

Is Decarbonization Gaining Momentum? Exploring ICE Climate Data Insights



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icecta
R2024b

Create Intercontinental Exchange (ICE) Climate Transition Analytics (CTA) connection
Since R2024a expand all in page

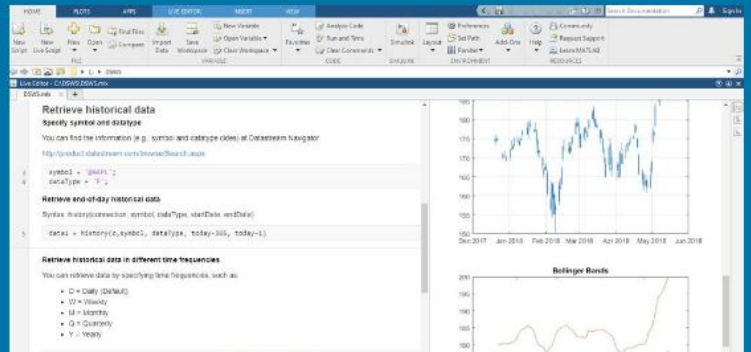
Description

The `icecta` function creates an object that represents a connection to the Intercontinental Exchange® (ICE®) data server. After you create an `icecta` object, you can retrieve Climate Transition Analytics (CTA) data for use in your climate data workflows.

Creation

Syntax

```
c = icecta(token)
c = icecta(token,timeout,url,mediatype,debugmodevalue)
```






ICE Climate Transition Finance Data

October 2024



ICE Climate Transition Finance Data

Climate scenario analysis, emissions and targets data to develop decarbonization strategies



Scope 1, 2 & 3 Emissions / Intensity

Emissions Reduction Targets

Implied Temperature Rise (ITR)

Forward-looking Projections

I. GHG Emissions Data

- Greenhouse Gas Protocol defined Scope 1, 2 and 3 emissions (including 15 Categories of Scope 3 emissions).
- Coverage of 9,000+ global companies with modelled data for 30K+ companies.*
- Emissions data mapped to 1.4+ million securities
- Coverage can be extended to private companies, unlisted securities, Small and Medium Enterprises (SMEs) to increase coverage
- 10+ years of historical emissions data (to the extent available)

II. Emissions Reduction Targets Data

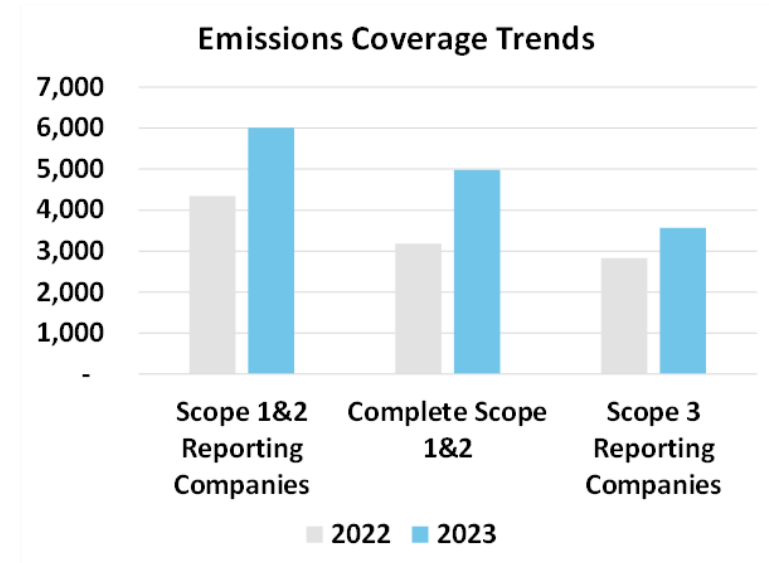
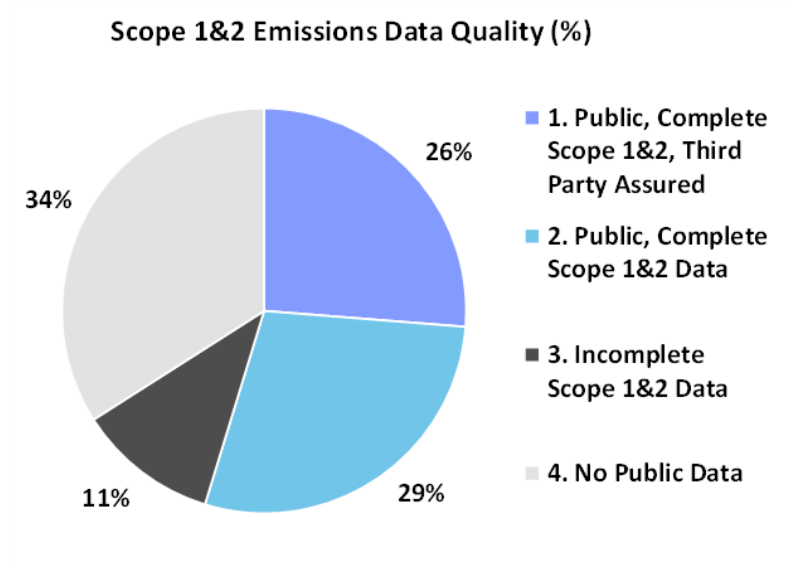
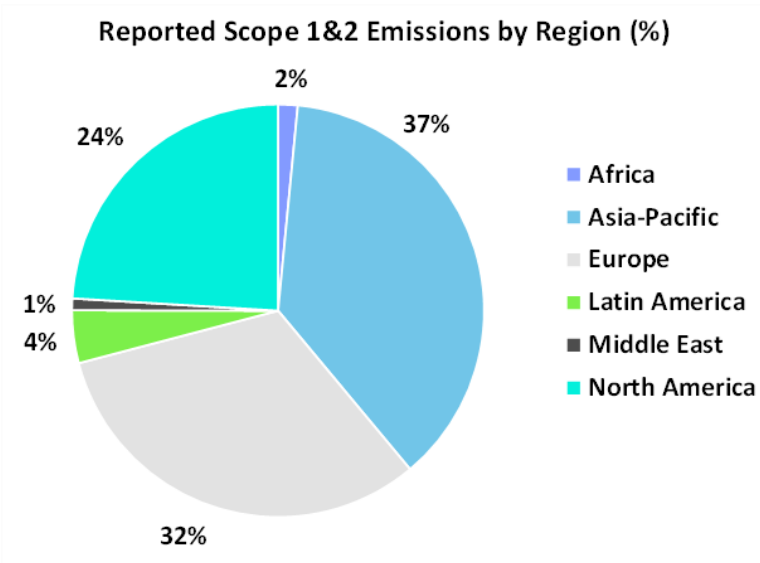
- Targets those aligned with the Science-Based Targets Initiative (SBTi) temperature scoring.
- Coverage of 30,000+ reported targets across ~5,500+ companies.*

