

# Carbon Portfolio Analytics

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Prepared for:	Client ABC
Portfolio Name:	Sample Large Cap
Benchmarked Market Index:	MSCI ACWI
Benchmarked ESG Index:	MSCI ACWI Low Carbon Target
<b>Report Date:</b>	<b>June 1, 2015</b>



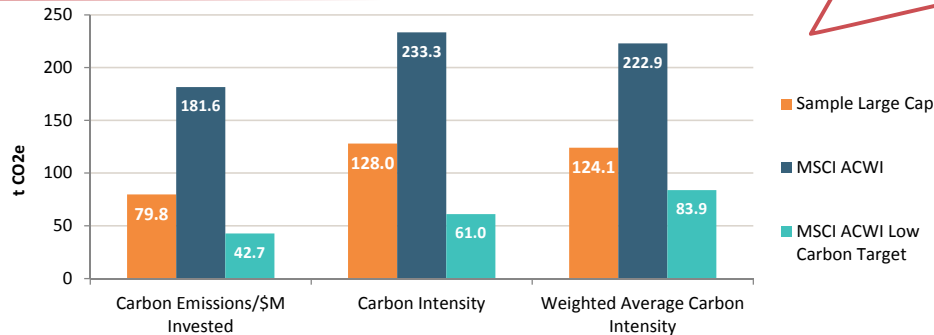
	Carbon Footprint				
	Carbon Emissions /\$M Invested	Carbon Emissions*	Carbon Intensity	Weighted Average Carbon Intensity	Carbon Emissions Data Availability
Sample Large Cap	<b>79.8</b>	79,813	128.0	124.1	100.0%
MSCI ACWI	181.6	181,573	233.3	222.9	99.8%
MSCI ACWI Low Carbon Target	42.7	42,722	61.0	83.9	99.9%
	t CO2e / \$M Invested	t CO2e	t CO2e / \$M Sales		Market Value

\*Based on investment of \$1,000,000,000

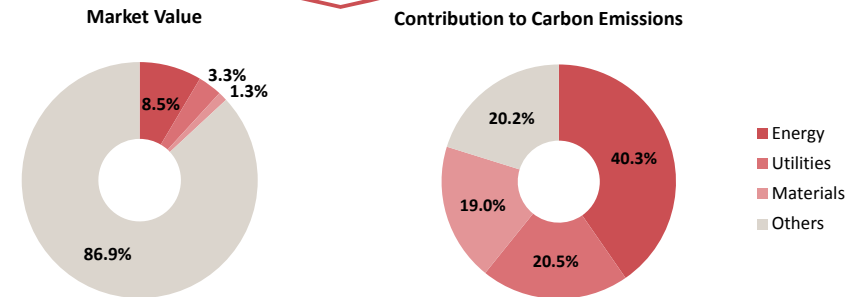
This report analyzes a portfolio of securities in terms of the carbon emissions, fossil fuel reserves, and other carbon-related characteristics of the entities that issue those securities. It compares this data to the performance of a portfolio replicating a market benchmark and a portfolio replicating a relevant ESG benchmark (Environment, Social and Governance). The data below represents a high-level subset of the information found in the following pages.

MSCI ESG Research defines portfolio carbon footprint as the total carbon emissions of a portfolio per \$million invested. Additional headline metrics provided in the table to the left include an absolute figure for portfolio carbon emissions and two intensity measures: portfolio carbon intensity measures the carbon efficiency of a portfolio and is defined as the total carbon emissions of the portfolio per \$million of portfolio sales; while weighted average carbon intensity is a measure of a portfolio's exposure to carbon related potential market and regulatory risks and is computed as the sum product of the portfolio companies' carbon intensities and weights. More information on these metrics is included in the appendix.

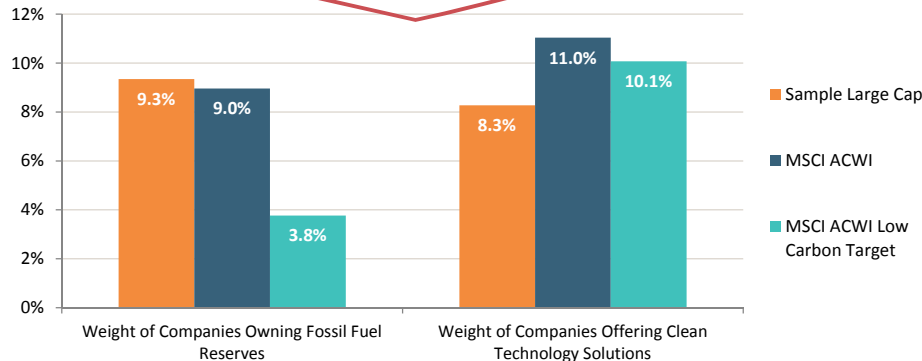
The Sample Large Cap portfolio Carbon Emissions are 56% lower than the MSCI ACWI, Carbon Intensity is 45.1% lower, and Weighted Average Carbon Intensity is 44.3% lower. (Pages 3, 5 and 6)



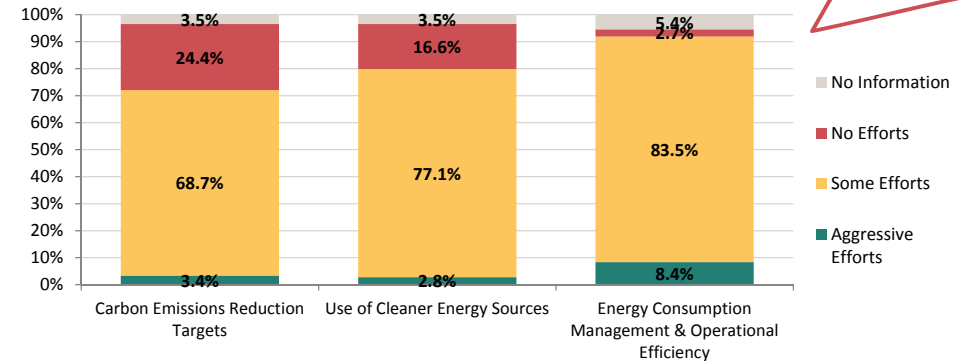
The Energy, Utilities, and Materials sectors in the Sample Large Cap portfolio contribute 13.1% of the weight versus 79.8% of the carbon emissions. (Page 3)



The Sample Large Cap portfolio is 0.4% overweight, relative to the MSCI ACWI, in companies that own Fossil Fuel Reserves, and 2.8% underweight in companies offering Clean Technologies Solutions. (Pages 8 and 13)



8.4% of the weight of the Sample Large Cap portfolio has Aggressive Efforts in Energy Consumption Management & Operational Efficiency, but 24.4% has No Efforts in Carbon Reduction Targets. (Page 12)



# Carbon Footprint: Carbon Emissions/\$M Invested

The timeline compares the historical and most recent emissions of the portfolio to the benchmarks based on the current constituents and weights of each.

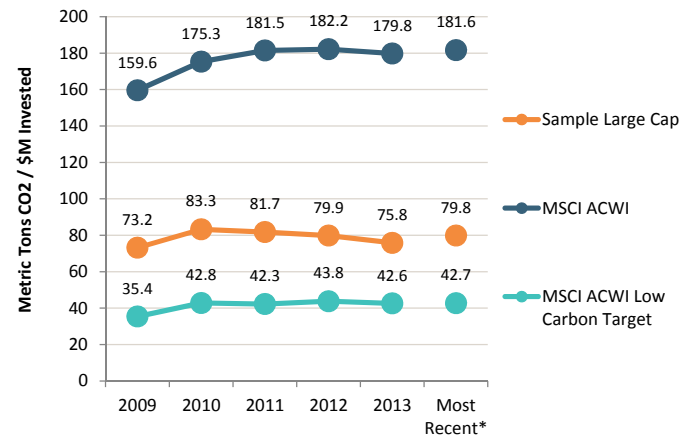
The column chart in the lower right shows the composition by sector of the portfolio and benchmarks by market capitalization as well as by each sector's contribution to emissions. This highlights that dominant sectors, in terms of emissions, tend to be Energy, Utilities, and Materials.

The sector table shows the comparison of the portfolio sector emissions to those of each benchmark.

The attribution analysis presented on the next page evaluates how stock selection and sector weighting drive the portfolio carbon footprint versus the benchmarks.

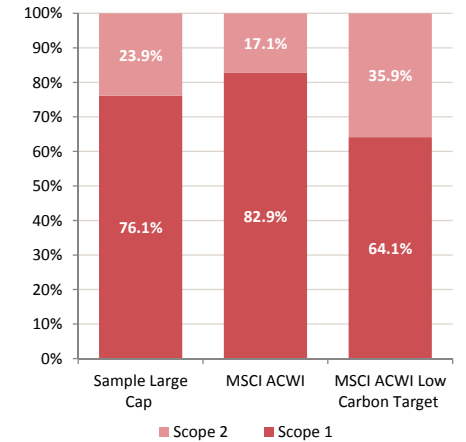
The company tables on the following page show emissions in two ways: 1) total emissions of the companies whose securities are in the portfolio, which provides an order of magnitude in an absolute sense, and 2) contribution of companies to the portfolio-level emissions. The tables also indicate whether the emissions data is reported or estimated, and how each company performs on Carbon Risk Management relative to peers.

Carbon Emissions Trend of Current Holdings



\*Reflects most recently available data for each company on the date of running the report.

