges
- Risk interaction
- Systemic risk
- Expertise

**EY's Climate Risk Models**

<b>Transition pathway</b>	<b>Physical pathway</b>	<b>Scenario</b>	<b>Climate risk integration</b>
<ul style="list-style-type: none"> <li>Not required in nature</li> <li>Climate change</li> <li>Water scarcity</li> <li>Physical impacts</li> </ul>	<ul style="list-style-type: none"> <li>Temperature</li> <li>Sea level rise</li> <li>Extreme weather events</li> <li>Physical impacts</li> <li>Climate change</li> <li>Water scarcity</li> <li>Physical impacts</li> </ul>	<ul style="list-style-type: none"> <li>Scenario</li> <li>Scenario</li> <li>Scenario</li> <li>Scenario</li> <li>Scenario</li> <li>Scenario</li> </ul>	<ul style="list-style-type: none"> <li>Scenario</li> <li>Scenario</li> <li>Scenario</li> <li>Scenario</li> <li>Scenario</li> <li>Scenario</li> </ul>

- Climate scenario explorer
- Climate risk macro-economic model
- Climate hazard models
- Counterparty-level climate risk toolkit

- MAS expects FIs to utilize scenario analysis and stress testing to assess the impact of material environmental risk on its risk profile and business strategies, and explore its resilience to financial losses under a range of outcomes.
- EY's framework is tested at large FIs across multiple regulatory jurisdictions and provides accelerated adoption of environmental risk scenarios across the organization.



# Environmental Risk Impact Assessment using Scenario Analysis

## Impact analysis translates a specific climate scenario into financial impacts including credit loss

Determine impact on portfolio credit quality and estimated losses associated with potential climate conditions at specific points far in the future under given climate change scenarios.

	Physical Risk		
	Acute Risk	Chronic Risk	Transition Risk
Definition	<ul style="list-style-type: none"> <li>▸ Risks from specific weather events (e.g., heatwaves, floods, wildfires and storms)</li> </ul>	<ul style="list-style-type: none"> <li>▸ Risks from longer-term shifts in climate patterns (e.g., rising sea level and global warming)</li> </ul>	<ul style="list-style-type: none"> <li>▸ Risks arise from policy, technology and laws relating to climate change</li> </ul>
Segmentation/ Prioritization	<ul style="list-style-type: none"> <li>▸ Loan type (e.g., more impact to residential and commercial real estate for flood losses)</li> <li>▸ Geographical (e.g., more impact to east coast states for hurricane damages)</li> </ul>	<ul style="list-style-type: none"> <li>▸ Loan type (e.g., more impact to residential and commercial real estate for rising sea level)</li> <li>▸ Geographical (e.g., more impact to coastal states for rising sea level)</li> </ul>	<ul style="list-style-type: none"> <li>▸ Industry type (e.g., more impact to agriculture, utilities, etc.)</li> <li>▸ Nation (e.g., developed countries may implement more hash policies than developing countries)</li> </ul>
Modeling Horizon	<ul style="list-style-type: none"> <li>▸ Immediate shock</li> </ul>	<ul style="list-style-type: none"> <li>▸ Long-term impact</li> </ul>	<ul style="list-style-type: none"> <li>▸ Long-term impact</li> </ul>

### Methodology Considerations

#### Granularity

- Use a blend between **segment-level** and **borrower-level** modeling to capture segment-level distributional effects as well as borrower-level characteristics within the segment
- To reduce required time and resources, only a sample of “manual” borrower-level analysis is necessary to determine segment exposure

#### Quantitative vs. Qualitative

- Start with pursuing a **quantitative approach** and engage **expert judgement** when:
  - Lack of rich historical data for statistical analysis
  - High level of uncertainty presents given the long term nature of climate scenarios
  - Segment is immaterial

#### Leveraging existing models

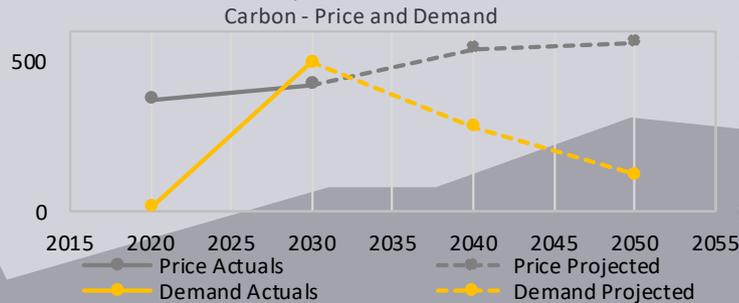
- **Capital stress testing models:** Translate climate scenario impacts into macroeconomic variables used by existing scorecards (e.g., HPI, oil price, sector credit spreads/GDP)
- **Credit rating models:** Expert judgment manipulation of scorecard inputs for sample of obligors with extrapolation to a broader population
- **Operational risk models:** Bayesian network approach to evaluate the risks to physical assets and processes

