S&P Global Sustainable1
Investor Client Council

H2 2024

From ESG to (Valuation) Impact:
A Financially Material Lens on Sustainability

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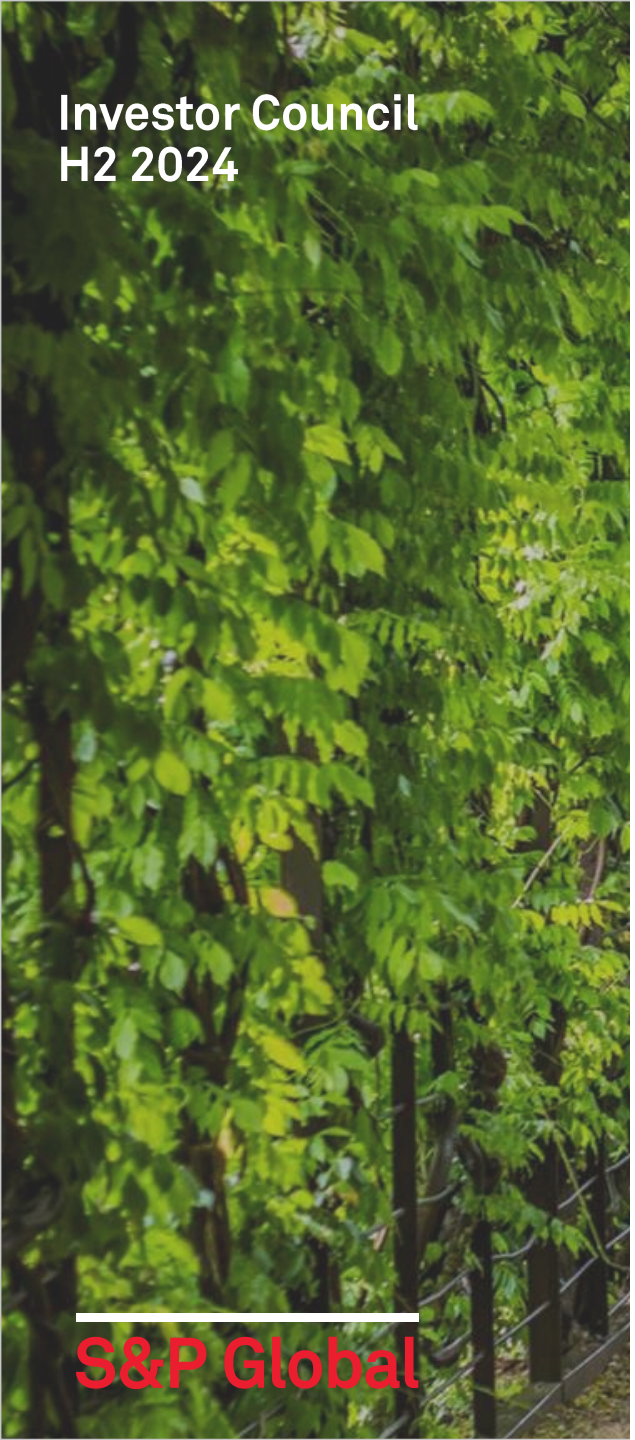

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From ESG to (Valuation Impact):
A Financially Material Lens on Sustainability

AGENDA

2:00 – 2:10: Welcoming Remarks
Chris Heusler, President of S&P Global Sustainable1

2:10 – 2:15: Purpose & Objectives
Mona Naqvi, Chair of the Investor Client Council

2:15 – 2:30: New Member Introductions

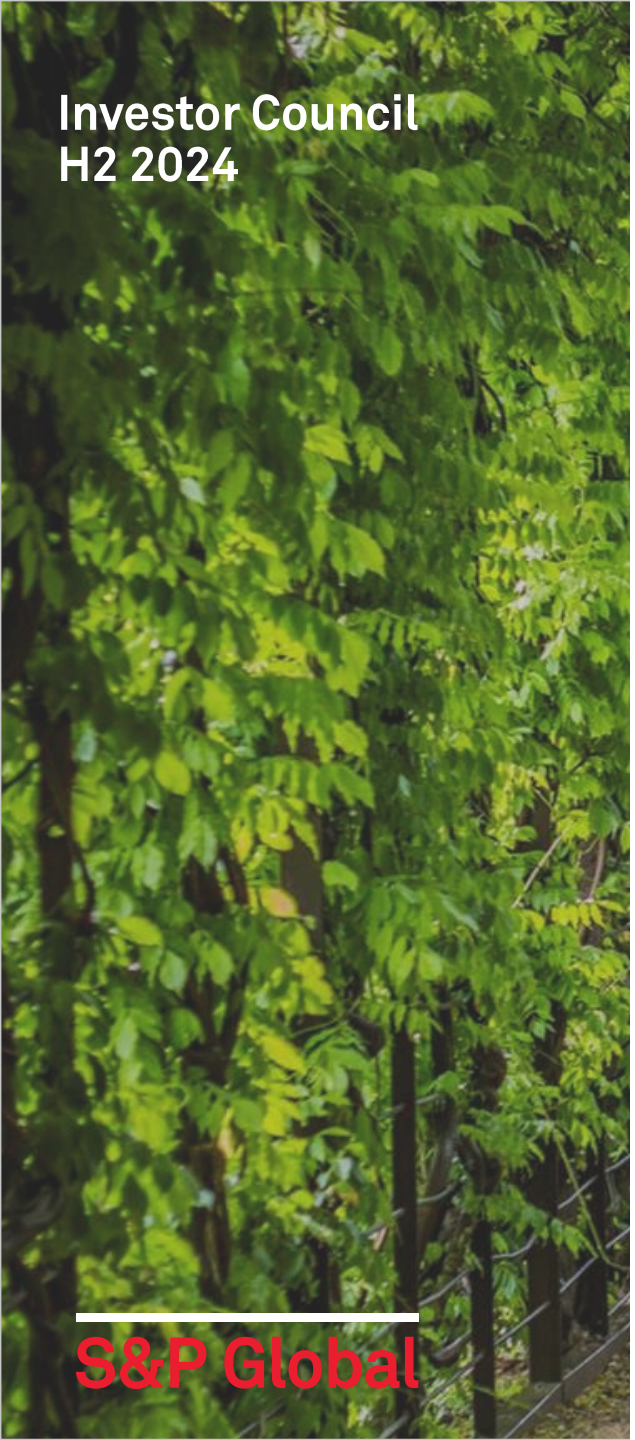
2:30 – 2:45: Keynote – Tipping Points: A Macroeconomic Lens on Sustainability
Dr Paul Gruenwald, Global Chief Economist at S&P Global Ratings

2:45 – 3:45: Sustainability Pathways to Credit Materiality

3:45– 4:00: Break

4:00 – 5:00: Are Investors Doubling Down on Double Materiality?

5:00: Concluding Remarks
Mona Naqvi, Chair of the Investor Client Council



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2:30 – 2:45: Keynote Presentation

Tipping Points: A Macroeconomic Lens on Sustainability

Dr Paul Gruenwald
Global Chief Economist

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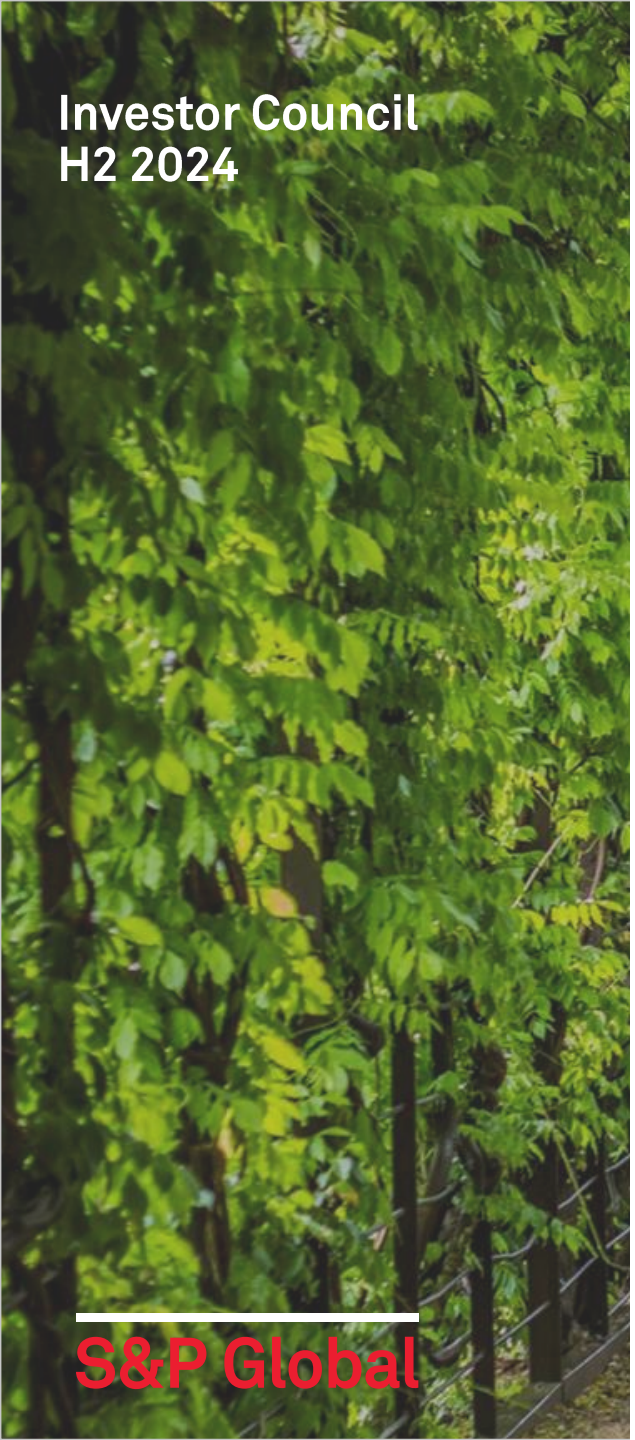

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2:45 – 3:45: Sustainability Pathways to Credit Materiality

Co-hosted by S&P Global Ratings

Alexandra Dimitrijevic, Head of Ratings Research & Development

Christa Clapp, Global Head of Sustainable Finance Market Analytics

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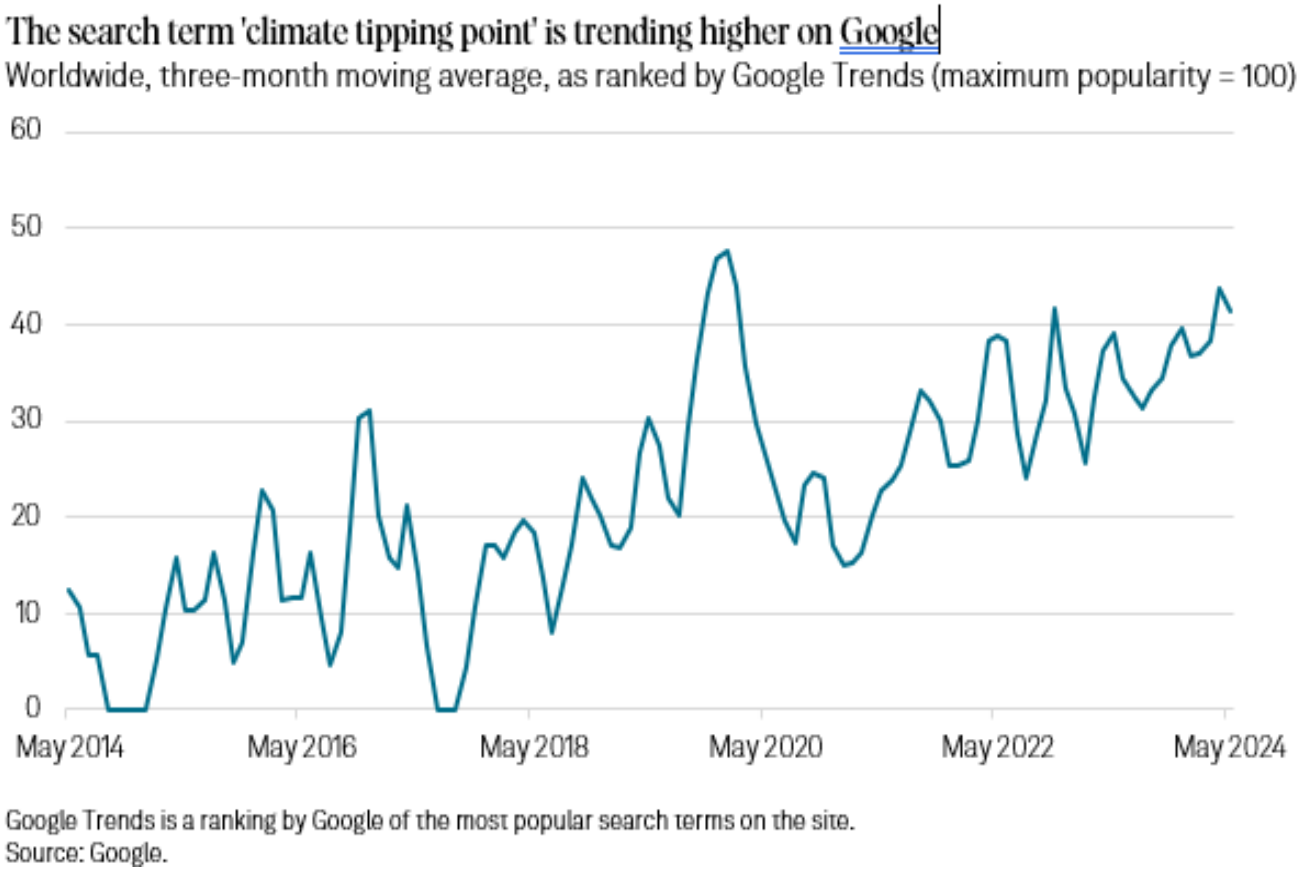
Tipping Points and Sustainable Growth | Introduction and Takeaways



- Tipping points have garnered increasing attention in the sustainability literature given their importance as potential "points of no return" in ecosystem dynamics.
- We develop a basic model featuring the interaction of physical capital and natural capital.
- Introducing a tipping point “shrinks the playing field" – it puts an upper bound on the deterioration of natural capital and a potential cap on the accumulation of physical capital (and output) if we are to achieve sustainability.
- The way out of this dilemma is green growth: expanding GDP while innovating to continuously lower the environmental impact of activity.