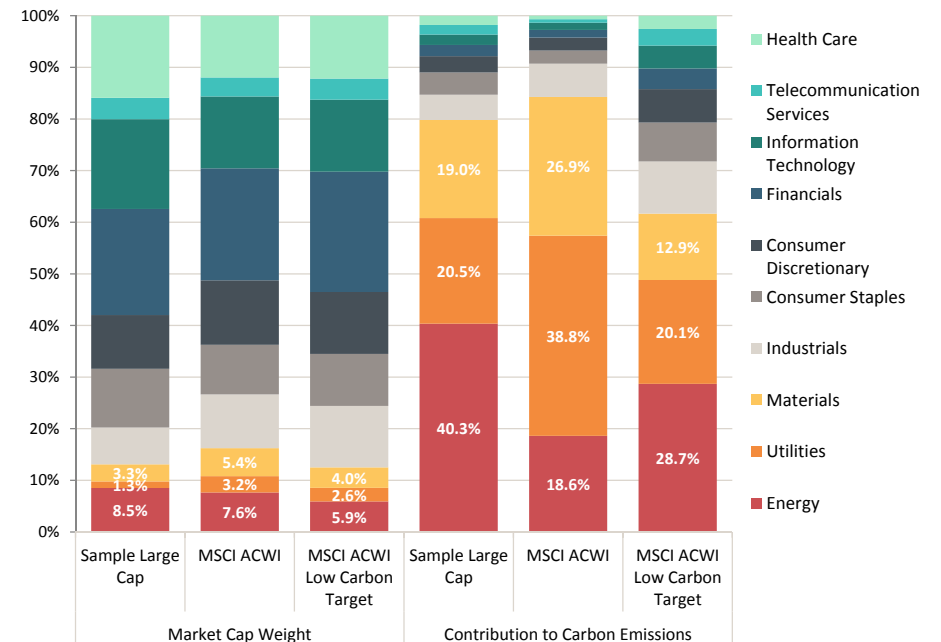
Type of Emissions as Percent of Contribution



Carbon Emissions by Sector	Sample Large Cap	MSCI ACWI	MSCI ACWI Low Carbon Target	Sample Large Cap vs MSCI ACWI	Sample Large Cap vs MSCI ACWI Low Carbon Target
t CO2e/\$M Invested					
Utilities	1,286.5	2,214.4	324.9	-41.9%	295.9%
Materials	461.3	905.4	138.4	-49.0%	233.2%
Energy	377.7	441.8	203.9	-14.5%	85.2%
Industrials	54.7	112.0	36.3	-51.2%	50.7%
Telecommunication Services	36.1	34.7	33.5	4.1%	7.7%
Consumer Staples	30.2	48.2	31.9	-37.4%	-5.4%
Consumer Discretionary	24.2	36.6	23.3	-33.9%	3.8%
Information Technology	9.2	18.2	13.5	-49.3%	-31.7%
Health Care	8.9	9.9	9.0	-10.5%	-1.6%
Financials	8.4	12.4	7.4	-31.8%	14.8%
Overall	79.8	181.6	42.7	-56.0%	86.8%

Key: 2,214.4 (red) 181.6 (blue) 0 (green)

Sector Weight vs Contribution to Emissions



# Carbon Footprint: Carbon Emissions/\$M Invested

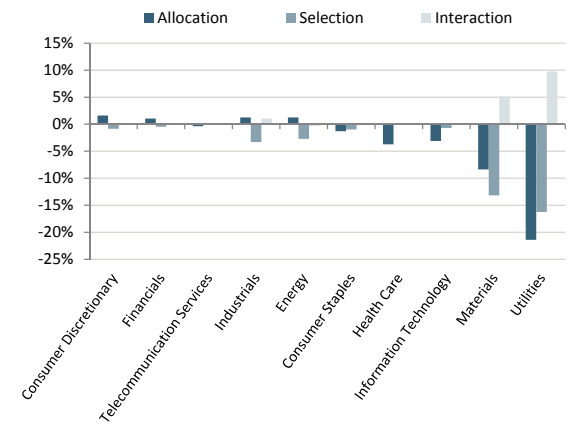
## - Attribution Analysis and Key Holdings

Sample Large Cap vs MSCI ACWI	Portfolio Weight	Active Weight*	Portfolio Carbon Emissions	Benchmark Carbon Emissions
Consumer Discretionary	10.4%	-2.0%	24.2	36.6
Financials	20.5%	-1.1%	8.4	12.4
Telecommunication Services	4.2%	0.5%	36.1	34.7
Industrials	7.1%	-3.3%	54.7	112.0
Energy	8.5%	0.9%	377.7	441.8
Consumer Staples	11.4%	1.7%	30.2	48.2
Health Care	15.9%	3.9%	8.9	9.9
Information Technology	17.4%	3.4%	9.2	18.2
Materials	3.3%	-2.1%	461.3	905.4
Utilities	1.3%	-1.9%	1,286.5	2,214.4
<b>Total</b>	<b>100%</b>	<b>0%</b>	<b>79.8</b>	<b>181.6</b>

t CO2e / \$M Invested

Absolute Attribution				Total
Sector	Allocation	Stock	Interaction	
Consumer Discretionary	2.9	-1.5	0.3	1.6
Financials	1.9	-0.9	0.0	1.1
Telecommunication Services	-0.7	0.1	0.0	-0.6
Industrials	2.3	-6.0	1.9	-1.8
Energy	2.3	-4.9	-0.6	-3.2
Consumer Staples	-2.3	-1.7	-0.3	-4.4
Health Care	-6.7	-0.1	0.0	-6.9
Information Technology	-5.6	-1.3	-0.3	-7.2
Materials	-15.2	-23.9	9.3	-29.8
Utilities	-38.9	-29.5	17.7	-50.6
<b>Total</b>	<b>-60.0</b>	<b>-69.8</b>	<b>28.0</b>	<b>-101.8</b>

Percentage Attribution				Total
Sector	Allocation	Stock	Interaction	
Consumer Discretionary	1.6%	-0.8%	0.1%	0.9%
Financials	1.1%	-0.5%	0.0%	0.6%
Telecommunication Services	-0.4%	0.0%	0.0%	-0.4%
Industrials	1.3%	-3.3%	1.0%	-1.0%
Energy	1.3%	-2.7%	-0.3%	-1.8%
Consumer Staples	-1.3%	-1.0%	-0.2%	-2.4%
Health Care	-3.7%	-0.1%	0.0%	-3.8%
Information Technology	-3.1%	-0.7%	-0.2%	-4.0%
Materials	-8.4%	-13.2%	5.1%	-16.4%
Utilities	-21.4%	-16.3%	9.8%	-27.9%
<b>Total</b>	<b>-33.0%</b>	<b>-38.4%</b>	<b>15.4%</b>	<b>-56.0%</b>



Portfolio Issuers with Highest Carbon Emissions				Portfolio Weight	Active Weight*	Carbon Emissions (t CO2e)	Contribution to Portfolio Emissions	Carbon Emissions Source	Carbon Risk Mgmt Relative to Industry
1	EXXON MOBIL CORPORATION	Energy	United States of America	1.73%	0.79%	148,000,000	9.04%	Reported	Average
2	DUKE ENERGY CORPORATION	Utilities	United States of America	0.25%	0.12%	124,592,000	7.54%	Reported	Leader
3	GAZPROM OAO	Energy	Russia	0.16%	0.07%	122,200,000	3.71%	Reported	Average
4	THE SOUTHERN COMPANY	Utilities	United States of America	0.18%	0.08%	102,000,000	5.94%	Reported	Average
5	ROYAL DUTCH SHELL PLC	Energy	Netherlands	0.92%	0.42%	83,000,000	5.04%	Reported	Average
6	CHEVRON CORPORATION	Energy	United States of America	0.94%	0.42%	61,571,049	3.72%	Reported	Average
7	BP P.L.C.	Energy	United Kingdom	0.60%	0.27%	55,770,000	2.57%	Reported	Average
8	TOTAL SA	Energy	France	0.53%	0.24%	50,300,000	2.70%	Reported	Average
9	ENI S.P.A.	Energy	Italy	0.22%	0.10%	48,055,680	2.04%	Reported	Average
10	BHP BILLITON LIMITED	Materials	Australia	0.34%	0.16%	45,000,000	2.66%	Reported	Leader
Top 10 Companies				5.89%			44.96%		

Largest Contributors to Portfolio Emissions				Portfolio Weight	Active Weight*	Carbon Emissions	Contribution to Portfolio Emissions	Carbon Emissions Source	Carbon Risk Mgmt Relative to Industry
1	EXXON MOBIL CORPORATION	Energy	United States of America	1.73%	0.79%	148,000,000	9.04%	Reported	Average
2	DUKE ENERGY CORPORATION	Utilities	United States of America	0.25%	0.12%	124,592,000	7.54%	Reported	Leader
3	THE SOUTHERN COMPANY	Utilities	United States of America	0.18%	0.08%	102,000,000	5.94%	Reported	Average
4	ROYAL DUTCH SHELL PLC	Energy	Netherlands	0.92%	0.42%	83,000,000	5.04%	Reported	Average
5	CHEVRON CORPORATION	Energy	United States of America	0.94%	0.42%	61,571,049	3.72%	Reported	Average
6	GAZPROM OAO	Energy	Russia	0.16%	0.07%	122,200,000	3.71%	Reported	Average
7	BHP BILLITON PLC	Materials	United Kingdom	0.22%	0.10%	45,000,000	2.72%	Reported	Leader
8	TOTAL SA	Energy	France	0.53%	0.24%	50,300,000	2.70%	Reported	Average
9	PHILLIPS 66	Energy	United States of America	0.21%	0.09%	43,852,070	2.68%	Derived from Reported Data	Average
10	BHP BILLITON LIMITED	Materials	Australia	0.34%	0.16%	45,000,000	2.66%	Reported	Leader
Top 10 Contributors				5.49%			45.76%		

\*Security weight in Sample Large Cap relative to security weight in MSCI ACWI

# Carbon Efficiency: Carbon Intensity

Carbon Intensity measures the carbon efficiency of a company as carbon emissions normalized by total sales. At a portfolio level, carbon intensity is the ratio of portfolio carbon emissions normalized by the investor's claims on sales. This method expresses portfolio carbon efficiency and allows investors to know how many emissions per dollar of sales are generated from their investment.

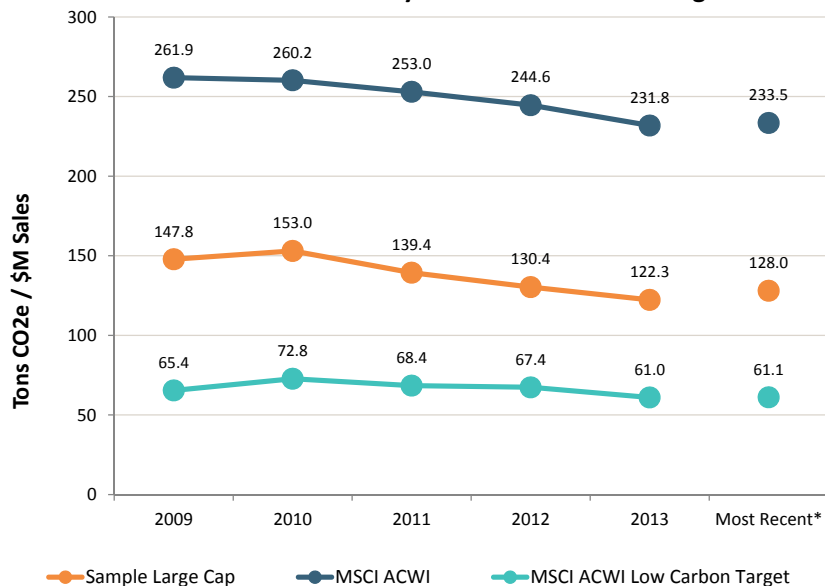
The timeline below compares the historical and most recent Carbon Intensity of the portfolio to the benchmarks based on the current constituents and weights of each. The table and chart to the right show sector weights and Carbon Intensity levels.

