From risk to resilience: Embedding climate intelligence in financial decisions

Reimagining financial services in a climate-influenced world

Capgemini

Why climate risk is the new credit risk

Climate risk has moved from the headlines into the balance sheets of financial institutions. For decades, credit models and financial stress tests have helped institutions decide who to lend to, where to invest, and how to optimize their financial resources. But the next major risk factor isn't about creditworthiness or market volatility. It's about something even less predictable: the climate.

Climate risks don't stop at the flood, fire or drought itself. They ripple outward, disrupting supply chains, cutting off access to raw materials and delaying production. A hurricane in the Gulf of Mexico doesn't just damage property – it halts shipments of chemicals and plastics used worldwide. A drought in Latin America doesn't just affect crops – it drives up input costs for food companies across the globe. Those downstream effects eventually land in lenders' portfolios as increased default risk and reduced Return on Equity.

Even "stable lending" – including financing sustainable operations or transition projects – carries climate risk. A borrower's net-zero transition plan can falter if supply chains collapse, new technologies underperform or extreme weather interrupts operations. When that happens, the bank carries the default risk.

Evidence on the ground

The testimonies are already here. In 2022, Europe faced its worst drought in 500 years. Water levels on the Rhine dropped so low that cargo ships could only sail at 25% capacity, delaying deliveries and driving up costs across multiple industries.[1] That same year, the Mississippi River ran so shallow that more than 2,000 barges were stranded until dredging crews cleared a path. The impact was an estimated $20 billion in economic damage.[2] And in the American Southwest, scientists say the region is amid its driest period in 1,200 years.[3]

For financial institutions, sustainability isn't just about greening their own operations. It's about understanding the climate exposures built into borrowers' business models, supply chains, and transition plans. Climate risk has already become the new credit risk. The challenge now is measuring it quickly and accurately enough to manage it.

The layers of climate risk

Financial institutions face physical and transition risks on multiple levels. It shows up in their own operations, the loans they extend, and the portfolios they manage. To make sense of it, we can think of three tiers of risk.

Layer 1: The bank as an entity

Banks are physical entities. Offices, data centers, and branches all sit in locations exposed to floods, heatwaves or wildfires. This is the simplest level of climate risk. If a critical facility goes offline, the disruption is real.

- **Best practices for modeling:** These exposures can be mapped and monitored, helping institutions put the right mitigation and continuity plans in place.

Layer 2: Portfolio-wide exposure

The middle layer is the hardest and the most integral. Banks hold diverse exposures: trading books, real estate, private equity, and corporate loans. These are often managed in silos, which makes it difficult to see the aggregate climate risk picture.

- **Best practices for modeling:** By integrating geospatial data, financial modeling, and robust scenario analysis and stress testing capabilities, banks get a consolidated portfolio-wide view. That's what allows leadership teams to make informed, top-down decisions.

Layer 3: Sustainable lending

This is where climate risk starts to cut deep. Transition finance and net-zero loans are tied directly to the borrower's ability to change their business model. If that borrower faces a climate disruption or fails to transition, the loan defaults.

- **Best practices for modeling:** Banks can stress test borrowers under different climate scenarios, define risk appetite, and structure financing terms that balance growth with resilience.

[1] European Commission "Droughts in Europe in August 2022: severe rainfall deficit is affecting crops and increasing fire risks," August 22, 2022.
[2] Reuters "Mississippi River reopens to barge traffic after low water closures - U.S. Coast Guard," October 10, 2022.
[3] Nature "Rapid intensification of the emerging southwestern North American megadrought in 2020-2021," March 2022.

What makes climate risk modeling effective

Climate models only matter if the results are clear, credible, and useful for decision-making. The most effective approaches share five traits:

- **Accuracy:** Global climate datasets provide the baseline – but without local refinement, they miss the risks that matter most. A global flood model might flag "Western Europe," but a local dataset pinpoints which rivers are at risk and which industrial zones sit on their banks.
- **Integration:** Too often, sustainability teams, risk managers, and finance teams use different tools. The result is duplicated effort and inconsistent numbers. Effective models unify data streams so everyone works from a single source of truth.
- **Speed:** Risk teams can't wait weeks for reports. Scenario testing has to be quick, repeatable, and flexible enough to answer boardroom questions in real time.
- **Translation:** Climate science is technical. Investors and executives need financial metrics. Effective models translate "2°C warming" into tangible outcomes like default probabilities, portfolio value-at-risk, and Return on Tangible Equity.
- **Validation:** Internal models matter, but they rarely stand alone. External validation builds confidence, highlights blind spots, and strengthens credibility with regulators and shareholders.

