



Aon's Response to FHFA's Climate and Natural Disaster Risk Management at the Regulated Entities RFI

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Executive Summary

The FHFA's 2021 Climate and Natural Disaster Risk Management at the Regulated Entities Request for Input ("2021 RFI") highlights both the emerging global concern to understand, model and protect against these risks, as well as FHFA's ability to lead a combined effort between government and the private sector to achieve this goal.

As climate change further influences the behavior of weather events, populations (many unaware of the increasing exposure) and new developments are often moving further into hazard risk areas. The humanitarian and financial impact from natural disasters, amplified by climate change is expected to grow. Changes in weather and climate events will create increased volatility for all financial institutions, amplifying existing physical risks and generating additional uncertainty in loan, credit, and investment portfolios. This requires *new analytical capacity* to understand and model current and future climate change impacts, *new climate resilience and mitigation strategies* to address the growing climate change risk; and *new approaches to accessing capital*, as these institutions strive to reduce exposures and close the protection gap. This is particularly true with Fannie Mae, Freddie Mac (the Enterprises) and the Federal Home Loan Banks (collectively the Regulated Entities) due to the extended tenor of the risk in their portfolios.

FHFA's effort to bring clarity to estimating this risk reflects the reasonable uncertainties that have been raised by both government and the private sector. There is growing pressure to address and understand climate change and natural disaster exposure:

Understanding existing and growing risks related to natural disasters and climate change that will impact the Regulated Entities is key to mitigating these risks using existing tools and assisting in the development of additional tools.

A robust and consistent modeling capacity is a crucial step in quantifying the risk to the Regulated Entities and all parties in the mortgage credit space; borrowers, lenders, insurers, as well as communities affected by climate change and natural disasters.

In summary, we suggest that the FHFA:

1. Model the Risk: Develop a robust, consistent, and well understood modeling capacity, and
2. Identify Protection Gaps

Background

Internationally, there is a growing demand to assess and disclose financial impacts of climate change, as evidenced below:

- The Task Force on Climate-Related Financial Disclosures (TCFD), the Sustainability Accounting Standards Board (SASB), the Climate Disclosure Standards Board (CDSB), CDP, the Global Reporting Initiative (GRI), and the International Integrated Reporting Council (IIRC) have all converged that **investors have a fiduciary duty to assess, disclose and incorporate climate risk into decision-making.**
- The International Monetary Fund (IMF) recognized that global warming will increase the frequency and severity extreme weather events, and in its Global Financial Stability Report (2020) examined

impacts of climate change physical risk on financial stability. Focusing on equity markets, IMF found that these risks are not being priced adequately. ⁽ⁱ⁾

- The Network for Greening the Financial System (NGFS), comprised of 83 central banks and financial supervisors, released reports that lay out tools for climate change assessments for financial institutions. NGFS stressed that **climate risks are a source of financial risk that will affect all agents in the economy (households, businesses, governments) across all industry sectors and all geographies**, and called on central banks to integrate climate risk factors into their own portfolio management decisions. ⁽ⁱⁱ⁾
- The Basel Committee on Banking Supervision (BCBS) released two reports in April 2021, 1) exploring how climate-related risk drivers, including physical risks and transition risks, can affect both banks and the banking system via micro- and macroeconomic transmission channels; and 2) providing an overview of conceptual issues related to climate-related financial risk measurement and methodologies, as well as practical implementation by banks and banking supervisors. ^(iii, iv)
 - The BCBS reports mention impacts of climate risk on property values, and collateral:
 - “Bin and Polasky (2004) find evidence of a sudden decrease in the price of homes in floodplains following a severe weather event. Ortega and Taspinar (2018) find that **prices for flooded neighbourhoods dropped nearly 20% in New York City after Hurricane Sandy, and three years later, homes in those neighbourhoods were still valued 10% lower than those in unflooded neighbourhoods, suggesting that asset prices can reflect the expectation that severe weather events will continue taking place in these areas.**”

In the US, pressure to consider climate change impacts on financial institutions, publicly traded entities and the whole of the economy is also accelerating:

- The Federal Reserve Board created a Supervision Climate Committee (SCC) in January 2021. The SCC’s *micro-prudential* work is intended to ensure the safety and soundness of financial institutions and constitutes one core pillar of the FRB’s framework for addressing the economic and financial consequences of climate change. ^(v)
- Subsequently, the Federal Reserve Board’s created a Financial Stability Climate Committee (FSCC) in March 2021. The FSCC will focus on the *macro-prudential* aspects of climate change, including the potential for climate-generated economic shocks and how climate change could “amplify these shocks and cause broader knock-on effects that could harm households, businesses, and communities.” ^(vi)
- The Securities and Exchange Commission is requesting public feedback into climate change disclosures. ^(vii)