The attribution analysis presented on the next page evaluates how stock selection and sector weighting drive the portfolio carbon footprint versus the benchmarks.

Carbon Intensity by Sector	Sample Large Cap		MSCI ACWI		MSCI ACWI Low Carbon Target		Sample Large Cap vs MSCI ACWI	Sample Large Cap vs MSCI ACWI Low Carbon Target
	Weight	t CO2e/\$M Sales	Weight	t CO2e/\$M Sales	Weight	t CO2e/\$M Sales		
Utilities	1.3%	2,594.4	3.2%	1,994.3	2.7%	493.9	30.1%	425.3%
Materials	3.3%	440.5	5.4%	834.6	4.0%	237.5	-47.2%	85.5%
Energy	8.5%	297.6	7.6%	323.9	5.9%	233.3	-8.1%	27.5%
Industrials	7.1%	90.9	10.4%	121.4	11.9%	41.0	-25.1%	122.0%
Consumer Staples	11.4%	50.4	9.6%	59.8	10.1%	48.5	-15.8%	3.8%
Telecommunication Services	4.2%	50.3	3.7%	47.1	4.1%	45.5	6.8%	10.5%
Consumer Discretionary	10.4%	31.7	12.5%	44.5	11.9%	29.5	-28.8%	7.6%
Information Technology	17.4%	27.7	14.0%	42.6	14.0%	33.5	-35.1%	-17.4%
Health Care	15.9%	21.7	12.0%	22.5	12.2%	18.9	-3.6%	14.9%
Financials	20.5%	13.2	21.7%	16.3	23.3%	8.7	-19.1%	51.7%
Overall	100%	128.0	100%	233.3	100%	61.0	-45.1%	109.7%

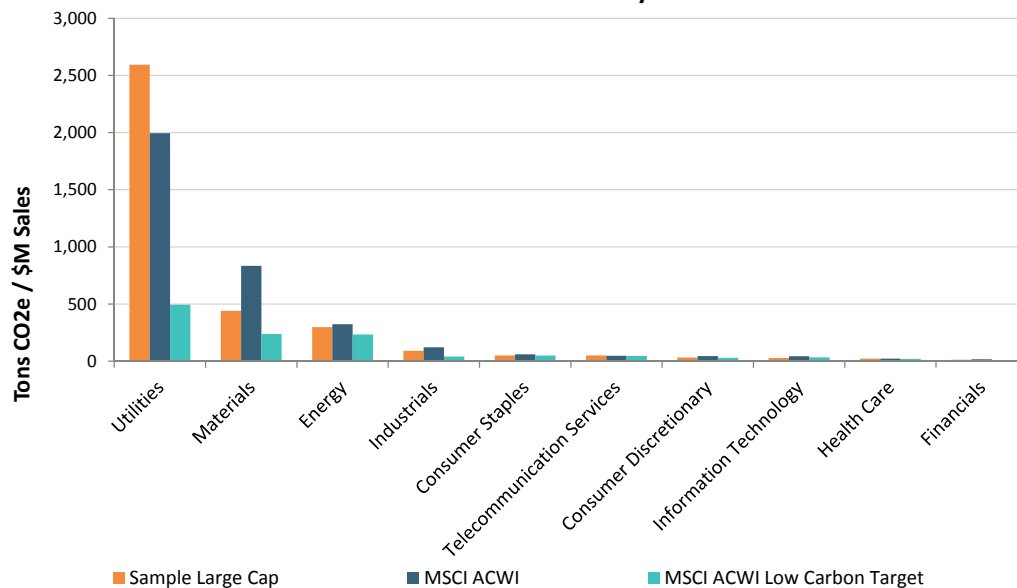
Key: 2,594.4 (red), 233.3 (teal), 0 (green)

Carbon Intensity Trend of Current Holdings



\*Reflects the most recently available data for each company on the date of running the report.

Sector Carbon Intensity



# Carbon Risk: Weighted Average Carbon Intensity

Carbon Intensity allows comparison of emissions across companies of different sizes and in different industries. At a company level, MSCI ESG Research calculates Carbon Intensity as carbon emissions per dollar of sales. The portfolio-level Weighted Average Carbon Intensity is the sum product of the constituent weights and intensities.

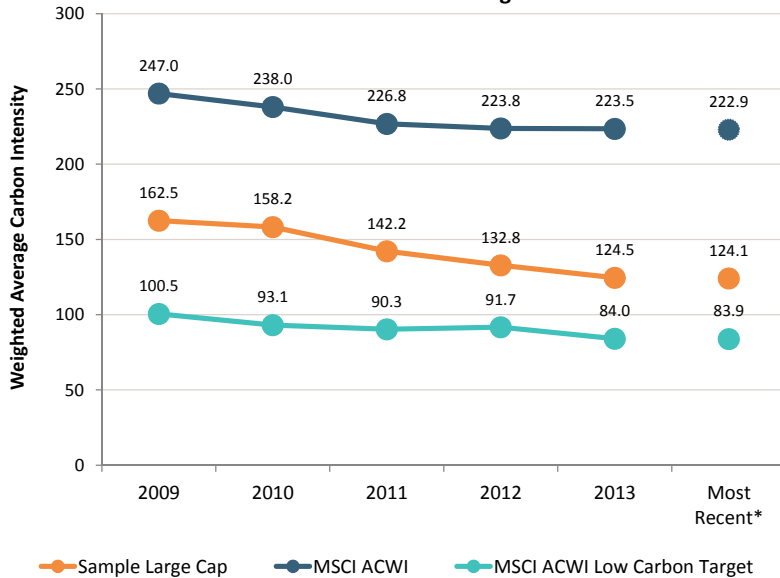
The timeline below compares the historical and most recent Weighted Average Carbon Intensity of the portfolio to the benchmarks based on the current constituents and weights of each. The table to the right shows sector weights and Weighted Average Carbon Intensity. And the column chart shows the composition by sector of the portfolio and benchmarks by market capitalization as well as by each sector's contribution to the Weighted Average Carbon Intensity.

The company tables on the following page show Carbon Intensity in two ways: 1) portfolio issuers with the highest Carbon Intensity, and 2) contribution of companies to the portfolio-level Weighted Average Carbon Intensity. The tables also indicate whether the emissions data is reported or estimated, and how each company performs on Carbon Risk Management relative to peers.

Weighted Average Carbon Intensity by Sector	Sample Large Cap	MSCI ACWI	MSCI ACWI Low Carbon Target	Sample Large Cap vs MSCI ACWI	Sample Large Cap vs MSCI ACWI Low Carbon Target
t CO2e / \$M Sales					
Comparison of t CO2e / \$M Sales					
Utilities	2,967.5	2,627.5	424.4	12.9%	599.2%
Materials	550.4	1,063.0	244.6	-48.2%	125.0%
Energy	399.4	491.3	504.6	-18.7%	-20.8%
Industrials	131.2	148.7	74.5	-11.7%	76.3%
Consumer Staples	55.3	60.1	51.6	-8.0%	7.2%
Telecommunication Services	54.8	51.7	49.9	5.9%	9.8%
Consumer Discretionary	30.1	47.1	29.9	-36.1%	0.6%
Information Technology	28.9	39.3	36.2	-26.4%	-20.0%
Health Care	27.8	29.5	27.5	-5.9%	1.0%
Financials	18.3	29.4	21.5	-37.8%	-15.2%
Overall	124.1	222.9	83.9	-44.3%	48.0%

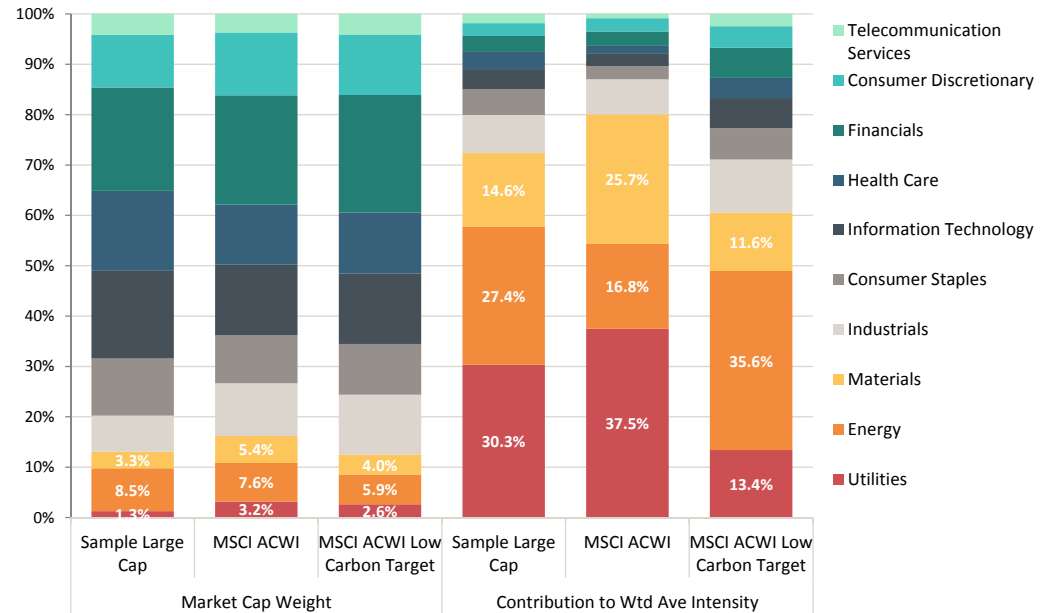


Weighted Average Carbon Intensity Trend of Current Holdings



\*Reflects the most recently available data for each company on the date of running the report.

