



Climate Risk Report

This portfolio report is designed to assess climate-related risks and opportunities and to align with the recommendations from the Task Force on Climate-related Financial Disclosures (TCFD)

Report date: June 30, 2022



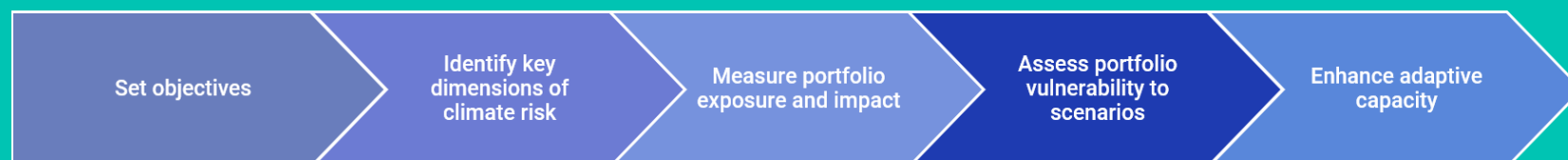
PORTFOLIO:

Sundaram India Midcap Fund



BENCHMARK:

Nifty Midcap 100 Index



About this report

This report is designed to provide institutional investors with transparency into their portfolios' climate-related risks and opportunities according to the recommendations from the Task Force on Climate-related Financial Disclosures (TCFD).

With climate-related risks posing a potential threat to the long-term resilience of investment portfolios and with climate reporting frameworks and regulations gaining momentum, there is a growing focus on climate risk management practices and disclosures. This report aims to help investors understand their exposure to these risks and opportunities, one of the key aspects of the TCFD recommendations and an essential step in a Net Zero journey.

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CLIMATE RISK DASHBOARD

PORTFOLIO: Sundaram India Midcap Fund
BENCHMARK: Nifty Midcap 100 Index

ANALYSIS DATE: June 30, 2022



Carbon Footprint

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Financed Emissions for Corporates

Allocation Base: **EVIC**

tons CO2e/\$M invested	Portfolio	Coverage	Benchmark	Coverage	Active
Scope 1 and 2	104.8	96.9%	226.9	91.2%	-53.8%
Scope 3 Total	327.8	96.9%	614.9	91.2%	-46.7%
<i>Data Quality</i>					
Reported Emissions	19.8%		27.3%		-27.5%
Estimated Emissions	77.0%		64.9%		18.8%

Weighted Average Carbon Intensity

Corporate Constituents

tons CO2e/\$M revenue	Portfolio	Coverage	Benchmark	Coverage	Active
Scope 1 and 2	215.9	96.9%	580.5	91.2%	-62.8%
Scope 3 Total	699.8	96.9%	1,406.9	91.2%	-50.3%

Sovereign Constituents

tons CO2e / \$M GDP nominal	Portfolio	Coverage	Benchmark	Coverage	Active
GHG Intensity	n/a	0.0%	n/a	0.0%	n/a



Green & Fossil Fuel-Based Revenue Exposure

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	Portfolio	Benchmark	Active
Green / Fossil Fuel-Based Ratio	1.0	0.5	0.5x
Green Revenue Exposure	1.3%	2.4%	-1.1%
Fossil Fuel-Based Revenue Exposure	1.3%	4.4%	-3.1%
Green and Fossil Fuel-Based Revenue Coverage	97.4%	92.7%	4.7%



Companies Transition Plans

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	Portfolio	Benchmark	Active
Companies with GHG emissions reduction targets	16.9%	15.2%	1.7%
Use of Cleaner Energy Sources	80.2%	75.8%	4.4%
Companies with top quartile carbon management score	9.5%	12.7%	-3.2%
Adaptive Capacity Coverage	94.1%	90.8%	3.3%



Low Carbon Transition Risk

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MSCI Low Carbon Transition Risk Assessment

Exposure to companies classified as:

	Portfolio	Benchmark	Active
Low Carbon Solutions	0.7%	3.8%	-3.1%
Low Carbon Transition Risk	24.6%	32.7%	-8.1%
Low Carbon Transition Risk Coverage	89.8%	89.7%	0.1%



Energy Sector & Power Generation Exposure

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	Portfolio	Benchmark	Active
Potential Financed emissions from fossil fuel reserves (tCO2e / \$m invested)	316,587.2	142,307.8	122.5%
Thermal coal exposure (Any tie)	2.0%	6.3%	-4.3%
Oil & Gas exposure (Any tie)	3.4%	14.5%	-11.1%
Exposure to Power Generation			
Thermal Coal (apportioned fuel mix, % of generation)	82.3%	70.7%	11.6%
Renewables (apportioned fuel mix, % of generation)	13.7%	10.5%	3.2%
Energy Sector and Power Generation Coverage	96.9%	92.2%	4.7%



Climate Scenario Analysis

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SELECTED SCENARIO: 1.5°C AIM CGE, Aggressive physical risk

MSCI Climate Value at Risk

	Portfolio	Benchmark	Active
Aggregate Climate Value at Risk (VaR)	-25.7%	-33.8%	8.1%
Policy Climate VaR	-10.3%	-17.0%	6.7%
Technology Opportunities Climate VaR	0.8%	2.9%	-2.1%
Physical Risk Climate VaR	-16.3%	-19.8%	3.5%
Climate Scenario Coverage	96.9%	91.9%	5.0%
MSCI Implied Temperature Rise	3.8°	5.3°	-1.5°
ITR Coverage	96.9%	91.2%	5.7%



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Carbon Footprint Metrics

Allocation Base: EVIC

		Portfolio	Coverage	Benchmark	Coverage	Active
Financed Carbon Emissions	Scope 1 and 2	104.8	96.9%	226.9	91.2%	-53.8%
<i>tons CO2e / \$M invested</i>	Scope 3 Upstream	90.4	96.9%	104.2	91.2%	-13.2%
Investor Allocation: EVIC	Scope 3 Downstream	237.4	96.9%	510.7	91.2%	-53.5%
Total Financed Carbon Emissions	Scope 1 and 2	4,519.3	96.9%	9,784.0	91.2%	-53.8%
<i>tons CO2e</i>	Scope 3 Upstream	3,897.4	96.9%	4,491.9	91.2%	-13.2%
Investor Allocation: EVIC	Scope 3 Downstream	10,235.5	96.9%	22,019.0	91.2%	-53.5%
Weighted Average Carbon Intensity	Scope 1 and 2	215.9	96.9%	580.5	91.2%	-62.8%
Corporate constituents	Scope 3 Upstream	291.1	96.9%	304.1	91.2%	-4.3%
<i>tons CO2e / \$M revenue</i>	Scope 3 Downstream	408.7	96.9%	1,102.8	91.2%	-62.9%
Sovereign constituents	GHG Intensity	n/a	0.0%	n/a	0.0%	n/a
<i>tons CO2e / \$M GDP nominal</i>						

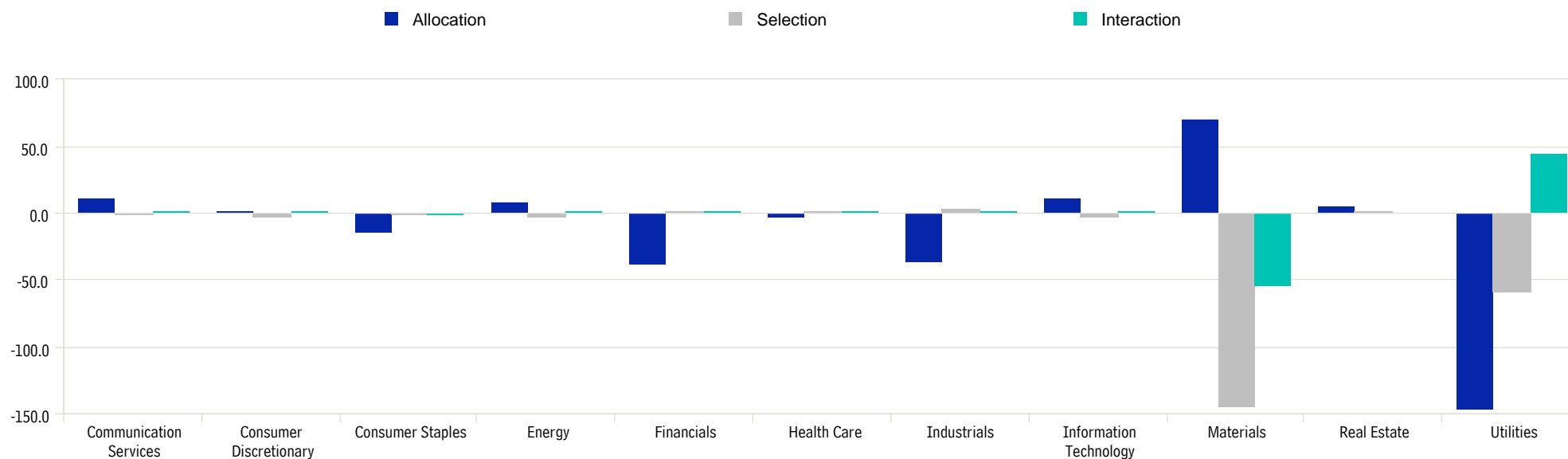
Carbon Footprint Metrics

Financed Carbon Emissions: Measures the carbon emissions for which an investor is responsible, per USD million invested, by their total overall financing. Emissions are apportioned across all outstanding shares and bonds (% Enterprise Value including Cash).