This is not surprising in the context of escalating financial and humanitarian costs of natural disasters. On August 16, 2020, the temperature in Death Valley reached 54.4°C, unofficially the hottest temperature ever recorded. By the end of the year, 22% of the lower 48 states had experienced “Extreme” or “Exceptional” drought. In total, 2020 was the second warmest year on record, with global mean temperatures nearly 1°C above the historical average. For 9 years, Aon’s has reported on climate and natural catastrophe events and the latest Weather Climate & Catastrophe Insight report highlights the impacts our changing climate can have on people and properties.

In the United States alone, natural catastrophe perils set new records across the board. The Atlantic Hurricane season produced 30 named storms and 12 landfalling events. In August, a historic derecho swept across the Midwest, which, along with an additional \$13 billion loss-causing events, led to severe storm being the costliest peril in the United States. Wildfires raged in the west, leading to a record number of acres burned in the modern-era, and causing losses that are only surpassed by the extreme events of 2017 and 2018.

This extreme event activity generated \$119 billion (USD) of economic losses, of which only 62% were paid for by insurance. The remaining gap in protection means that the full cost of climate change is borne throughout communities and financial stakeholders. For anyone who owns real property, from private individuals, property companies, mortgage lenders, and global investment funds, climate change presents an existential threat to the tools and models used to predict risk of loss or risk of default driven by climate events, and therefore erodes the ability to properly price for or underwrite assets that may end up in the eye of the storm. It is critical that stakeholders understand where they sit on the “risk-chain” and how to quantify the portion of loss that is coming their way.

For the past ten years, Aon has collaborated with the Enterprises, the reinsurance market, and the FHFA to help quantify the climate-driven default risk and managing that risk by creating strong reinsurance markets and CRT programs. We first helped the Enterprises deepen their expertise with CRT programs, and subsequently helped expand the scope and sophistication of the CRT reinsurance market to absorb risk from the private mortgage insurers.

Aon has placed more than 80% of the multi-line insurance CRT transactions to date and represents five of the six current mortgage insurers. We also believe our experience brokering capital relief transactions for European banks and our familiarity with European capital frameworks are useful to the Enterprises.

This historical engagement with the Enterprises drives our holistic and objective view of the FHFA’s goals. Throughout this engagement, Aon has also applied our strong perspective on natural catastrophe risk. We have modeled hurricane, flood, and earthquake risk for the Enterprises and have also shared some of our perspectives on this historically.

Aon appreciates FHFA’s timely leadership and welcomes the opportunity for further dialogue with the FHFA and other key stakeholders on this important topic. Especially in-light-of climate change, fully understanding the Enterprises’ exposure to natural catastrophes, their loss mitigating options (including hazard insurance requirements), and risk transfer alternatives is worthy of discussion. We have worked closely with many large institutions in the US that are significantly exposed to these types of events, including FEMA, and are happy to share our perspective.

Developing a Robust, Consistent and Well Understood Modeling Capacity

While many stakeholders will be impacted by climate change, the long-tail nature of the risk retained by the Regulated Entities means that FHFA is uniquely positioned to lead the development of a robust, consistent, and well understood modeling capacity for both acute and chronic risks.

In areas where heat stress, flooding or other peril is expected to increase, the costs associated with those properties (cooling, repair, control and management) will likewise increase, along with default risk. Moreover, in areas that are chronically exposed to flood, wildfire, wind/hurricane damage, home insurance affordability and availability will be impacted. Property values can be negatively impacted, eroding collateral posted by the borrowers, and increasing the risk of mortgage arrears and defaults. Unlike other shocks to loan to value ratios that impact default rates, the impact of repetitive extreme weather events on loan to value ratios may persist and preclude the expectation that prices will rise in the future.

