

Key Findings Report

Hackney Portfolio Footprint

27 September 2019

Trucost
ESG Analysis

S&P Global



ABOUT TRUCOST

Trucost is part of S&P Global.

A leader in carbon and environmental data and risk analysis, Trucost assesses risks relating to climate change, natural resource constraints, and broader environmental, social, and governance factors. Companies and financial institutions use Trucost intelligence to understand their ESG exposure to these factors, inform resilience and identify transformative solutions for a more sustainable global economy. S&P Global's commitment to environmental analysis and product innovation allows us to deliver essential ESG investment-related information to the global marketplace.

For more information, visit www.trucost.com.

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For more information, visit www.spglobal.com.

CONTACTS

UK: trucostinfo@spglobal.com

North America: trucostnorthamerica@spglobal.com

Europe: trucostemea@spglobal.com

Asia: trucostasiapacific@spglobal.com

South America: trucostsouthamerica@spglobal.com

Telephone (UK): +44 (0) 20 7160 9800

Telephone (North America): +1 800 402 8774

www.trucost.com

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INTRODUCTION TO CLIMATE-RELATED REPORTING

The effects of climate change pose considerable and far-reaching risks to the global economy. Among those most directly affecting businesses include physical risks posed by increased climate variability and more frequent extreme weather events, which may result in property damage, challenges linked to business continuity, and the disruption to global supply chains. Businesses also face risks associated with the transition to a low-carbon economy, including policy changes designed to discourage carbon-intensive energy use or favour more resource-efficient industries and operations.

At the request of the G20, the Financial Stability Board (FSB) reviewed how the reporting on climate-related issues in financial reporting could be improved in order to better reflect the risks and opportunities facing financial institutions and non-financial businesses alike. In June 2017, the FSB Taskforce for Climate-Related Financial Disclosure (TCFD) published recommendations on the disclosure of "information needed by investors, lenders, and insurance underwriters to appropriately assess and price climate-related risks and opportunities."

The TCFD provides a voluntary disclosure framework organized around four themes, designed to facilitate better disclosure. These are **governance, strategy, risk management, and metrics and targets**. In order for organizations to disclose in line with TCFD recommendations, they must be able to quantify or qualify the risks and opportunities facing them, linked to climate-related issues, and be able to describe policies, procedures and systems in place to monitor and address climate-related issues on an on-going basis.

This report by Trucost provides both forward-looking and historical metrics that may be used by asset owners and/or asset managers to support their climate-related disclosures in line with TCFD recommendations, and inform internal processes for risk management and strategy development within an organization.

The report is comprised of two parts:

Historical Performance





















- Carbon Footprint Metrics
- Carbon Disclosure Metrics
- Fossil Fuel & Stranded Assets Exposure Metrics

Forward-Looking Metrics and Scenario Analysis

- 2 Degree Alignment: Energy Generation Mix

See appendix 1 for more information on the TCFD recommended disclosures for asset owners and asset managers, as well as the grey 'call-out' boxes throughout the report which link the recommendations to specific metrics.

COVERAGE RATE

	Original Value of Holdings (mGBP)	Standard Portfolio Analysis	
		No. Companies Analysed	Value Analysed Coverage Rate (mGBP) (%)
2016UKPassiveEquity	288	402	253 88 
BM: 2019GlobalPassiveEquity1	-	1,613	- 99.56 
2016EMActiveEquity	62	176	61 97.68 
BM: 2019GlobalPassiveEquity2	-	1,613	- 99.56 
2016Aggregate	741	708	681 91.92 
BM: 2019GlobalPassiveEquity3	-	1,613	- 99.56 
2016GlobalActiveEquity	391	150	367 93.88 
BM: 2019GlobalPassiveEquity4	-	1,613	- 99.56 
2019GlobalActiveEquity	222	32	214 96.65 
BM: 2019GlobalPassiveEquity5	-	1,613	- 99.56 
2019EMActiveEquity	80	171	78 96.96 
BM: 2019GlobalPassiveEquity6	-	1,613	- 99.56 
2019LowCarbonPassiveEquity	168	1,278	167 99.74 
BM: 2019GlobalPassiveEquity7	-	1,613	- 99.56 
2019GlobalPassiveEquity	282	1,613	280 99.56 
BM: 2019GlobalPassiveEquity8	-	1,613	- 99.56 
2019UKPassiveEquity	153	449	145 95.06 
BM: 2019GlobalPassiveEquity9	-	1,613	- 99.56 
2019Aggregate	904	2,114	885 97.89 
BM: 2019GlobalPassiveEquity10	-	1,613	- 99.56 

A NOTE ON MAPPING:

- STANDARD PORTFOLIO ANALYSIS: Equity instruments are mapped to the issuing entity. Debt instruments are mapped to the first publically listed entity in the instrument's parent chain (starting with a bond's issuer, followed by its immediate parent, and finally it's ultimate parent). Bonds with no public parent are excluded. This approach to mapping is also applicable to Transition Pathway and Unpriced Carbon Cost analysis.

CARBON SCORECARD

The Carbon Scorecard is an annual Trucost publication that evaluates a range of S&P indices across some of our key climate performance metrics. The table below ranks each portfolio across the same metrics, allowing for a quick comparison of performance between funds. For more information on each individual metric please refer to the associated section within this report.

For access to previous Carbon Scorecards, visit www.trucost.com/news-insights.

	Carbon Intensity (tCO2e/mGBP)*		Reserve Emissions Intensity (tCO2e/mGBP)**		Exposure to Coal Revenues (% of VOH)		Renewables Share in Energy Mix (% of GWh)	
2016UKPassiveEquity	319	3	10,038	7	5.3%	9	24.5%	4
2016EMActiveEquity	713	10	16,242	9	2.8%	4	12.4%	9
2016Aggregate	353	6	7,113	6	3.9%	7	17.1%	6
2016GlobalActiveEquity	324	5	3,577	4	3.1%	6	14.8%	7
2019GlobalActiveEquity	164	1	936	2	0.0%	1	0.0%	10
2019EMActiveEquity	528	9	18,306	10	0.9%	2	40.2%	1
2019LowCarbonPassiveEquity	172	2	274	1	1.7%	3	34.0%	2
2019GlobalPassiveEquity	372	8	2,609	3	4.3%	8	14.4%	8
2019UKPassiveEquity	366	7	13,234	8	7.5%	10	28.8%	3
2019Aggregate	320	4	4,883	5	3.0%	5	21.4%	5

