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By Electronic Submission

MOODY'S ESG SOLUTIONS' PUBLIC COMMENT TO THE BASEL COMMITTEE ON  
BANKING SUPERVISION CONSULTATION ON PRINCIPLES FOR EFFECTIVE  
MANAGEMENT AND SUPERVISION OF CLIMATE-RELATED FINANCIAL RISKS

Moody's ESG Solutions (MESG) appreciates the opportunity to provide comments to the Basel Committee on Banking Supervision with respect to its consultation on principles for effective management and supervision of climate-related financial risks.

MESG is a business unit of Moody's Corporation that provides ESG, climate and sustainable finance solutions, including ESG and climate scores, analytics and sustainable finance reviewer and certifier services.<sup>1</sup>

MESG has responded to this consultation in collaboration with Moody's Analytics (MA), Moody's operating segment that delivers products and solutions including a comprehensive range of data-driven and forward-looking ESG-adjusted insights, macroeconomic forecasts and credit risk tools.

There is growing understanding that insurers, banks and other financial markets participants face significant risks from climate change and that these risks need to be sized and accounted for in decision making. This requires continued research to integrate climate risk factors into financial and economic modeling processes.

We welcome the initiative to develop international principles on how banks should take into account climate risks in their risk management as this will be important for harmonization across markets.

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<sup>1</sup> MESG is a separate business unit from Moody's Investors Service, a leading provider of credit ratings, research and risk analysis, and from Moody's Analytics, a global provider of data and analytic solutions which help companies make better and faster decisions. MIS did not contribute to this consultation response.

Thank you for your consideration.

Your sincerely,

**Julia Haake**  
**Managing Director, Market Strategy**  
**Moody's ESG Solutions**

**Questions:**

**Q1. Has the Committee appropriately captured the necessary requirements for the effective management of climate-related financial risks and the related supervision? Are there any aspects that the Committee could consider further or that would benefit from additional guidance from the Committee?**

We welcome the initiative by the Committee to provide more guidance for improving risk management and supervisory practices related to climate-related financial risks and on how banks should take into account climate risks in their risk management, as this will be important for harmonization across markets.

While the principles capture the necessary requirements at a high level it could be helpful to further outline how banks could reflect climate-related risks in capital adequacy assessments. Market participants could benefit from additional guidance on specific forward-looking metrics on how banks should disclose their physical and transition risks to help banks implement these principles, such as those metrics suggested in the appendix of the TCFD report [Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures, released in October 2021](#). Our comments below on specific principles provide additional examples.

**Q2. Do you have any comments on the individual principles and supporting commentary?**

**Principle 6: Banks should identify, monitor and manage all climate-related financial risks that could materially impair their financial condition, including their capital resources and liquidity positions. Banks should ensure that their risk appetite and risk management frameworks consider all material climate-related financial risks to which they are exposed and establish a reliable approach to identifying, measuring, monitoring and managing those risks. [Reference principles: BCP 15, SRP 30]**

We welcome this principle. Moody's Analytics' research finds that physical risks driven by climate-related hazard events can lead to material increases in concentration risks for some portfolios, and can

be reflected comprehensively in an economic capital framework, underscoring the need for banks to monitor their forward-looking climate risk and the potential future impacts of climate-related risk drivers on other material risks.<sup>2</sup>

**Principle 7: Risk data aggregation capabilities and internal risk reporting practices should account for climate-related financial risks. Banks should seek to ensure that their internal reporting systems are capable of monitoring material climate-related financial risks and producing timely information to ensure effective board and senior management decision-making. [Reference principles: BCP 15, SRP 30, Principles for effective risk data aggregation and risk reporting]**

28. A bank's risk data aggregation capabilities should include climate-related financial risks to facilitate the identification and reporting of risk exposures, concentrations and emerging risks. Banks should have systems in place to collect and aggregate climate-related financial risk data across the banking group as part of their overall data governance and IT infrastructure. Banks should also put in place processes to ensure that the aggregated data is accurate and reliable. Banks may consider investing in data infrastructure and enhancing existing systems where appropriate to make it possible to identify, collect, cleanse and centralise the data necessary to assess material climate-related financial risks.