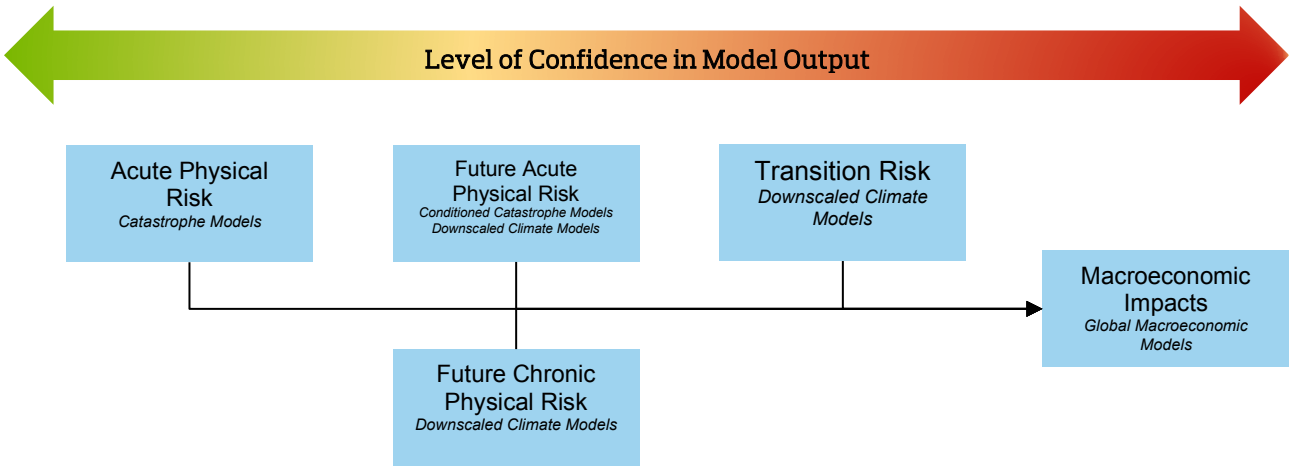
If asset valuations are impacted due to resultant declining consumer demand, loss given default may also increase. Modeling climate change scenarios will position all parties involved in the mortgage credit space to insure, underwrite or engage in mitigation strategies for loans that could become problematic before a loss of value occurs.

To date, much of the work carried out to assess physical risks from weather events has been carried out using catastrophe models. Catastrophe models are the stalwart of the insurance and reinsurance industry and provide the means by which all natural catastrophe risk is quantified and traded in (re)insurance markets. These models use historical data to simulate thousands of scientifically probable events and use advanced weather modelling to provide a view of hazard at such a high resolution, you can differentiate the peril risks between city blocks, housing developments, and even individual homes. Thus, the catastrophe models provide the best view of climate risks in the near- or medium-term for purposes of portfolio risk assessment, individual risk pricing, and risk selection for homeowners, lenders, and insurers.

Climate change science, on the other hand, relies on extremely large scales across space and time, bringing global atmospheric observations into future simulations of the state of the weather. To understand climate change, scientists rely on global climate models, such as those being developed by the Sixth Coupled Model Intercomparison Project (CMIP6). These models provide the best view of future, global climate, but are poor predictors of extreme weather events at the local level. In order to understand localized impacts of chronic or severe events, global climate models need to be downscaled to a level of detail that can determine climate change impact on physical assets.

There is an emerging landscape of climate change models (see chart below) that are attempting to quantify losses over a long-term timescales at regional and local levels. An inherent challenge in these models is in the marrying together of global and continental scale climate change models down to an individual asset’s vulnerability. These models are, as private vendors, largely “black-box”, meaning they do not disclose their process of downscaling global data. Users of these models, such as FHFA and the Enterprises, need to have an appreciation of the uncertainty that exists in climate loss predictions. Climate change models have three main sources of uncertainty: natural weather volatility, resolution of the hazard, and emission scenarios. Natural weather volatility makes it extremely challenging to attribute climate change impact to extreme events. The uncertainty in extreme-event attribution means that while global climate models can predict global mean temperature with confidence, they struggle to predict the impact that will have on the frequency and severity of catastrophes.

Bringing together global climate data with the high-resolution catastrophe model framework presents the best solution for assessing both physical and chronic risks driven by climate change. A climate-conditioned catastrophe model will include output from global climate models and generate extreme catastrophes that are scientifically plausible based on the changing climate. For example, it’s not enough to say that a warmer planet will lead to stronger or more frequent hurricanes. In fact, there may be a propensity for hurricanes to have different behaviour and to take different paths. For climate-conditioned catastrophe models to be credible within the scientific community, and usable by the stakeholder community, they should be based on open, peer-reviewed scientific research.



Identifying Protection Gaps

Climate change will have impacts in various ways across the risk value chain. Gaps in coverage can lead to direct physical losses as well as increased mortgage default risk. To assist in prioritizing efforts, we include the chart below to identify those gaps and existing US models for those perils.