Why current approaches fall short

Financial institutions aren't choosing whether to model climate risk. Regulators and standard setters are already requiring it. Across the globe, the bar is high, and the timelines are real:

- **The Corporate Sustainability Reporting Directive (CSRD)** in the EU is live, mandating sustainability disclosures backed by data and scenario analysis.
- **The Task Force on Climate-Related Financial Disclosures (TCFD)** has become a global baseline, already embedded in reporting regimes from the UK to Japan.
- **The International Sustainability Standards Board (ISSB)** is rolling out standards that are rapidly being adopted across jurisdictions.

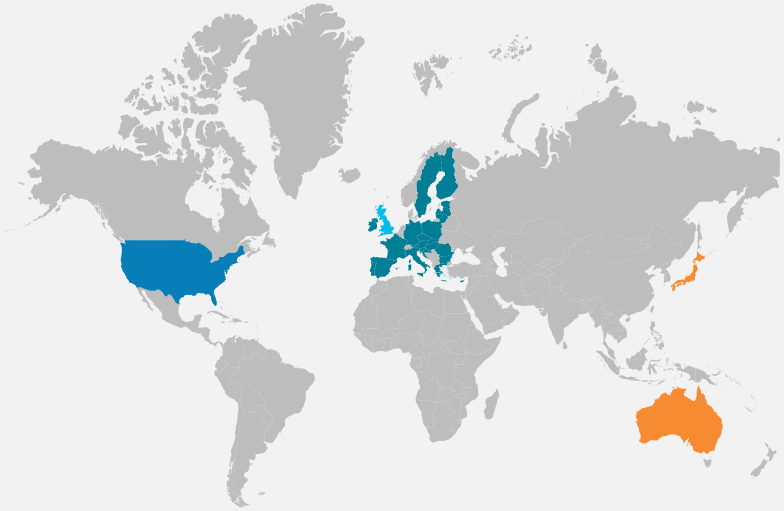
Disclosures must be transparent, data-driven, and auditable. And they must keep pace with regulatory and investor expectations.

The translation gap

Climate science doesn't map neatly to financial statements. A "2°C warming scenario" might sound academic, but what does it mean in practice? Does it raise the default probability of a regional agribusiness loan by 5%? Does it change the value-at-risk of a corporate portfolio by $100 million? Bridging this gap requires models that connect climate inputs to financial outcomes in a language that boards and investors can understand.

The regulatory heat map

How different regions are moving on climate disclosure



- EU (CSRD) – detailed climate disclosure is already required
- UK (TCFD-aligned) – mandatory for large listed companies
- US (SEC climate rule, pending finalization) – on the horizon but politically charged
- APAC (Singapore, Japan, Australia) – regulators require climate stress tests

Siloed processes, inefficient tools

Many banks already run climate models in-house, but the reality can be messy:

- Risk, finance, and sustainability teams working in silos.
- Data comes from scattered sources, often in different formats and assumptions.
- Models are immature, inconsistent, and rarely validated externally.
- Reporting is slow. By the time a stress test is completed, market conditions may have shifted and the opportunity to act may have passed.

The result is disclosures that take significant effort and still struggle to deliver the depth regulators and investors increasingly expect.

