



ESG & Climate Risk in Financial Services

Evolution, Expectations and Challenges

Federal Home Loan Bank of NY – 2022 Member Education Series

August 25th, 2022

Meeting with you today



Ricardo Martinez, Principal

- US Sustainable Finance Risk Leader
- Specializes in non-financial risk management, served as the Lead Business Partner for the European Central Bank, where some of the original climate risk regulations and guidance originated
- Experience across several regulatory and compliance remediation initiatives



Corey Goldblum, Principal

- Leads Deloitte's Credit Risk Advisory practice in the US
- 23+ years of experience in financial modeling, credit analysis, valuation, ALLL/CECL, stress testing, DRR engagements
- Member of Deloitte's US Climate Risk leadership team (co-leads the Climate Risk Modeling area)



Cecilia Valverde, Senior Manager

- 12 years of experience with risk and modeling in the financial services industry
- Experience developing and validating models used for risk management at financial services companies
- Member of Deloitte's internal Climate Risk Modeling working group



Gowri Zoolagud, Managing Director

- US ESG Data & Technology Leader
- 17+ years of experience helping financial services firms operationalize regulatory, risk, and compliance requirements through business, data and technology transformations
- Experience developing enterprise data governance and data quality programs for clients and advancing through policies, processes, and implementation plans

Discussion Agenda

-  SEC Climate Risk Guidance & Regulatory Expectations
-  Climate Risk Scenario Analysis & Stress Testing
-  Embedding Climate Risk into Credit Models
-  ESG Data & Technology Landscape

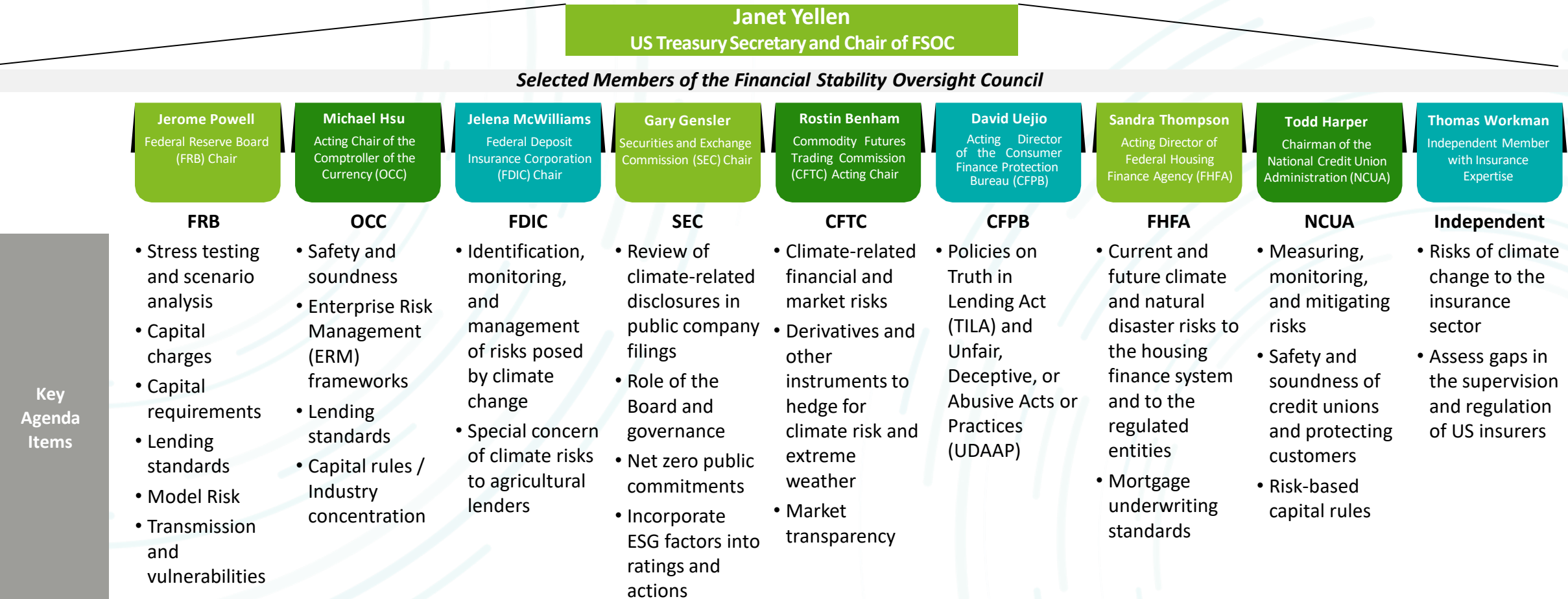


SEC Climate Risk Guidance & Regulatory Expectations



Regulatory dynamics under the Biden Administration's whole-of-government approach

There is new momentum to address climate-related financial risks by coordinating the Financial Stability Oversight Council (FSOC).



OCC Principles for Climate-related Financial Risk

Though applicable only to large US financial institutions in initial stages, these principles can serve as a reference for future expectations and inform short- and medium-term actions for banks of all sizes.



Management of Risk Areas

Credit Risk

Liquidity Risk

Other Financial Risk

Operational Risk

Legal and Compliance Risk

Other Nonfinancial Risk

SEC Rulemaking Update

In March 2022, the SEC began issuing proposed rulemaking that would require registrants to provide enhanced ESG disclosures with more expected in the coming months related to human capital and governance

Climate

Proposed March 21st, 2022

Enhanced and standardized climate disclosures related to Climate and Risk Strategy, Targets & Metrics, Scope 1, 2 & 3 GHG Emissions



Cybersecurity

Proposed March 9, 2022

Enhanced disclosures on cybersecurity incidents and cybersecurity risk, management, strategy, and governance



- Potential impact to quarterly 10-Qs and annual 10-K
- 60-day comment period from date of proposal was extended and now has closed
- Disclosures will be both qualitative (Reg S-K) and quantitative (Reg S-X)
- Impacts most periodic SEC filers, including domestic registrants, foreign private issuers, smaller reporting companies, BDCs, and emerging growth companies. Registered investment companies are not addressed in the rule.

SEC Proposal: Enhancement and Standardization of Climate-Related Disclosures

Today...

- **Oversight of ESG is often not clearly established or defined**, though governance and organizational capacity are critical to managing climate-related efforts.¹
- **Timeliness for data collection and reporting** typically extend beyond current 10-K filing deadlines.²
- **Data processes and controls** over climate-related information are generally not as mature as financial reporting processes and controls.¹
- **Climate-related disclosure is voluntary.** Companies use a variety of sustainability reporting frameworks and standards, and disclosure outlets.²
- **Assurance**—an avenue to quality, accurate, and reliable disclosure—is currently not required.¹

Under the proposed rule, registrants would be required to disclose³...

- 1. Governance of climate-related risks**, how identified climate-related risks have or are likely to have a material impact on a company's strategy, business model, outlook over short-, medium-, or long-term, and risk management processes.
- 2. Climate-related financial statement metrics** (e.g., disaggregated climate impacts on financial statement line items) **and impact of climate-related physical events and transition activities** on estimates and assumptions.
- 3. Greenhouse gas (GHG) emissions**, including Scope 1 and 2 (and Scope 3 phased in if material or if registrant has Scope 3 target).
- 4. Reasonable assurance**, phased in for accelerated and large accelerated filers over certain GHG emissions disclosures; limited assurance precedes.
- 5. Information about climate-related targets** and transition plans.

¹2022 Deloitte CxO Sustainability Report. Deloitte. 2022.

²ESG Reporting and Attestation: A Roadmap for Audit Practitioners CAQ. 2021.

³The Enhancement and Standardization of Climate-Related Disclosures for Investors. SEC. March 21, 2022.

SEC Proposal: Enhancement and Standardization of Climate-Related Disclosures

Focus Areas of the Proposed Rules



Materiality	Organizational Boundary	Scope 3 GHG emissions	Assurance
<ul style="list-style-type: none">• Voluntary GHG reporting compared to reporting in financial filings –differences that impact materiality:<ul style="list-style-type: none">• Users of the disclosures• Disclosure requirements• Scope 3 GHG emissions disclosure is required:<ul style="list-style-type: none">• If material• If registrant has set a GHG reduction target	<ul style="list-style-type: none">• GHG Protocol: Company may apply; 1) equity share or a 2) control approach (operational and financial)• SEC proposed rule:<ul style="list-style-type: none">• Boundary must be consistent with consolidated financial statements• Registrants already reporting under GHG Protocol will need to revise boundary to align with financial statements	<ul style="list-style-type: none">• GHG information to be disclosed:<ul style="list-style-type: none">• Disaggregated by each greenhouse gas• In the aggregate• Gross, excluding offsets• Intensity (per \$ revenue and per economic unit)• Methodology (e.g., approach, assumptions)• Safe harbor for Scope 3 GHG emissions disclosures• No attestation requirement	<ul style="list-style-type: none">• Scope 1 and 2 GHG emissions subject to limited assurance (phase-in period), followed by reasonable assurance.• Requirements for attestation are consistent with the standards issued by the AICPA, PCAOB, and IAASB.

