Advancing Climate Metrics

TOWARD QUALITY, CONSISTENCY & SCALABILITY

2023 Climate Business & Investment Conference at Columbia Business School
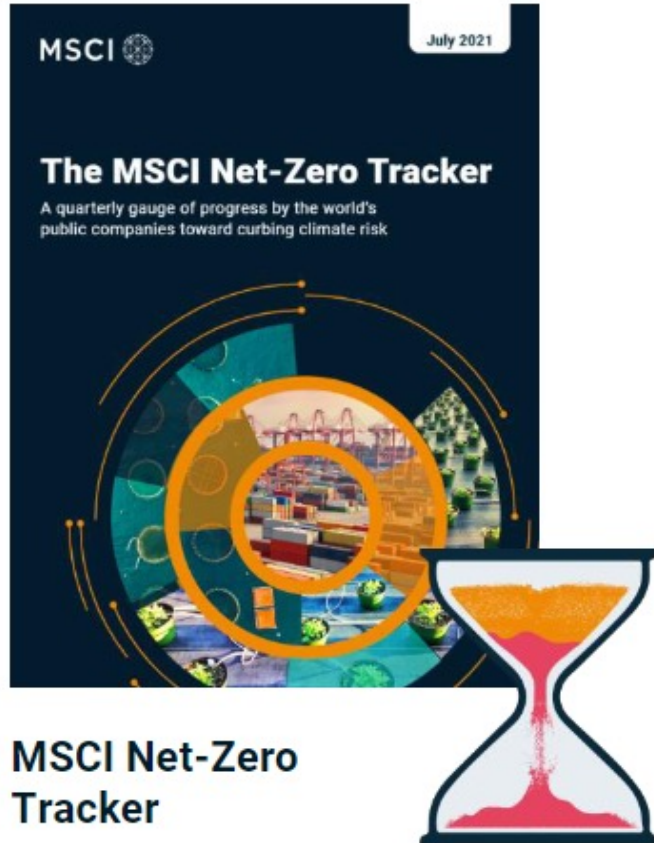
Linda-Eling Lee, Ph.D., Managing Director, MSCI

28 April 2023

MSCI's Call to Action: The Net-Zero Revolution

**The Role of Capital in the Net-Zero Revolution**

MSCI Net-Zero Tracker

> Capital markets are an essential and critical force to drive the transition to net-zero with concerted action from all participants, ranging from a reallocation of capital by asset owners, to effective channelling of funds by asset managers and banks to greener investments and innovation, alongside the commitment of companies.[1]

-- Henry Fernandez
   Chairman and Chief Executive Officer, MSCI

At Enterprise Level: TCFD reporting
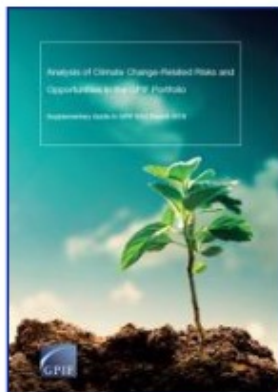
GPIF compared the impact of a 1.5°C pathway scenario vs. a 3°C scenario on the valuation of their portfolios.
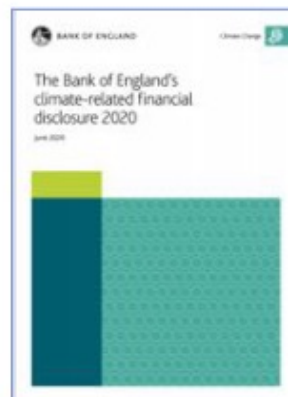
BOE compared the temperature alignment of their portfolio to its benchmark's.