Total Financed Carbon Emissions: Measures the carbon emissions for which an investor is responsible by their total overall financing. Emissions are apportioned across all outstanding shares and bonds (% Enterprise Value including Cash).

Corporate Constituents: Measures a portfolio's exposures to carbon-intensive companies, defined as the portfolio weighted average of companies' Carbon Intensity (emissions/sales).

Sovereign Constituents: Measures a portfolio's exposures to carbon-intensive economies, defined as the portfolio weighted average of sovereigns' GHG Intensity (emissions/GDP).

Weighted Average Carbon Intensity (S1+S2 tCO₂ / \$M sales) - Attribution Analysis

Understanding carbon attribution analysis

In attribution analysis of carbon footprints, negative values represent areas that contribute to a smaller footprint relative to the benchmark, while positive values contribute to a larger relative footprint.

- **Sector Allocation** measures the impact of a manager's decisions to over- or underweight portfolio sectors relative to a benchmark. Negative values come from underweighting sectors with higher carbon footprints than the benchmark or overweighting sectors with carbon footprints lower than the benchmark.
- **Stock Selection** measures the impact of a manager's security selection within a sector relative to a benchmark. Negative values in a sector come from selecting companies with lower footprints relative to those in the benchmark. The weight of the sector in the portfolio determines the size of the effect.
- **Interaction** measures the combined impact of a manager's allocation and stock selection within a sector. For example, overweighting a sector with a lower carbon footprint relative to the benchmark results in negative interaction, while underweighting a sector with a lower relative carbon footprint leads to a positive interaction effect.

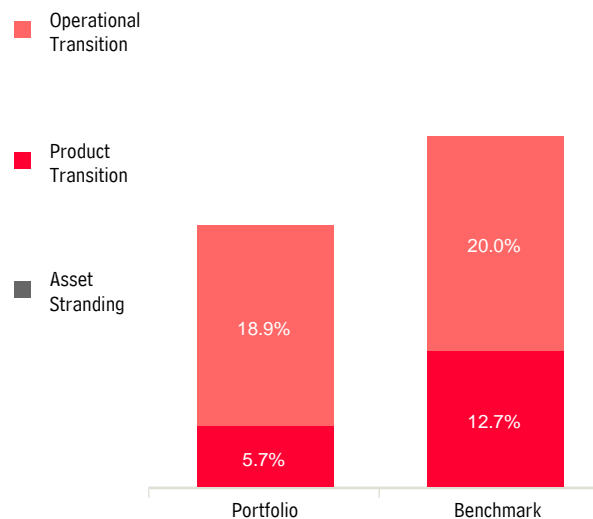
Exposure to Low Carbon Solutions



Carbon Solutions

Identifies the portfolios market value exposed to companies that have potential to benefit through the growth and demand for low carbon products and services. These typically include companies that offer renewable electricity, electric vehicles, solar cell manufacturers

Exposure to Low Carbon Transition Risk



Transition Risk

Identifies the portfolios market value exposed to companies with increased operations and/or capital costs (operational transition), facing reduced demand for carbon-intensive products (product transition), and companies with potential stranding of physical/ natural assets due to regulatory, market or technology forces.

Low Carbon Transition Categories



Solutions

Companies that have potential to benefit through the growth of low-carbon products and services. Examples include renewable electricity, electric vehicles, solar cell manufacturers etc.



Operation Transition

Companies with increased operation and/or capital cost due to carbon taxes and/or investment in carbon emission mitigation measures leading to lower profitability of the companies. Examples include fossil fuel based power generation, cement, steel etc.



Product Transition

Companies that face reduced demand for carbon-intensive products and services. Leaders and laggards are defined by the ability to shift product portfolio to low-carbon products. Examples include Oil & gas exploration & production; Petrol/diesel based automobile manufacturers, thermal power plant turbine manufacturers etc.



Asset Stranding

Potential to experience "stranding" of physical/natural assets due to regulatory, market or technological forces arising from low-carbon transition. Examples include coal mining & coal based power generation; Oil sands exploration/production

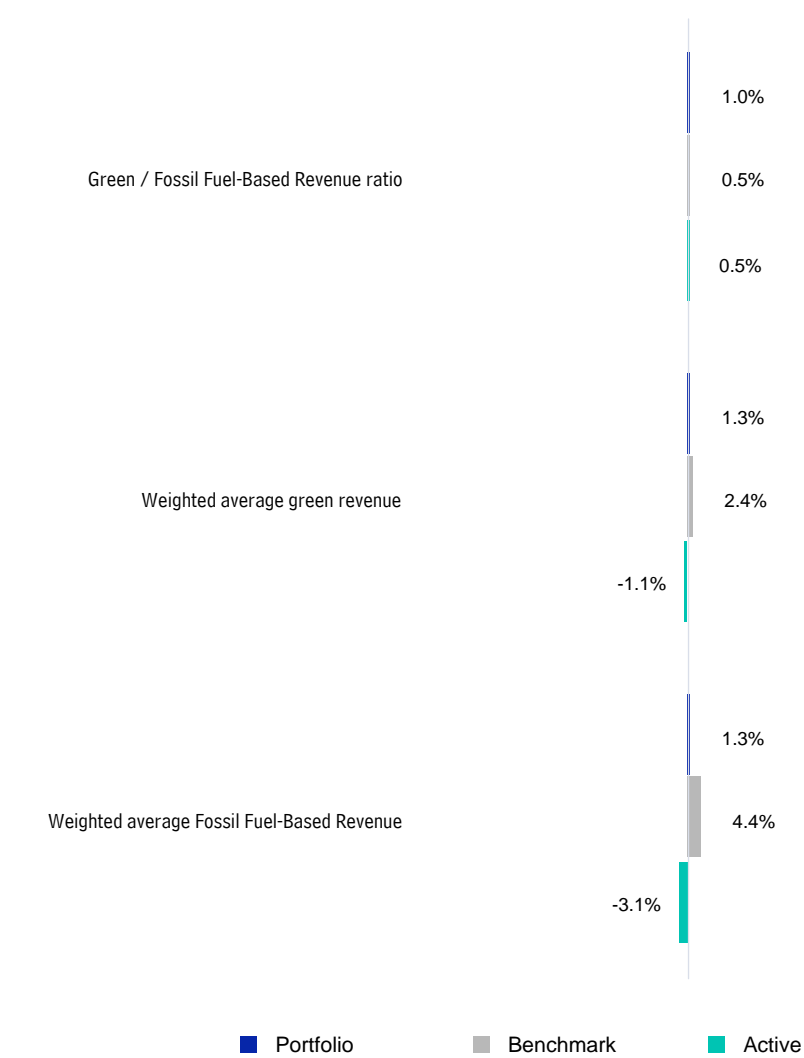
Understanding MSCI Low Carbon Transition Risk Assessment

The Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5°C published in October 2018 re-iterated that achieving the Paris agreement target of 1.50°C warming level would require rapid, far-reaching and unprecedented transitions in all aspects of society. The "Low Carbon Transition" refers to the necessary transition of the global economy from carbon intensive operations and energy sources to zero or low carbon operations and energy sources.

MSCI Low Carbon Transition Categories classify companies in five categories that highlight the predominant risks and opportunities they are most likely to face in the transition to a low carbon economy (See categories to the right).

Fossil Fuel-Based and Green Revenues Summary

Weighted Average Green/Fossil Fuel-Based Revenue



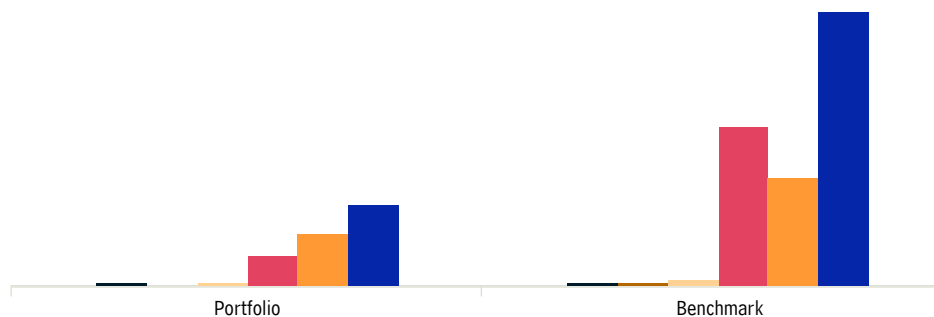
Understanding Fossil Fuel-Based Revenue

Fossil fuel-based revenue is the weighted average of revenue exposure to thermal coal extraction, unconventional and conventional O&G extraction, O&G refining as well as revenue from thermal coal power generation.