* Per million revenues

** Per million invested

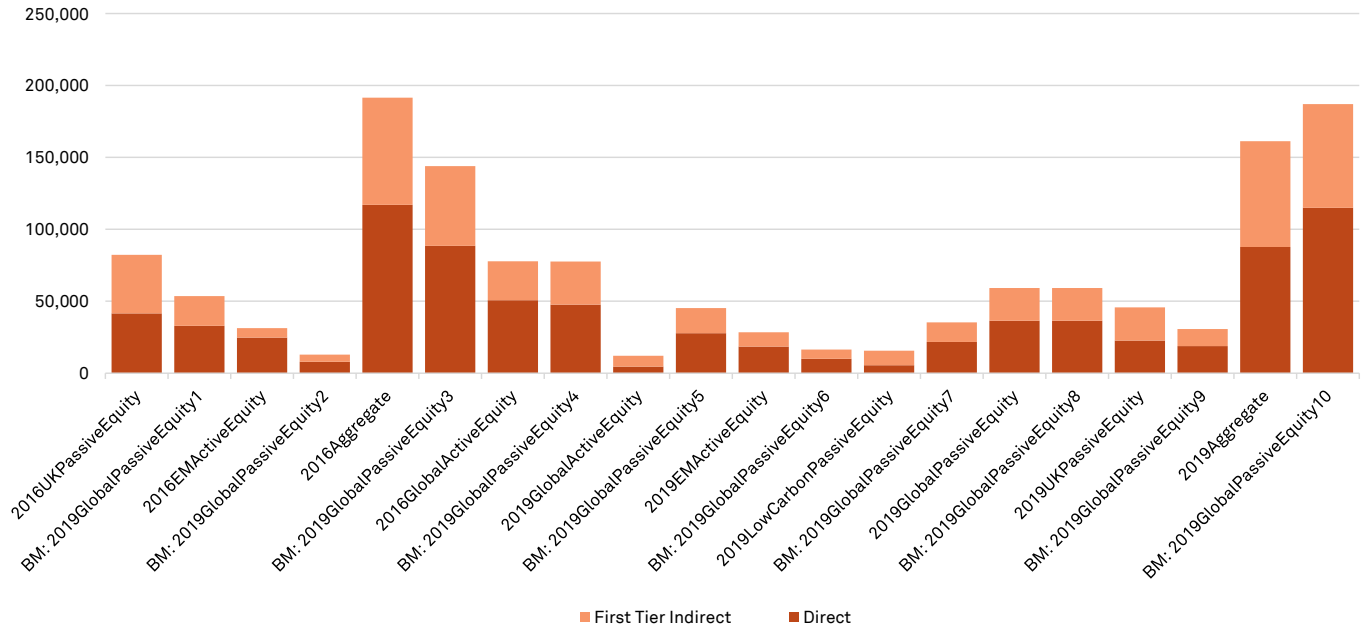
CARBON FOOTPRINT METRICS

Carbon Apportioned by Scope

Carbon audits offer a systematic assessment of the carbon related impacts within a portfolio or index at a given point in time. Emissions associated with investee companies may range from those generated by direct operations, to those generated throughout the entire value chain. The charts below show the total carbon that has been apportioned to each of the portfolios analysed, broken out by scope. It represents each portfolio's absolute contribution towards climate change.

For more information on apportioning please see appendix 2, or for more information on the different scopes refer to appendix 3.

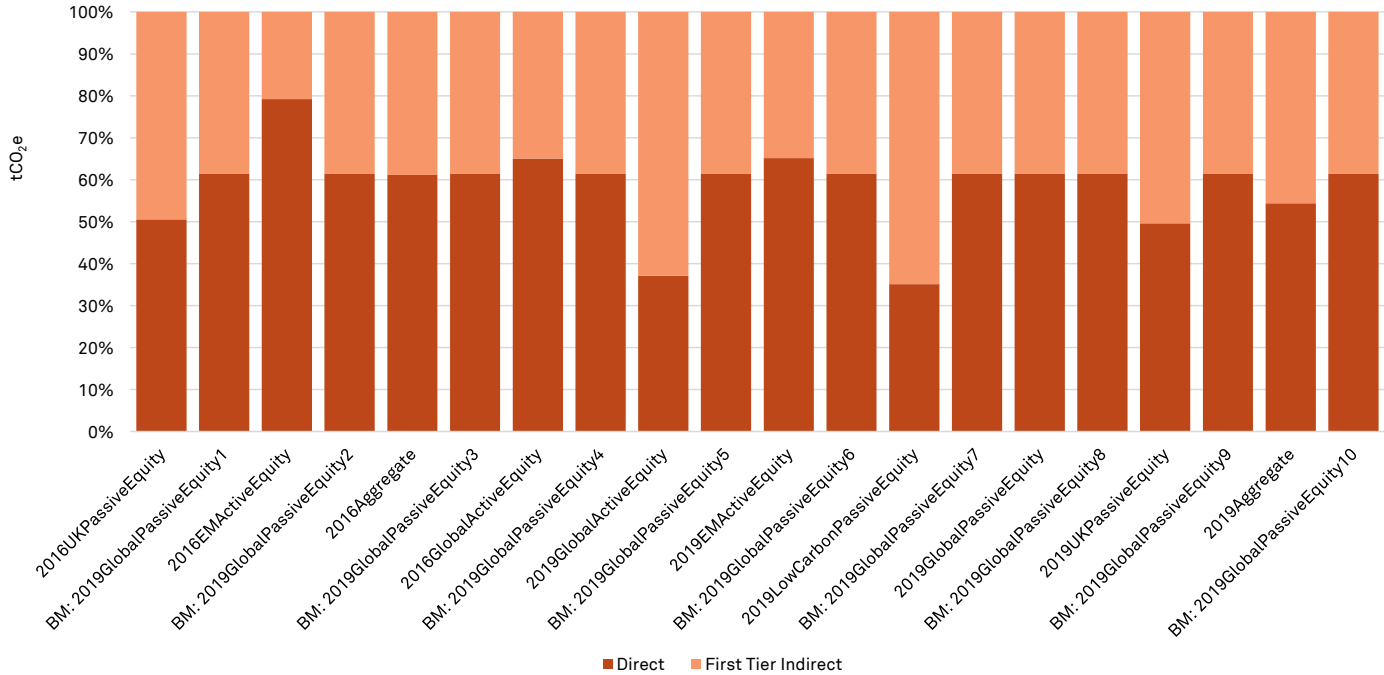
Total Apportioned Carbon by Scope (tonnes)



CARBON FOOTPRINT METRICS

Carbon Apportioned by Scope

Total Apportioned Carbon by Scope (%)



CARBON FOOTPRINT METRICS

Carbon Apportioned by Scope

Below are the tabulated results from the charts above. These figures may be used to support internal and/or external reporting, as well as for the setting and tracking of climate-related targets. See the box at the bottom for how these relate to the TCFD guidance documents.

	Direct emissions tCO ₂ e	First Tier Indirect emissions tCO ₂ e
2016UKPassiveEquity	41,585	40,691
BM: 2019GlobalPassiveEquity1	32,917	20,611
2016EMActiveEquity	24,830	6,519
BM: 2019GlobalPassiveEquity2	7,937	4,970
2016Aggregate	117,066	74,423
BM: 2019GlobalPassiveEquity3	88,568	55,456
2016GlobalActiveEquity	50,651	27,212
BM: 2019GlobalPassiveEquity4	47,713	29,875
2019GlobalActiveEquity	4,517	7,636
BM: 2019GlobalPassiveEquity5	27,852	17,439
2019EMActiveEquity	18,580	9,945
BM: 2019GlobalPassiveEquity6	10,079	6,311
2019LowCarbonPassiveEquity	5,496	10,162
BM: 2019GlobalPassiveEquity7	21,742	13,614
2019GlobalPassiveEquity	36,459	22,828
BM: 2019GlobalPassiveEquity8	36,459	22,828
2019UKPassiveEquity	22,676	23,015
BM: 2019GlobalPassiveEquity9	18,889	11,827
2019Aggregate	87,728	73,586
BM: 2019GlobalPassiveEquity10	115,021	72,019

TCFD GUIDANCE FOR ASSET OWNERS / MANAGERS: METRICS & TARGETS RECOMMENDED DISCLOSURE (A)

Asset owners / managers should describe metrics used to assess climate-related risks and opportunities in each fund / product or investment strategy. Where relevant, asset owners / managers should also describe how these metrics have changed over time. Where appropriate, asset owners / managers should provide metrics considered in investment decisions and monitoring.

TCFD GUIDANCE FOR ASSET OWNERS / MANAGERS: METRICS & TARGETS RECOMMENDED DISCLOSURE (B)

Asset owners / managers should provide the weighted average carbon intensity, where data are available or can be reasonably estimated, for each fund / product or investment strategy. In addition, asset owners / managers should provide other metrics they believe are useful for decision making along with a description of the methodology used.