# Environmental Risk Impact Assessment using Scenario Analysis

## Illustrative example of transition risk impact for the utilities industry

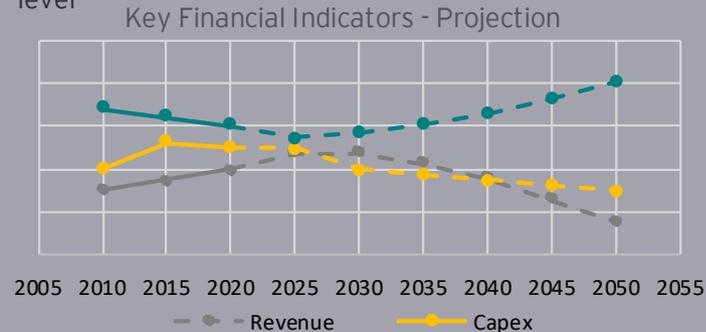
### 1 Scenario Enrichment

#### 1.1 Obtain scenario Outputs:



#### 1.2 Conduct research on relationship between climate-related variables and macroeconomic/ financial factors: *Revenue Impact = (Energy Price X Energy Demand)*

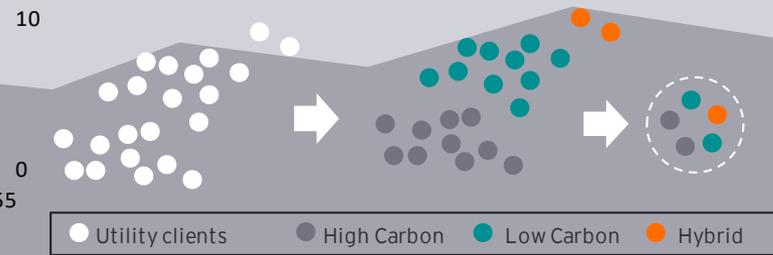
#### 1.3 Derive macro-economic/financial factors at sector level



#### 1.4 Assess scenario impact on key variables / financial factors to be analyzed by credit risk experts

### 2 Borrower-level Rating Impact

#### 2.1 Conduct climate-risk based segmentation, then perform sampling of obligors within these segments:

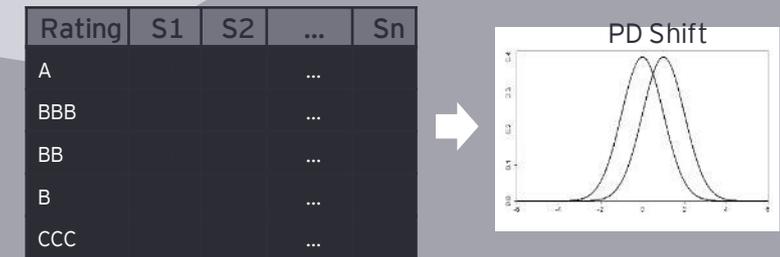


#### 2.2 Obligor rating adjustment for each sampled obligor:

Metrics	Score		Rationale
	Cur.	Adj.	
Revenue	2	3	Decrease revenue score due to reduced demand for coal and oil fired plants offset by shift in mix toward renewables.
Profitability	3	3.5	Decrease profitability score due to increase in cost from carbon tax.
Leverage	3	3.5	Decrease leverage score due to capital expenditures required to change generation mix
Qualitative factors	2	3	Net impact to qualitative factors is a slight decrease in score due to strategic risk associated with change in mix.
Rating	BB	BB-	

### 3 Industry Extrapolation

#### 3.1 Average rating notch impact by segment:



#### 3.2 LGD adjustment:

$$Adj. LGD_{Segment} = f(\Delta PD_{Segment})$$

#### 3.3 Sector impact by segment:

Segment	Cur. EL	Adj. EL	ΔEL%	Action
S1	185 (\$MM)	250 (\$MM)	+35%	Mitigate
S2	165	190	+15%	Monitor
...	...	...	...	...
Sn	95	110	+15%	Monitor
Sector Agg.	2,890	3,180	+10%	Monitor

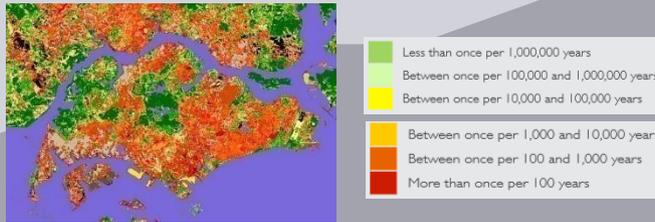
# Environmental Risk Impact Assessment using Scenario Analysis

## Illustrative example of acute physical risk impact for residential real estate

The following example shows the process to assess acute physical risk on a real estate portfolio. The illustration assumes 2°C warming by 2050, increasing flooding frequency in Singapore. The impact is assessed on LGD, assuming no changes on PD.

### 1 Scenario Decomposition

1.1. Obtain scenario outputs, i.e. flooding frequency at regional level



1.2. Translate flood metrics into flooding impact



1.3. Extrapolate results at zip-code level according to severity of the flooding

Zip Code	Risk
10001	High
23456	Medium
34567	High
45678	Low

### 2 Impact on Property Values

2.1. Sample obligors representative of the portfolio. Attributes to consider:

- Significant Exposure
- Geographical Location
- Credit Rating



2.2. Define relationships between risk and outcome, and develop assumptions

$Property\ Value = f(Flooding\ Risk)$

- Assumption 1: Property value decreases 10% for medium severity and 40% for high severity
- Assumption 2: Average age to maturity is 20 years
- Assumption 3: Property values do not impact probability of default