Why in-house isn't enough

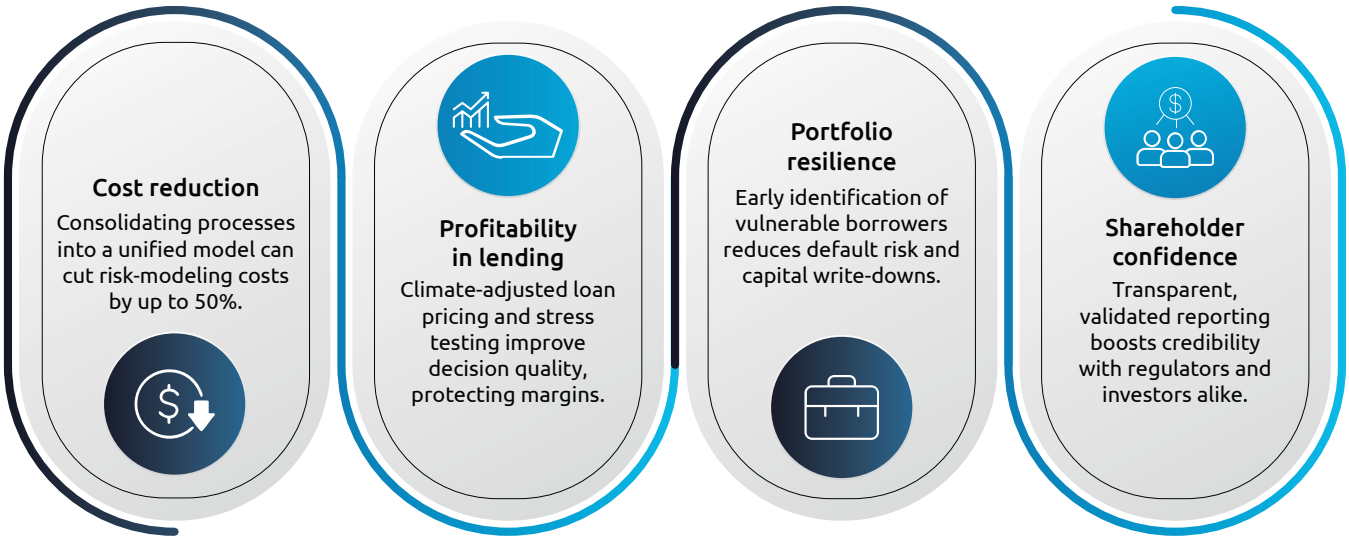
Financial institutions build smart models, but even the best internal teams face three recurring gaps:

- **Validation:** Models need external benchmarking. Without outside validation, confidence is low, and regulators may question credibility.
- **Analysis:** Models produce data, but not always the actionable insights boards and investors need. Institutions often struggle to turn climate metrics into portfolio-level decisions.
- **Perspective:** Risk is rarely contained within a single team or dataset. What's needed is a 30,000-foot view that connects all the moving parts.

The benefits of getting it right

The consequences of weak climate modeling are evident on the balance sheet. A factory loan written off after a flood, a borrower defaulting during a drought or a stranded asset dragging on valuation all translate directly into financial losses. Add reputational damage from insufficient disclosures, and the cost compounds.

On the other side, the return on equity of getting it right is tangible:



That's the real reason current approaches fall short: they don't just slow compliance – they also put financial performance at risk.

Is your climate modeling ready?

A quick self-check for risk, finance, and sustainability teams:

- **Integration:** Is your data shared across risk, sustainability, and finance, or are teams working in silos?
- **Speed:** Can you run climate scenarios in hours, not weeks?
- **Translation:** Do your models turn climate events into credit risk, default probabilities, and financial loss?
- **Validation:** Have your models been benchmarked externally to identify blind spots?
- **Coverage:** Are you testing across all three tiers of risk: entity, lending, and portfolio?

If the answer is "no" to any of the above, your institution may struggle to meet regulatory expectations and miss opportunities to turn climate insight into business strategy.

What effective hybrid models deliver

Forecasting alone won't prepare financial institutions for climate risk. What's needed is a hybrid approach that combines top-down analysis with bottom-up detail, linking climate science to financial outcomes.

A strong hybrid model delivers three things:

- **Probability:** How likely is a flood, drought or wildfire in a borrower's region?
- **Impact:** If it happens, what are the consequences for revenue, supply chains or repayment ability?
- **Options:** What's the difference between doing nothing, responding late or having a mitigation plan in place?

Every scenario should be stress tested and back-tested, with accuracy improving as new data becomes available. When done right, this gives institutions both a broad view of macroeconomic shocks and a granular lens on portfolio or asset-level exposure.