SEC Proposal: Enhancement and Standardization of Climate-Related Disclosures

Proposed disclosure location and timeline

	Financial Statements	Climate-Related Disclosure Section (10-K Item 6)
Disclosure Required	For climate-related events and transition activities: (1) financial impact metrics (2) expenditure metrics (3) discussion of the impact on financial estimates and assumptions	<ul style="list-style-type: none"> • GHG emission disclosures for Scopes 1, 2 and 3 • Climate governance • Climate-related risks and opportunities • Climate risk management • Climate targets and goals
Controls and procedures	Subject to internal control over financial reporting	Subject to disclosure controls and procedures
Attestation	Part of financial statement & ICFR audit	Phase-in to reasonable assurance over Scope 1 & 2 GHG emission disclosures for large accelerated and accelerated filers

Timeline for Proposed Climate Rule (timeline for calendar year end filers)

Registrant Type	All Disclosures Except Scope 3 GHG Emission Disclosures	Scope 3 GHG Emission Disclosures	Attestation on Scope 1 and Scope 2 GHG Emission Disclosures
Large accelerated filer	2023	2024	Limited assurance — 2024 Reasonable assurance — 2026
Accelerated filer	2024	2025	Limited assurance — 2025 Reasonable assurance — 2027
Nonaccelerated filer	2024	2025	Not required

* Smaller reporting companies would be exempt from Scope 3 GHG emission disclosures and would have an additional year of transition (i.e., all other disclosures would be required in 2025).

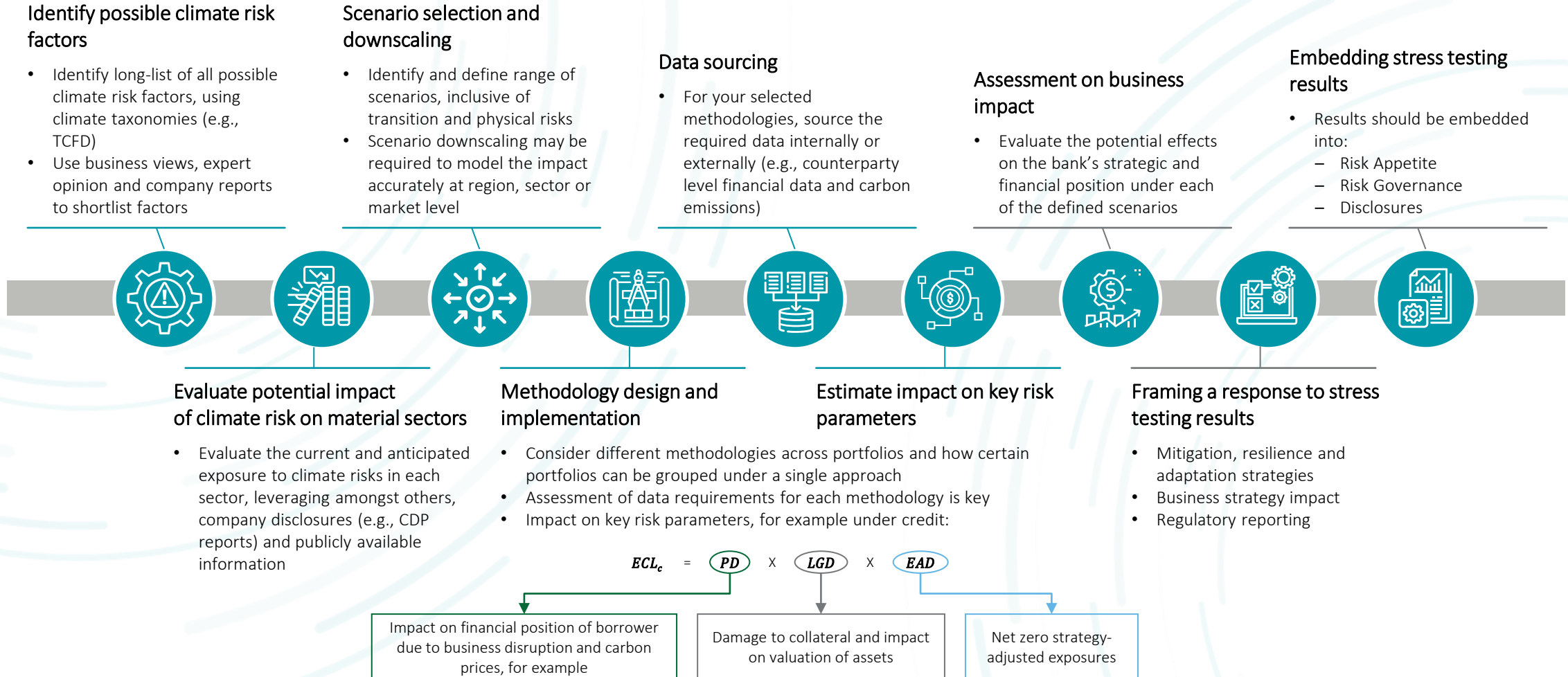


Climate Risk Scenario Analysis & Stress Testing



Scenario Analysis Modeling Process Overview

The below scenario analysis process is easy to apply systematically across portfolios for a range of physical and transition risk factors



Climate Stress Testing – Global Regulatory Perspectives

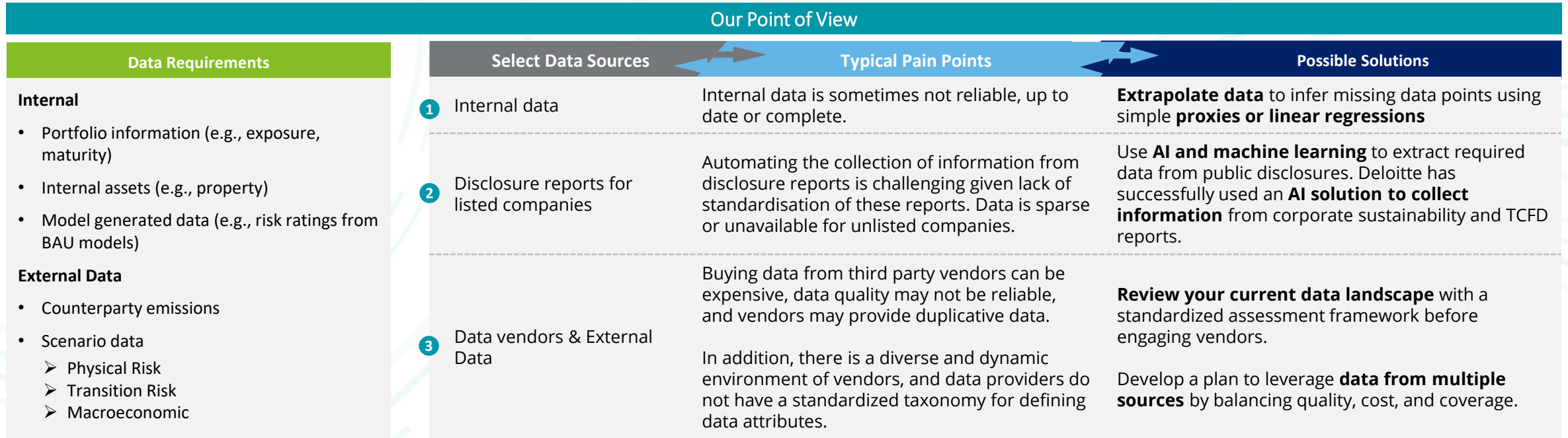
The NGFS is helping promote alignment in global regulatory practices, but significant uncertainty remains around adoption in the US. This is highlighted by comparing climate stress test (CST) practices for the three jurisdictions to date with formalized requirements.

Comparison of European Stress Testing Practices

	Bank of England	Banque de France	European Central Bank
Participation	<ul style="list-style-type: none"> Large banks and insurers 	<ul style="list-style-type: none"> Large banks and insurers 	<ul style="list-style-type: none"> All significant supervised institutions (assets of more than EUR 30 billion)
Timetable	<ul style="list-style-type: none"> Likely biennial; Second edition launched in June 2021; Results published in May 2022 	<ul style="list-style-type: none"> Latest results published in May 2021; Next CST planned for 2023/2024 	<ul style="list-style-type: none"> Latest results published in July 2022; Next CST planned for 2024
Forecasting Horizon	<ul style="list-style-type: none"> 2050 (with add on for 2050-2080 risks under “No Policy Action” scenario) 	<ul style="list-style-type: none"> 2050 	<ul style="list-style-type: none"> 2050
Balance Sheet	<ul style="list-style-type: none"> Static through 2050 	<ul style="list-style-type: none"> Static through 2025, dynamic from 2025-2050 	<ul style="list-style-type: none"> Static in the Short-Term Dynamic in the Long-Term
Scenarios	<ul style="list-style-type: none"> Physical and Transition Risks: Early, Late, and No Policy Action based on NGFS with additional macro variables provided by BoE 	<ul style="list-style-type: none"> Transition Risk: Orderly, Disorderly, and Immediate 1.5 based on NGFS with additional macro variables provided Physical risk: Based on “RCP 8.5” IPCC scenario 	<ul style="list-style-type: none"> Physical and Transition Risk: Orderly transition scenario, Disorderly transition scenario, Hot House World scenario.
Reporting Metrics	<ul style="list-style-type: none"> Credit Risk: Impairment charge Market Risk: <i>Excluded</i> 	<ul style="list-style-type: none"> Credit Risk: Expected Credit Loss (ECL) Market Risk: Revaluation of trading portfolio 	<ul style="list-style-type: none"> Income and exposure to CO2 intensive sectors; Bottom-up analysis for 43 banks covering credit, market and operational risks

Data Considerations for Climate Scenario Analysis

Data sourcing is a key challenge. Banks require a combination of internal and external data with processes and procedures to promote data quality and handle incomplete datasets.