AXA analyzed the impact of their divestments on the temperature alignment of their current holdings.
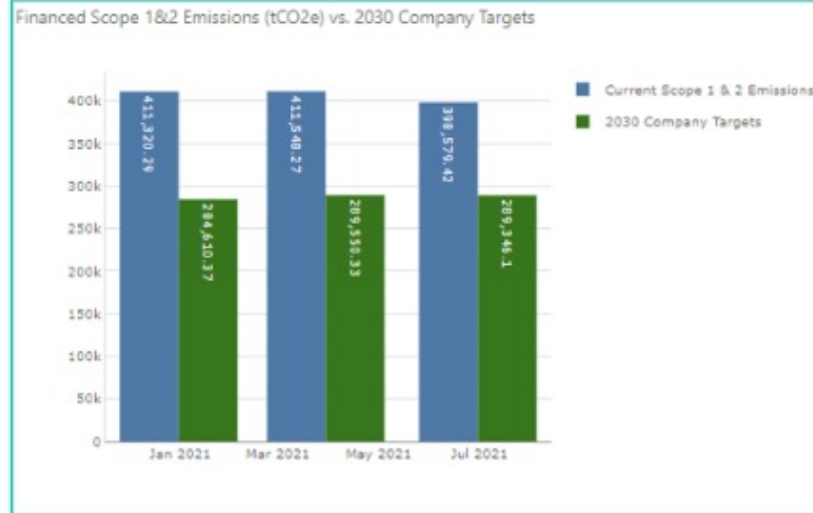
CalPERS analyzed the extent to which climate risks may present a 'drag' on returns.
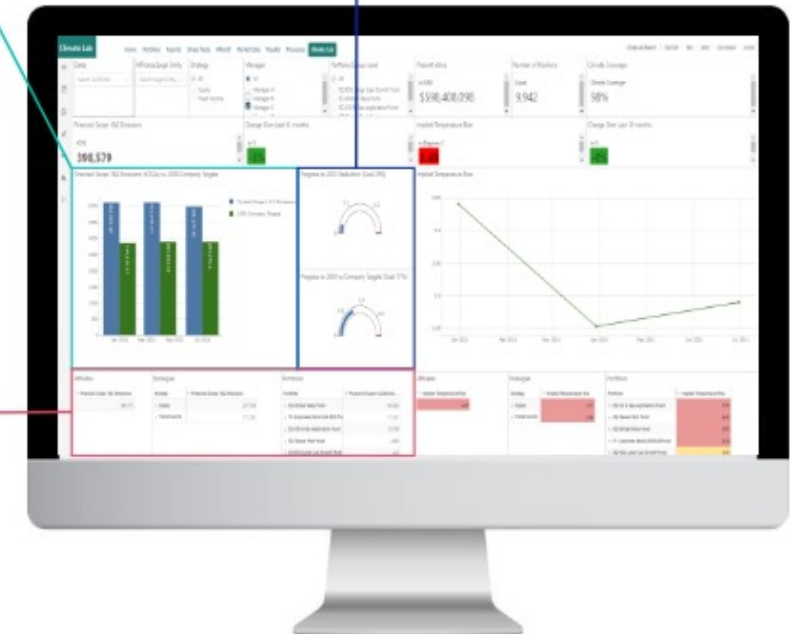
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Need for systematic monitoring in order to mobilize all parties across the enterprise to consider climate risks & impacts
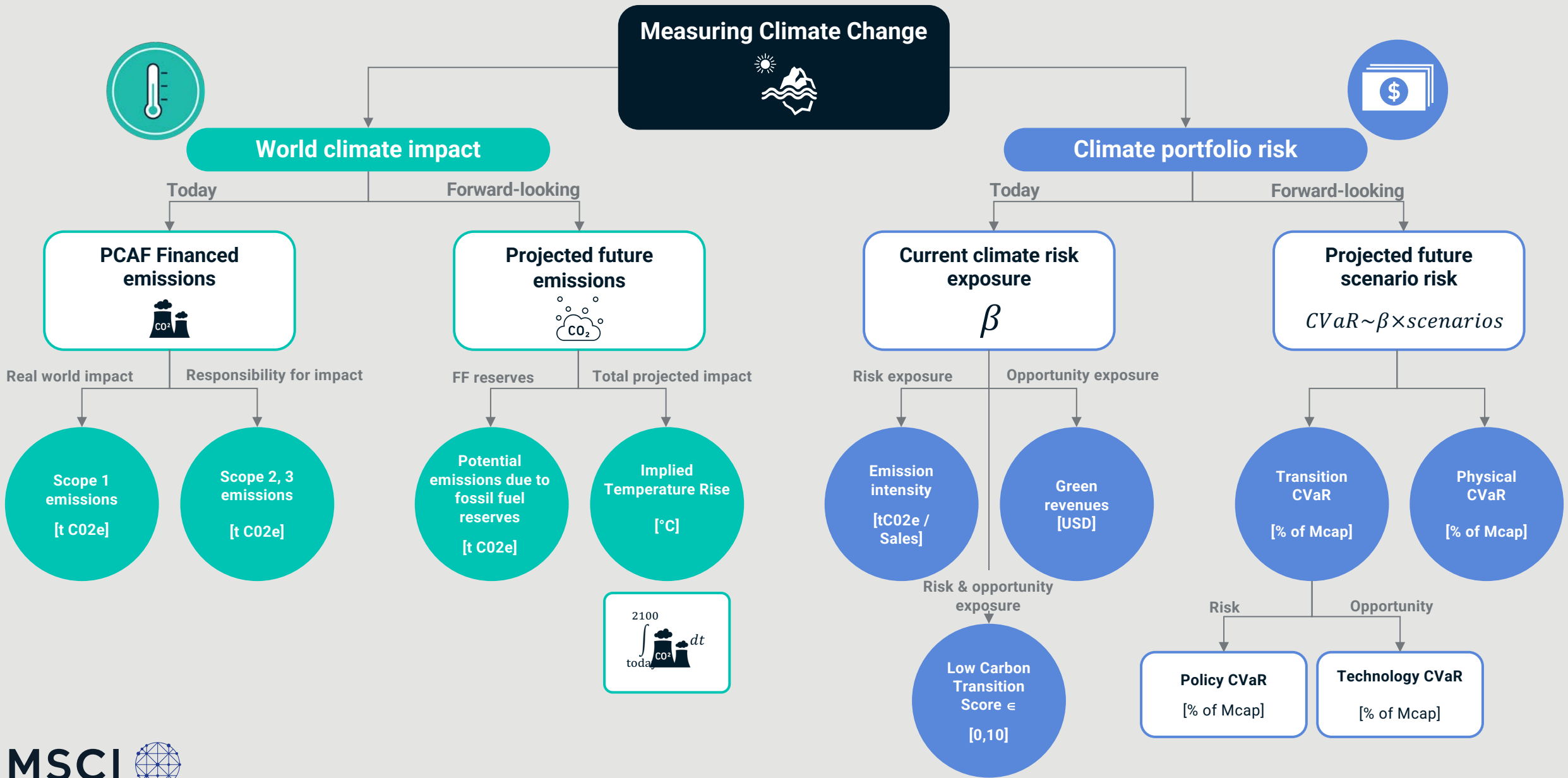
