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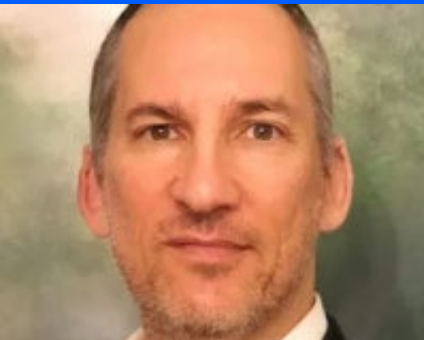


Climate Risk Management for Canadian Insurers: Navigating OSFI's B-15 Guidelines and Regulatory Expectations

Webinar – May 30th, 2024

David Fihrer, Host

Sr. Director
Actuarial Services
Moody's



Pete Richardson

Head of Research
Manifest Climate



Sharon Seilman

Director
Climate Strategy
Manulife



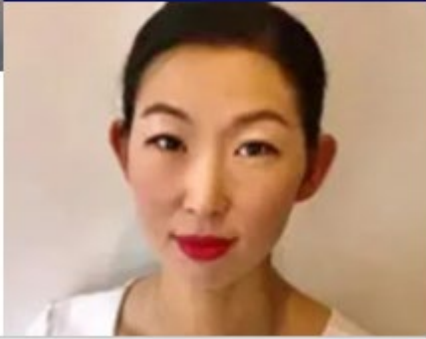
Steven Morrison

Sr. Director
Research
Moody's



Jin Oh

Senior Director
Industry Practice
Lead
Moody's



Gavin Conn

Director
Research
Moody's



Agenda

10:00	Welcome	Host - David Fihrer, Sr. Director Actuarial Services, Moody's
10:05	State of the Market: Canadian Insurers preparedness for B15	Pete Richardson, Head of Research, Manifest Climate
10:20	Key challenges and priorities to address B-15 Guidelines for Climate Risk Management: An insurer's perspective.	Sharon Seilman, Director Climate Strategy, Manulife
Preparing for Climate Risk Materiality Assessments:		
10:35	Calculating Carbon Emissions, with a spotlight on PCAF methodology.	Steven Morrison, Sr. Director Research, Moody's
10:50	How to conduct physical risk assessments on multi-asset class portfolios using bottom-up, climate-adjusted credit models.	Jin Oh, Senior Director Industry Practice Lead, Moody's
11:05	How to conduct top-down climate scenario analysis to help develop a better understanding of the financial impacts of material climate risks. This will include a special focus on short term stresses for the ORSA.	Gavin Conn, Director Research, Moody's
11:20-11:30	Q&A and Close	



State of the Market

Preparedness for B-15

PRESENTED BY:

PETE RICHARDSON

HEAD OF RESEARCH, MANIFEST CLIMATE

MAY 30, 2024

Introductory Remarks

- | | |
|----|---------------------|
| 01 | Evolution of B-15 |
| 02 | State of the market |
| 03 | Lessons learned |



Evolution of B-15

March 2023 - Initial Release



OSFI issues principles-based guidance to help FRFIs manage climate-related risks

(Note: focus on prudential risks, not climate-related outcomes)

March 2024: Updates & Readiness



Update issued to align B-15 with IFRS S2, in anticipation of FY 2024

(Note: B-15/IFRS S2 “mostly” aligned, but there are differences)

2025+: Implementation & Beyond

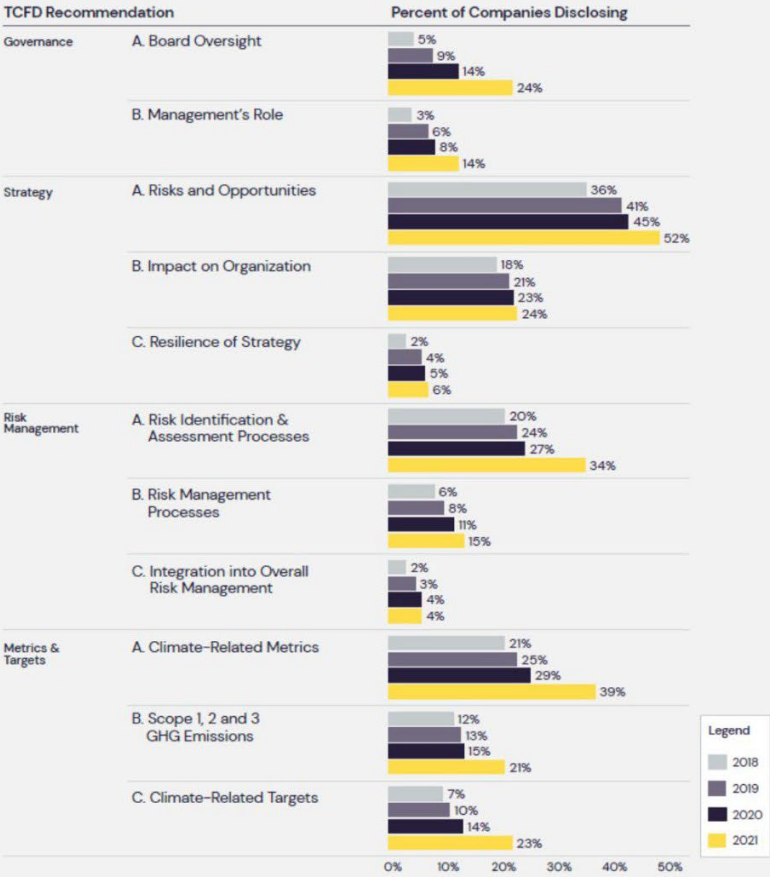


Ongoing implementation and development of “TBD” in B-15 (scenario analysis and transition planning)



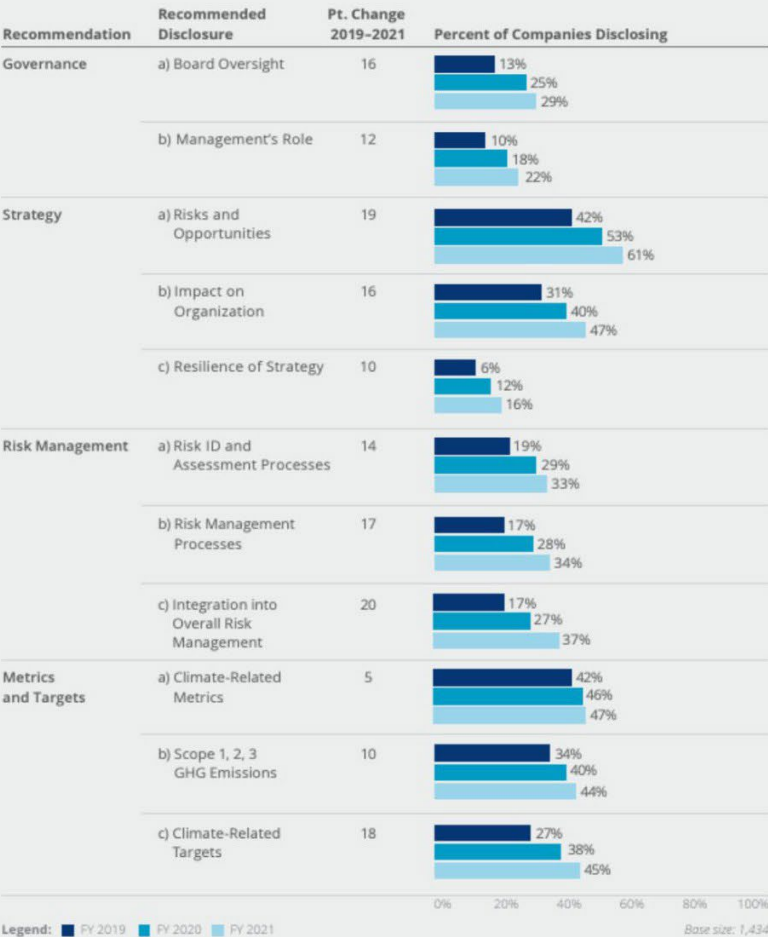
Climate-Related Disclosures (worldwide)

Figure 2
TCFD-alignment of climate disclosures worldwide



Manifest Climate Inaugural
Benchmark Review 2022, pp.11

Figure A2
TCFD-Aligned Disclosures by Fiscal Year for 2019–2021



Legend: ■ FY 2019 ■ FY 2020 ■ FY 2021

Base size: 1,434

TCFD Status Report
2022, pp.12

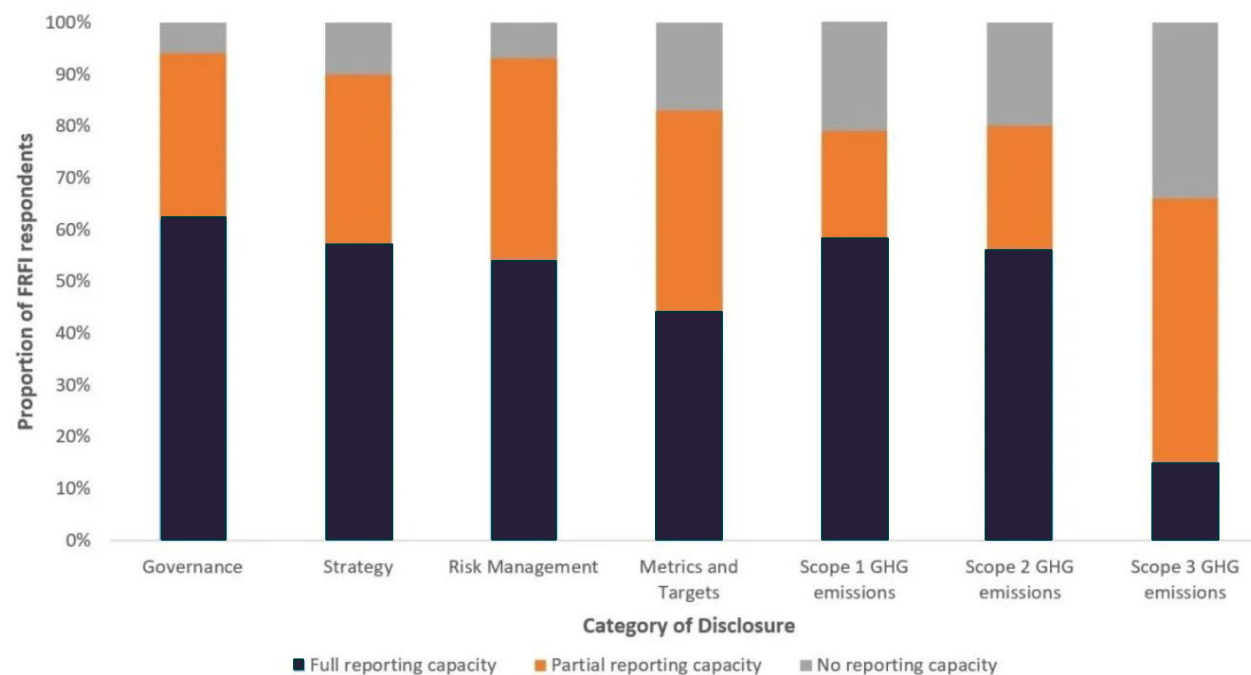


What we expected - Climate-Related Disclosures (FRFIs)

“[Responses confirm] there is **no one-size-fits-all approach for managing climate-related risks**, given the unique risks and vulnerabilities that will vary with a FRFI’s size, nature, scope, and complexity of its operations, and risk profile [...] FRFIs will have to assess their risks and exposures and **apply the Guideline expectations proportionally** to their overall risk profile.”

OSFI: What we heard report (December 2023)

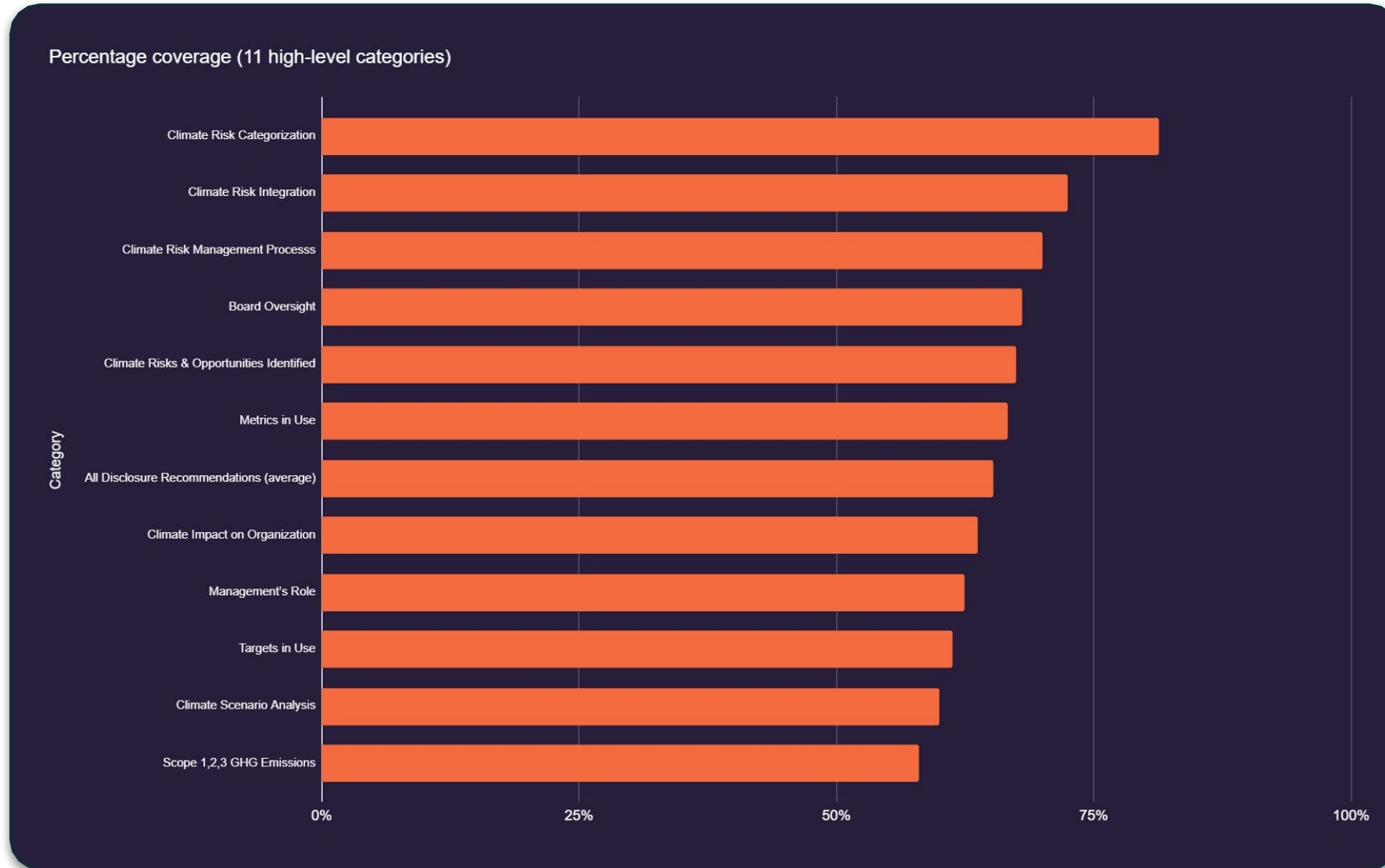
Proportion of FRFIs with capacity to report on climate-related financial disclosures



OSFI: What we heard report (Sec. 2.3)



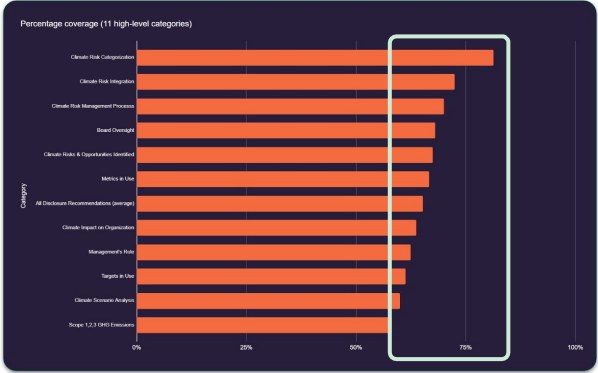
What we found - Climate-Related Disclosures (selected FRFIs)