Use Cases

- Transition risk assessment
- Reporting
- Target setting and comparison
- Net Zero analysis
- Climate stress testing and scenario analysis for banks
- Corporate engagement
- Risk management
- Tailoring investment strategies

ICE Global Corporate Emissions Data Coverage*

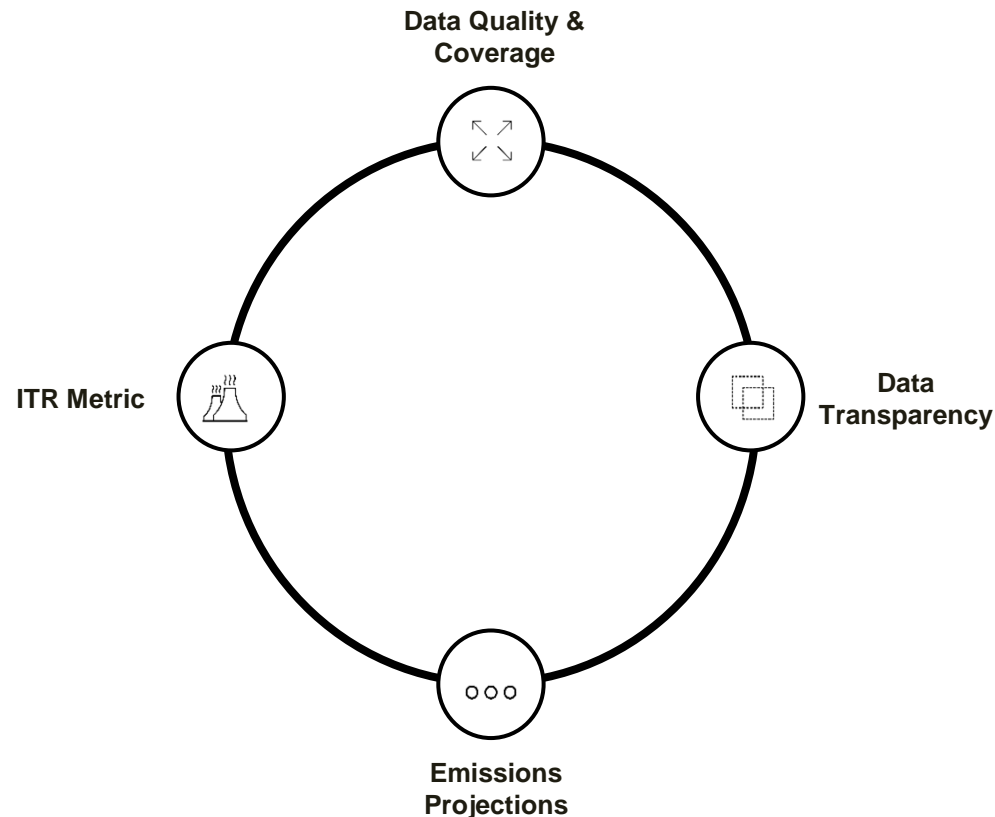
- 9,000+ companies analyzed
- 6,000+ companies reporting Scope 1 & 2 emissions
- 4,900+ companies reporting complete Scope 1 & 2 emissions
- 30,000+ companies modelled data
- 1,200+ companies reporting all 15 categories of Scope 3
- 3,500+ companies reporting at least one category of Scope 3
- 2,300+ companies providing Third-Party Assurance
- 1.4+ million securities covered across equities/fixed income/sovereigns



Coverage can be expanded to meet client requirements (client input required) - Private companies / unlisted securities / Small Medium Enterprises (SMEs)

*Data as of March 2024

Key Data Features



Data Quality & Coverage

- Global cross-asset class coverage
- The coverage can be expanded further using the ICE inference model
- Robust quality assurance process

Transparency

- Each individual data point is identified as either reported or inferred
- Transparency around the completeness of disclosed emissions data
- Detailed targets data and information on SBTi approval

Forward-Looking Emissions Projections

- Scenario aligned projections taking into consideration company's current and historical emissions
- Consideration of sectoral and regional trends information from selected scenarios
- Data available for NGFS, IPCC and IEA scenarios

Forward-Looking Implied Temperature Rise Metric

- Metric that allows to measure the overall alignment to the selected climate scenario
- Robust emissions and targets data which is a key pillar of the ITR metric
- Inclusion of historical emissions to benefit companies that have already reduced emissions historically

*The Greenhouse Gas (GHG) Protocol: A Corporate Accounting and Reporting Standard (Revised ed.). <https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf>

Use Cases At-A-Glance

Customer Type	Use Case	Solution
Central Banks Commercial Banks Investment Banks	Bank Climate Stress Testing Climate Risk Management Portfolio / Loan Book climate assessment	Emissions data and targets data Customer dataset (Private/unlisted/SMEs) Scenario analysis / forward projections
Pension Funds Asset Owners Asset / Portfolio Managers	Climate Reporting (TCFD) Climate Opportunities / Risk Management Portfolio Screening / Construction / Strategies	Emissions data and targets data ICE Climate Transition Analytics Tool Net Zero / Avoided Emissions Analysis
Hedge Funds Investors	Climate Opportunities / Risk Management Investment Strategies / Index Creation Carbon Momentum / Low Carbon	Emissions data and targets data ICE Climate Transition Analytics Tool Climate Strategy backtesting
International Finance and Policy Orgs Research Institutes / NGOs Universities	Climate data and analytics research Climate policy development Climate metrics development	Emissions data and targets data