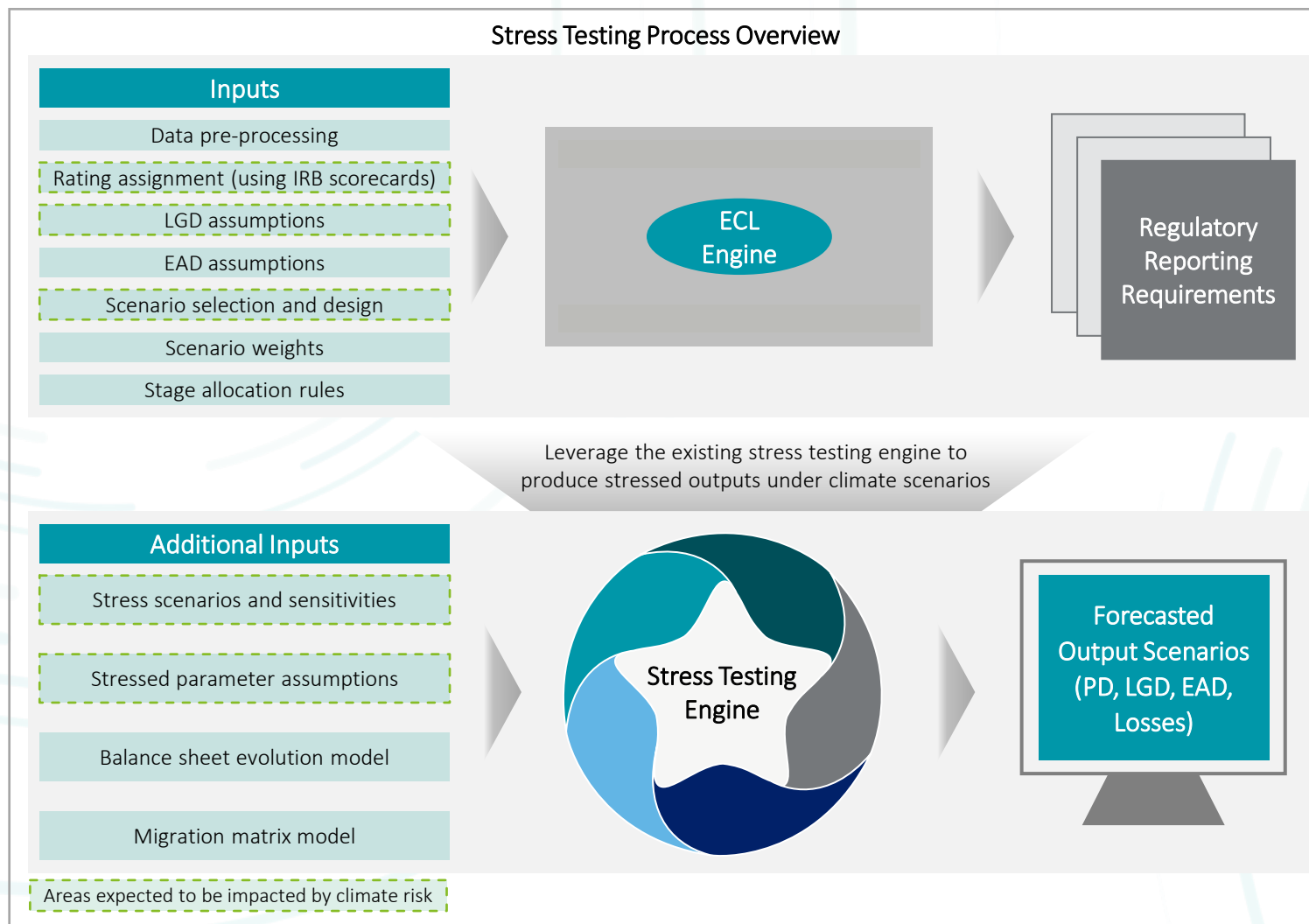


Illustrative data vendors



Leveraging Existing Stress Testing Infrastructure

Scenario analysis involves development of new analytical methodologies which can be incorporating into existing frameworks including technology, upstream/downstream models, and processes.



Key Considerations

- **Leverage your existing model capabilities** when measuring climate metrics and building stress testing capabilities to maximize efficiency and alignment with existing processes
- Existing functionality can be leveraged but **new capabilities will also be required**, including methodologies for:
 - The risk drivers of your existing rating systems (e.g., IRB scorecards)
 - The materiality of the climate-related risk drivers of your portfolios
 - The characteristics of the portfolios in scope (e.g., security type, purpose of lending, geography, etc.)
 - Potential new climate metrics such as Climate VaR
- The **regulatory landscape around climate risk in capital is currently uncertain**, but linkages to climate capital should be considered for planning.
- Increased **corporate reporting requirements** may also require automated data collection, processing, and reporting.

Climate Scenario Development Process

While intuitions have historically focused effort in the scenario expansion phase, we increasingly see customization at each step.



Scenario Expansion

Perspectives

- Firms commonly utilize scenario expansion to obtain forecasts of additional variables under pre-existing scenarios
- Various statistical approaches are available including econometric models, NiGEM¹, and CGE²
- Additionally, we see heavy reliance on business judgment used to build out scenarios



Scenario Downscaling

Perspectives

- Scenario downscaling is frequently used, specifically for physical risk, to help accurately model climate impact at region, sector or market level
- Statistical models (ECM, VAR) can be used by banks, but more commonly banks rely on vendors
- Granularity of regulatory scenarios in US is uncertain



Climate Metric Forecasts

Perspectives

- Many institutions directly leverage NGFS and regulatory scenario output without customization
- Increasingly, organizations are developing methodologies to generate custom scenarios
- Custom scenario builds require significant investment in data and tools, and benefits should be weighed against costs



Climate Science Models

Perspectives

- Most commonly used by industry groups (NGFS) and regulators to build out climate narratives
- Typically leverages General Circulation Models (GCM) and Catastrophe models for physical risks Integrated Assessment Models (IAM) for transition risks
- Limited investment from banks in developing such models

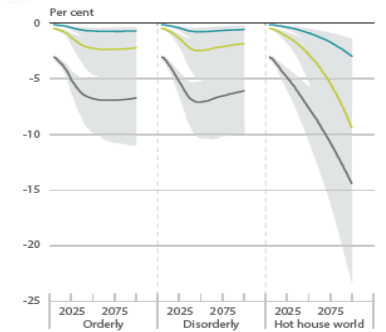


Scenario Narratives

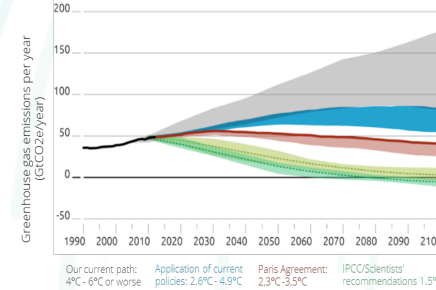
Perspectives

- Firms typically rely on regulatory / external narratives (e.g., NGFS)
- Regulators such as PRA and ECB also rely on NGFS narratives, foreshadowing potential future US approach
- Some organizations may customize scenarios, but typically within the context of existing overarching narratives

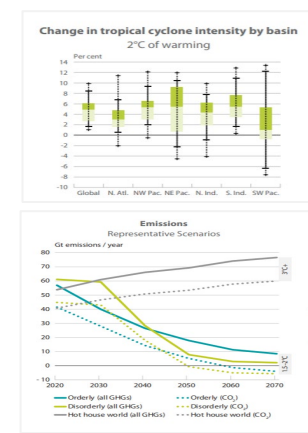
Variable Expansion



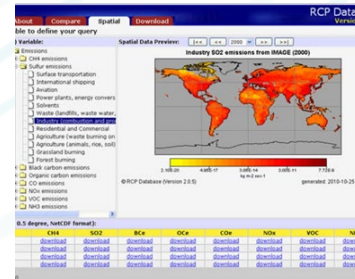
US Market Scenarios



Global NGFS GHG Scenarios

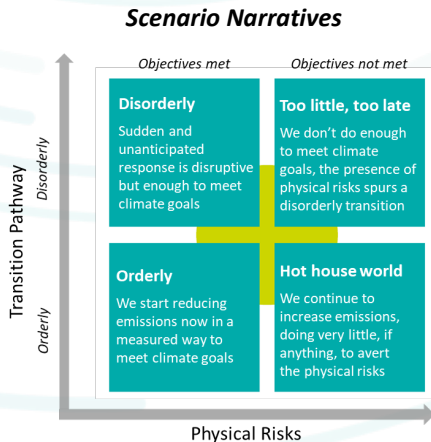
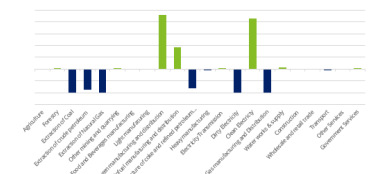


IPCC Pathways



* Intergovernmental Panel on Climate Change (IPCC) open-source climate trajectories

Example: Impact of Net Zero on Green Sectors using D.CLIMATE Model



Macro Variables (NiGEM model)	Energy & Climate-related Variables
GDP	Energy Capacity
Unemployment	Emissions Data
Exchange Rate	Agricultural Demand
Interest Rate	Energy Use
Carbon Price	Energy Investments
Inflation	Land Cover
Imports & Exports	Carbon Sequestration

¹ National institute Global Econometric Model considers short-term macroeconomic effects, used by NGFS
² Computable General Equilibrium augmented model used in our D.Climate methodology; see slide 45

Measuring Physical and Transition Risk

The below table provides industry perspectives on how institutions are modeling physical and transition risk across Wholesale and Retail Portfolios.