Manifest Climate: Benchmark Review of 40 FRFIs



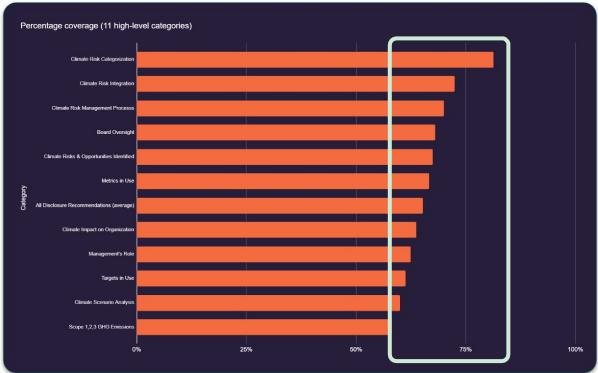
What we found - Coverage Detail



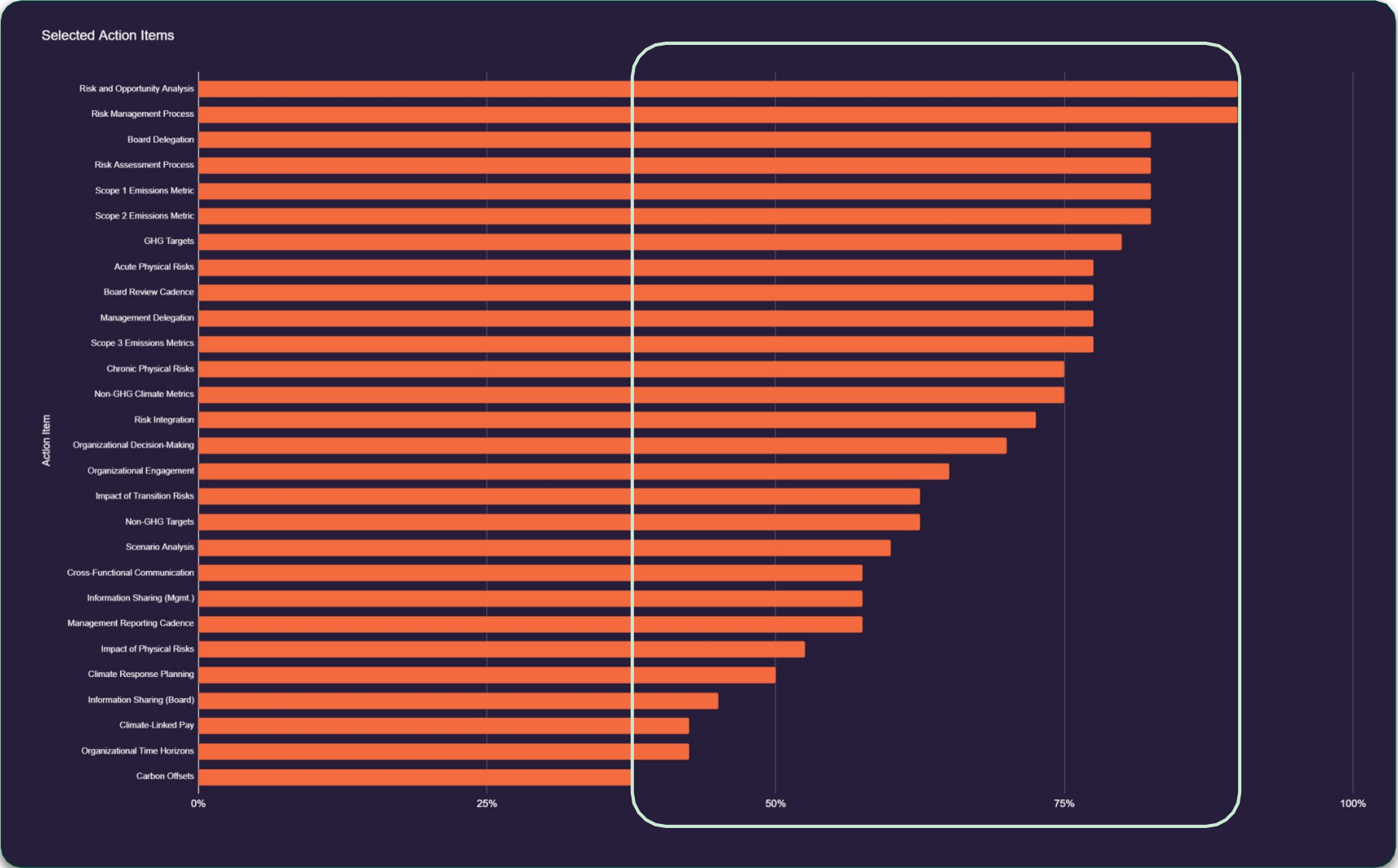
High-Level Categories



What we found - Coverage Detail



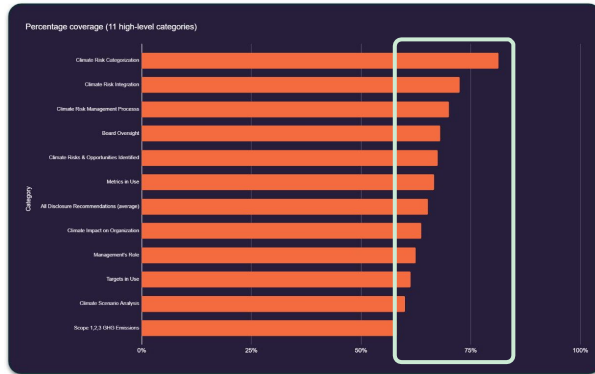
High-Level Categories



Granular Action Item Review



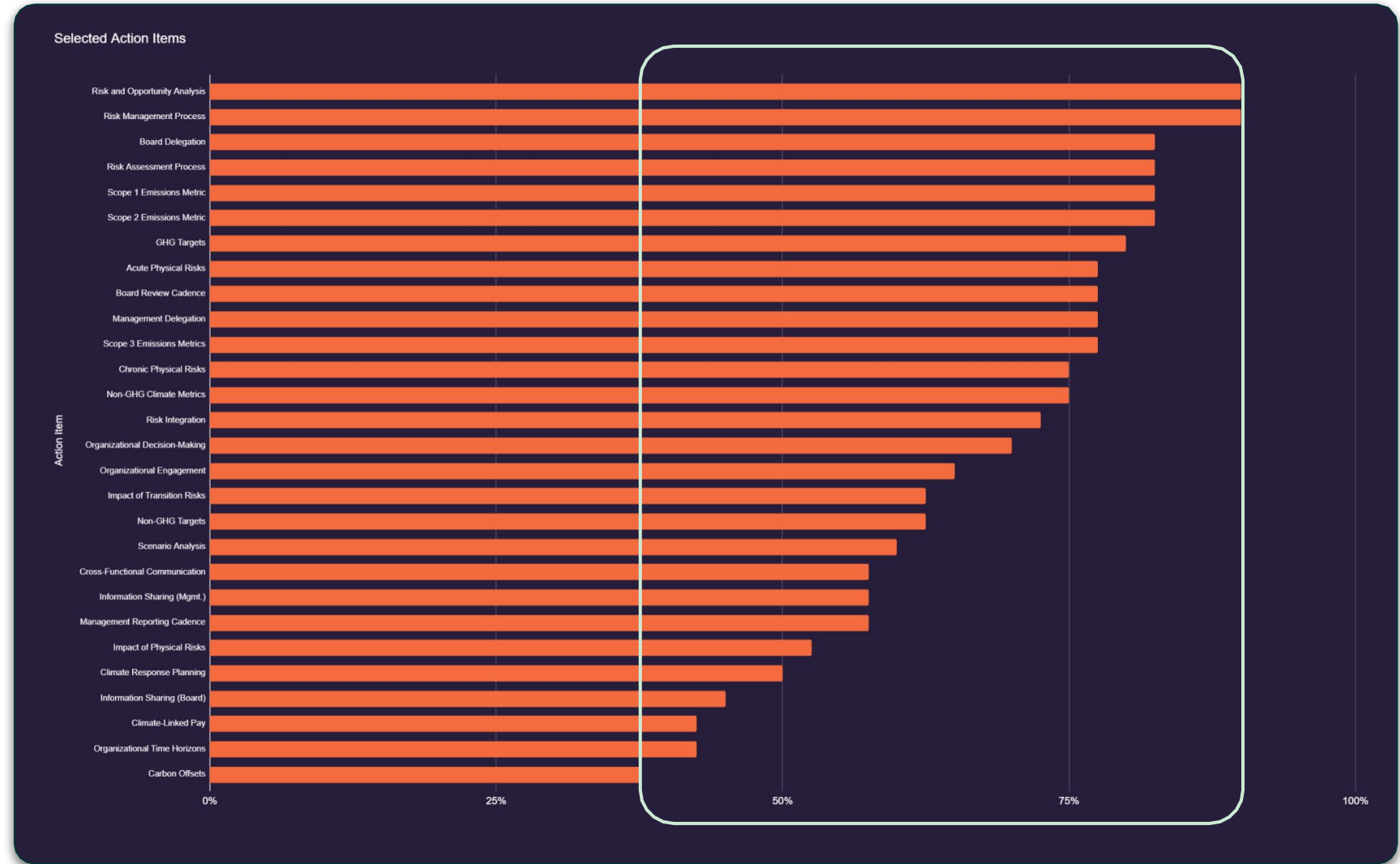
What we found - Coverage Detail



High-Level Categories

TAKEAWAYS:

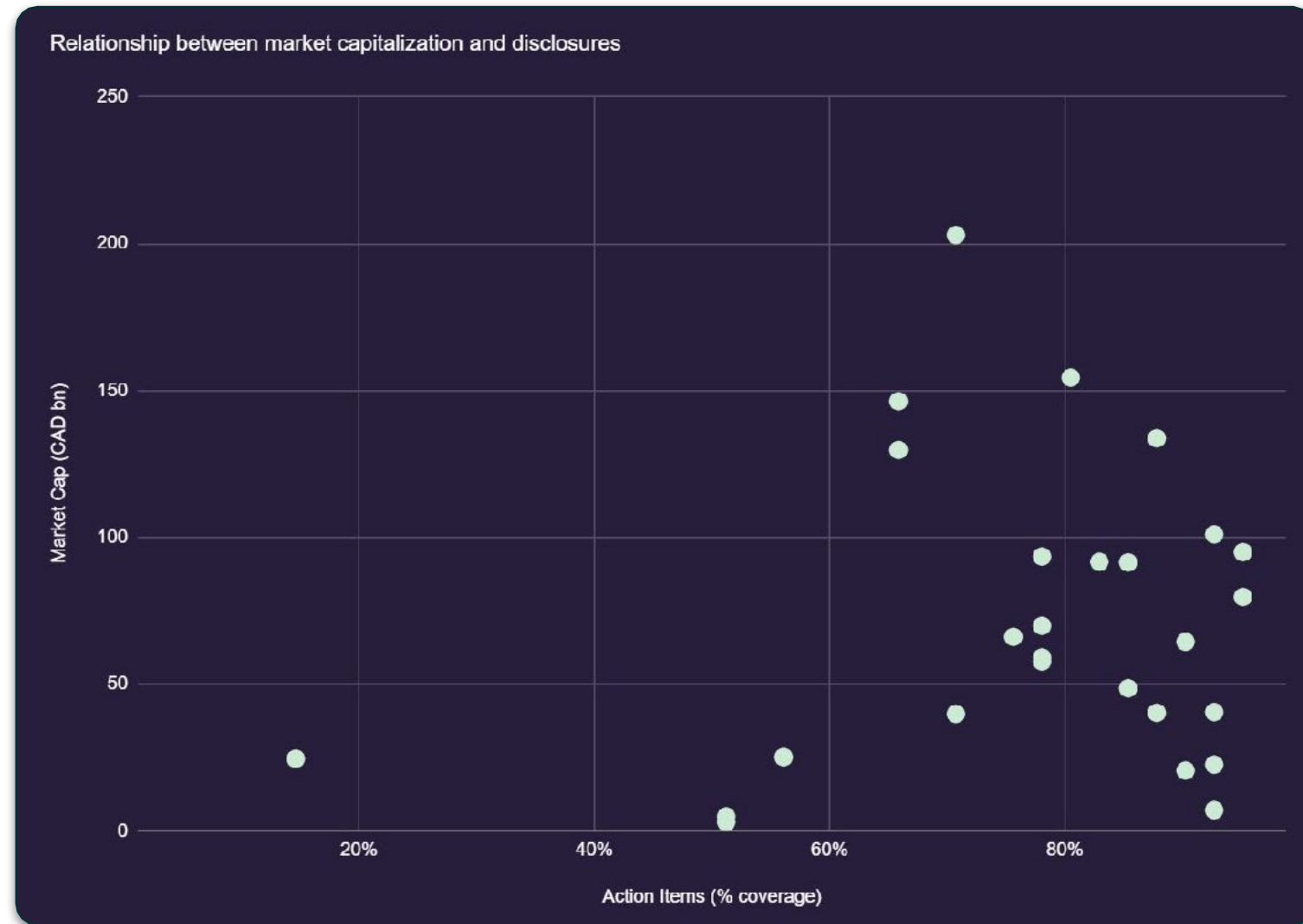
- Companies are good at issue spotting, and board mandates; Scope 3 disclosures increasing
- Disclosing impact of risks remains a key challenge for many
- Management and cross-functional communication remains (relatively) under disclosed, alongside climate-linked pay



Granular Action Item Review



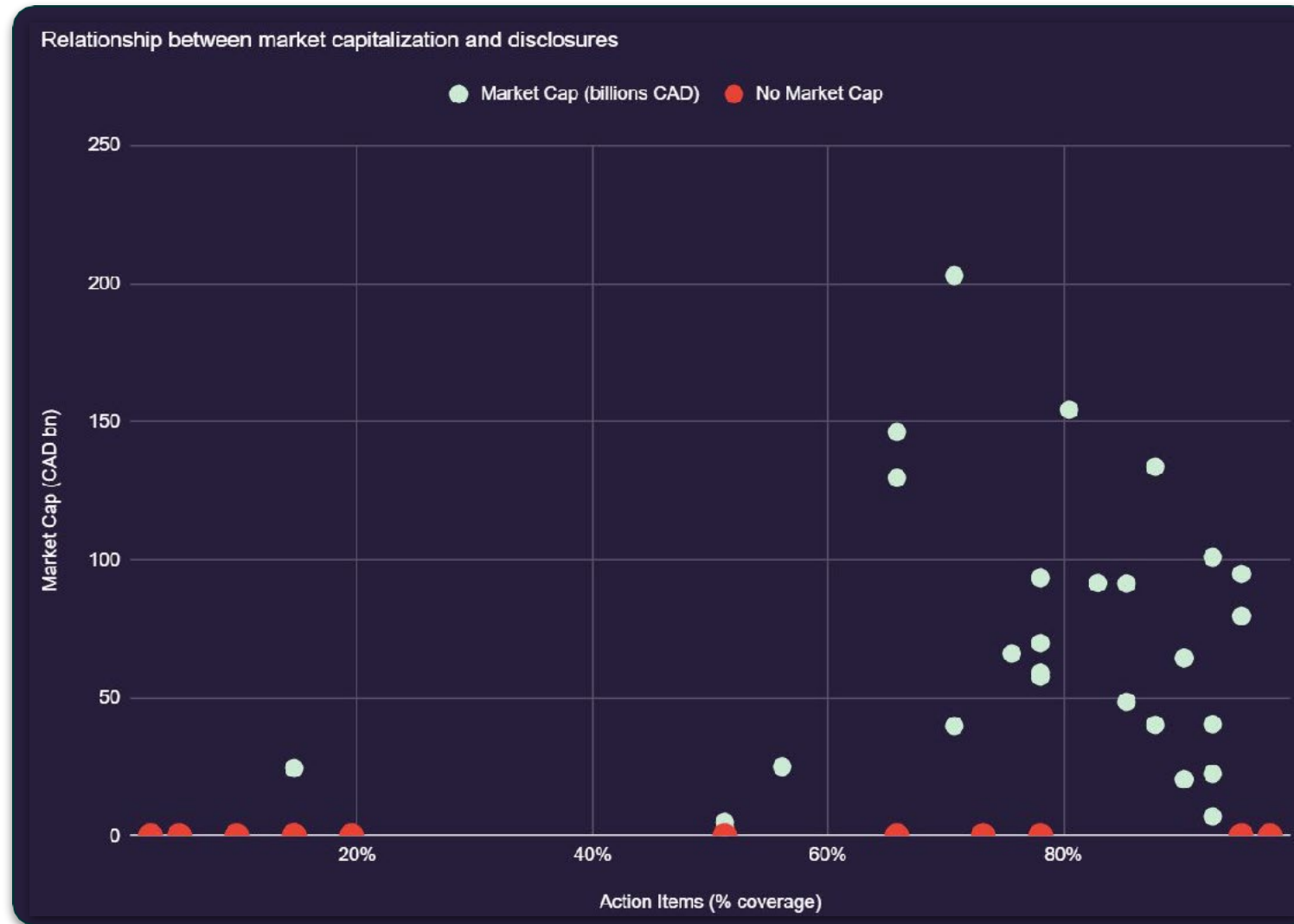
What we found - Size vs. Coverage



Manifest Climate: Benchmark Review of 40 FRFIs



What we found - Size vs. Coverage



Manifest Climate: Benchmark Review of 40 FRFIs



Lessons Learned

How do we improve alignment to B-15?

