



MSCI's Response on OSFI's Consultation on Navigating Uncertainty in Climate Change

MSCI ESG Research LLC

April 2021

INTRODUCTION

MSCI ESG Research LLC appreciates the opportunity given to provide feedback on the OSFI's Consultation on Navigating Uncertainty in Climate Change

About MSCI

MSCI ESG Research

For over 40 years, MSCI ESG Research has measured and modelled Environmental, Social and Governance (ESG) risk^a. MSCI is a leading provider of ESG ratings, indexes and analytical tools. We aim to help investors integrate ESG across their entire investment process; powering better investment decisions.

Our solutions:

*First ESG provider to assess companies based on industry financial materiality, dating back to 1999. Only dataset with live history (12+ years) demonstrating economic relevance^b. For over 11 years, we have rated companies on their exposure to, and management of, industry-specific ESG risks. We rate nearly 14,000 issuers representing more than 680,000 securities, with 90% of equity and fixed income market value. Our research is used by over 1,400 clients globally. Clients can use ESG ratings to support fundamental and quant analyses, portfolio construction and risk management and thought leadership and engagement.

* MSCI ESG Indexes: MSCI is the world's largest provider of ESG indexes with over 1,500 ESG equity and fixed Income Indexes leveraging MSCI ESG Research data to support ESG integration, screening and impact approaches. Several global asset owners have selected MSCI ESG Indexes, with over \$180 billion allocated in recent years^c. The indexes can also be used as the basis for exchange-traded-funds and other index-based products.

* MSCI ESG Analytics: Our ESG research, data and indexes are available within MSCI's analytics systems. MSCI Analytics clients can explore ESG exposures on 680,000 securities and 8 million derivatives to support security selection, portfolio construction, stress testing, and risk and performance attribution analysis.

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.

For the purposes of the ESG metrics for the ESG benchmarks disclosures, the ESG metrics are provided by MSCI ESG Research LLC. MSCI ESG Indexes are provided by MSCI Inc. and utilize information from, but are not provided by, MSCI ESG Research LLC. MSCI Limited is the benchmark administrator for the MSCI Indexes under the EU Benchmark Regulation. 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.

- a. Through MSCI ESG Research and its legacy companies KLD, Innovest, IRRG, and GMI Ratings*
- b. Origins of MSCI ESG Ratings established in 1999. Produced time series data since 2007*
- c. Based on publicly available information in press releases published from 2014 to date*

MSCI's responses

Climate-Related Risks and their Impact on FRFIs and FRPPs

1. What are your views on the characterization of climate-related risks as drivers of other risks? How do climate-related risks affect FRFIs and FRPPs? Do you have other views on the characterization of climate-related risks set out in this paper?

MSCI: We broadly agree with OSFI's characterization of climate risks as transition or physical, which is reflected in the research methodologies adopted by MSCI ESG Research LLC for assessing climate risk. We view liability risk as one of several reputational risks related to a firm's climate change and energy-related policies and initiatives. In evaluating the severity of controversies linked to climate change, our research team evaluates a history of involvement in GHG-related legal cases, widespread or egregious impacts due to corporate GHG emissions, resistance to improved practices, and criticism by NGOs and/or other third-party observers.

Transition risks may arise from the policy, market and technological changes required to mitigate climate change and enable a transition to a low carbon economy. Physical risks may arise from acute or long-term shifts in climate patterns, including extreme weather, extreme temperature changes, changing precipitation patterns and the indirect socioeconomic consequences of these changes. Our research largely assesses operational loss due to physical risk and market loss due to both transition and physical risk through the MSCI Climate Value-At-Risk (ClimateVaR) model, which provides forward looking and return-based valuation assessments to measure the potential impact of climate change on company valuations. The tool provides insights into the potential stressed market valuation of investment portfolios and downside risks, translating climate-related costs into potential valuation impacts.

In a white paper published by us in March 2021, entitled [Foundations of Climate Investing – How Equity Markets Have Priced Climate Transition Risks](#), we found the following transmission channels of climate risk:

1. For financial risk models, [issuer] companies' emissions profiles represent the climate transition-risk exposure, rather than the climate-risk driver. The results also support the Bank of International Settlement's proposal that providing a

firm-level green rating based on a company's total emissions profile could provide a useful signal to investors (Ehlers et al., 2020).