Defining Sustainability | Strong Versus Weak

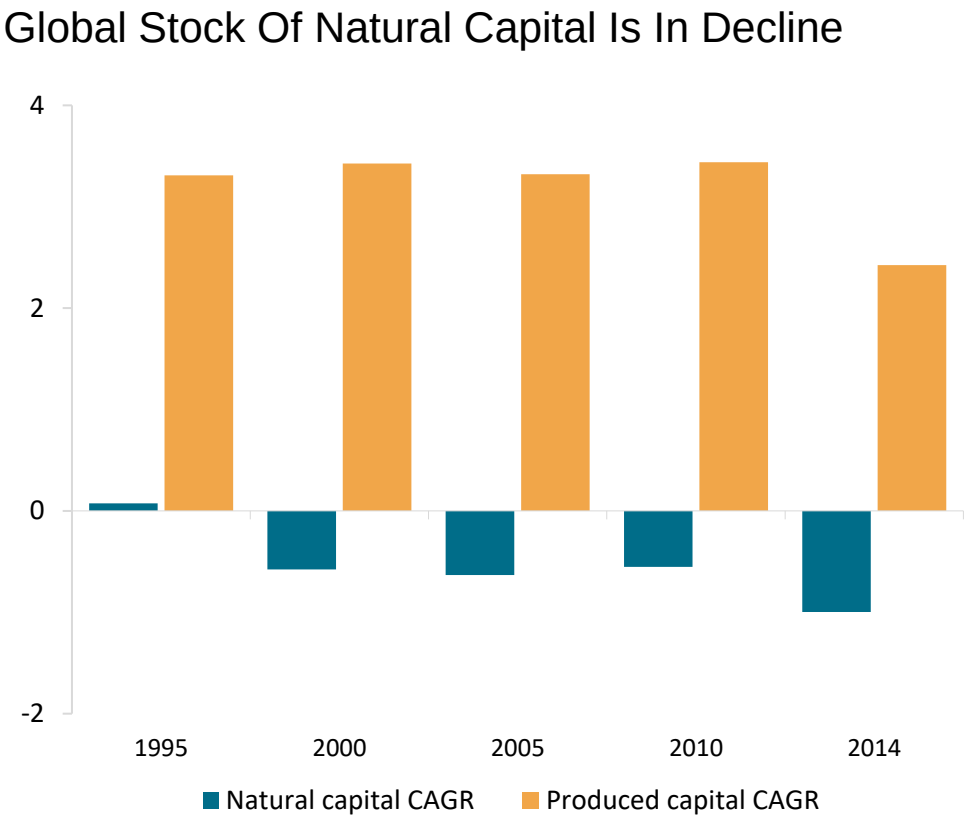
Strong Sustainability

- Physical capital and natural capital are not substitutes.
- Natural capital provides unique benefits to society in the areas of biodiversity, ecosystem services, and resources.
- Physical capital is reproducible, natural capital mostly is not.
- Goal: accumulate physical capital; preserve natural capital.

Weak Sustainability

- Physical capital and natural capital are highly substitutable.
- No meaningful differences in the "utility" they generate.
- Natural capital is an input into production.
- Goal: Sum of physical and natural capital should be maximized.

Source: https://sustainabledevelopment.un.org/content/documents/6569122-Pelenc-Weak%20Sustainability%20versus%20Strong%20Sustainability.pdf



Based on 2005 constant U.S.-dollar series. CAGR--Compound annual growth rate.
Source: Managi and Kumar, eds., "Inclusive Wealth Report 2018."

Good and Bad | Output and Emissions

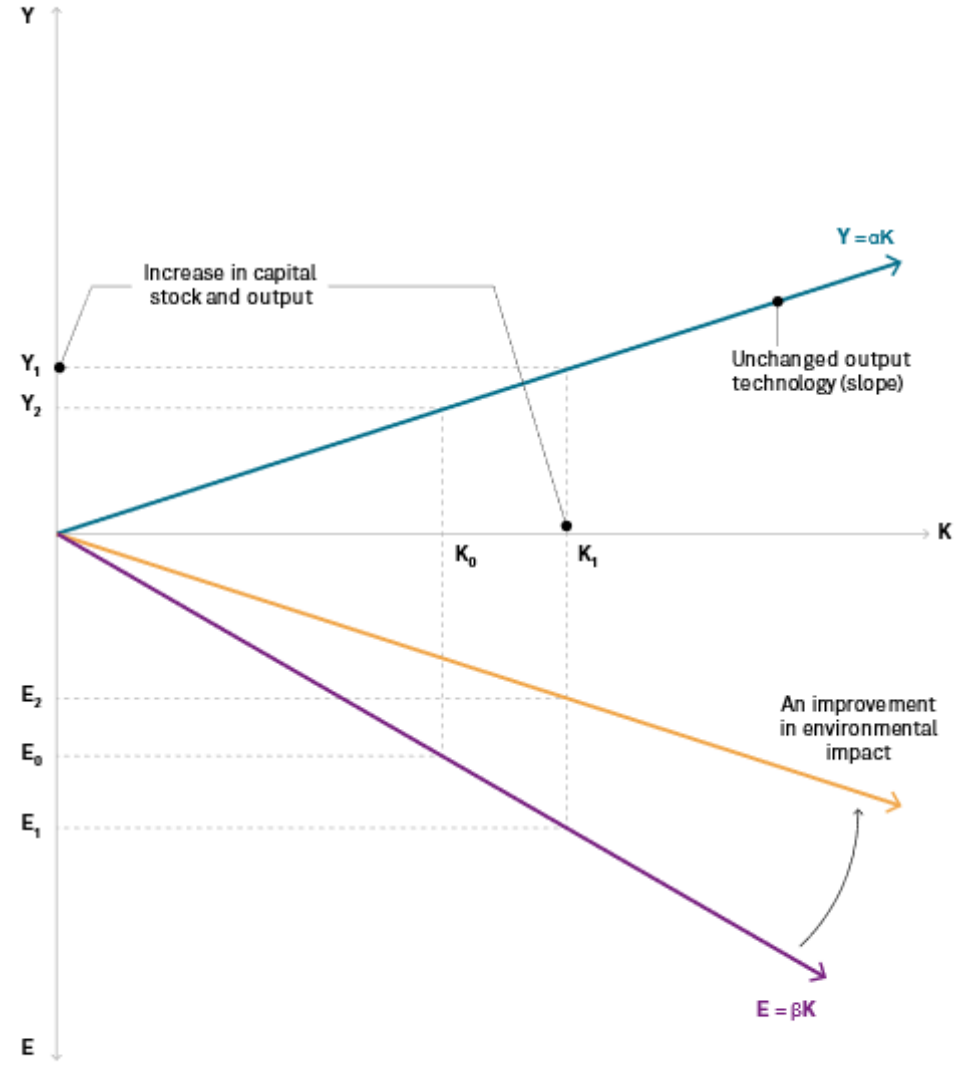
Traditional framework for economic growth (top panel)

- Capital is accumulated through investment (financed by saving)
- Output – and consumption possibilities – continuously grow
- Productivity gains can lift output: higher α.
- No explicit consideration of nature or “natural capital”

Incorporating environmental impact (bottom panel)

- Economic activity produces both output and emissions
- Emissions have a negative impact on natural capital – see below.
- Environmental impact of activity can be reduced via lower β.
  - Less carbon intensive output.
  - Restoring biodiversity and ecological assets.

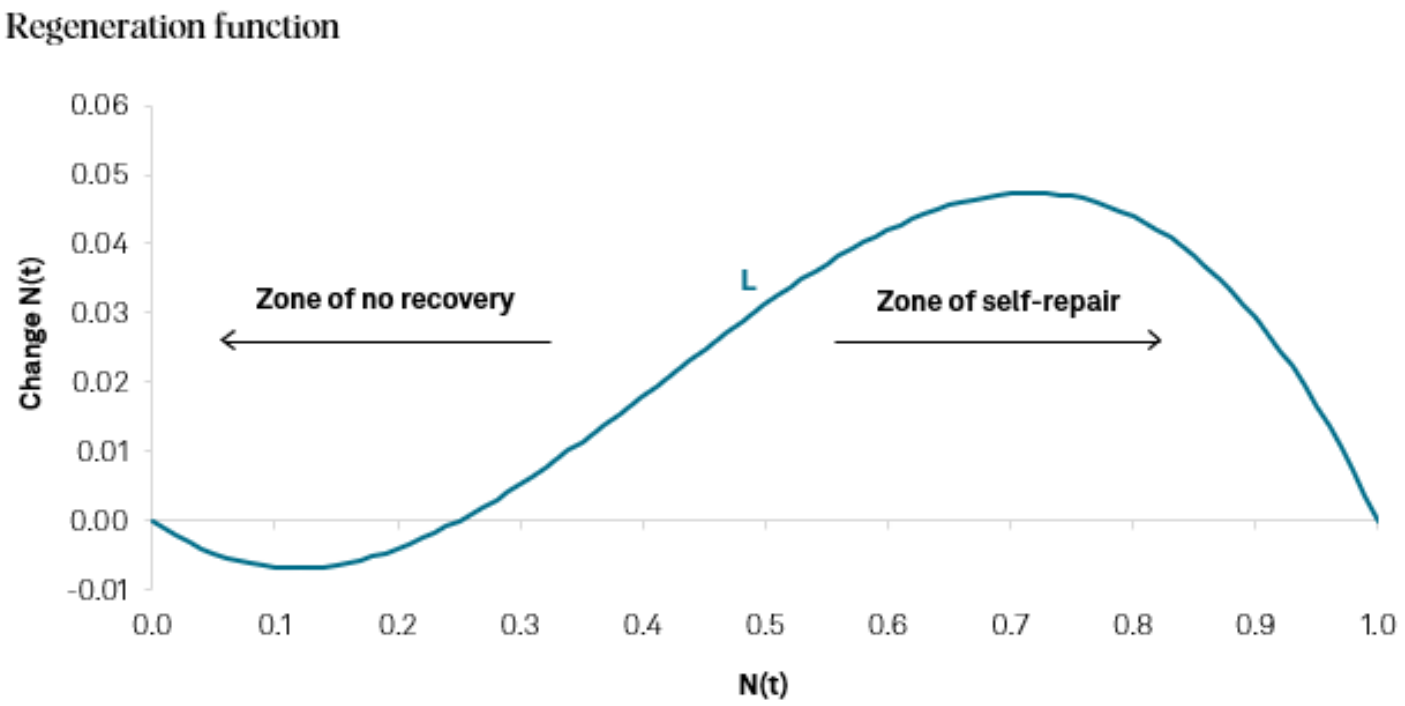
Basic growth model with an increase in capital stock and environmental efficiency



Source: S&P Global Ratings.