- Location of disclosures
- Clarity of disclosures
- Whole-of-business engagement

The screenshot displays the 'Tracker' application interface. The left sidebar contains navigation links: Home, Workspace, Tracker (highlighted), and Resources. The main content area is divided into a 'Contents' sidebar and a main panel. The 'Contents' sidebar lists 'Policy and Legal' (expanded), 'Carbon Pricing', 'Climate Disclosure Regulation', 'Climate Litigation', 'Market Risk', 'Risk Category', and 'Risk Category'. The main panel shows 'Policy & Legal Risks' with 'POTENTIAL IMPACTS' listed in three columns. Below this is the 'Carbon Pricing' section, which includes a 'RISK PREVALENCE' indicator (four filled circles) and a 'QUALITATIVE REFERENCE' section for 'Alphabet'. The 'Alphabet' section describes the risk of increased energy costs and includes two red-bordered boxes: 'IMPACT: Cost increase by \$131 million' and 'TIME HORIZON: Short-term'.

Tracker Dashboard Data Risk Explorer **NEW**

Contents

- Policy and Legal**
 - Carbon Pricing**
 - Climate Disclosure Regulation
 - Climate Litigation
 - Market Risk
 - Risk Category
 - Risk Category

Policy & Legal Risks

POTENTIAL IMPACTS

- Increased operating costs (e.g., higher compliance costs, increased insurance premiums)
- Write-offs, asset impairment, and early retirement of existing assets due to policy changes
- Increased costs and/or reduced demand for products and services resulting from fines and judgments

Carbon Pricing **RISK PREVALENCE** ●●●●

Carbon Pricing is a climate-related risk referring to the cost associated with emitting carbon dioxide into the atmosphere. Companies may face financial risk due to regulatory measures imposing a price on carbon emissions, such as carbon taxes or cap-and-trade systems, which aim to reduce greenhouse gas emissions. This could significantly increase operational costs and affect profitability for businesses, particularly those in carbon-intensive industries.

QUALITATIVE REFERENCE

Alphabet

Google faces the risk of increased costs of energy if a price on carbon is applied through legislation such as cap and trade. If this price is passed on to Google from a regulated entity, the cost of running their operations will increase. A shadow price for carbon is included in Google's data center siting analysis to consider this risk even before the construction of a data center. A hypothetical carbon price of \$51/metric tonne could increase costs by approximately \$131 million, assuming these costs were passed through to electricity consumers and Google was not further able to reduce its carbon footprint.

IMPACT
Cost increase by \$131 million

TIME HORIZON
Short-term



Thank You

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manifestclimate.com



**MANIFEST
CLIMATE**

Approach to addressing Climate Risk Management

Sharon Seilman, Director, Climate Strategy – Manulife

May 30, 2024



OSFI's Climate Risk Requirements

B15: Climate Risk Management Guideline

- The guideline outlines expectations specifically in relation to how financial institutions should manage climate-related risks.
- The Guideline is organized into two chapters, each with its own focus and expectations.
 - Chapter 1: governance and risk management
 - Chapter 2: climate-related disclosure

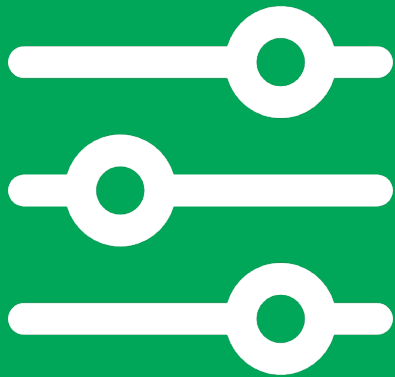
Standardized Climate Scenario Exercise

- The SCSE aims to increase federally regulated financial institutions' understanding of their potential exposures to climate-related risks. It also aims to build their capacity to conduct climate scenario analysis and risk assessments.
- The SCSE includes four separate modules across credit risk, market risk, and physical and transition risks for real estate.

Climate-related Risk Returns

- The purpose of the Climate Risk Returns is to collect standardized climate-related emissions and exposure data, directly from all institutions to enable OSFI to carry out evidence-based policy development, regulation, and prudential supervision as it pertains to climate risk management.

Building upon a strong foundation, we are focusing on the following areas to meet OSFI's requirements



Governance and controls



Data and analytical
capabilities

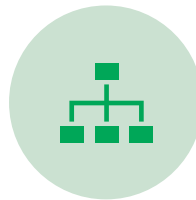


Disclosure readiness

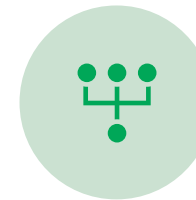
Governance and Controls



Enhancing internal governance frameworks for climate risk management



Integrating climate-related risks into the enterprise risk management framework



Documenting controls and processes for existing climate-related policies and standards



Implementing controls to ensure the accuracy, completeness, and timeliness



Capacity building and training on climate-related risks, risk identification and measurement

Data and Analytical Capabilities



Assessing appropriate metrics and targets, including requirements to measure existing metrics and targets



Establishing data management processes to collect, validate, and analyze relevant data



Developing capabilities to conduct scenario analysis to assess the potential impact of climate-related risks



Incorporating climate risk factors into existing risk models and stress testing frameworks



Enhancing asset class coverage across financed emissions measurement

Disclosure Readiness



Developing necessary disclosure controls and governance processes



Enhancing disclosure of climate-related risks and opportunities including the identification and monitoring of impact



Disclosure of climate transition plan and approach to measure progress



Ensuring that all disclosure requirements are met in accordance with OSFI's guidelines and expectations, including accuracy and timelines

Thank you

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OSFI B-15
Emissions Accounting
May 2024

OSFI B-15 Guidance

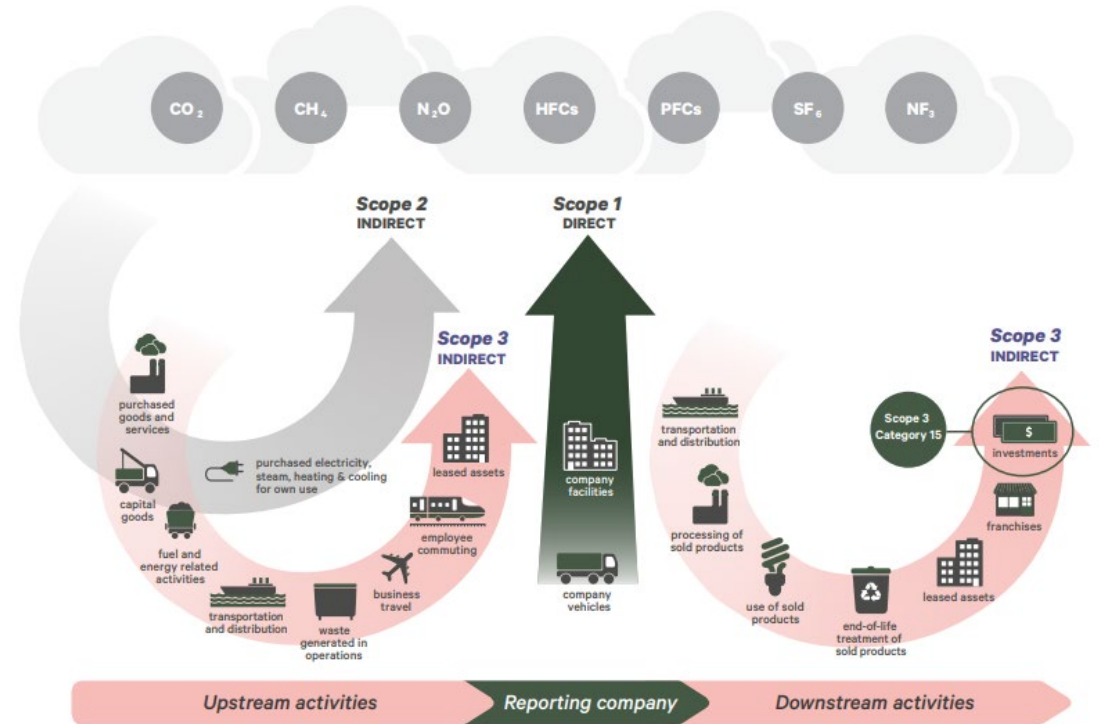
Emissions disclosure and accounting

B-15 Annex 2-2 (Metrics and Targets Section) sets out expectations for emissions disclosure

- Federally Regulated Financial Institutions (FRFIs) are required to disclose Scope 1, 2 and 3 absolute GHG emissions
- In preparing its Scope 3 emissions, FRFI should consider its entire value chain and all 15 categories of Scope 3 GHG emissions, and **ensure inclusion of Category 15: Investments emissions**

B-15 Annex 2-1 sets out expectations on accounting calculations

- For Scope 3 Category 15 emissions, the FRFI is expected to use the latest **Partnership for Carbon Accounting Financials' (PCAF's) Global GHG Accounting and Reporting Standard for the Financial Industry**, or a comparable industry-accepted approach.



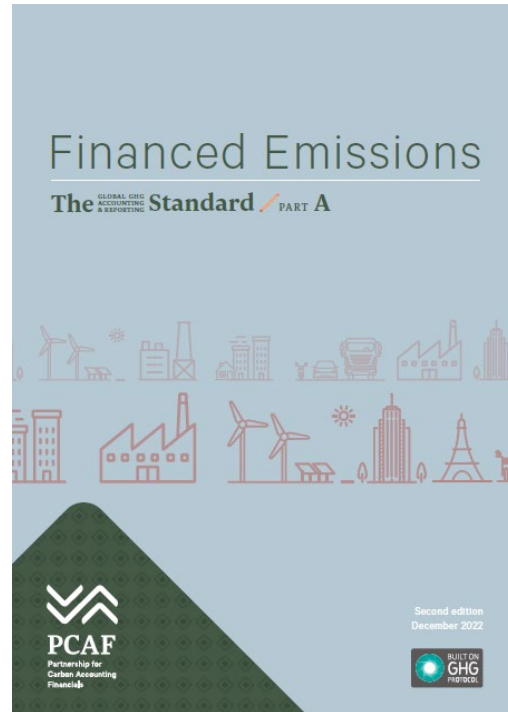
Source: (WRI and WBCSD, 2011) adapted by PCAF, 2022

Scope 3 Category 15 emissions

Emissions sub-categories, institutions in scope, and associated PCAF Standards

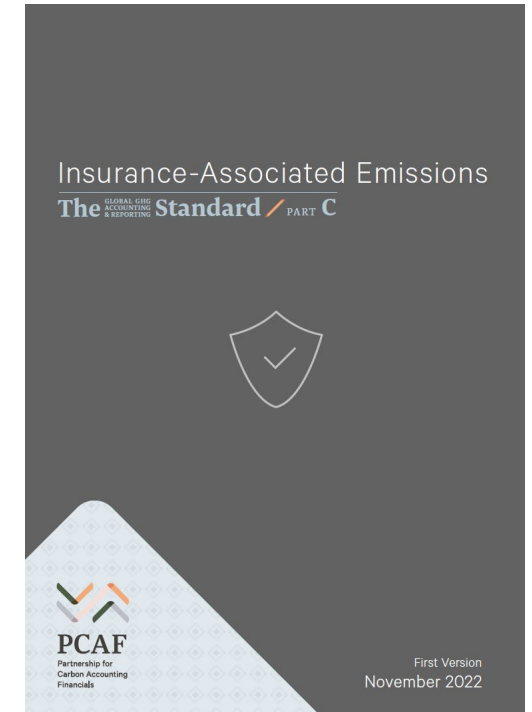
Financed Emissions

- For all in -scope FRFIs, Category 15 entails emissions from loans and investments (financed emissions).
- For in-scope FRFIs that participate in asset management activities , Category 15 entails emissions from assets under management (AUM).



Insurance-Associated Emissions

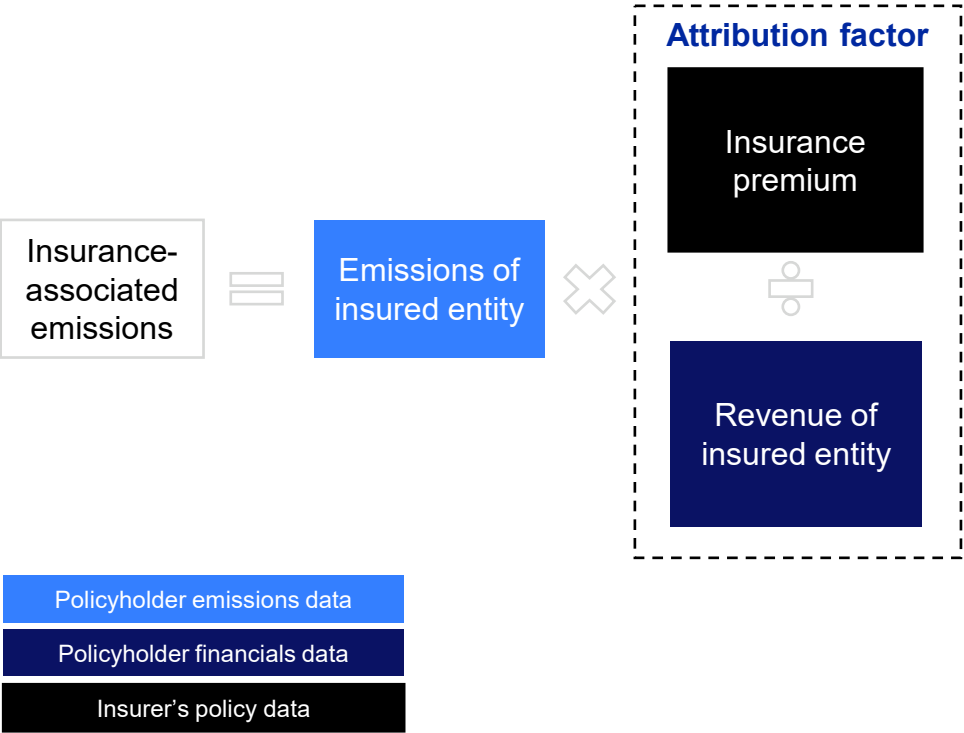
- For in-scope FRFIs that participate in financial activities associated with property and casualty insurance (excluding mortgage insurance) , Category 15 entails emissions from insurance and reinsurance underwriting portfolios (insurance-associated emissions).