Source: FSB TCFD (2017) Implementing the Recommendations of the TCFD

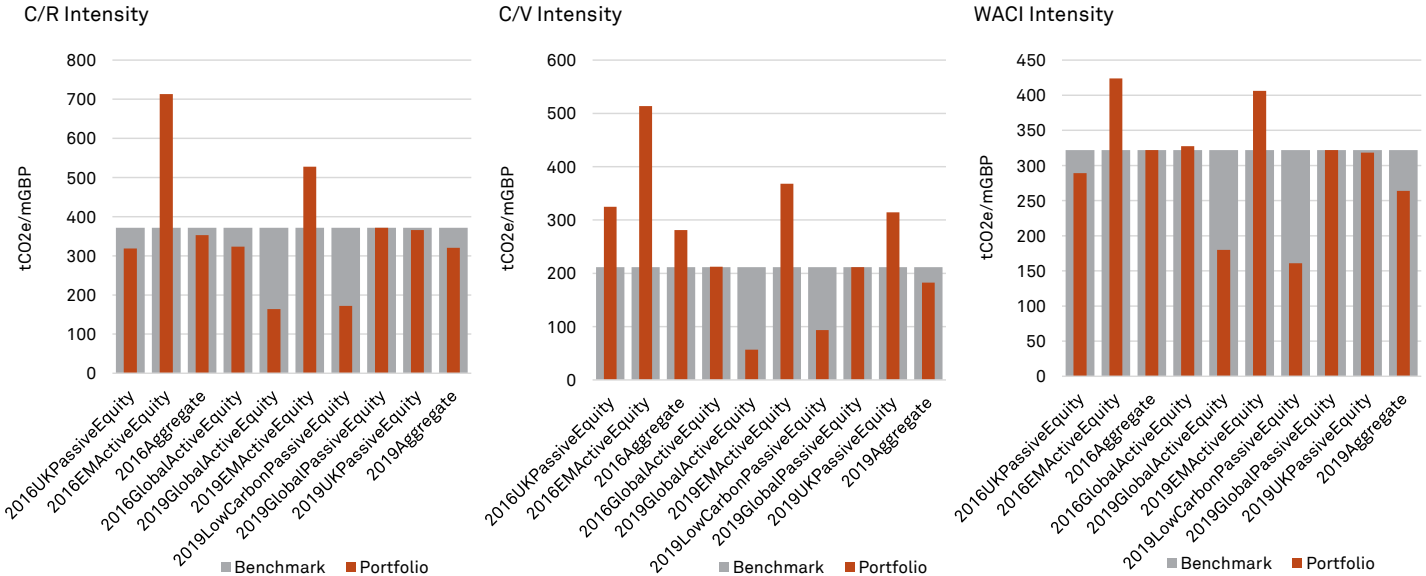
CARBON FOOTPRINT METRICS

Carbon Intensity by Method

Portfolios with larger assets under management will typically also have larger absolute carbon footprints than smaller portfolios due to their size. In order to facilitate fair comparison between portfolios, benchmarks and across years, it is therefore important to normalize the totals, either by revenues or by value invested. The three most common approaches to normalization are:

1. **Carbon to Revenue (C/R):** Dividing the apportioned CO₂e by the apportioned annual revenues.
2. **Carbon to Value Invested (C/V):** Dividing the apportioned CO₂e by the value invested.
3. **Weighted Average Carbon Intensity (WACI):** Summing the product of each holding's weight in the portfolio with the company level C/R intensity (no apportioning).

The charts below show the intensity for all portfolios using all three calculation methods. The scopes used for the intensity were **Direct** and **First Tier Indirect Emissions**.



CARBON FOOTPRINT METRICS

Carbon Intensity by Method

Below are the tabulated results from the charts above. These figures may be used to support internal and/or external reporting, as well as for the setting and tracking of climate-related targets.

	C/R	Relative		C/V	Relative		WACI	Relative
	tCO2e/mGBP	Efficiency		tCO2e/mGBP	Efficiency		tCO2e/mGBP	Efficiency
2016UKPassiveEquity	319	14%		325	-54%		289	10%
BM: 2019GlobalPassiveEquity1	372	-		211	-		322	-
2016EMActiveEquity	713	-92%		514	-143%		424	-32%
BM: 2019GlobalPassiveEquity2	372	-		211	-		322	-
2016Aggregate	353	5%		281	-33%		322	0%
BM: 2019GlobalPassiveEquity3	372	-		211	-		322	-
2016GlobalActiveEquity	324	13%		212	0%		328	-2%
BM: 2019GlobalPassiveEquity4	372	-		211	-		322	-
2019GlobalActiveEquity	164	56%		57	73%		180	44%
BM: 2019GlobalPassiveEquity5	372	-		211	-		322	-
2019EMActiveEquity	528	-42%		368	-74%		406	-26%
BM: 2019GlobalPassiveEquity6	372	-		211	-		322	-
2019LowCarbonPassiveEquity	172	54%		94	56%		161	50%
BM: 2019GlobalPassiveEquity7	372	-		211	-		322	-
2019GlobalPassiveEquity	372	0%		211	0%		322	0%
BM: 2019GlobalPassiveEquity8	372	-		211	-		322	-
2019UKPassiveEquity	366	2%		315	-49%		318	1%
BM: 2019GlobalPassiveEquity9	372	-		211	-		322	-
2019Aggregate	320	14%		182	14%		264	18%
BM: 2019GlobalPassiveEquity10	372	-		211	-		322	-

Both C/R and WACI measure company intensities on a revenue basis. In the WACI method, the tilt toward or away from high (or low) intensity companies is determined by their value of holdings (VOH) weight in the portfolio, whereas in the C/R method it is determined by their relative contribution to the total apportioned revenues.

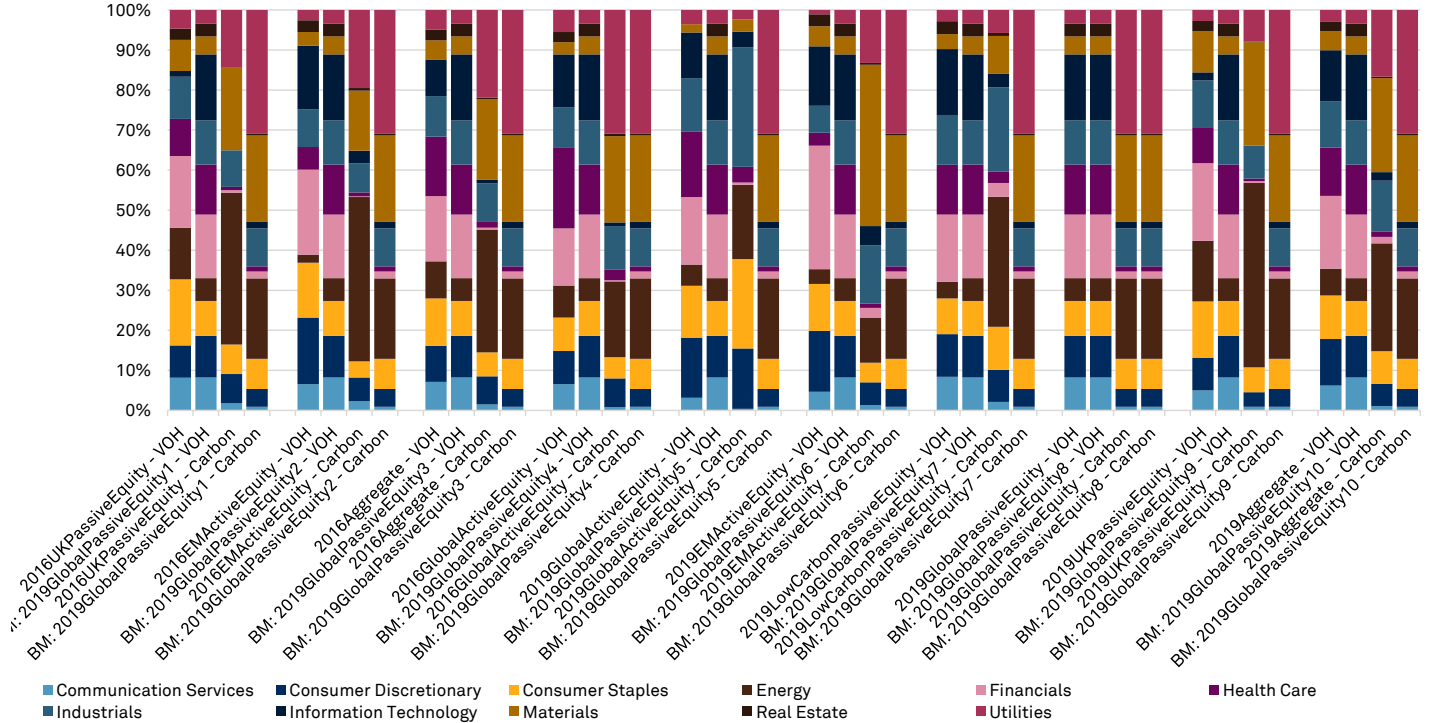
In contrast to C/R and WACI, C/V measures company intensities on a valuation basis. However as with WACI, the tilt towards or away from high (or low) intensity companies is determined by their VOH weight in the portfolio. WACI will be higher than C/V if - on average - the tilt is towards companies whose annual revenues are lower than their