2.3. Define stressed conditions on the assumptions

### 3 Loss impact at portfolio level

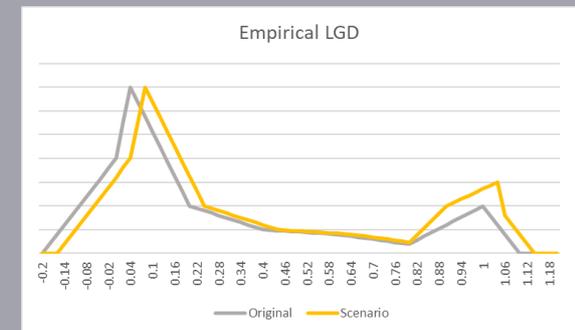
3.1. Update LTV ratios based on updated property values

$$LTV = \frac{Loan\ Amount}{Property\ Value}$$

3.2. Extrapolate impact on LTV from loan-level to portfolio level

3.3. Determine impact on LGD

$$LGD = f(Idiosyncratic\ Factors, LTV)$$



3.3. Determine impact on losses

$$Losses = f(EAD, PD, LGD)$$

# Finally, greater scrutiny can be expected as regulators increase their expectations for clearer, more meaningful disclosures to managing environmental risk



## 4. Disclosures

### EY Climate Risk Disclosure Insights

Firms should consider:

#### Governance and Strategy

- Providing details around where overall responsibility for climate risk resides (e.g. at the BoD with which committee)
- Describing the frequency of interactions with climate or risk subcommittees of the board
- Disclosing results of scenario analysis, including financial impacts or statement on the resilience of the FI's strategy

#### Risk Management:

- Describing specific examples of transitional and physical risks identified at a enterprise-wide level
- Having systematic monitoring of emerging risk by conducting period reviews to identify new and emerging risks and trends

#### Metrics and Targets:

- FI's must identifying relevant metrics and targets for quantification and disclosures
- Having alignment of executive directors performance and remuneration with the achievement of GHG targets can be a useful approach

MAS supervisory expectations require FI's to at least annually, disclose its approach to managing environmental risk. MAS suggest the TCFD framework should be referenced



TCFD elements	TCFD recommended disclosures
Governance	a. Board oversight
	b. Management's role
Strategy	a. Climate-related risks and opportunities
	b. Impact on the organization's businesses, strategy, and financial planning
	c. Resilience of the organization's strategy
Risk Management	a. Risk identification & assessment processes
	b. Risk management process
	c. Integration into overall risk management
Metrics & Targets	a. Climate-related metrics in line with strategy and risk management process
	b. Scope 1, 2, 3 GHG metrics and the related risks
	c. Climate-related targets and performance against targets

Source: "Final Report: Recommendations of the TCFD on Climate-related Financial Disclosures," TCFD website, <https://www.fsb-tcfid.org/wp-content/uploads/2017/06/FINAL-TCFD-Report-062817.pdf>, accessed 10 June 2019.

### Our overall assessment:

Limited progress has been made in addressing climate related disclosures and further development is needed to start satisfying MAS supervisory expectations.

### Breakdown by TCFD element

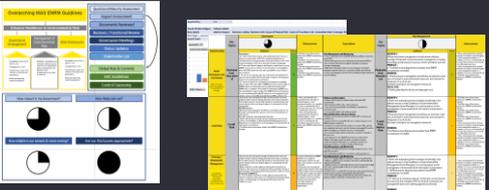
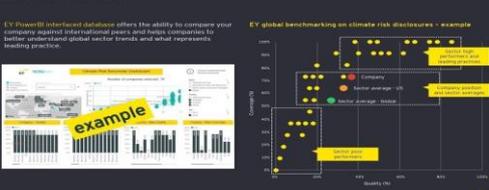
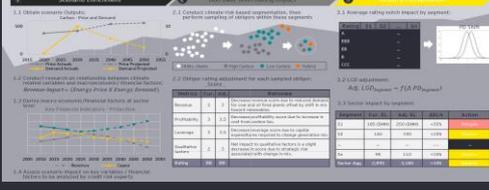
Coverage and quality scores across the four elements of the TCFD recommendations

Quality Coverage



## ■ **Tools / Accelerators**

# Our accelerators can help you **build capabilities** to close the gaps and stay ahead of the curve while demonstrating compliance with regulatory requirements