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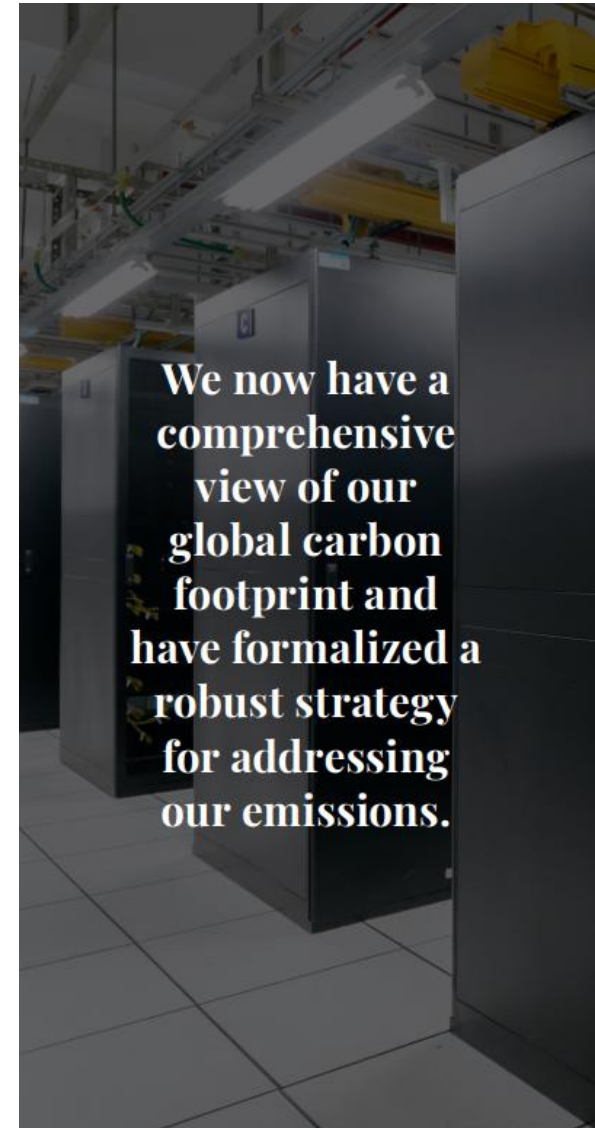
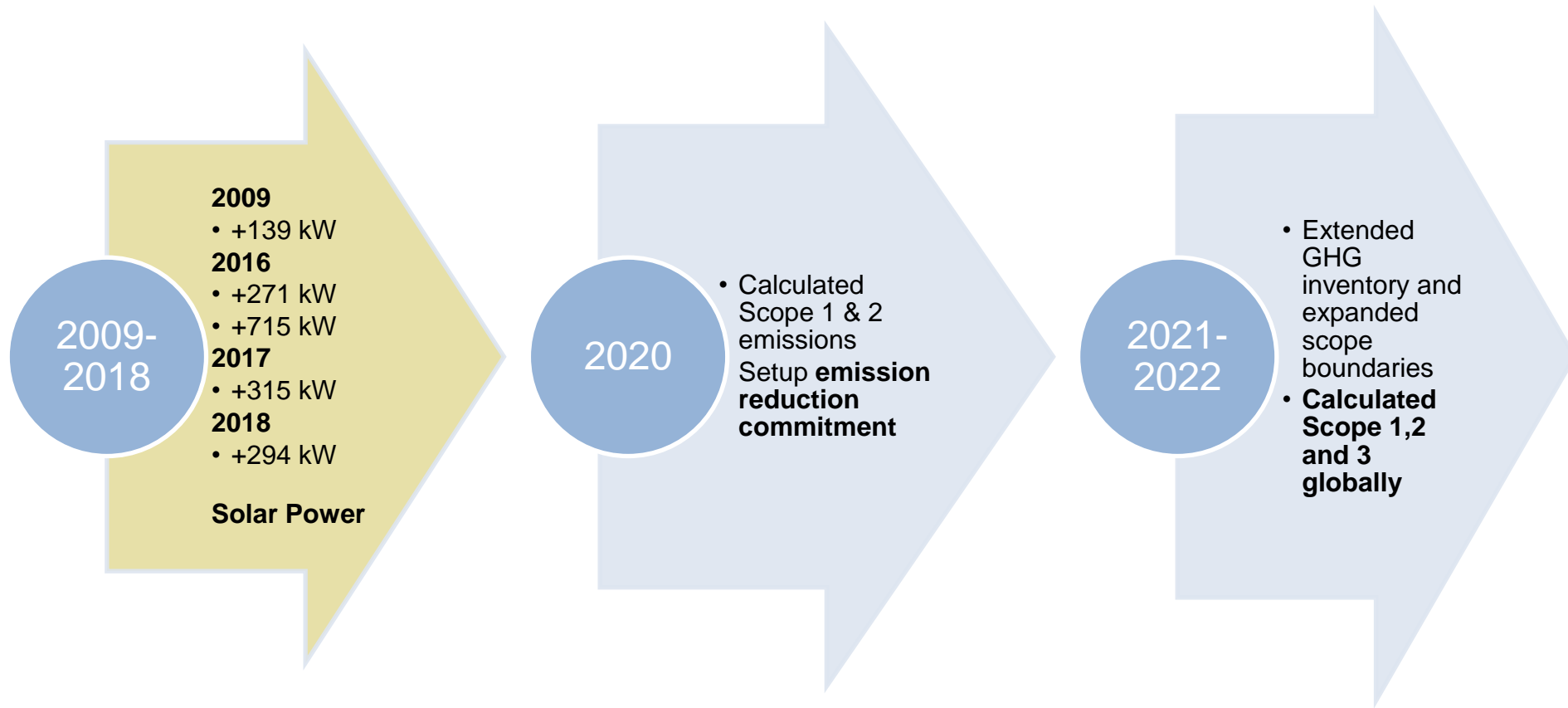
GHG emissions information available is either compiled from publicly reported information or estimated, as indicated in the applicable product and services.

