FROM MSCI ESG RESEARCH LLC

THE STATE OF CLIMATE CHANGE RISK MANAGEMENT BY INSTITUTIONAL INVESTORS

Current Status and Future Trends

Short Version*

July 2017

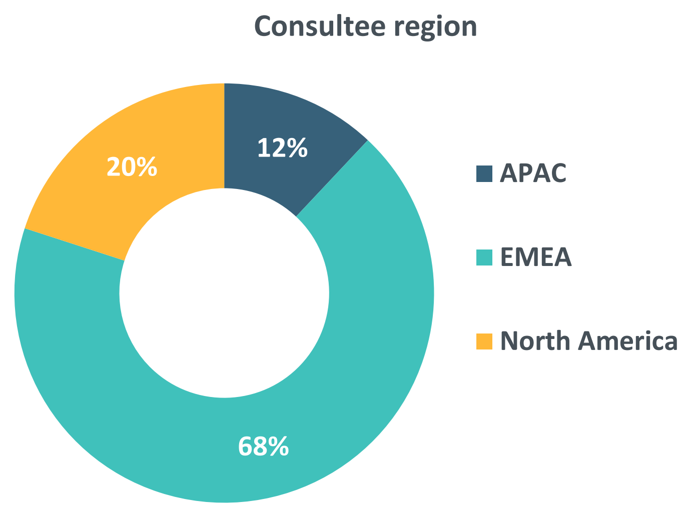
Manish Shakdwipee

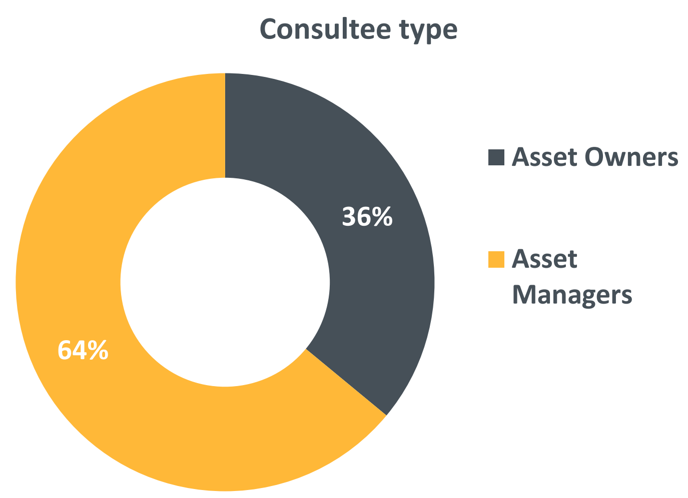
***The full version of this report is available to MSCI's clients on ESG Manager platform.**

MSCI

INTRODUCTION

- **This report details the status of climate risk management by institutional investors.**
- It further discusses three topics where institutional investors are turning to MSCI ESG Research for guidance:
  - Assessing Transition Risk in Portfolios
  - Carbon Footprinting of Corporate Bond Portfolios
  - Carbon Footprinting of Sovereign Bond Portfolios
- In order to gain insight on the current status of climate change risk management among institutional investors and to identify future trends, MSCI ESG Research LLC consulted with institutional investors from November 2016 to January 2017. The findings of this report are based on the above-mentioned consultation.





KEY TAKEAWAYS

Current Status:

- Primarily driven by initiatives such as the Montreal Pledge and the Portfolio Decarbonization Coalition, **carbon footprinting of equity portfolio remained a priority** for institutional investors.
- In order to **de-carbonize their portfolios**, the institutional investors we consulted have taken initiatives such as screening, divestment, and allocation to low-carbon indexes.

Future Trends:

- While **carbon footprinting** across asset classes was a **priority area** for most of the institutional investors we consulted, we also observed a **growing demand for integration of climate transition risk** in portfolios.

ASSESSING TRANSITION RISK IN PORTFOLIOS

- Increased interest in **integrating transition risk** into portfolio and risk analysis and for **'2-degree aligned' portfolio** construction
- Though **no consensus around the definition of '2-degree alignment'**

CARBON FOOTPRINTING OF CORPORATE BOND PORTFOLIOS

- Selection of allocation base was an issue of debate

CARBON FOOTPRINTING OF SOVEREIGN BOND PORTFOLIOS

- Preference for risk exposure based metrics – e.g. **weighted average carbon intensity of GDP**

Exhibit: Future Trends

KEY TAKEAWAYS CONTINUED…

- Institutional investors we consulted highlighted the importance of conducting **multi-dimensional assessment** of climate change risk and opportunities.

- While institutional investors were using various metrics and approaches to **assess transition risk** or **analyze portfolios**, we observed **demand for greater standardization**.

