The current state of scenario analysis: summary of 'Changing Course' report

Prepared for Climate Financial Sector Conference

October 2019

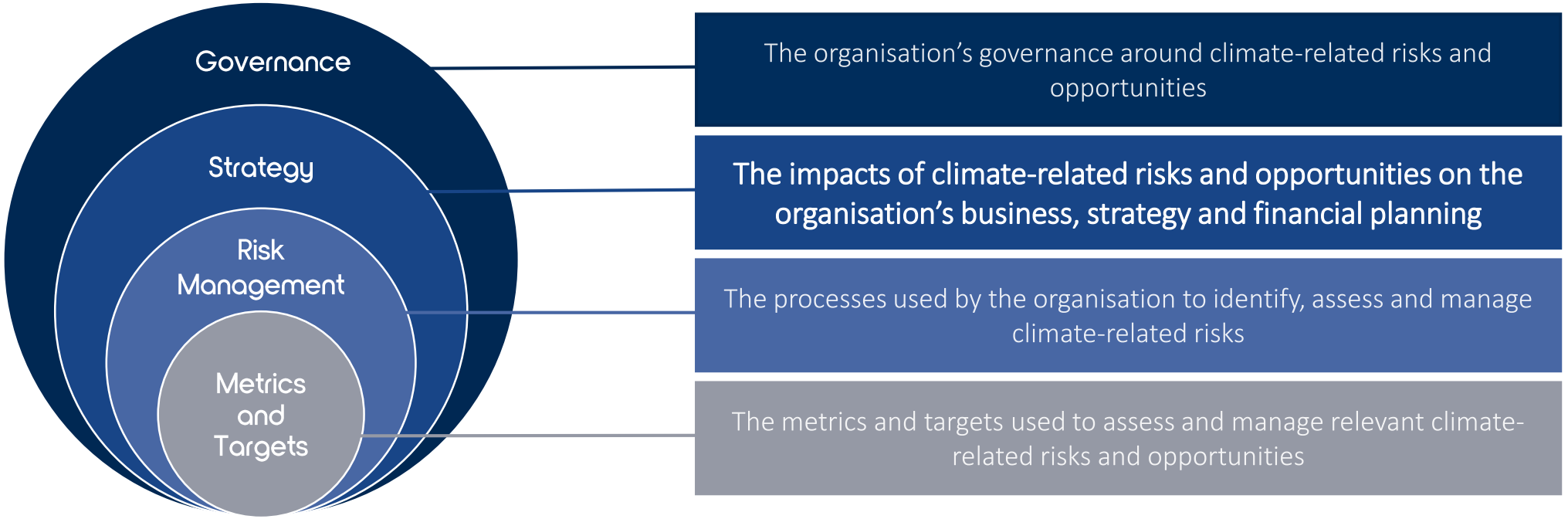
Link to report: https://www.unepfi.org/wordpress/wp-content/uploads/2019/05/TCFD-Changing-Course.pdf

vivideconomics
putting economics to good use

Forward looking scenario-based assessments of climate related risks and opportunities are a core element of the TCFD recommendations

Why scenario analysis?

The timing, magnitude and nature of climate change impacts on companies' business models, strategies and financial performance is uncertain – to appropriately incorporate these potential impacts in strategic decisions investors need analyse the potential risks and opportunities under various possible states of the world, exploring a wide variety of sensitivities.



Source: 2019 TCFD Status Report: https://www.fsb-tcfd.org/wp-content/uploads/2019/06/2019-TCFD-Status-Report-FINAL-053119.pdf

Source: 2019 TCFD Status Report: https://www.fsb-tcfd.org/wp-content/uploads/2019/06/2019-TCFD-Status-Report-FINAL-053119.pdf

There are a large number of methodologies and providers that offer diverse and continually improving analyses of the impacts of these scenarios

Physical risk

- 4°C scenarios are most common, and are usually paired with another, lower temperature, scenario
- Analysis of acute hazards (extreme weather events) is more common than chronic hazards (such as average temperature rise)
- Most analyses focus on a counterparty's operations and assets and macroeconomic environment.
- There is good coverage of exposure and sensitivity to risk
- Analyses range from facility to country and sector level, depending on scope and data availability

Transition risk

- 2°C scenarios are most common, while not many methodologies currently include a 1.5°C scenario
- Methodologies tend to cover policy and technology transition risks together
- Most impact analyses focus on a counterparty's operations and assets and the market for products
- There is good coverage of exposure and sensitivity to risk and some evaluation of the capacity to adapt to transition risk
- Most analysis is done at the firm and sector levels, with facility-level analysis limited to the oil and gas sector to date

What are the key remaining gaps?

