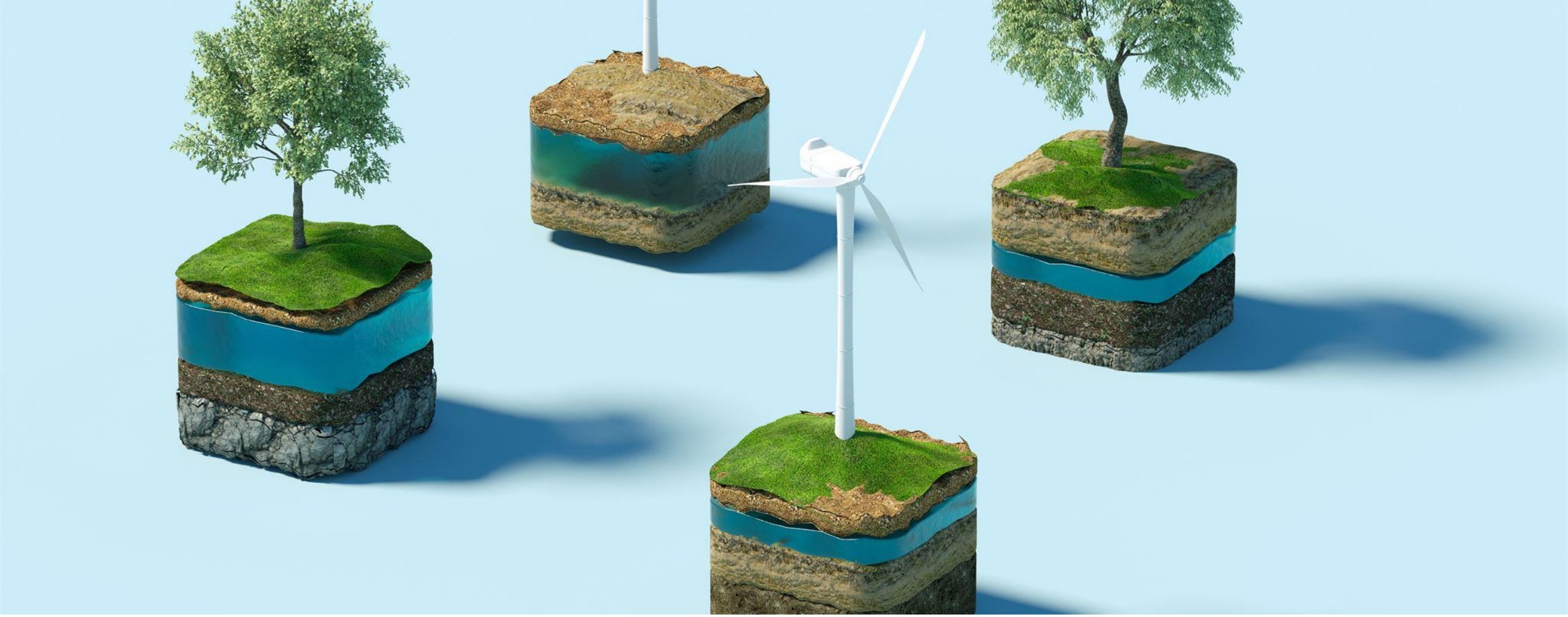
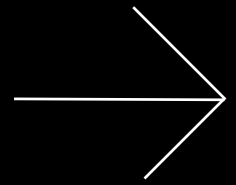


Driving sustainable practices through data-driven insights

ESG Emissions Intelligence and Sustainability Solutions

Problem



Challenges in ESG Emissions Data

Incomplete Emissions Disclosure

Many companies do not fully report Scope 1, 2, and 3 emissions, causing significant data gaps for stakeholders.

Lack of Data Transparency

Inconsistent and fragmented reporting hinders comparability across sectors and regions, reducing trust in ESG data.

Inefficient Workflows

Manual and slow processes complicate emissions tracking, adding inefficiency and delaying actionable insights.

Systemic Risks and Compliance Issues

Data gaps create risks for investments and sustainability goals, while hindering regulatory compliance and risk assessment.

Solution: Sustainability Insights & Emissions Estimation Engine

Unified Emissions Intelligence Platform

Machine Learning Emissions Estimation

The platform uses machine learning to estimate missing Scope 1 and Scope 2 emissions, improving ESG reporting completeness.

Industry and Country Benchmarking

Provides benchmarking across 20 sectors and country-level comparisons to help organizations assess their emissions performance globally.