Understanding Green Revenue

Green revenue is the weighted average of revenue exposure to alternative energy, energy efficiency, green building, pollution prevention, sustainable water and sustainable agriculture.

Weighted Average Fossil Fuel-based Revenue Exposure



Thermal Coal Extraction	0.0%	0.0%
Unconventional O&G	0.0%	0.0%
Conventional O&G	0.0%	0.1%
Generation Fossil Fuel	0.5%	2.5%
O&G Refining	0.8%	1.7%
Total	1.3%	4.4%

Understanding Fossil Fuel-based Revenue Exposure

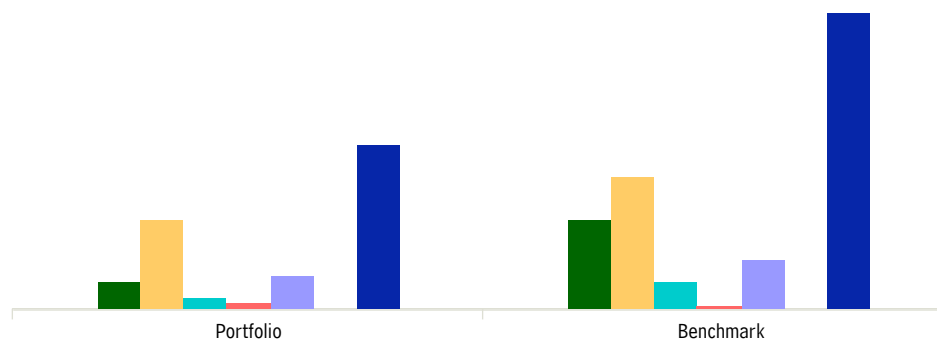
The reduced demand for carbon-intensive products and services could lead to financial stress and asset stranding in carbon-intensive industries. It is estimated that a low-carbon transition could put assets worth USD 25 trillion at risk of stranding in the fossil-fuel industry alone (source: "2020 vision: why you should see peak fossil fuels coming" Carbon Tracker, Sept. 2018).

Historically, investors have focused much attention on the carbon-intensive industries that could be directly affected by a potential low-carbon transition: fossil-fuel-based power generation, coal mining and oil and gas production and refining.

Top 5 Companies with Highest Proportion of Fossil Fuel Revenues

	Weight	Fossil Fuel Theme	Fossil fuel revenue
HINDUSTAN PETROLEUM CORPORATION LIMITED	0.81%	Conventional O&G,O&G Refining,	100.0%
THE TATA POWER COMPANY LIMITED	0.53%	Thermal Coal,Generation Fossil Fuels	57.3%
JINDAL STEEL AND POWER LIMITED	1.45%	Generation Fossil Fuels	11.5%
ANUPAM RASAYAN INDIA LIMITED	0.44%		0.0%
APOLLO HOSPITALS ENTERPRISE LIMITED	2.16%		0.0%

Weighted Average Green Revenue Exposure



Alternative Energy	0.2%	0.7%
Energy Efficiency	0.7%	1.0%
Green Building	0.1%	0.2%
Pollution Prevention	0.0%	0.0%
Sustainable Water	0.3%	0.4%
Sustainable Agriculture	0.0%	0.0%
Total	1.3%	2.4%

Understanding Green Revenue Exposure

Companies and industries whose products and operations are well positioned for the transition (e.g. renewable-energy producers and electric-vehicle manufacturers) could see increased demand for their products and services in the low-carbon transition.

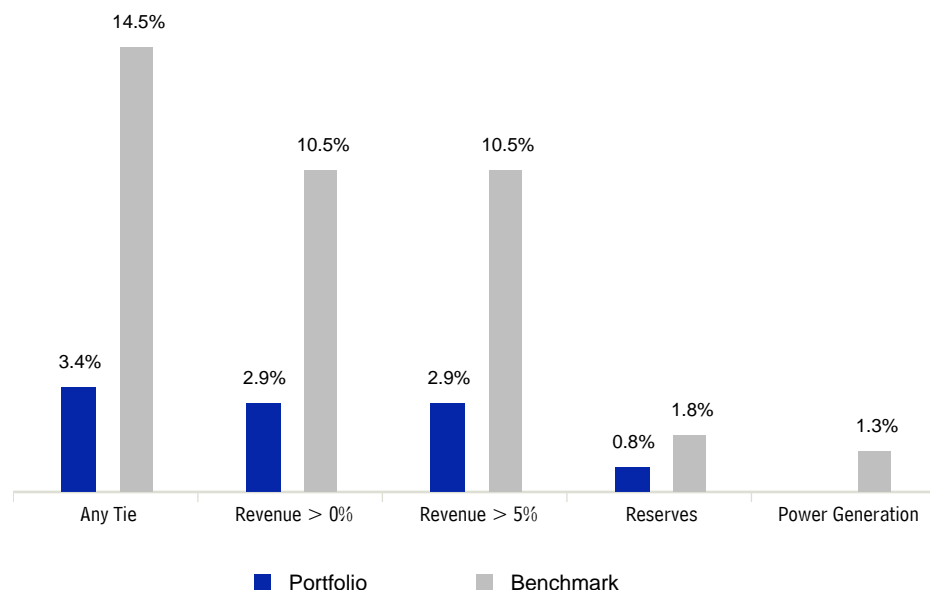
For instance in 2016, solar-photovoltaic additions rose faster than for those of any other fuel – and even surpassed the net growth in coal-fired power plants (source: “Renewables 2017” International Energy Agency, Oct 2017).

A similar trend has been observed in the automobile industry as well, where the demand for electric cars has grown by more than 40% per year since 2010 (source: Global EV Outlook 2017, International Energy Agency).

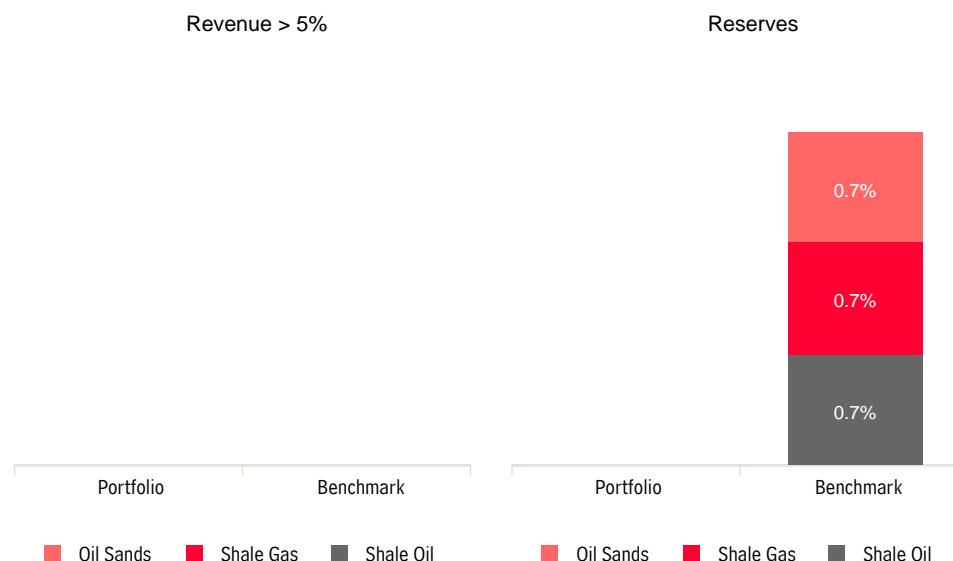
Top 5 Companies with Highest Proportion of Green Revenues

	Weight	Green Revenue Theme	Green Revenue
ASTRAL LIMITED	0.78%		28.6%
THE TATA POWER COMPANY LIMITED	0.53%	Alternative Energy,Energy Efficiency,	21.2%
DIXON TECHNOLOGIES (INDIA) LIMITED	0.74%	Energy Efficiency,	17.1%
L&T TECHNOLOGY SERVICES LIMITED	1.29%	Alternative Energy,Energy Efficiency,	8.7%
OBEROI REALTY LIMITED	1.32%	Green Building,	6.0%

Oil & Gas Exposure



Unconventional Oil & Gas Exposure



Oil & Gas Outlook

Demand for oil and gas in a low carbon world is forecast to decline under low carbon scenarios (IEA SDS), leading to potentially stranded assets.