Sector Weight vs Contribution to Weighted Average Carbon Intensity

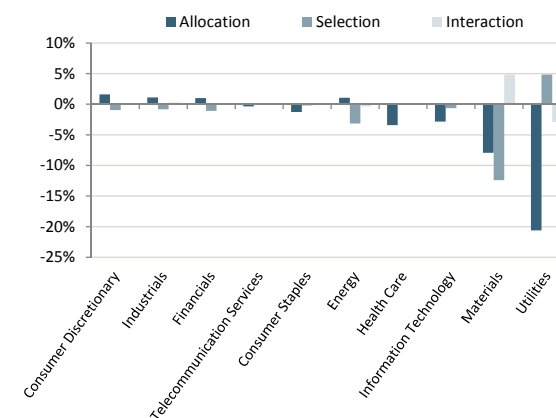


# Carbon Risk: Weighted Average Carbon Intensity - Attribution Analysis and Key Holdings

Sample Large Cap vs MSCI ACWI	Portfolio Weight	Active Weight*	Portfolio Wtd Ave Intensity	Benchmark Wtd Ave Intensity
Consumer Discretionary	10.4%	-2.0%	30.1	47.1
Industrials	7.1%	-3.3%	131.2	148.7
Financials	20.5%	-1.2%	18.3	29.4
Telecommunication Services	4.2%	0.5%	54.8	51.7
Consumer Staples	11.4%	1.8%	55.3	60.1
Energy	8.5%	0.9%	399.4	491.3
Health Care	15.9%	3.9%	27.8	29.5
Information Technology	17.4%	3.5%	28.9	39.3
Materials	3.3%	-2.1%	550.4	1,063.0
Utilities	1.3%	-1.9%	2,967.5	2,627.5
<b>Total</b>	<b>100%</b>	<b>0%</b>	<b>124.1</b>	<b>222.9</b>

t CO2e / \$M Sales

Absolute Attribution				Total	Percentage Attribution				Total
Sector	Allocation	Selection	Interaction		Sector	Allocation	Selection	Interaction	
Consumer Discretionary	3.6	-2.1	0.3	1.8	1.6%	-1.0%	0.2%	0.8%	
Industrials	2.4	-1.8	0.6	1.2	1.1%	-0.8%	0.3%	0.5%	
Financials	2.2	-2.4	0.1	0.0	1.0%	-1.1%	0.1%	0.0%	
Telecommunication Services	-0.8	0.1	0.0	-0.7	-0.4%	0.1%	0.0%	-0.3%	
Consumer Staples	-2.9	-0.5	-0.1	-3.4	-1.3%	-0.2%	0.0%	-1.5%	
Energy	2.4	-7.0	-0.8	-5.5	1.1%	-3.1%	-0.4%	-2.4%	
Health Care	-7.6	-0.2	-0.1	-7.9	-3.4%	-0.1%	0.0%	-3.5%	
Information Technology	-6.3	-1.4	-0.4	-8.1	-2.8%	-0.6%	-0.2%	-3.7%	
Materials	-17.7	-27.7	10.8	-34.6	-7.9%	-12.4%	4.8%	-15.5%	
Utilities	-45.9	10.8	-6.5	-41.6	-20.6%	4.8%	-2.9%	-18.7%	
<b>Total</b>	<b>-70.6</b>	<b>-32.2</b>	<b>4.0</b>	<b>-98.8</b>	<b>-31.7%</b>	<b>-14.5%</b>	<b>1.8%</b>	<b>-44.3%</b>	



Portfolio Issuers with Highest Carbon Intensity						Portfolio Weight	Active Weight*	Carbon Intensity	Contribution to Wtd Ave Carbon Intensity	Carbon Emissions Source	Carbon Risk Mgmt Relative to Industry
1	THE SOUTHERN COMPANY	Utilities	United States of America	0.18%	0.08%	5,970	8.89%	Reported	Average		
2	DUKE ENERGY CORPORATION	Utilities	United States of America	0.25%	0.12%	5,065	10.39%	Reported	Leader		
3	NEXTERA ENERGY, INC.	Utilities	United States of America	0.21%	0.10%	2,970	5.03%	Reported	Leader		
4	DOMINION RESOURCES, INC.	Utilities	United States of America	0.20%	0.09%	2,581	4.10%	Reported	Average		
5	THE WILLIAMS COMPANIES, INC.	Energy	United States of America	0.18%	0.08%	1,756	2.51%	Derived from Reported Data	Laggard		
6	PRAXAIR, INC.	Materials	United States of America	0.17%	0.08%	1,512	2.03%	Reported	Average		
7	CANADIAN NATURAL RESOURCES LIMITED	Energy	Canada	0.16%	0.07%	1,249	1.60%	Reported	Laggard		
8	LINDE AKTIENGESELLSCHAFT	Materials	Germany	0.17%	0.08%	1,178	1.63%	Reported	Average		
9	ANADARKO PETROLEUM CORPORATION	Energy	United States of America	0.20%	0.09%	1,033	1.65%	Reported	Average		
10	L'AIR LIQUIDE SOCIETE ANONYME POUR L'ET	Materials	France	0.21%	0.10%	1,006	1.73%	Reported	Average		
Top 10 Companies				1.93%			39.57%				

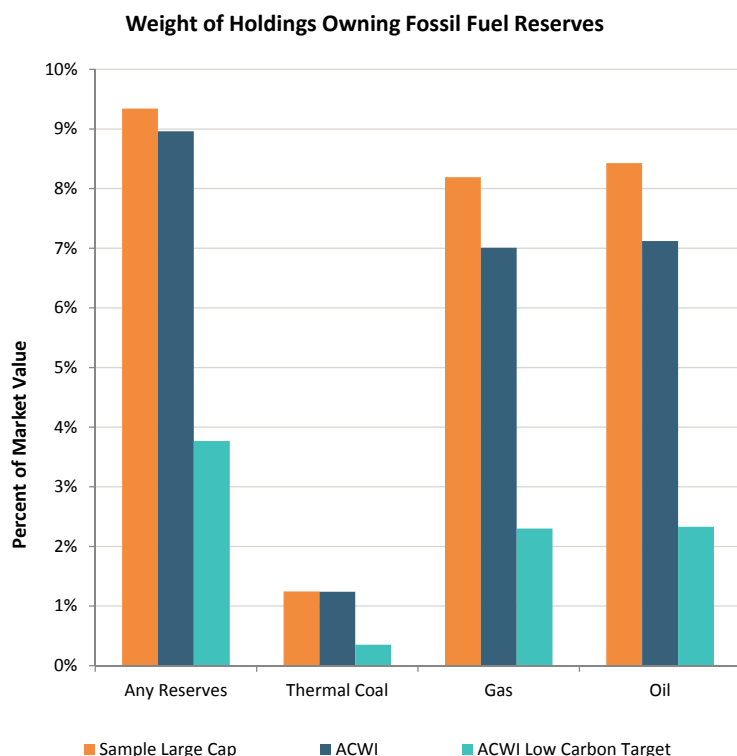
Largest Contributors to the Portfolio's Weighted Average Carbon Intensity						Portfolio Weight	Active Weight*	Carbon Intensity	Contribution to Wtd Ave Carbon Intensity	Carbon Emissions Source	Carbon Risk Mgmt Relative to Industry
1	DUKE ENERGY CORPORATION	Utilities	United States of America	0.25%	0.12%	5,065	10.39%	Reported	Leader		
2	THE SOUTHERN COMPANY	Utilities	United States of America	0.18%	0.08%	5,970	8.89%	Reported	Average		
3	EXXON MOBIL CORPORATION	Energy	United States of America	1.73%	0.79%	379	5.30%	Reported	Average		
4	NEXTERA ENERGY, INC.	Utilities	United States of America	0.21%	0.10%	2,970	5.03%	Reported	Leader		
5	DOMINION RESOURCES, INC.	Utilities	United States of America	0.20%	0.09%	2,581	4.10%	Reported	Average		
6	KINDER MORGAN, INC.	Energy	United States of America	0.36%	0.16%	994	2.89%	Estimated - Does not Disclose	Laggard		
7	THE WILLIAMS COMPANIES, INC.	Energy	United States of America	0.18%	0.08%	1,756	2.51%	Derived from Reported Data	Laggard		
8	CHEVRON CORPORATION	Energy	United States of America	0.94%	0.42%	291	2.19%	Reported	Average		
9	PRAXAIR, INC.	Materials	United States of America	0.17%	0.08%	1,512	2.03%	Reported	Average		
10	UNION PACIFIC CORPORATION	Industrials	United States of America	0.43%	0.20%	544	1.89%	Reported	Average		
Top 10 Contributors				4.65%			45.23%				

\*Security weight in Sample Large Cap relative to security weight in MSCI ACWI

The chart below shows the weight of the portfolio and benchmarks made up by companies that own thermal coal, oil and gas reserves. The table to the right shows the reserves for which an investor would be responsible based on comparable dollar investments in the portfolio and benchmarks.

The tables indicate the largest contributors to portfolio reserves in Thermal Coal, Gas, and Oil, and whether these companies have unconventional sources of reserves such as oil sands, shale oil, and shale gas.

Fossil Fuel Reserves	Thermal Coal (Tons)	Gas (MMBOE)	Oil (MMBOE)
Based on investment of: \$1,000,000,000			
Sample Large Cap	434,945	5.7	3.4
MSCI ACWI	853,888	4.3	3.4
MSCI ACWI Low Carbon Target	188,887	0.5	0.5



Largest Contributors to Portfolio Thermal Coal Reserves					Contribution to Portfolio Thermal Coal Reserves
Company	Sector	Country	Portfolio Weight	Thermal Coal Reserves (Tons)	
1 BHP BILLITON PLC	Materials	United Kingdom	0.22%	2,841,513,200	31.54%
2 BHP BILLITON LIMITED	Materials	Australia	0.34%	2,841,513,200	30.81%
3 GLENCORE PLC	Materials	Switzerland	0.24%	2,473,454,440	23.54%
4 RIO TINTO PLC	Materials	United Kingdom	0.27%	1,041,630,000	10.29%
5 WESFARMERS LIMITED	Consumer Staples	Australia	0.18%	346,000,000	3.82%
Top 5 Contributors			1.24%		100.00%

Largest Contributors to Portfolio Gas Reserves					Contribution to Portfolio Gas Reserves	Unconventional Sources
Company	Sector	Country	Portfolio Weight	Gas Reserves (MMBOE)		
1 GAZPROM OAO	Energy	Russia	0.16%	137,140	58.12%	
2 EXXON MOBIL CORPORATI	Energy	United States of America	1.73%	11,556	9.86%	🚩
3 ROYAL DUTCH SHELL PLC	Energy	Netherlands	0.92%	6,719	5.70%	🚩
4 BP P.L.C.	Energy	United Kingdom	0.60%	7,449	4.79%	🚩
5 TOTAL SA	Energy	France	0.53%	5,598	4.20%	🚩
Top 5 Contributors			3.95%		82.68%	

Largest Contributors to Portfolio Oil Reserves					Contribution to Portfolio Oil Reserves	Unconventional Sources
Company	Sector	Country	Portfolio Weight	Oil Reserves (MMBOE)		
1 EXXON MOBIL CORPORATI	Energy	United States of America	1.73%	13,713	19.85%	🚩
2 BP P.L.C.	Energy	United Kingdom	0.60%	9,816	10.71%	🚩
3 GAZPROM OAO	Energy	Russia	0.16%	14,274	10.26%	
4 CHEVRON CORPORATION	Energy	United States of America	0.94%	6,249	8.95%	🚩
5 ROYAL DUTCH SHELL PLC	Energy	Netherlands	0.92%	6,130	8.82%	🚩
Top 5 Contributors			4.36%		58.58%	



# Stranded Assets: Potential Emissions from Fossil Fuel Reserves

Different fuels have different carbon content and different net calorific value. To make reserves of these fuels comparable in terms of contribution to greenhouse gas emissions, we calculate the potential emissions of the fuels and express these as tons of CO2 using the Potsdam Institute methodology.