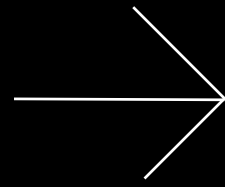
Detailed Emission Source Analysis

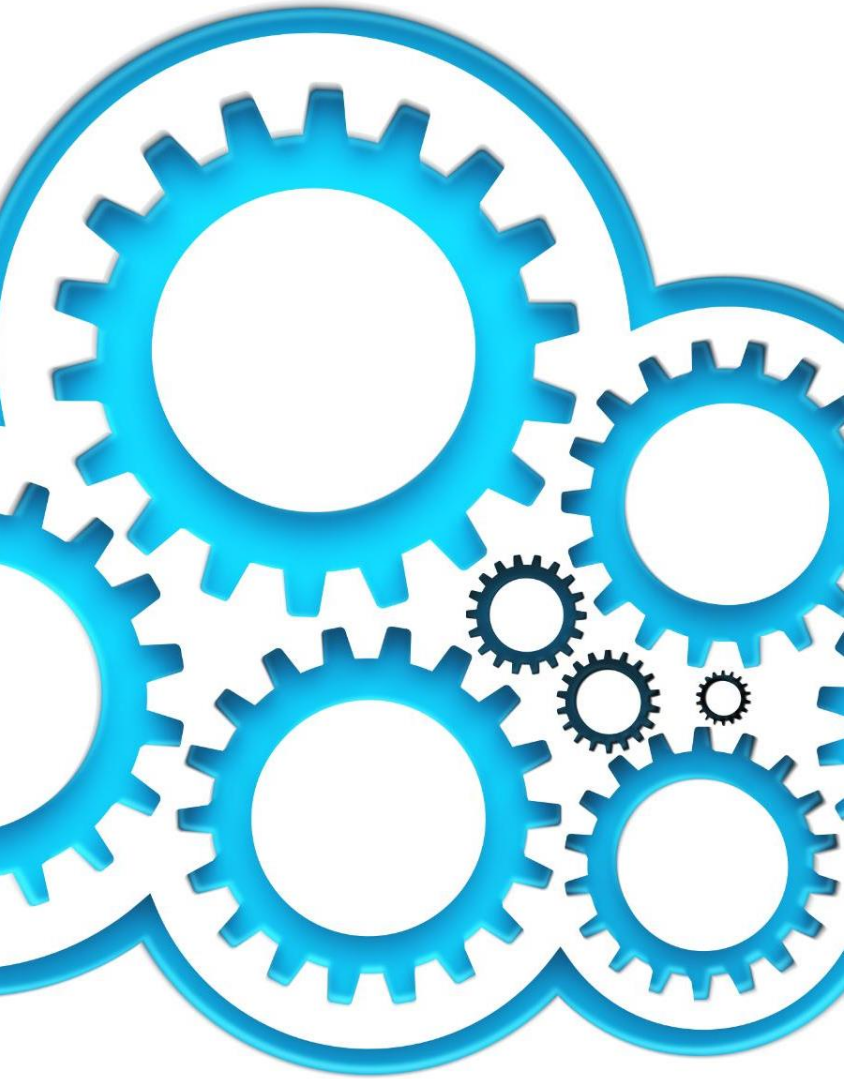
Offers granular insights into emission drivers like combustion, electricity, logistics, and refrigerants for targeted sustainability actions.

AI-Powered Reduction Recommendations

Includes AI-generated recommendations with estimated carbon savings to guide effective emissions reduction strategies.

How It Works (MVP Flow)





Data Processing and Model Workflow

Data Ingestion and Feature Engineering

Clients provide financial, operational, and emissions data which is processed into derived metrics for analysis.

Multi-Model Ensemble Prediction

Regression, KNN, and XGBoost models combine to predict emissions with confidence intervals ensuring accuracy.

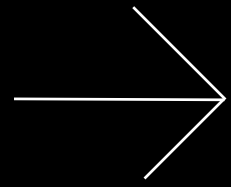
Insights and Dashboard Visualization

The model outputs are transformed into actionable insights displayed on dashboards for emission breakdowns and benchmarking.

Comprehensive Emissions Reporting

Final report generation supports decision making even with partial or missing emissions disclosures.

Why It Matters



Impact on Stakeholders

Financial Institutions Benefits

The solution fills ESG reporting gaps, supports regulations compliance, and enables precise climate risk scoring to enhance investment decisions.

Corporate Insights and Action

Companies gain deep emissions insights to identify reduction opportunities and benchmark against peers, enabling net-zero strategies.