Scope of methodologies

- **Currently do not cover the entire value chain** of counterparties from suppliers to markets
- **Currently don't extend across the range of asset classes** with a consistent level of bottom-up detail
- **Do not include risks such as legal and reputational risk**

Depth of methodologies

- **Remain inadequate in their examination of 'adaptive capacity'**, and hence don't fully account for dynamic responses to climate risks and opportunities
- **For physical risk in particular, methodologies do not sufficiently consider the opportunities created**

Integration of methodologies

- **Do not integrate macroeconomic (top-down) and microeconomic (bottom-up) analysis in a consistent, holistic way**
- **Rarely consider physical and transition risk together**, and the potential trade-offs that arise

There is a clear need for better disclosure of climate-related data from investee companies, particularly including a company's individual sensitivity and adaptive capacity. The more granular the data disclosed by investee companies, the more informative scenario-based analysis can be for investors. This includes data on individual facilities, such as production sites and real estate.

Caveats and overall takeaways on the use of scenario analysis

- The purpose of scenario analysis is to explore several plausible 'what-if' scenarios, rather than to precisely forecast the future or to evaluate the correctness of current market pricing
- There are some critical underlying complexities in the relationships between, for example:
  - Atmospheric GHG concentrations and the climate system
  - The climate system and the economy
  - Emissions reduction policies, technological innovation and market behaviours
- Hence, while scenario analysis can be a useful tool to explore and disclose the potential impacts of an uncertain future, it is not a precise prediction of the future
- As a result:
  - any numbers derived from such methodologies should be used with caution and fully evaluated in the context of the scenario's and model's underlying assumptions
  - investors should consider building in-house capacities and tools to integrate scenario analysis
  - Scenario analysis methodologies are not yet mature enough to inform strategic asset allocation decisions such as investment and divestment, but might be useful for engagement with counterparties on how they could more effectively manage risk

Low carbon transitions and insurance

Prepared for Climate Financial Sector Conference

October 2019

LLOYD'S

vivideconomics

putting economics to good use

How does transition risk impact on the risk profiles of insurance customers and the demand for insurance products?

Sectoral production and competition

Existing cover:

- **Level of demand** could change as sector size shifts
- **Risk profiles** could vary as asset values change
- **Costs of insurance** can change if sectoral risks become less diversified or more expensive to verify

New cover:

- **New technologies** could present new risks to insure, new business models to assist companies in risk management

Supply chain and customer interactions

Existing cover:

- **Level of demand** could be affected by volume of transactions
- **Risk profiles** could shift as creditworthiness of counterparties change

New cover:

- **Sectoral and geographical shifts in supply chains** could mean sectors face new risks, including political risks
- **New products and new contracting relationships** in industries such as autonomous vehicles, hydrogen infrastructure, CCS

Transition-related litigation and liability risk

Existing cover:

- **Disclosure and compliance risks** increase with climate-related regulation. **These could shift rapidly.**
- **Sectoral restructuring** increases litigation risk related to transactions and defaults

New cover:

- Increased uptake of low carbon technologies may be associated with **significant IP risk** for companies, which could present an opportunity for new insurance products

Modelling evidence, research and expert judgement informs the construction of a heatmap that shows how important impact channels are for sectors

	Impact channel criteria for heatmap		
	Sectoral production and competition	Supply chain and customer interactions	Transition-related litigation and liability risk
High	There is a **greater than 30%** shift in sector **revenue or deployment of new technologies.**	There is a **greater than 30%** shift in either the sector's **customer base, suppliers or nature of interactions.**	Major activity has been **observed** in **at least one of the five** types of climate-related litigation.
Medium	There is a **10-30%** shift in sector revenue or deployment of new technologies.	There is a **10-30%** shift in either the sector's customer base, suppliers or nature of interactions.	Sector trends are **significantly increasing the risk** of litigation in **at least one of the five** types.
Low	There is a **less than 10%** shift in sector revenue or deployment of new technologies.	There is a **less than 10%** shift in the sector's customer base, suppliers and nature of interactions.	Litigation risk across the five types is **not significantly increasing**.

