

FutureProof Responses to SEC Climate Change Disclosure Questions

We would like to thank the Securities and Exchange Commission (SEC) for seeking public input on how the SEC can facilitate the disclosure of consistent, comparable, and reliable information on climate change. We commend SEC on taking this step to address this issue, which we believe carries crucial implications for both economic and environmental resiliency.

FutureProof Technologies is a team of Ph.D. economists, Ph.D. finance scholars, Ph.D. climate scientists, and data scientists. We have been performing research on the impact of climate and climate change on SEC-regulated entities. We are finding financially significant impacts. **We are making our tools available to financial regulators, including the SEC, free of charge.**

As a result of our work, we are in a position to provide our views on a number of the questions posed by SEC:

1. Where and how should such disclosures be provided? Should any such disclosures be included in annual reports, other periodic filings, or otherwise be furnished?

- As background, a large body of research and commercially-available products provide information on physical climate risk, i.e. on the **frequency and severity** of physical climate risks, such as prevalence of wildfires, floods, or hurricanes.
- Where possible, SEC should **require disclosures of physical climate risk in financial terms** -- i.e. not merely about the frequency and severity of climate hazards, but about the financial implications of these hazards in dollars-and-cents terms. In this way, climate change disclosure can be brought into closer alignment with other forms of risk that are currently regulated by the SEC.
- This framework builds on a standard catastrophe risk modeling framework that the academic literature and the private sector have developed. Specifically, this framework combines a number of pieces including:
 - A *hazard* module specifying the frequency and severity of perils such as hurricanes, wildfires, etc.
 - An *exposure* module that contains information on the characteristics of the assets.
 - A *vulnerability* module estimating how the magnitude of the physical hazard translates into the monetary value of financial damages (e.g. how hurricane damage losses relate to the wind speed of the hurricane).

- A *financial* module that considers how insurance mediates the financial impacts.
- Many tools in the market today contain information only on the *hazard*, i.e. the frequency and severity of climate perils.
- We believe it is important also to incorporate the vulnerability, exposure, and financial modules.
- We also believe it is important to estimate vulnerability models that pertain specifically to each outcome of interest. For example:
 - A vulnerability model that projects dollar value of losses from the climate-related physical damage to a property is different from a vulnerability model that projects the dollar value of losses to holders of a bond backed by the collateral at that property.
 - If we are interested in the losses on a bond, the latter model is what we need.
 - We are estimating such vulnerability models at FutureProof.
- Such an approach, consistent with broader standards for financial reporting and financial projections, will lead to more meaningful integration of climate risk into mainstream “financial risk.”
- Requiring climate-related disclosures in financial terms is the only viable path to enabling regulators, investors, or registrants to ingest comparable and reliable information about climate-related risks across asset classes or firms and manage risk appropriately.

2. What information related to climate risks can be quantified and measured? Do climate change related impacts affect the cost of capital, and if so, how and in what ways? How have registrants or investors analyzed risks and costs associated with climate change? What are registrants doing internally to evaluate or project climate scenarios, and what information from or about such internal evaluations should be disclosed to investors to inform investment and voting decisions?

- Physical climate risk, (i.e., the impact of climate-related hazards such as wildfire, hurricanes, etc.), and its attendant financial losses, can be quantified and measured through combining techniques from climate science and finance.
- From the many dozen conversations FutureProof has had with asset managers and other institutional investors since 2018, we have learned that market actors are using a broad range of strategies within their broader investment theses to analyze the risks and costs associated with climate change:

- Some make qualitative “educated guesses.”
- Firms concerned with disclosing to their stakeholders are using frameworks such as the Task Force on Climate-Related Financial Disclosures.
- Finally, we hear increasingly that firms are interested in integrating climate risk into their cash flow analyses, annual valuation process or asset acquisition strategies.
- Firms that are using software-based tools to understand their climate risk are typically gathering information about the prevalence of climate-related hazards for a specific location or portfolio. Climate risk information is typically provided as an aggregation across a number of climate-related hazards (such as prevalence of wildfire or hurricane at present and in the future) and rolled into a “climate score” or “risk score,” often presented on a scale of 0-100.
- The 0-100 scale can be used primarily as a qualitative guide for investors. However, such a system holds little potential to provide a systematic way to inform investment and voting decisions, particularly if reporting firms are using different climate risk software tools, each which calculates its “climate score” in a different way, and including different hazards.
- Instead, the direct financial impact of climate-related physical risks should be disclosed to investors in **dollars-and-cents terms**.
- Dollars reflect a clear metric that both can be **integrated with standard financial analysis** and also facilitate **comparison of climate metrics across firms as well as financial instruments**. Frameworks from the catastrophe risk modeling industry can be adapted for this use case, as catastrophe models are designed to translate physical hazards into financial losses.
- A **catastrophe model** must be developed specifically projecting climate-linked **average annual financial losses to firms**, or measures of **tail risk** such as probable maximum losses. At FutureProof we have used econometric and artificial intelligence techniques to estimate these impacts.

3. What are the advantages and disadvantages of permitting investors, registrants, and other industry participants to develop disclosure standards mutually agreed by them? Should those standards satisfy minimum disclosure requirements established by the Commission? How should such a system work? What minimum disclosure requirements should the Commission establish if it were to allow industry-led disclosure standards? What level of granularity should be used to define industries (e.g., two-digit SIC, four-digit SIC, etc.)?

- The Task Force on Climate-Related Financial Disclosures (TCFD) and other voluntary frameworks have greatly advanced the dialogue around physical climate risks, but disclosing climate risk in financial terms, as described above, is necessary for decision-useful and consistent reporting across firms.
- Thus, any industry-led minimum disclosure requirements must, at a minimum, satisfy an SEC requirement that disclosures of physical climate risks be in financial terms.

14. What climate-related information is available with respect to private companies, and how should the Commission's rules address private companies' climate disclosures, such as through exempt offerings, or its oversight of certain investment advisers and funds?

- Information about the financial implications of physical climate risk is available today with respect to both public and private firms.
- FutureProof offers projections of financial implications of physical climate risk for over 60,000 companies worldwide, including many public and private companies regulated by the SEC.

FutureProof is happy to serve as a resource for SEC as SEC grapples with these issues, including by making its software available free of charge. Thank you for the opportunity to submit our responses, and for SEC's work on these important matters.