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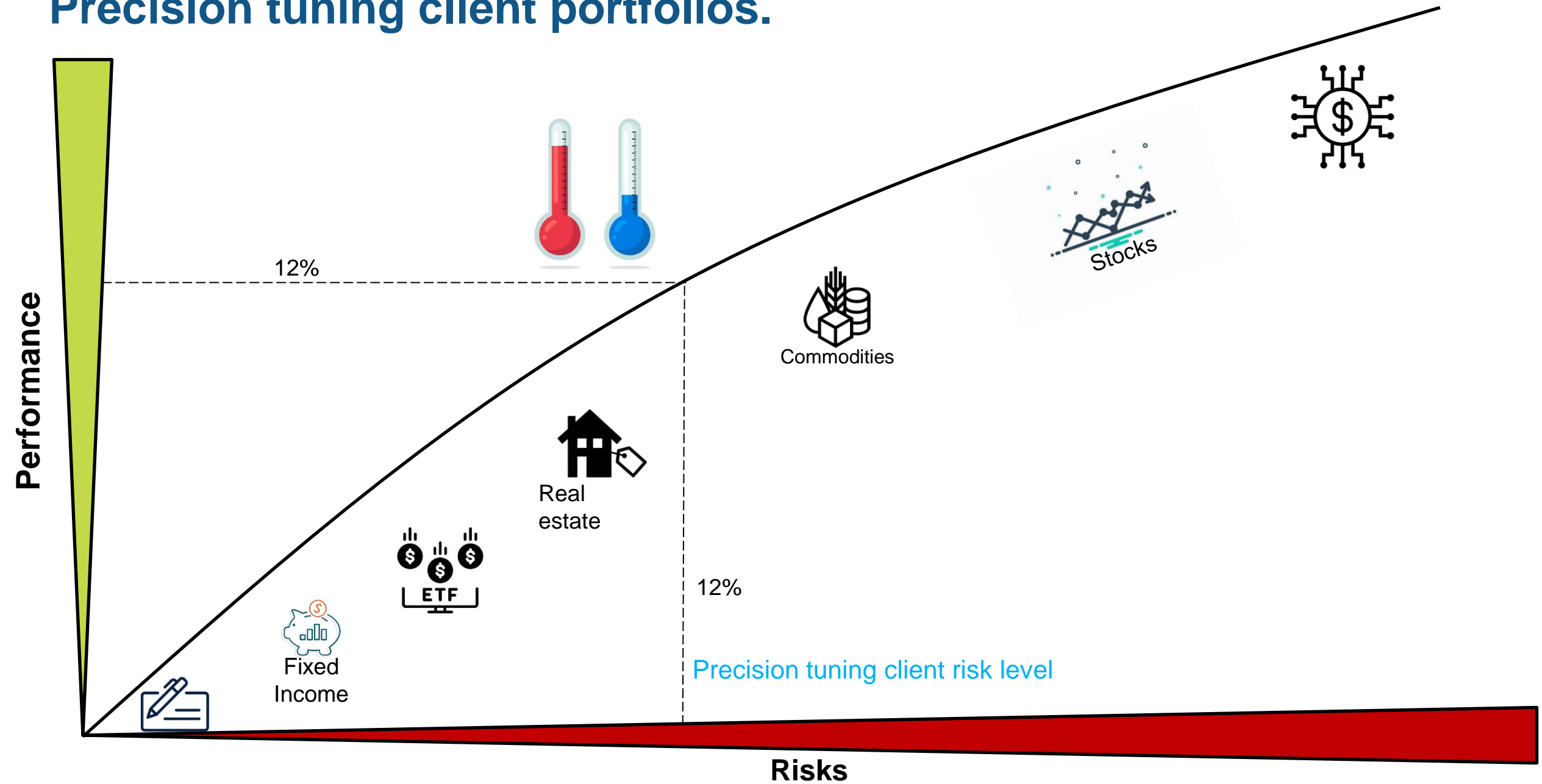
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Is global decarbonization gaining momentum?

MathWorks is addressing our carbon footprint



Precision tuning client portfolios.





$$X_i = \left\{ x \mid x \geq 0, \sum_{j=1}^n x_j = 1, ESG(x) \geq ESG_i \right\}$$