CARBON FOOTPRINT METRICS

Sector VOH Share vs. Carbon Share

The chart below compares each sector's value-based weight in a portfolio or benchmark to its share of the total apportioned carbon emissions.

VOH vs. Carbon Share by Sector



CARBON FOOTPRINT METRICS

Sector Carbon Intensities

The table below shows the carbon intensities of the portfolio and benchmarks at the GICS sector level.

	Communication Services	Consumer Discretionary	Consumer Staples	Energy	Financials	Health Care	Industrials	Information Technology	Materials	Real Estate	Utilities
2016UKPassiveEquity	68	179	199	721	14	76	214	47	688	59	579
BM: 2019GlobalPassiveEquity1	55	114	250	837	37	52	257	86	1,283	159	2,607
2016EMActiveEquity	312	185	243	5,181	10	146	510	126	2,814	343	4,475
BM: 2019GlobalPassiveEquity2	55	114	250	837	37	52	257	86	1,283	159	2,607
2016Aggregate	79	161	184	954	12	57	292	95	1,143	90	870
BM: 2019GlobalPassiveEquity3	55	114	250	837	37	52	257	86	1,283	159	2,607
2016GlobalActiveEquity	54	140	156	927	9	49	372	76	2,294	75	909
BM: 2019GlobalPassiveEquity4	55	114	250	837	37	52	257	86	1,283	159	2,607
2019GlobalActiveEquity	52	208	279	634	7	35	169	130	400		240
BM: 2019GlobalPassiveEquity5	55	114	250	837	37	52	257	86	1,283	159	2,607
2019EMActiveEquity	85	256	260	842	52	378	845	140	3,536	137	3,943
BM: 2019GlobalPassiveEquity6	55	114	250	837	37	52	257	86	1,283	159	2,607
2019LowCarbonPassiveEquity	55	91	177	700	30	52	210	77	550	110	593
BM: 2019GlobalPassiveEquity7	55	114	250	837	37	52	257	86	1,283	159	2,607
2019GlobalPassiveEquity	55	114	250	837	37	52	257	86	1,283	159	2,607
BM: 2019GlobalPassiveEquity8	55	114	250	837	37	52	257	86	1,283	159	2,607
2019UKPassiveEquity	68	141	200	728	10	77	241	43	720	75	642
BM: 2019GlobalPassiveEquity9	55	114	250	837	37	52	257	86	1,283	159	2,607
2019Aggregate	63	141	231	753	28	55	257	104	1,142	132	1,646
BM: 2019GlobalPassiveEquity10	55	114	250	837	37	52	257	86	1,283	159	2,607

CARBON FOOTPRINT METRICS

Top Contributors

The table below shows the top contributors to the carbon intensity of the portfolios analysed. Note that if the method used is C/R or C/V, then a company may appear due to the proportion owned/financed, rather than because it is the most carbon intensive held. The 'Contribution' is the percentage change in the portfolio's intensity that would be caused by excluding the holding referenced. In other words, it is a measurement of how much a specific holding affects the carbon performance of the portfolio.

	Name	Sector	VOH Weight	Carbon Weight	Company C/R (tCO2e/mGBP)	Company C/R Contribution	Climate 100+*
2016UKPassiveEquity	1 Royal Dutch Shell PLC	Energy	8.23%	22.77%	792	-14.98%	Yes
	2 BP	Energy	4.14%	14.39%	679	-8.19%	No
	3 CRH Plc	Materials	1.01%	5.45%	1,512	-4.35%	Yes
	4 Drax Group	Utilities	0.08%	4.05%	4,316	-3.76%	No
	5 International Consolidated Airlines G	Industrials	0.38%	3.92%	1,515	-3.12%	No
2016EMActiveEquity	1 Bangchak Corporation PCL	Energy	0.17%	36.17%	29,517	-35.60%	No
	2 Korea Elec Power Corp	Utilities	0.34%	15.90%	6,761	-14.47%	Yes
	3 Lucky Cement Ltd	Materials	0.32%	4.96%	5,948	-4.39%	No
	4 Enka Insaat ve Sanayi AS	Industrials	0.92%	5.00%	4,373	-4.22%	No
	5 Ternium SA ADR	Materials	0.21%	4.21%	4,499	-3.57%	No
2016Aggregate	1 Royal Dutch Shell PLC	Energy	3.81%	12.18%	792	-7.14%	Yes
	2 Intl Paper Co	Materials	0.47%	6.90%	3,270	-6.20%	Yes
	3 Bangchak Corporation PCL	Energy	0.02%	5.92%	29,517	-5.85%	No
	4 AES Corp	Utilities	0.19%	5.16%	8,163	-4.95%	Yes
	5 BP	Energy	1.54%	6.18%	679	-3.07%	No
2016GlobalActive Equity	1 Intl Paper Co	Materials	0.86%	16.97%	3,270	-15.56%	Yes
	2 AES Corp	Utilities	0.35%	12.69%	8,163	-12.25%	Yes
	3 AirAsia Group	Industrials	0.79%	5.97%	1,588	-4.81%	No
	4 Royal Dutch Shell PLC	Energy	1.39%	5.89%	792	-3.57%	Yes
	5 Southwestern Energy Co	Energy	0.18%	3.69%	2,379	-3.20%	No
2019GlobalActive Equity	1 InterContinental Hotels Group Plc	Consumer Discretionary	2.22%	10.27%	1,792	-9.43%	No
	2 EOG Resources	Energy	3.82%	9.29%	651	-7.12%	No
	3 Neste Oyj	Energy	1.46%	9.28%	618	-7.00%	No
	4 Essity AB	Consumer Staples	2.18%	8.68%	397	-5.29%	No
	5 Anheuser Busch Inbev NV	Consumer Staples	3.37%	7.23%	387	-4.31%	No

*Climate Action 100+ is an investor initiative to ensure the world's largest corporate greenhouse gas emitters take necessary action on climate change. The companies include 100 'systemically important emitters', accounting for two-thirds of annual global industrial emissions, alongside more than 60 others with significant opportunity to drive the clean energy transition. For more information see <http://www.climateaction100.org>.