In terms of data banks should collect, we believe it is crucial for banks to collect data on the geographical footprint of their counterparties due to the localized nature of physical climate change risk. For corporate loans, this includes the exact locations of firms' facilities, as well as their suppliers. This data is essential to properly quantify counterparties' exposures to physical risk and understand their portfolio-level implications. For example, building from our existing climate risk models, Moody's Analytics' research is currently enhancing their capabilities with a portfolio framework that implements such a bottom-up approach, combining counterparty facility locations with correlated physical risk exposures of these locations.<sup>3</sup> Business interruption due to climate related issues with suppliers needs to be addressed and quantified by banks and financial institutions, in addition to risks associated with operations of the counterparties themselves.

In relation to transition risk, we believe it is important for the institutions to adopt harmonized approaches similar to those outlined in the ECB/ESRB "Climate-related risk and financial stability" report,<sup>4</sup> which include aggregation of borrowers (exposures) into predefined climate-sensitive sectors, and/or their categorization based on GHG emissions footprint. These approaches allow for the capturing the "green" or the "non-green" (high-emitting) dimension of a portfolio, which is a

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<sup>2</sup> Ozkanoglu, O. et al. 'A Framework for the Identification, Quantification and Management of Climate Hazard Concentration Risk', *Moody's Sustainability In Focus Webinar*, 2 November 2021; Ozkanoglu, O. 'Incorporating Climate Scenarios and Hazard Events in Corporate Credit Risk', *International Association of Credit Portfolio Managers (IACPM) Virtual Fall Conference*, 18 November 2021.

<sup>3</sup> Moody's Analytics' climate hazard concentration risk framework will be described in more detail in a forthcoming paper, Ozkanoglu et al. (2022)

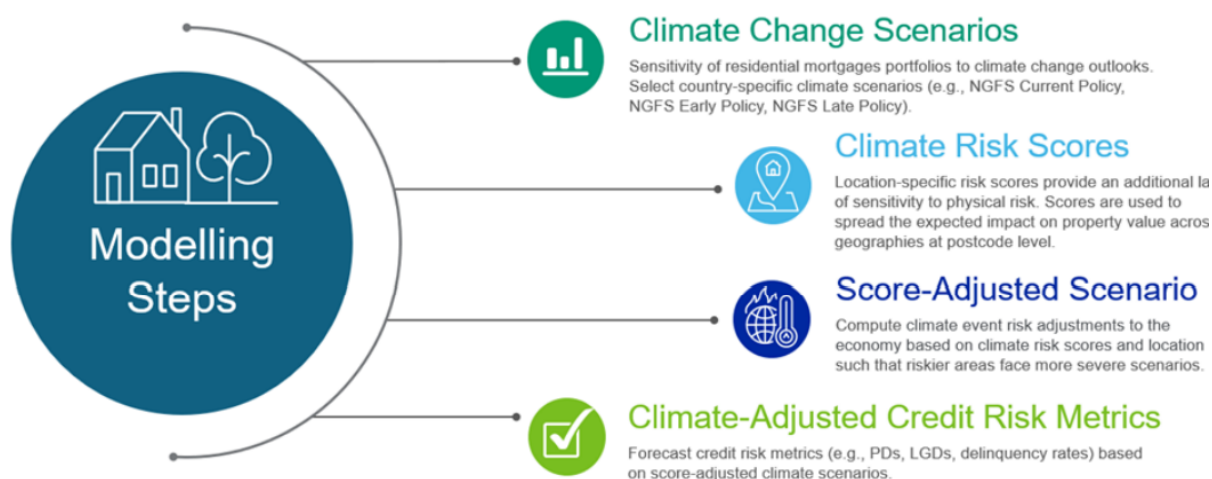
<sup>4</sup> ECB/ESRB "Climate-related risk and financial stability – Data supplement", July 2021; chapter 2.1 "Assessing transition risks"

fundamental question for assessing transition risks, as they increase with the share of "non-green" exposures or decrease with the share of "green" exposures. For example, Moody's Analytics leverages their portfolio framework that implements these approaches, combining granular classification of firms into climate policy relevant sectors, firm-level emissions data, and correlated transition risk exposures of individual sectors.

**Principle 8: Banks should understand the impact of climate-related risk drivers on their credit risk profiles and ensure credit risk management systems and processes consider material climate-related financial risks.** [Reference principles: BCP 17, BCP 19, SRP 20, Principles for the management of credit risk]

**32. Banks should have clearly articulated credit policies and processes to address material climate-related credit risks. This includes prudent policies and processes to identify, measure, evaluate, monitor, report and control or mitigate the impacts of material climate-related risk drivers on their credit risk profiles (including counterparty credit risk) on a timely basis. Banks should incorporate consideration of material climate-related financial risks into the entire credit life cycle, including client due diligence as part of the onboarding process and ongoing monitoring of clients' risk profiles.**

We welcome this principle and underscore that effective climate risk management is based on a forward-looking risk assessment that captures different dimensions of how this risk will manifest over several scenarios, leveraging metrics such as Probability of Default and other relevant metrics. As mentioned above, assessing risk at the asset-level can then inform portfolio-level risk analysis. As an example, the diagram below outlines key components of integrating climate risk into risk management for real estate, as part of its credit life cycle. It is important for the time horizon of the risk analysis to extend at least through the life of the mortgage.