- **Need for systematic overview**
- **Should encompass affiliates, all asset classes, all portfolios**
- Need robust enterprise system to ensure external reputational risk is managed properly
- Customization capabilities allow you **to tailor your analyses** to your firm's specific targets
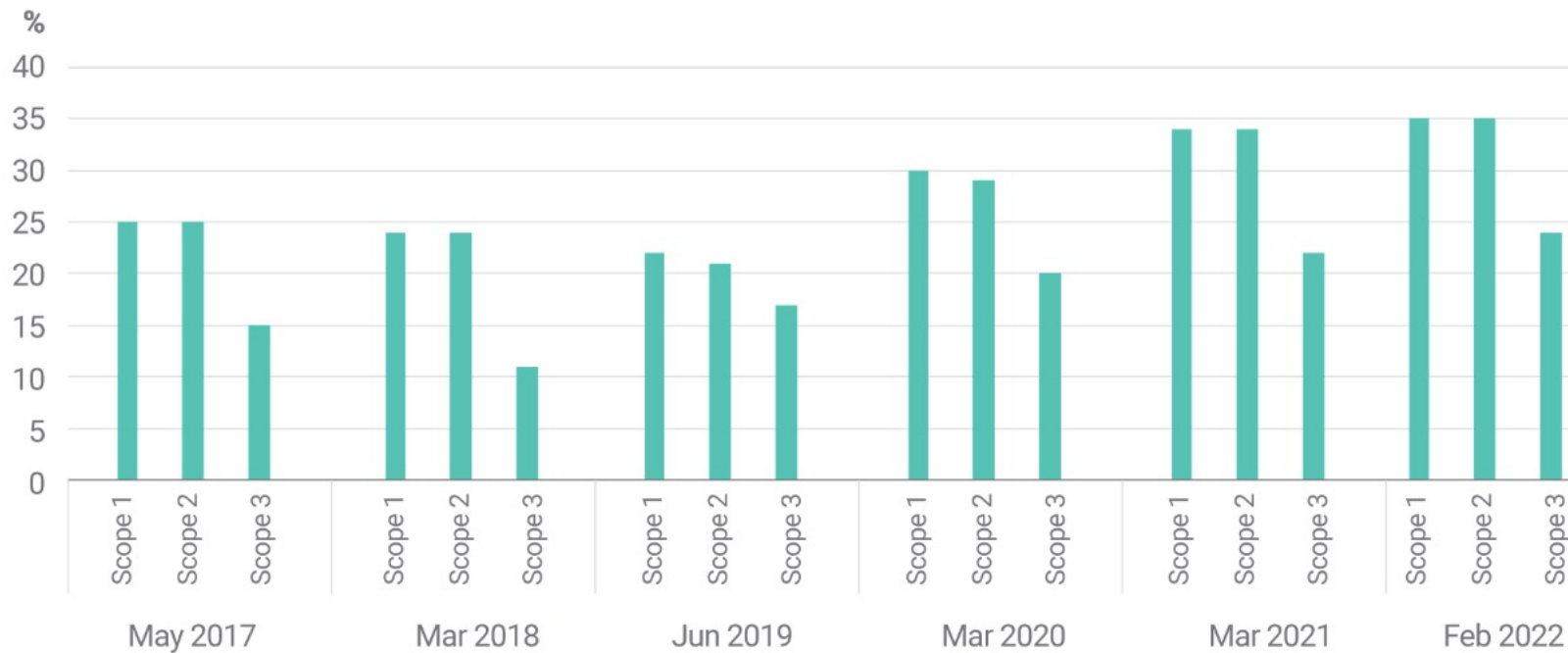
Understanding MSCI's Climate Metrics
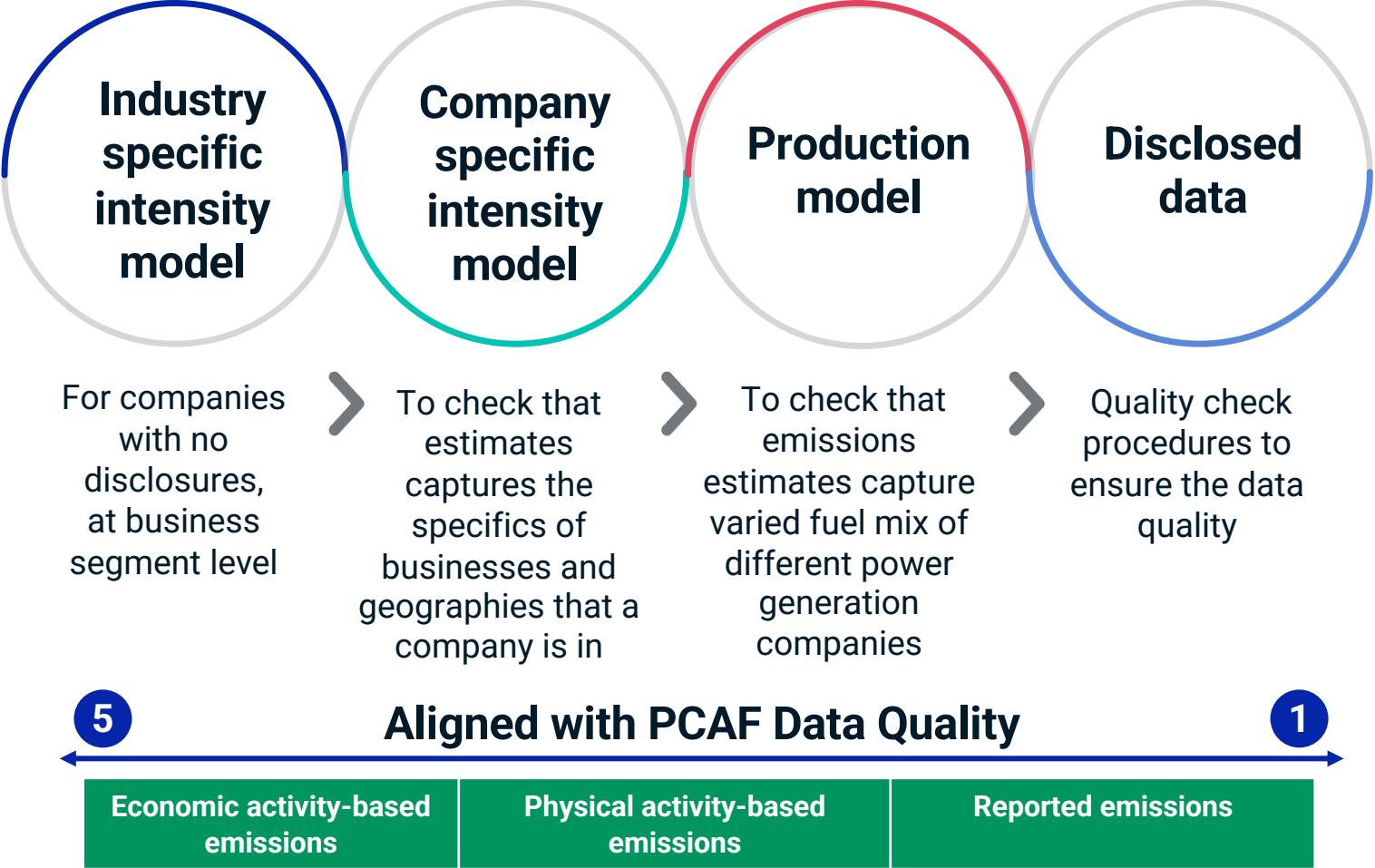
Emissions disclosure rates remain low