Notes: Expert judgement and qualitative research is applied to refine ratings where modelling faces limitations.

Modelling and desk research highlights critical impacts in extractive industries, energy and transport

Priority sector	Impact channel		
	Sectoral production and competition	Supply chain and customer interactions	Transition-related litigation and liability risk
Fossil fuels	High	Medium	High
Heavy industry	Medium	Medium	Medium
Air & marine transport	Medium	Medium	Low
Road transport	High	Medium	Medium
Power	High	High	High
Agriculture	Low	Low	Low
Construction & Buildings	Low	Medium	Medium

Insurance can play a key role in supporting low carbon transitions, but requires management of uncertainty and rapid shifts in market conditions

Implications are traced to eight key insurance business lines, examining the effects on claims for existing contracts, the scope for innovation in new contracts, and the expected impact on overall demand

Key opportunities

- **Regulatory risk –** pervasive in both growing and declining sectors, with appetite from asset owners for risk transfer. Significant scope for expansion and innovation
- **Project finance** – where new investment can be underpinned through reduced regulatory, counterparty, and technology risks
- **Risk management –** where standards are emerging or evolving for new technologies

Key challenges

- **Uncertainty –** for regulatory, technology, and some tail liability risks
- **Risk management –** where sectors encounter growing pains
- **Reputation –** can be a barrier to offering insurance. Already a factor in coal and takes hold rapidly

This analytical approach set out in this work provides a roadmap that others can follow in implementing the TCFD requirements.