Natural Capital | Regeneration Function

Regeneration is key to our framework (inspired by the UK Government's Dasgupta Review

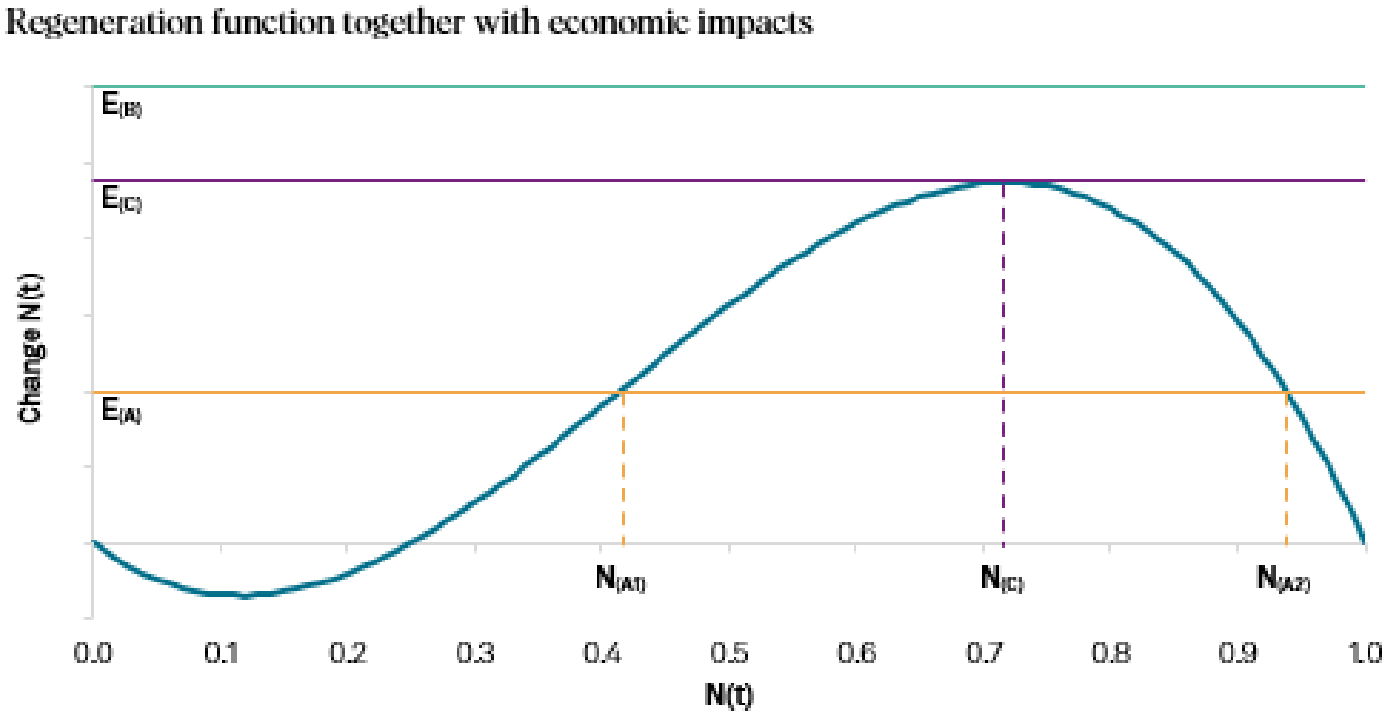


r = 0.50, L = 0.25. Source: S&P Global Ratings.

- The horizontal axis is the level of natural capital, ranging from 0 (totally degraded) to 1 (pristine). In between is a continuum of intermediate states.
- The vertical axis measures the change in natural capital. This can, in principle, take on any positive or negative value.
- There are three equilibria: 0, L and 1.
- For values of N between L and 1, $\Delta N > 0$ so N will increase and return to 1. For values of N between 0 and L, $\Delta N < 0$ so N will decrease and fall to 0. *L is therefore a tipping point*.
- Higher r increases the amplitude; higher L shifts the cuve to the right. And vice versa.
- Note: this example is only for nature. There is no interaction with the economy yet.

Combining Regeneration with Environment Impact of Production

This is the key innovation of our framework

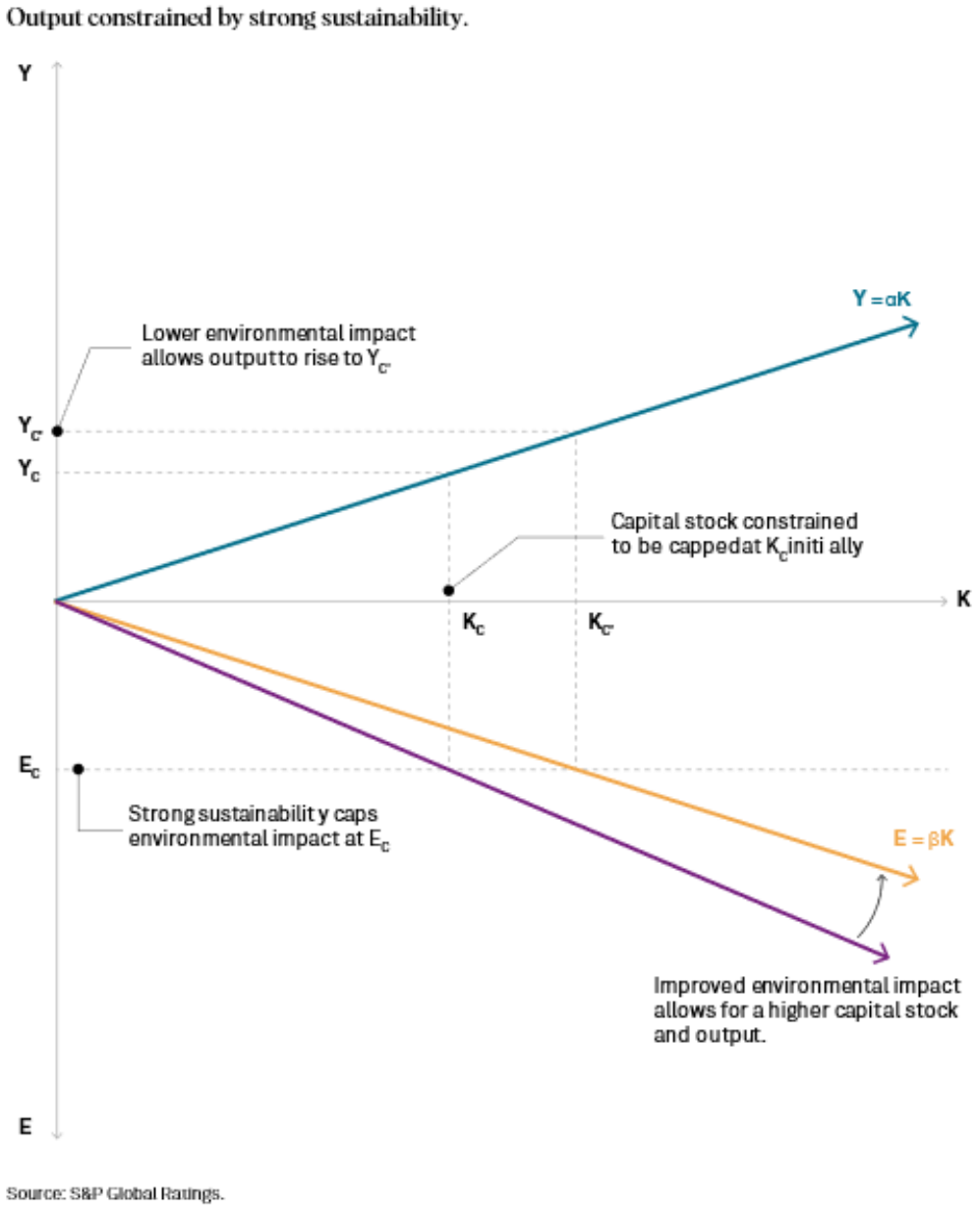


r = 0.50, L = 0.25. Source: S&P Global Ratings.

- The change in natural capital is the net of regeneration minus the enviromental impact of production: $\Delta N_t = \Delta R_t - E_t = 0$.
- We have shifted the horizontal axis up by the value of E (from our production model).
- Case A: the environmental impact line E_A intersects the regeneration curve twice, yielding two equilibria. Natural capital in this economy will settle at a level of N(A2)
- Case B: has no equilibrium for ΔN because the level of environmental impact is too high. $\Delta R_t - E_t < 0$ and N goes to zero.
- Case C: shows the critical sustainability threshold: this the maximum value for E that still has a natural capital equilibrium value. *This is a key value in our model.*

Put It All Together | Sustainable Growth

- We can now return to our production framework and derive sustainable growth.
- From the previous slides on natural capital, "emissions" are capped at E_C, which caps the capital stock and output at K_C and Y_C, respectively.
- This capping would appear to validate the "no growth" viewpoint. But that view assumes static technology.
- Sustainable or green growth is possible in this model only if the environmental impact of production (β) continuously falls.
- Empirically, this positive outcome has been occuring in the US, Europe and Japan in recent decades as emissions have delinked from output.
- To reach global sustainable growth, these technology gains need to be extending the EMs and the Global South.



Source: S&P Global Ratings.

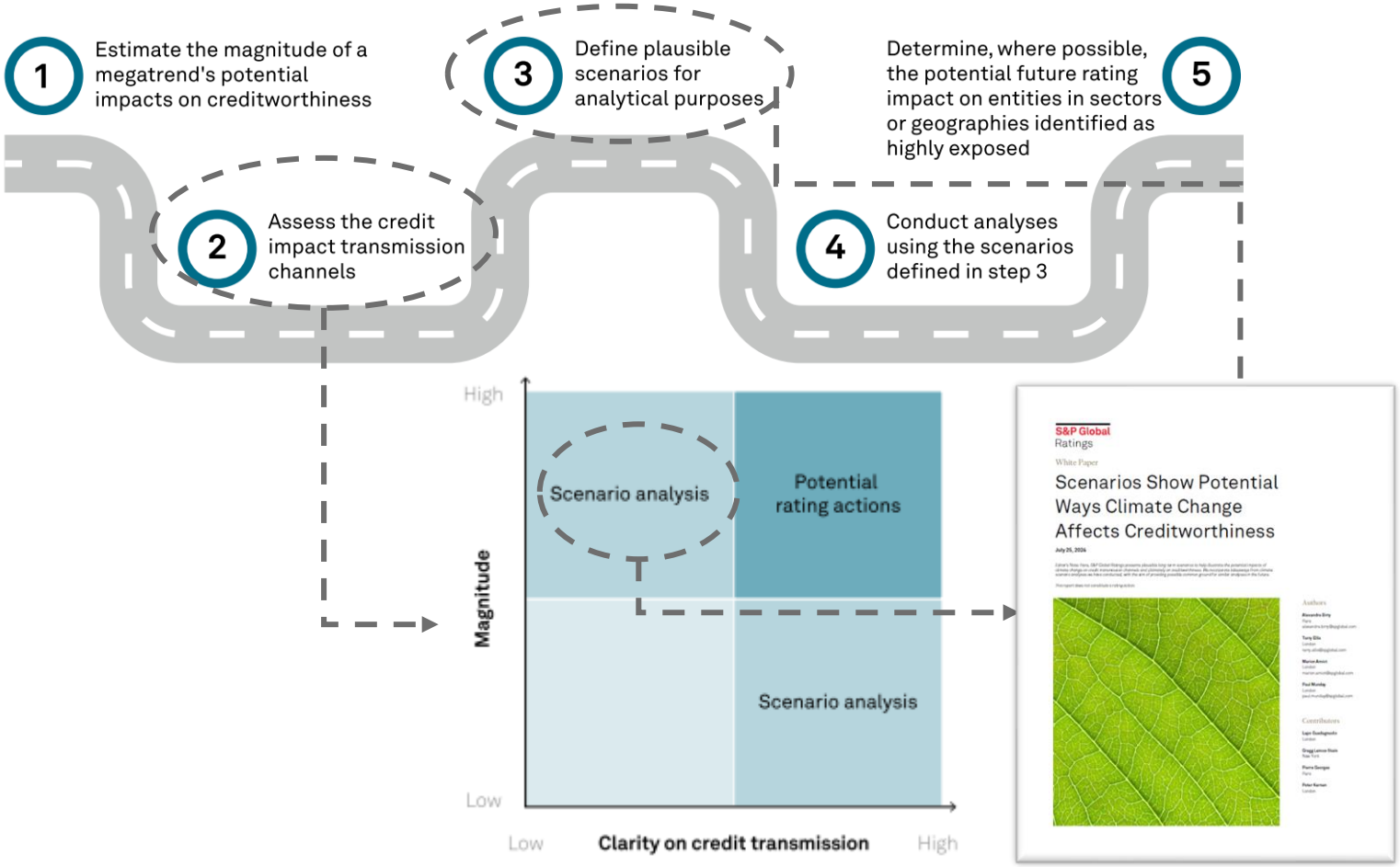
Conclusions and Future Work | Still Much To Do

1. The “holy grail” of two capital models is bi-directional interaction between the economy and the environment.
2. This model makes progress toward that goal but does not fully achieve it.
3. This action above goes from the economy to the environment, with strong sustainability constraining growth.
4. In other models such as “GDP at risk” the action goes from the environment to the economy.

Our research agenda:

- Work on two-way linkages to make further progress toward the holy grail.
- Calibrate this model to make it a “computable equilibrium” exercise.
- Introduce preferences across consumption and the environment in order to optimize/rank outcomes.
- Endogenize technical progress in the spirit of “endogenous growth models.”