$$\min_{x \in X_i} (x - x_0)^T \Sigma (x - x_0)$$

Max Climate Score 0.9853

Benchmark Climate Score 0.4419

ESG Ports Analyze Port

Pick Investment Universe

Setup Benchmark Port

Optimize Temperature

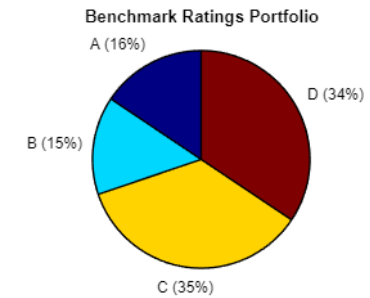
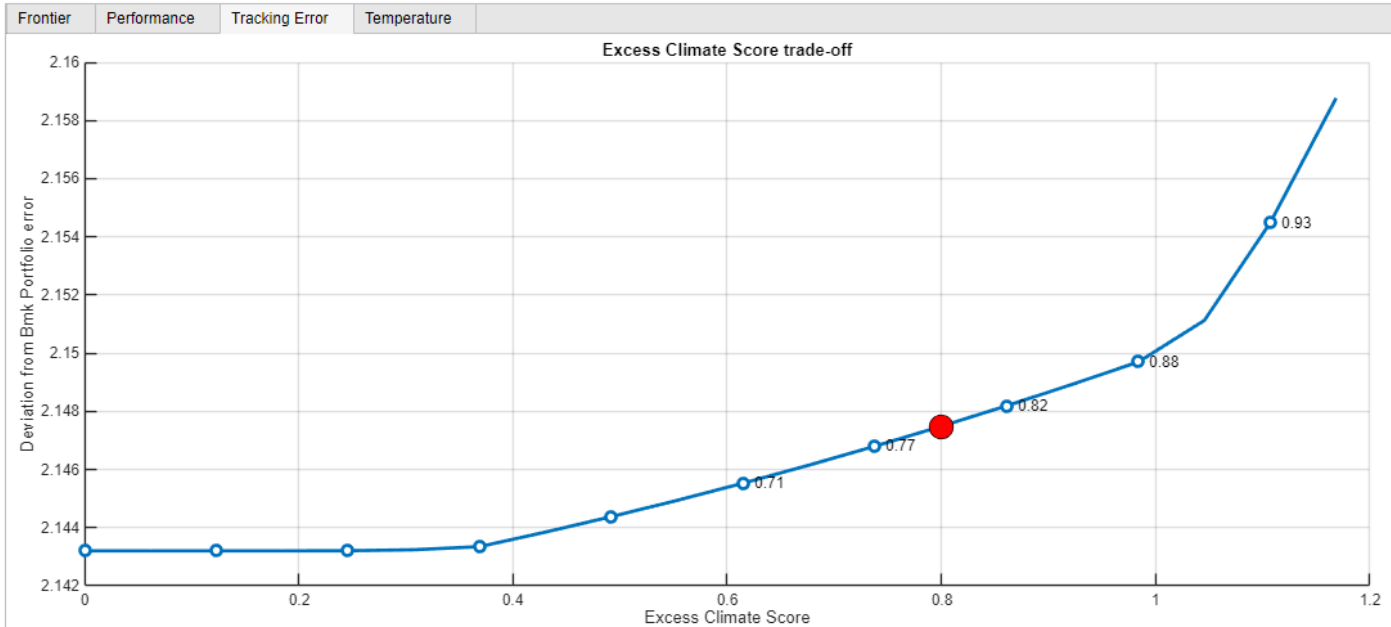
Evaluate Portfolio

weightsSR	Ticker	expRet	expVol	temperatureScore	emissionsScore	scope3_impact_score	reported_emissions_score	pcf_score_impact	disclosure_score	esgRating	SectorAdj	CompanyName	ISIN	TargetQualification	SME
16.5707	LH.BK	0.1122	0.0204	0.1042	0.0044	0.0014	0.0014	0	0.4000	C	Restaurant	Midsona AB	SE0000565210	2.0000	
10.7505	AAOI	0.0772	0.0201	0.1033	0.0037	0.0011	0.0011	0	0.4000	D	Real Estate	ACCIONA S.A.	ES0125220311	1.5000	
8.1024	722123.TWO	0.0954	0.0210	0.3594	0.0003	0.0001	0.0000	0	0.0533	D	Services	SAP SE	DE0007164600	1.5000	
5.8485	225590.KQ	0.0906	0.0424	0.2955	0.0064	0.0021	0.0000	0	0.1467	A	Financial	Credit Suisse Group	CH0012138530	NaN	
5.1756	225440.KS	0.0900	0.0244	0.4141	0.0150	0.0050	0.0000	0	0	B	Financial	BNP Paribas	FR0000131104	NaN	
4.2139	2RM.F	0.0846	0.0227	0.1043	0.0049	0.0013	0.0011	0	0.4000	C	Real Estate	Tokyo Tatemono Co., Ltd.	JP3582600007	NaN	
3.1957	2RM.F	0.0591	0.0208	0.2321	0.0225	0.0034	0.0049	0.0333	0.2200	A	Manufacturing	UPM-Kymmene Corpor...	FI0009005987	1.5000	
2.9405	44T.F	0.0874	0.0279	0.1168	0.0190	0.0025	0.0025	0	0.4000	A	Utilities	Enel SpA	IT0003128367	1.5000	

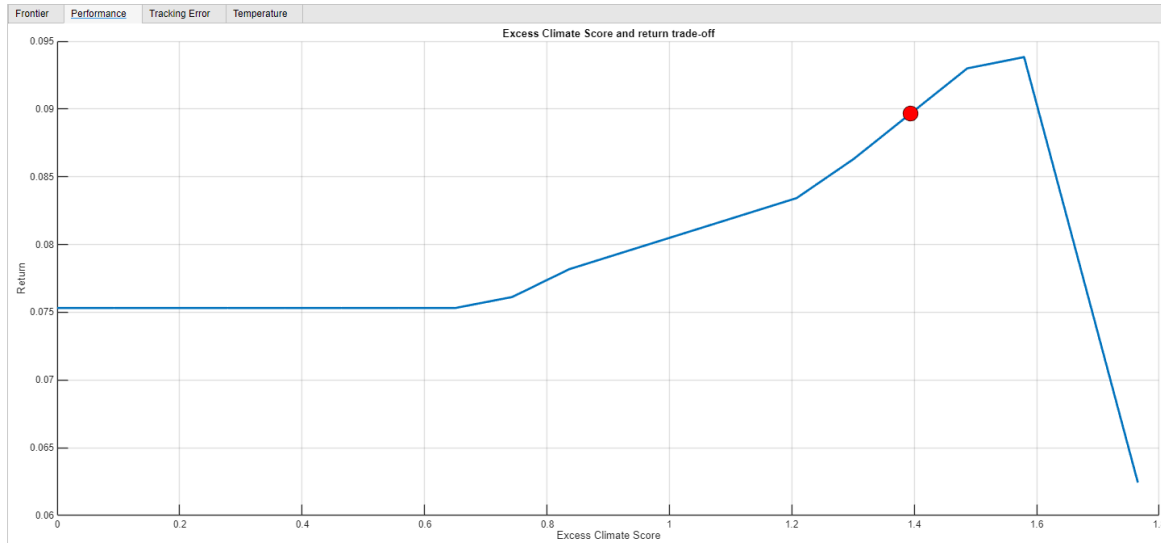
Port-0.2459816

Portfolio (TE 4.6117)

Optimized Ratings Portfolio



Excess climate score tradeoffs



Climate constraints

Objective: Minimize portfolio risk (variance) for a given target return.

$$\min_{\mathbf{x}} (\mathbf{x} - \mathbf{x}_0)^T \mathbf{K} (\mathbf{x} - \mathbf{x}_0)$$