- **MSCI ESG Research LLC** – in its statement on the **TCFD's*** draft recommendations – highlighted the need for standard metrics and approaches, and multi-dimensional assessment of climate change risk and opportunities.

*TCFD: Task Force on Climate-related Financial Disclosures

CARBON RISK MANAGEMENT – WHERE ARE WE NOW?

INSTITUTIONAL INVESTORS’ EXPERIENCE WITH CARBON FOOTPRINTING TO DATE

- In 2015, we discussed how initiatives such as the Montreal Pledge and the Portfolio Decarbonization Coalition[1] were driving institutional investors to disclose the carbon footprint of their equity portfolios[2].
    - As of 1st June 2016, **more than 80%** of the signatories to Montreal Pledge had **disclosed the carbon footprint of their portfolios**.[3]
    - Reporting coverage was **generally limited to equities**. While disclosures included the carbon footprint of listed equities in 96% of cases, **fewer than 15% reported the carbon footprint for bonds**.[3]
- Institutional investors we consulted identified carbon footprinting…
    - .. as a **useful tool to identify hotspots** in a portfolio such as exposure to carbon intensive assets (e.g. thermal coal, oil sands) and exposure to clean-technologies...
    - .. as **setting a necessary baseline** to inform future actions…
    - .. but difficult to extend to **other asset classes**...
- Analysis **beyond equities** was identified as a **major limitation**.

[1] http://montrealpledge.org/; http://unepfi.org/pdc/
[2]Source: MSCI ESG Research, Carbon Footprinting 101: A Practical Guide to Understanding and Applying Carbon Metrics (Sep 2015).
[3]Montreal Carbon Pledge: Accelerating Investor Climate Disclosure. https://www.unpri.org/download_report/22480

CARBON RISK MANAGEMENT – WHERE ARE WE NOW?

Demand for carbon research can be grouped along three dimensions

1. **CARBON ANALYSIS OF PORTFOLIOS**

   Analysing carbon exposure of portfolios, including carbon footprint.

2. **DE-CARBONIZATION / SCREENING**

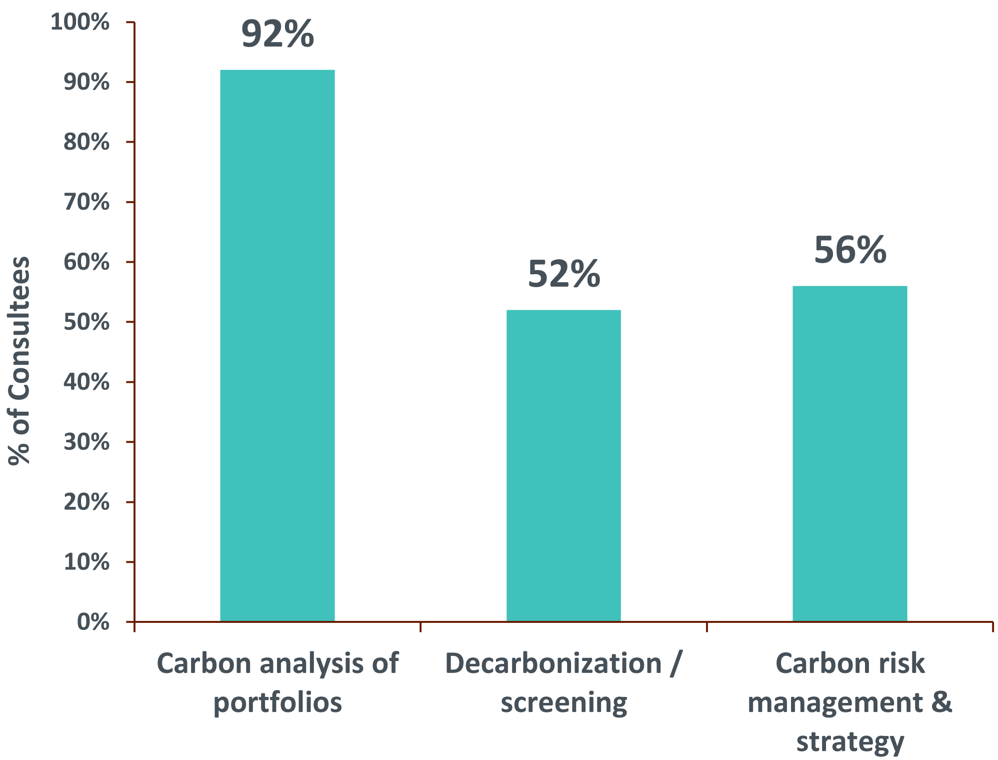
   Tilting or screening portfolios to reduce fossil fuel and carbon exposure, and/or increase clean-tech exposure.