Portfolio	Physical Risk	Transition Risk
Wholesale	<ul style="list-style-type: none"> ▪ Measure through geospatial location of counterparties ▪ Observed practices of assessment <ul style="list-style-type: none"> ▪ Acute physical risks: assessment of potential impacts of extreme weather on the value of the bank's real estate collateral and counterparty operations ▪ Chronic physical risks: translation into productivity changes, and subsequently into changes in firms' revenues 	<ul style="list-style-type: none"> ▪ Measure through changes in firms' revenues, in the costs of goods, and in property values <ul style="list-style-type: none"> ▪ Assess impact of the scenarios on financials at the borrower level with sector segmentation ▪ Borrow level financials can be run through existing risk rating scorecards ▪ Extrapolate on a sectoral level and use the climate impact to adjust credit risk metrics
Retail	<ul style="list-style-type: none"> ▪ Measure through the impact of the hazard on the collateral value for fixed assets, and usage of macroeconomic variables for uncollateralized or non-fixed assets ▪ Model component considerations: likelihood, severity, and damage ▪ Commonly used metrics: single hazards and/or the vulnerability of certain locations to these hazards, multi-hazard or aggregate risk scores, and heatmap 	<ul style="list-style-type: none"> ▪ Auto: Measure through macroeconomic variables and assessment of collateral value on gas-powered vehicles triggered by potential green energy vehicle policy ▪ Credit cards: Generally measured through consideration of macro variables factored into scenarios ▪ Mortgage: Measure impact on household income / expenditure from changes in macro and climate factors (e.g., energy bill, cost of water)

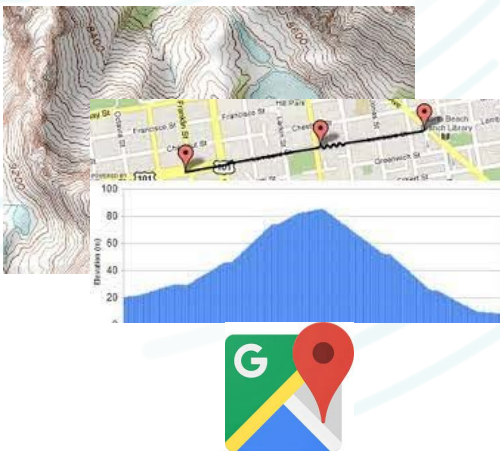
Measuring Physical Risk

Physical risk to fixed assets is typically measured through an assessment of the likelihood, severity and damage to understand economic impact. This analysis may be leveraged for **loan exposures** as well a firm's **own assets**.

Likelihood

- What is the risk of being affected by the hazard?
- For example, what is the risk of flooding?

The risk rating will be influenced by property characteristics. For example of flooding, elevation is one of the risk factors



Severity

- How severe is the event?
- For example, how deep is the water level?

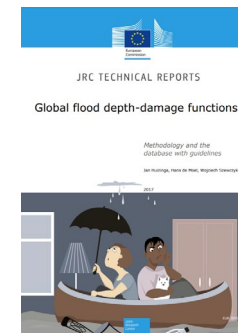
This element is driven by the scenario and for each hazard you need to select a proxy variable. For flooding, this is typically rainfall



Damage

- What is the expected damage given the severity?
- For example, how much damage was done to the property given the level of flooding?

Damage curves need to be represented as a function of the severity e.g. damage by depth of flooding

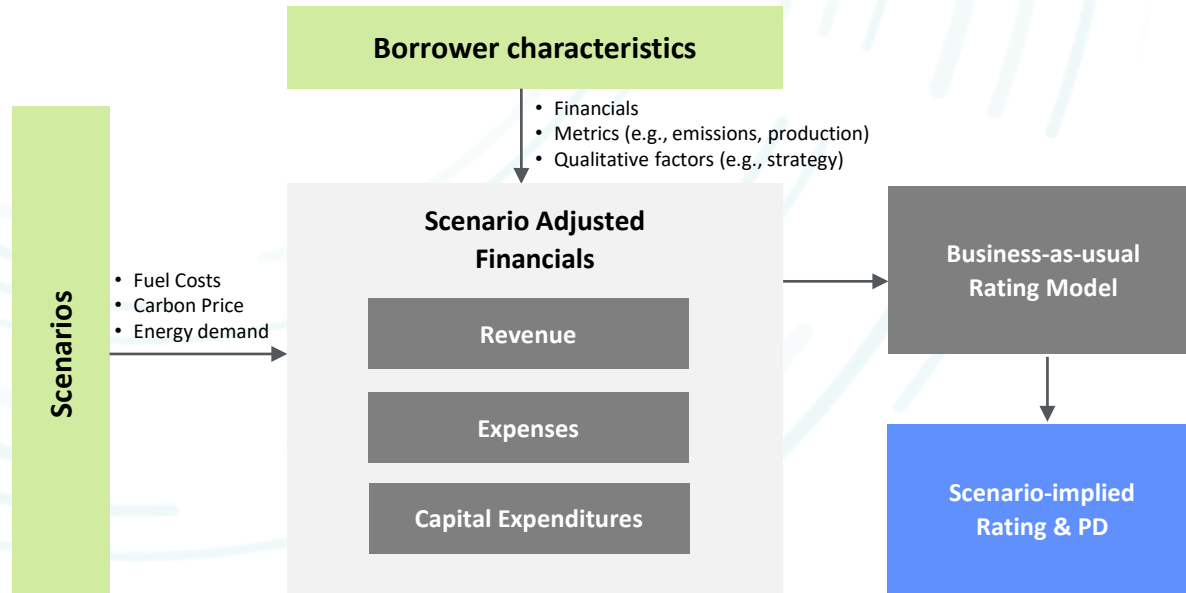


Measuring Transition Risk for Wholesale Exposures

The United Nations Environment Program Finance Initiative (UNEP FI)¹ has developed a methodology for quantifying the impact of transition risks on wholesale exposures using a combination of bottoms-up and top-down modeling approaches.

Bottom-Up Module

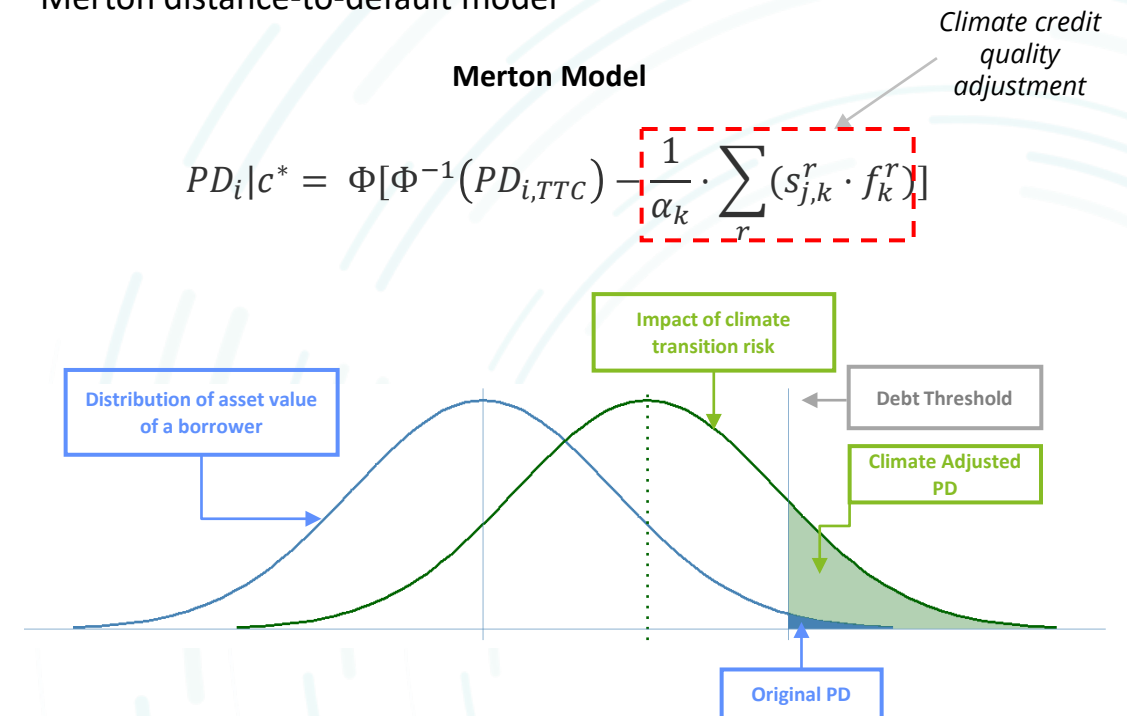
- 1 Develop calibration points by calculating PD impact of climate scenarios for a sample of borrowers across homogeneous segments