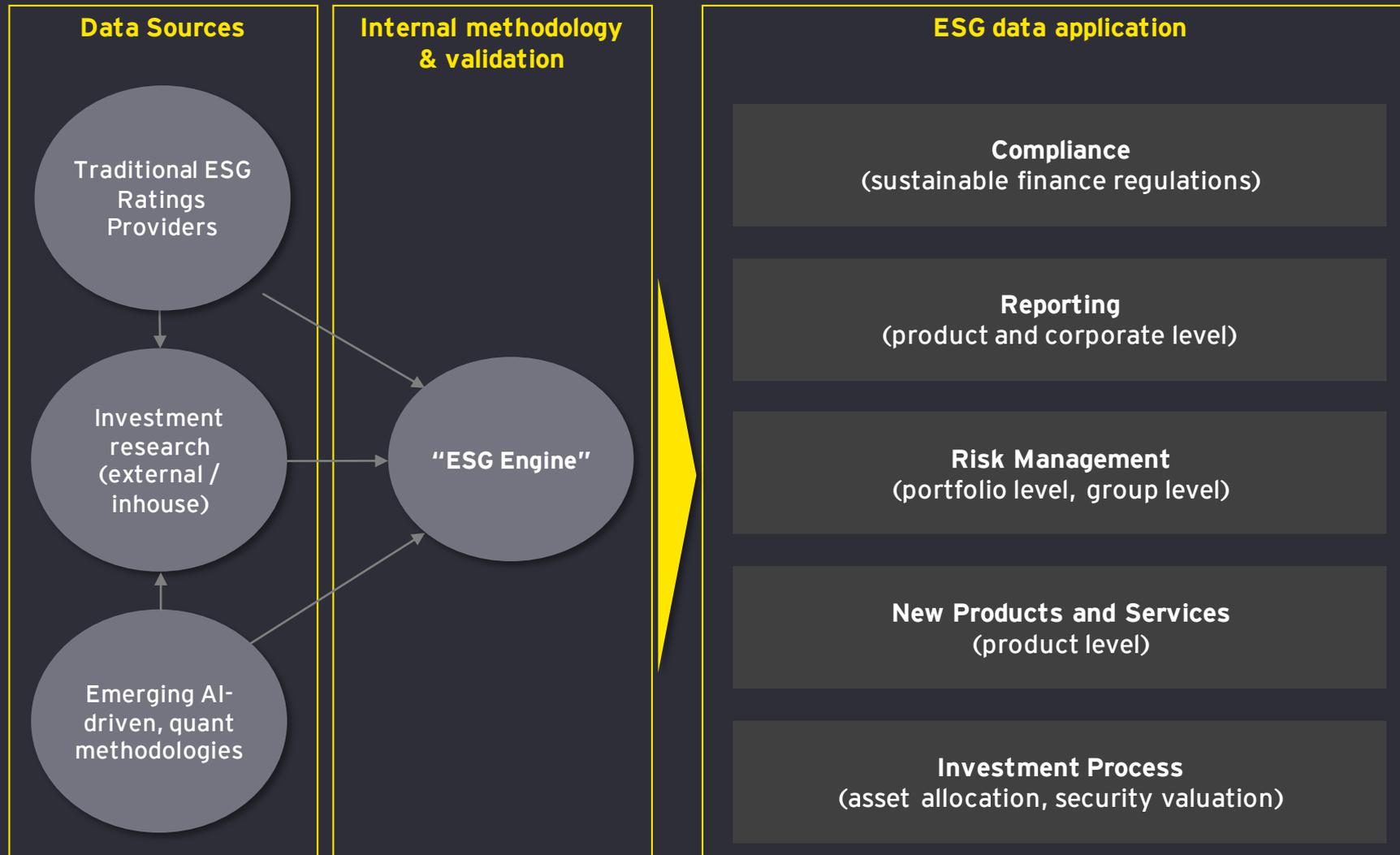
Tools/Accelerators	Description	Key Features	Illustration
Physical Risk Quantification Tool	<ul style="list-style-type: none"> <li>➤ Based on Bayesian Networks, this tool helps quantify the risk to a bank/FI from adverse climate events</li> </ul>	<ul style="list-style-type: none"> <li>➤ UI based Interactive approach to design physical risk scenarios</li> <li>➤ Incorporates multiple scenario analyses including geographic events</li> </ul>	
Regulatory Impact-assessment Templates	<ul style="list-style-type: none"> <li>➤ Tools to visualize degree of compliance and navigate impact assessment providing end-to-end regulatory traceability</li> </ul>	<ul style="list-style-type: none"> <li>➤ Tailored impact assessment focused on MAS requirements and leading industry practices</li> <li>➤ Risk based visualisation dashboard</li> </ul>	
Global Benchmarking on Climate Risk Disclosures	<ul style="list-style-type: none"> <li>➤ Tool providing insight on global benchmarking and roadmap to improve banks disclosures to satisfy reg expectations</li> </ul>	<ul style="list-style-type: none"> <li>➤ Climate risk disclosure barometer to benchmark banks disclosures</li> <li>➤ PowerBI interface for user interactions</li> </ul>	<p>EY PowerBI resource</p> <p>EY PowerBI interface enables the ability to compare your company against international peers and track compliance to further understand global sector trends and what represents leading practice.</p> 
Scenario Analysis	<ul style="list-style-type: none"> <li>➤ Design scenarios using credible data inputs and clear linkage to risk factors from transition risk</li> </ul>	<ul style="list-style-type: none"> <li>➤ Builds on the existing scenario analysis capabilities</li> <li>➤ Links the environmental risk impact to macro factors and then to risk factors for calculations</li> </ul>	
Climate Risk Scorecard	<ul style="list-style-type: none"> <li>➤ Assess worthiness of counterparties based on environmental risk factors</li> </ul>	<ul style="list-style-type: none"> <li>➤ Comprehensive tool encompassing climate-related and ESG criteria</li> <li>➤ Helps quantify climate related risks</li> </ul>	