3. **CARBON RISK MANAGEMENT & STRATEGY**

   Incorporating climate change into risk management strategies and scenario analysis, or construction of portfolio aligned with low-carbon trajectories.

CARBON RISK MANAGEMENT – WHAT'S NEXT?

INSTITUTIONAL INVESTORS' PRIORITIES OVER THE NEXT 12 MONTHS



- Over 90% of the institutional investors we consulted identified **carbon analysis of portfolios**, especially footprinting for fixed income, among their priorities for the upcoming year.
- European institutional investors showed more interest in the **'Carbon Risk Management & Strategy' approach**, which can largely be attributed to Article 173 of French Energy Transition Law.
- Institutional investors in North America showed more interest in a **'De-carbonization / Screening' approach**, partly driven by the California Department of Insurance's request in 2016.

OVER HALF OF THE INSTITUTIONAL INVESTORS WE CONSULTED WERE CONSIDERING MOVING BEYOND CARBON FOOTPRINTING. WHILE MORE ACTION WAS OBSERVED AMONG EUROPEAN ASSET OWNERS AND ASSET MANAGERS, WE OBSERVED RISING INTEREST FROM US AND ASIAN INSTITUTIONAL INVESTORS.

CARBON RISK MANAGEMENT – WHAT'S NEXT?
INSTITUTIONAL INVESTORS ARE ASKING FOR GUIDANCE

The following sections address three topics where institutional investors are turning to MSCI ESG Research LLC for guidance:

- ASSESSING TRANSITION RISK IN PORTFOLIOS
- CARBON FOOTPRINTING OF CORPORATE BOND PORTFOLIOS
- CARBON FOOTPRINTING OF SOVEREIGN BOND PORTFOLIOS

ASSESSING TRANSITION RISK IN PORTFOLIOS

MSCI ESG Research's Multi-dimensional framework for assessing climate change risks and opportunities

		RISKS		OPPORTUNITIES
Physical Risk	**Climate Change**	**EXTREME WEATHER EVENTS**	• Loss of physical assets located in vulnerable geographies. • Operational risk due to above reasons	**Climate change adaptation efforts**
		GRADUAL CLIMATE CHANGE	Assets stranding and/or operational risk due to: • Increased water stress in some geographies • Shortage of agricultural raw materials.	
Transition Risk	**Transition to Low-carbon Economy**	**DIRECT RISK** Risk due to regulations to reduce carbon emissions to: • High emitters • Industries producing products with high locked-in carbon emissions	**INDIRECT RISK** Asset stranding and/or revenue loss due to: • Reduced demand for certain products and services in low-carbon economy such as fossil fuels etc.	**Support to low/zero carbon technologies**

PHYSICAL EFFECTS OF CLIMATE CHANGE AND EFFORTS TO REDUCE GREENHOUSE GAS EMISSIONS ARE TWO KEY DIMENSIONS OF THE CLIMATE CHANGE PHENOMENON WHICH POSE BOTH RISKS AND OPPORTUNITIES FOR CORPORATES AND COUNTRIES.

MSCI

ASSESSING TRANSITION RISK IN PORTFOLIOS

REGULATIONS DRIVING DEMAND FOR TRANSITION RISK INTEGRATION

Regulations are driving demand for Transition Risk integration..

Paris Climate Agreement

Aims to keep global warming below 2°C and to pursue efforts to limit it to 1.5°C

French Energy Transition Law

Requires institutional investors to disclose integration of climate change-related risks

CA-DOI Call

California Department of Insurance asked insurance companies to voluntarily divest from thermal coal and provide information on any investments in the carbon economy

- Consultees showed growing interest in assessing transition risk in their portfolios, especially around '2-degree-aligned' portfolio construction…
- …but there was **no consensus** around the definition of '2-degree alignment'.

WE OBSERVED GROWING INTEREST IN INTEGRATING TRANSITION RISK IN PORTFOLIOS, BUT THERE WAS NO CONSENSUS AROUND THE DEFINITION OF A '2-DEGREE ALIGNED' PORTFOLIO.