Contact us

Vivid Economics Limited
163 Eversholt Street
London NW1 1BU
United Kingdom

T: +44 (0)844 8000 254

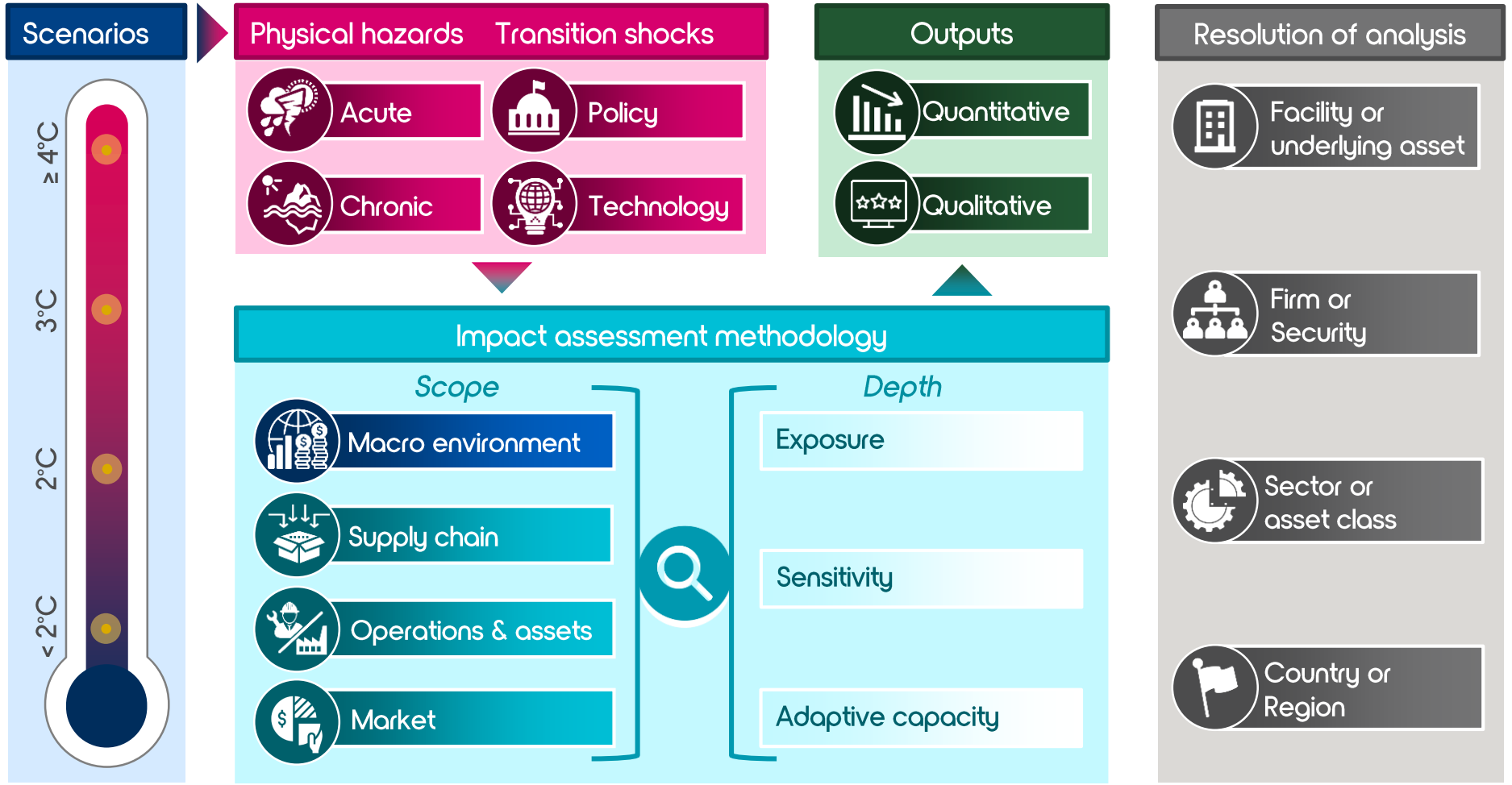
enquiries@vivideconomics.com

vivideconomics.com

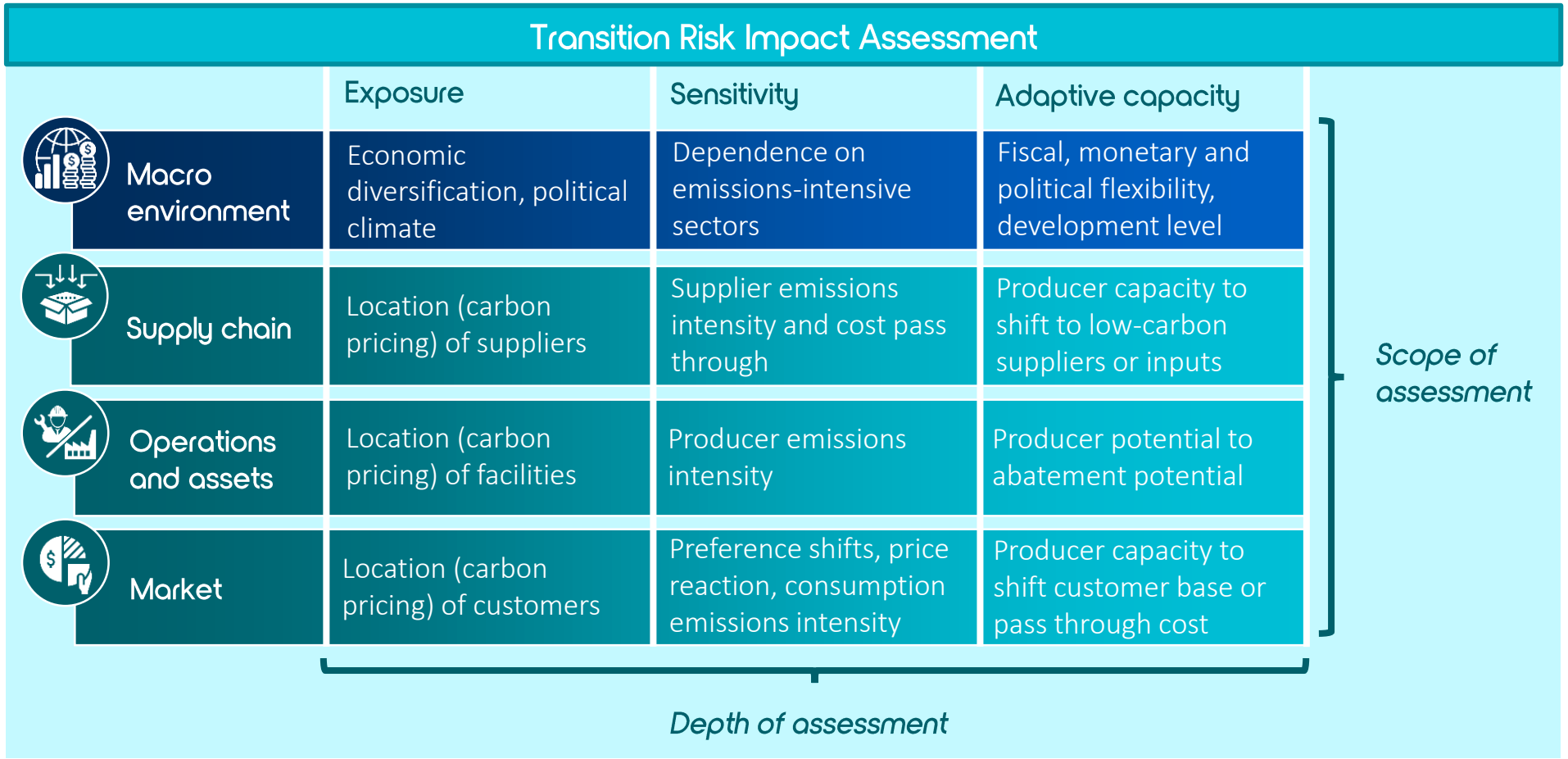
vivideconomics
putting economics to good use