1. Source: <https://www.unepfi.org/wordpress/wp-content/uploads/2018/04/EXTENDING-OUR-HORIZONS.pdf>

Top-Down Module

- 2 Extrapolate PD impact across portfolio by calibrating a modified Merton distance-to-default model

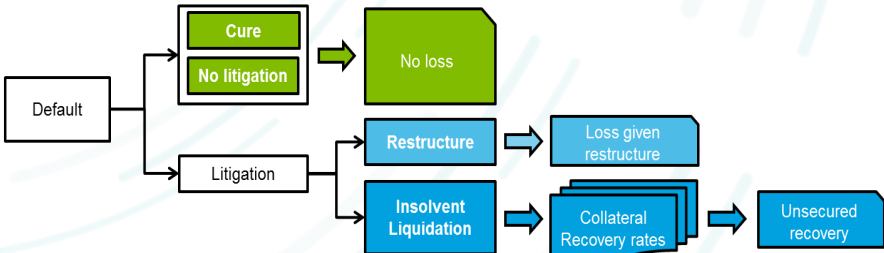
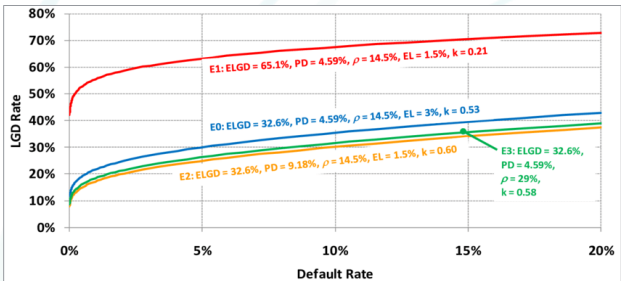


Considering LGD Impact for Wholesale Portfolios

Many institutions focus on PD when considering transition risk of wholesale portfolios, but LGD can also have a material impact on losses.

Our Point of View

The impact of climate risk on LGD is likely to be driven by valuation impacts on the underlying collateral. Typically, there are two main types of collateral that underpin wholesale lending:

Security Type	Physical assets	Financial security																								
	Examples include moveable and immoveable assets	Examples include guarantees, debentures, corporate bonds																								
Select Methodologies	<ul style="list-style-type: none"> Typically, firms use a workout framework to estimate LGD where a physical security is held as collateral.  <pre> graph LR Default[Default] --> Cure[Cure] Default --> NoLitigation[No litigation] Cure --> NoLoss[No loss] NoLitigation --> Restructure[Restructure] NoLitigation --> Litigation[Litigation] Restructure --> LossRestructure[Loss given restructure] Litigation --> InsolventLiquidation[Insolvent Liquidation] InsolventLiquidation --> CollateralRecovery[Collateral Recovery rates] CollateralRecovery --> UnsecuredRecovery[Unsecured recovery] </pre> <ul style="list-style-type: none"> The asset valuation can be impacted by physical risk events that causes damage to the asset, while transition risk is likely to drive the risk of stranded assets. The expected impact on asset valuation can be estimated using traditional stress testing models, which will primarily capture transition risk impact. For physical risk, a similar approach to the real estate sector can be used to assess valuation impacts. 	<ul style="list-style-type: none"> The LGD can be projected forward by relating the change in the LGD to changes in the PD (using Frye-Jacobs for example).  <table border="1"> <caption>Scenario Data from LGD Rate Graph</caption> <thead> <tr> <th>Scenario</th> <th>ELGD</th> <th>PD</th> <th>ρ</th> <th>EL</th> <th>k</th> </tr> </thead> <tbody> <tr> <td>E1</td> <td>65.1%</td> <td>4.59%</td> <td>14.5%</td> <td>1.5%</td> <td>0.21</td> </tr> <tr> <td>E2</td> <td>32.6%</td> <td>9.18%</td> <td>14.5%</td> <td>1.5%</td> <td>0.60</td> </tr> <tr> <td>E3</td> <td>32.6%</td> <td>4.59%</td> <td>29%</td> <td>1.5%</td> <td>0.58</td> </tr> </tbody> </table> <ul style="list-style-type: none"> For financial securities, a workout framework (as outlined on the left) can also be used, in which case firms will need to estimate the impact of climate risk on asset values. For corporate bonds, changes in bond valuations can be assumed to be driven by changes in the credit rating of the issuer. Subsequently, UNEP FI methodology can be used to estimate changes in the credit rating of the borrower. Traditional stress testing models can be used to predict changes in LGD using macro variables provided with climate scenarios. 	Scenario	ELGD	PD	ρ	EL	k	E1	65.1%	4.59%	14.5%	1.5%	0.21	E2	32.6%	9.18%	14.5%	1.5%	0.60	E3	32.6%	4.59%	29%	1.5%	0.58
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Consumer Portfolio Considerations

Understanding the climate risk factors your portfolios are exposed to is the key to targeted scenarios and effective stress testing exercises.

Physical Risk Scenario Drivers

- **Acute extreme weather events** that property and asset collateral are sensitive to, such as flood, wildfire, etc.
- **Chronic physical drivers** can consider rising temperature affecting productivity and **insurance risk**

Transition Risk Scenario Drivers

- **Direct impact:** Policy mandate that bans the sale of gas-powered vehicles, regulation requirements on property energy efficiency, and changes in consumer preferences.
- **Indirect impact:** Macro-economic variables such as employment, HPI, energy price, etc.



Vehicle Lending

- Vehicle lending is observed to be **mainly transition risk driven**. Due to the short-term nature of auto loans, only **sharp and unexpected collateral value decline** on gas-powered vehicles driven by government policy are likely to drive material risk to a **gas-powered vehicle concentrated** portfolio.
- **Physical risk is less material** due to movable collateral and insurance coverage. However, insurance assumptions can be leveraged to estimate impact to auto loans.



Credit Card

- Both physical and transition risks can be reflected in **scenario-conditioned macroeconomic variables**. For example, high energy prices, GDP reduction, lay-offs in carbon intensive industries due to transition to renewable energy, etc., would negatively impact the repayment capacity of borrowers.



Residential Mortgage

- Mortgage and home equity loans are observed to be **both physical risk and transition risk driven**.
- **Physical risk** is manifested through **extreme weather events design** causing geographical hazard impact on the property collateral value, as well as through insurance assumptions.
- **Transition risk** is reflected through **spending on upgrading a property's energy efficiency rating** in response to new regulation.