ADDRESSING TRANSITION RISK IN PORTFOLIOS

VARIOUS METHODS AND DATA SETS EXIST…

TYPICAL APPROACHES	TYPICAL DATA SETS	MSCI ESG RESEARCH PRODUCTS
Reduce exposure to non-aligned assets • Screening & divestment from carbon-intensive assets • Allocation to low-carbon or fossil fuel free indexes	• Carbon emissions: Scope 1 + Scope 2 • Fossil fuel reserves • Fuel mix for electric utilities • Revenue from fossil fuels & related businesses	• **Carbon Metrics** • **MSCI Low-Carbon Indexes*** • **MSCI ex Fossil Fuel Indexes***

Increase exposure to assets aligned with low-carbon scenario
• Allocation to thematic / clean-tech indexes
• Allocation to green-bond indexes
	• Revenue derived from clean-technology products & services such as:
	  • Renewable energy
	  • Energy efficient equipment
	  • Green buildings etc.
		• **Environmental Impact Metrics**
		• **MSCI Global Environment Indexes***
		• **Bloomberg Barclays MSCI Green Bond Indexes**

Analyze companies' risk exposure and risk management
• Measure companies' exposure to transition risk and their risk mitigation efforts
• Identify best- / worst-in-class companies
	• Revenue and/or asset exposure to:
	  • Carbon-intensive businesses
	  • Highly-regulated geographies
	• Transition risk mitigation: performance, targets & programs, policies & oversight.
		• **MSCI ESG Ratings**

SELECTION OF DATA SETS AND TOOLS DEPENDS ON THE TRANSITION RISK INTEGRATION STRATEGY

* provided by MSCI Inc.

CARBON FOOTPRINTING OF CORPORATE BOND PORTFOLIOS

CURRENT STATUS & ANALYSIS OF DIFFERENT FOOTPRINTING METRICS

- As of June 1, 2016, fewer than 15% of carbon footprinting disclosures included bonds.[4] Further, carbon footprinting of fixed income portfolios was largely limited to corporate bonds.
- Like equity portfolios,[5] different approaches are being used to compute the portfolio carbon footprint for bonds. These are:

RISK EXPOSURE BASED APPROACH:

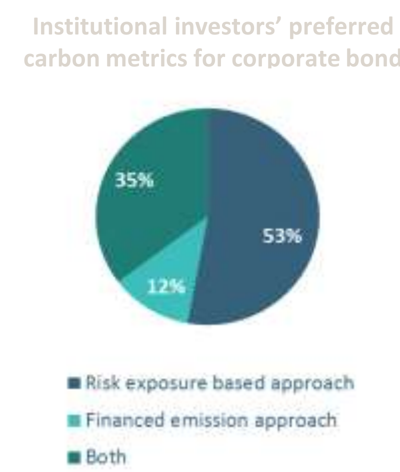
Understand exposure to carbon intensive issuers.

- More than 85% of consultees were inclined to use this approach - with over half showing clear preference for it.
- This approach uses **Weighted Average Carbon Intensity (WACI)** metric.
- **WACI** metric is r**ecommended** by the **TCFD** in its final report

FINANCED EMISSIONS APPROACH:
Estimate the amount of carbon associated with the investment

- 47% of the consultees were inclined to use this approach – though only 12% of them showing clear preference for it
- Allocates a constituent company's carbon emissions to a portfolio in proportion to the portfolio's share of that company's total financing. This **'total financing'** metric is used as **allocation base** for footprinting fixed income portfolios.

CONSULTATION FEEDBACK:



GROWING DEMAND FOR FOOTPRINTING OF CORPORATE BOND PORTFOLIOS BUT NO CONSENSUS AMONG INSTITUTIONAL INVESTORS ON ALLOCATION METRICS FOR CORPORATE FIXED INCOME SECURITIES.

[4]Montreal Carbon Pledge: Accelerating Investor Climate Disclosure. (https://www.unpri.org/download_report/22480)
[5]Source: MSCI ESG Research, Carbon Footprinting 101: A Practical Guide to Understanding and Applying Carbon Metrics (Sep 2015).

MSCI

CARBON FOOTPRINTING OF SOVEREIGN BOND PORTFOLIOS

COUNTRIES HAVE COMMITTED TO REDUCING CARBON EMISSIONS

Events leading to Paris COP21

Durban: COP17, 2011

- Governments committed to a new universal climate change agreement by 2015 for the period beyond 2020.
- All Parties decided to communicate their 'Intended Nationally Determined Contributions' (INDCs) well in advance of COP 21.

Pre COP 21

197 countries/regions responsible for 98.9% of global GHG emissions submitted their INDCs by March 2017.

Pre COP 21

The synthesis report published analyzed INDCs of 147 parties (submitted before October 1st 2015) representing 86% of global emissions in 2010.