CARBON FOOTPRINT METRICS

Top Contributors

The table below shows the top contributors to the carbon intensity of the portfolios analysed. Note that if the method used is C/R or C/V, then a company may appear due to the proportion owned/financed, rather than because it is the most carbon intensive held. The 'Contribution' is the percentage change in the portfolio's intensity that would be caused by excluding the holding referenced. In other words, it is a measurement of how much a specific holding affects the carbon performance of the portfolio.

	Name	Sector	VOH Weight	Carbon Weight	Company C/R (tCO2e/mGBP)	Company C/R Contribution	Climate 100+*
2019EMActiveEquity	1 Inter RAO OJSC	Utilities	0.21%	10.60%	7,048	-9.88%	No
	2 China Resources Cement Holdings I	Materials	0.26%	8.26%	19,800	-8.06%	No
	3 Ternium SA ADR	Materials	0.29%	8.04%	4,499	-7.16%	No
	4 China BlueChemical Ltd. - H Shares	Materials	0.17%	5.36%	9,251	-5.07%	No
	5 Enka Insaat ve Sanayi AS	Industrials	0.75%	5.70%	4,373	-5.05%	No
2019LowCarbon PassiveEquity	1 Phillips 66	Energy	0.35%	7.59%	936	-6.28%	Yes
	2 Valero Energy Corp	Energy	0.23%	6.28%	785	-4.97%	Yes
	3 Marathon Petroleum Corp.	Energy	0.23%	4.50%	872	-3.64%	Yes
	4 Marubeni Corp	Industrials	0.19%	5.15%	473	-3.34%	No
	5 Royal Dutch Shell PLC	Energy	0.30%	2.89%	792	-2.27%	Yes
2019GlobalPassive Equity	1 Exxon Mobil Corp	Energy	0.79%	3.03%	1,133	-2.06%	Yes
	2 LafargeHolcim Ltd	Materials	0.06%	1.93%	8,184	-1.84%	Yes
	3 RWE AG	Utilities	0.04%	1.96%	3,604	-1.76%	Yes
	4 ArcelorMittal Inc	Materials	0.02%	1.83%	4,182	-1.67%	Yes
	5 Royal Dutch Shell PLC	Energy	0.66%	2.79%	792	-1.50%	Yes
2019UKPassiveEquity	1 Royal Dutch Shell PLC	Energy	9.57%	27.37%	792	-16.87%	Yes
	2 BP	Energy	5.00%	17.94%	679	-9.17%	No
	3 CRH Plc	Materials	0.95%	5.29%	1,512	-4.07%	Yes
	4 International Consolidated Airlines G	Industrials	0.34%	3.68%	1,515	-2.82%	No
	5 Rio Tinto PLC	Materials	2.46%	3.64%	1,207	-2.56%	No
2019Aggregate	1 Royal Dutch Shell PLC	Energy	1.84%	9.06%	792	-5.60%	Yes
	2 BP	Energy	0.93%	5.78%	679	-3.14%	No
	3 Inter RAO OJSC	Utilities	0.02%	1.87%	7,048	-1.79%	No
	4 China Resources Cement Holdings I	Materials	0.02%	1.46%	19,800	-1.44%	No
	5 CRH Plc	Materials	0.18%	1.70%	1,512	-1.35%	Yes

*Climate Action 100+ is an investor initiative to ensure the world's largest corporate greenhouse gas emitters take necessary action on climate change. The companies include 100 'systemically important emitters', accounting for two-thirds of annual global industrial emissions, alongside more than 60 others with significant opportunity to drive the clean energy transition. For more information see <http://www.climateaction100.org>.

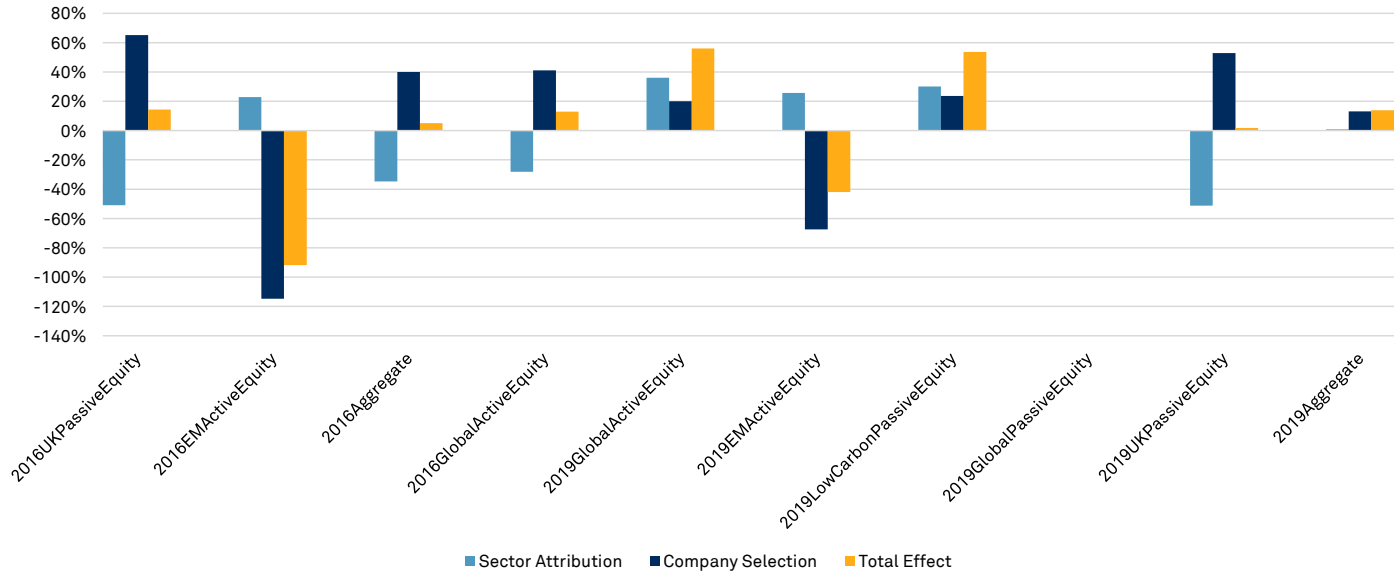
CARBON FOOTPRINT METRICS

Attribution Analysis

The principal reasons for the carbon intensity of a portfolio to differ from the benchmark are a) **sector allocation** decisions and b) **company selection** decisions. Sector allocation decisions can cause the carbon intensity of a portfolio to diverge from its benchmark when it is over or underweight markedly high or markedly low carbon sectors. For example, if a portfolio is overweight a high carbon sector, then it is more likely to have a higher overall intensity than the benchmark. However, if the companies selected within a high carbon sector are the most carbon efficient, then it is still possible that the portfolio may have a lower overall intensity.

The chart on the right shows the relative contribution of **sector allocation** and **company selection** effects towards the 'Total Effect' of each portfolio versus their respective benchmark. Sector allocation effects are determined using the 11 GICS Sector classifications, and the analysis uses the Carbon-to-Revenue intensity metric.

Performance Attribution



CARBON FOOTPRINT METRICS

Key Takeaways

Total Carbon

- Overall, the 2019 portfolios have a lower total apportioned carbon than the portfolios of 2016.
- The highest total apportioned carbon values are observed in the two aggregate portfolios (2016 Aggregate and 2019 Aggregate) which are largely driven by the size of their holdings. However, the 2019 Aggregate portfolio has a lower apportioned carbon than the 2016 Aggregate portfolio even though the VOH are higher. This suggests that the 2019 Aggregate portfolio is more carbon efficient than the 2016 Aggregate.