PCAF Global GHG Accounting and Reporting Standard

Insurance-Associated Emissions - Commercial Insurance

Insurance-Associated Emissions



Data Quality Score

Table 5-3. General description of the data quality score table for commercial lines Insurance (score 1 = highest data quality; score 5 = lowest data quality)

Data quality	Options to estimate insurance-associated emissions		When to use each option (what data should be available)		
			Attribution factor	Emissions	
				Scope 1	Scope 2
Score 1	Option 1: Reported Emissions	1a	Re/insurance Premium/Customer Revenue	Reported - Verified	Reported Market Based - Verified
Score 2		1b		Reported - Unverified	Reported Market Based - Unverified Reported Location Based - Unverified Reported Location Based - Verified
	Option 2: Reported or physical activity-based emissions	2a		Energy Consumption x EF (Intensity per MWh of Electricity)	
2b		Production Output x EF (Average Sector Emission Intensity per t of Production [output])			
Score 4	Option 3: Economic-activity based emissions	3a	Re/Insurance Premium/Customer Revenue <u>not aligned with insured entities</u>	Reported Emissions/Energy Consumption/ Production Output Data <u>not aligned with insured entities</u>	
Score 5		3b	Re/insurance Premium/Average Sector Revenue	Average Sector Revenue x EF (Average Sector Emission Intensity per Revenue)	

Source: The Global GHG Accounting & Reporting Standard (Part C). PCAF (2022)

OSFI Climate Risk Returns

Financed Emissions and Insurance-Associated Emissions

Applicable Field Listing - IC2 Return (To be completed by all insurers*)
 Sub-Table IC2-B: Financed GHG Emissions – Scope 3 by Asset Class (Canada and outside Canada)

		Aggregation categories				Attributed emissions		Data Quality Scores		
Applicable Field Listing - IC2 Return (To be completed by all insurers *) Sub-Table IC2-B: Financed GHG Emissions – Scope 3 by Asset Class (Canada and outside Canada)										
						Financed emissions				
return_subtable	asset_class		sector	region	credit_quality	scope_1_counterparty_absolute_emissions	scope_2_counterparty_absolute_emissions	weighted_avg_scope_1_counterparty_data_quality_score	weighted_avg_scope_2_counterparty_data_quality_score	weighted_avg_counterparty_data_quality_score (Column I and J)
IC2-B	Bonds and Debentures - Government - Federal			✓	✓	✓	✓	✓	✓	✓
IC2-B	Bonds and Debentures - Corporate - Public		✓	✓	✓	✓	✓	✓	✓	✓
IC2-B	Bonds and Debentures - Corporate - Private		✓	✓	✓	✓	✓	✓	✓	✓
IC2-B	Mortgage Loans			✓	✓	✓	✓	✓	✓	✓
IC2-B	Preferred Shares - Fixed Term		✓	✓		✓	✓	✓	✓	✓
IC2-B	Preferred Shares - Equity Preferred		✓	✓		✓	✓	✓	✓	✓
IC2-B	Total Common Shares		✓	✓		✓	✓	✓	✓	✓
IC2-B	Investment in Subsidiaries		✓	✓		✓	✓	✓	✓	✓
Applicable Field Listing - IC2 Return (to be completed by P&C insurance companies only) Sub-Table IC2-C: Insurance-Associated GHG Emissions										
						Insurance-associated emissions				
return_subtable	insurance_class	sector		region		scope_1_policyholder_absolute_emissions	scope_2_policyholder_absolute_emissions	weighted_avg_scope_1_policyholder_data_quality_score	weighted_avg_scope_2_policyholder_data_quality_score	weighted_avg_policyholder_data_quality_score (Column H and I)
IC2-C	Personal Automobile			✓		✓	✓	✓	✓	✓
IC2-C	Commercial Property	✓		✓		✓	✓	✓	✓	✓
IC2-C	Other Commercial Lines	✓		✓		✓	✓	✓	✓	✓

Source: Field applicability matrices for Insurers, OSFI (March 2024)

Scope 3 Category 15 emissions

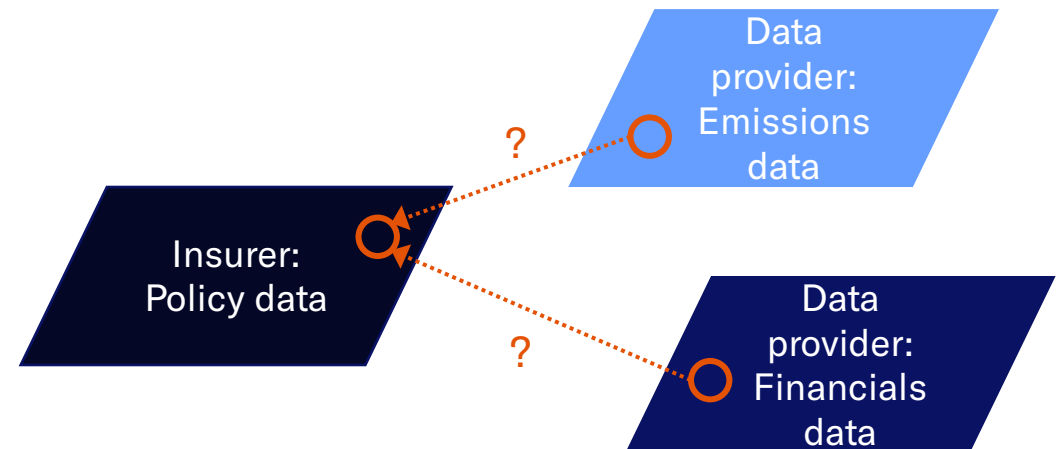
Challenges

Data availability

- Challenging to obtain required policyholder & investee data
 - Limited emissions disclosure
 - Particularly challenging for SMEs and private companies
- **Data gap for commercial insurance portfolios can be >90%**
- Estimation models required to bridge the gap
 - Acknowledged by PCAF and accounted for using Data Quality Scores
- At a minimum, sector and region data required, for disaggregation purposes and as input to estimation models

Joining it up

- » Joining insurers' policy data with one or more 3rd party providers is challenging
- » No universal company key/identifier
- » Requires automated name matching
- » Requires care to ensure consistency in emissions and financials data



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Scenario Analysis and Credit Impact

OSFI B-15: Guideline for Climate Risk Management

Evolving standards for preparedness and resilience to climate-related risks

Purpose

- Establishes expectations for the management of climate-related risks
- FRFIs have unique risks and vulnerabilities that vary with size, complexity and risk profile

←

→

“The Guideline should be read, and implemented, from a risk-based perspective that allows the FRFI to compete effectively while managing its climate-related risks prudently”

Governance

- Governance structure and operating model for managing climate risk with clear responsibilities
- Plans for managing the transition to a low-carbon economy

Scenario Analysis

- The use of multiple scenarios, time horizons and models
- Should consider both physical and transition risk across all relevant channels

Risk Management

- Incorporate into ERM framework, policies and procedures, and portfolio management
- Acquire the data needed to support timely and effective decision making
- Develop reporting capabilities

Capital Adequacy

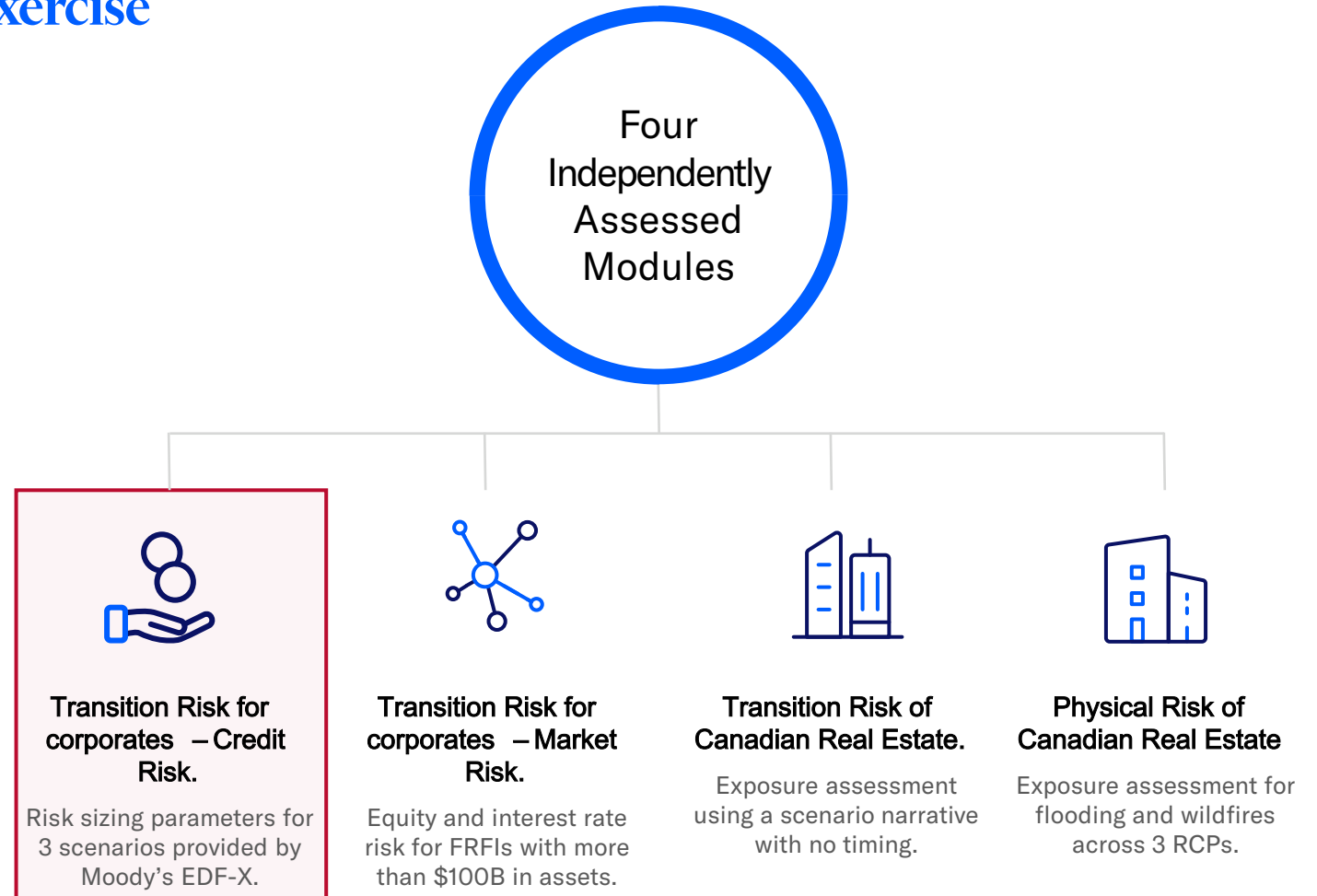
- Incorporate climate risks into ICAAP/ORSA processes
- Impact of climate risk drivers on liquidity risk and buffers

OSFI B-15: Standardized Climate Scenario Exercise (SCSE)

A system-wide scenario analysis exercise

Due to high levels of uncertainty surrounding the timing and severity of climate-related risks, *OSFI* will **focus on risk discrimination and exposure assessment, not risk sizing**.

- Latest draft for consultation was released in April and now includes the workbook and instructions
- Three objectives:
 - Raise awareness
 - Encourage FRFIs to build capabilities
 - Establish a standard
- Meant to be conducted in addition to an FRFI's internal scenario analysis
- Uses balance sheets as of Q4 2023 and concepts consistent with IFRS9



Physical and Transition Risk for Broader B-15

Physical Risk

Transition Risk

Focus

Increased frequency and severity of weather events

Increased regulations related to GHG intensive industries

Risk Event

Credit risk: damage to collateral

Credit risk: counterparties with high GHG emissions face a higher cost of business and lower revenue and profitability, lowering credit quality

Potential Impact and Loss

Credit impact: higher loan to value for real estate, higher loss given default, leading to higher capital requirements, lowering credit quality

Credit impact: increased probability of default and LGD

Physical risk identification and quantification



Identify physical risk hotspots

- » Where is climate risk high today?
- » Which assets are least likely to have sufficient insurance coverage?
- » Which areas could experience significant future increases in risk and insurance costs?



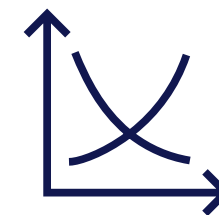
Construct realistic climate shocks for scenario analysis

- » What scenarios are physically plausible – now and in the future?
- » Select scenarios that align to severity criteria in line with your risk appetite and policy
- » What analytical resolution is required to ensure meaningful results?



Analyze damages on real estate or other collaterals

- » How much damage does each asset sustain?
- » How does damage vary across different locations, asset types and property characteristics?
- » How can I appropriately stress, validate, and document key analytical assumptions?



Quantify resulting impact on credit risk

- » How much of the damage might be covered by insurance?
- » How does structural damage impact the total value of an asset?
- » How does damage result in changes in PD, LGD, expected loss, and other key metrics across different time horizons?

Physical Materiality assessment

Results provided are for illustrative purposes only
Actual model results may vary significantly

- Screen portfolio for physical risk; identify risk hotpots
- Use analysis to design and justify idiosyncratic shock scenarios
- Analysis of key climate perils (wildfire, flood, hurricane)
- Capture a large set of event simulations with different severities, to create a full risk profile spanning the range of possible events
- Output metrics reflect potential damages across the full range of event severities analyzed

Real estate collateral

Asset ID	Longitude	Latitude	Asset use	Structural Value (USD)
123	-81.429420	28.482441	Residential – Multi-family housing	3,750,000

Materiality Assessment

Modeled damages under present climate for each asset and peril:

Asset ID	Peril	Metric	Damage (% of structure)	Damage (USD) ¹
123	Flood	AAD ² – no insurance	0.2%	7,500
		AAD – net of insurance ³	0.1%	3,750

Modeled changes in damages under future climate for area and peril

ZIP	Peril	Metric	Damage (USD) ¹
32839	Flood	AAD – no insurance – present-day risk	70m
		AAD – no insurance – RCP4.5 in 2050	95m
		AAD – no insurance – RCP8.5 in 2050	108m

Moody's Way of Constructing realistic scenario events...

Our models are built “event first” and simulate millions of realistic events



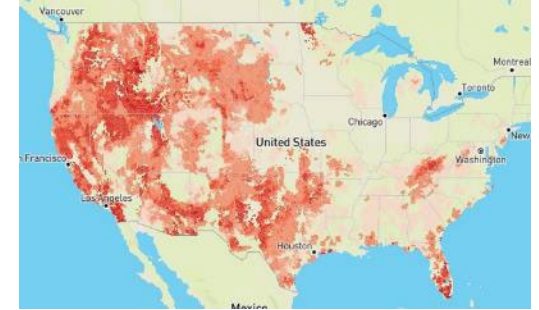
Millions of realistic event simulations form the basis of our models



Event footprints capture parameters that drive impact (e.g., extreme precipitation, flood depth)

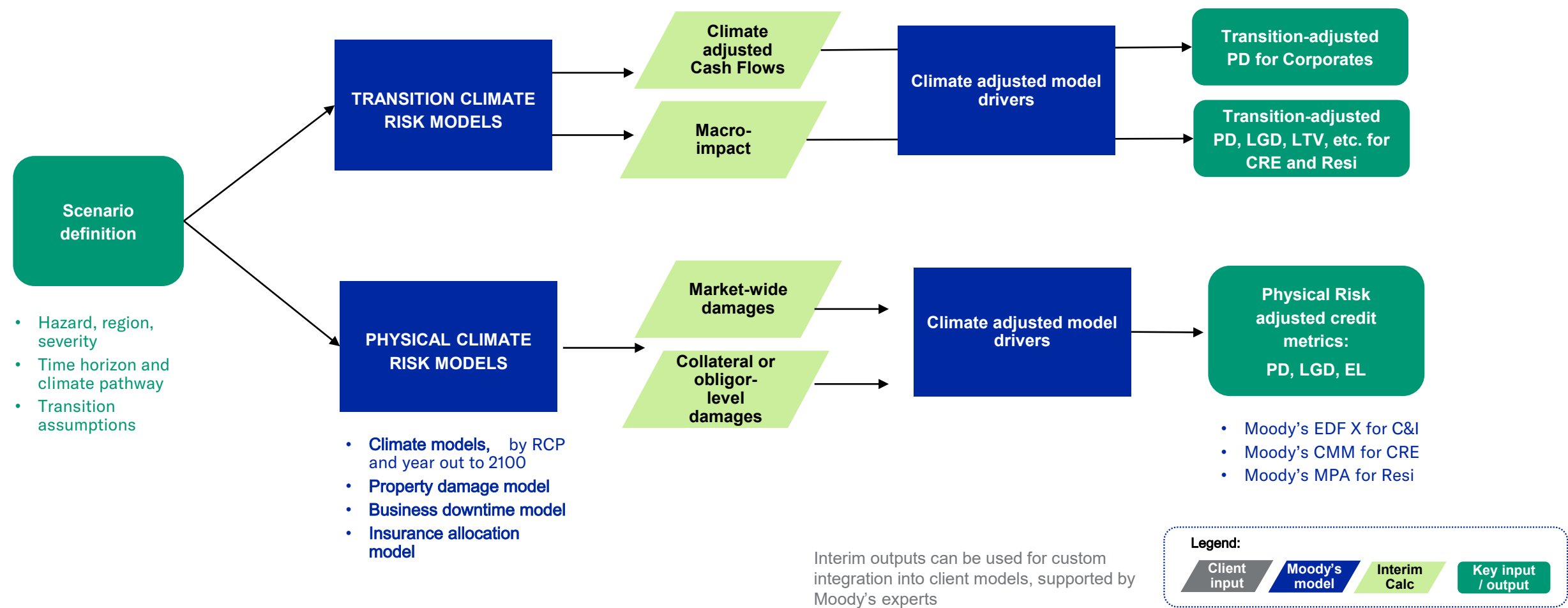


Account for correlation across perils for each realistic event (e.g., hurricane winds + storm surge + inland flood)