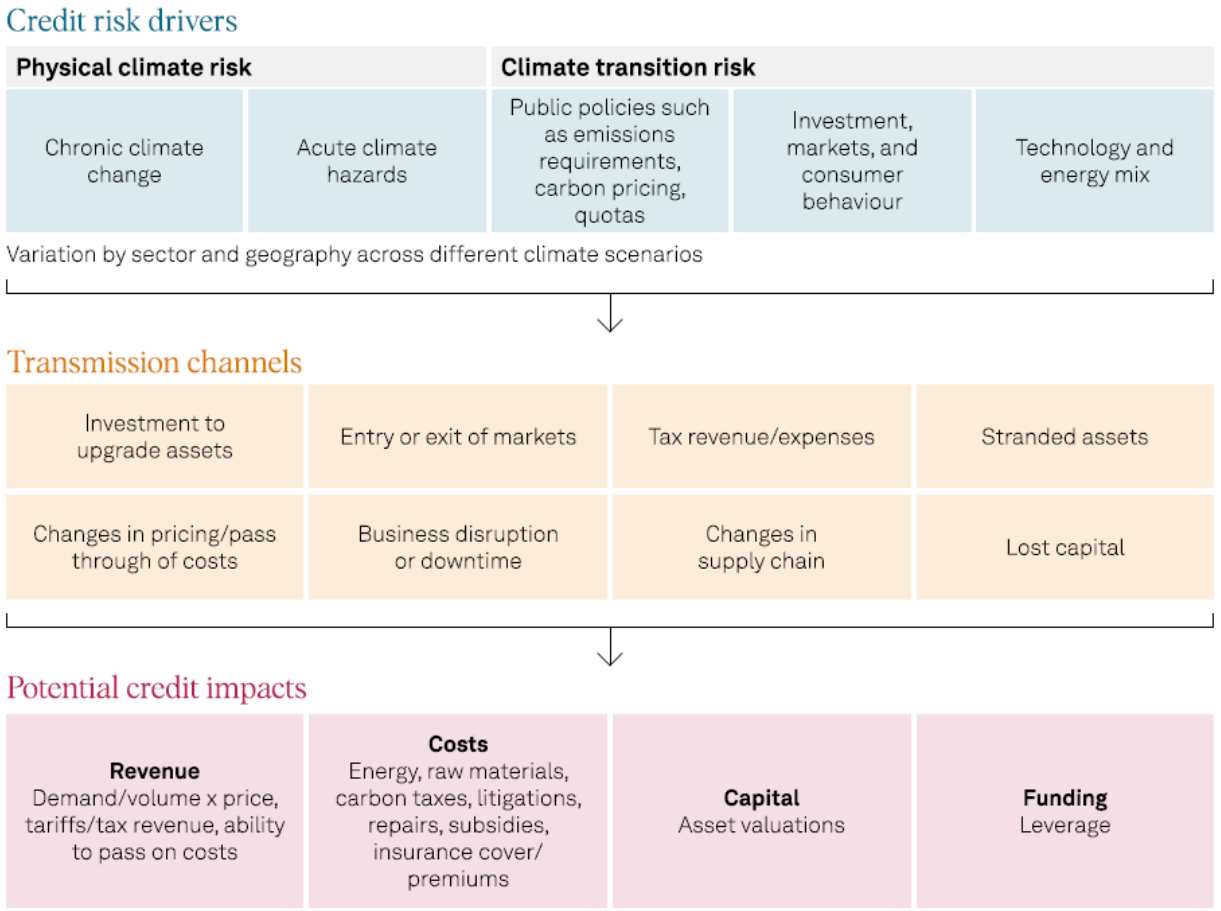
Assessing How Climate Change May Influence Credit Ratings



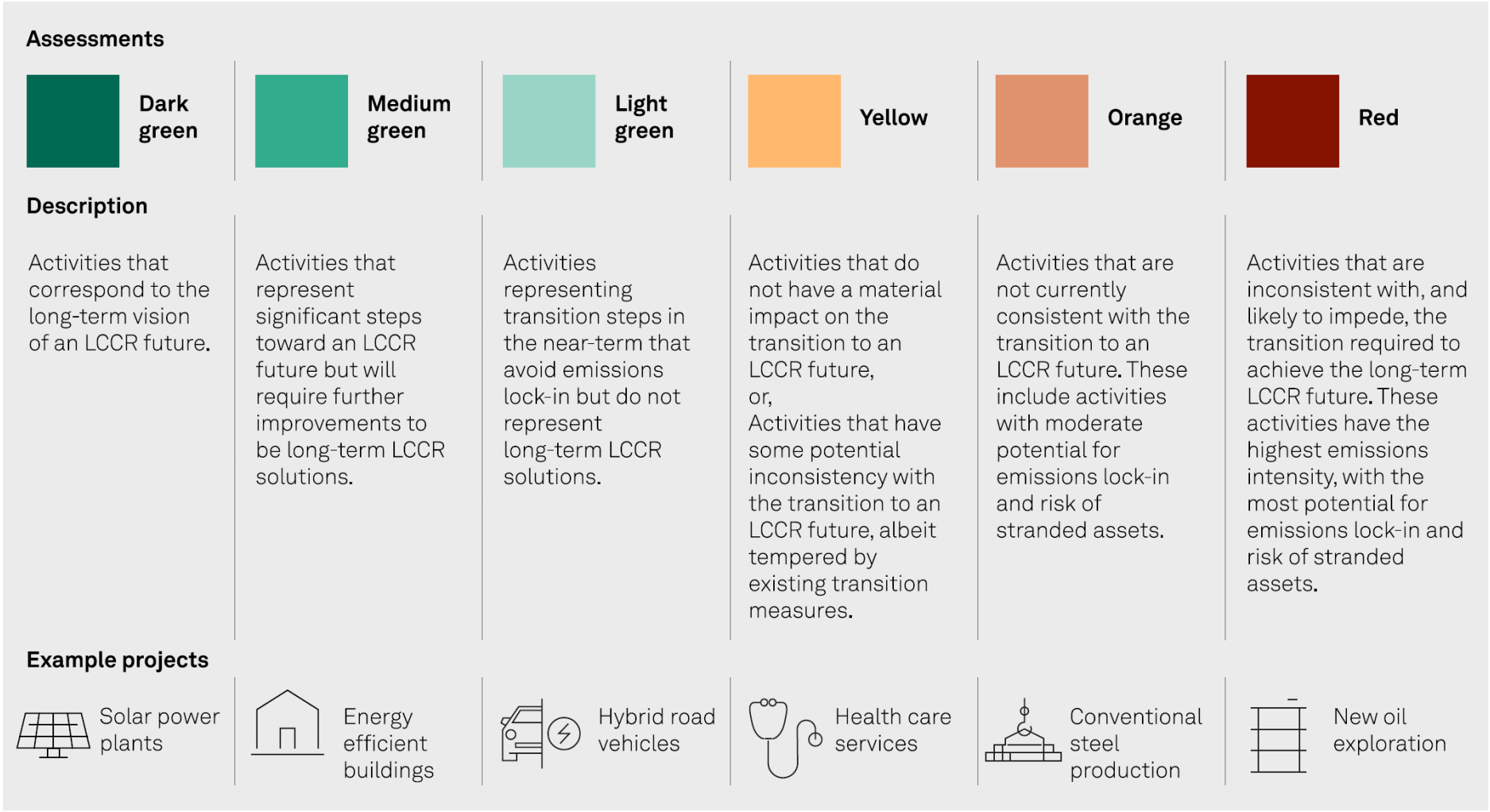
- Climate change is a megatrend whose **magnitude** we would typically consider high
- We however find that **clarity of how climate risks are transmitted** to creditworthiness is generally low
- **Scenario analysis** can help deepen understanding of how transition and physical climate risks may evolve over time and affect ratings.
- Publication on July 25 of Scenarios Show Potential Ways Climate Change Affects Creditworthiness
- Aim of providing possible **common ground** for climate scenario analyses that we will continue to conduct

Source: White Paper: Assessing How Megatrends May Influence Credit Ratings (capitaliq.com)

How Climate-related Credit Risk Drivers Can Transmit To Potential Credit Impacts



We express our opinions through the Shades of Green scale, which includes a spectrum of three green shades



All three green shades signify important steps along the transition pathway toward the Paris Agreement's goals

We use our Climate Transition Assessment (CTA) Analytical Approach to assess the robustness of a company's transition plan

Current activity

We apply Shades of Green to the current mix of economic activities.

→

Climate transition plan

Metrics and targets

Actions and investments

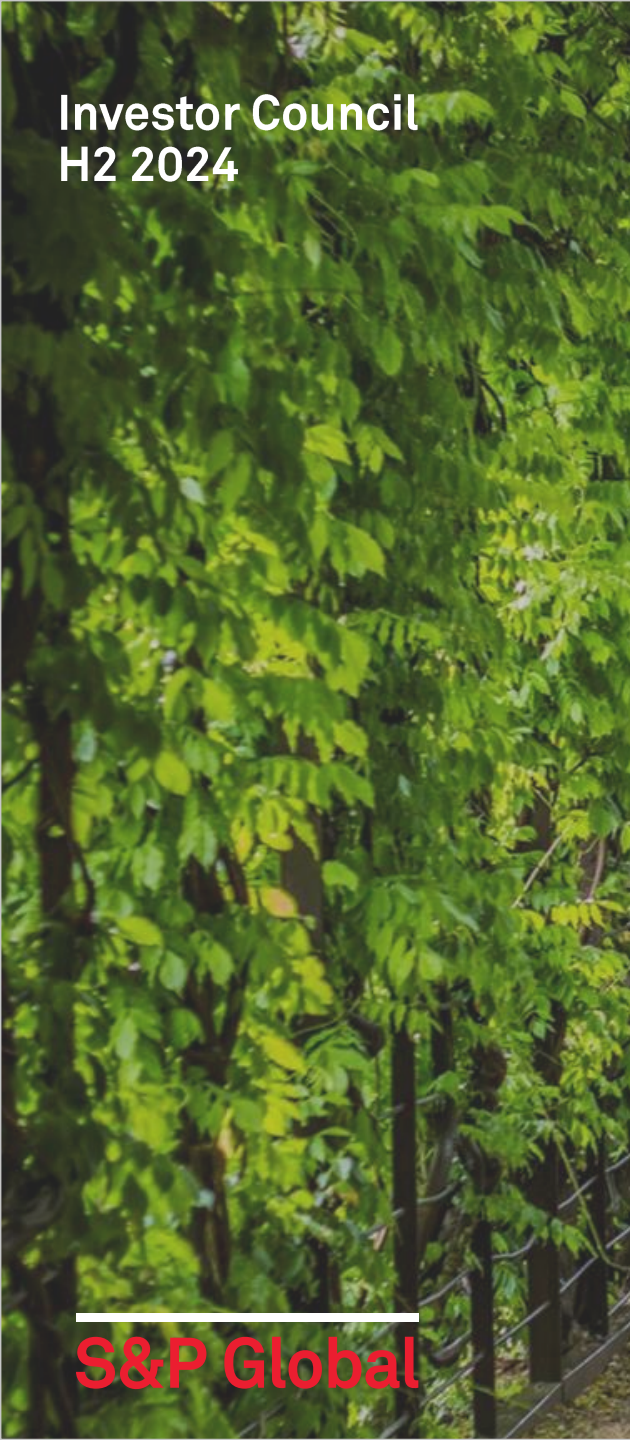
Implementation drivers

→

Future Shade

We assign a single Shade of Green based on likely future mix of economic activities once current plans are implemented.

Source: S&P Global Ratings.



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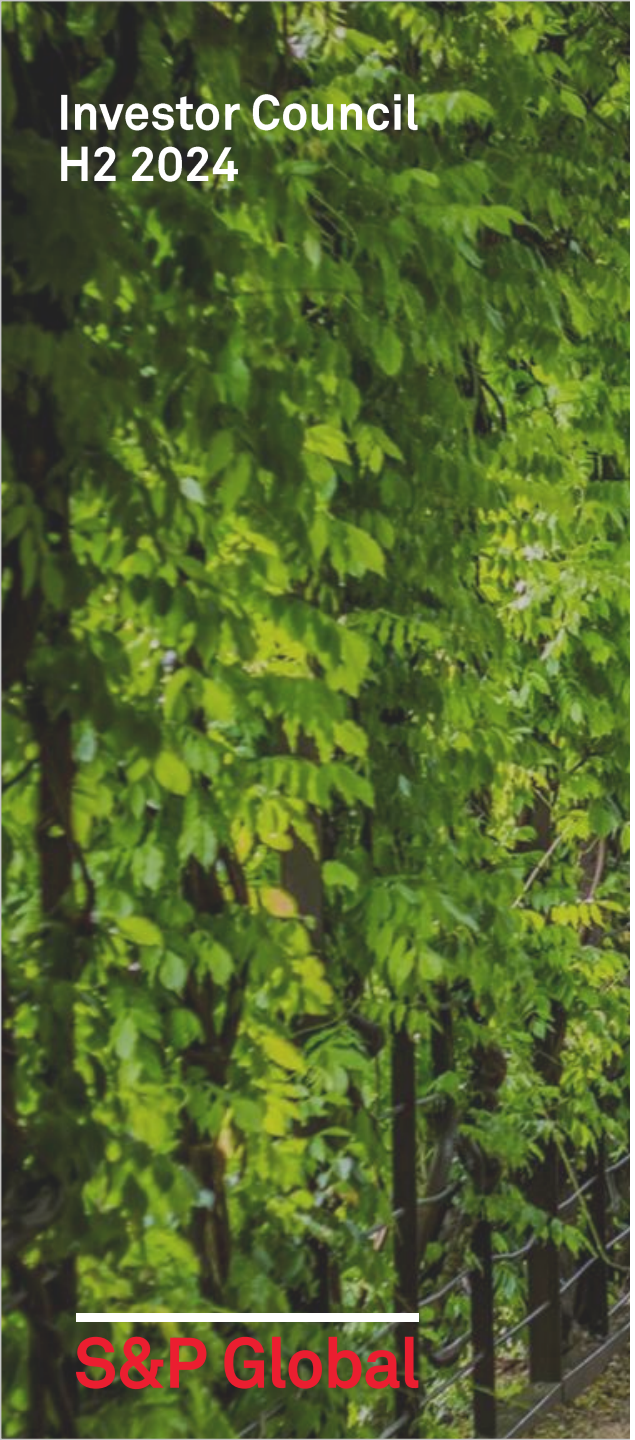
3:45– 4:00: Break