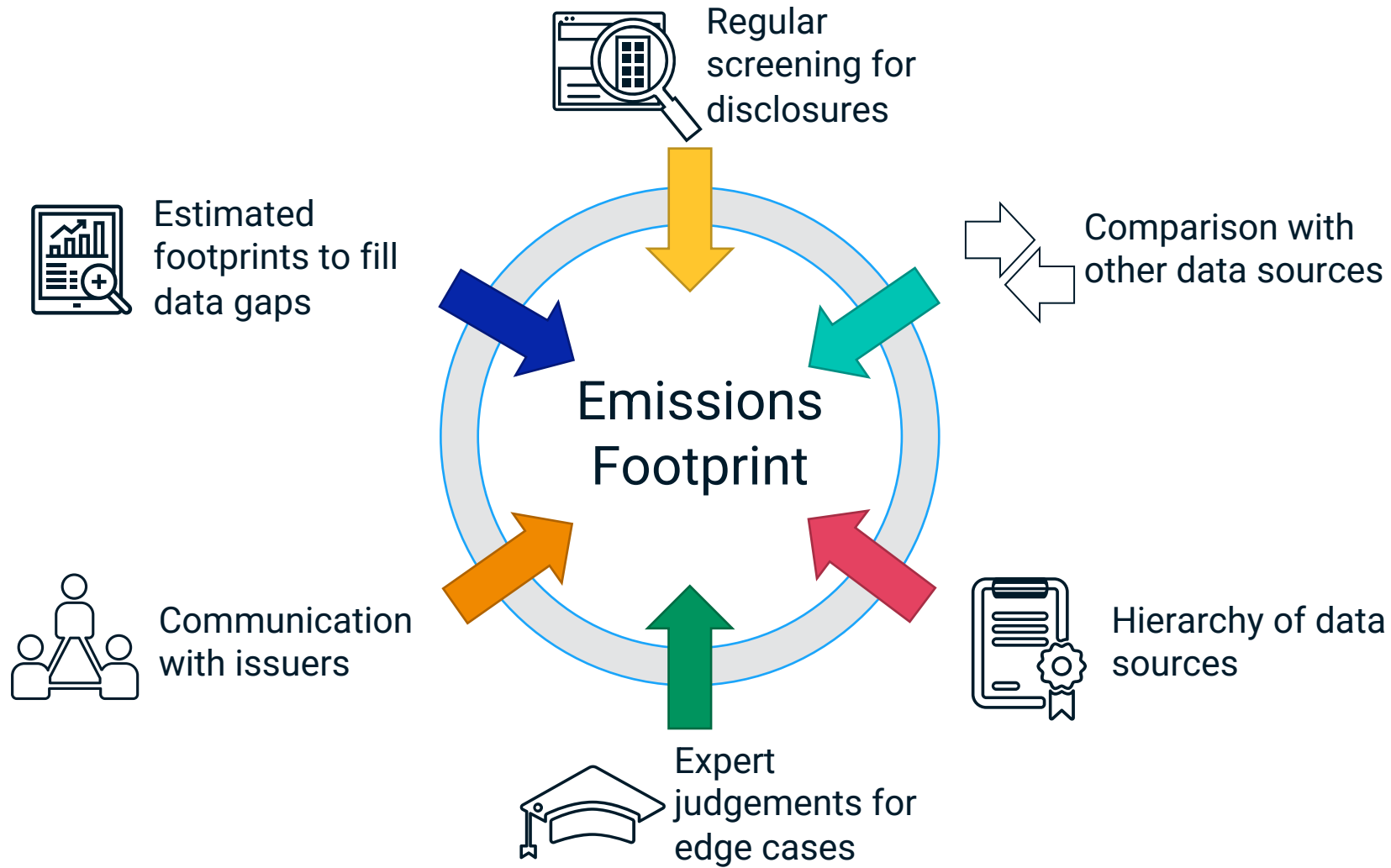**GHG-disclosure rates for MSCI ACWI IMI constituents**

