

From hazard to value: turning climate science into financial insights



Rémy Estran, CEO, and **Alexis de Pampelonne**, Manager at Scientific Climate Ratings, discuss why climate risk is becoming central for real asset investors, why generic climate scores often miss asset-level nuances, and how climate science can be translated into actionable financial insights to support resilient investment decisions.

Climate risk is now a strategic priority

Climate risk is shifting from a peripheral concern to a core strategic priority. Volatile extreme weather, tightening regulation, and rising scrutiny around resilience are reshaping investment expectations. Asset classes with long holding periods are at the forefront of these pressures, as climate variability affects operating costs, insurance availability, long term valuations and capital planning. Decision makers increasingly seek quantifiable and comparable metrics to understand how climate factors reshape risk-adjusted returns and capital allocation.

Generic climate scores fall short for real assets

Many investors begin with high-level climate scores or ESG ratings that summarise company or sector exposure. While useful for screening, they rarely capture the complexity of real assets and climate dynamics. Two buildings in the same portfolio can experience entirely different climate trajectories depending on their location, asset type, and local regulations. Equally, industrial facilities in the same sector can face divergent levels of flood, heat or wind exposure due to micro-geography or adaptation measures.

Aggregated corporate and sector-level views provide valuable context but are most effective when complemented by asset-level assessments that capture location-specific vulnerabilities. When asset-level granularity is missing, key operational dimensions, such as TICCS asset class representation, revenue exposure and location-specific climate hazards, are often insufficiently reflected. As a result, an entire sector may appear resilient despite notable underlying assets facing material disruption risk. Therefore, while high-level views often meet existing regulatory requirements, they offer limited insights into asset-specific value dynamics, constraining their usefulness for investment and portfolio analysis.

This gap sets the stage for a more granular, scientific approach that connects climate science directly to asset-level realities.

Translating climate data into decision-ready intelligence

Assessing climate risk where capital is deployed requires integrating diverse datasets (from financial to geospatial data) and translating them into financial insights.

Step 1 - Working across complementary data sources

First fact: no single dataset captures the full climate risk picture. Climate scenario projections from organisations such as Oxford Economics and NGFS provide a foundation for climate and market trends. Hazard maps, from organizations such as Copernicus or NASA outline geolocated hazard intensities. Asset metadata provides information on asset class, geographical boundaries, related revenue, costs and deployed adaptation measures. Lastly, local context adds details about market regulations, outlooks and historical events. Each source covers only part of the picture, making coherent integration essential to avoid blind spots and double counting.

Step 2 - Quantifying impacts with damage functions

Second fact: Exposure alone does not indicate materiality. A facility can sit in a flood-prone area, but its expected damage depends on location and asset-specific scopes such as expected hazard intensity (e.g., depth & duration), asset type (e.g., tunnel, motorway) and operational thresholds. Damage

¹Adaptation and resilience can be assessed using established research frameworks such as ClimaTech's, evaluating the effectiveness of decarbonization and resilience measures.

functions bridge this relation by translating hazard exposure into expected asset disruption, cost, or loss. They form the backbone of climate-adjusted cashflow estimates and help evaluate the sensitivity of income streams to physical risks.

Step 3 - Determining asset-specific vulnerabilities

Third fact: Nearby assets can react differently to climate hazards. Two nearby assets within the same hazard zone, may show different outcomes. Asset type-specific construction norms, adaptation measures¹ and maintenance history influence sensitivity to hazards. An industrial site operating at high internal heat loads may respond differently to extreme temperatures than an AC-operated office building. Capturing these nuances explains why asset-level modelling is essential, and why simple extrapolations from averages often fail.

Step 4 - Connecting climate risks to financial pathways

Fourth fact: Climate risks become decision-relevant when they are connected to financial outcomes. Climate risk oversees two types of identifiable impacts: physical and transition. Both influence OPEX and CAPEX requirements along with revenues and long-term value. On the physical side, recurrent extreme events such as Gulf Coast hurricanes have disrupted energy, transport and utility infrastructure, increasing outages, costs and resilience investment needs. On the transition side, policies, technology shifts, and evolving market expectations introduce uncertainty. For example, coal phase-out regulations in Germany sharply reduced the long-term viability of coal-fired assets. Climate scenarios provide a structured framework to translate these dynamics into forward-looking financial pathways, showing how risks and value evolve across time horizons. Integrating physical and transition risks completes the asset-level assessment and supports robust, forward-looking investment decisions.

The need for rigorous and transparent methods

As climate considerations enter the core of strategic capital planning, investors, corporations and regulators require confidence in how risk estimates are produced. Methodologies must be transparent and auditable to ensure trust and comparability across markets.

At Scientific Climate Ratings, we build on years of academic work from the EDHEC Climate Institute, to create precise, scientifically grounded methods that identify, quantify and monitor asset-level climate risks.

By combining rigorous climate science and transparent methodologies, we aim to help companies move beyond generic indicators and towards climate analytics that meaningfully inform capital allocation. As markets evolve and regulatory expectations tighten, the ability to translate complex climate science into clear, asset-specific intelligence will increasingly become a strategic advantage.

Scientific Climate Ratings, an EDHEC Venture, provides transparent, science-based climate risk ratings (physical and transition), for over 6000+ infrastructure assets. Our ratings combine rigorous research with actionable insights, helping investors monitor, manage, and report climate risks confidently.