Carbon Intensity

- The EM Active Equity portfolios are the most carbon intensive. Nevertheless, when comparing the portfolio carbon intensity between the two analysis years, there is a reduction of 25% from 2016 to 2019.
- Changes in carbon intensities over time can be caused by a multitude of factors, for example by changes in the percentage owned/financed of investees, or by fluctuations in exchange rates. However, broadly speaking there are three key drivers:
 1. **Valuation Changes:** If, all else being equal, valuations rise for all companies held – for example in a bull market – then this may contribute towards a year-on-year fall in C/V intensities, but no change to C/R or WACI intensities. If valuations fall only for the carbon intensive companies held, then this may contribute towards a year-on-year rise in C/V intensities (as their carbon-to-value ratio worsens), but a fall in WACI intensities (as their relative weight in the portfolio decreases). The opposite would be true of a rise in valuations for carbon intensive companies.
 2. **Revenue Changes:** If, all else being equal, revenues rise for all companies held – for example in a booming economy – then this may contribute towards a year-on-year fall in both the C/R and WACI intensities, but cause no change to the C/V intensity.
 3. **Constituent Weight Changes:** If, all else being equal, the VOH weight in the portfolio of carbon intensive companies is increased (by increasing the share of their equity or debt held), then this may contribute to towards year-on-year increases across all three methodologies. The opposite would be true for decreasing their weight in the portfolio (by decreasing the share of their equity or debt held), or for increasing the weight of carbon efficient companies.

TCFD Relevance

- The TCFD identifies GHG emissions intensity, as well as absolute emissions levels, as types of transition risk metrics.
- WACI is the primary intensity metric recommended by the TCFD for portfolio footprinting. Portfolios exposed to more carbon intensive companies and sectors by percentage of overall value of holdings will tend to have a higher WACI. The TCFD recommends this approach because it can be applied across asset classes and avoids calculating 'ownership' of emissions.
- The TCFD also encourages asset owners and asset managers to provide other metrics useful for decision making, including the absolute carbon emissions, C/R intensity and C/V intensity metrics provided in this report.

CARBON DISCLOSURE METRICS

Disclosure Analysis

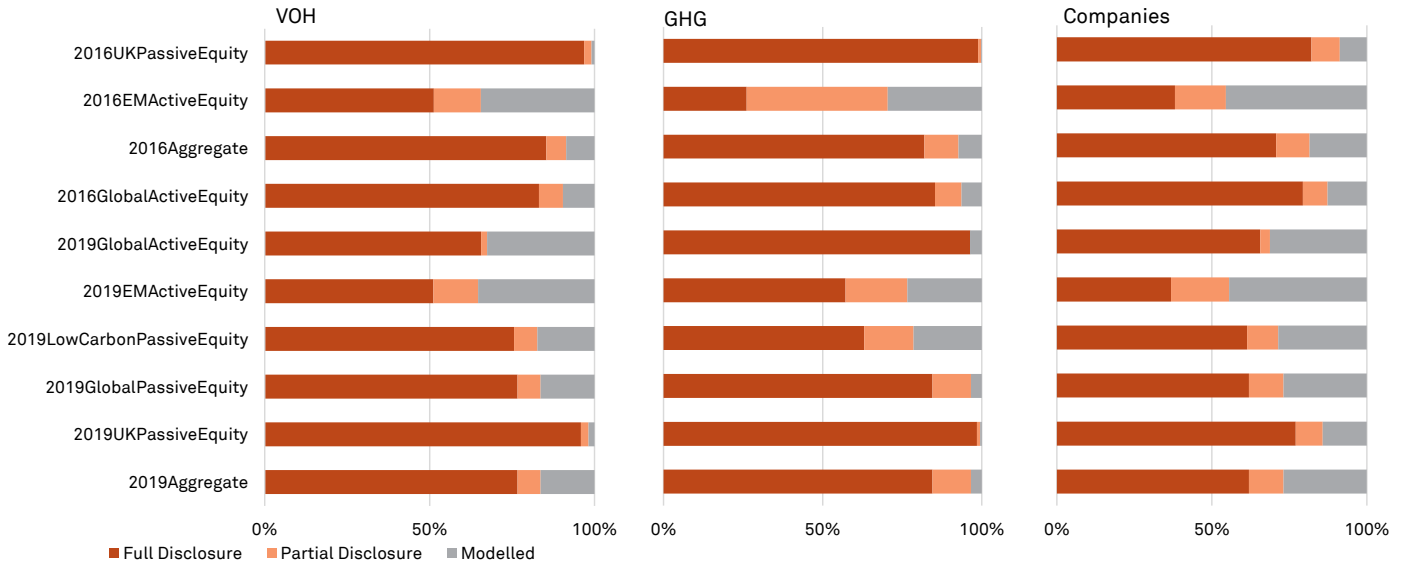
In the charts below, the overall level of disclosure in each portfolio is assessed using the following three methods:

- VOH:** The sum of the weights of each holding within each of the three disclosure categories.
- GHG:** The sum of each holding's share of the total apportioned Scope 1 CO₂e within each of the three disclosure categories.
- Companies:** The number of companies, shown as a percent of all companies analysed, within each of the three disclosure categories.

For more information on the three disclosure categories, please refer to appendix 4.

TCFD GUIDANCE FOR ASSET OWNERS / MANAGERS: RISK MANAGEMENT RECOMMENDED DISCLOSURE (A)
Asset owners / managers should describe, where appropriate, engagement activity with investee companies to encourage better disclosure and practices related to climate-related risks to improve data availability and asset owners' / managers' ability to assess climate-related risks.

Source: FSB TCFD (2017) *Implementing the Recommendations of the TCFD*



CARBON DISCLOSURE METRICS

Top Modelled Contributors

The level of carbon disclosure is based on each company's Scope 1 emissions, which can be classified as **fully disclosed**, **partially disclosed**, or **modelled**. The table below shows the top contributors to each portfolio's C/R intensity whose Scope 1 CO₂e is classified as **modelled**. These may be prime candidates for company engagement.

	Name	Sector	VOH Weight	Carbon Weight	Company C/R (tCO ₂ e/mGBP)	Company C/R Contribution	Climate 100+*
2016UKPassiveEquity	1 Wizz Air Holdings Plc	Industrials	0.03%	0.07%	955	-0.05%	No
	2 Ibstock Plc	Materials	0.01%	0.01%	787	-0.01%	No
	3 Macau Property Opportunities Fund	Real Estate	0.00%	0.00%	109	0.00%	No
	4 Real Estate Credit Investments Limit	Financials	0.01%	0.00%	17	0.00%	No
	5 Phoenix Spree Deutschland Ltd.	Real Estate	0.01%	0.00%	110	0.00%	No
2016EMActiveEquity	1 Bangchak Corporation PCL	Energy	0.17%	36.17%	29,517	-35.60%	No
	2 Lucky Cement Ltd	Materials	0.32%	4.96%	5,948	-4.39%	No
	3 Ternium SA ADR	Materials	0.21%	4.21%	4,499	-3.57%	No
	4 Ereğli Demir Celik	Materials	0.18%	1.77%	4,589	-1.50%	No
	5 Lee & Man Paper Manufacturing Ltd	Materials	0.34%	0.78%	1,091	-0.27%	No
2016Aggregate	1 Bangchak Corporation PCL	Energy	0.02%	5.92%	29,517	-5.85%	No
	2 Norwegian Cruise Line Holdings Ltd	Consumer Discretionary	0.30%	0.97%	1,699	-0.77%	No
	3 Lucky Cement Ltd	Materials	0.03%	0.81%	5,948	-0.76%	No
	4 Ternium SA ADR	Materials	0.02%	0.69%	4,499	-0.64%	No
	5 Ereğli Demir Celik	Materials	0.02%	0.29%	4,589	-0.27%	No
2016GlobalActive Equity	1 Norwegian Cruise Line Holdings Ltd	Consumer Discretionary	0.56%	2.38%	1,699	-1.94%	No
	2 Concho Resources Inc	Energy	0.28%	0.17%	669	-0.09%	No
	3 Cabot Oil & Gas A	Energy	0.22%	0.13%	735	-0.08%	No
	4 Kinder Morgan Inc	Energy	0.28%	0.17%	475	-0.06%	Yes
	5 Hexagon AB	Information Technology	0.12%	0.02%	135	0.02%	No
2019GlobalActive Equity	1 Misumi Group Inc	Industrials	1.78%	2.12%	167	-0.05%	No
	2 Incyte Corp	Health Care	1.30%	0.15%	68	0.21%	No
	3 MarketAxess Holdings	Financials	3.03%	0.03%	17	0.26%	No
	4 HDFC Bank Ltd	Financials	3.31%	0.04%	7	0.85%	No
	5 Amazon.com Inc	Consumer Discretionary	3.39%	1.29%	92	1.03%	No