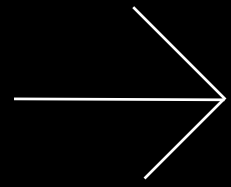
Regulators and Auditors Support

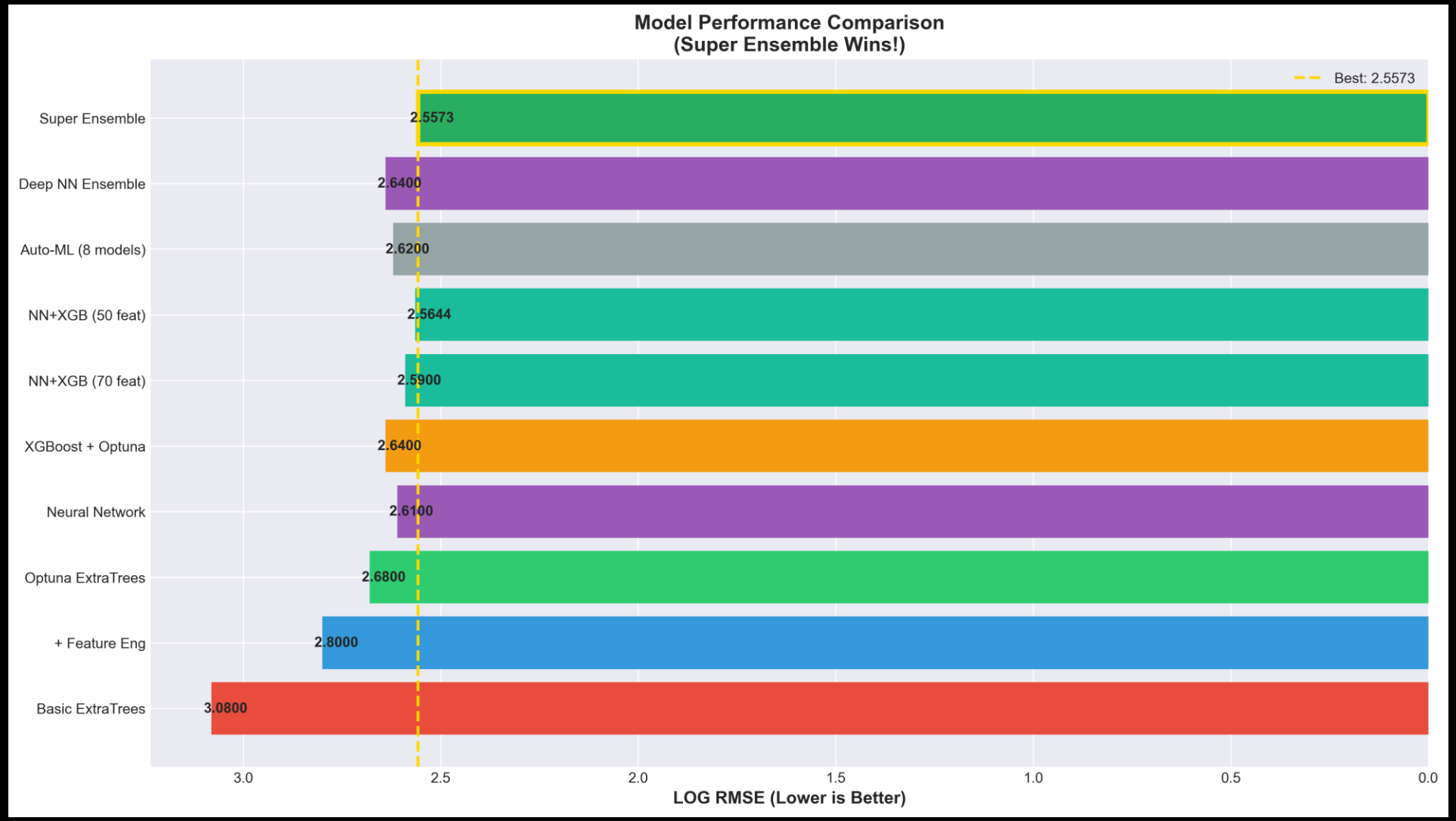
Regulators and auditors receive reliable estimates and transparent methodologies supporting disclosures in data-poor markets.