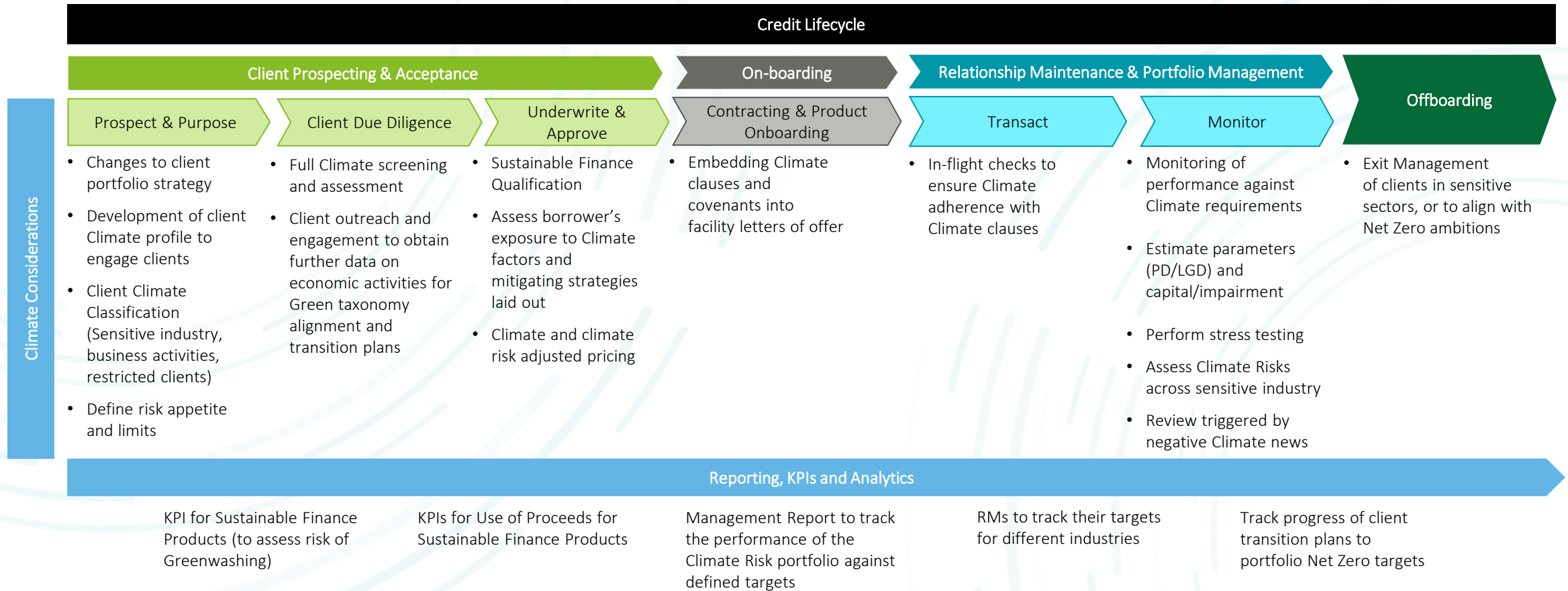


Embedding Climate Risk into Credit Models



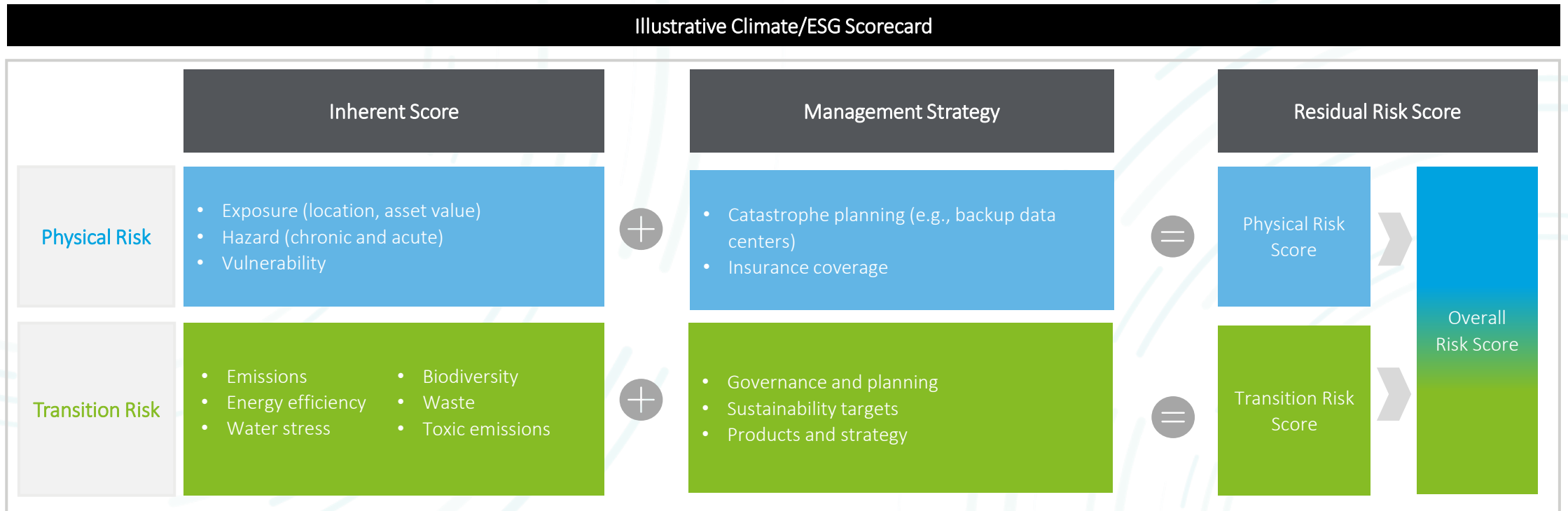
Integrating Climate into the Credit Lifecycle

The impact of climate risk should be considered at each stage in the credit life cycle, and tracking credit portfolios is key when developing reporting capabilities and KPIs.



Climate Risk Ratings

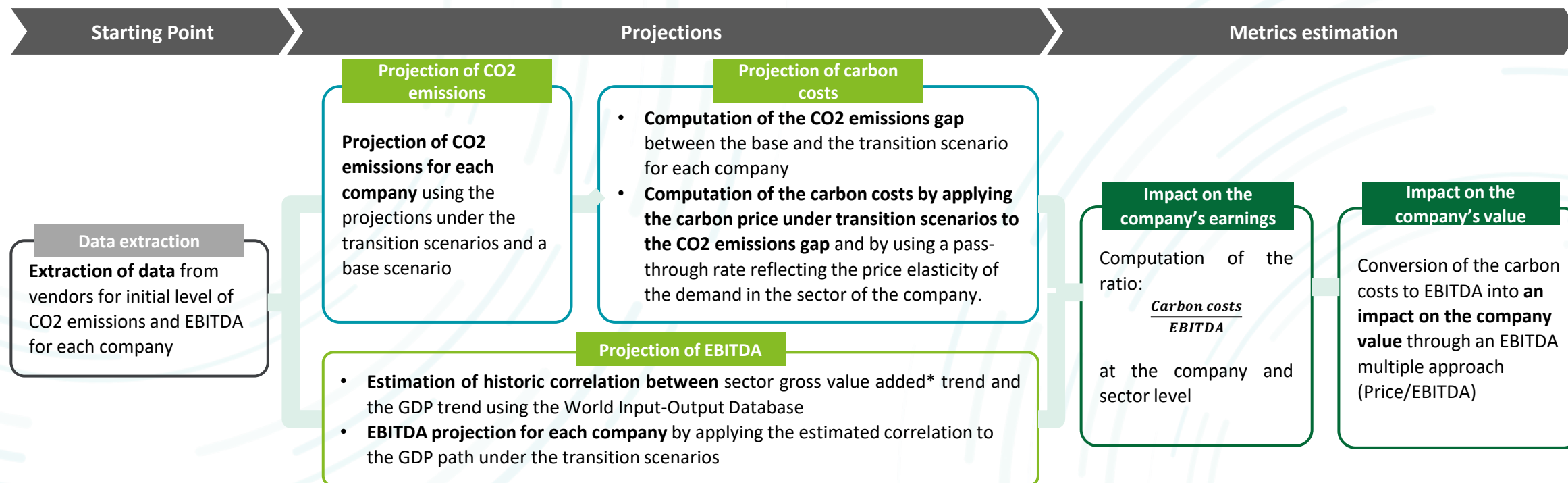
In addition to performing scenario analysis, consideration of climate risk ratings can play a key role in integrating climate into credit for loan underwriting and counterparty risk management.



Climate ratings may be use for **risk management**, **disclosures**, and incorporation into **existing risk rating processes** (e.g., via overrides)

Impact of Climate on Market Risk

Climate scenarios can be leverage to forecast company metrics like EBITDA which can be further translated into market risk metrics such as Climate Value at Risk (VaR).



RESULTS

Market risk metrics and data visualization heatmaps illustrating the assessment along dimensions of impact materiality, impact severity, sector, and geography

(*) The gross value added has been chosen as the metric because:

- According to the value-added method for the GDP, the sum of all sectoral gross value added for a country corresponds to this country's GDP (GDP is available in the NGFS scenarios).
- This metric is equivalent to EBITDA as it excludes depreciation and amortizing of the capital and excludes the financing structure.