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4:00 – 5:00: Are Investors Doubling Down on Double Materiality? | Hosted by S&P Global Sustainable1

Steve Bullock
Global Head of Research & Methodology
S&P Global Sustainable1

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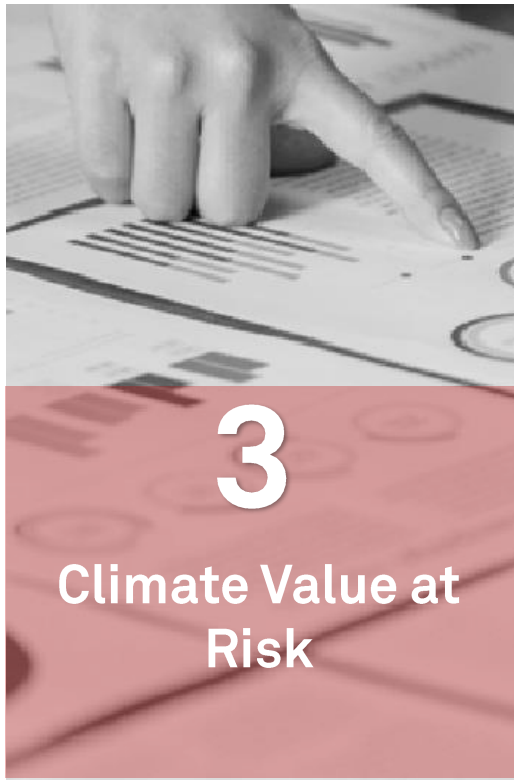
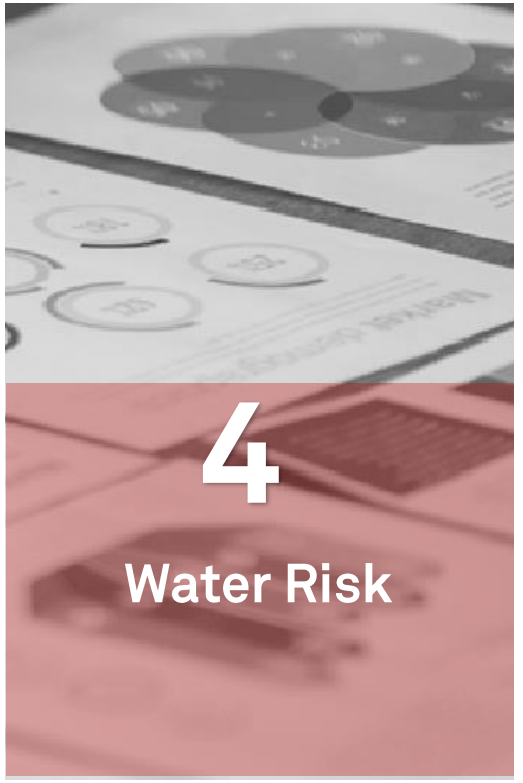
Agenda





S1 Materiality Spectrum – By Solution

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The impact of the environment and society on the company ('Outside-In')

The impact of the company's operations on the environment and society ('Inside-Out')

Physical Risk Scores and Financial Impact

Paris Alignment

Environmental

CVAR

Net Zero Commitments Tracker

Nature and Biodiversity Risk

ESG Scores and Data

Climanomics

SDGs

Financial Materiality

Internalization Risk Levers:
- Physical (e.g., resource scarcity)
- Regulatory (e.g., environmental fines and/or taxes)
- Reputational (e.g., social license to operate)

Environmental and Social Materiality

Traditional financial costs and/or benefits

Societal costs and/or benefits

Internalized costs and/or benefits likely to be incomplete and deferred in time

Double Materiality in S&P Global ESG Scores

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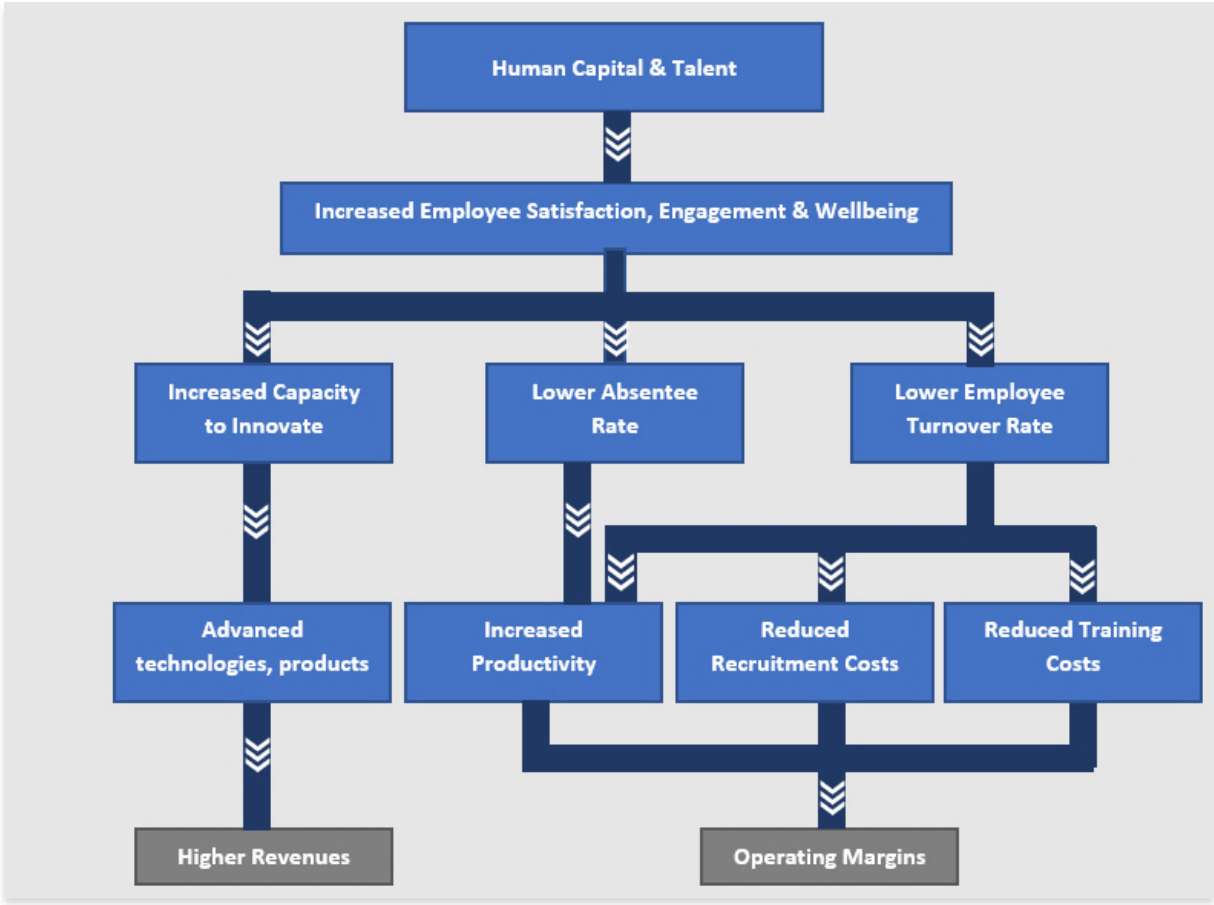
23 Materiality Core Subjects mapped to CSA criteria topics both cross-sectoral & industry specific and linked with key opportunity & risk factors and impact areas.

Double Materiality in S&P Global ESG Scores

Every core material subject, for every industry, is reviewed by S1 industry experts, to determine how these concepts affect a company's business. Below is a mental map exercise of how this analysis is conducted.



SDG Methodology at a Glance

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Presenting a methodology that offers users a deep diver into corporate contributions to or detraction from achieving the SDG's including data level granularity and broader insights into impacts

Objectivity

- Contributions bifurcated based on revenue segmentation, product offering, management practices, geographic location, and controversies

Transparency

- Exposure of contributions down to the most granular data point level inputs
- Product clearly exposing the underlying data point, aggregation methodology and output analytics

Comparability

- Visibility on cross industry comparison for each SDG
- Clear exposure of cross industry and regional metrics

Clarity

- Covers both negative and positive contributions
- Increased granularity of business segment activities

Methodology at a Glance

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Robust analysis with granular analysis and comprehensive evaluation of company's impacts

Alignment Assessment	• SDG alignment assessment per individual SDG • Holistic overview of a company's positive contributions and detractions from achieving the SDGs • Integrated operational, management and business contributions, geography and controversy views
Business Segments	• Mapping business segments using in-house classification system including over 1,100+ granular activities and corresponding revenue bifurcation
Product Information	• Integrating product level revenues across key positive and negative impact areas
Management	• Integrating how well companies are managing their positive/negative impact through their programs and KPIs based on the CSA leveraging over 1,400 datapoints
Controversy Adjustment	• Incorporating controversies on a scale of minor to severe indicating real-time impacts by a company
Geographic Adjustment	• Leveraging asset level data to determine geographic additionality • Evaluating the level of SDG achievement of the locations where the company operates and its ability to achieve local impact

Methodology Enhancements Overview

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Evaluating the contribution of a company to the SDGs through the alignment of its products and services with the SDGs, its management practices as well as its exposure to controversies and operating markets that detract/support achievement of the SDGs

Data Input

- CSA ESG data
- Controversy Analytics
- S1 Business Segmentation data
- Environmental modeled data
- Business Involvement Screens data
- ESG Country based data

Components

Revenue impact

Purpose
Captures negative and positive alignment to SDGs from products and services offered by companies

Enhancement
Added granular positive to negative scale (prev. only binary)

Operational impact

Purpose
Captures negative and positive alignment on SDGs due to companies' operational impact and management practices

Enhancement
New component
Added positive to negative scale (prev. risk only), 185 new KPIs

Operating markets

Purpose
Measures the degree to which a company is contributing to SDG progress in those countries with the greatest need

Enhancement
More granular raw data linked to SDG targets, gap filling methods, increased country coverage

Adjustments

Controversy adjustment

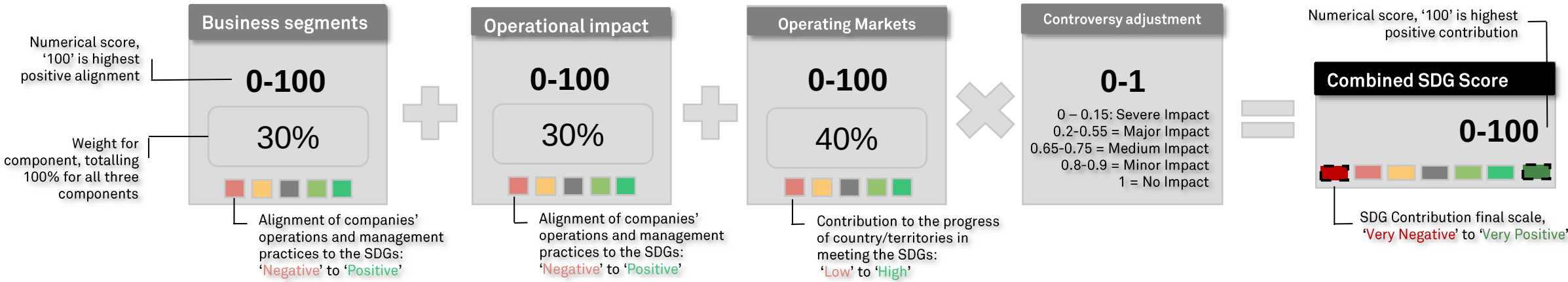
Purpose
Captures negative impact on SDGs due to companies' involvement in controversies

Enhancement
New component
Added controversy monitoring and corresponding impact rating

SDG Outputs

- **Raw Data mapped to SDG goals and targets.**
- **Business Segments scores** x 17 per company
- **Operational Impact scores** x 17 per company
- **Operating Market scores** x 17 per company
- **Combined SDG Goal scores** x 17 per company
- **Overall SDG score** x 1 per company