In that the total potential emissions of existing known fossil fuel reserves vastly exceed the limit of emissions that scientific consensus indicates must be met in order to manage climate change, many of these reserves may not be usable. If this is the case, the market values of companies holding reserves may be overstated because they are based in part on the present value of these reserves assuming that they can be fully utilized.

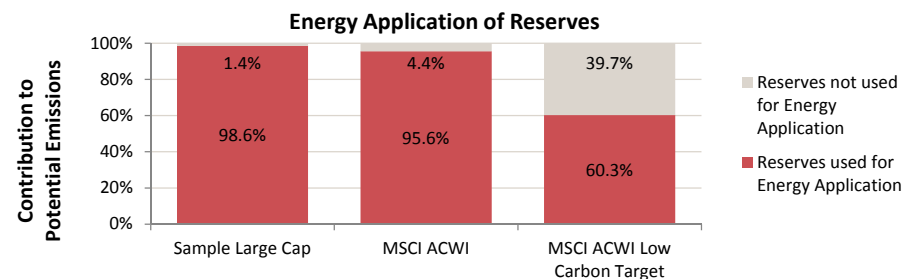
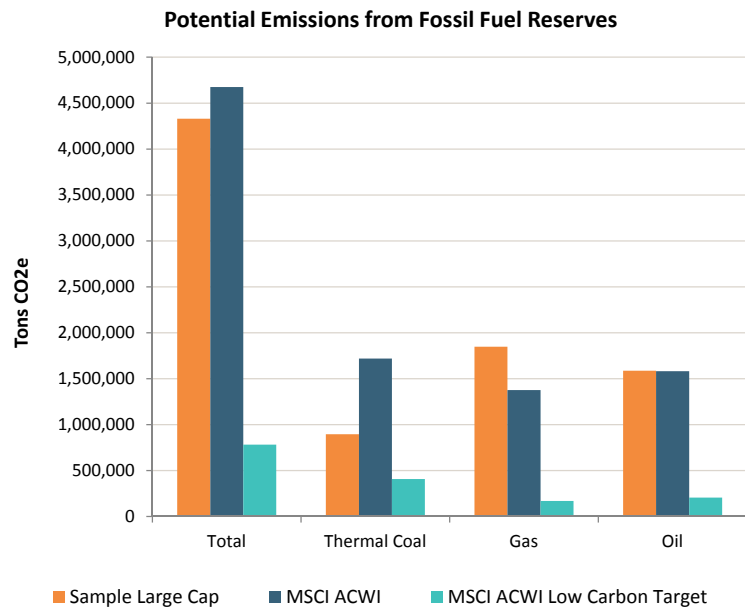
The tables indicate the companies with the most potential emissions, the largest contributors to portfolio potential emissions, and whether these companies have unconventional sources of reserves. The charts show the potential emissions, by reserve type, for the portfolio and benchmark, as well as the contribution to potential emissions coming from reserves used for energy applications.

Potential Emissions from Reserves	Thermal Coal (t CO2e)	Gas (t CO2e)	Oil (t CO2e)	Total (t CO2e)
Based on investment of: \$1,000,000,000				
Sample Large Cap	895,487	1,848,082	1,586,626	4,330,195
MSCI ACWI	1,718,520	1,374,963	1,581,416	4,674,898
MSCI ACWI Low Carbon Target	407,854	168,836	204,410	781,100

Contribution to Potential Emissions	Thermal Coal	Gas	Oil	Total
Sample Large Cap	20.7%	42.7%	36.6%	100%
MSCI ACWI	36.8%	29.4%	33.8%	100%
MSCI ACWI Low Carbon Target	52.2%	21.6%	26.2%	100%

Portfolio Companies with Highest Potential Emissions				Potential Emissions (Mt CO2e)	Contribution to Portfolio Potential Emissions	Unconventional Sources
Company	Sector	Country	Portfolio Weight			
1 GAZPROM OAO	Energy	Russia	0.16%	50,416	28.18%	
2 EXXON MOBIL CORPORATI	Energy	United States of America	1.73%	10,458	11.77%	🚩
3 BHP BILLITON LIMITED	Materials	Australia	0.34%	6,973	7.60%	🚩
4 BHP BILLITON PLC	Materials	United Kingdom	0.22%	6,973	7.77%	🚩
5 BP P.L.C.	Energy	United Kingdom	0.60%	6,596	5.60%	🚩
Top 5 Companies			3.06%		60.92%	

Largest Contributors to Portfolio Potential Emissions				Potential Emissions (Mt CO2e)	Contribution to Portfolio Potential Emissions	Unconventional Sources
Company	Sector	Country	Portfolio Weight			
1 GAZPROM OAO	Energy	Russia	0.16%	50,416	28.18%	
2 EXXON MOBIL CORPORATI	Energy	United States of America	1.73%	10,458	11.77%	🚩
3 BHP BILLITON PLC	Materials	United Kingdom	0.22%	6,973	7.77%	🚩
4 BHP BILLITON LIMITED	Materials	Australia	0.34%	6,973	7.60%	🚩
5 ROYAL DUTCH SHELL PLC	Energy	Netherlands	0.92%	5,189	5.81%	🚩
Top 5 Contributors			3.38%		61.13%	



Certain fuels such as coal, oil sands, shale oil and shale gas are arguably more exposed to stranded assets risk as they have a higher carbon content than other types of oil and gas. Coal is by far the most carbon intensive fuel type, emitting roughly twice as much carbon emissions per kilowatt hour (kwh) than natural 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 – this is the case with oil sands, which have been targeted as being particularly climate-unfriendly.

With regards to coal, the carbon stranded assets debate has focused on thermal coal, which is mainly used in power generation. While both thermal and metallurgical coal have a high carbon content, metallurgical, or coking coal is primarily used in steel making and has few substitutes, so many investors believe that while thermal coal is particularly vulnerable to stranding, there will still be a future for metallurgical coal.

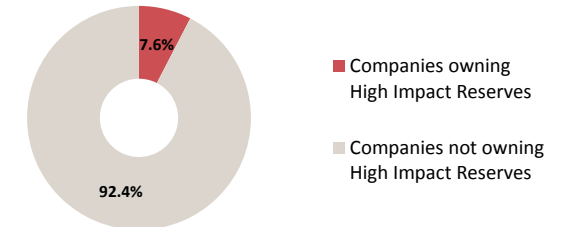
Potential Emissions from High Impact Reserves	Thermal Coal	Oil Sands	Shale Oil or Shale Gas	Sum High Impact	Other (t CO2e)
Based on investment of: \$1,000,000,000					
Sample Large Cap	895,487	517,426	264,800	1,677,713	2,652,482
MSCI ACWI	1,718,520	426,159	387,959	2,532,638	2,142,260
MSCI ACWI Low Carbon Target	407,854	16,956	93,039	517,849	263,251

Contribution to Potential Emissions	Thermal Coal	Oil Sands	Shale Oil or Shale Gas	Sum High Impact	Other Reserves
Sample Large Cap	20.7%	11.9%	6.1%	38.7%	61.3%
MSCI ACWI	36.8%	9.1%	8.3%	54.2%	45.8%
MSCI ACWI Low Carbon Target	52.2%	2.2%	11.9%	66.3%	33.7%

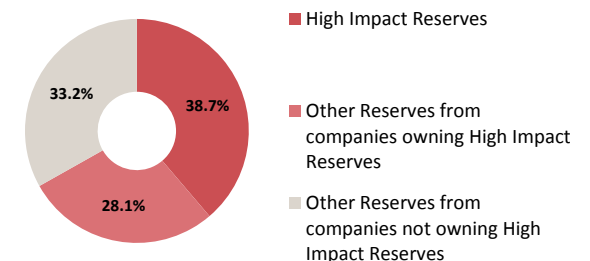
Largest Portfolio Positions Owning High Impact Reserves						
Company	Sector	Country	Portfolio Weight	Potential Emissions (Mt CO2e)	Potential Emissions from High Impact Reserves (Mt CO2e)	High Impact Reserve Type*
1 EXXON MOBIL CORPORATION	Energy	United States of America	1.73%	10,458	6,674	OS and SO/SG
2 CHEVRON CORPORATION	Energy	United States of America	0.94%	4,356	454	Oil Sands
3 ROYAL DUTCH SHELL PLC	Energy	Netherlands	0.92%	5,189	1,348	Oil Sands
4 BP P.L.C.	Energy	United Kingdom	0.60%	6,596	106	Oil Sands
5 TOTAL SA	Energy	France	0.53%	4,275	705	Oil Sands
Top 5 Companies			4.72%			