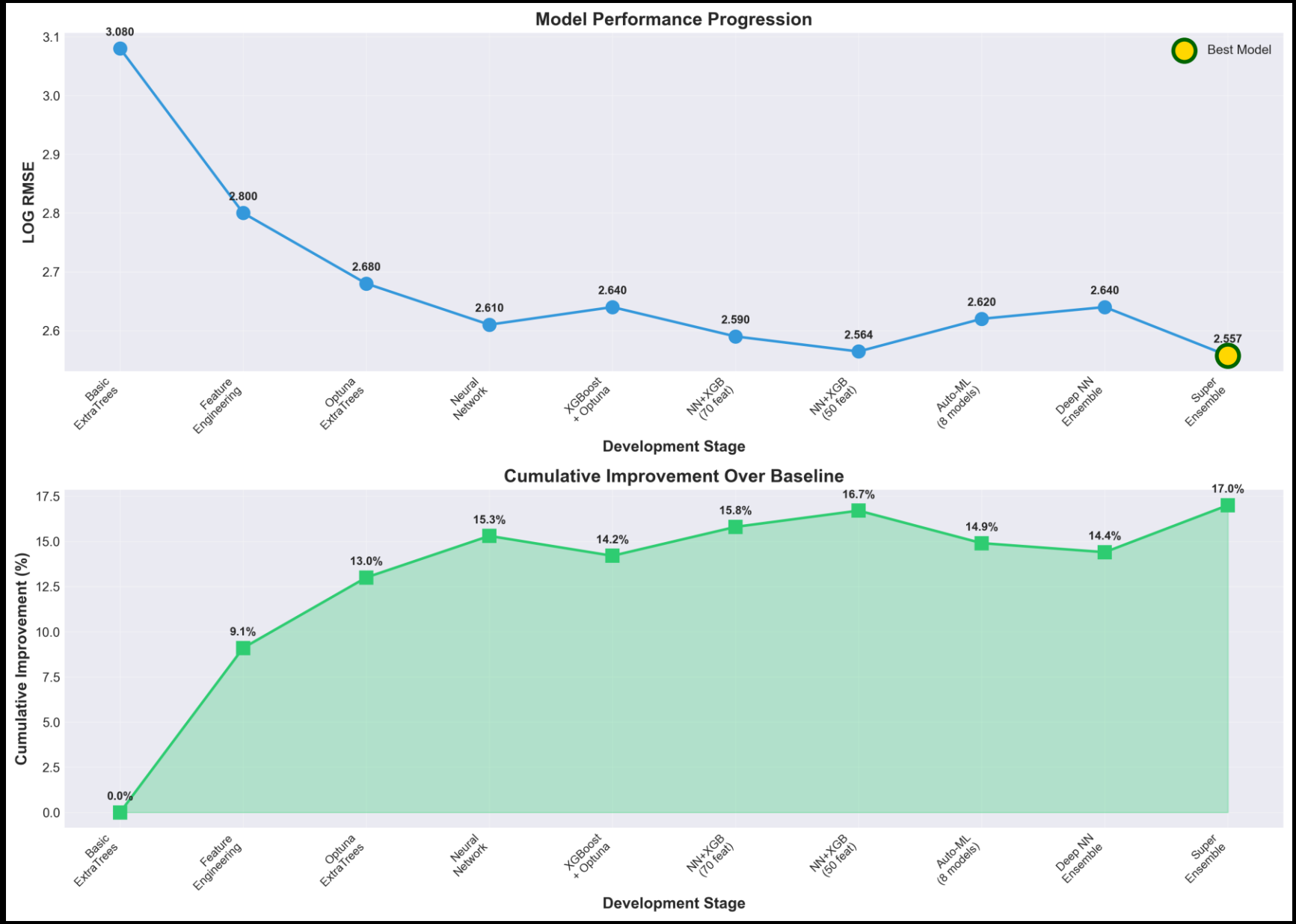
AI-Driven Sustainability Intelligence

The MVP leverages AI and structured ESG data to provide fast, scalable, and actionable sustainability intelligence globally.

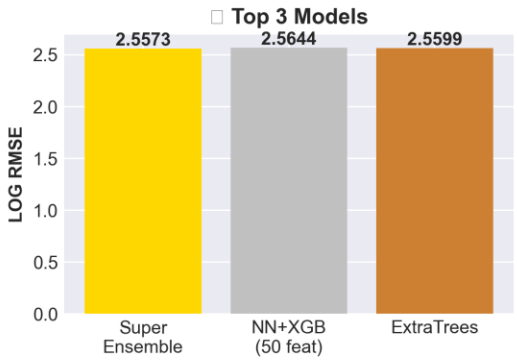
Models and Results




Model Performance Comparison
(Super Ensemble Wins!)
Best: 2.5573
Super Ensemble
Deep NN Ensemble
Auto-ML (8 models)
NN+XGB (50 feat)
NN+XGB (70 feat)
XGBoost + Optuna
Neural Network
Optuna ExtraTrees
+ Feature Eng
Basic ExtraTrees
2.5573
2.6400
2.6200
2.5644
2.5900
2.6400
2.6100
2.6800
2.8000
3.0800
3.0
2.5
2.0
1.5
1.0
0.5
0.0
LOG RMSE (Lower is Better)