2. The financial impact of climate transition risk across the constituents of the MSCI All Country World Index (ACWI) Investable Market Index (IMI) was mainly concentrated in the two smallest and most extreme categories, i.e., asset stranding and solutions, while the financial impact was small in the neutral Low Carbon Transition (LCT) Category (accounting for 74% of the benchmark by market capitalization).
3. For asset stranding and solutions, there was a strongly non-linear relationship between companies' LCT Scores and stock-specific returns, which suggests that companies' emissions profiles provided a relevant stock-price factor alongside common style factors.
4. The financial effects of climate transition risk appeared continuously over time and have accelerated significantly since 2019, which mirrors the findings in Giese et al. (2020), which found climate risk to be a long-term "erosion risk." This finding can be explained by the economic transmission channels, which show how policies and technology potentially drove the process of transforming climate uncertainty into "priceable" pieces of climate risk information over time.

2. What steps can FRFIs and FRPPs take to improve their definition, identification and measurement of climate-related risks and the impact of these risks?

MSCI:

(1) Define Objectives & Policy

- Define climate objectives & policy
- Select low carbon, climate benchmark

(2) Integrate Into Investment Process

- Identify companies best positioned and those lagging
- Manage portfolio exposures
- Develop low carbon & fossil fuel free strategies
- Conduct climate stress testing aligned with the Task Force on Climate-Related Disclosure (TCFD) recommendations

(3) Engage Stakeholders & Report

- Engage companies on climate risks & scenarios
- Calculate carbon footprinting
- Provide insightful reporting on climate change exposure & management

Once the core objective is clear, the following three key dimensions may be considered when developing a climate investment strategy:

- a. **Mitigate Risk by reducing exposure** to stranded assets and long-term environmental risks
- b. **Capture Disruptive Opportunities by increasing exposure** to companies providing environmental-friendly technologies and solutions. Incentives may be planned based on the progress and efforts.
- c. **Promote Stewardship by shifting behavior** of companies to improve operations, develop long term strategy and be transparent on progress i.e. incentives on better climate risk management

Ways FRFIs Could Prepare for, and Build Resilience to, Climate-Related Risks

3. Does your organization have, or plan to develop, a climate-related risk appetite and strategy? How does your organization approach setting its risk appetite and strategy?

MSCI:

a. Operational Strategy

The Governance Committee of MSCI Inc., the parent company of MSCI ESG Research LLC, is responsible for overseeing environmental (including climate), social and governance matters as they relate to MSCI's business and long-term strategy. The Chief Responsibility Officer (CRO), provides quarterly updates and reports to the Governance Committee that are also made available to the full Board. The updates include progress on the execution of the Corporate Responsibility Committee's operating plan. This provides a framework for executing on high-impact areas for improvement, including MSCI Inc's practices and disclosures, and for developing and implementing short- and long-term plans to address key priorities, commitments and reporting. For example, in 2019, the CRO led the Governance Committee in a review of the results of MSCI's TCFD Scenario Analysis and, in 2020, presented to the Governance Committee, MSCI's climate-management strategy and our efforts to enhance MSCI's transparency around climate reporting. MSCI Inc. published its inaugural [TCFD Report](#) in 2020, which outlines our climate risk management strategy.

Using science-based target methodologies, we are committing to reducing our Scope 1 and Scope 2 emissions by 50% and our Scope 3 emissions by 20% by 2035, starting

in 2019. This aligns with the objective of reducing our carbon footprint. From an operational perspective, we remain committed to limiting our environmental impact and have developed an Environmental Policy that we monitor via an environmental management system, with specific metrics and periodic reporting to our Corporate Responsibility Committee.