COUNTRY	EMISSIONS REDUCTION TARGET	BASE YEAR	TARGET YEAR	TARGET TYPE
China	60% - 65%	2005	2030	Intensity
USA	26%-28% (now withdrawn)	~~2005~~	~~2025~~	~~Absolute~~
EU	Min. 40%	1990	2030	Absolute
India	33% - 35%	2005	2030	Intensity
Brazil	37%	2005	2025	Absolute
Russia	25%-30%	1990	2030	Absolute
Japan	26%	2013	2030	Absolute
Canada	30%	2005	2030	Absolute
Australia	26%-28%	2005	2030	Absolute

Source: INDCs, UNFCCC

COUNTRIES' CURRENT COMMITMENTS COULD LIMIT THE TEMPERATURE RISE TO AROUND 2.7 DEGREES BY 2100 (AS COMPARED TO A 2-DEGREES TARGET) - INDICATING THAT, IN FUTURE, THE EMISSIONS REDUCTION TARGETS COULD BECOME EVEN MORE STRINGENT…

MSCI

CARBON FOOTPRINTING OF SOVEREIGN BOND PORTFOLIOS

ANALYSIS OF DIFFERENT FOOTPRINTING METRICS

As with corporates, there could be two possible approaches for measuring the carbon footprint of a sovereign bond portfolio:

FINANCED EMISSIONS APPROACH:
Estimate the amount of carbon associated with the investment

- × What should be the allocation base?
- × While one may consider using 'public debt' as the allocation base, institutional investors in general were not in favor of using it due to inconsistent boundaries of public debt (only Government) vs. GHG emissions (entire country).

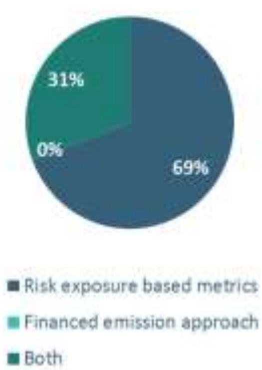
RISK EXPOSURE BASED APPROACH:

Understand exposure to carbon intensive issuers.

- ✓ Institutional investors, in general, favored this approach for Sovereigns.
- ✓ Uses the country-level carbon intensity to compute **Weighted Average Carbon Intensity**. This metric was **recommended** by the **TCFD** also in its final report.

CONSULTATION FEEDBACK:

Institutional investors' preferred carbon metrics for sovereigns



FOR SOVEREIGN BOND ISSUERS, WE OBSERVED A PREFERENCE FOR RISK EXPOSURE BASED METRICS SUCH AS WEIGHTED AVERAGE CARBON INTENSITY

CONCLUSIONS

- While **carbon footprinting**, especially for fixed income securities, is **still a priority area** for most of the institutional investors we consulted, we observed a **growing demand for integration of transition risk** in portfolio construction and reporting.

- In terms of approaches to manage transition risk, while **European institutional investors** in general showed more interest in 'Carbon Risk Management' approaches, **US institutional investors** preferred 'Decarbonization / Screening' approaches.

- Institutional investors' feedback on different approaches centered around a few key themes such as the need for **transparent methodologies and data, simple and meaningful analysis**, and broader coverage of asset classes other than equities.

- Institutional investors we consulted highlighted the need for a **multi-dimensional assessment** of climate risk and opportunities.

- While there was **no consensus** among consultees in terms of the definition of '2-degree alignment' or footprinting metrics/approaches for fixed income securities, we observed demand for **flexibility** with respect to metrics and methodologies in the short-term with a long-term objective of **greater standardization**.

ABOUT MSCI

About MSCI ESG Research Products and Services

MSCI ESG Research products and services are provided by MSCI ESG Research LLC, and are designed to provide in-depth research, ratings and analysis of environmental, social and governance-related business practices to companies worldwide. ESG ratings, data and analysis from MSCI ESG Research LLC. are also used in the construction of the MSCI ESG Indexes. MSCI ESG Research LLC is a Registered Investment Adviser under the Investment Advisers Act of 1940 and a subsidiary of MSCI Inc.

About MSCI

For more than 40 years, MSCI's research-based indexes and analytics have helped the world's leading investors build and manage better portfolios. Clients rely on our offerings for deeper insights into the drivers of performance and risk in their portfolios, broad asset class coverage and innovative research. Our line of products and services includes indexes, analytical models, data, real estate benchmarks and ESG research. MSCI serves 97 of the top 100 largest money managers, according to the most recent P&I ranking.

For more information, visit us at www.msci.com.

CONTACT US

AMERICAS	+ 1 212 804 5299
EUROPE, MIDDLE EAST & AFRICA	+ 44 20 7618 2510
ASIA PACIFIC	+ 612 9033 9339

msci.com/esg

esgclientservice@msci.com

MSCI

NOTICE AND DISCLAIMER

MSCI