ESG Data & Technology Landscape

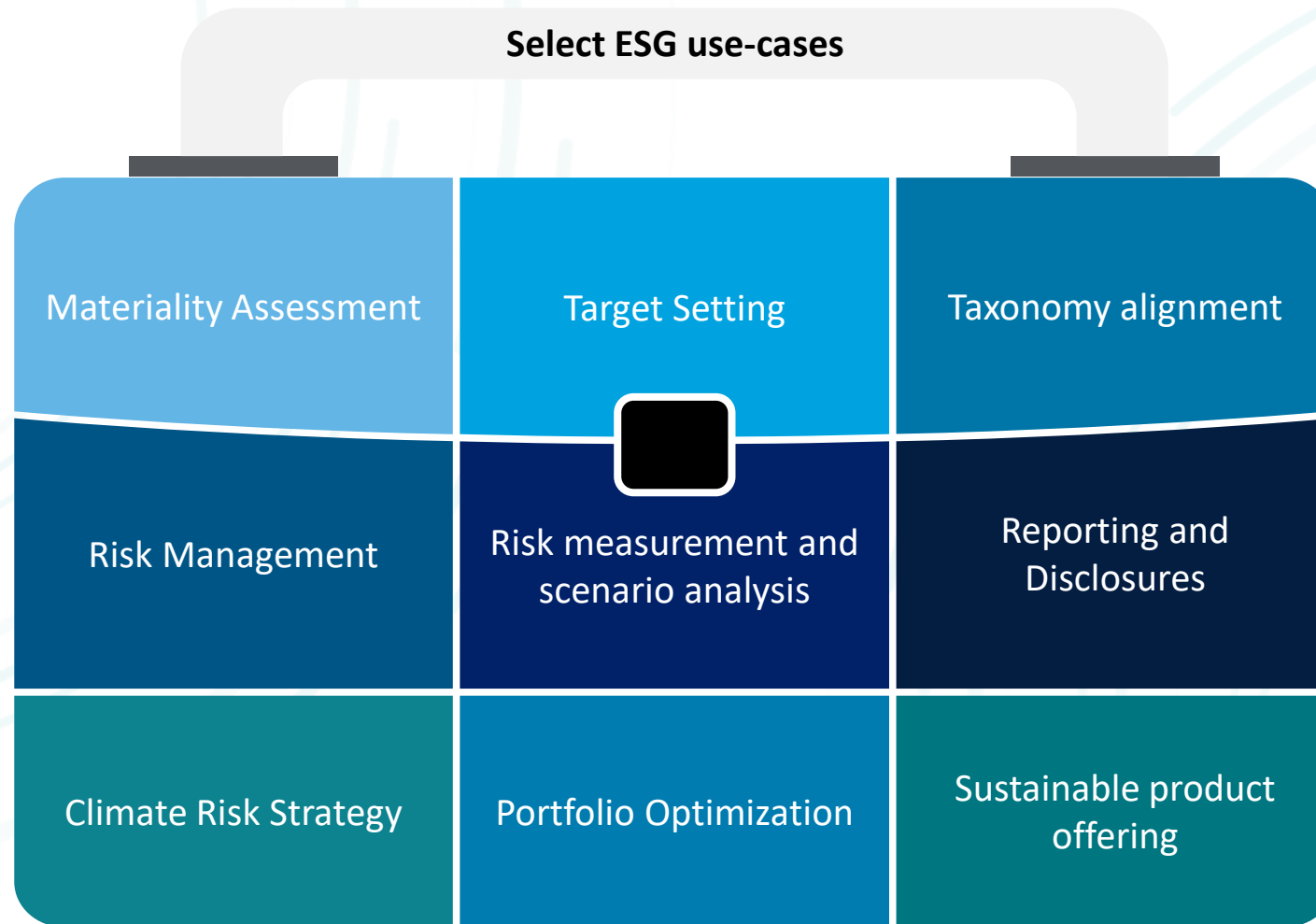


Perspectives on data for climate (and ESG) risk management

- 01 CLIMATE AND SUSTAINABILITY TEAMS FACE OFF TO NUMEROUS INTERNAL AND EXTERNAL STAKEHOLDERS:** A bank integrating climate risk now faces off to a wide array of stakeholders – governments, regulators, shareholders, customers, employees among others.
- 02 BANKS ARE RESPONDING TO STAKEHOLDER EXPECTATIONS BY COMMITTING TO SEVERAL INITIATIVES AND SETTING DEMANDING TARGETS:** Each of these is a data-hungry book of work and requires access to its own data feeds on an ongoing basis.
- 03 DEMONSTRATING PROGRESS ON MULTIPLE INTERNAL WORKSTREAMS IN TANDEM IS A KEY CHALLENGE:** Stakeholders expect progress on the sustainability agenda in all directions – from governance to risk management to strategy -- *on each* of the many initiatives and *in tandem*.
- 04 DATA WILL NEED TO BE AT THE HEART OF YOUR CLIMATE AND SUSTAINABILITY STRATEGY:** This puts a bank's data strategy at the heart of its climate risk success, if it wants to deliver effectively on its milestones. Most stakeholders -- be it consumers, clients or regulatory bodies -- continue to expect engagement and delivery despite the data being patchy.
- 05 ARTICULATING REQUIREMENTS FOR THE DIFFERENT USE-CASES FOR BUSINESS LINES AND FUNCTIONS ACROSS YOUR FOOTPRINT IS ESSENTIAL:** We see banks working through a systematic articulation of the use-cases. Given the breadth of Sustainable Finance, there are numerous use-cases-- Scenario Analysis, Disclosures, Net Zero are just some of them.
- 06 OPERATIONALISING DATA STRATEGY MAY BE A MULTI-YEAR BOOK OF WORK:** Introducing clarity about the data requirements, laying down the operationalisation principles and implementing a strategic workflow are some key recommendations. These recommendations will accelerate the climate risk integration and introduce efficiencies across your book of work on climate and ESG.
- 07 WITH PRIORITISATION, IT'S POSSIBLE TO GET SOME QUICK WINS :** Despite data the wide scope, the data incompleteness and data quality issues, through smart prioritisation banks can get some quick wins.

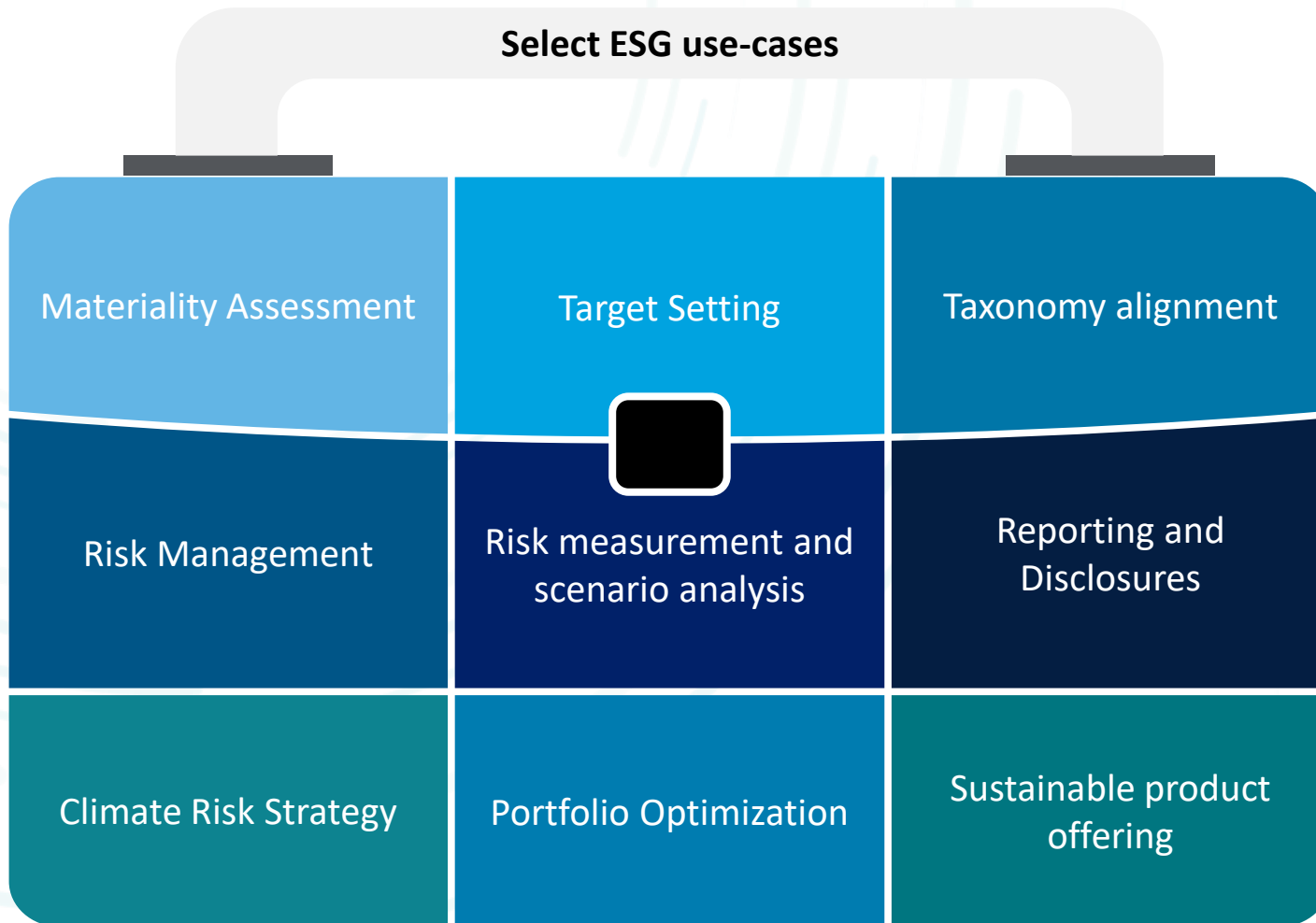
It is especially helpful to develop ESG specific data use-cases