- Disclosure rates are increasing but remain at a low level
- Especially for Scope 3, data quality poses an issue besides coverage
- Automated checks as well as other governance processes are necessary

Approach for estimating emissions across your portfolio

We have designed our methodology to align with the PCAF standard across the process:

Industry specific intensity model

Company specific intensity model

Production model

Disclosed data

For companies with no disclosures, at business segment level

> To check that estimates captures the specifics of businesses and geographies that a company is in

> To check that emissions estimates capture varied fuel mix of different power generation companies

> Quality check procedures to ensure the data quality

5 **Aligned with PCAF Data Quality** **1**

Economic activity-based emissions	Physical activity-based emissions	Reported emissions

Many checks required to ensure data quality & consistency (Scope 1, 2, 3)

Regular screening for disclosures

Comparison with other data sources

Estimated footprints to fill data gaps

Emissions Footprint

Hierarchy of data sources

Communication with issuers

Expert judgements for edge cases

Applying AI & NLP to multiple data sources in the QA process

- **Lack of data disclosure standards** make it challenging to capture ESG & Climate data in a timely and accurate manner. Usage of **multiple data sources** for collection and triangulation is a must have.
- **AI and NLP applied to these multiple sources of data to create a complete picture t**hat complement our data collection and QA processes and **assist our domain experts.**