Scoring a company's contribution to each SDG Goal



Mining Industry: Distribution of SDG Goal Assessments

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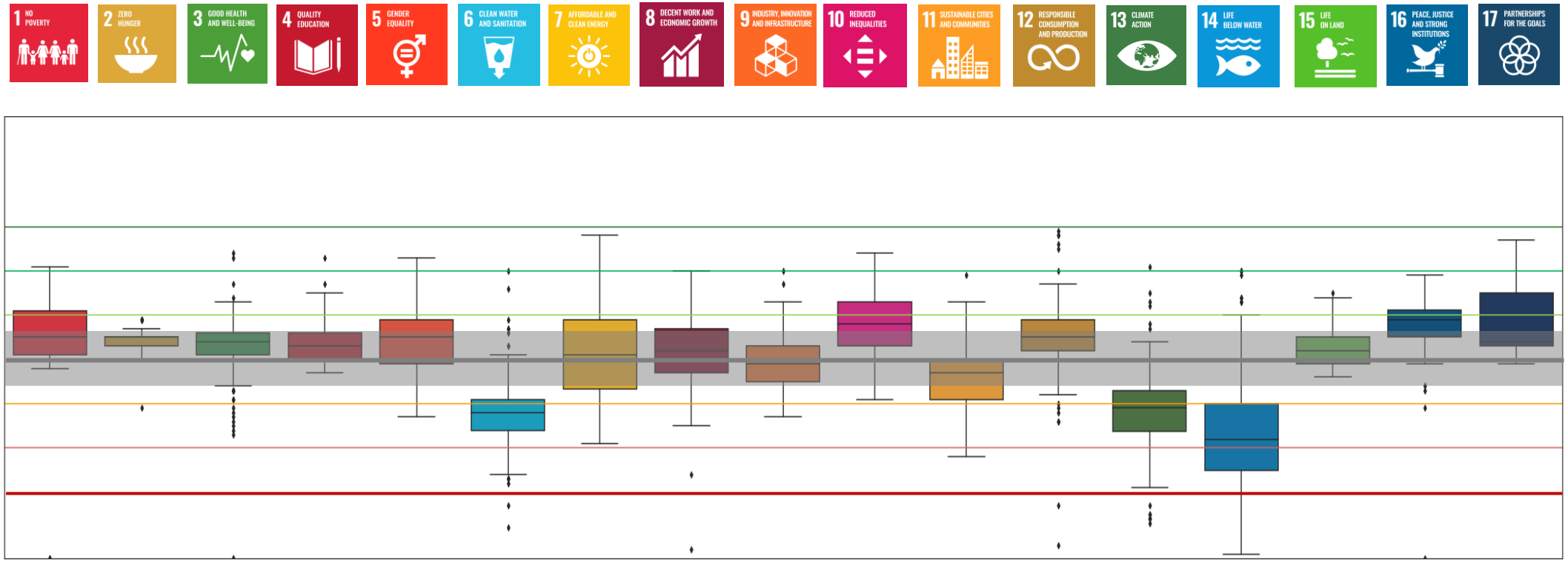
Companies in this industry generally detract from the achievement of environmental SDGs (e.g., 6, 13 and 14)
Some companies positively contribute to social SDG's through reducing inequalities (e.g., 10) and good governance practices (e.g., 16 &17)

Mining



SDG Contribution scale

- Very Positive
- Positive
- Moderately Positive
- Neutral
- Moderately Negative
- Negative
- Very Negative

Example: SDG Scores

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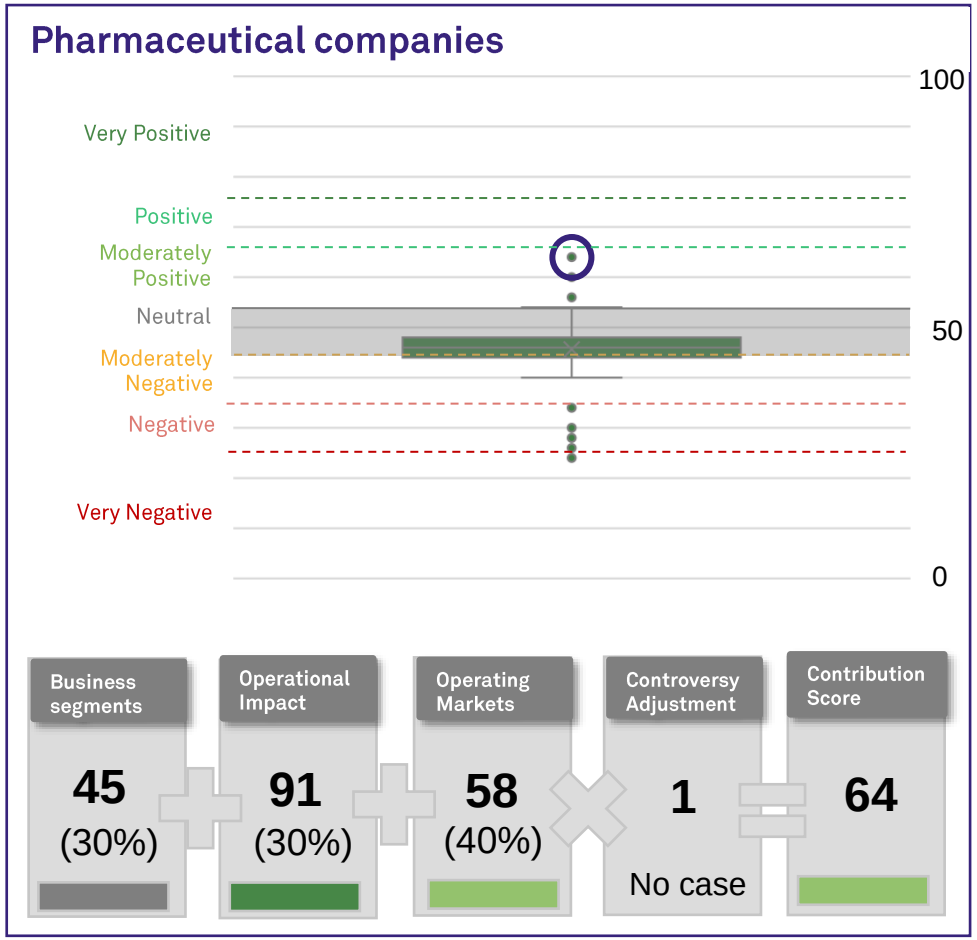
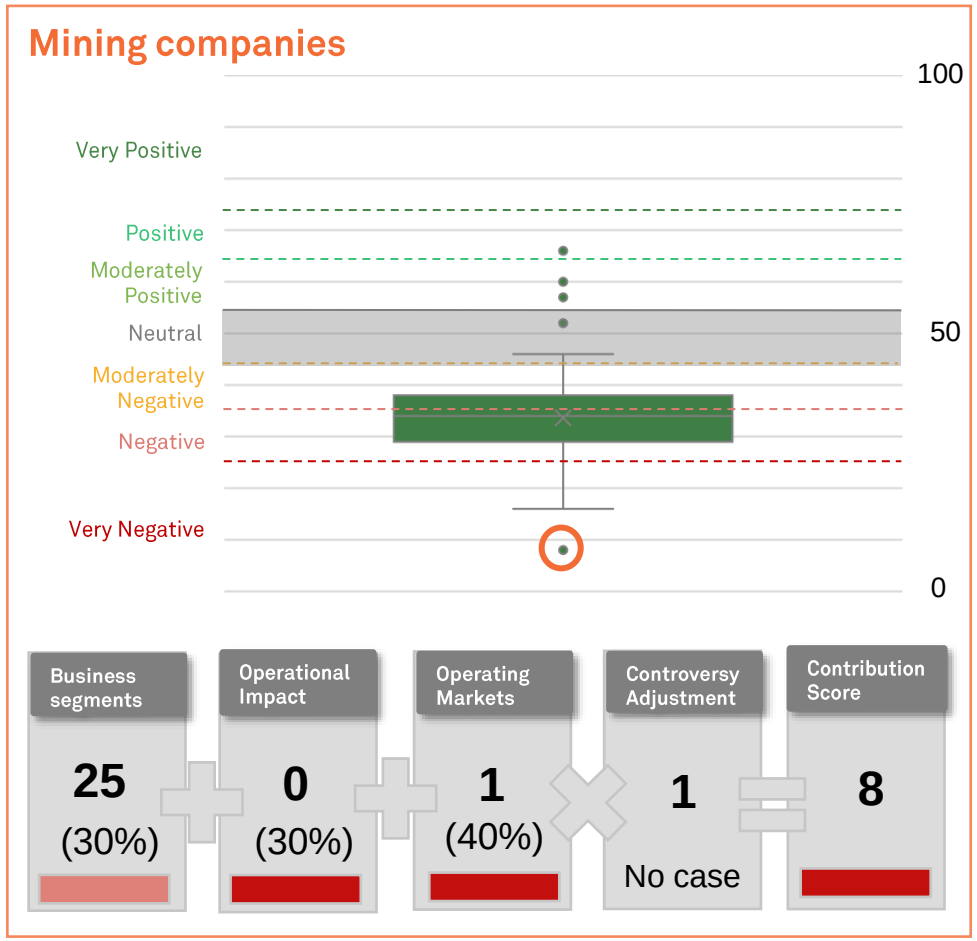
- *Pharmaceutical companies on average tend to have a neutral to slightly negative impact on SDG 13*
- *Mining companies, due to their operations, have a more negative impact on SDG 13*





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Climate Value at Risk (CVAR)

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S&P Global Sustainable1 is developing two complementary CVAR solutions targeting reporting, investment management and risk management applications

S1 Dataset	Climate Adjusted Value	Climate Value at Risk
User Type	Sustainability / Sustainable Investing	Market Risk
Description	Issuer level analysis of the financial impact of climate physical and/or transition risks (and opportunities) on earnings, enterprise value or market capitalization	Portfolio level probabilistic analysis of potential losses due to a shock / change in market conditions – driven by climate change (or other factors)
Unit of Analysis	Issuer/Company	Portfolio
Modelling Approach	Deterministic	Probabilistic / Monte Carlo Simulation
Input Data	Asset and company level activity data, scenario assumptions	Issuer and market level changes in financial drivers e.g. change in earnings, equity market stress
Output Metrics	Climate Adjusted Earnings Climate Adjusted Market Value Climate Adjusted Enterprise Value	95th Percentile Value at Risk 90th Percentile Value at Risk
Coverage	17,000-20,000 Issuers	17,000-20,000 Issuers All associated equity and fixed income instruments
Delivery	Xpressfeed, CIQ Pro	Market Risk Platform
Expected Release	H1 2025	H2 2025

Climate Value at Risk (CVAR)

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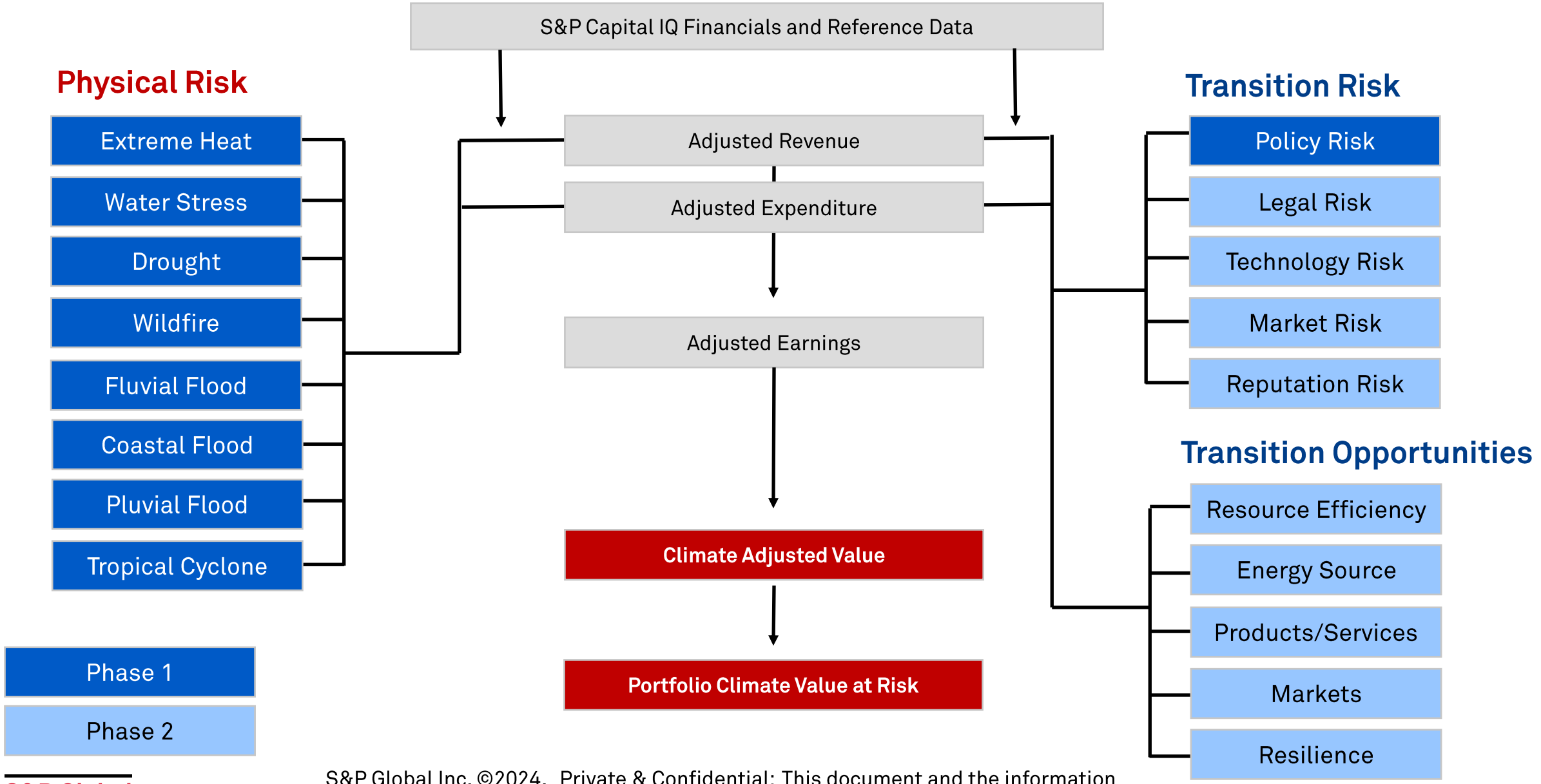