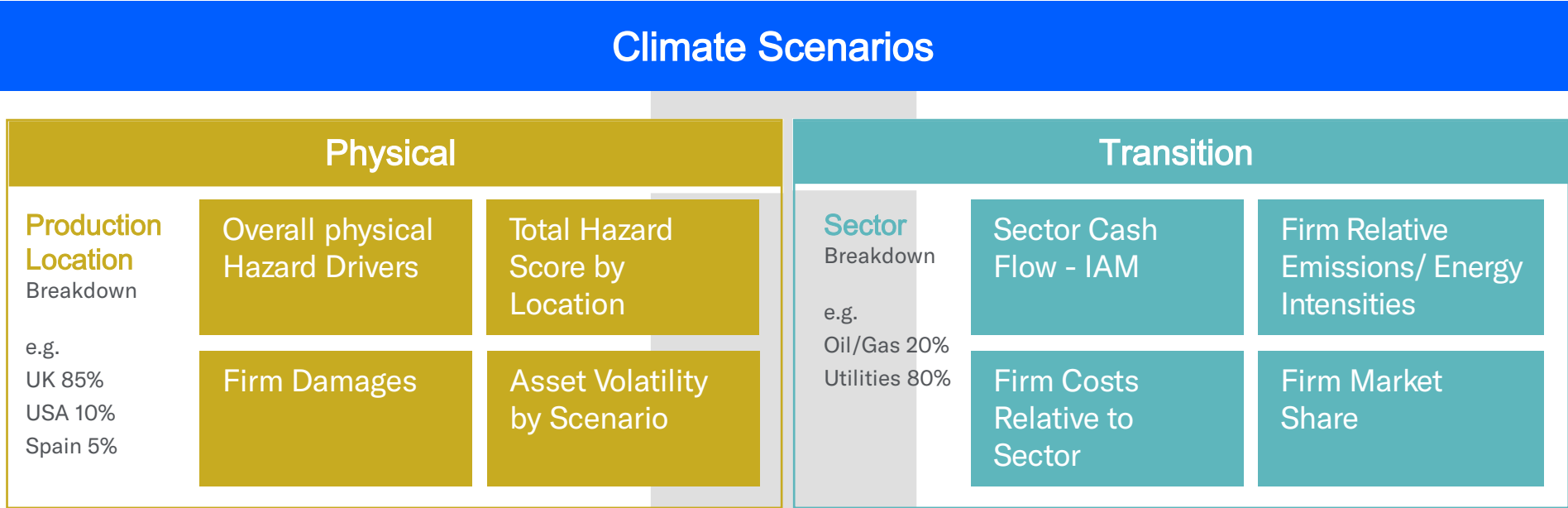
Create high resolution hazard footprints for bottom-up analysis

Converting Climate Impact Into Credit Risk

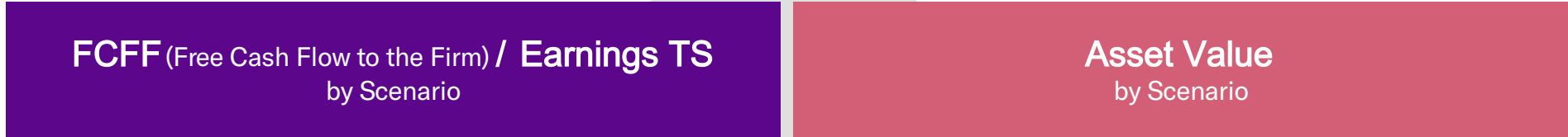


Corporate Climate-adjusted Credit Risk Framework

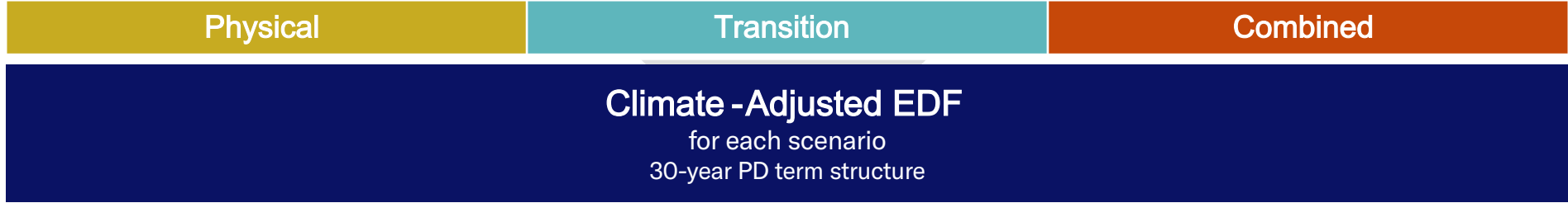
Sub-drivers



Drivers



Output

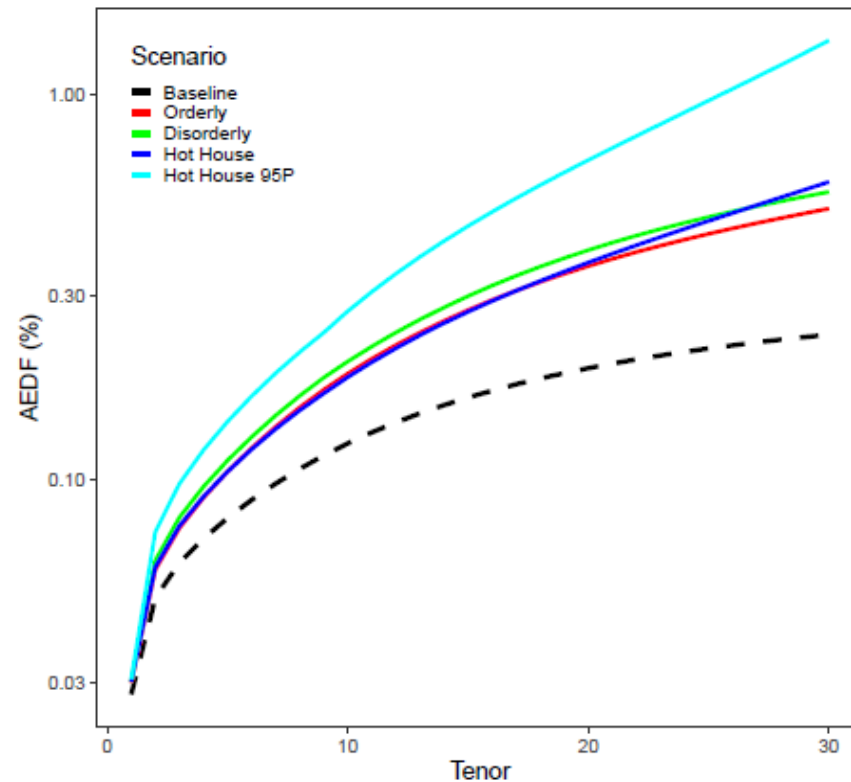


Impact of Climate Risk on Credit Risk

Chevron Corp

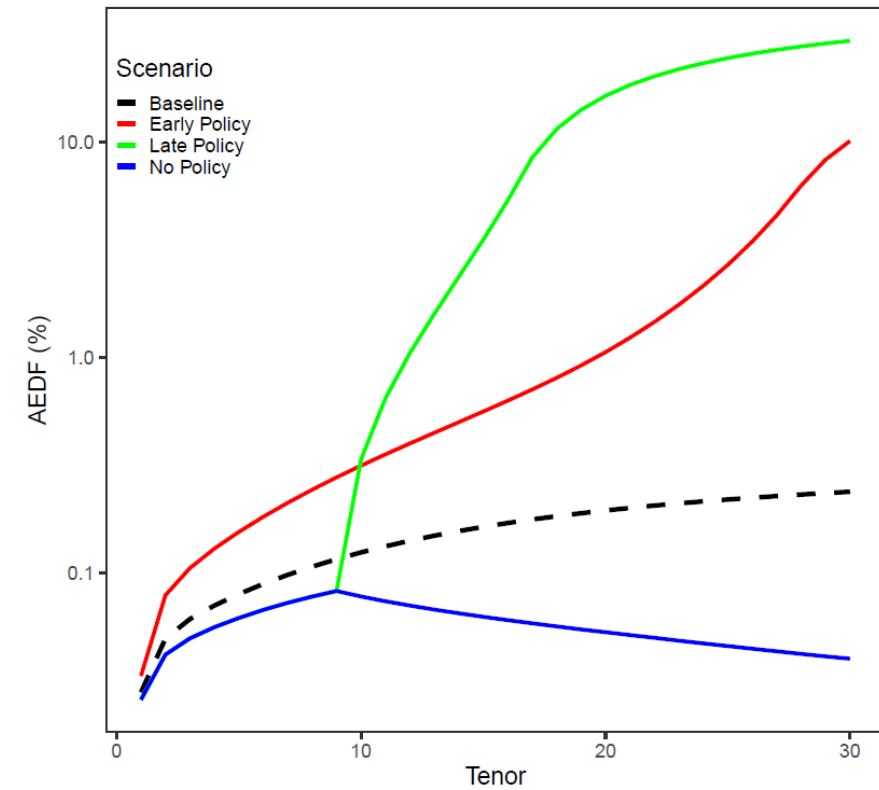
Physical Risk: PD Term Structure By Scenario

CHEVRON CORP. | Climate Score: 96



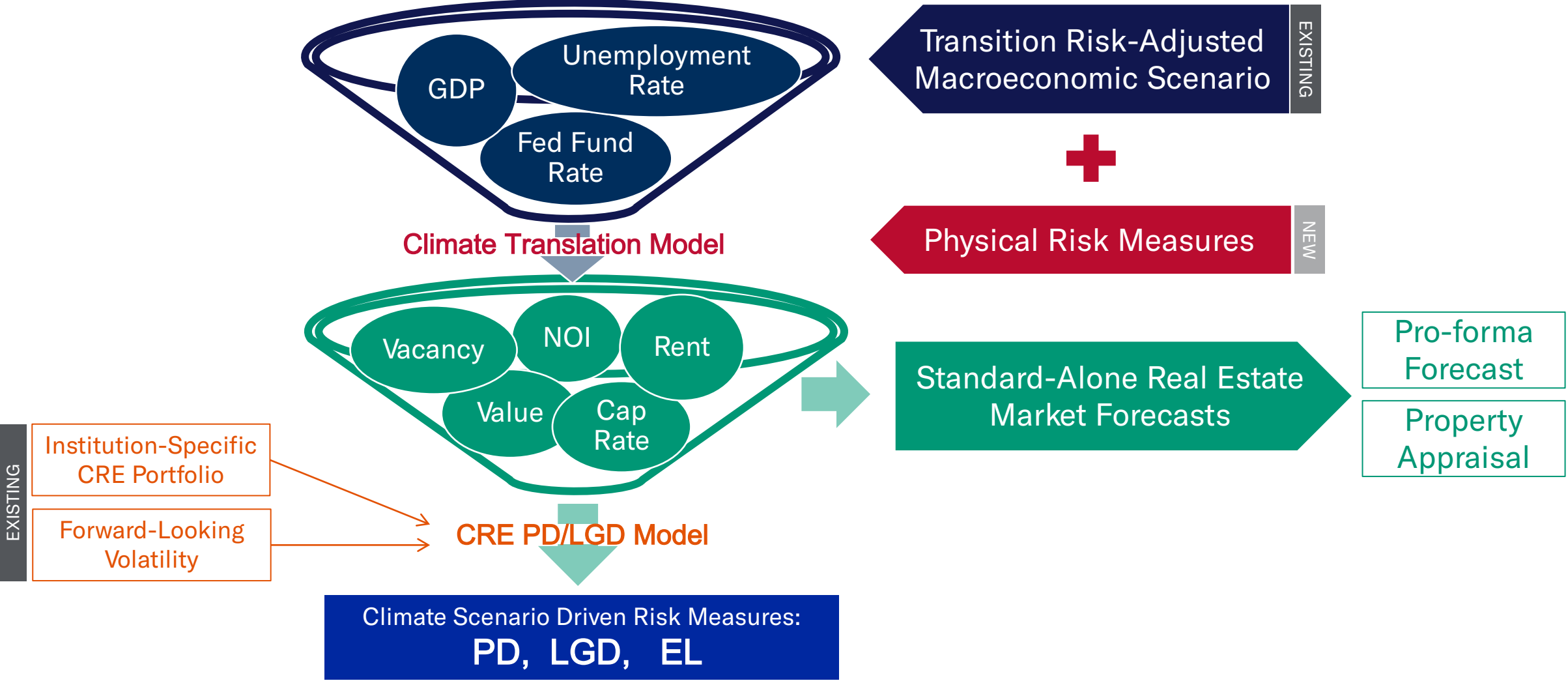
Transition Risk: PD Term Structure By Scenario

CHEVRON CORP.



Investor Expectations Assumption: Physical Climate damages not currently priced, but perfect scenario foresight occurs when announced

Real Estate Climate-adjusted Credit Risk Framework

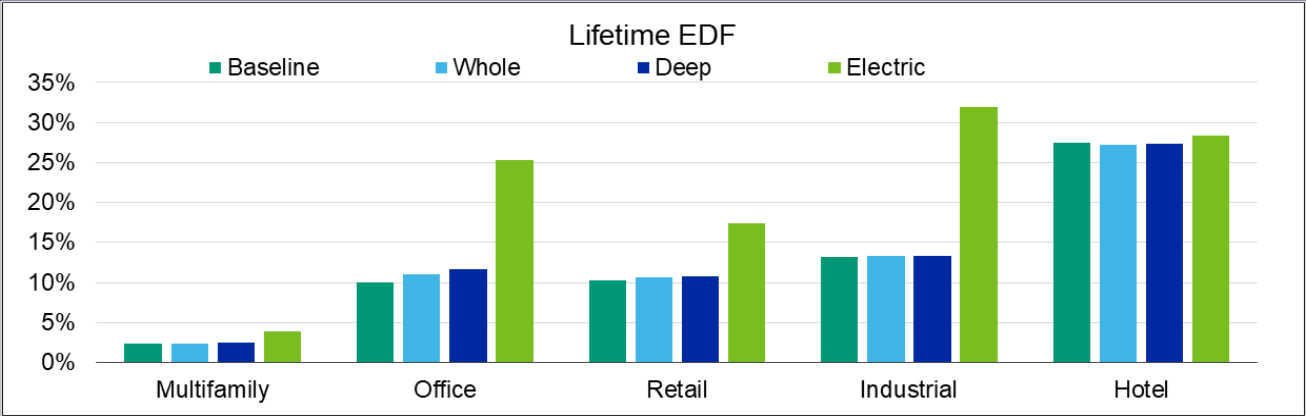
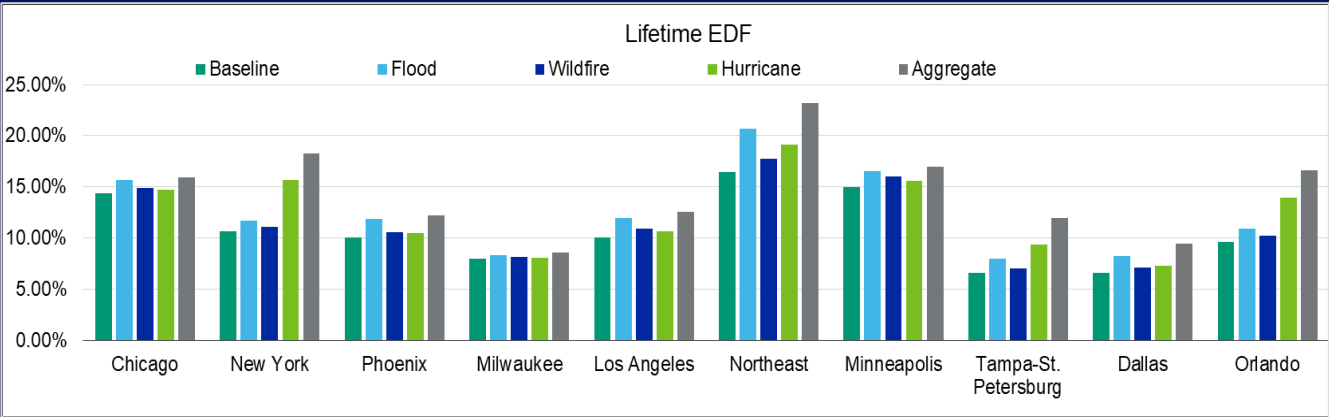