*Climate Action 100+ is an investor initiative to ensure the world's largest corporate greenhouse gas emitters take necessary action on climate change. The companies include 100 'systemically important emitters', accounting for two-thirds of annual global industrial emissions, alongside more than 60 others with significant opportunity to drive the clean energy transition. For more information see <http://www.climateaction100.org>.

CARBON DISCLOSURE METRICS

Top Modelled Contributors

The level of carbon disclosure is based on each company's Scope 1 emissions, which can be classified as **fully disclosed**, **partially disclosed**, or **modelled**. The table below shows the top contributors to each portfolio's C/R intensity whose Scope 1 CO₂e is classified as **modelled**. These may be prime candidates for company engagement.

	Name	Sector	VOH Weight	Carbon Weight	Company C/R (tCO ₂ e/mGBP)	Company C/R Contribution	Climate 100+*
2019EMActiveEquity	1 Ternium SA ADR	Materials	0.29%	8.04%	4,499	-7.16%	No
	2 Hoa Phat Group JSC	Materials	0.22%	1.89%	3,724	-1.63%	No
	3 SK Holdings Co Ltd	Industrials	0.32%	3.95%	645	-0.74%	No
	4 Tube Investments Of India	Consumer Discretionary	0.11%	0.65%	3,078	-0.54%	No
	5 Packages Ltd	Materials	0.06%	0.28%	926	-0.12%	No
2019LowCarbon PassiveEquity	1 Mitsui & Co	Industrials	0.38%	3.14%	601	-2.26%	No
	2 HollyFrontier Corporation	Energy	0.12%	2.37%	974	-1.96%	No
	3 Berkshire Hathaway	Financials	0.67%	1.87%	555	-1.29%	Yes
	4 Itochu Corp	Industrials	0.09%	0.53%	385	-0.29%	No
	5 Atmos Energy Corp	Utilities	0.28%	0.38%	549	-0.26%	No
2019GlobalPassive Equity	1 Berkshire Hathaway	Financials	0.68%	0.84%	555	-0.28%	Yes
	2 Nucor Corp	Materials	0.04%	0.26%	1,139	-0.18%	No
	3 Mitsui & Co	Industrials	0.07%	0.25%	601	-0.09%	No
	4 HollyFrontier Corporation	Energy	0.02%	0.15%	974	-0.09%	No
	5 Norwegian Cruise Line Holdings Ltd	Consumer Discretionary	0.03%	0.11%	1,699	-0.09%	No
2019UKPassiveEquity	1 Wizz Air Holdings Plc	Industrials	0.09%	0.19%	955	-0.12%	No
	2 Ibstock Plc	Materials	0.04%	0.04%	787	-0.02%	No
	3 Bluebird Bio Inc	Health Care	0.00%	0.00%	86	0.00%	No
	4 Rocket Internet SE	Consumer Discretionary	0.00%	0.00%	92	0.00%	No
	5 PureCircle Ltd	Consumer Staples	0.01%	0.00%	354	0.00%	No
2019Aggregate	1 Ternium SA ADR	Materials	0.03%	1.42%	4,499	-1.32%	No
	2 SK Holdings Co Ltd	Industrials	0.03%	0.70%	645	-0.35%	No
	3 Hoa Phat Group JSC	Materials	0.02%	0.34%	3,724	-0.31%	No
	4 Berkshire Hathaway	Financials	0.34%	0.49%	555	-0.21%	Yes
	5 HollyFrontier Corporation	Energy	0.03%	0.28%	974	-0.19%	No

*Climate Action 100+ is an investor initiative to ensure the world's largest corporate greenhouse gas emitters take necessary action on climate change. The companies include 100 'systemically important emitters', accounting for two-thirds of annual global industrial emissions, alongside more than 60 others with significant opportunity to drive the clean energy transition. For more information see <http://www.climateaction100.org>.

FOSSIL FUEL & STRANDED ASSETS EXPOSURE METRICS

Financial Exposure to Fossil Fuel Activities

Future emissions from fossil fuel reserves far outweigh the allowable carbon budget that will limit global warming to 2 degrees Celsius above pre-industrial levels. Industry experts refer to assets that may suffer from unanticipated or premature write-downs, devaluations or conversion to liabilities as 'stranded assets'.

Trucost assesses exposure to such assets by showing the combined value of holdings with business activities in either fossil fuel extraction or fossil fuel energy generation industries. This helps to identify potentially stranded assets that would become more apparent as economies move towards a low carbon economy.

Extraction-related activities include the following:

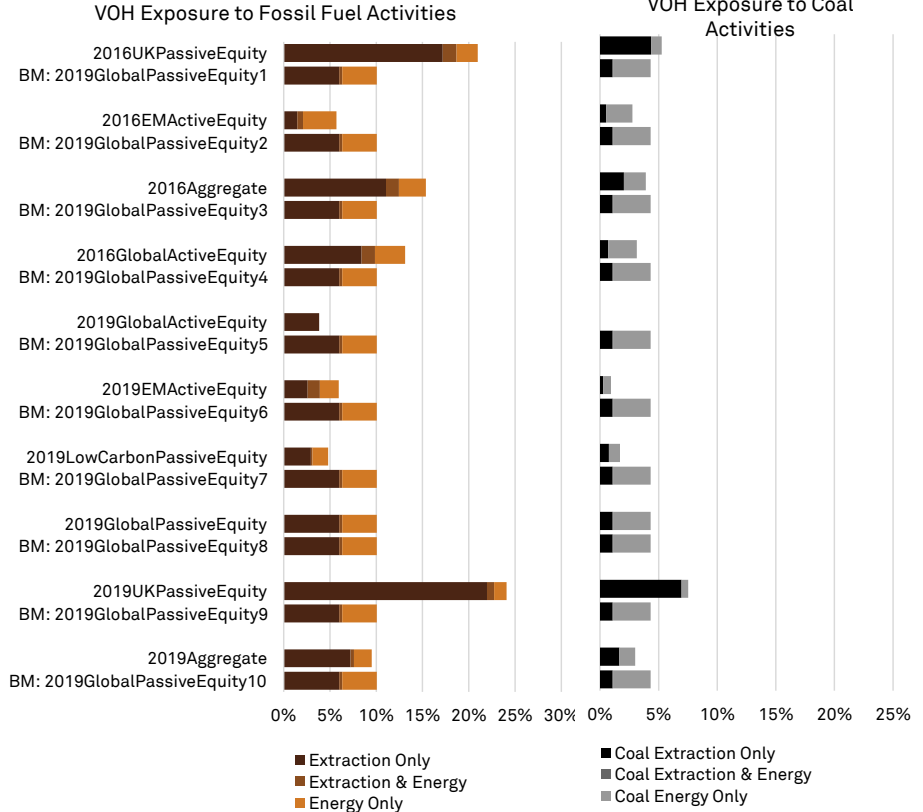
- Crude petroleum and natural gas extraction
- Tar sands extraction
- Natural gas liquid extraction
- Bituminous coal underground mining
- Bituminous coal and lignite surface mining
- Drilling oil and gas wells
- Support activities for oil and gas operations

Energy-related activities include the following:

- Coal power generation
- Petroleum power generation
- Natural gas power generation

The left-hand chart shows the percentage share of the portfolio's total value invested in companies that derive anything above 0% of their total revenues from fossil fuel extraction and/or energy.