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The Ecolab Smart Water Navigator

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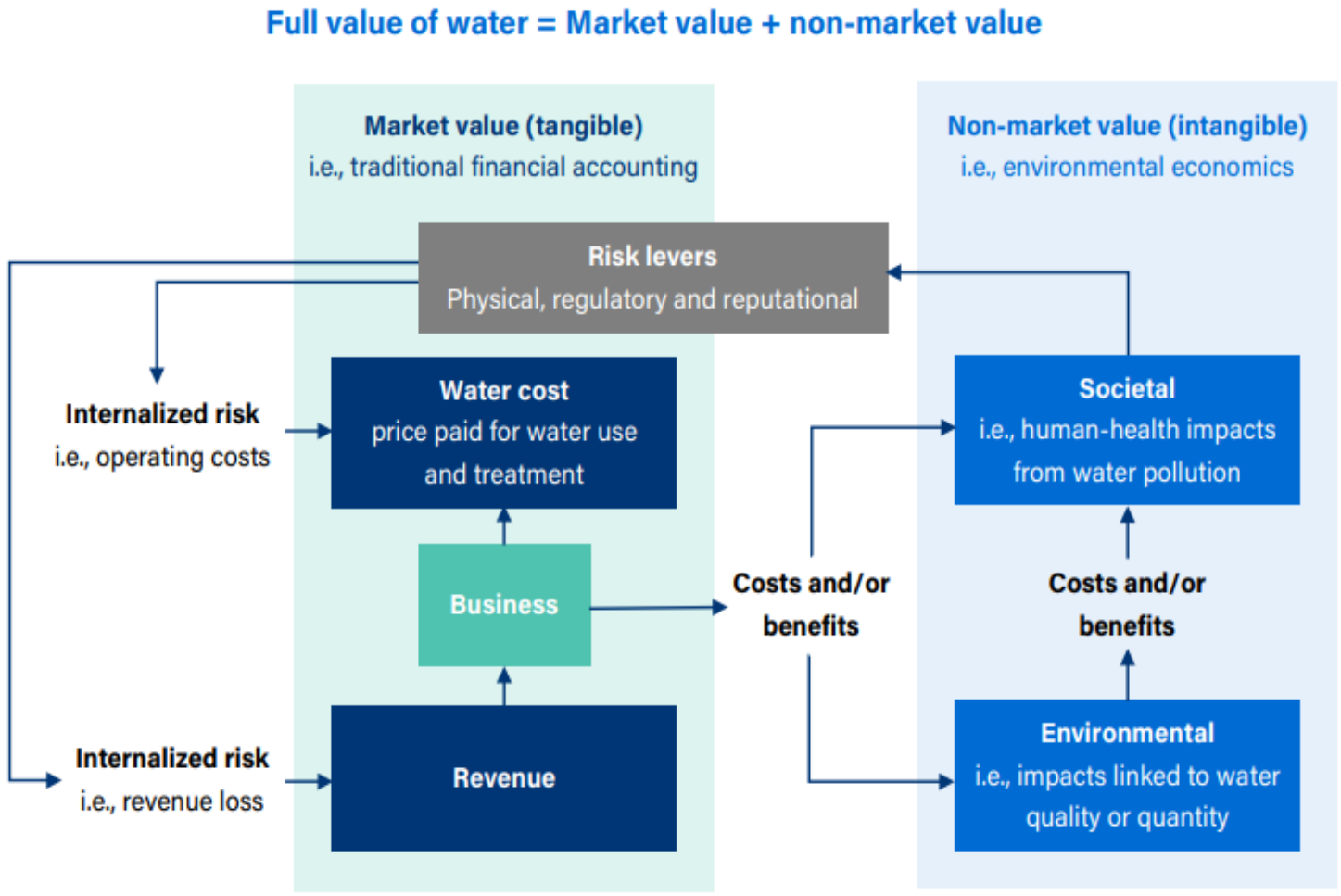
The Smart Water Navigator provides a comprehensive series of risk metrics to help businesses understand incoming (quantity and quality) risks and outgoing (quality) risks by using economic techniques to quantify the risks in financial terms.

The Smart Water Navigator is globally relevant, simple to use and applicable across a wide range of businesses and industries.

Fig. 1: Linking water risk metrics to business decision making



Source: Smart Water Navigator (2024)

The Ecolab Smart Water Navigator

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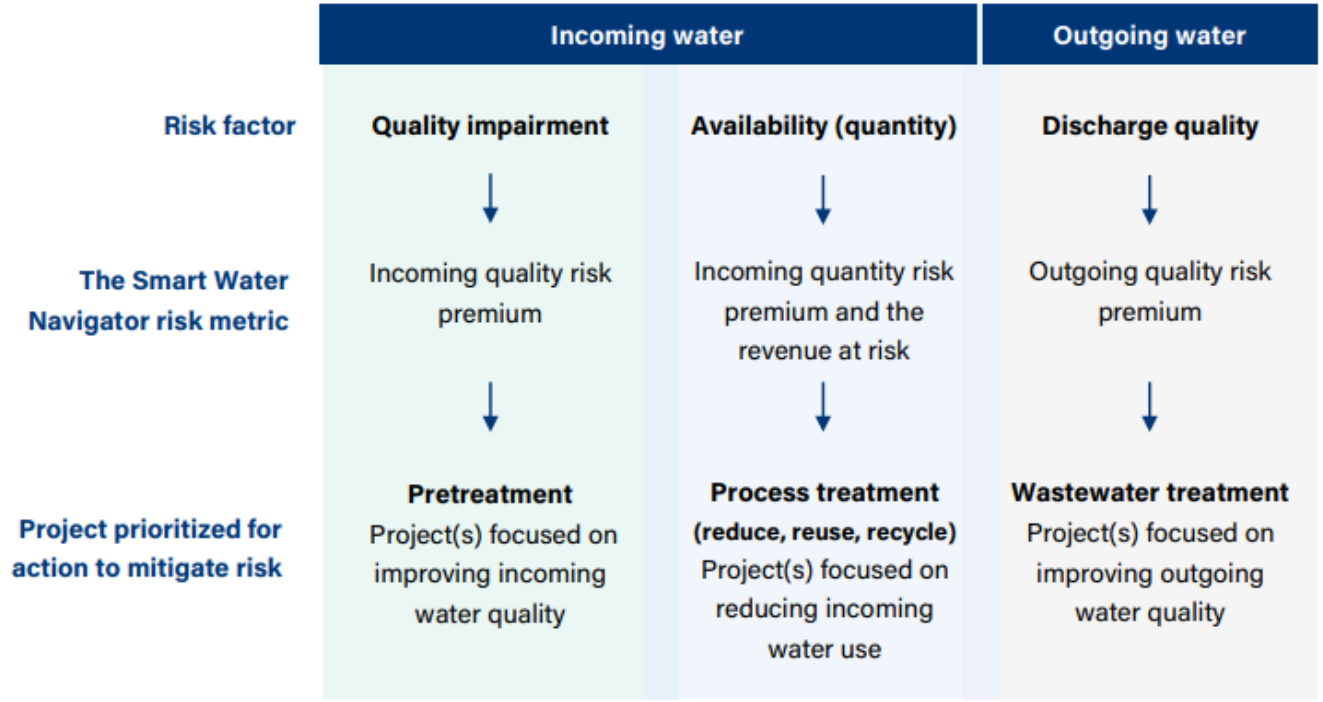
Fig. 2: Total Economic Value Framework for Incoming Water Risk (Deep Dive)

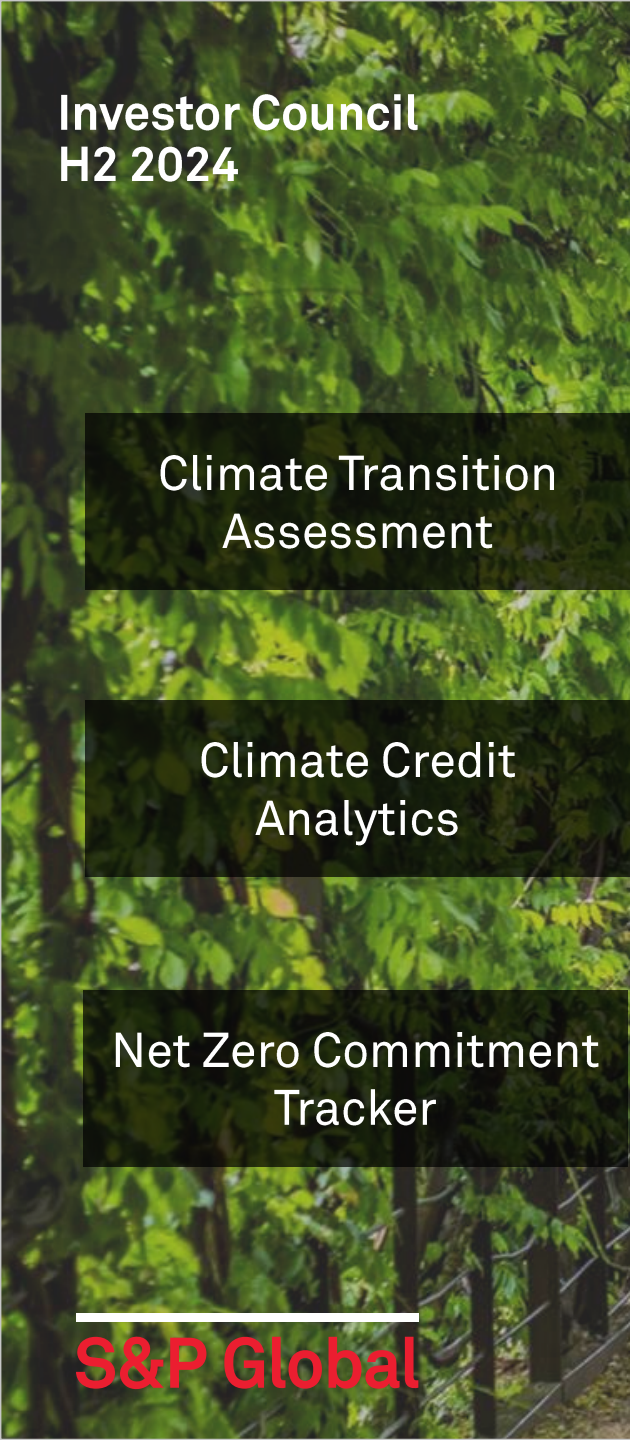
Full value of water	Non-market (Intangible)	**Human-health impacts** | The value of human-health impacts due to the reduction in water available for agriculture and increased incidence of water-borne diseases **Environmental impacts** | The value of environmental impacts on local ecosystems as a result of water depletion **Domestic value** | The value of water supply to the domestic population	Incoming quantity risk premium
		Future treatment costs | To improve the quality of incoming water in line with business requirements or the cost of sourcing water from an alternative location	Incoming quality risk premium
	Market (Tangible)	**Administration** **Operations and maintenance** **Capital**	Incoming water price

Source: Smart Water Navigator (2024)

Fig. 3: An example of using water risk metrics to guide the business decision-making process



Source: Smart Water Navigator (2024)



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H2 2024

Climate Transition Assessment

Climate Credit Analytics

Net Zero Commitment Tracker

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From ESG to (Valuation Impact):
Evaluating Our Sustainability Investing Toolkit

Use Case	Persona	Methodology	Inputs	Valuation Impact
Green equity labeling, IPO, FI Disclosure/ Communications Input to portfolio analysis	Market Risk Equity Research Portfolio Managers Risk	A Shade of Green to reflect the company's expected future consistency w/ a low-carbon, climate resilient future	Disclosure, Revenues, capex, and company action plans, direct access to management	Robustness/ attractiveness of equity & debt financing to climate-focused investors
Scenario Analysis Stress Testing Credit Risk Analysis	Credit Analysts Portfolio Managers Risk Teams	Modelling adjusted financials & credit risk metrics driven by climate change scenarios	S1 Climate Datasets Credit Models Financial and Reference Data	Direct modelling of adjusted financials and credit risk metrics
Net Zero Strategy Portfolio Inclusion /Exclusions Engagement Reporting	Equity Research Portfolio Managers Engagement Teams	Standardized emissions reduction commitments Temperature aligned future emissions projections based on commitments	Company disclosure IEA IPCC CDP	Reputation risks associated with poor performance vs peers Market price pressures due to index inclusion/exclusion