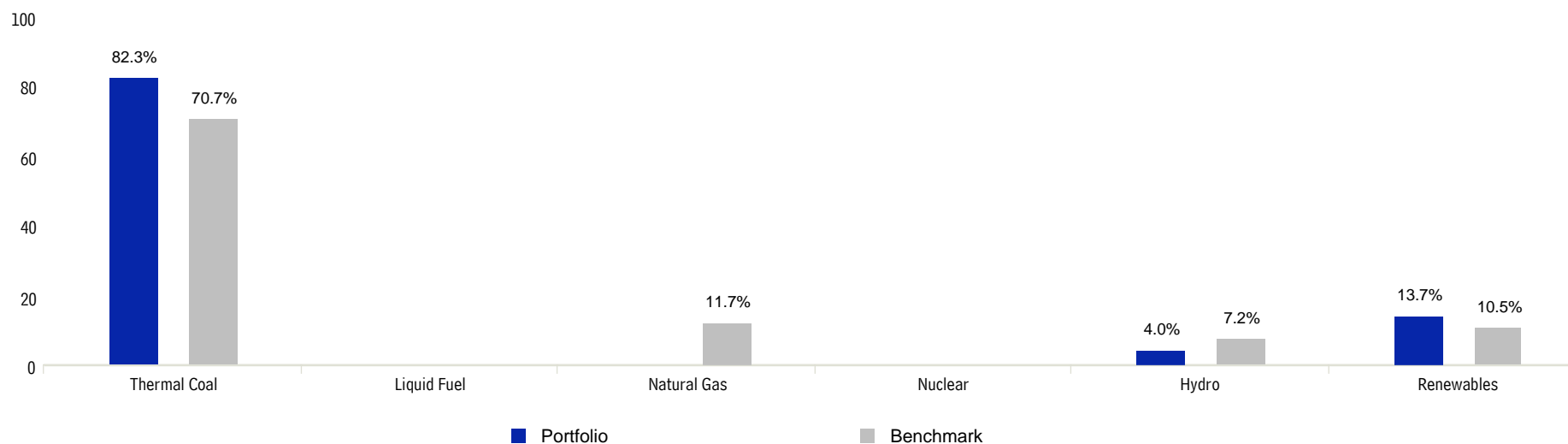
Oil and Gas Revenue & Reserves Exposure

There are several ways to determine a portfolio's exposure to oil and gas. 'Any tie' is the broadest indicator encompassing activities related to oil and gas reserves ownership, revenue derived from oil and gas production, and ownership of or by oil and gas companies.

Unconventional Oil and Gas

We classify oil sands, shale gas and shale oil as 'unconventional'. Oil sands and shale oil are arguably more exposed to stranded assets risk as they have a higher carbon content than other types of oil and gas. In addition to higher carbon intensity, the extraction of unconventional sources of oil and gas can be costly because of various geological, technical and environmental challenges

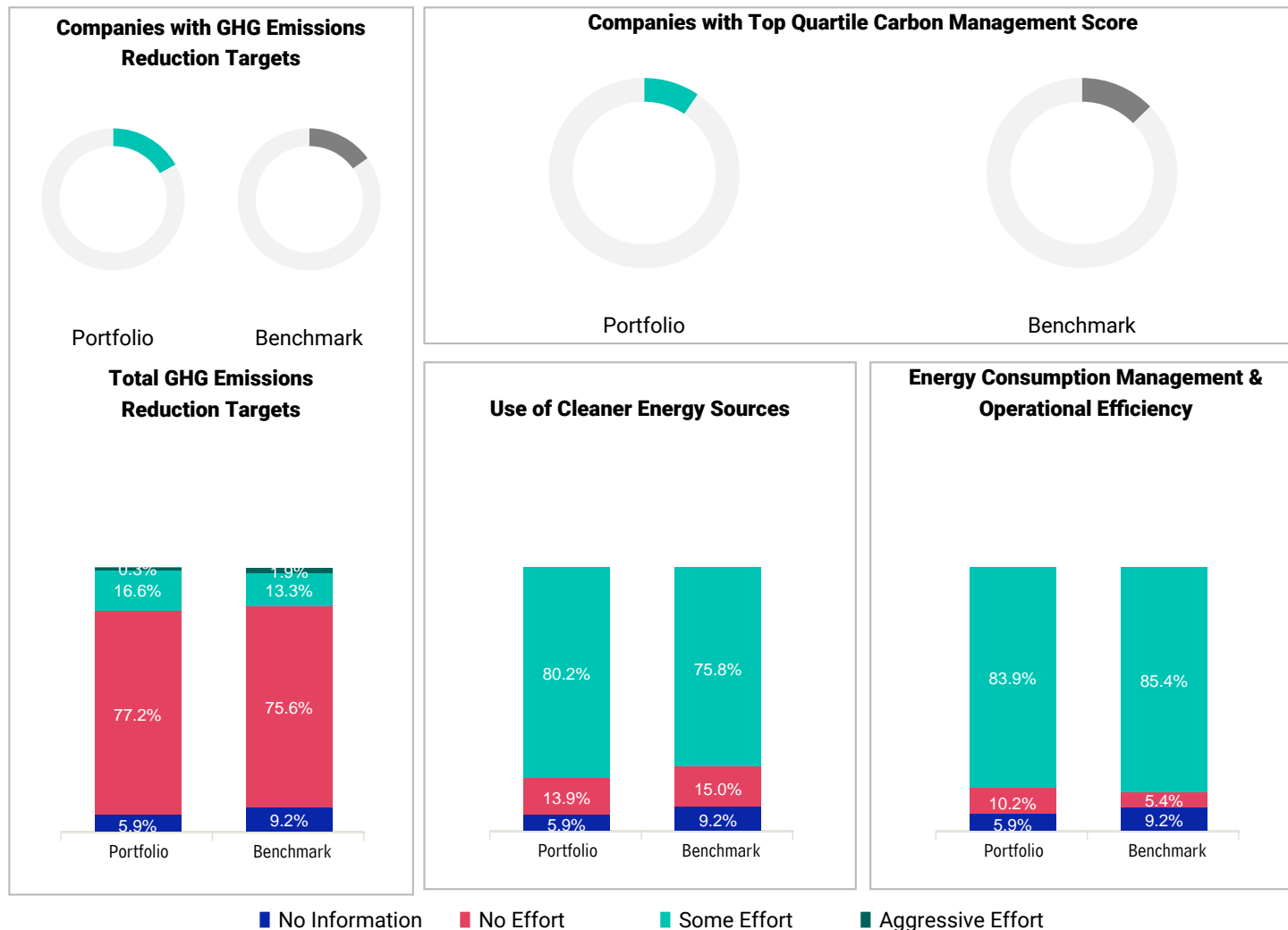
Exposure to Power Generation - Apportioned Fuel Mix



Understanding Power Generation - Apportioned Fuel Mix

The Paris Agreement calls for coordinated efforts ensuring global temperature rise as a result of GHG emissions is limited to 1.5°C or below. Analytical results vary, but most Paris-aligned scenarios require industrial carbon emissions peaking in the 2020s and reducing rapidly thereafter, leading to a net-zero industrial emissions in the second half of this century.

Exposure to Companies with Proactive Carbon Risk Mitigation Initiatives



Understanding Carbon Risk Management Initiatives

Companies have a variety of strategies to reduce emissions, including setting targets for reductions, using cleaner energy sources and managing energy consumption

While these efforts vary considerably across companies, we categorize them as No Efforts, Some Efforts, and Aggressive Efforts to make them more comparable.

Exposure to Holdings Deriving Revenues From Fossil Fuel

■ Portfolio ■ Benchmark



CLIMATE RISK & OPPORTUNITIES - LARGEST 10 HOLDINGS

PORTFOLIO: Sundaram India Midcap Fund
BENCHMARK: Nifty Midcap 100 Index

ANALYSIS DATE: June 30, 2022

Top 10 Holdings by Weight

	Portfolio Weight (%)	ESG Rating	Low Carbon Transition Category	Carbon Risk	Fossil Fuel-Based Revenue	Green Revenue
SCHAEFFLER INDIA LTD	4.2	-	Neutral	Low	0.0	0.0
VARUN BEVERAGES LIMITED	3.0	B	Neutral	Low	0.0	0.0
SRF LIMITED	2.9	B	Operational Transition	High	0.0	0.0
GRINDWELL NORTON LTD	2.8	-	N/A	High	0.0	0.0
THE FEDERAL BANK LTD	2.8	A	Neutral	Very Low	0.0	0.0
CHOLAMANDALAM INVESTMENT AND FINANCE COM	2.6	BBB	Neutral	Very Low	0.0	0.0
PAGE INDUSTRIES LIMITED	2.6	B	Neutral	Low	0.0	0.0
NAVIN FLUORINE INTERNATIONAL LIMITED	2.5	-	Operational Transition	Very High	0.0	0.0
AXIS BANK LIMITED	2.5	A	Neutral	Low	0.0	0.0
THE BANK OF BARODA LIMITED	2.5	BBB	Neutral	Very Low	0.0	0.0

Carbon Risk is an indication of the carbon Intensity of an issuer, measured as the ratio of annual scope 1 and 2 carbon emissions to annual revenue. Carbon Risk is categorized as Very Low (0 to <15), Low (15 to <70), Moderate (70 to <250), High (250 to <525), and Very High (>=525).