Information Detection

- **Capability to detect relevant information** for analysts across various sources enabling informed decision
- **Processes built to improve accuracy of data sourcing** through improved recall, **better timeliness** and provide **increased coverage**
- **Effective filtering content (noise reduction) and provide recommendations** thereby increasing analyst throughput

Entity and Facts Extraction

- **Capabilities for identification of entities (organization, people, etc**.) in semi-structured and unstructured sources
- **Processes for detection of facts in documents and extraction of corresponding facts** present in tabular structures, text, images
- **Models using computer vision, segmentation, etc.** to process raster data (geospatial) and extract relevant facts

Anomaly Detection

- **Processes for identification of anomalies** at data point level, peer group behaviors as well as through transversal relations with other data points
- **Unique entity / duplicate detection capabilities** which learn from analyst feedback and improve over time
- **Processes to use language understanding** to review analyst content and flag **errors through sentiment analysis, false usage detection, etc.**

Research & Development

- Continuous pipeline of experiments which fuel our next generation capabilities
- **About 20% of team efforts** spent on evaluation of new techniques, models, concepts, etc.
- **Research work tagged to specific projects** and part of execution. No "academic research" initiatives
- Focus areas include summarization, language models for extraction, data augmentation, reinforcement learning, etc.

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MSCI's Asset Location Database (ALD)

- Combines company-level data with information on commercial assets including geolocation, size, asset activity, etc.
- Spatial database of over 1 million company locations worldwide
- Enables the 'bottom-up' nature of our climate and biodiversity models
- ALD data can be aggregated at the company, portfolio, regional or global level
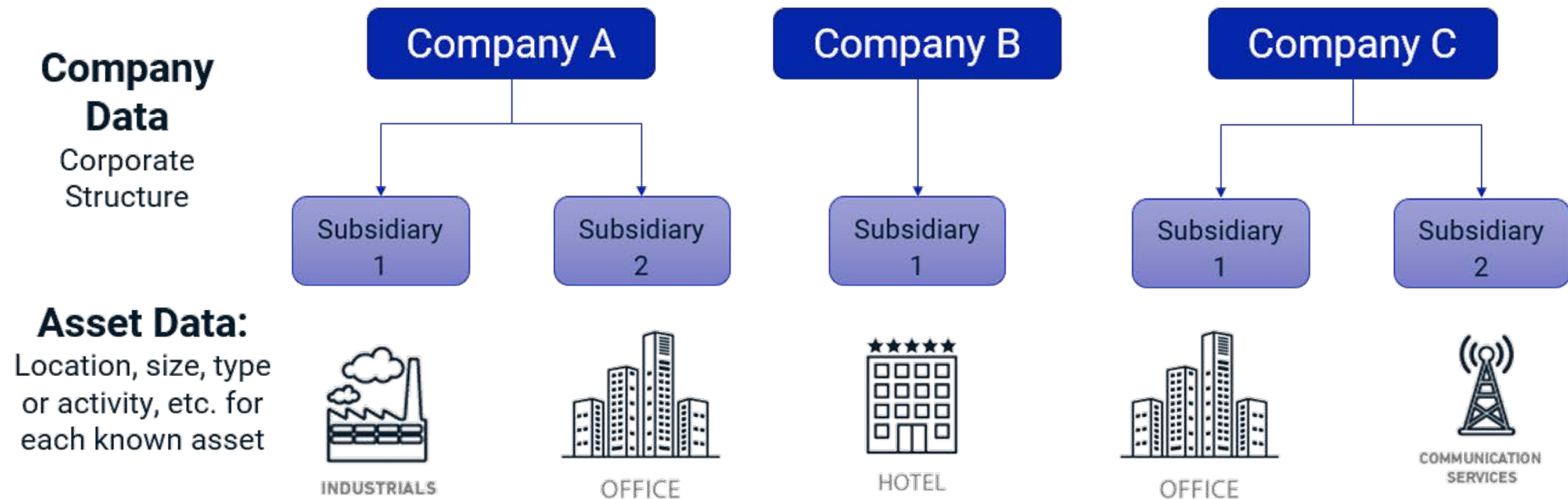
Geospatial data processing at scale to enable Physical Risk Modeling

- To calculate the physical risk that a company is exposed to (for example flood risk), we need to know where the physical assets (offices, factories, …) are and what their value is.

- Key inputs into the value of a physical asset are its size and associated revenues. Factual data on size of physical assets is lacking at scale. Our research methodologies require **building height** and **building footprint (area) on the surface of the earth** for calculation.