Appendix: further detail on review of methodologies for 'Changing Course'

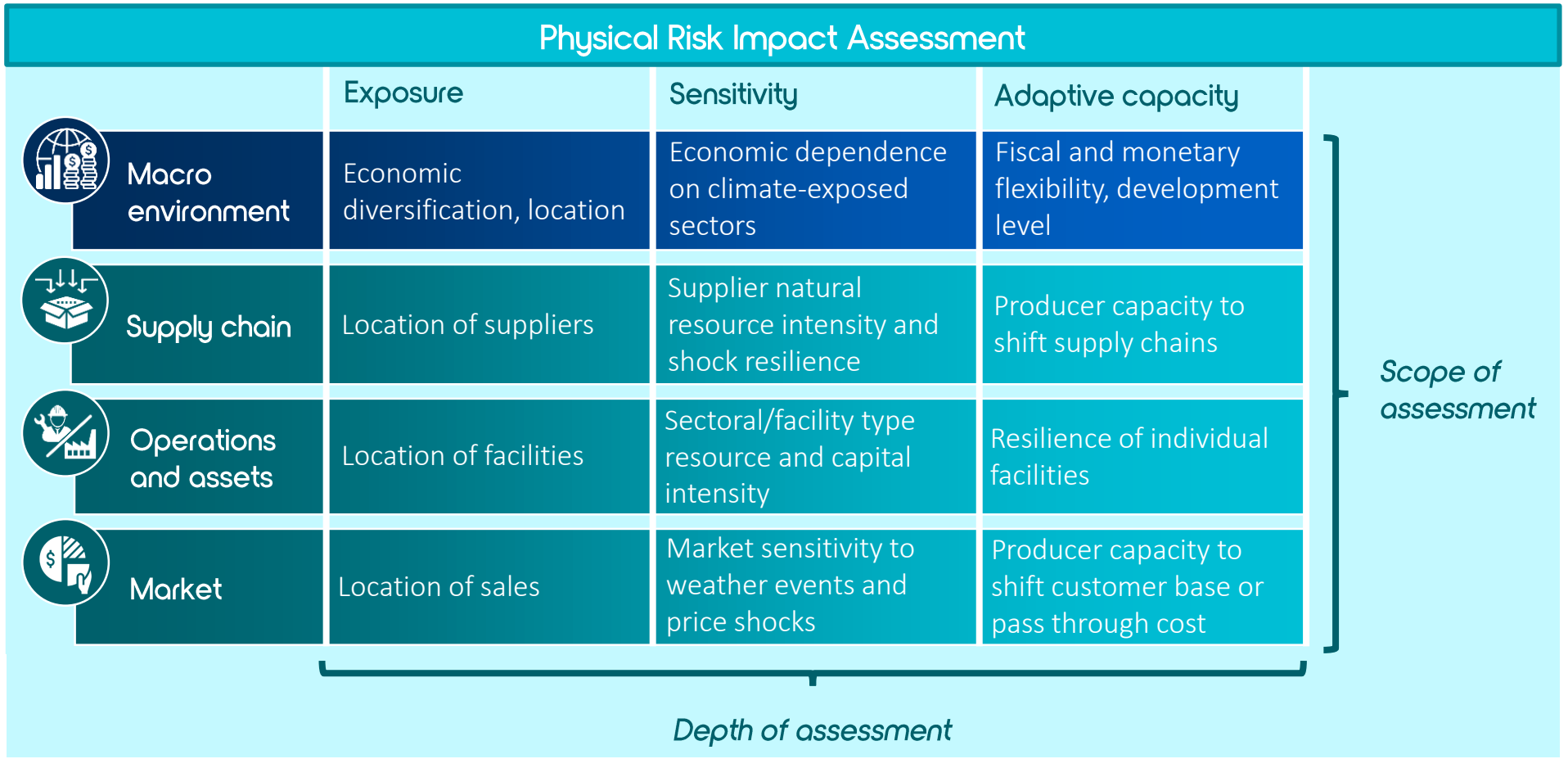
Analytical elements of scenario-based impact assessments