\*Key TC = Thermal Coal  
OS = Oil Sands  
SO/SG = Shale Oil or Gas

Portfolio Weight from Companies Owning High Impact Reserves



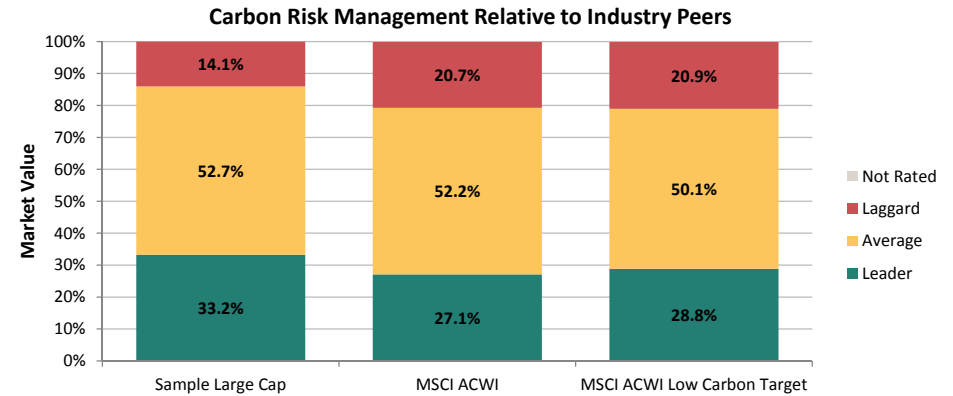
Contribution to Portfolio Potential Emissions from Companies Owning High Impact Reserves



Highest Potential Emissions from High Impact Reserves						
Company	Sector	Country	Portfolio Weight	Potential Emissions (Mt CO2e)	Potential Emissions from High Impact Reserves (Mt CO2e)	High Impact Reserve Type*
1 EXXON MOBIL CORPORATION	Energy	United States of America	1.73%	10,458	6,674	OS and SO/SG
2 BHP BILLITON LIMITED	Materials	Australia	0.34%	6,973	6,099	Thermal Coal
3 BHP BILLITON PLC	Materials	United Kingdom	0.22%	6,973	6,099	Thermal Coal
4 GLENCORE PLC	Materials	Switzerland	0.24%	4,704	4,630	Thermal Coal
5 SUNCOR ENERGY INC.	Energy	Canada	0.20%	2,427	2,327	Oil Sands
Top 5 Companies			2.73%			

As part of the MSCI ESG Ratings model, we analyze a number of Key Issues, including Carbon Emissions. Assessment data for this issue is available for all companies for which we have determined that carbon presents material risks as well as for all companies on the MSCI World Index.

Assessment of carbon management includes a look at emissions intensity trend and performance relative to industry peers as well as the company's reduction targets (if any) and mitigation efforts. The chart to the right shows the percentage of companies in the portfolio with leading, lagging, and average efforts to manage carbon emissions compared to their industry peers, with the same percentages also shown for the benchmarks.



Largest Positions in Portfolio				10 (Best) - 0 (Worst)		Carbon Risk Management Relative to Industry	Carbon Intensity
Company	Sector	Country	Portfolio Weight	Active Weight*	Carbon Risk Management Score		
1 APPLE INC.	Info Tech	United States of America	3.59%	1.63%	2.3	Laggard	2.0
2 MICROSOFT CORPORATION	Info Tech	United States of America	1.75%	0.79%	6.7	Leader	16.9
3 EXXON MOBIL CORPORATION	Energy	United States of America	1.73%	0.79%	5.5	Average	379.2
4 GOOGLE INC.	Info Tech	United States of America	1.47%	0.67%	6.7	Leader	21.5
5 JOHNSON & JOHNSON	Health Care	United States of America	1.36%	0.62%	7.0	Average	16.8

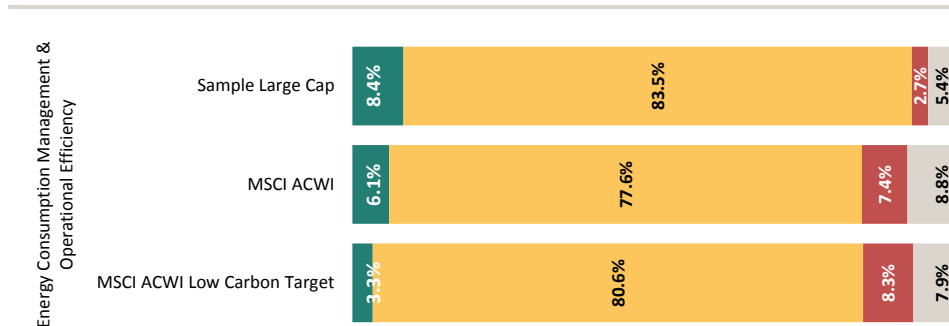
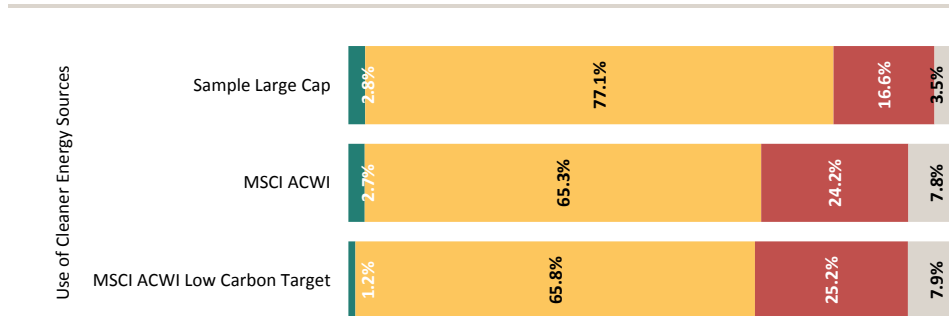
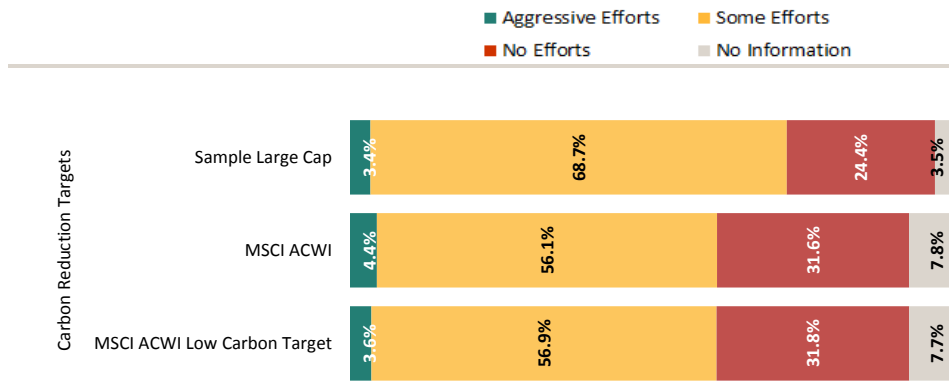
Lowest Portfolio Carbon Risk Management Scores				Carbon Risk Management Score	Carbon Risk Management Relative to Industry	Carbon Intensity	
Company	Sector	Country	Portfolio Weight	Active Weight*			
1 DANAHER CORPORATION	Industrials	United States of America	0.26%	0.12%	1.0	Laggard	110.5
2 KINDER MORGAN, INC.	Energy	United States of America	0.36%	0.16%	1.7	Laggard	994.1
3 THE WILLIAMS COMPANIES, I	Energy	United States of America	0.18%	0.08%	1.7	Laggard	1,756.1
4 CANADIAN NATURAL RESOURCE	Energy	Canada	0.16%	0.07%	2.2	Laggard	1,249.3
5 OCCIDENTAL PETROLEUM CORP	Energy	United States of America	0.28%	0.13%	2.7	Laggard	720.7

Highest Portfolio Carbon Risk Management Scores				Carbon Risk Management Score	Carbon Risk Management Relative to Industry	Carbon Intensity	
Company	Sector	Country	Portfolio Weight	Active Weight*			
1 NEXTERA ENERGY, INC.	Utilities	United States of America	0.21%	0.10%	8.8	Leader	2,969.6
2 BASF SE	Materials	Germany	0.42%	0.19%	8.3	Leader	224.7
3 NATIONAL GRID PLC	Utilities	United Kingdom	0.25%	0.11%	7.6	Leader	457.9
4 GENERAL ELECTRIC COMPANY	Industrials	United States of America	1.31%	0.59%	7.3	Leader	34.1
5 BG GROUP PLC	Energy	United Kingdom	0.29%	0.13%	7.3	Leader	343.7

\*Security weight in Sample Large Cap relative to security weight in MSCI ACWI

# Carbon Risk Management: Energy 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. We present this information for the portfolio and benchmarks, as well as the largest 5 portfolio positions with aggressive efforts and the largest 5 portfolio positions with no efforts.



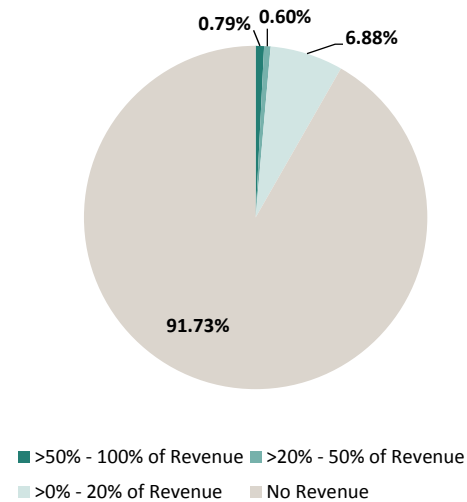
	Company	Sector	Country	Portfolio Weight	
Carbon Reduction Targets	<b>Largest Positions with Aggressive Efforts</b>				
	1	GENERAL ELECTRIC COMPANY	Industrials	United States of America	1.31%
	2	BASF SE	Materials	Germany	0.42%
	3	BHP BILLITON LIMITED	Materials	Australia	0.34%
	4	E. I. DU PONT DE NEMOURS	Materials	United States of America	0.30%
	5	ENI S.P.A.	Energy	Italy	0.22%
	<b>Largest Positions with No Efforts</b>				
	1	APPLE INC.	Info Tech	United States of America	3.59%
	2	ROYAL DUTCH SHELL PLC	Energy	Netherlands	0.92%
	3	TOYOTA MOTOR CORPORATION	Consumer Disc	Japan	0.89%
4	BERKSHIRE HATHAWAY INC.	Consumer Disc	United States of America	0.79%	
5	AMAZON.COM, INC.	Consumer Disc	United States of America	0.78%	
Use of Cleaner Energy Sources	<b>Largest Positions with Aggressive Efforts</b>				
	1	ROYAL DUTCH SHELL PLC	Energy	Netherlands	0.92%
	2	BP P.L.C.	Energy	United Kingdom	0.60%
	3	TOTAL SA	Energy	France	0.53%
	4	BG GROUP PLC	Energy	United Kingdom	0.29%
	5	ENI S.P.A.	Energy	Italy	0.22%
	<b>Largest Positions with No Efforts</b>				
	1	BANK OF AMERICA CORPORATI	Financials	United States of America	0.83%
	2	AMAZON.COM, INC.	Consumer Disc	United States of America	0.78%
	3	GILEAD SCIENCES, INC.	Health Care	United States of America	0.78%
4	THE HOME DEPOT, INC.	Consumer Disc	United States of America	0.69%	
5	COMCAST CORPORATION	Consumer Disc	United States of America	0.69%	
Energy Consumption Management & Operational Efficiency	<b>Largest Positions with Aggressive Efforts</b>				
	1	NESTLE S.A.	Consumer Staples	Switzerland	1.18%
	2	CHEVRON CORPORATION	Energy	United States of America	0.94%
	3	ROYAL DUTCH SHELL PLC	Energy	Netherlands	0.92%
	4	BERKSHIRE HATHAWAY INC.	Financials	United States of America	0.79%
	5	BP P.L.C.	Energy	United Kingdom	0.60%
	<b>Largest Positions with No Efforts</b>				
	1	AMERICAN INTERNATIONAL GR	Financials	United States of America	0.39%
	2	KINDER MORGAN, INC.	Energy	United States of America	0.36%
	3	THE PRICELINE GROUP INC.	Consumer Disc	United States of America	0.30%
4	DANAHER CORPORATION	Industrials	United States of America	0.26%	
5	EOG RESOURCES, INC.	Energy	United States of America	0.23%	