Source: Moody's Analytics

**33. Banks should also identify, measure, evaluate, monitor, report and manage the concentrations within and between risk types associated with climate-related financial risks. For example, banks could use metrics or heatmaps to assess and monitor concentration of exposure to geographies and sectors with higher climate-related risk.**

For physical risks, it is important to focus on identifying high-risk assets rather than averaging risk in a portfolio, as average risk can mask meaningful exposure to extreme conditions at individual assets. For mortgages, for example, even two adjacent properties located on the same street can have very different physical risk profiles for a hazard such as floods, due to difference in elevation and asset-level resilience. Incorporating property level physical risk profile into existing credit risk models is crucial in deriving the climate-adjusted PDs and LGDs for mortgages.

Heat maps of climate adjusted PDs and LGDs will be a useful visualization aid to begin to assess and identify climate hazard risks within a given portfolio, but do not independently speak to climate concentration risk. Traditional heatmaps can be extended to also reflect the correlations between and within the segment-specific risk in question and other risks relevant to the portfolio. Whilst traditional heat maps are a useful starting point, it is important to highlight that they do have limitations as a tool for concentration risk analysis in that they do not typically reflect these correlations. For instance, a location may have high levels of risks related to cyclones but not cause much concentration risk if the exposure to that location is low and cyclone risks in that location have low correlations with other risks relevant to the portfolio (e.g., cyclones in other locations).

More generally, it could be useful for the principles to outline additional examples of tools for concentration risk analysis.

**34. Banks should consider a range of risk mitigation options to control or minimise material climate-related credit risks. These options may include adjusting credit underwriting criteria, deploying targeted client engagement, or imposing loan limitations or restrictions such as shorter-tenor lending, lower loan-to-value limits or discounted asset valuations. Banks could also consider setting limits on or applying appropriate alternative risk mitigation techniques to their exposures to companies, economic sectors, geographical regions, or segments of products and services that do not align with their business strategy or risk appetite**

While the tools and techniques mentioned are useful, it would be helpful if the principles also offered the possibility of refining traditional capital adequacy assessment techniques to reflect climate-related risks.

Further, depending on data availability and the type of risk models employed, banks can test alternative risk mitigation options such as varying insurance coverage, exploring asset-level resilience measures (such as waterproofing lower floors, upgrading to fire resistant material, etc.), engaging with borrowers

and communities on their risk exposure and risk management, or adjusting holdings within a portfolio to balance risk.

**Principle 9: Banks should understand the impact of climate-related risk drivers on their market risk positions and ensure that market risk management systems and processes consider material climate-related financial risks. [Reference principles: BCP 22]**

We welcome this principle, as market risk is an important transmission channel for climate risk impacts. In December 2020, Moody's Analytics published a white paper, [An Empirical Assessment of the Financial Impacts of Climate-related Hazard Events, which](#) gives an example of this risk and how historical data on asset values climate-related hazard events can be used to assess this exposure.

**Principle 11: Banks should understand the impact of climate-related risk drivers on their operational risk and ensure that risk management systems and processes consider material climate-related risks. Banks should also understand the impact of climate-related risk drivers on other risks and put in place adequate measures to account for these risks where material. This includes climate-related risk drivers that might lead to increasing strategic, reputational, and regulatory compliance risk, as well as liability costs associated with climate-sensitive investments and businesses. [Reference principles: BCP 25, Principles for the sound management of operational risk, Principles for operational resilience, SRP 20, SRP 30]**

As mentioned above, it is essential to leverage forward-looking data when assessing physical risk exposure in banks' operations, as preparing for the past frequency and severity of extreme events is no longer sufficient in a changing climate.