Packaging a wide number of data requirements into a select cluster of use-cases

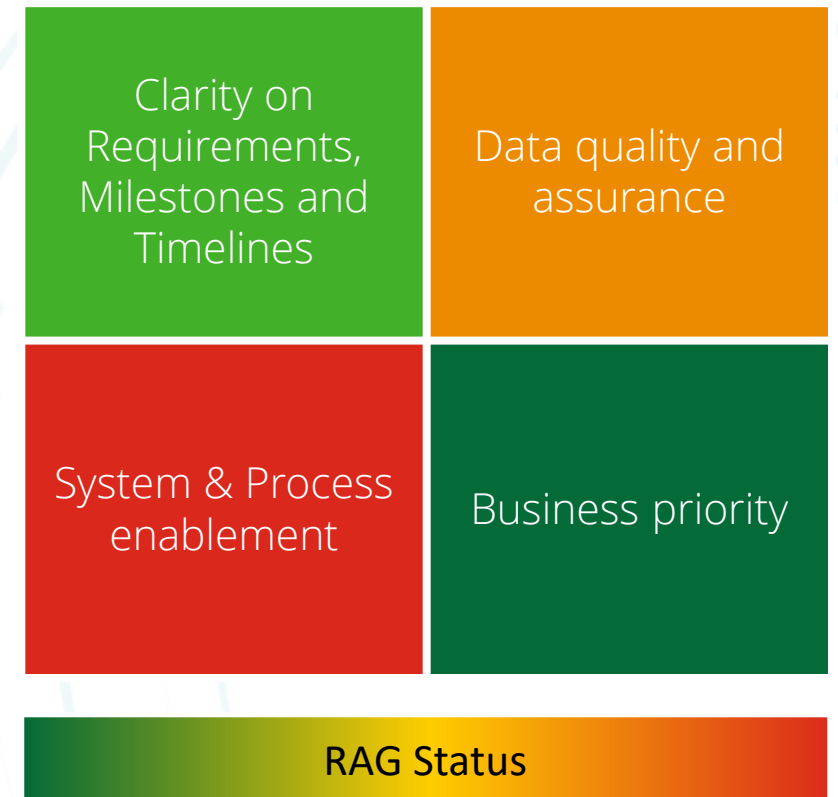


We recommend heat-mapping each use-case to track regular progress

As ESG data can be of varying quality, have differing business priorities and require system enablement over time, assessing a RAG status to each use-case will help with monitoring progress



Suggested criteria for reviewing progress – to be applied systematically for each use-case



Continue to make progress on the ESG data strategy and its dimensions

Operationalizing the data strategy could be a multi-year, multi-team effort

Data Governance

- Delineate roles and responsibilities
- Develop policies and standards
- Clarify escalation procedures and sharing protocols

Data Sourcing Analysis

- Seek market expertise on data
- Generate data sourcing and consumption strategy – including use of analytical techniques
- Get business sign off on vendor/market data

Operationalise Capabilities

- Design and implement data assurance operating model
- Define data quality (DQ) checks (technical and rule based)
- Ensure processes are ESG-inclusive

Business Requirements Mapping

- Articulate business benefits
- Map ESG data requirements from across the teams and conduct data gap analysis e.g. Client coverage, Regulatory reporting, Investor relations, Risk management
- Socialise potential use cases for synergies

Architectural Design & Industry Benchmarking

- Review adequacy of current data architecture
- Develop a future state architecture, including system map and identification of business process flows
- Benchmark against the industry

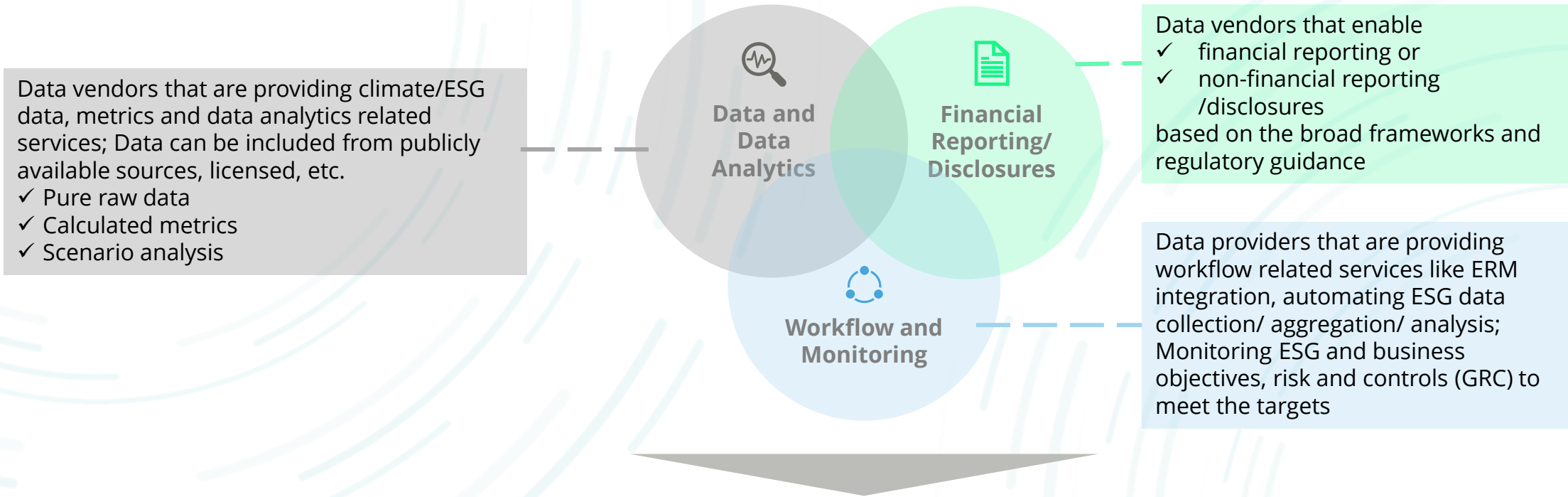
Planning and Implementation

- Outline milestones and deliverables
- Develop communication and stakeholder map
- Execute the plan



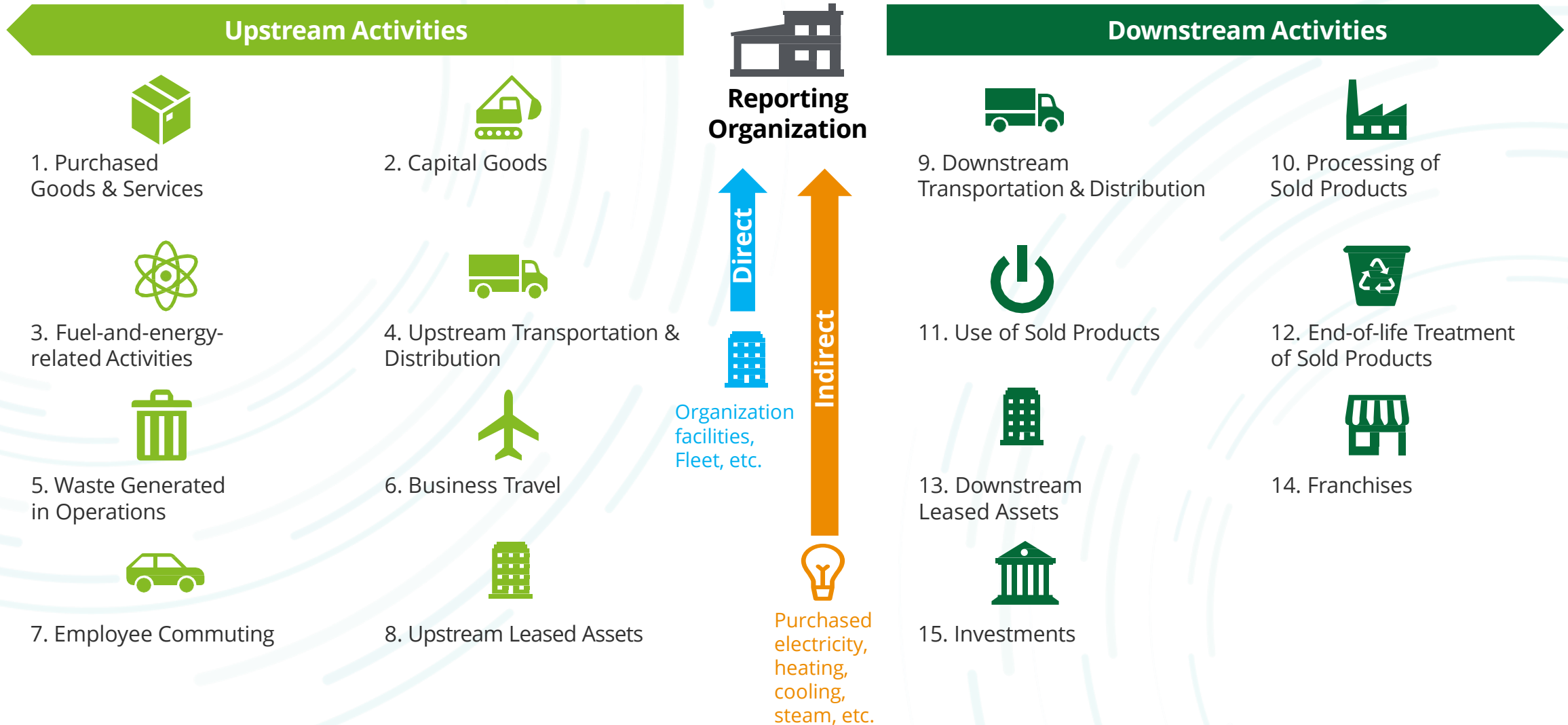
ESG Data Ecosystem and Vendor Landscape

While many data sources are internal, given ESG measurement is across supply chain and includes many estimations, data vendors may need to be assessed as needed to source information



Scope 1, 2 and 3 emissions

Data to be collected across Scope 1, 2, 3 emissions are broad and complex and including estimations in many areas





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