MSCI ESG Research analyzes companies involved in clean technology solutions based on their sales in the following categories: Alternative Energy, Energy Efficiency, Green Building, Pollution Prevention, and Sustainable Water. The table and chart show the percent of the portfolio and benchmarks that are represented by companies with sales from these activities. Also included are the top ten holdings of the portfolio based on the estimated percent of revenue from these activities.

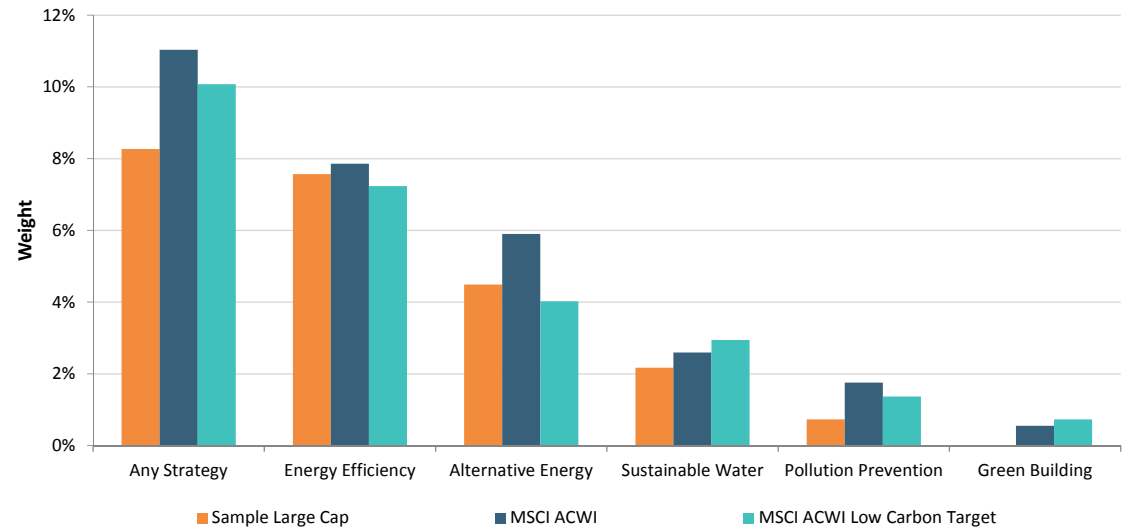
Weight of Companies Offering Clean Technology Solutions				
		Sample Large Cap	MSCI ACWI	Low Carbon Target
Theme	Alternative Energy	4.5%	5.9%	4.0%
	Energy Efficiency	7.6%	7.9%	7.2%
	Green Building	0.0%	0.6%	0.7%
	Pollution Prevention	0.7%	1.8%	1.4%
	Sustainable Water	2.2%	2.6%	2.9%
	<b>Any Strategy</b>	<b>8.3%</b>	<b>11.0%</b>	<b>10.1%</b>
Estimated Revenue Generated	>50% - 100%	0.8%	1.0%	1.3%
	>20% - 50%	0.6%	1.4%	1.7%
	>0% - 20%	6.9%	8.6%	7.1%
	<b>Any Revenue</b>	<b>8.3%</b>	<b>11.0%</b>	<b>10.1%</b>

Top 10 by Estimated Percent of Revenue Generated from Clean Technology Solutions						
Company	Sector	Country	Portfolio Weight	Clean Technology Solution	Revenue from Clean Tech	
1 SCHNEIDER ELECTRIC SE	Industrials	France	0.19%	Energy Efficiency	75%	
2 EATON CORPORATION PUBLIC L	Industrials	Ireland	0.16%	Energy Efficiency	63%	
3 NEXTERA ENERGY, INC.	Utilities	United States of America	0.21%	Alternative Energy	59%	
4 ABB LTD	Industrials	Switzerland	0.22%	Energy Efficiency	51%	
5 EMERSON ELECTRIC CO.	Industrials	United States of America	0.20%	Energy Efficiency	38%	
6 SIEMENS AKTIENGESELLSCHAFT	Industrials	Germany	0.41%	Energy Efficiency	37%	
7 SAMSUNG ELECTRONICS CO.,LT	Info Tech	South Korea	0.74%	Energy Efficiency	20%	
8 L'AIR LIQUIDE SOCIETE ANON	Materials	France	0.21%	Alternative Energy	15%	
9 HONEYWELL INTERNATIONAL IN	Industrials	United States of America	0.37%	Energy Efficiency	13%	
10 GENERAL ELECTRIC COMPANY	Industrials	United States of America	1.31%	Energy Efficiency	13%	

Portfolio Weight Grouped by Estimated Revenue Generated from Clean Technology Solutions



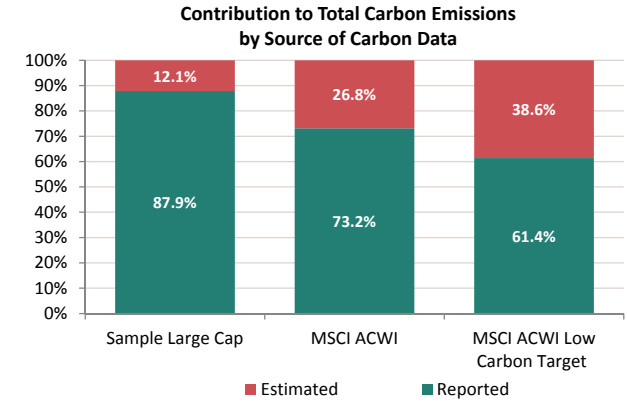
Weight of Companies Offering Clean Technology Solutions



# Appendix A - Data Availability

MSCI ESG CarbonMetrics evaluates approximately 8,500 companies, covering the MSCI ACWI IMI. When reported data is not available, Scope 1 & 2 carbon emissions are estimated using MSCI's proprietary carbon estimation model.

Availability of Carbon Emissions Data	Number of Securities				Percent of Securities			Percent of Market Value		
	Total	Reported	Estimated	No Data	Reported	Estimated	No Data	Reported	Estimated	No Data
Sample Large Cap	249	222	27	0	89.2%	10.8%	0.0%	91.6%	8.4%	0.0%
MSCI ACWI	2,428	1467	949	12	60.4%	39.1%	0.5%	80.8%	19.0%	0.2%
MSCI ACWI Low Carbon Target	1,636	998	635	3	61.0%	38.8%	0.2%	80.4%	19.5%	0.1%



Portfolio Issuers with Highest Carbon Emissions (Based on Estimated Emissions Only)				Portfolio Weight	Carbon Emissions (t CO2e)	Contribution to Portfolio Emissions	Carbon Emissions Source	Carbon Risk Mgmt Relative to Industry
1	KINDER MORGAN, INC.	Energy	United States of America	0.36%	13,983,807	0.69%	Estimated - Does not Disclose	Laggard
2	HON HAI PRECISION INDUSTRY CO., LTD.	Info Tech	Taiwan	0.19%	6,500,300	0.33%	Estimated - Does not Disclose	Laggard
3	SOFTBANK CORP.	Telecomm	Japan	0.27%	2,983,661	0.14%	Estimated - Does not Disclose	Leader
4	AMERICA MOVIL S.A.B. DE C.V.	Telecomm	Mexico	0.16%	2,784,785	0.12%	Estimated - Does not Disclose	Laggard
5	DANAHER CORPORATION	Industrials	United States of America	0.26%	2,112,324	0.11%	Estimated - Does not Disclose	Laggard
6	COMCAST CORPORATION	Consumer Disc	United States of America	0.69%	1,185,429	0.07%	Estimated - Does not Disclose	Average
7	INDUSTRIAL AND COMMERCIAL BANK OF CHINA L	Financials	China	0.30%	1,008,404	0.01%	Estimated - Does not Disclose	Laggard
8	GENERAL DYNAMICS CORPORATION	Industrials	United States of America	0.19%	946,623	0.05%	Estimated - Does not Disclose	Laggard
9	CHINA CONSTRUCTION BANK CORPORATION	Financials	China	0.33%	844,669	0.01%	Estimated - Does not Disclose	Laggard
10	BANK OF CHINA LIMITED	Financials	China	0.25%	712,909	0.01%	Estimated - Does not Disclose	Laggard
Top 10 Companies				3.00%		1.55%		

