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Nephila Climate Input on Climate Change Disclosures

June 15, 2021

The Honorable Gary Gensler
Chair
U.S. Securities and Exchange Commission
100 F Street, NE
Washington, DC 20549

Re: Request for Comment on Climate Change Disclosures

Dear Chair Gensler:

Nephila is a USD 9.4 billion investment manager specializing in reinsurance and climate risk. Nephila offers comments on a subset of Question #2:

What information related to climate risks can be quantified and measured? How are markets currently using quantified information?

For over 20 years, Nephila has quantified financial exposure to physical climate risk, including heat waves, droughts, floods, hurricanes, and variable volume of wind/sun/rain. Placing a 'dollar value' on physical climate risk enables Nephila to price the financial protection it sells to insurers, corporations, and governments to limit their exposure to variable weather and climate conditions.

Managing portfolios of climate risk within capital markets, we have developed a classification system to contextualize which climate risk elements we are well positioned to quantify (see bolded terms below). The classification system includes time horizon, climate risk type, and financial impact type:

- Time horizon: **Short term (<10 years)** vs. Long term (10+ years)
- Climate risk type: **Physical** vs. Transitional
- Financial impact type: **Income statement (earnings volatility)** vs. Balance sheet (assets and liabilities devaluation)

Our expertise is in quantifying the impact of short term, physical climate risk on income statements[1]. Here, we share concrete steps that we and the broader (re)insurance sector use to measure (and then often to transfer) such risk. Regulators, capital providers, and climate risk holders can use the steps presented below to better understand the financial implications of physical climate risk they hold today.

By understanding the amount of physical climate risk held today, organizations can:

1, If the SEC is interested in constructing a unified view of climate risk across time horizons, climate risk types, and financial impact types, Nephila is available to discuss more broadly the quantification climate risk elements that we do not focus on in this comment.

- Determine the amount of financial climate risk they wish to retain
- Identify the amount of financial climate risk they wish to mitigate (e.g., by increasing the resilience of assets, transferring to a (re)insurer through financial protection, or adopting other approaches)
- Project how their financial climate risk may evolve in the coming decades

For each step presented below, we offer a case study to contextualize our recommendations.

Case study: A hydroelectric plant owner in the Northeast United States wants to refinance its assets to repair and upgrade them to operate for the next 10 years. The cost of debt financing is higher than the plant expected because lenders are uncertain about the link between intermittent river flow and electricity revenue volatility. To reduce its debt cost, the plant owner wants to demonstrate to the lender that it understands the potential variability of its revenue.

Step 1: Gather relevant climate data

Numerous sources of climate data are available today. Climate variables, such as temperature, rainfall, snowfall, wind speed, river flow, and others, are measured globally by public weather agencies and private weather data providers. Airports, satellites, and other collection platforms can be sources of local data for a climate exposure location. Instrumentation and recorded data are also routinely quality controlled using transparent procedures.

Case study: The hydroelectric plant owner gathers 40 years of historical daily river flow data that is measured by the United States Geological Survey (USGS) at a river gauge upstream of the plant. The data are quality controlled by the USGS, resulting in an uninterrupted historical record of river flow.

Step 2: Gather relevant financial data

A stakeholder concerned about its exposure to physical climate risk typically has access to financial data of the exposed institution or asset. Data such as historical revenue, costs, and other financial metrics are usually recorded at regular time intervals to aid performance tracking and financial reporting.

Case study: The hydroelectric plant owner has access to 30 years of historical monthly energy volumes sold, electricity prices, and revenue.

Step 3: Adjust historical data to account for trends

While historical information can guide what to expect today (on average), it is important to adjust historical analyses to study outcomes that are plausible but may not have occurred before. One approach is to detrend historical climate and financial data. By removing climate (e.g. warming or drying weather) and financial (e.g. market or technology advancements) trends that have occurred over time, one can place historical climate and financial outcomes within the context of today's prevailing climate.

Case study: The plant owner has observed that river flow and the corresponding volume of hydroelectricity sold have increased during the period of their respective historical records. To adjust the historical data to reflect today's climate, the owner detrends the data using various statistical methods such as linear, LOESS (moving), and recent (e.g., 5- or 10-year) averages.

Step 4: Quantify the relationship between climate and financial data

A stakeholder now has raw (non-detrended) and detrended views of historical climate and financial outcomes. Aligning these time series facilitates quantification of relationships between the datasets. For example, an organization can calculate the degree to which climate and financial outcomes covary. A high degree of covariance (high positive or negative correlation) indicates high financial sensitivity to climate (i.e., financial outcomes are linked to prevailing climate outcomes). Conversely, a low degree of covariance (near-zero correlation) indicates little financial sensitivity to climate outcomes.

Case study: The plant owner first aligns its climate and financial data. The owner retains the most recent 30 of 40 years of climate data to match the time period of the financial data. Next, the owner calculates cumulative monthly river flow by summing daily river flow within each month. The owner then studies the relationship between the 30 years of historical raw and detrended monthly river flow and electricity sales, prices, and revenue. The owner finds that climate and financial data typically covary, indicating that its business has high climate sensitivity.

Step 5: Quantify frequency and severity of historical climate and financial impacts

After historical data have been detrended, aligned, and correlated, a stakeholder can calculate key metrics that help quantify the range of climate outcomes that are possible within the current climate. Similarly, a stakeholder can quantify the range of associated financial outcomes that are possible. Monte Carlo simulation and other data science techniques can lend perspective on outcomes that have not been observed historically.

Key metrics can include:

- Range (maximum and minimum) of physically plausible outcomes
- Average (mean) outcomes
- Variability of outcomes
- Annual likelihood of observing non-extreme and extreme outcomes
- Annual likelihood of observing outcomes more extreme than shown in the historical record (via simulations)

Case study: The plant owner learns from its preferred lender that the lender is concerned that revenue will fall below the 10th percentile outcome. In the lender's experience, debtors are more likely to default on debt repayments when revenue falls below that level. The lender's inability to quantify the likelihood of low river flow and revenue outcomes presents an opportunity to the plant owner to share its method for doing so. Because the river flow data is publicly available, the lender can independently determine the likelihood of low river flow and default. Such an analysis gives the lender more comfort in refinancing the assets of the hydroelectricity plant, resulting in a lower debt cost for the plant and an expanded loan portfolio for the lender.

Insurers, corporations, and governments can use variations of the method outlined above to quantify short term physical climate risk and its impacts to income statements. This both facilitates better disclosure and provides a framework for growing a risk transfer market for climate risks.

Sincerely,

Nephila Climate