Portfolio Corporate Issuers with Highest Carbon Intensity

	Sector	Weight (%)	Active Weight (%)	Carbon Intensity (S1+2) tCO2e/\$m	Cont to Weighted Avr Carbon Intensity	Total Carbon Emission Source	Low Carbon Transition Cat	Low Carbon Transition Mgmt Score Quartile
DALMIA BHARAT LIMITED	Materials	0.3	-0.6	8,153.5	9.9	Reported	Operational Transition	2
THE TATA POWER COMPANY LIMITED	Utilities	0.5	-2.2	7,776.0	19.6	Reported	Operational Transition	2
JINDAL STEEL AND POWER LIMITED	Materials	1.4	0.4	3,529.2	24.4	Reported	Operational Transition	4
COROMANDEL INTERNATIONAL LIMITED	Materials	1.5	0.6	590.1	4.2	E.Segmt-Moderately Low	Operational Transition	3
NAVIN FLUORINE INTERNATIONAL LIMITED	Materials	2.5	1.5	568.7	6.9	E.Segmt-Moderately Low	Operational Transition	4
SRF LIMITED	Materials	2.9	2.9	398.8	5.5	E.CSI	Operational Transition	4
CROMPTON GREAVES CONSUMER ELECTRICALS LI	Consumer Discretionary	2.3	0.6	397.6	4.3	E.CSI	Operational Transition	2
GRINDWELL NORTON LTD	Industrials	2.8	2.8	343.5	4.6	E.Segmt-Moderate	N/A	0
TUBE INVESTMENTS OF INDIA LIMITED	Consumer Discretionary	2.2	2.2	285.8	3.0	E.Segmt-Low	Operational Transition	2
BHARAT FORGE LTD	Consumer Discretionary	1.7	0.4	285.2	2.3	E.CSI	Operational Transition	3

Largest Contributors to Portfolio Weighted Average Carbon Intensity

	Sector	Weight (%)	Active Weight (%)	Carbon Intensity (S1+2) tCO2e/\$m	Cont to Weighted Avr Carbon Intensity	Total Carbon Emission Source	Low Carbon Transition Cat	Low Carbon Transition Mgmt Score Quartile
JINDAL STEEL AND POWER LIMITED	Materials	1.4	0.4	3,529.2	24.4	Reported	Operational Transition	4
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DALMIA BHARAT LIMITED	Materials	0.3	-0.6	8,153.5	9.9	Reported	Operational Transition	2
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SRF LIMITED	Materials	2.9	2.9	398.8	5.5	E.CSI	Operational Transition	4
GRINDWELL NORTON LTD	Industrials	2.8	2.8	343.5	4.6	E.Segmt-Moderate	N/A	0
CROMPTON GREAVES CONSUMER ELECTRICALS LI	Consumer Discretionary	2.3	0.6	397.6	4.3	E.CSI	Operational Transition	2
COROMANDEL INTERNATIONAL LIMITED	Materials	1.5	0.6	590.1	4.2	E.Segmt-Moderately Low	Operational Transition	3
TUBE INVESTMENTS OF INDIA LIMITED	Consumer Discretionary	2.2	2.2	285.8	3.0	E.Segmt-Low	Operational Transition	2
BHARAT FORGE LTD	Consumer Discretionary	1.7	0.4	285.2	2.3	E.CSI	Operational Transition	3

Climate Value at Risk

Selected Scenario ▼









Selection of transition scenarios

	1.5°C AIM CGE			1.5°C MID-RANGE AIM CGE			2°C AIM CGE			2°C HIGH RISK AIM CGE Late Action Scenario			3°C MID-RANGE AIM CGE		
	Portfolio	Benchmark	Active	Portfolio	Benchmark	Active	Portfolio	Benchmark	Active	Portfolio	Benchmark	Active	Portfolio	Benchmark	Active
Policy Climate VaR (Scope 1,2,3)	-10.3%	-17.0%	6.7%	-10.3%	-17.0%	6.7%	-6.7%	-13.1%	6.5%	-11.1%	-17.9%	6.7%	-1.9%	-5.6%	3.7%
Technology Opportunities Climate VaR	0.8%	2.9%	-2.1%	0.8%	2.9%	-2.1%	0.3%	1.1%	-0.8%	0.3%	1.1%	-0.8%	0.3%	1.1%	-0.8%
Physical Climate VaR -Aggressive	-16.3%	-19.8%	3.5%	-16.3%	-19.8%	3.5%	-16.3%	-19.8%	3.5%	-16.3%	-19.8%	3.5%	-16.3%	-19.8%	3.5%
Aggregated Climate VaR	-25.7%	-33.8%	8.1%	-25.7%	-33.8%	8.1%	-22.6%	-31.8%	9.2%	-27.0%	-36.5%	9.5%	-17.8%	-24.2%	6.4%

Physical Climate Value at Risk Detail

Selected Scenario ▼

Selection of transition scenarios

			Aggressive (Var-Covar)			Average		
			Portfolio	Benchmark	Active	Portfolio	Benchmark	Active
Chronic Risks (0.5° global grid)		Extreme Cold	-1.6%	-2.2%	0.6%	0.2%	0.1%	0.0%
		Extreme Heat	-11.9%	-14.6%	2.7%	-11.2%	-13.9%	2.7%
		Extreme Precipitation	-0.8%	-1.0%	0.2%	-0.6%	-0.8%	0.2%
		Heavy Snowfall	0.0%	-0.0%	0.0%	0.0%	0.0%	0.0%
		Extreme Wind	-0.0%	-0.0%	-0.0%	-0.0%	0.0%	-0.0%
Acute Risks (high res)		Coastal Flooding	-4.0%	-5.3%	1.3%	-3.7%	-5.2%	1.5%
		Fluvial Flooding	-0.9%	-1.3%	0.4%	-0.8%	-1.2%	0.5%
		Tropical Cyclone	-0.1%	-0.3%	0.2%	-0.0%	-0.1%	0.1%
Aggregate Physical Climate VaR			-16.3%	-19.8%	3.5%	-15.5%	-19.1%	3.6%

Implied Temperature Rise

Portfolio

Benchmark

3.8°C



5.3°C



STRONGLY MISALIGNED

STRONGLY MISALIGNED

>3.2°C

STRONGLY MISALIGNED

>2.0 - 3.2°C

MISALIGNED

>1.5 - 2.0°C

2°C ALIGNED

≤1.5°C

1.5°C ALIGNED

Climate VaR Portfolio Coverage Summary

	Portfolio	Benchmark	Active
Policy Climate VaR	96.9%	91.2%	5.7%
Technology Opportunities Climate VAR	96.9%	91.2%	5.7%
Physical Climate VAR	73.0%	71.1%	1.9%
Implied Temperature Rise	96.9%	91.2%	5.7%

MSCI Implied Temperature Rise Company Analysis

AGGREGATED IMPLIED TEMPERATURE RISE

Portfolio: 3.8°C **Benchmark** 5.3°C

Implied Temperature Rise: Companies with Highest Temperature Alignment

Company Name	Weight	Implied Temperature Rise
THE TATA POWER COMPANY LIMITED	0.5%	10.0°C
TVS MOTOR COMPANY LIMITED	0.7%	10.0°C
INDRAPRASTHA GAS LTD	0.6%	9.6°C
GUJARAT STATE PETRONET LIMITED	1.4%	9.5°C
HINDUSTAN PETROLEUM CORPORATION LIMITED	0.8%	8.4°C
SUNDARAM -CLAYTON LIMITED	1.4%	6.3°C
ASHOK LEYLAND LIMITED	2.0%	5.9°C
NAVIN FLUORINE INTERNATIONAL LIMITED	2.5%	5.3°C
CUMMINS INDIA LIMITED	1.9%	4.2°C
COROMANDEL INTERNATIONAL LIMITED	1.5%	4.0°C

Implied Temperature Rise: Companies with Lowest Temperature Alignment

Company Name	Weight	Implied Temperature Rise
MAX FINANCIAL SERVICES LIMITED	2.3%	1.4°C
BAJAJ FINSERV LIMITED	1.0%	1.4°C
AU SMALL FINANCE BANK LIMITED	2.0%	1.5°C
CHOLAMANDALAM FINANCIAL HOLDINGS LIMITED	1.6%	1.5°C
SHRIRAM TRANSPORT FINANCE COMPANY LIMITE	2.1%	1.5°C
MINDTREE LIMITED	2.3%	1.5°C
PERSISTENT SYSTEMS LIMITED	0.7%	1.5°C
CHOLAMANDALAM INVESTMENT AND FINANCE COM	2.6%	1.5°C
MPHASIS LIMITED	1.6%	1.5°C
ICICI SECURITIES LIMITED	0.7%	1.5°C

