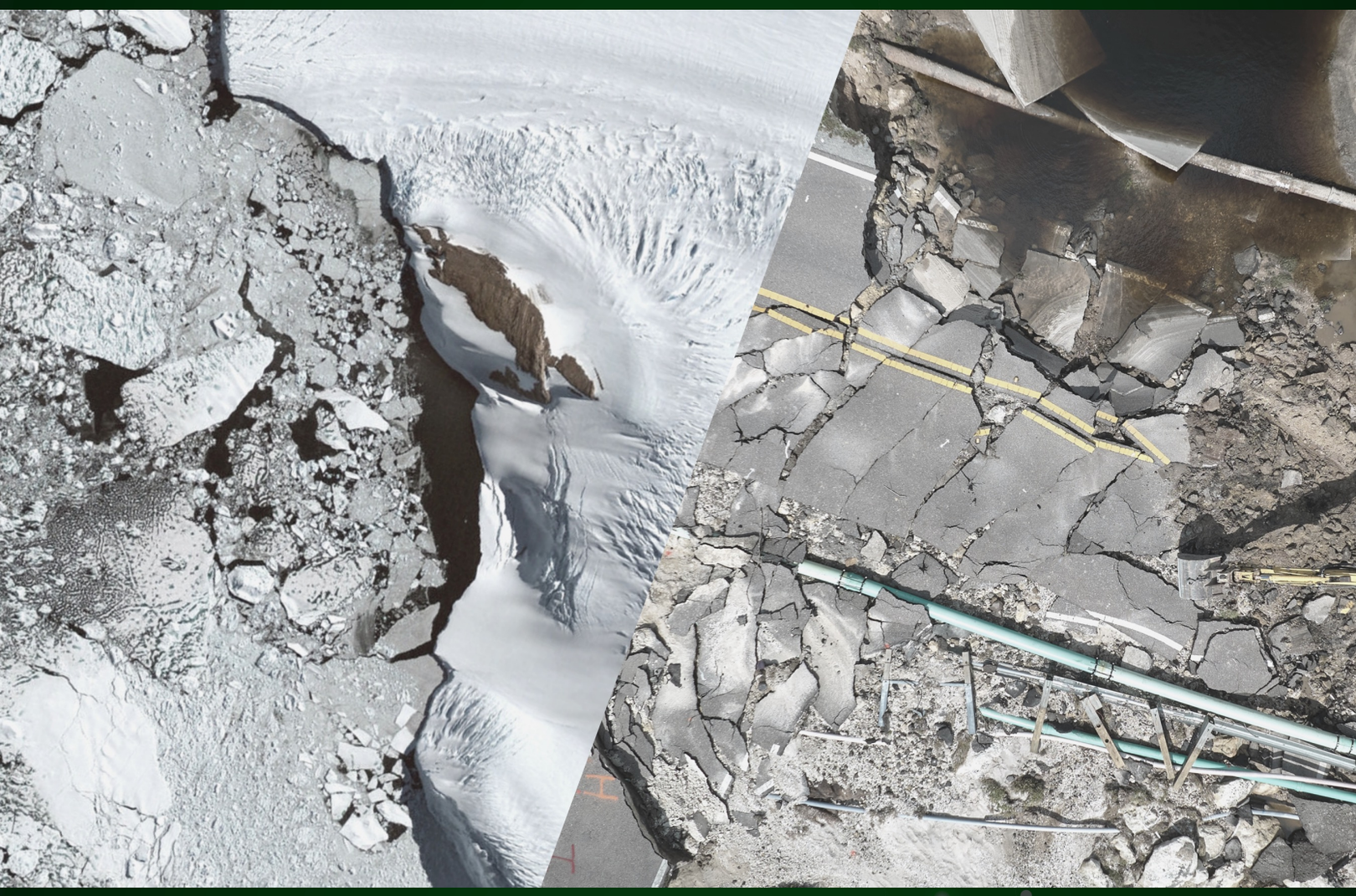
Infrastructure Investment Climate Impacts & Risks Data and Services



infraMetrics®

Scientific Infra & Private Assets
An EDHEC Venture

November 2023

Version 2.1

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Climate Impact & Risks Data in infraMetrics

The infraMetrics Climate Impacts & Risk Metrics include index-, segment- and asset-level measures of the climate impacts, the transition risks, and the physical risks of hundreds of infrastructure investments globally. Our climate metrics are calculated for a minimum of three climate scenarios (Orderly transition, Delayed transition, and No transition) and four horizons (Today, 2030, 2040, and 2050). All metrics are developed using asset-level data and sector-specific models.

