Climate Risk Model Performance and Insights Report

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Executive summary

EcoSense Analytics developed the Climate Risk Assessment Model to help investors evaluate both transition and physical climate risks for corporate portfolios. The model has achieved a 0.82 AUC score on validation datasets, with improved stability across industries. However, some data limitations still exist due to inconsistent disclosures from smaller firms.

This report summarizes recent model performance, highlights portfolio-level insights, and outlines how the model supports sustainable investment strategies. The goal is to provide decision-makers with a transparent, data-driven view of climate exposure across sectors.

Model overview

The Climate Risk Assessment Model combines financial, emissions, and policy data to quantify transition and physical risk exposure for over 1,200 listed companies.

- Transition risk factors: carbon pricing, regulatory change, technology adoption, and market volatility.
- Physical risk factors: flooding, heat stress, and extreme weather frequency.
- Methodology: Gradient Boosting model trained on public and proprietary datasets.

The model generates composite risk scores that support investors in portfolio risk analysis, stress testing, and regulatory disclosure alignment (e.g., TCFD).

Performance summary

- Accuracy: 0.82 AUC (improved from 0.77 last quarter).
- Data coverage: 89% of firms with sufficient disclosures.
- Key challenge: smaller, emerging-market firms lack standardized data.
- Validation: Results benchmarked against third-party climate analytics tools with consistent directional accuracy.

While these metrics indicate strong technical performance, documentation on explainability and governance remains under development.

Business and environmental relevance

The model helps clients:

- Prioritize high-risk holdings and design mitigation strategies.
- Enhance climate reporting under TCFD and EU CSRD requirements.
- Allocate capital toward more sustainable, resilient businesses.

However, feedback from sustainability and compliance teams suggests that some outputs are overly technical. Non-technical users find it difficult to interpret how the model's risk scores translate into practical actions or regulatory expectations.

Governance and fairness

Model governance follows internal quality and validation protocols, but documentation on fairness and bias mitigation is still being drafted.

- Governance logs track model versions, data updates, and retraining cycles.
- Fairness assessments are planned for next quarter to check sectoral bias.
- Audit readiness: partial alignment with ISO/IEC 42001 (AI management system) underway.

Clearer communication on these areas will help build stakeholder confidence—especially among regulators and ESG-focused investors.