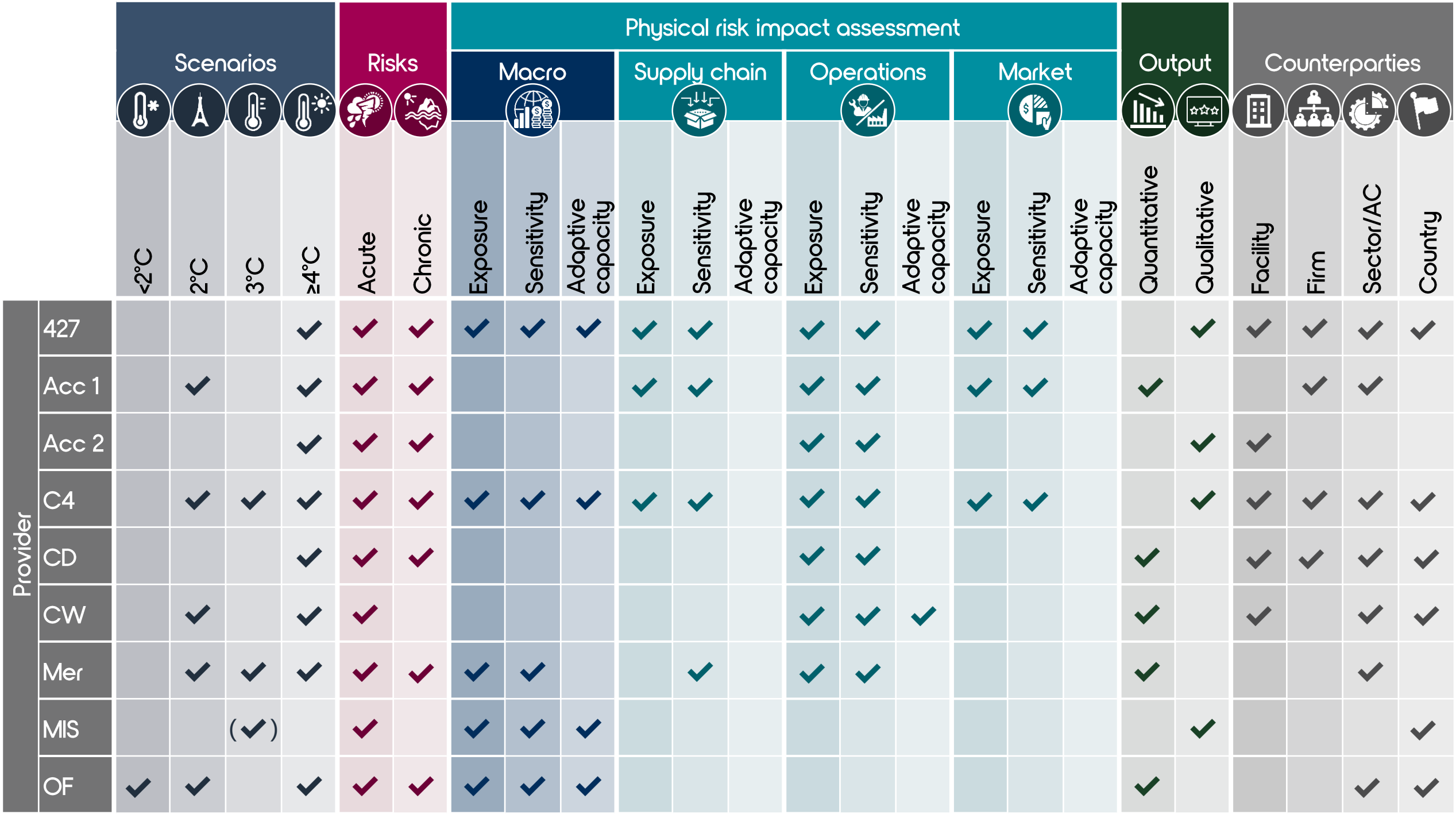
Framework for analysis of transition approaches