Model Performance Progression
LOG RMSE
Best Model
3.080
2.800
2.680
2.610
2.640
2.590
2.564
2.620
2.640
2.557
Basic ExtraTrees
Feature Engineering
Optuna ExtraTrees
Neural Network
XGBoost + Optuna
NN+XGB (70 feat)
NN+XGB (50 feat)
Auto-ML (8 models)
Deep NN Ensemble
Super Ensemble
Development Stage
Cumulative Improvement Over Baseline
Cumulative Improvement (%)
0.0%
9.1%
13.0%
15.3%
14.2%
15.8%
16.7%
14.9%
14.4%
17.0%
Development Stage

PROJECT SUMMARY: 17% IMPROVEMENT ACHIEVED!

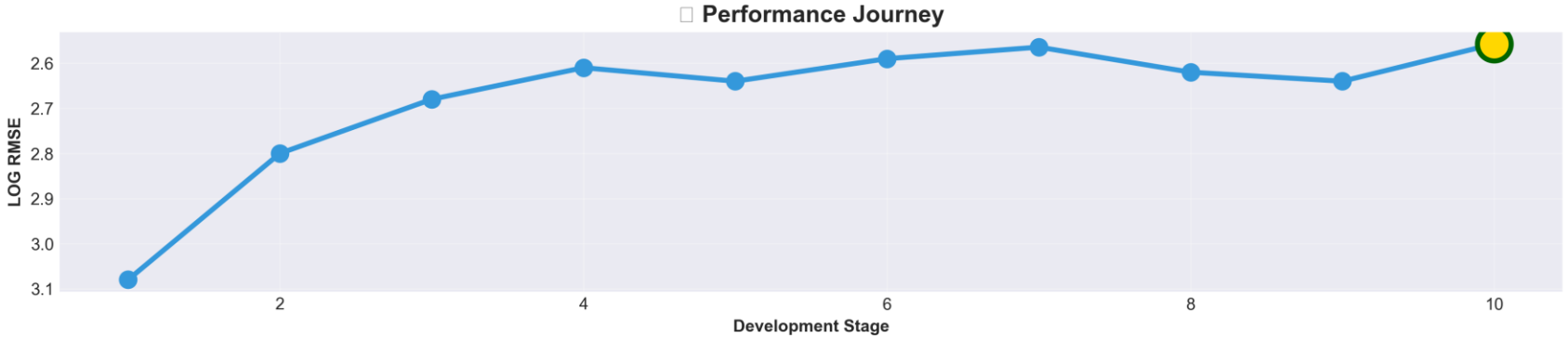
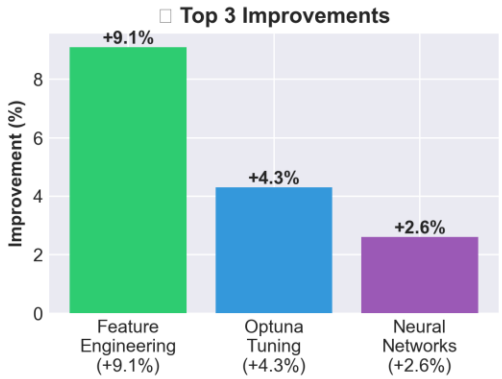
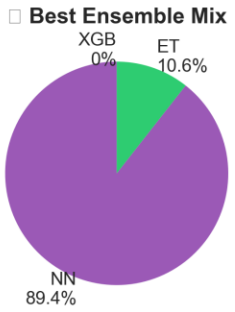
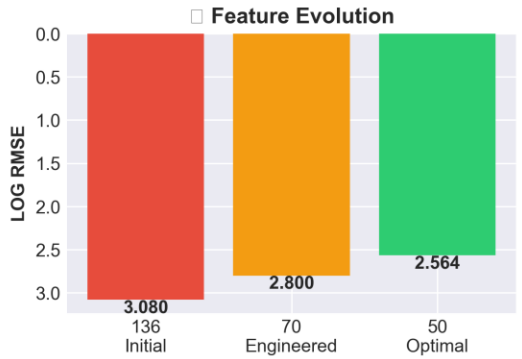


17.0%

Total Improvement

From 3.08 → 2.5573

16

Models Tested

Across 5 categories