**Principle 12: Where appropriate, banks should make use of scenario analysis, including stress testing, to assess the resilience of their business models and strategies to a range of plausible climate-related pathways and determine the impact of climate-related risk drivers on their overall risk profile. These analyses should consider physical and transition risks as drivers of credit, market, operational and liquidity risks over a range of relevant time horizons. [Reference principles: BCP 15, Stress testing principles]**

41. The objective(s) of climate scenario analysis, including stress testing, should reflect the bank's overall climate risk management objectives as set out by its board and senior management. These objectives could include, for example: (i) exploring the impacts of climate change and the transition to a low-carbon economy on the bank's strategy and the resiliency of its business model; (ii) identifying relevant climate-related risk factors; (iii) measuring vulnerability to climate-related risks and estimating exposures and potential losses; (iv) diagnosing data and methodological limitations in climate risk management; and (v) informing the adequacy of the bank's risk management framework, including risk mitigation options. Banks may explore the use of stress testing to assess the adequacy of their financial positions in the near term under severe yet plausible scenarios, though these capabilities are expected to mature more progressively over time as methodologies evolve.

**42. Scenario analysis should reflect relevant climate-related financial risks for banks. This should include the physical or transition risks that are relevant to a bank's business model, exposure profile and business strategy. Scenarios should cover a range of plausible pathways, as appropriate. Banks should consider the potential benefits and limitations of selected scenarios and assumptions (eg balance sheet assumption).**

The [scenarios of the Network for Greening the Financial System](#) have emerged as common templates for scenario analysis globally. Leveraging these scenarios as a starting point helps to improve standardization and comparability across different regions. Building from these scenarios banks can then consider creating custom climate scenarios that are tailored to their business models, exposures and strategy to stress test their holdings. While leveraging standardized scenarios can be an important first step, results from a custom climate scenario can reveal weaknesses that may otherwise not show up in the standardized regulatory scenarios, and they can be more relevant in evaluating the banks' risk management objectives.

**43. Banks should build sufficient capacity and expertise to conduct climate scenario analysis that are proportionate to their size, business model and complexity. Larger and more complex banks should be expected to have more advanced analytical capability.**

In a stress testing exercise, banks often need to expand on the prescribed regulatory scenarios to include more detailed concepts and more granular geographic coverage to tailor to their exposures. Usually, for a given scenario, the economic model is calibrated by taking the variable paths specified by the scenario and setting the key levers of the model to reproduce the scenario's paths. In the context of climate risk scenario, it is important to re-evaluate the economic model to see if the model equations are specified based on economic theory, and they feature shock properties that are essential in scenario construction, including the creation of economic forecasts consistent with different climate change assumptions. Adding climate related scenario levers such as carbon taxes, emissions and fuel consumption to the economic model should also be considered to allow for a direct linkage between climate risks and the economy.

**45. The field of climate scenario analysis is highly dynamic, and practices are expected to evolve rapidly, especially as climate science advances. Climate scenario models, frameworks and results should be subject to challenge and regular review by a range of internal and/or external experts and independent functions.**

While we strongly agree with the assessment that the field of climate scenarios is highly dynamic and climate scenario models should be subject to challenge and regular review by internal/external experts and independent functions, we also believe the same can be said about the climate risk quantification approaches that will translate climate scenarios into financial and credit impacts. Climate stress testing

poses unique challenges to traditional stress testing models and methodology due to factors such as its long forecast horizon, multi-dimensional impact channels, and lack of comparable history to be used as benchmark. A direct application of existing models and methodology is not likely to be sufficient, and modifications of existing models or even new approaches may be needed to meet the rigor of a good climate stress test. While we support the adoption of climate stress tests built from relevant scenarios now, we acknowledge that they will continue to evolve and improve as both the climate scenarios and the stress testing models are continuously refined.

**Principle 14: Supervisors should determine that banks can adequately identify, monitor and manage all material climate-related financial risks as part of their assessments of banks' risk appetite and risk management frameworks. [Reference principles: BCP 15, SRP 20, SRP 30]**

As the focus increases on firms' impacts on communities and economies, we suggest that the principles consider taking into account double materiality and not only financial materiality. A double materiality approach takes into account in equal measure both entity specific risks caused by climate change and also the impacts on climate by the entity's activities.

This would also be in line with current global regulatory developments in jurisdictions such as the EU, where the principle of double materiality is becoming increasingly essential to sustainability related reporting and risk management. In addition to the importance of managing climate-related risk, the need to transition to a low-carbon and resilient economy presents significant opportunities for banks to support this transition. The principles could consider encouraging banks to assess relevant opportunities in addition to risk.

**Q3. How could the transmission of environmental risks to banks' risk profiles be taken into account when considering the potential application of these principles to broader environmental risks in the future? Which key aspects should be considered?**

No comment.