We also offer bespoke asset- and portfolio-level analyses to help investors report and manage the climate impacts and risks of their infrastructure investments (direct and in funds).

1. Climate Impact and Transition Risk Metrics

- ✓ Scopes 1, 2, and 3 emissions across 60+ TICCS industrial categories, covering 500+ infrastructure assets/companies in 23 countries.
- ✓ Carbon intensity metrics and within-sector transition risk rankings for hundreds of market indices, market segments, and individual assets across most infrastructure asset types in the TICCS® classification.

2. Physical Risk Metrics

- ✓ Asset-type specific damage functions are used to estimate damage factors for over 500+ individual assets across all infrastructure asset types and several types of climate hazards.
- ✓ Physical damage-at-risk (99% PDaR), physical value-at-risk (99% VaR), expected loss, and within-sector physical damage rankings for hundreds of market indices, market segments, and individual assets across most infrastructure asset types in the TICCS® classification.

3. Extreme Climate Value

- ✓ Using both transition and physical risk exposures in different climate scenarios (NGFS or other), infraMetrics produces scenario-specific asset valuations, transition risk, alignment risk, and physical risk extreme value metrics.

Science-based metrics

For maximum robustness and integrity, our climate metrics use validated academic approaches, with full transparency of the data creation process and independence.

AI-powered

Advanced algorithms are used to transform a range of non-financial data from maps to weather and traffic data into synthetic and robust impact and climate risk aggregates.

Key Use Cases

Portfolio Analysis Using Climate Benchmarks

Investors in infrastructure equity or debt can compare the impacts and transition risk of their portfolios against the climate metrics of representative market indices and market segments to determine their exposure to climate risks. This can be done across all sectors and geographies worldwide.

Climate Impact and Transition Risk Proxies

Our clients can easily generate customised proxies of any missing climate data in a portfolio, including impact and transition risk metrics, using our "comps" builder; a tool powered by the largest representative sample and multi-sector coverage of climate impacts and risk available in infraMetrics.

Climate Risk Management

Investors can use our climate metrics to understand the risks their portfolios face and design strategies to effectively manage climate risks. With the comprehensive view we offer of hundreds of market segments, investors can identify investment opportunities and challenges in their own portfolios.

Regulatory Reporting

InfraMetrics data can be used as direct inputs or to generate proxies for reporting requirements at the portfolio and asset level. They are aligned with TCFD, the mandatory Principal Adverse Impact indicators (PAI) of the SFDR, the EU Taxonomy sustainability, and the Do-No-Significant Harm criterion.

Infrastructure Activities Covered

More than 500 Market Segments Available	
By Geography	By TICCS® Industrial Activity
23 Countries in Europe, Americas and Asia Pacific	• Power x-Renewables (Gas, Coal, CHP, and Other Fossil Fuel-Fired Power) • Environmental Services (NH Waste Treatment, WTP Generation, Water Treatment, Sea Water Desalination, Wastewater Treatment & Reuse • Social Infrastructure (Education, Health, Government Buildings, Stadiums, etc.) • Energy & Water Resources (LNG, and Crude Oil Refinery) • Data Infrastructure (Data Centers) • Transport (Airports, Ports, Roads, Railways) • Renewables (Wind, Solar, Hydro, Biomass, and Geothermal Power Generation) • Utilities (Electricity Distribution & Transmission, Gas Distribution, and Water & Sewerage)

Modelling Climate Impacts & Risks

Carbon Emission Estimations (Baseline Scope 1, 2, and 3 emissions)

"Statistical" approach

Reported emission data
+
Asset-level characteristics*

Predicted emissions

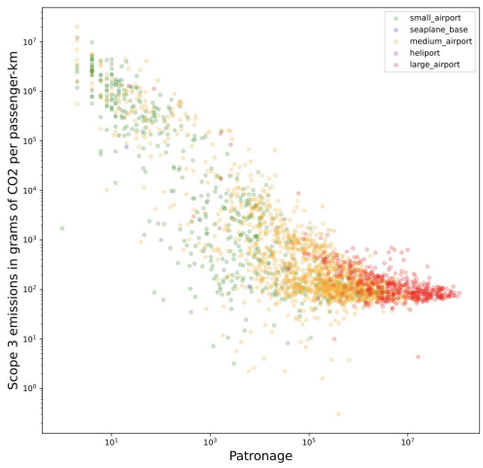
Character-specific emission model
e.g., Container Port scope 1&2 Drivers