Available U.S. Models by Peril and Significance to Mortgage Lending

Peril	Loan Insurance Requirement	Potential Mortgage Impact
Earthquake	Not Required; Voluntary take-up rates are low	Potential for credit losses due to EQ in exposed areas
River Flood	Required only in FEMA Special Flood Hazard Areas (SFHA)	Potential for non-SFHA flooding; underinsurance in flood zones
Hurricane Surge	Required only in FEMA Special Flood Hazard Areas (SFHA)	Potential for non-SFHA flooding; underinsurance in flood zones
Hurricane Winds	Required	Minimal from physical damage loss; potential for deterioration in property values
Severe Storm	Required	Minimal
Winter Storm	Required	Minimal
Fire Following Earthquake	Required	Minimal
Terrorism	Required	Potential for long term deterioration in property values
Wildfire	Required	Minimal

Conclusion

We welcome your feedback and look forward to discussing this response with you. Thank you for providing us with the opportunity to participate in this discussion.

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Appendix – Aon Modeling Capabilities – Benefits, Uses and Deliverables

How Aon helps clients to manage their climate risk

		Benefits	Uses	Deliverables
Catastrophe Modeling (Physical Risk)	<i>Impact Forecasting, AIR</i>	<ul style="list-style-type: none"> Insight into current <i>physical risk</i> from climate Simulates thousands of scientifically probable events Outputs a probability distribution 	<ul style="list-style-type: none"> Set geographic risk tolerances and insurance requirements Credit risk stress testing Physical risk disclosure Risk transfer pricing and structuring 	<ul style="list-style-type: none"> Probabilistic/stochastic output Average annual and probable maximum insured loss. Can be conditioned for climate scenarios
Climate Risk Modeling (Physical and Transition Risk)	<i>The Climate Service – Climonomics</i>	<ul style="list-style-type: none"> Scientific analysis of the impact from climate change on natural perils Scenario-based, outputs expected loss Projects future decades to 2100 	<ul style="list-style-type: none"> Translates climate <i>physical</i> and <i>transition risk</i> into financial impact Provides a view of future climate scenarios that impact business decisions today 	<ul style="list-style-type: none"> Scenario based output for RCP 4.5 and 8.5 pathways Average annual economic loss on decadal periods to 2100
Mapping and Visualization (Physical, Transition, Reputation Risk)	<i>Impact on Demand</i>	<ul style="list-style-type: none"> Location-based visualization platform Aggregates third-party data providers to create a customizable view of data and risk layers 	<ul style="list-style-type: none"> Bring together <i>catastrophe</i> and <i>climate</i> model output into one platform Enable a seamless integration of current and future climate analytics Faster response for cat impacted clients 	<ul style="list-style-type: none"> Visualize exposure to physical risks Set up real time event alerts Real-time exposure summaries Location Intelligence
Climate Risk Advisory and Risk Transfer (Physical, Transition, Reputation Risk)	<i>(Re)insurance, Capital Market Solutions</i>	<ul style="list-style-type: none"> Aon helps clients to access the full insurance capital stack, from traditional programs through to innovative solutions such as ILS 	<ul style="list-style-type: none"> Bespoke insurance programs for financial institutions delivering credit, hazard and flood programs Targeted coverage to address the "insurance gap" 	<ul style="list-style-type: none"> Mortgage Impairment (Re)insurance on loan portfolios LPI/REO insurance programs ILS/Catastrophe bonds Parametric insurance

Endnotes

ⁱ <https://www.imf.org/en/Publications/GFSR/Issues/2020/04/14/global-financial-stability-report-april-2020>

ⁱⁱ https://www.ngfs.net/sites/default/files/medias/documents/ngfs_first_comprehensive_report_-_17042019_0.pdf

ⁱⁱⁱ <https://www.bis.org/bcbs/publ/d517.pdf>

^{iv} <https://www.bis.org/bcbs/publ/d518.pdf>

^v <https://www.mayerbrown.com/en/perspectives-events/publications/2021/03/us-federal-reserve-announces-new-climate-committee-and-provides-more-guidance-on-its-approach-to-addressing-climate-change-risks#:~:text=On%20March%2023%2C%202021%2C%20Federal,related%20risks%20to%20financial%20stability.>

^{vi} <https://www.mayerbrown.com/en/perspectives-events/publications/2021/03/us-federal-reserve-announces-new-climate-committee-and-provides-more-guidance-on-its-approach-to-addressing-climate-change-risks#:~:text=On%20March%2023%2C%202021%2C%20Federal,related%20risks%20to%20financial%20stability.>

^{vii} <https://www.sec.gov/news/public-statement/lee-climate-change-disclosures>

About Aon

Aon plc (NYSE:AON) is a leading global professional services firm providing a broad range of risk, retirement and health solutions. Our 50,000 colleagues in 120 countries empower results for clients by using proprietary data and analytics to deliver insights that reduce volatility and improve performance.

About Aon's Public Sector Partnership (PSP)

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