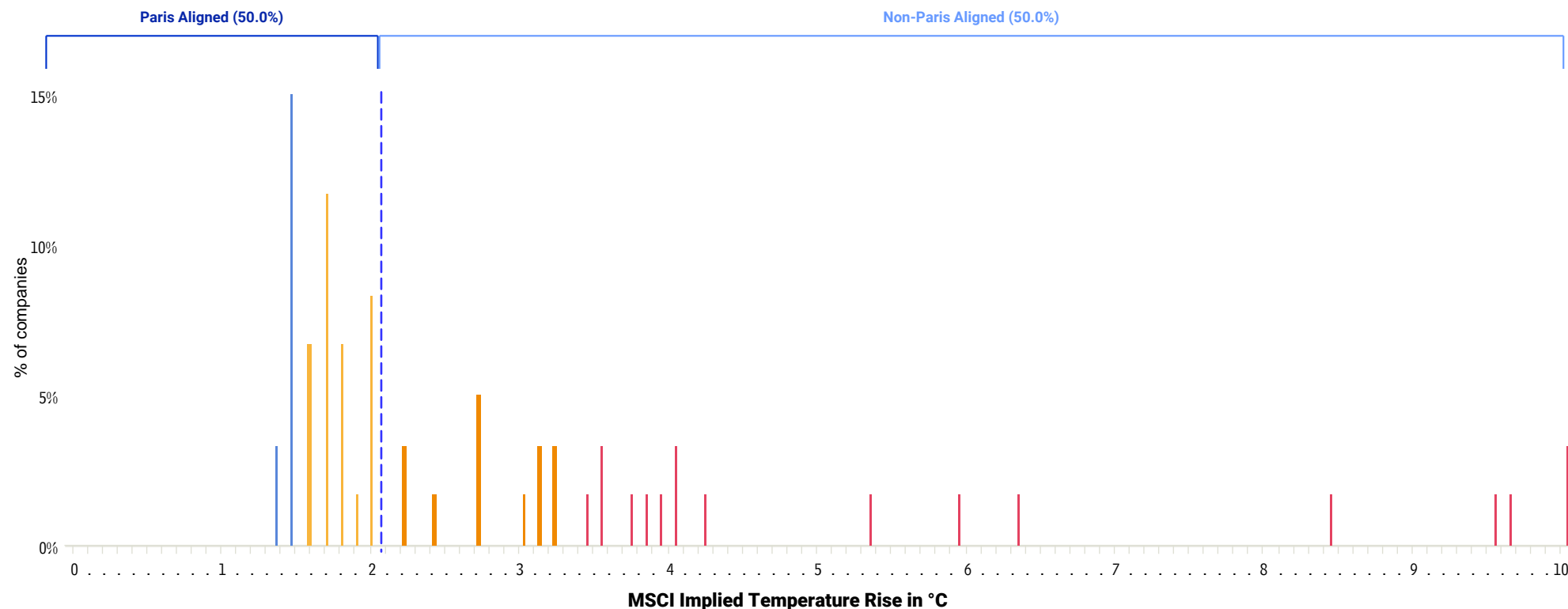
Implied Temperature Rise

The Implied Temperature Rise (ITR) metric provides an indication of how well public companies align with global temperature goals. Expressed in degrees Celsius, it is an intuitive, forward-looking metric that shows how a company aligns with the ambitions of the Paris Agreement - which is to keep a global temperature rise this century well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5°C.

The portfolio-level Implied Temperature Rise compares the sum of "owned" projected GHG emissions against the sum of "owned" carbon budgets for the underlying fund holdings. The portfolio's total estimated carbon budget over- /undershoot is then converted to a degree of temperature rise (°C) using the TCRE. The allocation base used to define ownership is Enterprise Value including Cash (EVIC) in order to enable the analysis of equity and corporate bond portfolios.

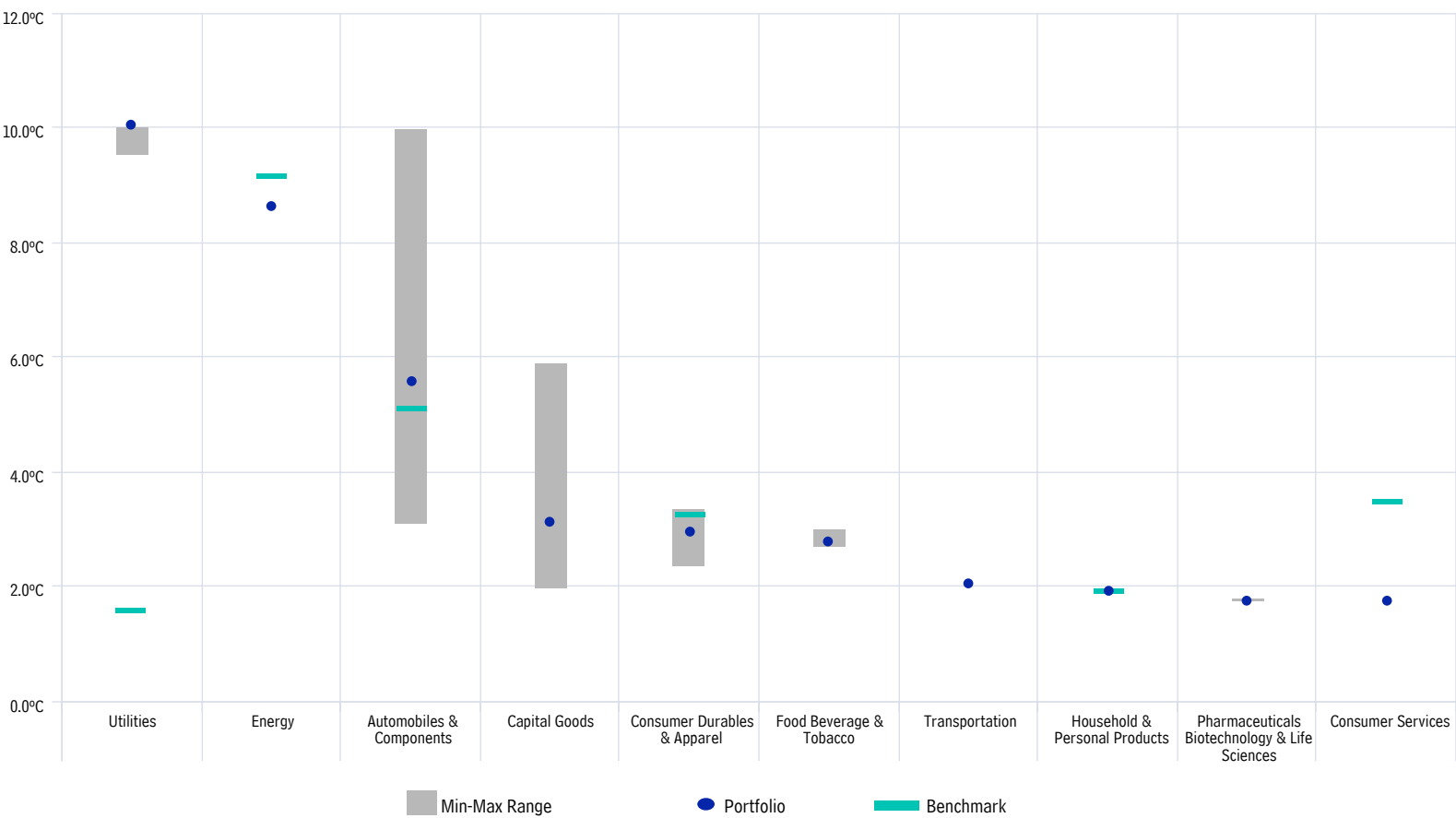
Portfolio MSCI Implied Temperature Rise Distribution

The issuers in the portfolio are distributed according to their Implied Temperature Rise showing the number who are aligned with the Paris Agreement and the more ambitious 1.5°C temperature goal.



Implied Temperature Rise Categories		% of Companies in Category
1.5° Aligned	≤1.5°C	10.0%
2°C Aligned	>1.5° - ≤2.0°C	40.0%
Misaligned	>2° - ≤3.2°C	21.7%
Strongly Misaligned	>3.2°C	28.3%

Aggregated Implied Temperature Rise by Sector



Aggregated Implied Temperature Rise Spread by Sector

The chart above displays the sectors in this portfolio that are associated with the highest aggregated Implied Temperature Rise (ITR). The grey bars are a measure of the maximum and minimum aggregated ITR per sector. Each teal bar represents either the average level of aggregated ITR per sector or the benchmark portfolio's aggregated ITR per sector (if specified). Each dark blue dot represents the ITR of this portfolio, taking into account holding weights. Use this graphic to identify a sector's current deviation from global climate goals and find sectors where climate goal alignment is most feasible. Company and portfolio level Implied Temperature Rises are floored and capped at 1.3°C and 10°C.