Framework for analysis of physical approaches




Scenarios
Risks
Transition risk impact assessment
Macro
Supply chain
Operations
Market
Output
Counterparties
<2°C
2°C
3°C
≥4°C
Policy
Technology
Exposure
Sensitivity
Adaptive capacity
Exposure
Sensitivity
Adaptive capacity
Exposure
Sensitivity
Adaptive capacity
Exposure
Sensitivity
Adaptive capacity
Quantitative
Qualitative
Facility
Firm
Sector/AC
Country
Provider
2dii
C4
CD
CT
Mer
MIS
OF
OW
Sch
TPI
Tru
VE 1
VE 2


Scenarios
Risks
Physical risk impact assessment
Macro
Supply chain
Operations
Market
Output
Counterparties
<2°C
2°C
3°C
≥4°C
Acute
Chronic
Exposure
Sensitivity
Adaptive capacity
Exposure
Sensitivity
Adaptive capacity
Exposure
Sensitivity
Adaptive capacity
Exposure
Sensitivity
Adaptive capacity
Quantitative
Qualitative
Facility
Firm
Sector/AC
Country
Provider
427
Acc 1
Acc 2
C4
CD
CW
Mer
MIS
OF

Acronyms

Transition risk tools	
2dii	2 degrees Investing Initiative PACTA tool
C4	Carbone 4 Carbon Impact Analytics
CD	Carbon Delta Climate Value at Risk
CT	Carbon Tracker 2 degrees of separation,
Mer	Mercer TRIP framework,
MIS	Moody's Investors Service sovereign risk ratings,
OF	Ortec Finance – Climate-savvy scenarios set
OW	Oliver Wyman for UNEP FI Banking Pilot,
Sch	Schroders – Carbon Value at Risk
TPI	Transition Pathways Initiative
Tru	Trucost Carbon Earnings
VE 1	Vivid Economics Net Zero Toolkit (asset level)
VE 2	Vivid Economics Net Zero Toolkit (macro)

Physical risk tools	
427	Four Twenty Seven physical risk scores
Acc 1	Acclimatise for UNEP FI Banking Pilot
Acc 2	Acclimatise Aware for Projects
C4	Carbone 4 Climate Risk Impact Screening (CRIS)
CD	Carbon Delta Climate Value at Risk
CW	ClimateWise (with Vivid Economics) Managing the physical risks of climate change
Mer	Mercer TRIP framework
MIS	Moody's Investors Service sovereign risk ratings
OF	Climate-savvy scenarios set