Key capabilities of a modern hybrid platform include:

- **Data integration:** Pulling in APIs, geospatial data, and manual inputs.
- **Regulatory flexibility:** Supporting multiple jurisdictions and templates.
- **Scenario management:** Creating, cancelling, and replaying simulations on demand.
- **Sandbox + production:** Experimenting without disrupting live operations.
- **Scalable analytics:** Running heavy simulations quickly and at scale.
- **Collaboration:** Risk, finance, and sustainability teams all working from the same view.

The payoff is speed and confidence. Stress tests that once took weeks can now be rerun in hours. And risk insights become clearer, enabling better lending choices, more resilient portfolios, and stronger conversations with regulators and shareholders alike.

Case in point: How the right risk model could have flagged the Rhine drought

The event

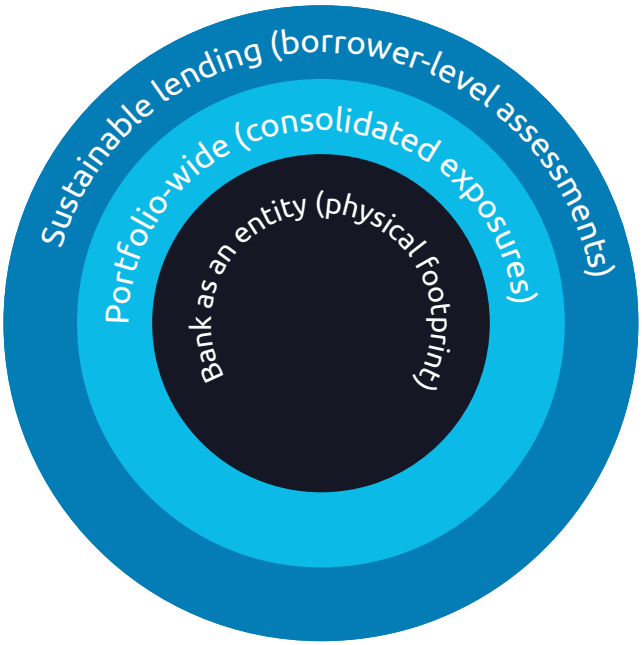
- In 2022, Europe's Rhine River dropped so low that cargo ships could only carry 25% loads.
- Entire industries stalled as raw materials and goods couldn't move.
- Losses ran into the millions.

The missed risk

- Many lenders hadn't modeled inland waterway exposure.
- Supply chain disruption cascaded into delayed revenues, weaker borrowers, and heightened default risk.

With the right risk model

- Simulated low-water scenarios could have revealed choke points.
- Portfolio stress testing would have flagged borrowers who depended on Rhine shipping.
- Banks could have adjusted exposure or contingency plans before the drought hit.



The way forward for financial institutions

Climate shocks are no longer rare disruptions. They're recurring stressors that affect borrowers, supply chains, and portfolios. For financial institutions, that makes climate risk a direct financial risk. Regulators know it. Investors expect it. Shareholders are asking for it.

To keep pace, banks need more than fragmented spreadsheets or untested in-house models. They need speed, validation, and a single view of risk that connects climate science to financial metrics.

Capgemini's Business for Planet Modeling (BfPM) was built with this challenge in mind. It helps institutions:

- Run climate scenarios quickly enough to inform real decisions.
- Validate and strengthen existing models.
- Integrate data across teams for a unified, credible view.
- Translate climate risk into the financial language that regulators and boards demand.

Climate risk is here to stay. With BfPM, banks can stop treating it as an external shock and start managing it as part of business as usual.

To learn more, explore Business for Planet Modeling with Google Cloud.

About Capgemini

Capgemini is a global business and technology transformation partner, helping organizations to accelerate their dual transition to a digital and sustainable world, while creating tangible impact for enterprises and society. It is a responsible and diverse group of 340,000 team members in more than 50 countries. With its strong over 55-year heritage, Capgemini is trusted by its clients to unlock the value of technology to address the entire breadth of their business needs. It delivers end-to-end services and solutions leveraging strengths from strategy and design to engineering, all fueled by its market leading capabilities in AI, generative AI, cloud and data, combined with its deep industry expertise and partner ecosystem. The Group reported 2024 global revenues of €22.1 billion.

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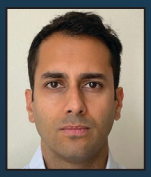

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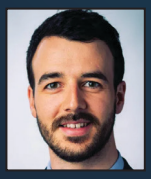

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