"Physical" approach

Asset-level usage/traffic

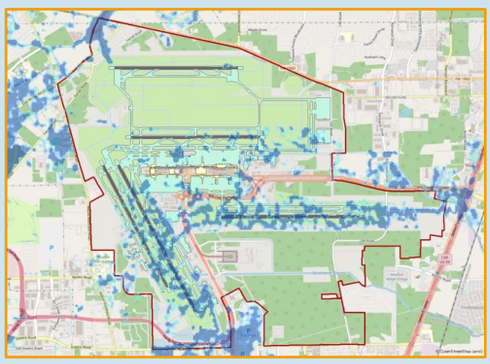
Predicted emissions

Activity-specific emission conversion factors
e.g., scope 3 emissions from flight distance



Physical Risk Estimations

Geo-located asset-level characteristics
(buildings, roads, turbines, etc.)
+
Physical hazard models
(floods, heat, storms, etc.)



Predicted physical damage
and value-at-risk

Asset-type-specific damage function
e.g., airport terminal flooding damage

Climate Scenario Estimations

Asset-level financials &
cash flows
+
Climate Scenarios (e.g., NGFS)
+
Climate impact &
risk metrics

Cash flow & financial predictions

Asset Pricing Model

Predicted asset prices
in each climate scenario until 2050

Predicted impact and risk climate metrics in each climate scenario until 2050

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* Asset-level characteristics include physical dimensions and size, location, traffic and utilization, etc.

Bespoke Portfolio Analysis

A customised analysis and reporting solution

We help investors generate a complete climate impact and risk assessment (with a limited number of data points for each individual asset or fund investment). Exploiting the robustness of the infraMetrics database and models, our custom-made climate impact and risk assessment include:

- ✓ Baseline carbon footprint estimates (requires technical asset-level data)
- ✓ Baseline physical risk analyses (requires geolocating individual assets)
- ✓ Scenario-based climate risk analyses including extreme transition and physical risk estimations (requires asset financials to conduct valuation analyses)
- ✓ All the above can also generate metrics for TCFD reporting

		Client Receives	Inputs for Client's Assets	Inputs for Client's Fund Investments
Climate Impacts		Carbon emissions at the asset level	Can be estimated by proxy if the investor does not have carbon estimations of its direct investments	Can be estimated by proxy if the investor does not have carbon estimations of its indirect investments
		Financed emissions (by NAV and EVIC)	Requires minimal asset-level data	Requires minimal asset-level data and using proxies for NAV
Climate Risks	Transition Risks	Carbon intensity of revenues or assets	Requires minimal asset-level data	Requires minimal asset-level data and using infraMetrics proxies for revenue and total assets
		EBITDA at risk	Requires minimal asset-level data	Requires minimal asset-level data and using proxies for EBITDA
	Physical Risks	Physical Damage at Risk	Requires limited asset geo-location information,	Requires limited asset geo-location information,
		Physical Value at Risk	Requires limited asset geo-location information, financials (total assets)	Requires limited asset geo-location information, financials (total assets)
		Expected loss	Derived calculation	Derived calculation
	Extreme Climate Value	Transition risk	Requires minimal asset-level data	Requires minimal asset-level data and using infraMetrics proxies for revenue and total asset
		No alignment risk		
		Late alignment risk		
		Physical risk	Requires limited asset geo-location information, financials (total assets)	Requires limited asset geo-location information, financials (total assets)
Climate Risk Value		Change in NAV at the horizon	Requires asset-level data	Requires asset-level data

Metrics are available for three scenarios (No Transition, Disorderly Transition, Orderly Transition) and multiple time horizons (Today, 2030, 2040, and 2050). They are computed for directly held assets, fund investments, and the total infrastructure portfolio.