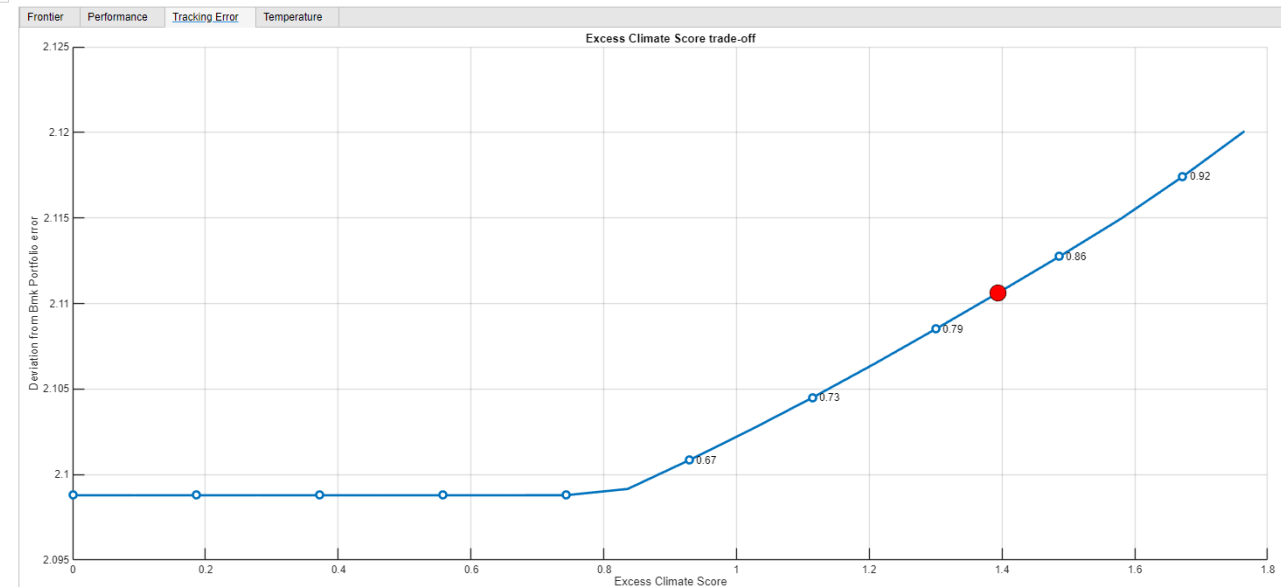
Subject to:

$$\mathbf{1}^T \mathbf{x} = 1$$

$$\mathbf{x}^T \mathbf{\Sigma} \mathbf{x} \leq \sigma_{\max}^2$$

$$\mathbf{x}^T \text{ClimateScore} \geq \text{ClimateScore}_{\min}$$

$$\mathbf{x} \geq 0$$



Tilting portfolios to take advantage of global decarbonization momentum?

Climate constraints

Objective: Minimize portfolio risk (variance) for a given target return.

$$\min_{\mathbf{x}} (\mathbf{x} - \mathbf{x}_0)^T \mathbf{K} (\mathbf{x} - \mathbf{x}_0)$$

Subject to:

$$\mathbf{1}^T \mathbf{x} = 1$$

$$\mathbf{x}^T \boldsymbol{\Sigma} \mathbf{x} \leq \sigma_{\max}^2$$

$$\mathbf{x}^T \text{ClimateScore} \geq \text{ClimateScore}_{\min}$$

$$\mathbf{x} \geq 0$$

Key Emissions and Carbon Intensity Metrics:

1. IntensityAverageInferenceScope1_2Total_tCO2e__mRevenue_ – This metric re
2. IntensityAverageInferenceScope3Total_tCO2e__mRevenue_ – Scope 3 emissio
3. IntensityAverageInferenceScope1_2_3Total_tCO2e__mRevenue_ – Total emiss
4. ReportedEmissionsIntensityScope1_2_3Total_tCO2e__mRevenue_ – Reported
5. PCAFScore – This score (often related to carbon accounting) can be useful for ev

Disclosure and Data Quality Metrics:

6. Scope1And2DisclosureCategory – Provides insight in
7. Scope3DisclosureQuality – Measures the quality of S
8. NumberOfScope3CategoriesDisclosed – Companie

Geographic and Sector Information:

9. Country – Can be used to tilt towards or awa
10. Region – Similar to "Country," but offering a
11. ICEUniformEntitySector – Sector-level data

Financial Emissions Metrics:

12. IntensityAverageInferenceScope1_tCO2e__mMarketCap_ – Car
13. IntensityAverageInferenceScope2_tCO2e__mEnterpriseValue_
14. ReportedEmissionsScope1_tCO2e__mMarketCap_ – Reported S

Absolute Emissions Metrics:

15. AbsoluteEmissionsAverageInferenceScope1_tCO2e_ – Absolut
16. AbsoluteEmissionsAverageInferenceScope3Total_tCO2e_ – Ab

Emission Categories and Activity Types:

17. IntensityAverageInferenceScope3PurchasedGoodsAndServices_tCO2e__mRevenue_ –
18. IntensityAverageInferenceScope3BusinessTravel_tCO2e__mRevenue_ – Emissions from

Customized objective and constraints

Mean Variance Optimization

Objective: Minimize portfolio risk (variance) for a given target return.

$$\min_{\mathbf{w}} \mathbf{w}^T \Sigma \mathbf{w} \quad \text{subject to: } \mathbf{w}^T \mathbf{1} = 1 \quad \text{and} \quad \mathbf{w}^T \boldsymbol{\mu} \geq \mu_{\text{target}}$$

Maximize Sharpe Ratio

Objective: Minimize portfolio risk (variance) for a given target return.

$$\max_{\mathbf{w}} \frac{\mathbf{w}^T \boldsymbol{\mu} - r_f}{\sqrt{\mathbf{w}^T \Sigma \mathbf{w}}} \quad \text{subject to: } \mathbf{w}^T \mathbf{1} = 1$$

Transaction Cost Optimization

Objective: Minimize portfolio risk (variance) for a given target return.