Top 10 Aggregated Climate VaR Risk Contributors

Security	Aggregated Policy Risk Climate VaR	Technology Opportunities Climate VaR	Physical Risk Climate VaR	Aggregated Climate VaR	Weight (%)	Climate VaR Risk Contribution
COROMANDEL INTERNATIONAL LTD	-78.34%	0.00%	-29.46%	-100.00%	1.49%	-1.49%
GUJARAT STATE PETRONET LTD	-59.54%	1.16%	-88.32%	-100.00%	1.45%	-1.45%
JINDAL STEEL AND POWER LTD	-100.00%	9.34%	-49.94%	-100.00%	1.45%	-1.45%
SUNDARAM CLAYTON LTD	-86.21%	6.13%	-92.07%	-100.00%	1.44%	-1.44%
MAX FINANCIAL SERVICES LTD	-3.59%	0.00%	-54.23%	-57.83%	2.31%	-1.33%
BANK OF BARODA LTD	-11.15%	0.00%	-32.14%	-43.29%	2.45%	-1.06%
SHRIRAM TRANSPORT FINANCE COMPANY LTD	-3.38%	0.00%	-35.88%	-39.26%	2.08%	-0.82%
HINDUSTAN PETROLEUM CORP LTD	-100.00%	2.32%	-100.00%	-100.00%	0.81%	-0.81%
ICICI BANK LTD	-2.09%	0.00%	-40.74%	-42.84%	1.85%	-0.79%
LIC HOUSING FINANCE LTD	-8.85%	0.00%	-68.45%	-77.31%	0.99%	-0.77%

The table provides an overview of the companies with the highest negative Aggregated Climate VaR contribution in the portfolio. The position weight of each individual security in the portfolio is multiplied by the Aggregated Climate VaR to establish the Climate VaR risk contribution of the portfolio. Aggregated Climate VaR in this chart is the sum of Policy Risk from Direct GHG Emissions (Scope 1) Climate VaR, Technology Opportunities Climate VaR and Physical Climate VaR for the selected scenario. Climate VaR numbers are calculated at the security level, i.e. 2 securities associated with the same issuer could have different Climate VaR.











Top 10 Technology Opportunities Climate VaR Companies

Company Name	Total Number of All Patents	Total Score of All Patents	Number of Low Carbon Patents	Score of Low Carbon Patents	Green Percentage % of Low Carbon Score in Total Score	Technology Opportunities Climate VaR
THE TATA POWER COMPANY LIMITED	2	1.30	0	0.00	0.00%	54.19%
JINDAL STEEL AND POWER LIMITED	0	0.00	0	0.00	N/A	9.34%
ASTRAL LIMITED	0	0.00	0	0.00	N/A	6.48%
SUNDARAM -CLAYTON LIMITED	591	346.91	12	18.93	5.46%	6.13%
BHARAT FORGE LTD	18	27.33	2	4.53	16.57%	3.64%
HINDUSTAN PETROLEUM CORPORATION LIMITED	N/A	N/A	N/A	N/A	N/A	2.32%
BHARAT ELECTRONICS LIMITED	N/A	N/A	N/A	N/A	N/A	2.01%
ASHOK LEYLAND LIMITED	85	50.29	15	23.47	46.67%	1.98%
VOLTAS LIMITED	0	0.00	0	0.00	N/A	1.22%
GUJARAT STATE PETRONET LIMITED	N/A	N/A	N/A	N/A	N/A	1.16%

Low Carbon Patent Statistics

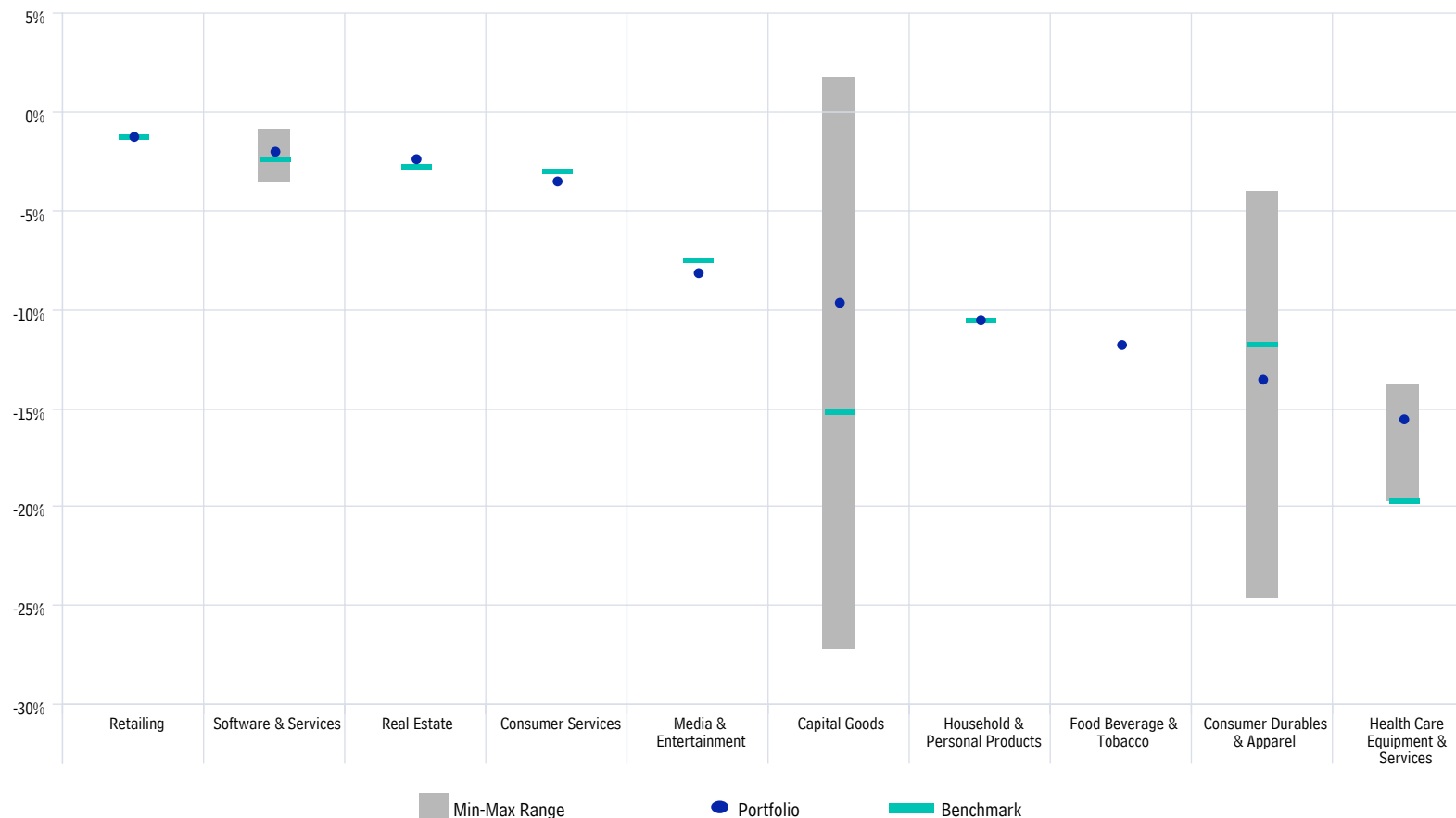
The table above provides an overview of the companies with the highest Technology Opportunities CVaR in the portfolio. Important statistics relating to the patent portfolio of each company are displayed and results of the quality scoring assessment within the technology opportunities methodology are included alongside the Technology Opportunities CVaR. The Technology Opportunities Climate VaR is capped at +100% and is by its nature reflecting future low carbon patent revenues, hence it is expressed as positive value compared with other Climate VaR metrics which are negative.