- Traditionally this data required substantial manual sourcing and cleaning. To vastly scale data collection, (10X in number of physical assets; 6X in number of issuers), we are building capabilities, including:
  - Significant investments in our Geospatial data processing **infrastructure**
  - **Deriving physical assets attributes by processing geospatial datasets (satellite images, lidar data, surface models) at planetary scale**

Solutions

LIDAR Survey used for Building Height calculation
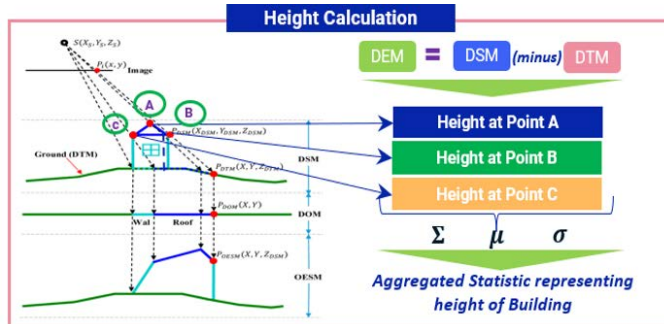
- **High resolution LIDAR survey (0.5 meter) data**, which provide distances of natural/man-made objects from a point in the sky
- **Building heights are calculated as a difference between surface (DSM) and terrain (DTM) models**
- **Computation model scaled globally through Google Earth Engine**, thereby being able to calculate heights for buildings anywhere in the world

Computer Vision (Image Segmentation) for Building Footprint Detection

- **Trained a custom image segmentation model** specialized on detecting buildings on a map
- **Leveraging images available through LANDSAT** to detect buildings in areas of interest
- **Proprietary methodology to convert "building footprints" on the map into vectors of co-ordinates**, which can be used for model calculations

Location Matters: Using geospatial analysis to assess biodiversity risks

Industries with operations in biodiversity-sensitive areas

Mean Species Abundance (MSA) >= 0.56
0.92
0.56

Percentage of assets in biodiversity sensitive areas
- Electric Utilities (11%)
- Independent Power & Renewable Electricity Producers (9%)
- Metals & Mining (8%)
- Multi-Utilities (6%)
- Paper& Forest Products (6%)
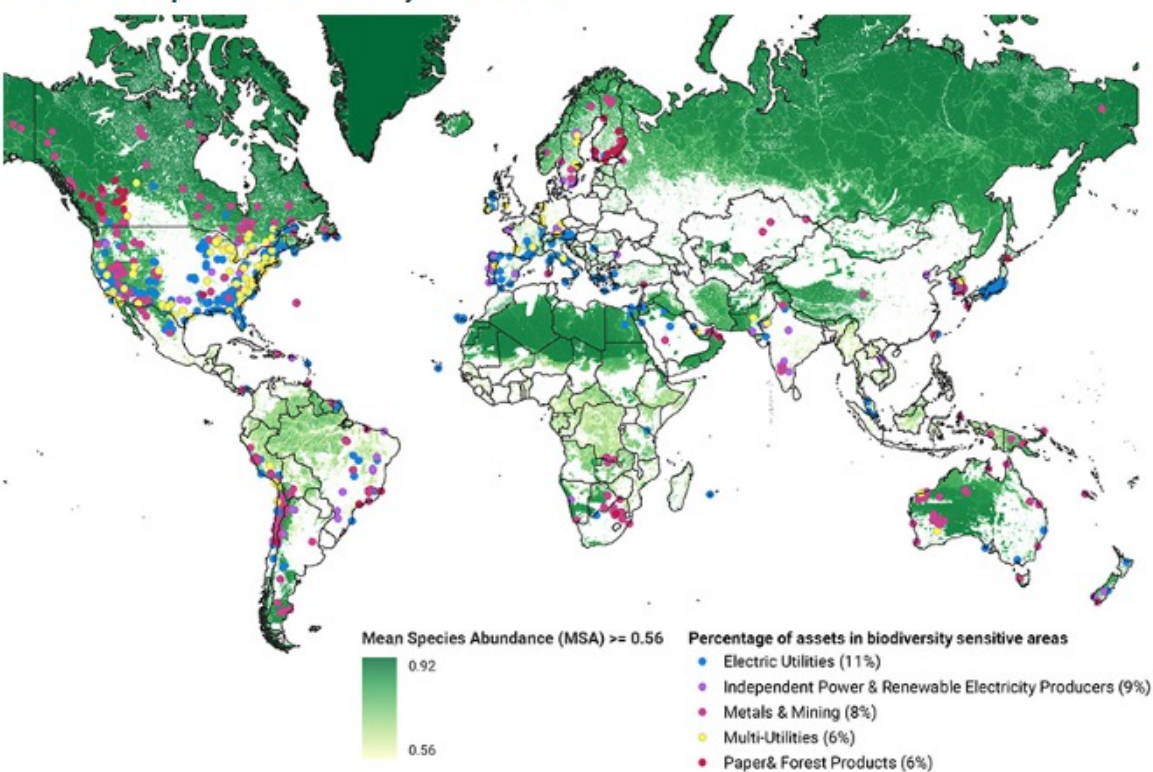
Data as of April 6, 2022. The "Mean Species Abundance" (MSA) metric indicates the local biodiversity intactness and is derived using the Global Biodiversity Model for Policy Support (GLOBIO). The GLOBIO model calculates local terrestrial biodiversity intactness by assessing anthropogenic pressures on the environment. MSA ranges from 0 (=all original species extinct) to 1 (fully intact environment) with 0.56 representing the global area-weighted mean for 2015 data as of April 12, 2022, with a total universe that includes the 2,850 constituents of MSCI ACWI Index. Schipper, Aafke, et al. "Projecting Terrestrial Biodiversity Intactness with GLOBIO 4." PBL, Nov. 3, 2019. Source: GLOBIO, MSCI ESG Research