In 2020, we conducted a detailed climate-related scenario analysis to quantitatively analyze the climate-related risks and opportunities that we can expect to face between now and 2030 using MSCI Climate VaR Model. While MSCI Inc.'s primary business of providing financial products and services does not expose us directly to climate-related risks, we may experience business interruptions from increased severity and frequency of extreme weather events, such as a heat wave, hurricane or flood that may result in a power loss or telecommunications failure. Our ability to continue to operate depends, in part, on the health and availability of our personnel, our office facilities and the proper functioning of our electronic, telecommunication and other related systems and operations.

b. Climate-Related Risk Products and Services

An increasing portion of our revenues comes from products that relate to certain trends, such as ESG investing, including climate change. We see significant opportunities for climate-related products and services among financial institutions and pension plans:



Figure 1: Climate Change Solutions

Our ESG products include MSCI ESG Ratings, screening, indexes and climate-related products. The said ESG and Climate Products and Services address the following objectives:

1. Investing with a systematic and explicit inclusion of ESG and Climate risks and opportunities in investment analysis,
2. Investing with the intention to generate measurable positive social or environmental benefits alongside a financial return, and
3. Investing in alignment with an organization or individual's values.

c. Research

We believe our research is important in helping clients understand and address current investment challenges.

Recent examples include the following papers and blog posts:

- [“Aligning with the Paris Agreement: An Index Approach”](#) illustrates how an index that embeds forward-looking measures of climate risk and return may help investors in their journey to decarbonizing their portfolios, both as a benchmark and as the basis for indexed allocations.
- [“Managing Climate Risk in Investment Portfolios”](#) shows how the MSCI Climate Value-at-Risk Model (Climate VaR) can be applied to a hypothetical global actively managed fund. This paper examines the different dimensions of climate-related risks, both in terms of measuring climate risks for the portfolio as a whole as well as which sectors, countries and securities were driving these risks.
- [“Climate Change and Climate Risk: An Index Perspective”](#) shows how a transition to a low-carbon economy could reduce demand for carbon-intensive products and services in favor of low-/zero-carbon counterparts. This migration in demand could also alter the risk-return profiles — not only of individual companies but of some entire industries. As this paper explains, the MSCI Climate Change Index aims to reflect these potential changes.
- [“Climate Change and Low-Carbon Risks and Opportunities in China”](#) provides a focused look at the implications of how a shift to a low-carbon economy could affect the risk-return profile of many industries in China. It supports the MSCI China Climate Change Index and the MSCI China A Climate Indexes.
- [“Measuring Climate Risk in Real Estate Portfolios”](#) explains that private real estate may be especially vulnerable to both physical and transition risks from climate change. Our analysis found that different potential physical risks may require different mitigation strategies, while transition risk may also play an increasingly important role with investors facing potential costs from emission-reduction requirements.

4. What new or adapted governance structures, policies or processes should FRFIs consider to effectively manage a FRFI's climate-related risks?

MSCI:

We have identified a number of key governance practices and standards aimed at enhancing companies' climate-related risk management programs. These practices are based primarily on guidance provided by the European Union, the World Economic Forum, or included in the Taskforce on Climate-related Financial Disclosures (TCFD) recommendations. The guidance recommends the creation of regular procedures by which the board and/or board committees are informed by management regarding the company's climate-related risks and concerns, and the integration of board-level consideration of such risks in all relevant board activities, including its strategic oversight. They also recommend that boards and directors regularly evaluate the appropriateness and effectiveness of their own individual climate-related skills and expertise, provide for training as needed, and disclose this information to investors at least annually. Boards should also disclose any climate-related targets adopted in aid of reducing the company's carbon footprint, and any other negative climate impacts, and ensure that the company's long-term executive incentives be based significantly on the achievement of such targets. Given that the majority of a financial institution's carbon footprint can be attributed to its investments, these disclosures should also include Scope 3 emissions.

5. What are the key considerations and challenges related to embedding climate-related risk management in a FRFI's three lines of defense?

MSCI :

Embedding climate-related risk management in a broader governance framework requires considerations that can be built as subsequent steps in the development of a climate change strategy.

The first step is to establish the core climate change objective. For example, is the purpose of the climate change strategy to build a more resilient planet (i.e. investing in an effort to mitigate climate change), or to build a more resilient portfolio (i.e. investing in an effort to stay afloat financially despite what happens to the climate)? The answer to this question can help shape the strategy.

Once the objective is set, the next step is to identify key climate risk and opportunities, and measure the exposure to these key climate risk and opportunities.

Risks and opportunities are typically categorized as either transition or physical. Transition risks may arise from the policy, market and technological changes required to mitigate climate change and enable a transition to a low carbon economy. Physical risks may arise from acute or long-term shifts in climate patterns, including extreme weather, extreme temperature changes, changing precipitation patterns and the indirect socio-economic consequences of these changes.