Top 10 Physical Risk Climate VaR Companies

Company Name	Physical Risk Climate VaR Contribution		Primary Physical Risk Hazard
SUNDARAM -CLAYTON LIMITED	-11.15%		Extreme Heat
GUJARAT STATE PETRONET LIMITED	-10.78%		Extreme Heat
MAX FINANCIAL SERVICES LIMITED	-10.54%		Extreme Heat
HINDUSTAN PETROLEUM CORPORATION LIMITED	-6.83%		Extreme Heat
THE BANK OF BARODA LIMITED	-6.64%		Extreme Heat
ICICI BANK LIMITED	-6.34%		Extreme Heat
SHRIRAM TRANSPORT FINANCE COMPANY LIMITE	-6.28%		Extreme Heat
JINDAL STEEL AND POWER LIMITED	-6.09%		Extreme Heat
LIC HOUSING FINANCE LTD	-5.72%		Extreme Heat
QUESS CORP LIMITED	-4.44%		Coastal Flooding

The table provides information on the most exposed companies to physical risk exposure in the portfolio such as extreme weather events in the selected physical risk scenario. However, physical risks can be both positive and negative and be expressed in both positive and negative values. MSCI currently models ten hazards including extreme heat and cold, coastal and river flooding, wildfires as well as wind gusts and precipitation. Physical changes can be event-driven ('acute') or longer-term in nature ('chronic')

MSCI Climate Value at Risk Spread by Sector



MSCI Climate Value at Risk Spread by Sector

The chart provides an understanding of the sector-level risks found within the portfolio. The highest risk sectors are displayed in order of risk exposure. The dark blue circles illustrate the aggregated Climate VaR in each sector weighted according to the security weights of the portfolio. The teal bars represent one of two things depending on whether or not a benchmark was selected. If no benchmark was selected then the teal bars represent the arithmetic average of the aggregated CVaR in each sector, whereas if a benchmark was selected then the teal bars represent the aggregated CVaR in each sector weighted according to the security weights of the benchmark. The gray bars are a measure of the variability in that sector's Climate VaR - demonstrating for each sector the spread between maximum and minimum values. This chart can be used to identify the most at risk sectors, but also those sectors where an optimization of the portfolio's exposure is possible by re-allocating capital to holdings with a lower Climate VaR.

Aggregated Climate VaR in this chart is the sum of Policy Risk from the Aggregated Policy Risk Climate VaR, Technology Opportunity Climate VaR and Physical Risk Climate VaR for the selected scenarios.

Policy Risks

The transition to a low-carbon economy will be accompanied by extensive regulatory and policy changes across the globe. Using a hybrid top-down and bottom-up methodology, MSCI ESG Research calculates the potential risks from future climate change policies. Direct GHG Emissions (Scope 1), Electricity Use (Scope 2), and Value Chain GHG Emissions (Scope 3) are calculated separately. Country-level greenhouse gas (GHG) emission reduction targets proposed in the Nationally Determined Contributions (NDCs) of the Paris Agreement are modelled. Country emission reduction targets are broken down into sector level targets and based on MSCI ESG Research's production facilities location database, sector emission reduction targets are then assigned to each company's production facilities. Using scenario production and consumption electricity data and estimates of the costs passed through to final electricity users, MSCI ESG Research calculates the potential costs related to electricity consumption in a transition scenario. Scope 3 emissions can be separated into upstream and downstream elements. A company's exposure to upstream emissions can add input costs whereas downstream emission exposure can lead to a company's loss in market share due to shifts in demand. Therefore, both sides of the supply chain are assessed independently to compute a company's policy risk. Policy costs are aggregated to issuer and portfolio level. The metric incorporates double counting considerations.

Technology Opportunities

MSCI ESG Research developed a low-carbon Technology Opportunity model based on a company's current low carbon revenue streams and company-specific patent data. Recently published patent databases allow an evidence-based view into the strategic R&D investments of companies. Using granted, low carbon patents as a proxy for low carbon innovative capacity, the Technology Opportunity model computes a company's "Technology Opportunity Climate VaR", identifying which companies might benefit from the implementation of long term climate stabilization targets on a global level.

Physical Risk

Climate related physical risk affects all company facilities; to some degree. Particularly at risk are those enterprises with locations in climate sensitive regions, or with longlived fixed assets. Physical climate risk scenarios are essential in identifying the potential change in extreme weather caused by increased levels of GHG emissions in the atmosphere. Physical risk scenarios model how the physical aspects of the climate system changes including variables such as temperature rise, sea level rise, and changes to the frequency and severity of specific extreme weather events. The physical risk analysis assesses changes in global temperatures, precipitation levels as well as flooding and cyclones due to climate change by relying on the both historical data of observed extreme weather and forward looking climate models. Physical risks and opportunities can be aggregated across company facilities, to issuer level, to portfolio level and capture both acute and chronic risks with 10 hazards being currently modelled.

Aggregated Climate VaR

The Aggregated Climate VaR is the sum of the Aggregated Policy Risk Climate VaR, the Technology Opportunity Climate VaR, and the Physical Risk Climate VaR with the selected transition and physical risk scenarios. The Climate VaR metric, expressed as a positive or negative percentage reflects a change from a portfolio's current valuation, assesses how an investment portfolio could be impacted by climate policy risk and extreme weather (physical climate risks), and benefitted by a low-carbon technology transition.

Implied Temperature Rise

The Implied Temperature Rise metric provides an indication of how companies and investment portfolios align to global climate targets. Some institutional investors would like to understand if their portfolios are 2°C aligned, referring to the Intergovernmental Panel on Climate Change (IPCC) goal of limiting the global temperature increase in the year 2100, compared to pre-industrial levels, to 2°C. Another important target is the 1.5°C limit, which was also popularized by the Paris Agreement. This limit has been advocated strongly by small island states, which are most threatened by sea level rise in a world with temperatures exceeding a rise of 1.5°C.

Key to understanding the Implied Temperature Rise is the concept of a carbon budget: how much the world can emit and, by extension, how much a company can emit (across Scopes 1, 2 and 3) and remain within the limitations required to meet a 2°C warming scenario by 2100. We use IPCC guidance to understand what the budgets need to be. Then we calculate companies' projected emissions out over the next five decades based on their emissions track record, stated reduction targets, and other data. A company whose projected emissions are below budget can be said to "undershoot" while those whose projected emissions exceed the budget "overshoot". The Implied Temperature Rise, expressed in degrees Celsius (°C), estimates the global implied temperature rise (in the year 2100 or later) if the whole economy had the same carbon budget over-/undershoot level as the company (or portfolio) in question.

Implied Temperature Rise Portfolio Aggregation Methodology

It estimates the global implied temperature rise (in the year 2100 or later) if the whole economy had the same carbon budget over-/undershoot level as the portfolio analysed, based on its projected Scope 1, 2, and 3 GHG emissions. The portfolio Implied Temperature Rise compares the sum of "owned" projected GHG emissions against the sum of "owned" carbon budgets for the underlying holdings. The portfolio's total estimated carbon budget over-/undershoot is then converted to a degree of temperature rise using the science-based ratio approach of Transient Climate Response to Cumulative Carbon Emissions (TCRE). Enterprise Value including Cash (EVIC) is used as a base to allocate companies' emissions to investment portfolios to enable analysis of both equity and corporate bond portfolios.

For example, an Implied Temperature Rise of 2.5°C would indicate that the fund is exceeding its fair share of the global carbon budget, and that if the whole economy exceeded their fair shares by a similar proportion, we would end up in a world with ~2.5°C of warming.

$$\text{Relative Portfolio Overshoot} = \frac{\text{Portfolio Overshoot}_{\text{Scope 1}} + \text{Portfolio Overshoot}_{\text{Scope 2}} + \text{Portfolio Overshoot}_{\text{Scope 3}}}{\text{Portfolio Budget}_{\text{Scope 1}} + \text{Portfolio Budget}_{\text{Scope 2}} + \text{Portfolio Budget}_{\text{Scope 3}}}$$

$$\text{ITR}_{\text{Agg}} = 2^{\circ}\text{C} + \text{Relative Portfolio Overshoot}_{\text{Agg}} * \text{Global Budget} * \text{TCRE}$$

Integrated Assessment Models

Climate change IAMs are tools that bring together very different types of information (e.g., knowledge about climate, economics, ecology) in a coherent framework that is usable by researchers and decision makers. In the assessment of climate change, integrated assessment refers to activity that considers the social and economic factors that drive the emission of greenhouse gases (GHG), the biogeochemical cycles and atmospheric chemistry that determines the fate of those emissions, and the resultant effect of GHG emissions on climate and human welfare. IAMs can provide a framework for understanding the climate change problem and for informing judgments about the relative value of options for dealing with climate change.

• AIM-CGE:

The AIM-CGE model was developed by the Japanese National Institute for Environmental Studies (NIES) to analyze the future of climate change mitigation and its impact on economic conditions. AIM/CGE is classified as a computable general equilibrium model, which covers all economic goods while considering production factor interactions. The trade of goods and services is also considered.

• GCAM4:

The Global Change Assessment Model (GCAM) is a dynamic-recursive model with technology-rich representations of the economy, energy sector, land use and water linked to a climate model that can be used to explore climate change mitigation policies including carbon taxes, carbon trading, regulations and accelerated deployment of energy technology. The Joint Global Change Research Institute (JGCRI) is the home and primary development institution for GCAM.

• IMAGE:

IMAGE is an ecological-environmental model framework that simulates the environmental consequences of human activities worldwide. It represents interactions between society, the biosphere and the climate system to assess sustainability issues such as climate change, biodiversity and human well-being. The IMAGE modelling framework has been developed by the IMAGE team under the authority of PBL Netherlands Environmental Assessment Agency.

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