# Summary landscape of Data Providers

DATA PROVIDER	RISK COVERED	SECTOR COVERAGE	DATA PROVISION
2° Investing Initiative	Transition Risk	Banking Commercial	Data Analytics
Acciona	Transition Risk	Cross Sector	Data Analytics
Acclimatise	Physical Risk	Cross Sector	Data Analytics
Carbone 4	Physical and Transition Risks	Cross Sector	Raw Data Vendor
Carbon Delta	Physical and Transition Risks	Cross Sector	Data Analytics
Carbon Tracker	Transition Risk	Cross Sector	Data Analytics
ClimateWise	Physical risk	Insurance	Data Analytics
FTSE Russel	Physical and Transition Risks	Wealth and Asset Management	Raw Data Vendor
Fitch Ratings	Physical and Transition Risks	Cross Sector	Raw Data Vendor
Four Twenty-Seven Climate Solutions	Physical and Transition Risks	Wealth and Asset Management	Data Analytics
GRE SB - Real Estate Scoring	Physical and Transition Risks	Cross Sector	Raw Data Vendor
London Stock Exchange Group	Physical and Transition Risks	Cross Sector	Raw Data Vendor
Mercer	Physical and Transition Risks	Insurance	Data Analytics
Moody's Investor Service	Physical and Transition Risks	Cross Sector	Raw Data Vendor
MSCI	Transition Risk	Wealth & Asset Management	Raw Data Vendor
Morningstar	Physical and Transition Risks	Wealth and Asset Management	Data Analytics
Oliver Wyman	Transition Risk	Banking Commercial	Data Analytics
Ortec Finance	Physical and Transition Risks	Financial Institutions	Data Analytics
Refinitiv	Physical and Transition Risks	Cross Sector	Raw Data Vendor
Reprisk	Physical Risk	Cross Sector	Raw Data Vendor
SAM- ESG Data, Ratings & Benchmarking	Physical risk	Wealth and Asset Management	Data Analysis
SASB	Physical and Transition Risks	Cross Sector	Raw Data Vendor
Schroders	Transition Risk	Asset Management	Asset Manager
Sense Folio	Physical and Transition Risks	Cross Sector	Data Analysis
Solactive	Physical and Transition Risks	Cross Sector	Data Analytics
Sustainalytics	Physical and Transition Risks	Cross Sector	Data Analytics
Transition Pathway Initiative	Transition Risk	Wealth and Asset Management	Data Analytics
Truecost	Transition Risk	Banking Commercial	Data Analytics
True value Labs	Physical and Transition Risks	Wealth and Asset Management	Data Analytics
Vivid Economy	Transition Risk	Public Sector	Data Analytics

## ■ ESG Data Provider Landscape

# Data is absolutely critical to ESG



# ESG Data Challenges, Risks and Opportunities

## Data Challenges

### New Data sources to Integrate

- **Raw data:** e.g. carbon emissions, gender of board members
- **Scores/ratings:** Provide ESG metrics for thousands of companies
- **Big Data Aggregators** ESG Sentiment analysis
- **Risk assessment providers:** ESG Risk modelling/scores

### Alignment of multiple Taxonomies

- Bringing together datasets never previously integrated
- Aligning taxonomies, classifications and measurements
- Lack of harmonisation across jurisdictions increases complexity

### Lack of Standardisation

- Lack of standardisation of calculation methodology (e.g. TCFD doesn't specify how to calculate disclosures so interpretations vary)
- ESG ratings vary markedly by provider
- Need to align rating provider methodology with corporate strategy

### Governance

- Significant business risks from misreporting ESG and classification of funds
- ESG Data Governance and data quality critical
- A key challenge will be how to evidence transparency

## Risks and Opportunities – The 4 C's

### Risk: Cost

- **Duplication:** Current data needs are dealt with in silos, leading to duplication
- **Manual processes:** Commonly used to compile ESG reports and analysis
- **Market Data:** Not fully disseminated across the firm, leading to a loss in potential value

### Risk: Control

- **Inconsistency:** Approaching data management and reporting in silos also leads to inconsistencies in reported values.
- **Data Gaps:** This is particularly the case where data gaps are managed in different ways across different teams

### Risk: Compliance

- **Transparency:** Regulators will expect timely and transparent disclosure – a lack of enterprise governance will risk regulatory scrutiny

### Opportunity: Competitive Advantage

- **ESG Leaders will gain market share:** The market is changing dramatically – investor needs are changing and organisations who lead in ESG stand to gain competitive advantage

# EY ESG Data Provider Analysis & Landscape - 3rd Party Vendor Assessment

## Snapshot:

- Analysis of 51 data providers and > 100 data service offerings
- Based on internet research, survey, interviews and demo sessions conducted with data providers directly
- Large collection of additional documentation on specific methodologies, ESG criteria, use cases etc.