These risks and opportunities can differ by region and sector, and thus careful attention to the current and future states of all transition and physical risk and opportunities is an important aspect in assessing the total risks and opportunities facing any portfolio.

Finally, it is important for the investor to develop the ability to examine the vulnerability or resilience of the investment strategy using scenario analysis and stress testing.

We have seen a wide range of applications from financial institutions using our climate analysis and data, involving all three lines of defense. The main themes we observed are below:

1. Engagement: MSCI clients such as pension funds have used the Climate VaR metric in their discussions with portfolio companies to make them aware of the risks of climate change to their business operations, e.g., transition risk from regulations, physical damage to assets and business interruptions. Such clients often take the view that divestment is the last course of action and engagement is preferable. The quantification of costs under different scenarios can be used during company engagements to communicate the potential operational risks posed by climate change.

2. Investment decision-making: MSCI clients such as asset managers have used the technology opportunity component of Climate VaR to identify companies that may have been overlooked by the market. The 'green' patent analysis provides extra-financial information that can be integrated into investment decision-making processes. Product development is another avenue that has been actively explored by clients, utilizing the Climate VaR metric in dedicated ESG products as a quantitative model input in universe selection or screening processes.

3. Risk analysis: Climate VaR metrics can be aggregated across portfolios, so that investment managers can understand portfolio-wide climate risk levels. Some risk departments have set Climate VaR targets or risk tolerance levels for portfolio managers.

4. Monitoring & compliance: Some jurisdictions such as France have introduced mandatory reporting requirements for investors. Notably, since 2016, France's Article

173 has required investors in the country to comply or explain their portfolio's alignment with the 2°C warming target set out in the Paris Agreement in the United Nations Framework Convention on Climate Change.¹ Article 173 is now being replaced by Article 29, and will require all French financial institutions – including banks, investors and insurers – to disclose biodiversity-related risks as well as climate-related risks as of 2022.²

5. TCFD reporting: We support clients with their reporting disclosure requirements to communicate the risks of assets and portfolios.³

6. Is the description of the data challenges presented by OSFI in this discussion paper complete or are there other data challenges that need to be considered? What is the relative importance you would assign to each of these challenges?

MSCI:

We agree with OSFI that traditional risk management tools are insufficient to capture climate risk due to the uncertainty and time horizon and that scenario analysis can be very useful.

The merits of scenarios are that they provide organizations with a method for producing a forward-looking assessment to understand the strategic implications of climate-related risks, while at the same time informing investors, lenders, insurance providers and other stakeholders of how a particular organization might perform under different transition and physical risk pathways. Hence, scenario analysis provides an invaluable lens through which to assess a company's targets, strategy and governance of sustainability issues and take a view on whether they are fit for purpose in a changing world.

Globally there is increasingly a drive to encourage the widespread adoption of climate scenario analysis among companies and financial institutions. We welcome this evolution to build capacity on climate change, encourage climate action and put in place measures for financial institutions to manage climate related risks over time. To this end, MSCI ESG Research LLC has established several principles that we believe are fundamental to establishing an effective, transparent and robust climate risk reporting regime. We think that the building blocks of such a reporting regime should include:

¹ <https://www.unpri.org/climate-change/french-energy-transition-law-global-investor-briefing-on-article-173/295.article>

² <https://tnfd.info/news/frances-article-29-biodiversity-disclosure-requirements-sign-of-whats-to-come/>

³ <https://www.fsb-tcf.org>, see <https://www.msci.com/tcfd> for more information

1. Criteria that compare positively to existing or other emerging reporting regimes to ensure consistency and easy of implementation – notably, TCFD;
2. The usage of “hybrid” methodologies, including top down and bottom up data;
3. Low carbon transition scenarios that reflect real world circumstances;
4. Physical climate scenarios that have been assembled by research institutes or referenced by the IPCC; and
5. A scenario modeling time horizon that captures the full impact(s) of climate change.

7. If your organization has started to include climate-related considerations in its risk management approaches and tools, please share your experience, including the usefulness and challenges associated with climate-related scenario analysis and stress testing. If not, please describe other processes and controls you have introduced to determine the materiality of climate-related risks and manage exposures to these material risks.