$$\min_{\mathbf{w}} \mathbf{w}^T \Sigma \mathbf{w} + \lambda \sum_{i=1}^n |w_i - w_i^{\text{initial}}| \quad \text{subject to: } \mathbf{w}^T \mathbf{1} = 1 \quad \text{and} \quad \mathbf{w}^T \boldsymbol{\mu} \geq \mu_{\text{target}}$$

Robust optimization uncertainty

Objective: Minimize portfolio risk (variance) for a given target return.

$$\min_{\mathbf{w}} \max_{\Sigma \in \mathcal{U}} \mathbf{w}^T \Sigma \mathbf{w} \quad \text{subject to: } \mathbf{w}^T \mathbf{1} = 1 \quad \text{and} \quad \mathbf{w}^T \boldsymbol{\mu} \geq \mu_{\text{target}}$$

Cardinality Constraints

Objective: Minimize portfolio risk (variance) for a given target return.

$$\min_{\mathbf{w}} \mathbf{w}^T \Sigma \mathbf{w}$$

$$\text{subject to: } \mathbf{w}^T \mathbf{1} = 1 \quad \text{and} \quad \mathbf{w}^T \boldsymbol{\mu} \geq \mu_{\text{target}} \quad \text{and} \quad \sum_{i=1}^n z_i \leq K \quad (\text{Cardinality constraint}), \quad w_i \leq z_i \quad \forall i \quad (\text{Binary constraint on asset selection}).$$

History of Portfolio Optimization

1930: *The Theory of Investment Value* (Dividend discount model)

1952:
 - Portfolio Selection Article in Journal of Finance (Harry Markowitz)
 - Stephen A. Ross in 1976 on [Arbitrage Pricing Theory](#)

1990: Noble Prize Awarded raising the bar for **MPT**
 Harry for his "Portfolio Choice"
 William Sharpe for the CAPM model
 Merton Miller for theory of corporate finance.

1990-2000: Portfolio optimization

- Mean variance optimization
 - Black Litterman (1992 [Goldman Sachs](#) by [Fischer Black](#) and [Robert Litterman](#))

1993: Factor based investing*

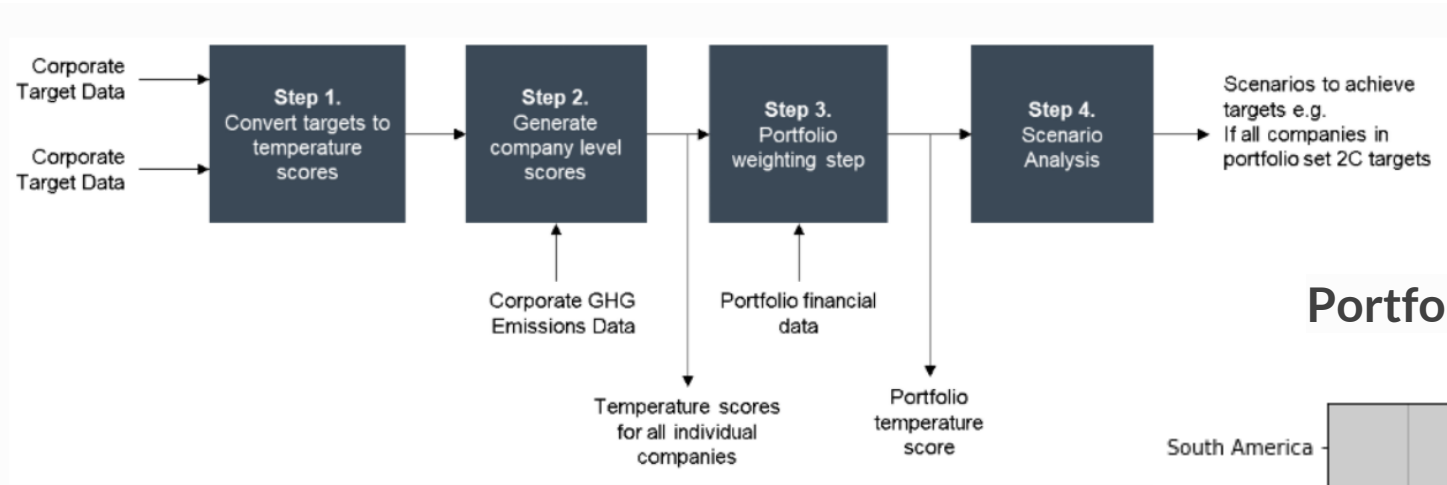
* [Eugene F. Fama](#) and Kenneth B. French published a seminal paper

2020: Goal based investing*

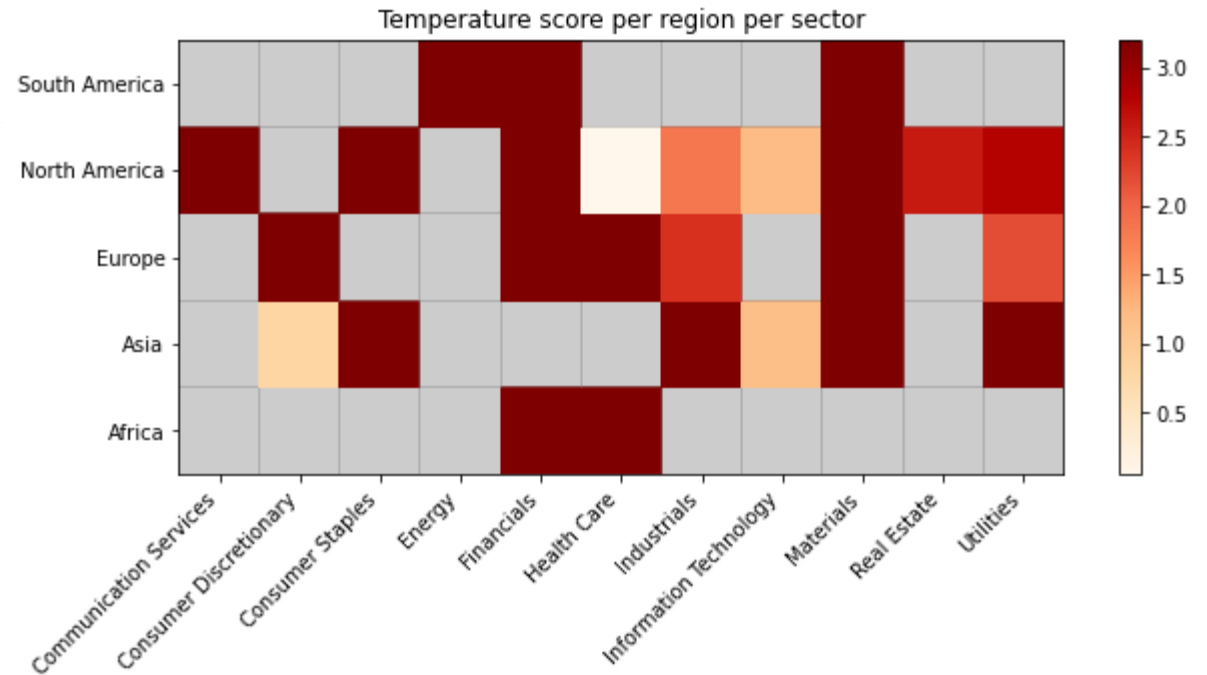
* has grown in popularity in the years after the [Great Recession](#) of 2008–09 as investors realized the extent to which chasing high returns could negatively impact long-term wealth accumulation