Index	Provider	ESG Service Offered	Description of the Service	Geographic Coverage	Asset Classes Covered	ESG Dimensions / Criteria	Methodology / Approach	Key Features	Client Focus
1	ACERN	ESG Raw Data ESG Scores	Identification of ESG issues related to companies, industry and regions	Global	Equity, Fixed Income	Environmental, Social, Governance	Materiality-based	Physical & Transition	Banks, Hedge Funds, Institutional Asset Managers, Insurance companies, Technology companies
2	ACUMINATE	ESG Raw Data ESG Scores	Climate Change Risk	Global	Equity, Fixed Income	Environmental, Social, Governance	Materiality-based	Physical & Transition	Government & private sector, ESG Research
3	akadia	ESG Raw Data ESG Scores	Environmental Data	Global	Equity	Environmental	Materiality-based	Physical and Transition	Asset owners and asset managers
4	Bloomberg	ESG Raw Data ESG Scores	Environmental Raw Data Rankings & Ratings	Global	Equity, Fixed Income	Environmental, Social, Governance	Materiality-based	Physical and Transition	Non financial corporates as well as financial institutions such as banks, asset owners, custodians, asset managers and insurance
5	CARBON TRACE	ESG Raw Data ESG Scores	ESG research platform & ESG data services analysis, track and score ESG behavior based on international ESG data	Global	Equity, Fixed Income	Environmental, Social, Governance	Materiality-based	Physical and Transition	Asset Owners, Portfolio Managers, Analysts, Financial Advisors, Consultants, and Quants
6	Carbon Intelligence	ESG Raw Data ESG Scores	Environmental (raw and derived) data	Global	Equity, Fixed Income	Environmental	Materiality-based	Transition	Asset Owners, Asset managers, Banks, central banks, policy providers, corporates, etc.
7	URGENTEM	ESG Raw Data ESG Scores	ESG research platform & ESG data services analysis, track and score ESG behavior based on international ESG data	Global	Equity, Fixed Income	Environmental, Social, Governance	Materiality-based	Physical and Transition	Asset Owners, Portfolio Managers, Analysts, Financial Advisors, Consultants, and Quants
8	Carbon Tracker	ESG Raw Data ESG Scores	Environmental (raw and derived) data	Global	Equity, Fixed Income	Environmental	Materiality-based	Transition	Asset Owners, Asset managers, Banks, central banks, policy providers, corporates, etc.
9	Carbon Finance	ESG Raw Data ESG Scores	Environmental (raw and derived) data	Global	Equity, Fixed Income	Environmental	Materiality-based	Transition	Asset Owners, Asset managers, Banks, central banks, policy providers, corporates, etc.
10	CDP	ESG Raw Data ESG Scores	Environmental (raw and derived) data	Global	Equity, Fixed Income	Environmental	Materiality-based	Transition	Asset Owners, Asset managers, Banks, central banks, policy providers, corporates, etc.

Index	Data Provider	Comprehensive or as Request Based	Data Category	Data Service Focus	Risks Covered	Client Focus
1	ACERN	Comprehensive	ESG Raw Data ESG Scores	Identification of ESG issues related to companies, industry and regions	Physical & Transition	Banks, Hedge Funds, Institutional Asset Managers, Insurance companies, Technology companies
2	ACUMINATE	Comprehensive	ESG Raw Data ESG Scores	Climate Change Risk	Physical & Transition	Government & private sector, ESG Research
3	akadia	Comprehensive	Environmental Data	Environmental Data	Physical and Transition	Asset owners and asset managers
4	Bloomberg	Comprehensive	Environmental Raw Data Rankings & Ratings	Environmental Raw Data Rankings & Ratings	Physical and Transition	Non financial corporates as well as financial institutions such as banks, asset owners, custodians, asset managers and insurance
5	CARBON TRACE	Comprehensive	ESG research platform & ESG data services analysis, track and score ESG behavior based on international ESG data	ESG research platform & ESG data services analysis, track and score ESG behavior based on international ESG data	Physical and Transition	Asset Owners, Portfolio Managers, Analysts, Financial Advisors, Consultants, and Quants
6	Carbon Intelligence	Comprehensive	Environmental (raw and derived) data	Environmental (raw and derived) data	Transition	Asset Owners, Asset managers, Banks, central banks, policy providers, corporates, etc.
7	URGENTEM	Comprehensive	ESG research platform & ESG data services analysis, track and score ESG behavior based on international ESG data	ESG research platform & ESG data services analysis, track and score ESG behavior based on international ESG data	Physical and Transition	Asset Owners, Portfolio Managers, Analysts, Financial Advisors, Consultants, and Quants
8	Carbon Tracker	Comprehensive	Environmental (raw and derived) data	Environmental (raw and derived) data	Transition	Asset Owners, Asset managers, Banks, central banks, policy providers, corporates, etc.
9	Carbon Finance	Comprehensive	Environmental (raw and derived) data	Environmental (raw and derived) data	Transition	Asset Owners, Asset managers, Banks, central banks, policy providers, corporates, etc.
10	CDP	Comprehensive	Environmental (raw and derived) data	Environmental (raw and derived) data	Transition	Asset Owners, Asset managers, Banks, central banks, policy providers, corporates, etc.