MSCI:

With our holistic MSCI Climate Solutions toolkit we aim to empower financial institutions with the tools necessary to build more climate resilient portfolios, protect assets from the worst effects related to climate change and also help identify new, innovative low carbon investment opportunities.

One example of a stress testing tool we provide to investors to support their risk management assessment of their climate-related strategies is MSCI's Climate Value-at Risk (Climate VaR) solution. Climate VaR incorporates ten transition scenarios and two physical climate scenarios, with its methodology closely aligned with the TCFD recommendations. Using the CVaR framework, we conduct assessments of climate change risks and opportunities embedded within investment portfolios through a hybrid top-down and bottom-up approach to its climate change scenario modelling.

The top down aspect is based on quantification of national emission reduction targets obtained from nationally determined contribution (NDC) which are attributed to sectors and then companies, whilst the bottom-up aspect utilizes a global asset level database from which facility and company specific estimations of emission reduction requirements can be computed. Eight extreme weather hazards provide physical risk analysis based on both probabilistic and re-analysis modelling at high resolution; risk values are calculated for individual company facilities. In addition, an analysis of each company's low carbon innovation through technology opportunity patent analysis is incorporated into the Climate VaR assessment.

MSCI Inc, the parent company of MSCI ESG Research LLC, conducted a detailed climate-related scenario analysis to quantitatively analyze the climate-related risks and opportunities that we can expect to face between now and 2030 using MSCI ESG Research's Climate VaR Model. According to our model, MSCI's stock price could drop by less than 0.1% under a 2°C policy scenario. Given that this is a very small downside risk level, especially when placed alongside MSCI's sector peers, MSCI's risk analysis should prioritize physical-climate risks instead of climate-policy risks. Based on the physical risk assessments, coastal flooding poses the greatest risk to MSCI's office locations, especially in Shanghai and Mumbai. We also observed that extreme heat and tropical cyclone risk exposure may slightly increase at some MSCI office locations. The current exposure to extreme cold will be decreasing in most places.

We define substantive strategic or financial impact from climate change as an impact that:

- requires a significant change in our operations and/or how we deliver our products to our clients;
- warrants an extended or permanent change in the location of a facility or the implementation of our Business Continuity Plan beyond current scenarios; and
- results in a significant change to our business strategy.

Currently, there are no disruptions to our business that meet this definition. In all areas, we use our TCFD scenario analysis to inform our office location strategy and help mitigate the disruption to our business as a result of longer-term global climate changes.

Ways FRPPs Could Prepare for, and Build Resilience to, Climate-Related Risks

8. What are the key considerations for incorporating climate-related risks into the FRPP's Statement of Investment Policies and Procedures (SIP&P)?

No Comments

9. For FRPPs where the administrator directly invests in assets, are scenario analysis and stress testing used to assess the pension plan's exposure to climate-related risks? If so, how useful are they? What are some other risk measurement tools that FRPP administrators should consider?

MSCI:

We believe that FRPPs should provide Greenhouse Gas (GHGs) emissions associated with each product or investment strategy normalized based on the amount invested and also disclose additional dimensions of carbon risk at the portfolio level, such as associated fossil fuel reserves, exposure to climate-related opportunities etc. We believe that such multi-dimensional disclosure would allow for a more comprehensive assessment of portfolio level carbon risks and opportunities. The framework we have developed for comprehensive reporting and climate risk/opportunity analysis (including scenario analysis) can be found below:

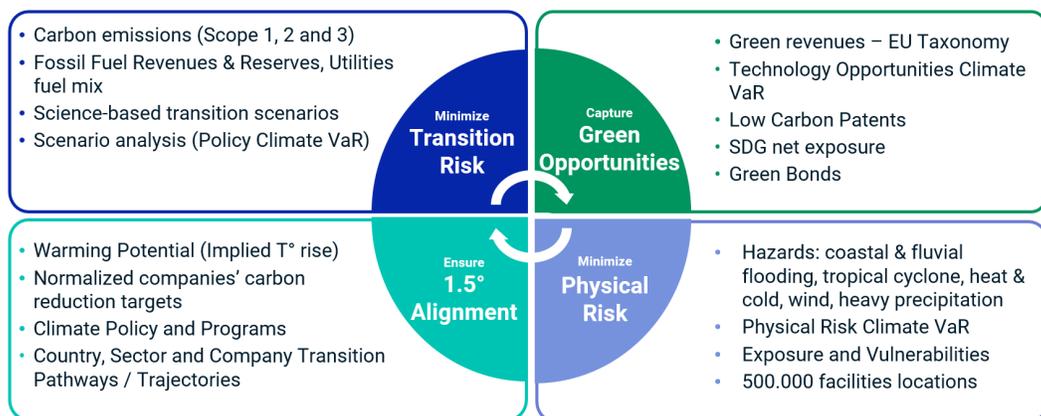


Figure 2: MSCI Climate Analytical Framework

10. For FRPPs where individual investment decisions are delegated to an investment manager, should consideration be given to climate-related risk management when plan administrators select investment managers? If so, what are the key climate-related criteria for selecting investment managers? If not, why not?

MSCI:

Yes, FRPPs should incorporate key climate-related criteria for selecting investment managers, given the financial and reputational risks posed by climate change to the pension plan. At a minimum, we believe that investment managers should provide Greenhouse Gas (GHGs) emissions associated with each product or investment strategy. Other metrics, such as the fossil fuel reserves, exposure to climate-related opportunities, and climate scenario analysis results (detailed in Figure 2 above) can provide FRPPs with a more comprehensive assessment of portfolio level carbon risks and opportunities. FRPPs should also ask investment managers about their climate targets and Warming Potential alignment, to understand how well they are equipped to adapt to the low-carbon transition.

Climate-Related Financial Disclosure

11. How does your organization currently disclose climate-related risk information? What are the drivers for any voluntary disclosure?

MSCI:

We strongly support the Task Force on Climate-related Financial Disclosures (TCFD)'s objectives to enhance transparency around climate-related risks and opportunities. We believe this transparency will help companies and investors take critical actions needed to protect our planet.

We have aligned our climate solutions with our own firm's actions and [MSCI's TCFD Report](#) is just one part of this process as we seek to provide transparency.

OSFI's Ongoing Work on Climate-Related Risks

12. A challenge OSFI has identified is lack of a universal climate-related risk taxonomy. Please describe the climate-related risk taxonomy, if any, your organization has developed or adopted?

MSCI:

We strongly support the mission of the Task Force on Climate-related Financial Disclosures (TCFD) to establish "a clear, efficient, and voluntary disclosure framework that improves the ease of both producing and using climate-related financial disclosures". In 2020, we published a [report](#) that aligns with the recommendations of the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD). It aims to provide greater transparency regarding our approach to sustainability, facilitating sustainable investing and helping to reduce our own long-term financial risks related to climate change.

The MSCI Climate VaR was designed to align with the TCFD recommendations. The model has four main applications for investors:

- **Policy transition scenarios:** The policy scenarios aggregate future policy costs based on an end of the century time horizon. By overlaying climate policy outlooks and future emission reduction price estimates onto company data,

MSCI's model provides insights into how current and forthcoming climate policies will affect companies

- **Innovation transition scenarios:** The low carbon technology scenario is based on company specific patent data, providing insight into the strategic investments companies are making to help the transition to a low-carbon economy
- **Portfolio warming potential:** the warming potential methodology computes the contribution of a company's activities towards climate change, delivering an exact temperature value that signifies what future temperature a company's activities are currently aligned with
- **Physical risks and opportunities:** The physical scenarios evaluate the impact and financial risk relating to several extreme weather hazards, such as extreme heat and cold and flood risk.

For OSFI, aligning with global standards, particularly the TCFD, and streamlining reporting requirements are two crucial components to promote the uptake of this important initiative, plus allowing for global comparisons and standardization of climate risk reporting.

13. Given OSFI's role as the prudential regulator and supervisor of FRFIs and FRPPs, what other work do you think OSFI should consider in relation to climate-related risks?

No Comments

14. What are your views on the relative importance of using (1) OSFI's capital framework, (2) supervisory review process, and (3) market discipline to promote FRFI preparedness and resilience to climate-related risks? What factors should OSFI consider when making changes to the design and approach to each of these areas?