Data available in infraMetrics

Metrics available for three scenarios (No Transition, Disorderly Transition, Orderly Transition) and multiple time horizons (Today, 2030, 2040, and 2050)

Class	Metric	Description	Availability
Climate Impact Metrics	Absolute carbon emissions	Direct emissions (Scope 1), indirect emissions from electricity consumption (Scope 2), indirect emissions from related activities (Scope 3*), and their totals	Asset Level
	Financed emissions –NAV	Carbon emissions (S1, S2, S3*, S(1+2), and S(1+2+3*)) divided by an asset's Net Asset Value	Index Level TICCS® segment level Asset level
	Financed emissions –EVIC	Carbon emissions (S1, S2, S3*, S12, and S123*) divided by an asset's Enterprise Value Including Cash (EVIC)	Index Level TICCS® segment level Asset level
	Implied Temperature Rise (ITR)**	Difference between No Transition scenario temperature and Net Zero scenario temperature	Index Level TICCS® segment level Asset level
Transition Risk Metrics	Carbon intensity by revenue	Carbon emissions (S1, S2, S3, S12*, and S123*) divided by an asset's revenue	Index Level TICCS® segment level Asset level
	Carbon intensity by total assets	Carbon emissions (S1, S2, S3*, S12, and S123*) divided by an asset's size (total asset value)	Index Level TICCS® segment level Asset level
	EBITDA-at-risk for S(1+2) carbon emissions	Shadow cost of carbon as % profits	Index Level TICCS® segment level Asset level

** Absolute carbon emissions for Scope 3 are not available for climate scenario predictions*
*** ITR is only calculated as part of the customised analysis and reporting solution*

Data available in infraMetrics

Metrics are available for three scenarios (No Transition, Disorderly Transition, Orderly Transition) and multiple time horizons (Today, 2030, 2040, and 2050)

Class	Metric	Description	Availability
Physical Risk Metrics*	Physical Damage–at–Risk (PDaR) (99%, 98%, 96.6%)	Asset-level damage factor (DF) per type of physical risk for 30-, 50-, and 100-year return periods. It includes DFs for flooding and storms (i.e., extra-tropical storms and cyclones).	Index Level Asset level
	Physical Value-at-Risk (PVaR) (99%, 98%, 96.6%)	Damage Factors (DFs) as described above multiplied by total asset value	Index Level Asset level
	Expected loss from physical damage	Physical Value-at-Risk (PVaR) as described above multiplied by the probabilities of each return period (100-year = 1%, 50-year = 2%, 30-year = 3.3%).	Index Level Asset level
	Operational revenue loss	The operational revenue per day is multiplied by the number of days above a given temperature threshold per year. Calculated separately for 30°, 35°, 40°, and 45° thresholds.	Asset level
	Physical risk exposure ranking	Ranking of assets based on max damage as defined above within each TICCS superclass sector for 30-, 50-, and 100-year return periods.	Asset level
Extreme Climate Value Metrics**	Transition risk	Impact of carbon tax on Net Asset Value (NAV) within the Disorderly scenario (with and w/o carbon emissions)	Index Level TICCS® segment level Asset level
	No alignment risk	Difference in NAV between No Transition and Orderly transitions	Index Level TICCS® segment level Asset level
	Late alignment risk	Difference in NAV between Disorderly and Orderly transitions	Index Level TICCS® segment level Asset level
	Physical risk	Impact of physical risk exposures on NAV within the No Transition scenario	Asset level

* At the moment, we only include climate scenario predictions for 100-year flood, extratropical storm, and cyclone hazard events ** Extreme climate value metrics are only available for climate scenario data

Notes

Notes

About Us

Scientific Infra and Private Assets Pte Ltd is a venture of the EDHEC Business School and its Infrastructure Research Institute (EDHECinfra). The company is an index data, benchmarks, analytics, and research provider for investors in the unlisted infrastructure and private equity universe. The infraMetrics platform rests on the largest and most representative database of unlisted infrastructure equity and private infrastructure debt investments in the world.

Scientific Infra and Private Assets Pte Ltd is a regulated index provider recognised by ESMA and maintains infraMetrics: a data platform that includes market indices, investor peer group benchmarks, infrastructure fund benchmarks, deals and due diligence analytics, asset-level valuation, credit risk and climate risk data, as well as research papers and datasets.

Contact Us

+44 (0) 207 062 5328

sales@scientificinfra.com

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London | Singapore

info@scientificinfra.com www.scientificinfra.com