Credit Analytics for CRE and Resi Mortgage

Loan-level modelling that can account for market, property and economic impacts

Climate Change Scenarios

Physical Risk Exposure



MOODY'S

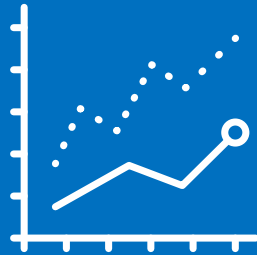
Top-down climate scenario
analysis

Climate scenario analysis

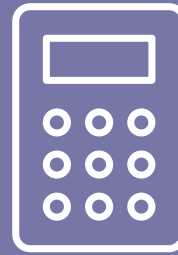
5-step process



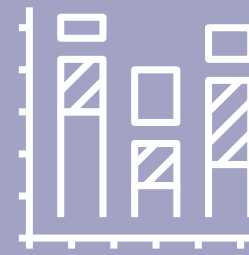
Select Climate
Scenarios



Translate
Macroeconomic
Impact



Calculate
Financial
Returns

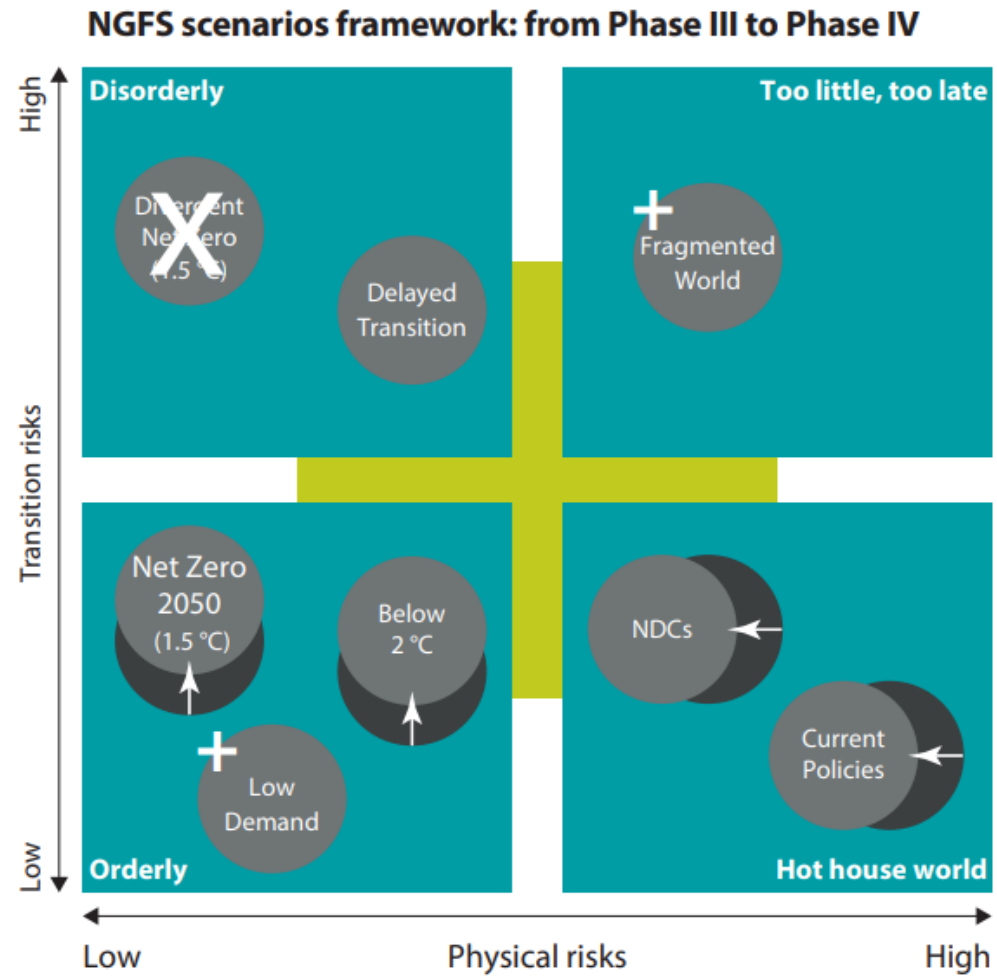


Set Calibration
Targets



Generate
Scenario Sets

NGFS Phase 4

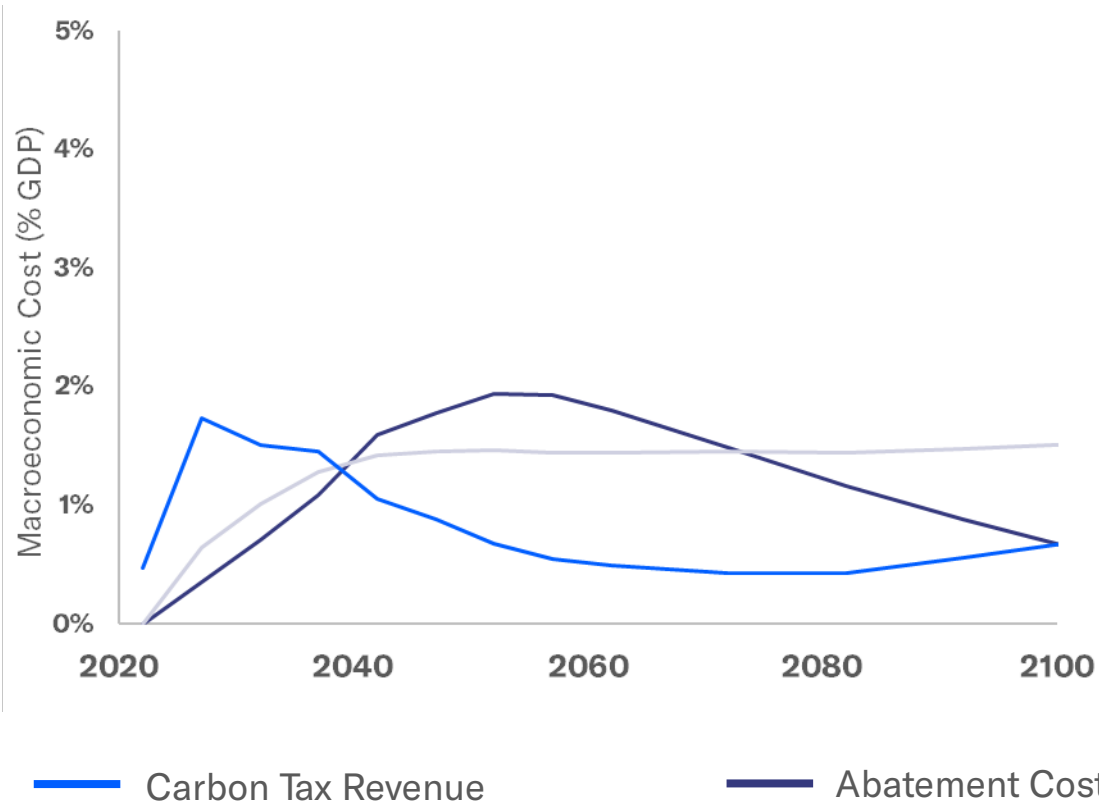


Positioning of scenarios is approximate, based on an assessment of physical and transition risks out to 2100.

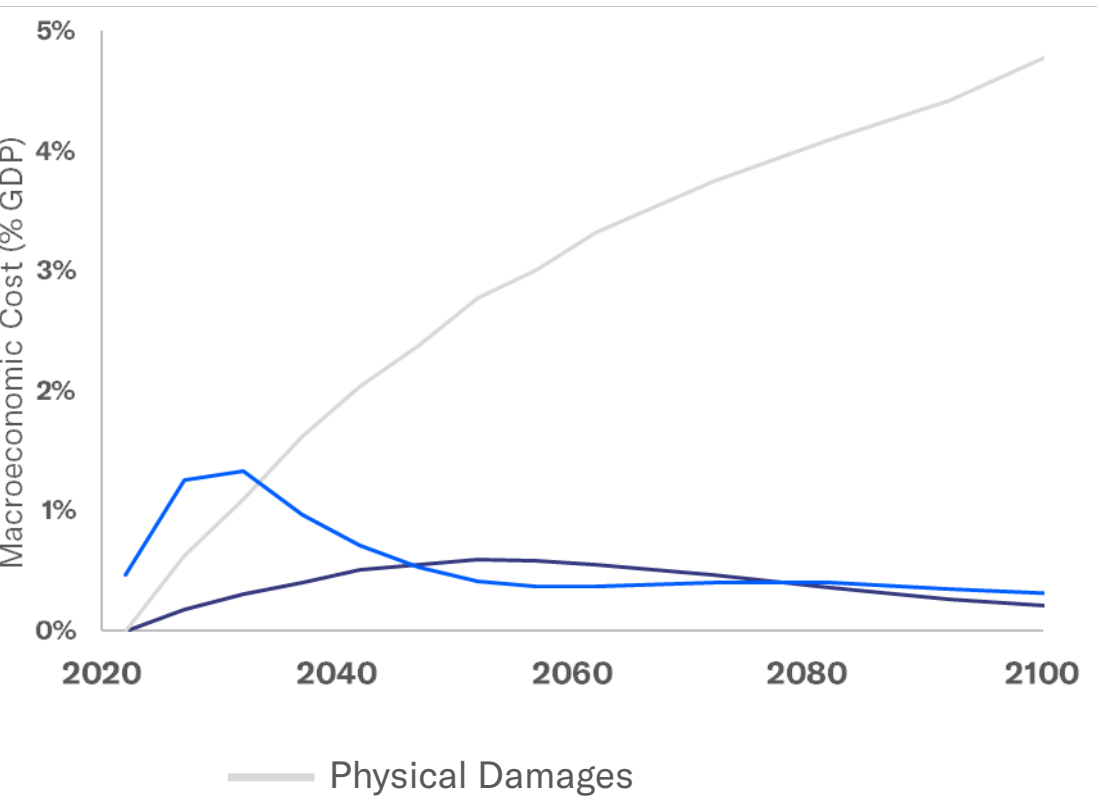
Three waves of costs

Costs vary across regions and scenarios

Orderly transition—Net Zero 2050



Hot house scenario—nationally determined contributions

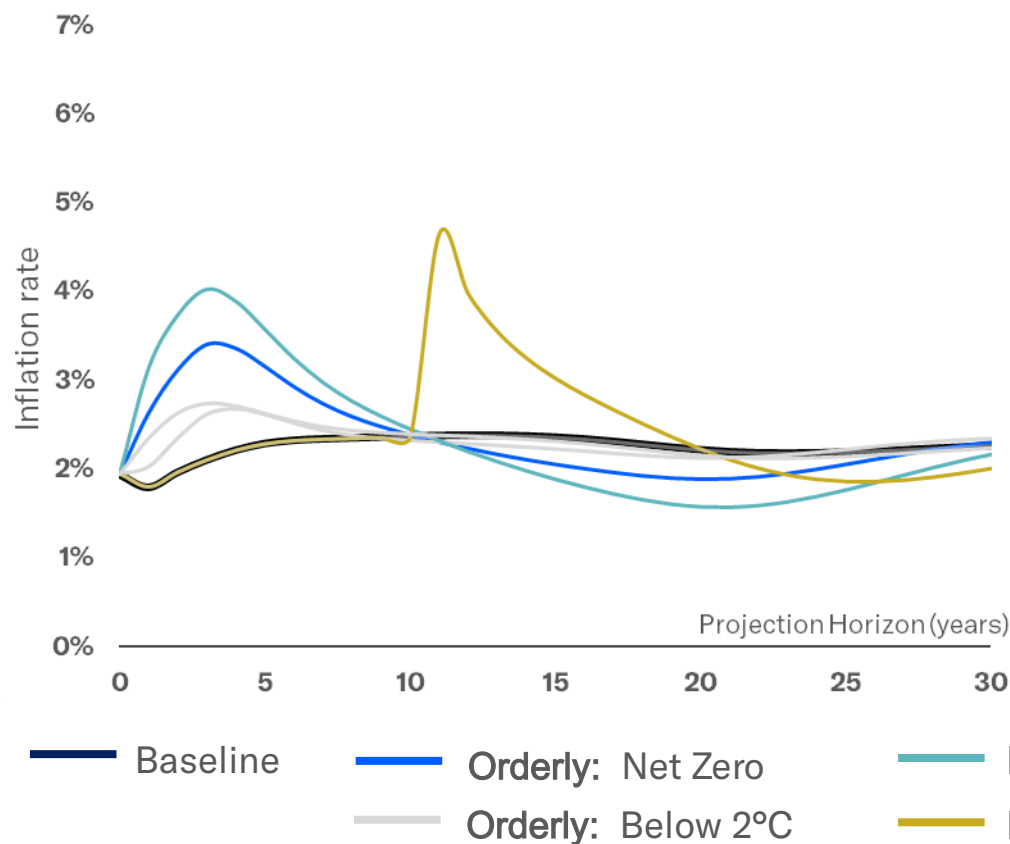


Projecting financial variables

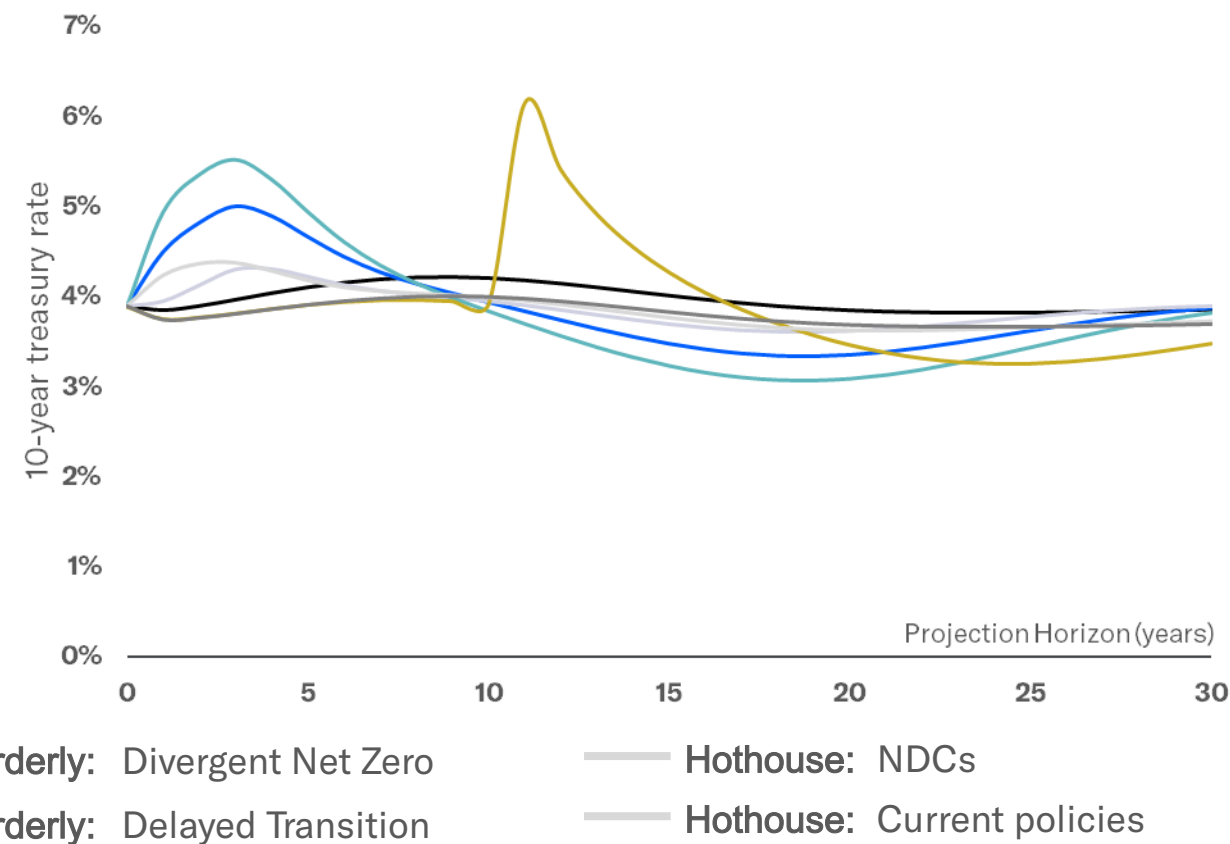
Interest rate projections

Scenario analysis converts the projected emissions and carbon price impacts into an impact on financial market variables