2020+: Thematic portfolio construction (Including climate.)

SBTI Temperature Scoring



Portfolio level analysis, grouped by region and sector



Temperature scoring

Table 8: Details of portfolio aggregation methods

Option	Method	Temperature score formula (where TS = Company temperature score)
Weighted average temperature score (WATS)	Temperature scores are allocated based on portfolio weights.	$\sum_n^i (Portfolio\ weight_i \times TS_i)$
Total emissions weighted temperature score (TETS)	Temperature scores are allocated based on historical emission weights using total company emissions.	$\sum_n^i \left(\frac{Company\ emissions_i}{Portfolio\ emissions} \times TS_i \right)$
Market Owned emissions weighted temperature score (MOTS)	Temperature scores are allocated based on an equity ownership approach.	$\sum_n^i \left(\left(\frac{Investment\ value_i}{Company\ market\ cap} \times Company\ emissions_i \right) \times TS_i \right)$
Enterprise Owned emissions weighted temperature score (EOTS)	Temperature scores are allocated based on an enterprise ownership approach	$\sum_n^i \left(\left(\frac{Investment\ value_i}{Company\ enterprise\ value} \times Company\ emissions_i \right) \times TS_i \right)$
Enterprise Value + Cash emissions weighted temperature score (ECOTS)	Temperature scores are allocated based on an enterprise value (EV) plus cash & equivalents ownership approach	$\sum_n^i \left(\left(\frac{Investment\ value_i}{Company\ EV + Cash} \times Company\ emissions_i \right) \times TS_i \right)$
Total Assets emissions weighted temperature score (AOTS)	Temperature scores are allocated based on a total assets ownership approach	$\sum_n^i \left(\left(\frac{Investment\ value_i}{Company\ Total\ Assets} \times Company\ emissions_i \right) \times TS_i \right)$



Decarbonization gaining momentum?

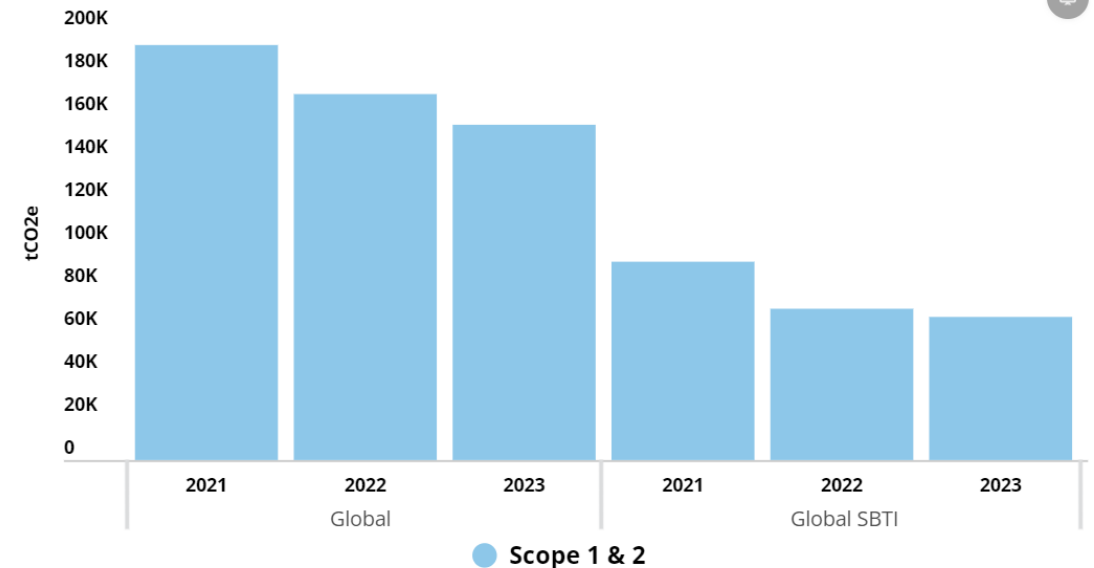
Intensity for reporting companies declining globally, for Scope 1, 2 and 3
 American companies starting to close emissions gap
 Global Temperature Rise (ITR) for reporting companies falling

Evidence to suggest these commitments are having an impact on global corporate emissions?



Ian Stannard
 Climate Transition Finance Manager
 ICE

Figure 2: Declining trend: Scope 1 & 2 absolute emissions (by EVIC)



Source: ICE. Notes: Average absolute emissions by EVIC (tCO2e), Scope 1 and 2, for our global portfolio of companies reporting complete Scope 1 and 2 emissions and at least one category of Scope 3 emissions for at least the past two years (sample 2005 companies), and the portfolio filtered for companies with verified SBTi temperature targets (sample 668 companies).

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