Risk management in biodiversity-sensitive areas
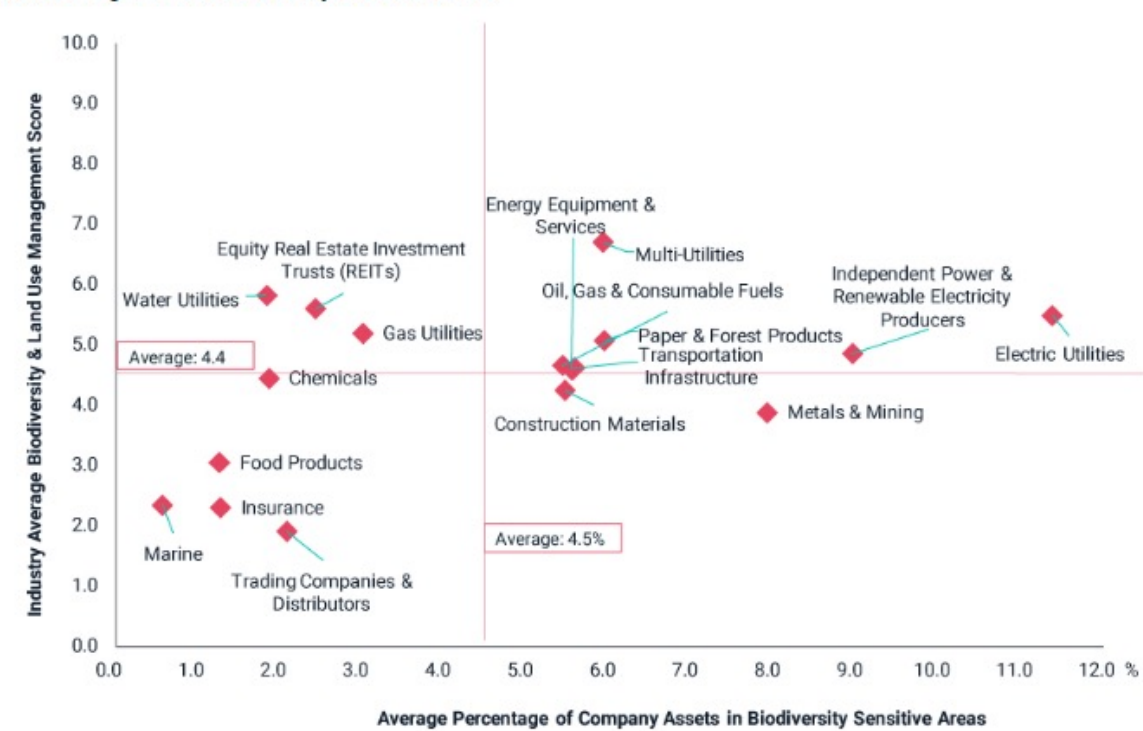
We considered an asset in an area with a MSA value above the global average of 0.56 is considered to be in a location that is more sensitive to adverse impacts. Total universe includes the 2,850 constituents of the MSCI ACWI Index. The "Biodiversity & Land Use Risk Management Score" is based on indicators such as policies, programs to address adverse biodiversity impacts and involvement in related controversies. 0 = lowest risk management capacity; 10 = highest. Sources: MSCI ESG Research, GLOBIO

Mollod, G. and Klug, A. 2022. "Location Matters: Using Geospatial Analysis to Assess Biodiversity Risks" MSCI Blog, May 10, 2022.

About MSCI: ESG

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Understanding MSCI's climate metrics

With an objective of **simplifying the growing maze of climate metrics** and **supporting institutional investors in selecting suitable metrics**, this report provides:

- In-depth overview of MSCI's climate metrics explaining their climate objectives, key strengths and limitations, and possible use cases

- A toolkit which suggests some key fundamental and practical questions, investors can ask to find suitable climate metrics

MSCI — MSCI ESG Research LLC

Understanding MSCI's Climate Metrics

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