Largest Contributors to Portfolio Emissions (Based on Estimated Emissions Only)				Portfolio Weight	Carbon Emissions	Contribution to Portfolio Emissions	Carbon Emissions Source	Carbon Risk Mgmt Relative to Industry
1	KINDER MORGAN, INC.	Energy	United States of America	0.36%	13,983,807	0.69%	Estimated - Does not Disclose	Laggard
2	HON HAI PRECISION INDUSTRY CO., LTD.	Info Tech	Taiwan	0.19%	6,500,300	0.33%	Estimated - Does not Disclose	Laggard
3	SOFTBANK CORP.	Telecomm	Japan	0.27%	2,983,661	0.14%	Estimated - Does not Disclose	Leader
4	AMERICA MOVIL S.A.B. DE C.V.	Telecomm	Mexico	0.16%	2,784,785	0.12%	Estimated - Does not Disclose	Laggard
5	DANAHER CORPORATION	Industrials	United States of America	0.26%	2,112,324	0.11%	Estimated - Does not Disclose	Laggard
6	COMCAST CORPORATION	Consumer Disc	United States of America	0.69%	1,185,429	0.07%	Estimated - Does not Disclose	Average
7	GENERAL DYNAMICS CORPORATION	Industrials	United States of America	0.19%	946,623	0.05%	Estimated - Does not Disclose	Laggard
8	IMPERIAL TOBACCO GROUP PLC	Consumer Staples	United Kingdom	0.23%	636,999	0.04%	Estimated - Does not Disclose	Average
9	TENCENT HOLDINGS LIMITED	Info Tech	China	0.50%	553,887	0.02%	Estimated - Does not Disclose	Laggard
10	MITSUBISHI UFJ FINANCIAL GROUP, INC.	Financials	Japan	0.44%	328,507	0.02%	Estimated - Does not Disclose	Average
Top 10 Companies				3.29%		1.59%		

	Relative Carbon Footprint	Total Carbon Footprint	Carbon Efficiency	Carbon Risk Exposure
Metric	Portfolio Carbon Emissions per \$M Invested	Portfolio Carbon Emissions	Portfolio Carbon Intensity	Weighted Average Carbon Intensity
Unit	tons of CO2e / \$M invested	tons of CO2e	tons of CO2e / \$M sales	tons of CO2e / \$M sales
Question Answered	<i>What is my portfolio's <u>relative carbon footprint</u> per \$M invested?</i>	<i>What is my portfolio's <u>total carbon footprint</u>?</i>	<i>How <u>efficient</u> is my portfolio in terms of total carbon emissions per unit of output?</i>	<i>What is my portfolio's <u>exposure</u> to potential carbon-related market and regulatory risks?</i>
Description	<i>Normalized measure of a portfolio's contribution to climate change that enables comparisons with a benchmark, between multiple portfolios, and over time, regardless of portfolio size.</i>	<i>Measures the carbon footprint of a portfolio – i.e. the total carbon emissions for which an equity portfolio is responsible – by summing up the proportionate carbon emissions of portfolio companies based on the investor's ownership share.</i>	<i>Expresses the carbon efficiency of the portfolio and allows investors to measure how much carbon emissions per dollar of sales are generated by portfolio companies. This metric adjusts for company size and is a more accurate measurement of the efficiency of output rather than a portfolio's absolute footprint.</i>	<i>Since companies with higher carbon intensity are likely to face more exposure to carbon related market and regulatory risks, this metric indicates a portfolio's exposure to potential climate change-related risks relative to other portfolios or a benchmark. Agnostic to ownership share, it also facilitates comparison with non-equity asset classes.</i>
Use Cases	✓ Report on relative carbon footprint	✓ Report on overall carbon footprint	✓ Report on carbon efficiency	✓ Report a proxy for carbon intensity across asset classes
	✓ Track carbon footprint over time and assist in setting reduction targets	✓ Track carbon footprint over time and assist in setting reduction targets	✓ Track carbon efficiency over time and assist in setting reduction targets	✓ Track carbon exposure over time and assist in setting reduction targets
	✓ Compare carbon footprint to a benchmark or other portfolios		✓ Compare carbon efficiency to a benchmark or other portfolios	✓ Compare carbon exposure to a benchmark or other portfolios
	✓ Identify largest contributors to carbon footprint through decomposition / attribution	✓ Identify largest contributors to carbon footprint through decomposition / attribution		✓ Identify most carbon intensive assets through decomposition / attribution analysis
	✓ Help inform strategies to tilt portfolio toward lower carbon footprint		✓ Help inform strategies to tilt portfolio toward higher carbon efficiency	✓ Help inform strategies to tilt portfolio toward a lower carbon exposure

## Carbon Emissions

To calculate the portfolio carbon emissions, we sum up all the emissions in the portfolio based on the investor's ownership share. The metric can also be expressed as per dollar invested.

$$\sum_n^i \frac{\$ investment_i}{Issuer's full mcap_i} * Issuer's emissions_i$$

## Carbon Intensity

Carbon intensity is the ratio of portfolio carbon emissions normalized by the investor's claims on sales.

$$\frac{\sum_n^i \frac{\$ investment_i}{Issuer's full mcap_i} * Issuer's emissions_i}{\sum_n^i \frac{\$ investment_i}{Issuer's full mcap_i} * Issuer's sales_i}$$

## Weighted Average Carbon Intensity

The Weighted Average Carbon Intensity is the sum product of the portfolio weights and Carbon Intensities.

$$\sum_n^i portfolio\ weight_i * Issuer's\ carbon\ intensity_i$$

Where issuer Carbon Intensity equals-

$$\frac{issuer's\ carbon\ emissions}{issuer's\ total\ sales}$$

## Background on Greenhouse Gas Emissions

Greenhouse gas emissions are classified as per the Greenhouse Gas Protocol and are grouped in three categories known as Scope 1, Scope 2 and Scope 3.

- Scope 1 GHG emissions are those directly occurring "from sources that are owned or controlled by the institution, including: on-campus stationary combustion of fossil fuels; mobile combustion of fossil fuels by institution owned/controlled vehicles; and "fugitive" emissions. Fugitive emissions result from intentional or unintentional releases of GHGs, including the leakage of hydrofluorocarbons (HFCs) from refrigeration and air conditioning equipment as well as the release of CH4 from institution-owned farm animals."
- Scope 2 emissions are "indirect emissions generated in the production of electricity consumed by the institution."
- Scope 3 emissions are all the other indirect emissions that are "a consequence of the activities of the institution, but occur from sources not owned or controlled by the institution" such as commuting, , waste disposal; embodied emissions from extraction, production, and transportation of purchased goods; outsourced activities; contractor-owned vehicles; and line loss from electricity transmission and distribution".

The greenhouse gases included in the GHG emissions are the 6 gases mandated by the Kyoto Protocol , given here below with global warming potential coefficient (GWP):

- Carbon dioxide (CO2) GWP: 1
- Methane (CH4) GWP: 21
- Nitrous oxide (N2O) GWP: 310
- Hydrofluorocarbons (HFCs) GWP: GWP: 150 – 11,700
- Perfluorocarbons (PFCs) GWP: 6500 – 9,200
- Sulphur hexafluoride (SF6) GWP: 23,900

United Nations Framework Convention on Climate Change (see [http://unfccc.int/kyoto\\_protocol/items/3145.php](http://unfccc.int/kyoto_protocol/items/3145.php))

Continued on next page-



### Estimating Carbon Emissions

We estimate Direct and Indirect emissions (Scope 1+2). While we do report Scope 3 emissions where available, we do not estimate Scope 3 because the definitions of which emissions should or should not be included in Scope 3 are not well defined or consistently calculated by companies. Also, these emissions are not fully within the company's control.

When there is no reported data, MSCI uses one of three models. We start with the Company Specific Intensity Model, which is based either on emissions data previously reported by the particular company or in the case of electric utilities, on the fuel mix the company uses for electricity generation (e.g. coal, natural gas, hydro), and therefore reflects the specifics of the businesses that the company is in and its own production processes. If the company does not report, we use the Global Industry Classification Standard<sup>11</sup> (GICS) Sub-Industry Model, which is more generalized but is based on our own emissions database.

In order to refine these models, we built a robust data set of reported emissions for the years 2008 to 2012 for companies in our research universe (reported data on about 1900 global companies). Lastly, for those companies that did not report data and whose GICS Sub-Industry was not represented in our data set, we used the Economic Input-Output Life-Cycle Assessment Model, a generalized model based on Standard Industrial Classification (SIC) codes.

<sup>11</sup> The Global Industry Classification Standard (GICS<sup>®</sup>) was developed by MSCI and Standard & Poor's. For more information, please see <http://www.msci.com/products/indices/sector/gics/>

### Carbon Emissions Source

In this report, we indicate the source of emissions data as follows:

- **Reported:** Reported by the company in documents or website, CDP, or regulatory databases.
- **Derived from Reported:** For carbon footprint analysis, we focus on Scope 1+2 emissions. In cases where the company discloses only Scope 1 emissions (usually the larger of the two scopes), we estimate Scope 2, so that the total Scope 1+2 is derived from reported data.
- **Estimated - Does Not Disclose:** In the case of the MSCI ACWI Index, we research all companies and estimate emissions when the company does not disclose. We can affirmatively state that the company did not disclose at the time the data was collected.
- **Estimated:** For companies beyond the MSCI ACWI Index, we have researched all companies where Carbon Emissions are a Key Issue in the ESG Rating model and have included other sources such as CDP but otherwise have estimated emissions. For more information, see Carbon Estimation Methodology on ESG Manager.

### Carbon Risk Management Relative to Industry

This indicator is based on MSCI's ESG Ratings. The company score on the Carbon Emissions Key Issue is measured against the industry average for the MSCI ACWI. The categories are Leader (1st quartile), Average (2nd and 3rd quartile), Laggard, (4th quartile), and Not Rated (when there is no IVA score for the company).

### Unconventional Sources of Fossil Fuel Reserves

We collect data on company ownership of proved reserves of oil sands, shale gas and shale oil. This also includes tight gas, coal bed methane and coal seam gas.

### Potential Emissions

To convert reserves data to potential carbon emissions, MSCI ESG Research applies a formula from the Potsdam Institute for Climate Impact Research (see Malte Meinshausen, Nicolai Meinshausen, William Hare, Sarah C. B. Raper, Katja Frieler, Reto Knutti, David J. Frame & Myles R. Allen. *Greenhouse-gas emission targets for limiting global warming to 2 °C*. *Nature* 458, 1158-1162 (30 April 2009) | doi:10.1038/nature08017; Received 25 September 2008; Accepted 25 March 2009. Supplementary Information, p. 7.

### 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.

## CONTACT US

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The company's flagship product offerings are: the MSCI indexes with approximately USD 8 trillion estimated to be benchmarked to them on a worldwide basis<sup>1</sup>; Barra multi-asset class factor models, portfolio risk and performance analytics; RiskMetrics multi-asset class market and credit risk analytics; IPD real estate information, indexes and analytics; MSCI ESG (environmental, social and governance) Research screening, analysis and ratings; and FEA valuation models and risk management software for the energy and commodities markets. MSCI is headquartered in New York, with research and commercial offices around the world.

<sup>1</sup> As of September 30, 2013, as reported on January 31, 2014 by eVestment, Lipper and Bloomberg  
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