No Comments

15. Are there circumstances where it would be appropriate to factor climate-related considerations in the capital framework beyond what is already reflected in existing inputs in the absence of empirical evidence? What are the pros and cons of such an approach?

No Comments

16. What factors should OSFI consider in designing its guidance, supervision process and reporting requirements to promote FRPP preparedness and resilience to climate-related risks?

No Comments

Contact us

clientservice@msci.com

AMERICAS

Americas	1 888 588 4567 *
Atlanta	+ 1 404 551 3212
Boston	+ 1 617 532 0920
Chicago	+ 1 312 675 0545
Monterrey	+ 52 81 1253 4020
New York	+ 1 212 804 3901
San Francisco	+ 1 415 836 8800
São Paulo	+ 55 11 3706 1360
Toronto	+ 1 416 628 1007

EUROPE, MIDDLE EAST & AFRICA

Cape Town	+ 27 21 673 0100
Frankfurt	+ 49 69 133 859 00
Geneva	+ 41 22 817 9777
London	+ 44 20 7618 2222
Milan	+ 39 02 5849 0415
Paris	0800 91 59 17 *

ASIA PACIFIC

China North	10800 852 1032 *
China South	10800 152 1032 *
Hong Kong	+ 852 2844 9333
Mumbai	+ 91 22 6784 9160
Seoul	00798 8521 3392 *
Singapore	800 852 3749 *
Sydney	+ 61 2 9033 9333
Taipei	008 0112 7513 *
Thailand	0018 0015 6207 7181 *
Tokyo	+ 81 3 5290 1555

* = toll free

About MSCI

MSCI is a leading provider of critical decision support tools and services for the global investment community. With over 50 years of expertise in research, data and technology, we power better investment decisions by enabling clients to understand and analyze key drivers of risk and return and confidently build more effective portfolios. We create industry-leading research-enhanced solutions that clients use to gain insight into and improve transparency across the investment process.

To learn more, please visit www.msci.com.

The process for submitting a formal index complaint can be found on the index regulation page of MSCI's website at: <https://www.msci.com/index-regulation>.

Notice and disclaimer

This document and all of the information contained in it, including without limitation all text, data, graphs, charts (collectively, the "Information") is the property of MSCI Inc. or its subsidiaries (collectively, "MSCI"), or MSCI's licensors, direct or indirect suppliers or any third party involved in making or compiling any Information (collectively, with MSCI, the "Information Providers") and is provided for informational purposes only. The Information may not be modified, reverse-engineered, reproduced or disseminated in whole or in part without prior written permission from MSCI. All rights in the Information are reserved by MSCI and/or its Information Providers.

The Information may not be used to create derivative works or to verify or correct other data or information. For example (but without limitation), the Information may not be used to create indexes, databases, risk models, analytics, software, or in connection with the issuing, offering, sponsoring, managing or marketing of any securities, portfolios, financial products or other investment vehicles utilizing or based on, linked to, tracking or otherwise derived from the Information or any other MSCI data, information, products or services.

The user of the Information assumes the entire risk of any use it may make or permit to be made of the Information. NONE OF THE INFORMATION PROVIDERS MAKES ANY EXPRESS OR IMPLIED WARRANTIES OR REPRESENTATIONS WITH RESPECT TO THE INFORMATION (OR THE RESULTS TO BE OBTAINED BY THE USE THEREOF), AND TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, EACH INFORMATION PROVIDER EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES (INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF ORIGINALITY, ACCURACY, TIMELINESS, NON-INFRINGEMENT, COMPLETENESS, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) WITH RESPECT TO ANY OF THE INFORMATION.

Without limiting any of the foregoing and to the maximum extent permitted by applicable law, in no event shall any Information Provider have any liability regarding any of the Information for any direct, indirect, special, punitive, consequential (including lost profits) or any other damages even if notified of the possibility of such damages. The foregoing shall not exclude or limit any liability that may not by applicable law be excluded or limited, including without limitation (as applicable), any liability for death or personal injury to the extent that such injury results from the negligence or willful default of itself, its servants, agents or sub-contractors.

Information containing any historical information, data or analysis should not be taken as an indication or guarantee of any future performance, analysis, forecast or prediction. Past performance does not guarantee future results.