## Agenda:

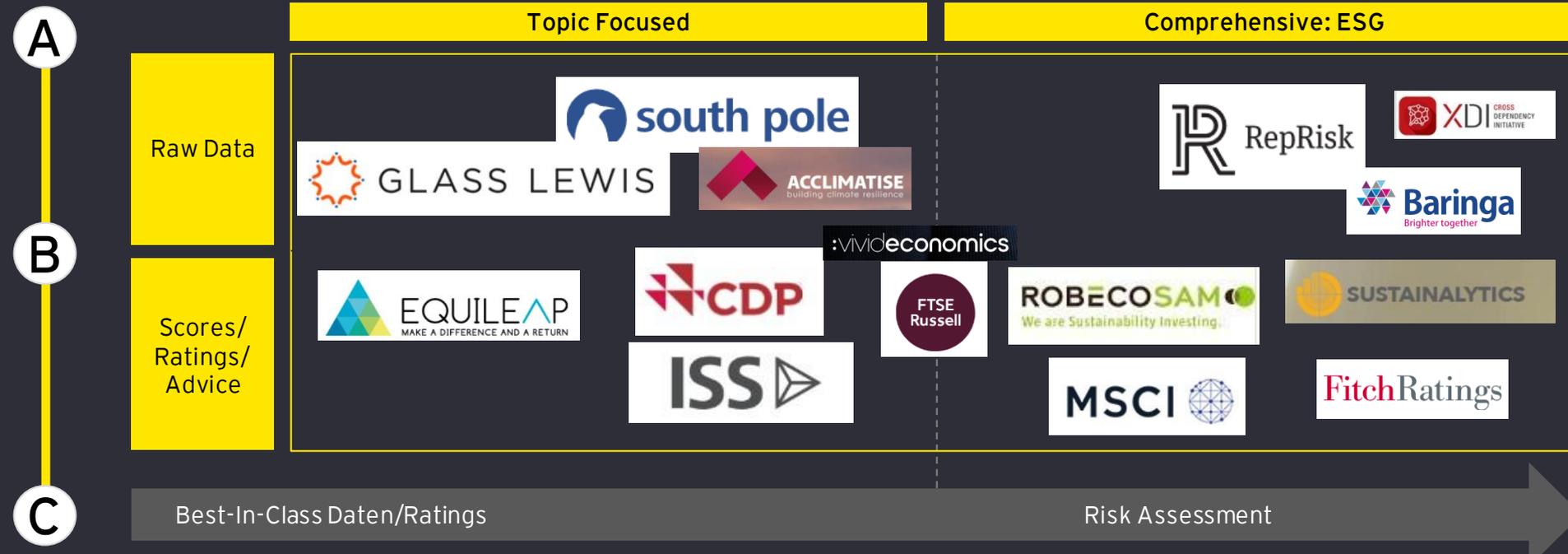
- General:**  
Description of data provider, client focus, geo coverage, certifications and associations
- Data Service:**  
Product type, data service focus and description, key differentiators, asset classes covered, criteria, coverage, use cases, pricing, integration in other data services
- Data:**  
Data type, data sources, historic data

- ESG Scoring / Risk Assessment Model**  
Methodology, calculation, description of output, review of methodology
- ESG Dimensions & SDGs:**  
Dimensions covered, dimensions ENV, SOC, GOV, Others, SDG focus / SDGs covered
- Risks:**  
Risk type considered (physical/transition), risks & opportunities, standard scenarios & assumptions, flexibility in adjusting assumptions & variables, top down vs. bottom up approach, output measure

## Solution Mapping:

- ✓ SFDR
- ✓ EU Taxonomy
- ✓ TCFD
- ✓ ESG Scoring/Rating
- ✓ ESG Indices
- ✓ Screening & Controversies
- ✓ Rohdaten & Analytics
- ✓ Supply Chain Daten
- ✓ Sentiment Analysis
- ✓ Net Zero
- ✓ Climate Risk Modelling/Stress Testing
- ✓ Biodiversity

# ESG Data Provider Selection



## A Topic Focused vs. Comprehensive

Topic-focused data providers have expertise in a specific area and try to have the best and deepest data on that topic. Comprehensive data providers need to have expertise on all topics and provide overall sustainability profiles across all ESG dimensions.

## B Raw data vs. scores/ratings

Raw data can range from carbon emissions to gender of board members or licenses for full database access. Scores/ratings are typically based on data reported by companies with companies getting points for the presence of policies or for improvements in indicators.

## C Best in class rating vs. risk assessment provider

Best in class data/ratings provide measures and defined numbers on metrics for thousands of companies putting their ESG performance in perspective. Risk assessment providers offer datasets, risk modelling and risk scorings to identify and monitor ESG risk and opportunities.

# ESG Data Provider offer a range of different ESG data solutions



	Data Solution	# of data provider offering that type of solution
Regulation Coverage	SFDR	4
	EU Taxonomy	3; 2 available 2021
	TCFD	8
	SDG Alignment	12; 1 available 2021

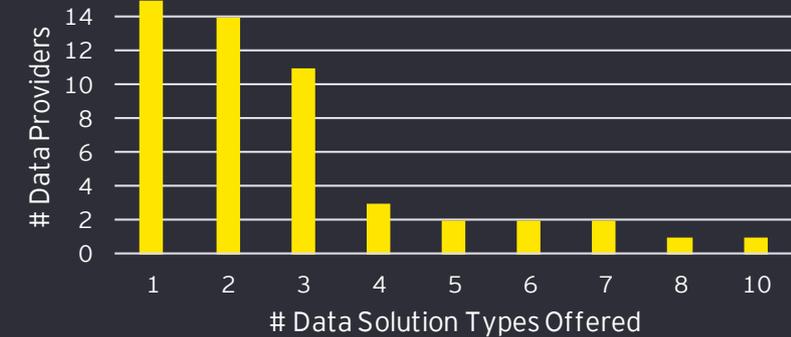


Data Coverage	ESG Scoring	25
	ESG Indices	8; 1 available 2021
	Raw Data/ Data Analytics	32
	Supply Chain	6
	Sentiment Analysis	8