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Climate Value-at-Risk

Paris Alignment Dataset

Physical Risk Scores & Financial Impact

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From ESG to (Valuation Impact):
Evaluating Our Sustainability Investing Toolkit

Use Case	Persona	Methodology	Inputs	Valuation Impact
Stress Testing Scenario Analysis Risk Management Reporting	Corporates/Issuers Credit Research Teams Risk Teams Portfolio Managers	Projected change in equity price due to impact of physical and transition risk on projected earnings	Disclosure IEA, IPCC, CDP CMIP6 Climate Model, Geographic Revenue Asset Level Data	Change in revenue, OpEx and earnings Change in market price
Net Zero Strategy Portfolio Inclusion/ Exclusions Engagement	Equity Research Portfolio Managers Engagement Teams	Projection of future emissions and implied temperature alignment	Company disclosure IEA IPCC CDP	Reputation risks Market price pressures due to index inclusion / exclusion
Stress Testing Scenario Analysis Reporting	Equity Research Credit Analyst Portfolio Managers Engagement Teams	Projected exposure to climate physical hazards and resulting financial impact at the asset and company level	Company disclosure IEA, IPCC, CDP CMIP6 Climate Models Geographic Revenue Asset Level Data	% financial impact due to changes in revenue, OpEx and capex

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Nature & Biodiversity Risk Dataset

Environmental Dataset

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From ESG to (Valuation Impact):
Evaluating Our Sustainability Investing Toolkit

Use Case	Persona	Methodology	Inputs	Valuation Impact
Stress Testing Scenario Analysis Reporting	Portfolio Managers Real Assets and Infrastructure Mortgage/ Loanbook	Projected financial impact due to climate physical hazard exposure at the asset level	CMIP6 Climate Models Impact function library	% & absolute financial impact by impact pathway e.g., business interruption, cleanup, repair costs
Reporting Portfolio Inclusion/ Exclusions Engagement Strategy	Equity Research Credit Analysts Portfolio Managers Engagement Teams	Asset level impact and dependency on ecosystem services derived from nature and biodiversity	WCMC Asset Level Data Other Sources	reputational, license to operate & resource constraint drivers linked to nature, market price pressures from index inclusion / exclusion
Reporting Exclusion Screens Engagement	Equity Research Portfolio Managers Engagement Teams	Comprehensive carbon and environmental data based on disclosed and modelled emissions	US BEA Company Disclosure Other Sources	Index/portfolio exclusion based on impact intensity or fossil fuel involvement

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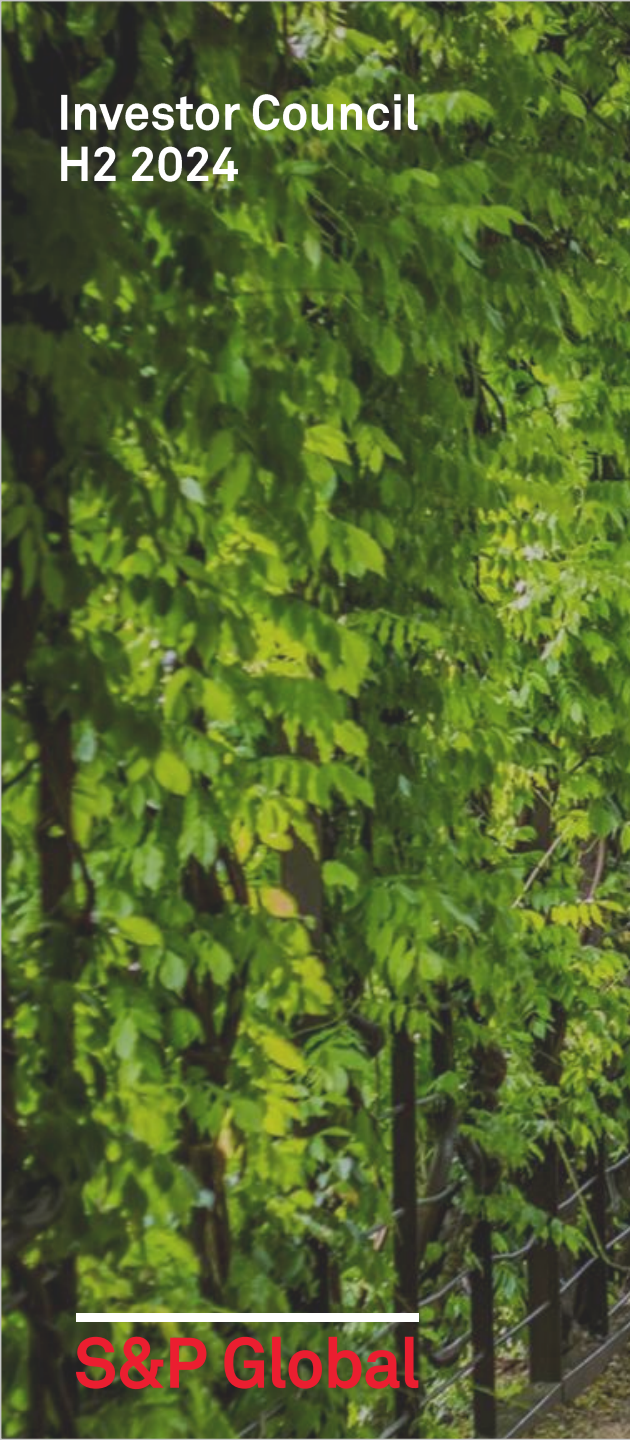
Use Case	Persona	Methodology	Inputs	Valuation Impact
Reporting Portfolio Inclusion/ Exclusions Engagement Strategy	Equity Research Portfolio Managers Engagement Teams Risk Teams Quant Teams Credit Analysts	A score of 0-1 reflecting a company's performance on & management of material ESG risks, opportunities, and impacts.	Direct corporate engagement through the Corporate Sustainability Assessment Corporate Reporting, Websites, Filings 3rd party websites (e.g. SBTI, UNGC, UNPRI) NGO's & News Sources RepRisk event cases	Indirect valuation impact due to reputational, license to operate and resource constraint drivers linked to ESG Reputational pressure Market price pressures due to index inclusion/exclusion



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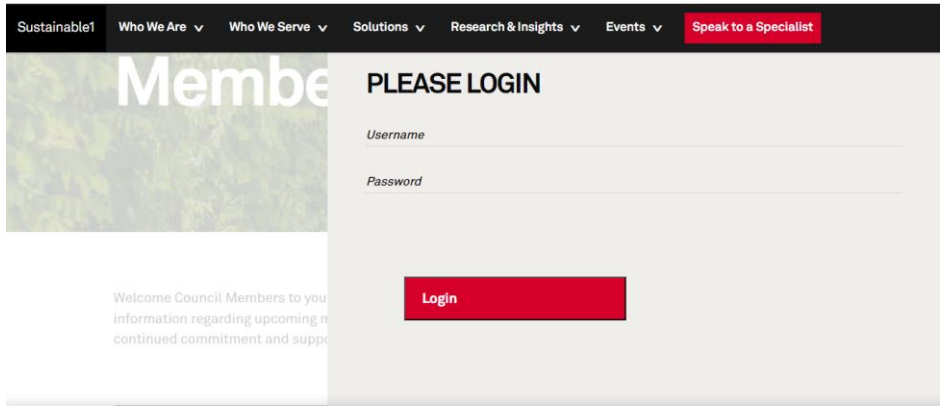

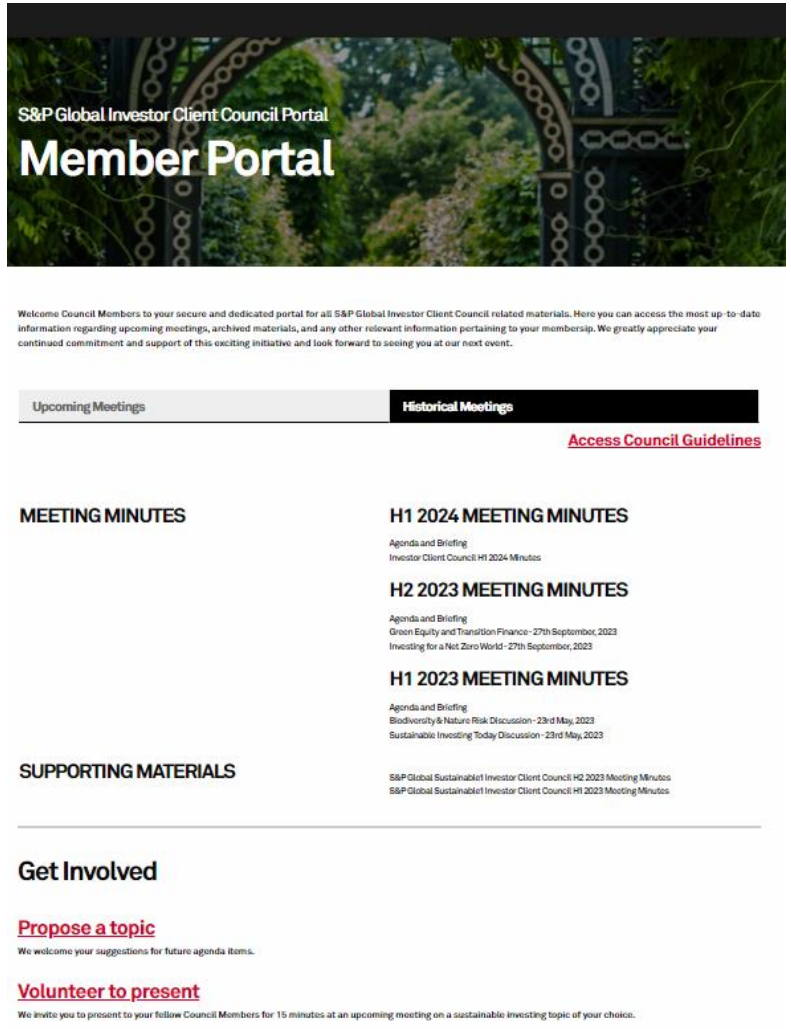

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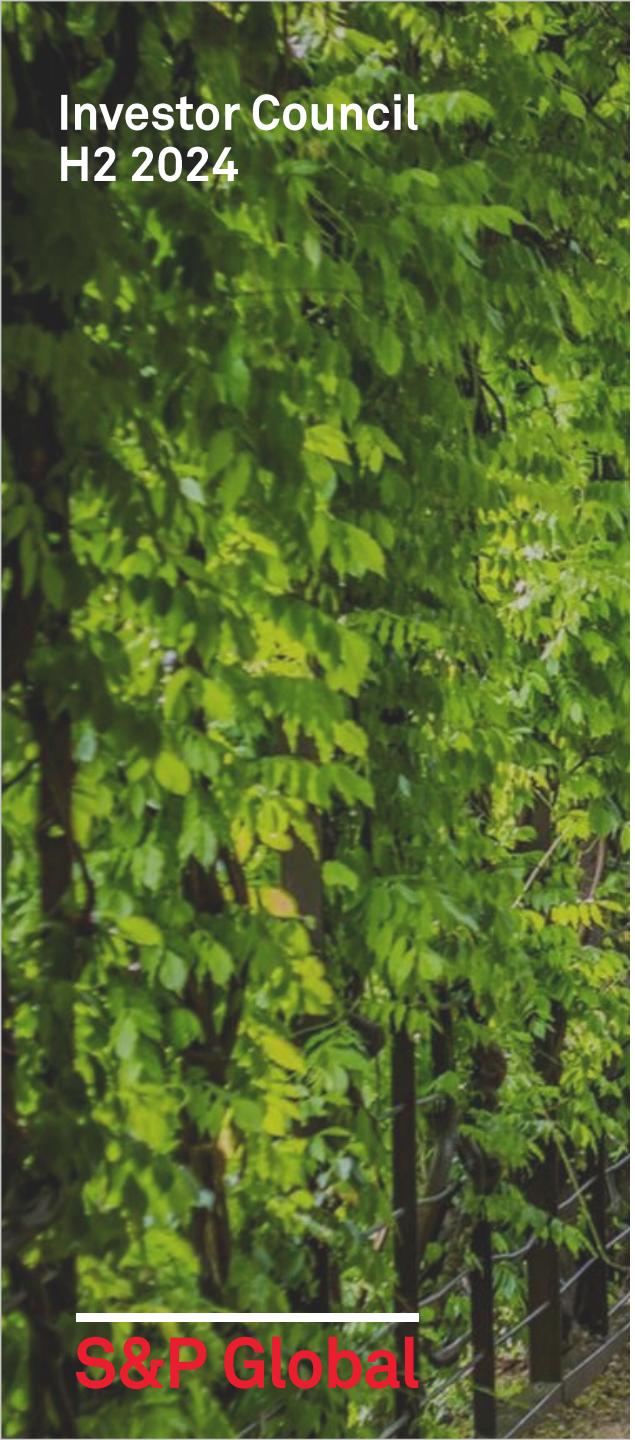

From ESG to (Valuation Impact):
A Financially Material Lens on Sustainability

Thank you for your participation!

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