The Information should not be relied on and is not a substitute for the skill, judgment and experience of the user, its management, employees, advisors and/or clients when making investment and other business decisions. All Information is impersonal and not tailored to the needs of any person, entity or group of persons.

None of the Information constitutes an offer to sell (or a solicitation of an offer to buy), any security, financial product or other investment vehicle or any trading strategy.

It is not possible to invest directly in an index. Exposure to an asset class or trading strategy or other category represented by an index is only available through third party investable instruments (if any) based on that index. MSCI does not issue, sponsor, endorse, market, offer, review or otherwise express any opinion regarding any fund, ETF, derivative or other security, investment, financial product or trading strategy that is based on, linked to or seeks to provide an investment return related to the performance of any MSCI index (collectively, "Index Linked Investments"). MSCI makes no assurance that any Index Linked Investments will accurately track index performance or provide positive investment returns. MSCI Inc. is not an investment adviser or fiduciary and MSCI makes no representation regarding the advisability of investing in any Index Linked Investments.

Index returns do not represent the results of actual trading of investable assets/securities. MSCI maintains and calculates indexes, but does not manage actual assets. Index returns do not reflect payment of any sales charges or fees an investor may pay to purchase the securities underlying the index or Index Linked Investments. The imposition of these fees and charges would cause the performance of an Index Linked Investment to be different than the MSCI index performance.

The Information may contain back tested data. Back-tested performance is not actual performance, but is hypothetical. There are frequently material differences between back tested performance results and actual results subsequently achieved by any investment strategy.

Constituents of MSCI equity indexes are listed companies, which are included in or excluded from the indexes according to the application of the relevant index methodologies. Accordingly, constituents in MSCI equity indexes may include MSCI Inc., clients of MSCI or suppliers to MSCI. Inclusion of a security within an MSCI index is not a recommendation by MSCI to buy, sell, or hold such security, nor is it considered to be investment advice.

Data and information produced by various affiliates of MSCI Inc., including MSCI ESG Research LLC and Barra LLC, may be used in calculating certain MSCI indexes. More information can be found in the relevant index methodologies on www.msci.com.

MSCI receives compensation in connection with licensing its indexes to third parties. MSCI Inc.'s revenue includes fees based on assets in Index Linked Investments. Information can be found in MSCI Inc.'s company filings on the Investor Relations section of www.msci.com.

MSCI ESG Research LLC is a Registered Investment Adviser under the Investment Advisers Act of 1940 and a subsidiary of MSCI Inc. Except with respect to any applicable products or services from MSCI ESG Research, neither MSCI nor any of its products or services recommends, endorses, approves or otherwise expresses any opinion regarding any issuer, securities, financial products or instruments or trading strategies and MSCI's products or services are not intended to constitute investment advice or a recommendation to make (or refrain from making) any kind of investment decision and may not be relied on as such. Issuers mentioned or included in any MSCI ESG Research materials may include MSCI Inc., clients of MSCI or suppliers to MSCI, and may also purchase research or other products or services from MSCI ESG Research. MSCI ESG Research materials, including materials utilized in any MSCI ESG Indexes or other products, have not been submitted to, nor received approval from, the United States Securities and Exchange Commission or any other regulatory body.

Any use of or access to products, services or information of MSCI requires a license from MSCI. MSCI, Barra, RiskMetrics, IPD and other MSCI brands and product names are the trademarks, service marks, or registered trademarks of MSCI or its subsidiaries in the United States and other jurisdictions. The Global Industry Classification Standard (GICS) was developed by and is the exclusive property of MSCI and Standard & Poor's. "Global Industry Classification Standard (GICS)" is a service mark of MSCI and Standard & Poor's.

MIFID2/MIFIR notice: MSCI ESG Research LLC does not distribute or act as an intermediary for financial instruments or structured deposits, nor does it deal on its own account, provide execution services for others or manage client accounts. No MSCI ESG Research product or service supports, promotes or is intended to support or promote any such activity. MSCI ESG Research is an independent provider of ESG data, reports and ratings based on published methodologies and available to clients on a subscription basis. We do not provide custom or one-off ratings or recommendations of securities or other financial instruments upon request.

For information about how MSCI collects and uses personal data, please refer to our Privacy Notice at <https://www.msci.com/privacy-pledge>.