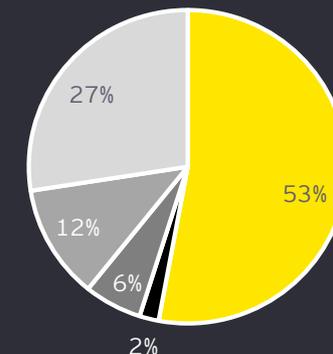


Modelling Coverage	Net Zero	11
	Climate Risk Modelling/Stress Testing	22
	Biodiversity	2

**Data Solution:** Whereas the majority of data providers specializes in 1 – 3 types of data solutions (e.g. scoring or raw data), there are some data providers offering the whole range of ESG data product types:

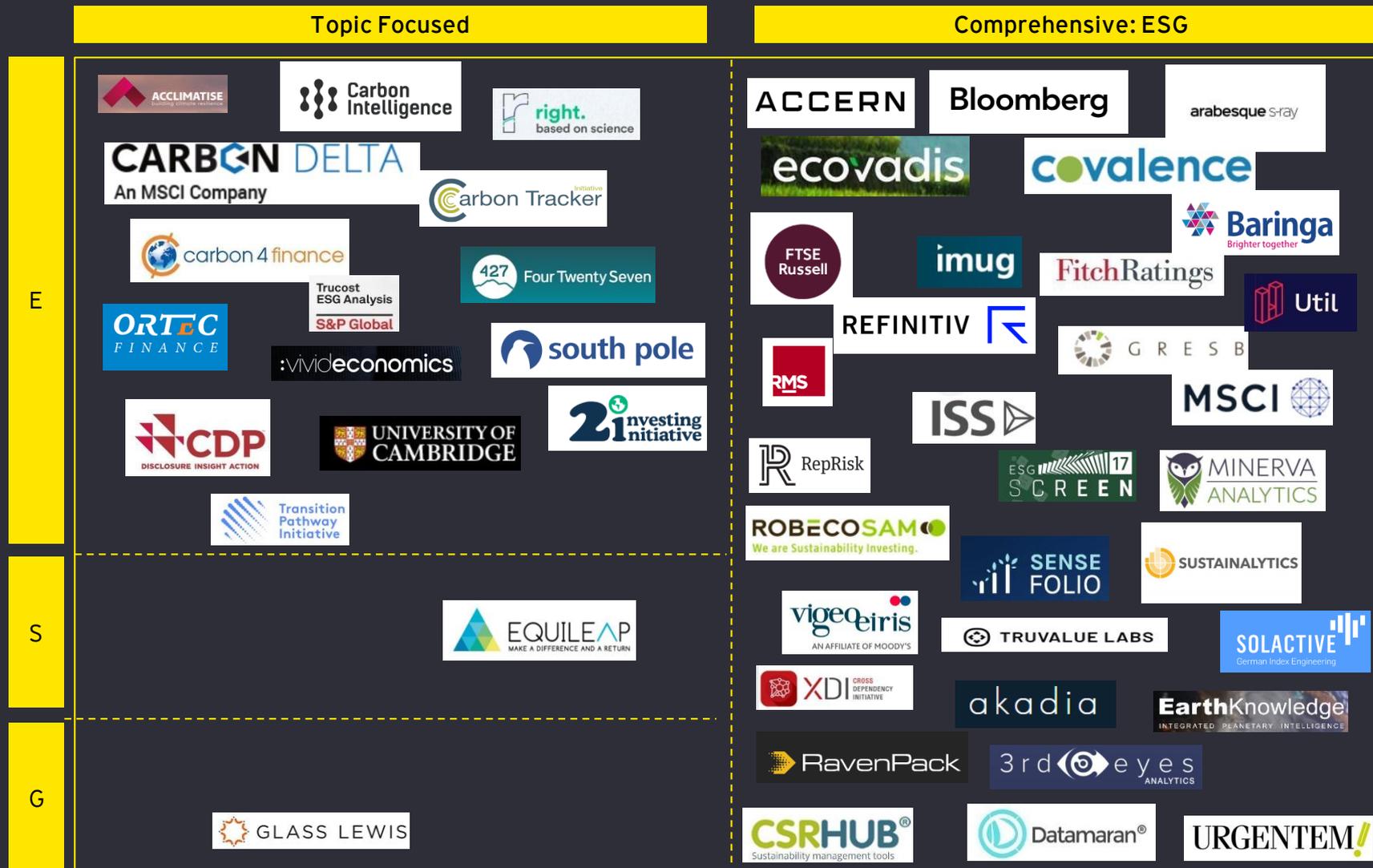


**Commercial model:** Most data solutions can be bought via licenses whereby fees differ depending on data usage and amount of data used. Six of the analysed data providers offer their solutions as open source and offer for-free implementation services.



- Yearly subscription/license
- Per dataset
- Bespoke Pricing
- Open Source
- No information

# ESG Data Provider Analysis - Insights



## Further Insights

- ▶ Raw data offerings, risk assessment/modelling providers, scoring/rating and index providers
- ▶ ESG specialists vs. general data provider with ESG as a use case
- ▶ Dynamic market with M&A activities ongoing (e.g. Carbon Delta & MSCI, Robeco SAM & S&P Global, Sustainalytics & Morningstar)
- ▶ ESG data provider/tech companies specialized in analyzing unstructured media content, public available company data, analyst reports by applying natural language processing and AI
- ▶ Data provider collecting own data through surveys vs. data provider aggregating data from other sources to feed their database, create their scores

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