Projection of U.S. break-even inflation

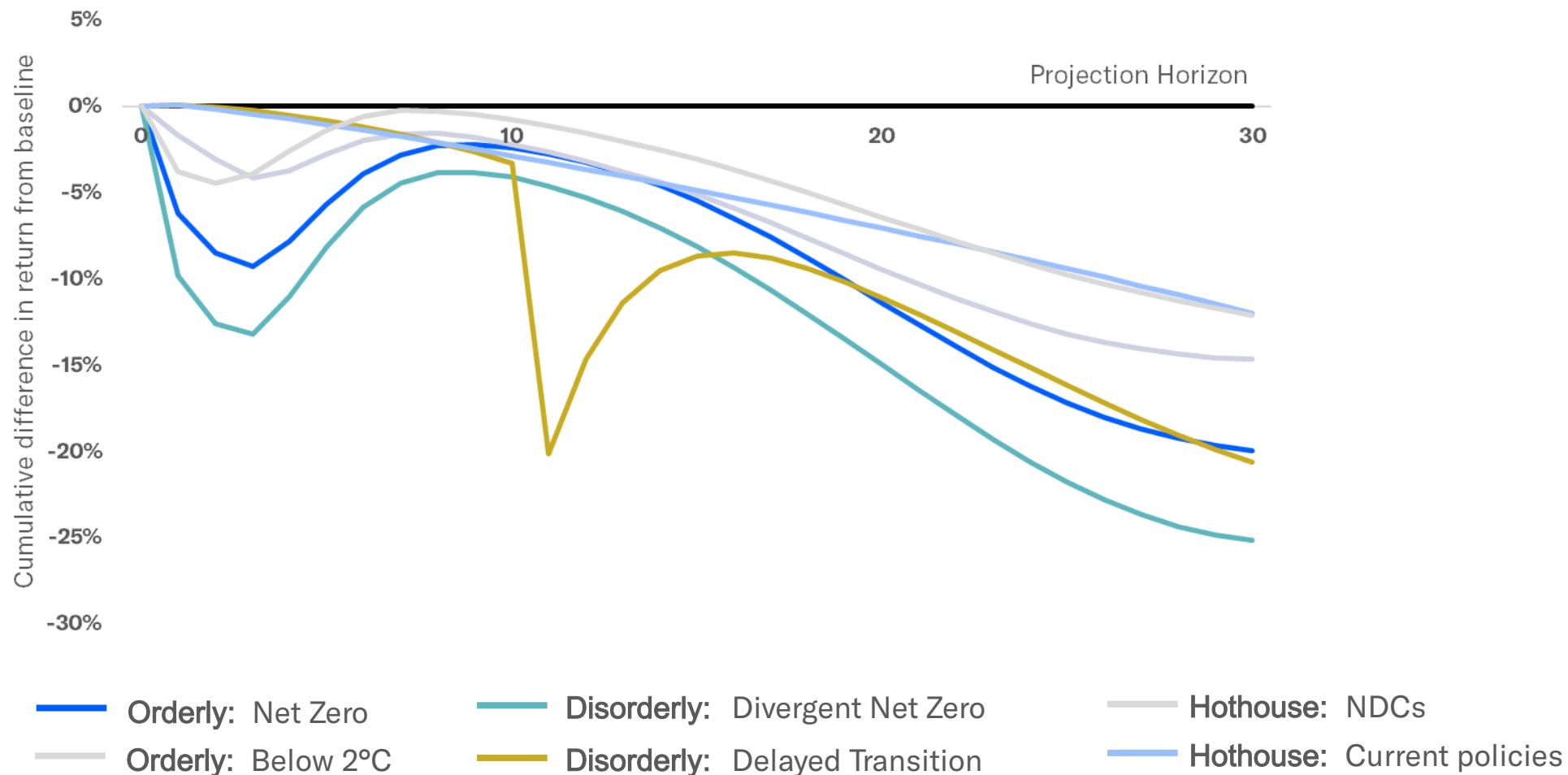


Projection of USD 10Y treasury rate



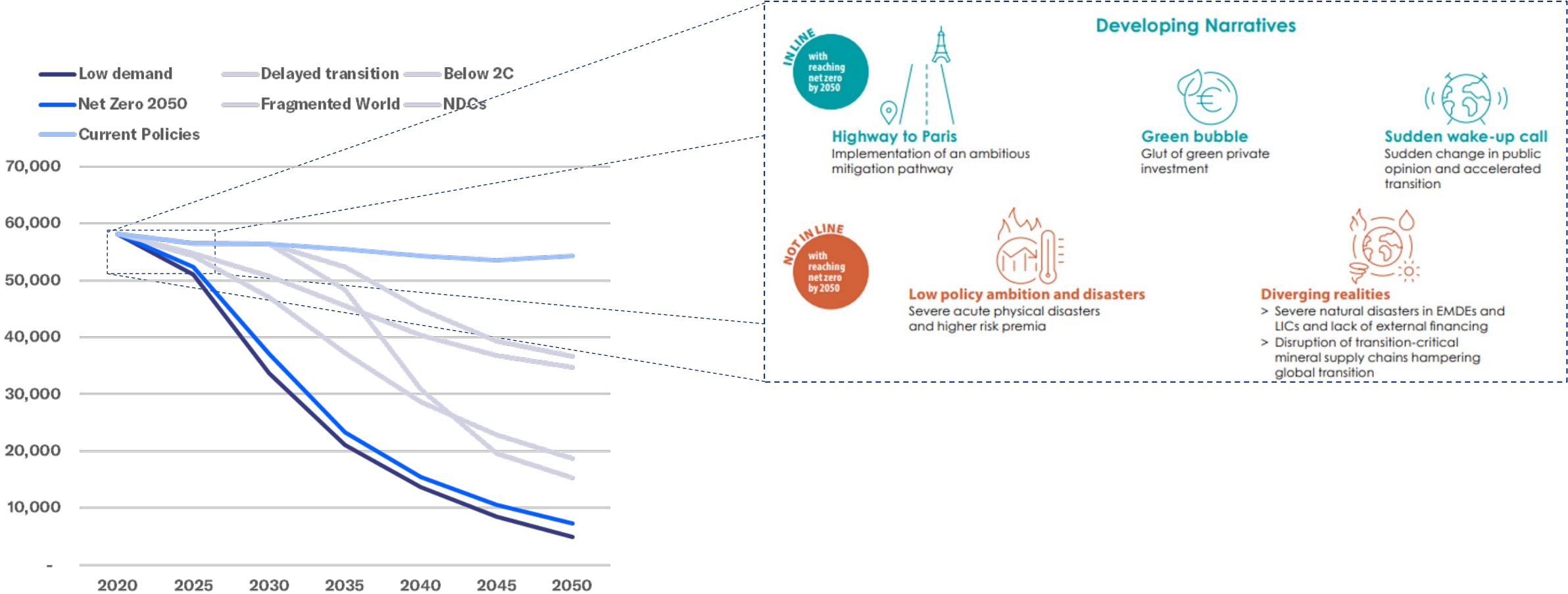
Projecting equity returns

Cumulative impact on expected equity return



Short-term narratives

A change in horizon



Should we give more thought to the short term?

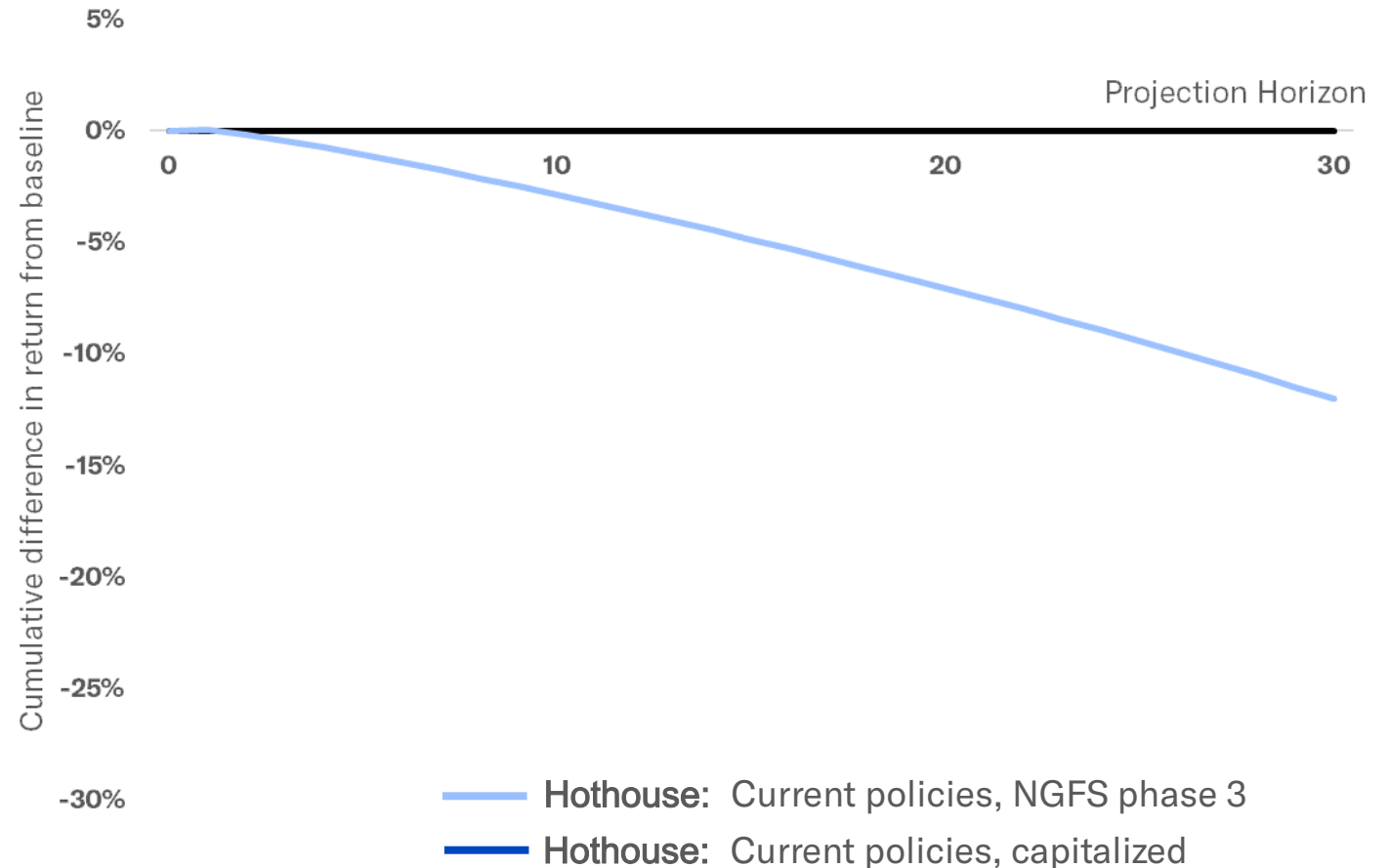
Capitalizing changes in expectations

Long-term drag on returns can be brought forward by capitalization

Climate scenarios are often considered as slow-onset, long-term effects, which exert a drag on growth and returns over decades, but these can be converted into short-term scenarios.

- Simulate a “climate Minsky moment” via a change in expectations and pricing in future losses.
- This is particularly relevant for physical risk and hothouse scenarios where direct effects take time to impact the economy

Current policies—projected excess equity return



Should we give more thought to the short term?

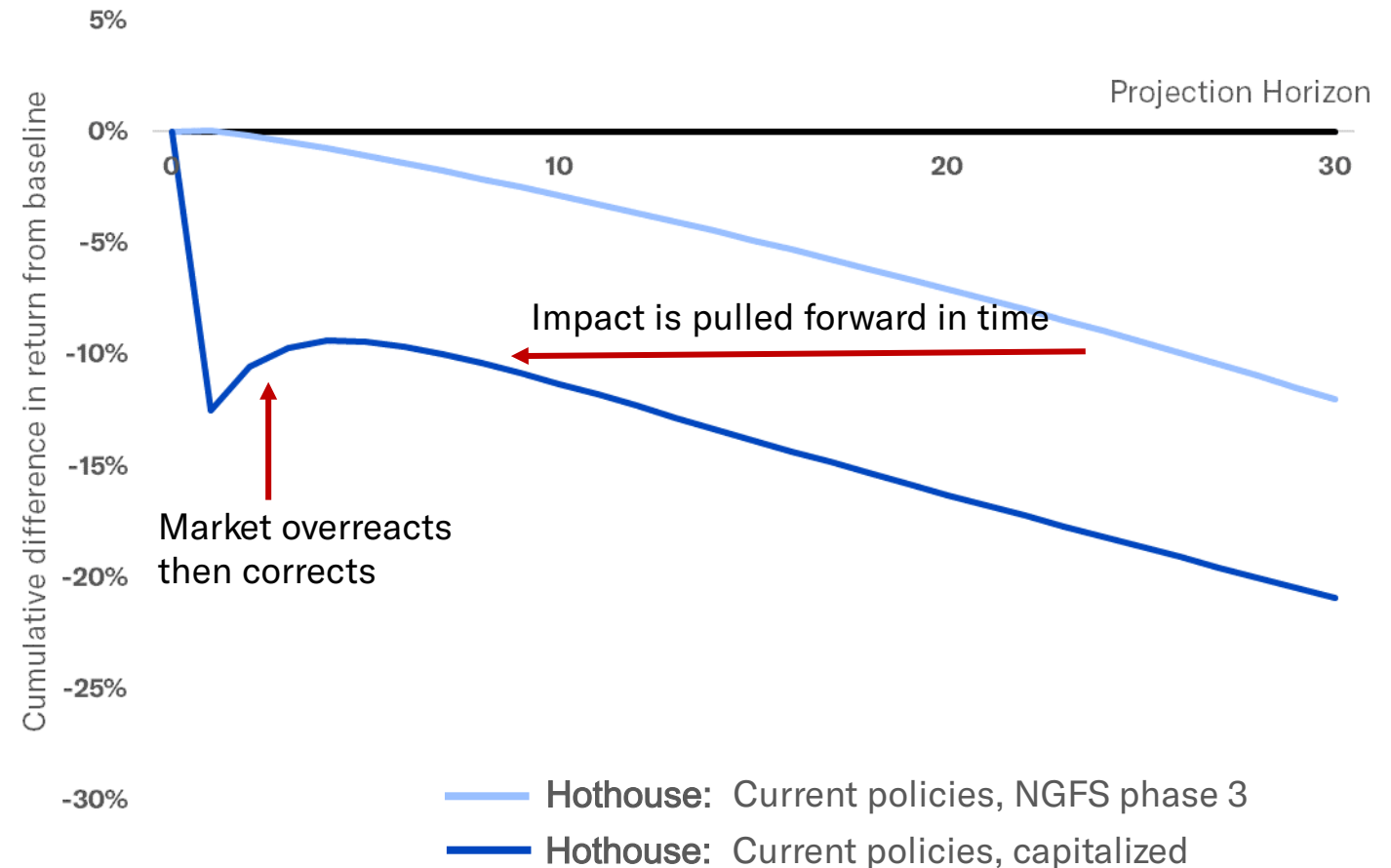
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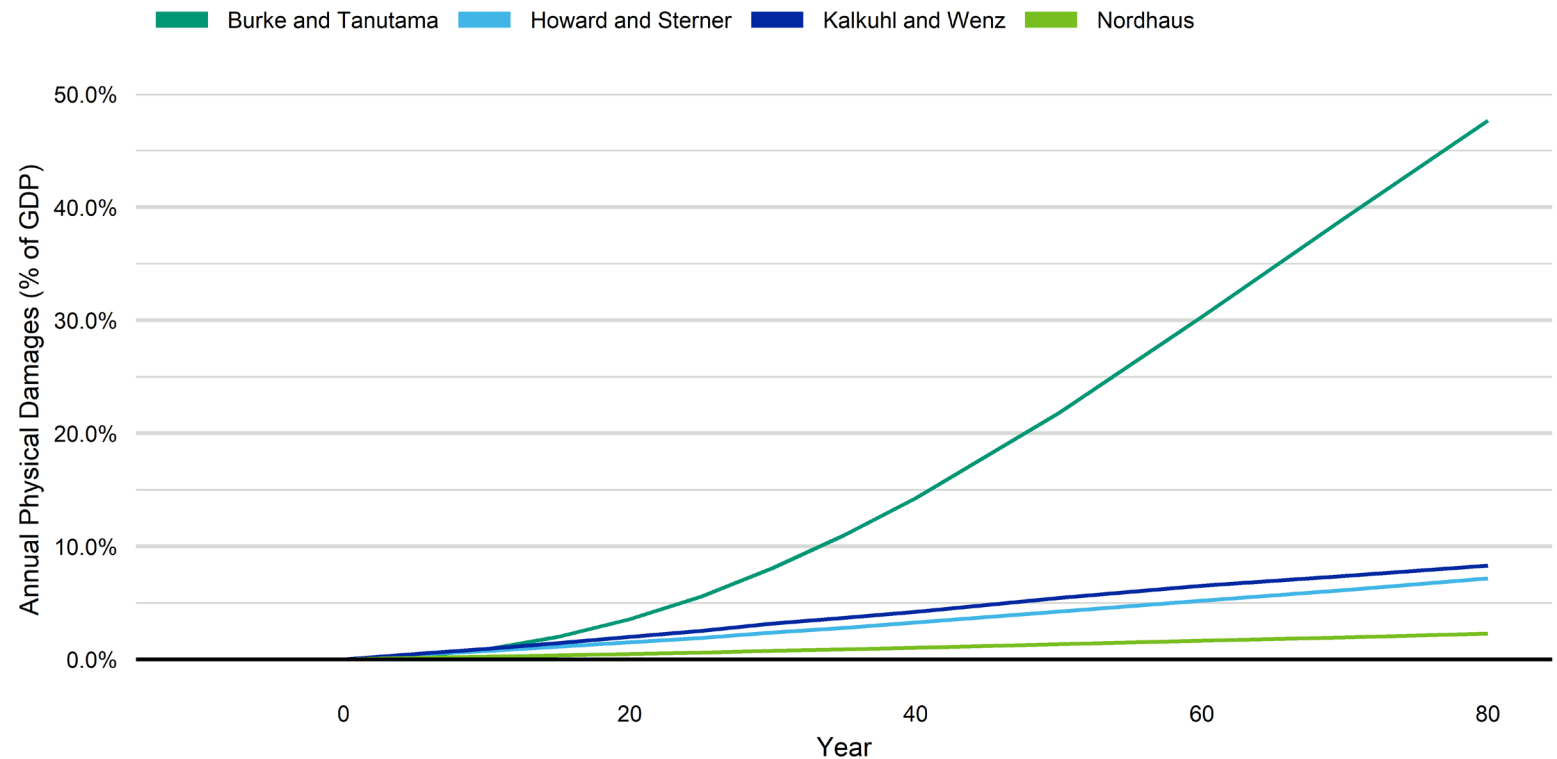
Physical damage functions

There is no consensus of the level of chronic physical damages

The NGFS has offered a range of physical damage functions relating temperature level to cost over their first three phases.

- Some functions are country-specific, and others are global
- Publications by the UK actuarial profession* suggest exploring alternative physical damage functions that project a more material loss in GDP, e.g., Burke-Tanutama, 2019

Projected GDP loss output by physical damage function

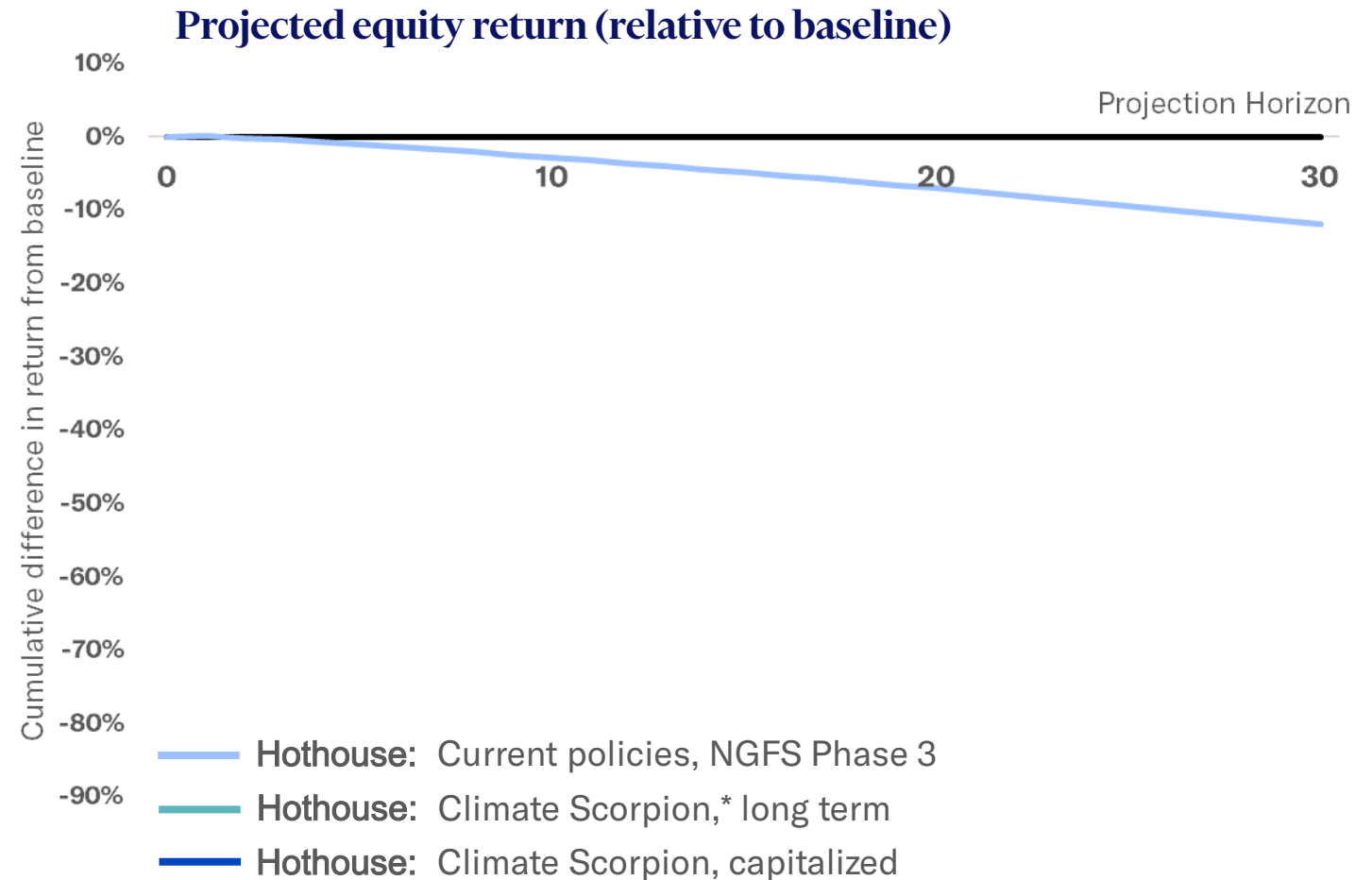


*"The Emperor's New Climate Scenarios," Institute and Faculty of Actuaries, University of Exeter, July 2023

Climate scorpion

Exploring more extreme physical damage function

- The actuarial approach to risk management typically focuses on the tail risks. Recent paper by the UK actuarial profession, *Climate Scorpion – the sting is in the tail*, supports looking at worst-case scenarios.
- Climate Scenarios with more extreme climate sensitivity and physical damages can show shocks outside the typical 99.5th percentile range

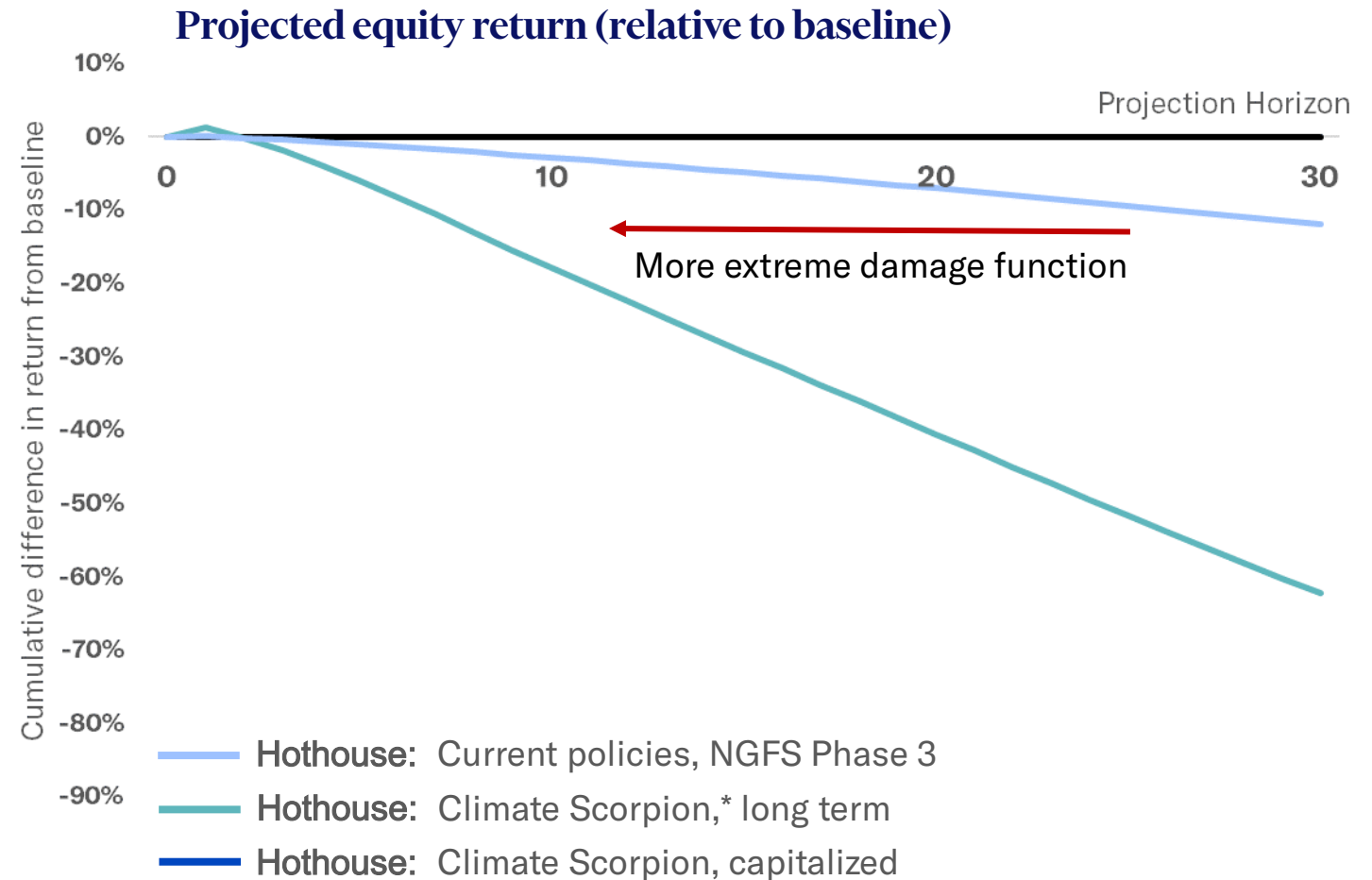


*Climate Scorpion—the sting is in the tail,” Institute and Faculty of Actuaries, University of Exeter, March 2024

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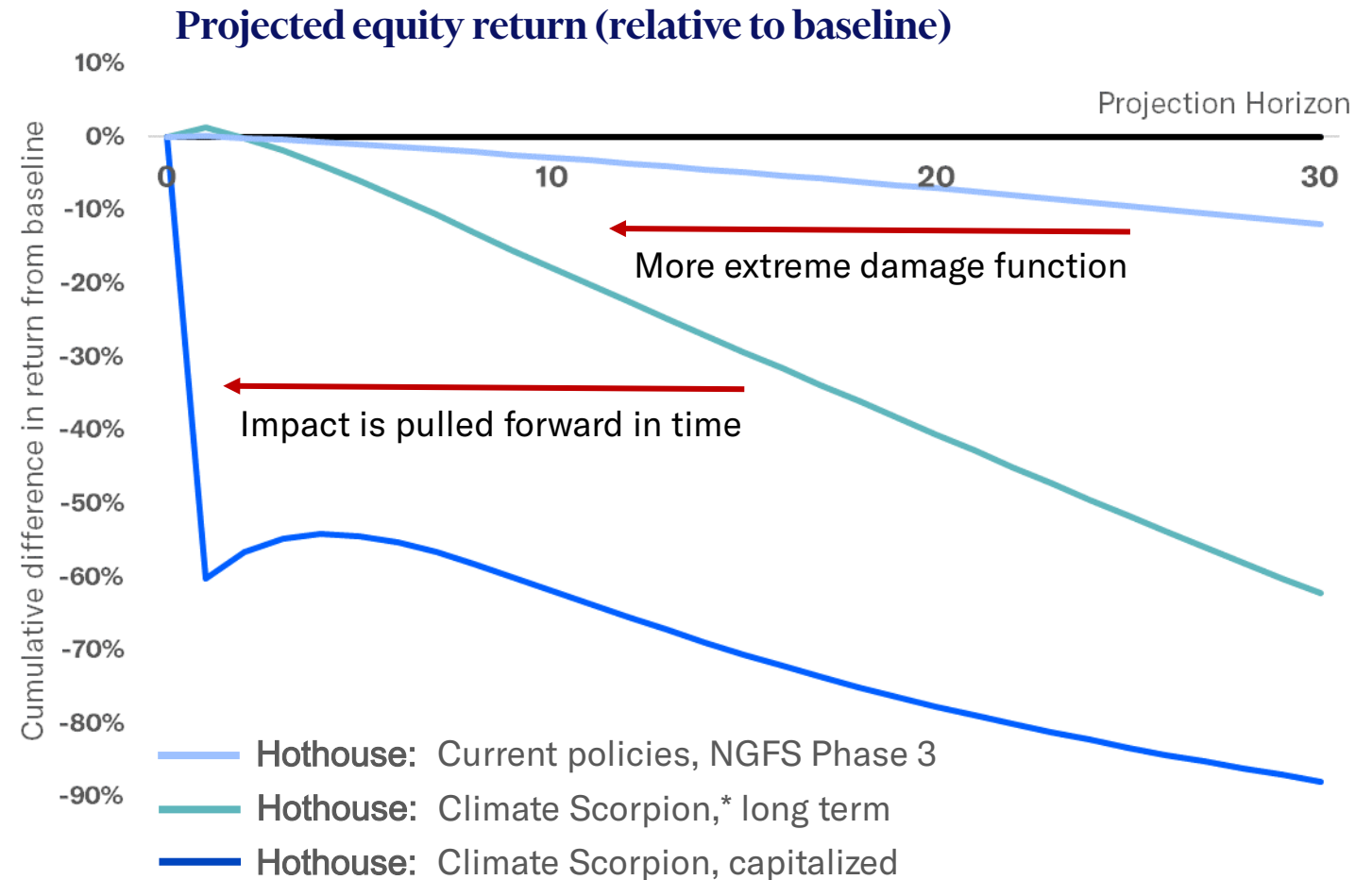


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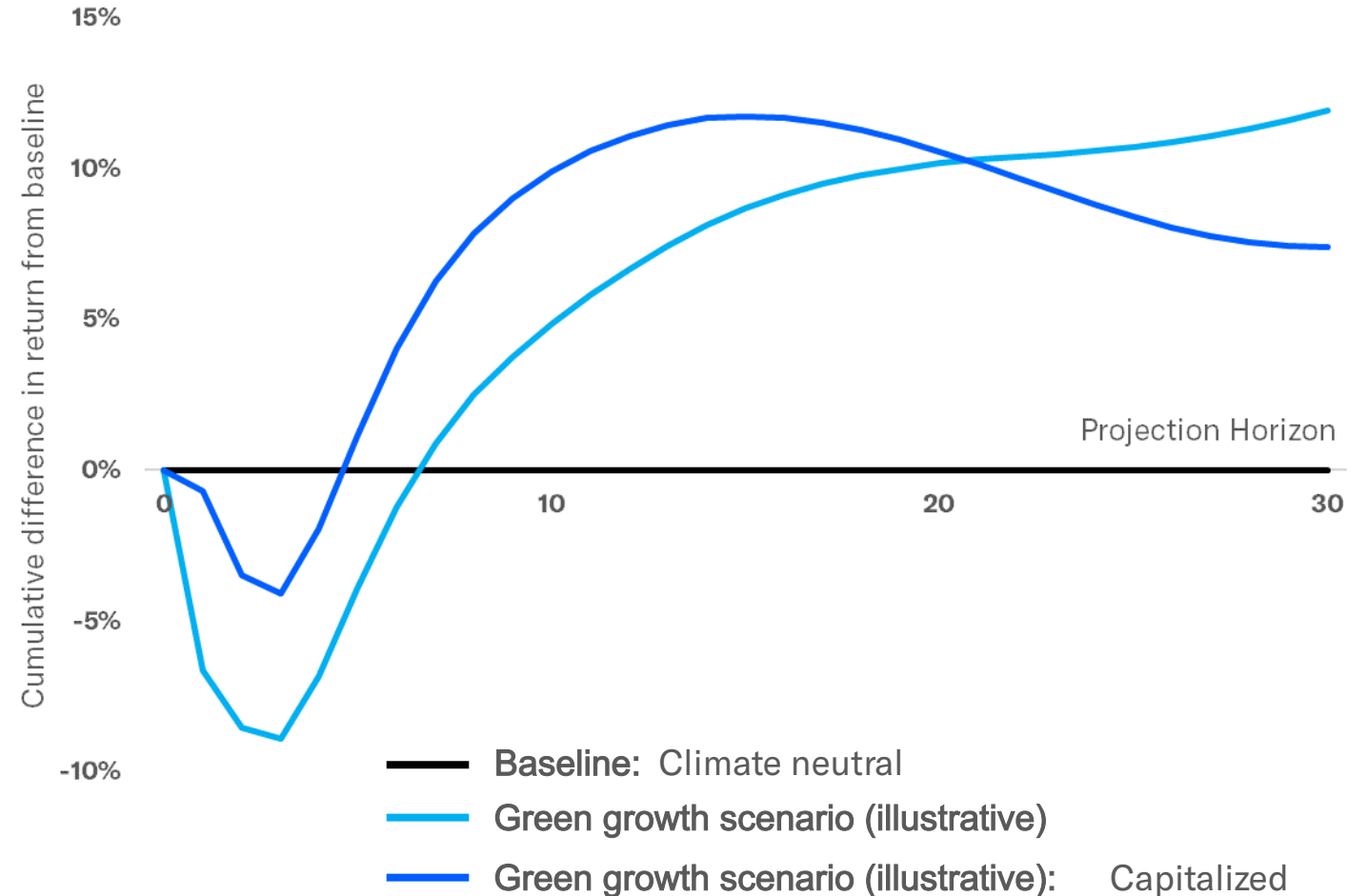
*Climate Scorpion—the sting is in the tail,” Institute and Faculty of Actuaries, University of Exeter, March 2024

An alternative narrative

Green growth scenario

- Changing assumptions about investment allow us to create a “green growth” scenario
- Model assumes that abatement spending provides a boost to overall economic output
- NGFS publication* in 2023 refers to a “Highway to Paris” scenario, which reflects an immediate and technology-driven transition

Projected equity return (relative to baseline)



*"Conceptual note on short-term climate scenarios," NGFS, October 2023



Thank you

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