The right-hand chart highlights exposure to coal related activities only.

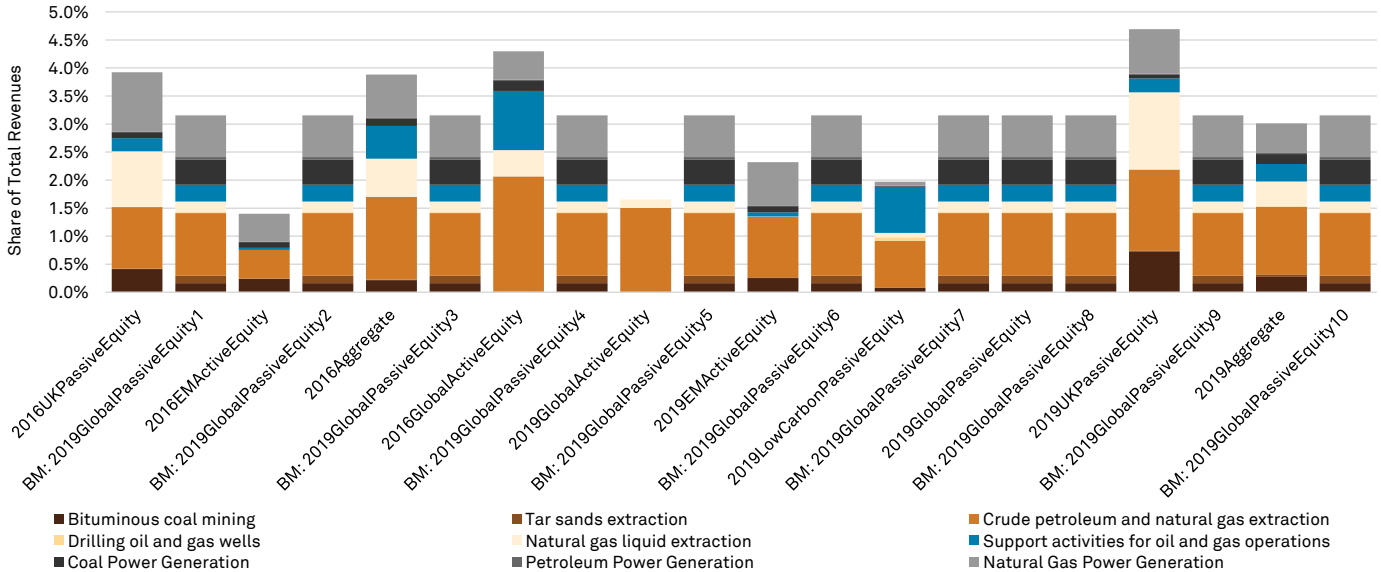


FOSSIL FUEL & STRANDED ASSETS EXPOSURE METRICS

Fossil Fuel Activities Revenue Breakdown

The previous page gives an indication of the combined weight in the portfolio of companies engaging in fossil fuel related activities above a given revenue threshold. The chart below, however, gives an indication of the level of revenue dependency that investees have in these activities, broken-out by type.

Fossil Fuel Related Revenue Share



TCFD GUIDANCE FOR ASSET OWNERS / MANAGERS: RISK MANAGEMENT RECOMMENDED DISCLOSURE (B)
 Asset owners should describe how they consider the positioning of their total portfolio with respect to the transition to a lower-carbon energy supply, production, and use. This could include explaining how asset owners actively manage their portfolios' positioning in relation to this transition. Asset managers should describe how they manage material climate-related risks for each product or investment strategy.

Source: FSB TCFD (2017) Implementing the Recommendations of the TCFD

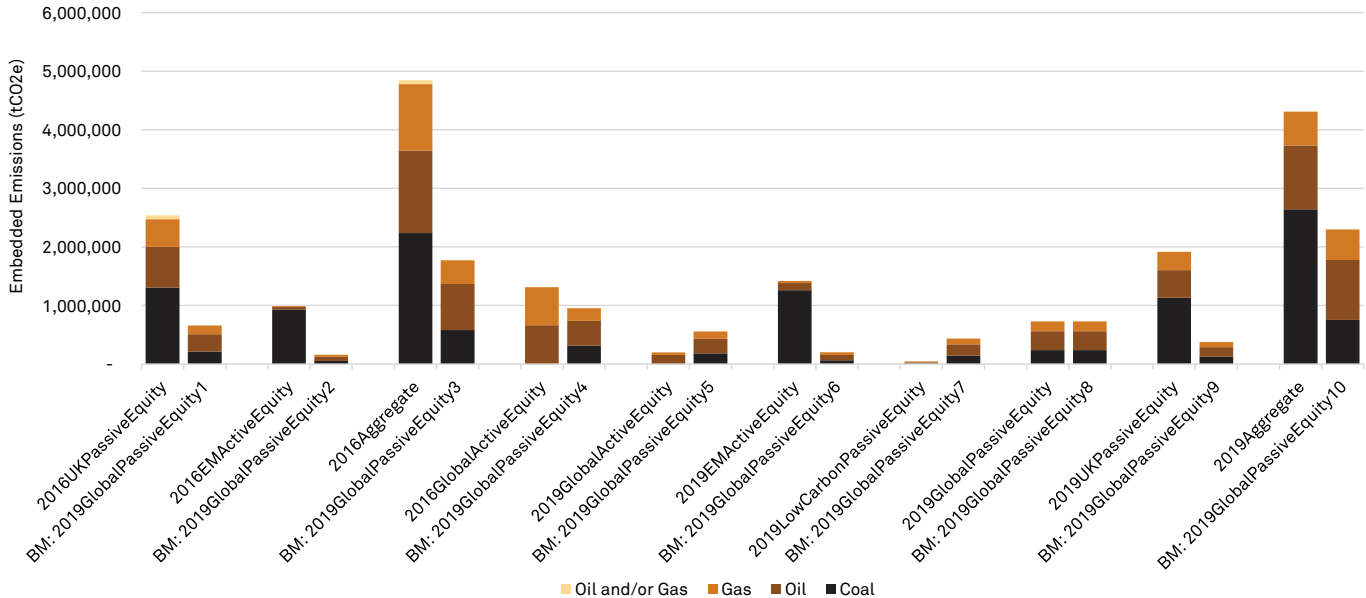
FOSSIL FUEL & STRANDED ASSETS EXPOSURE METRICS

Emissions from Reserves

Trucost is able to analyse two additional metrics that provide additional insights relevant to stranded asset risk. First, are the carbon emissions embedded within company owned fossil fuel reserves which can be considered 'unburnable' if 2°C targets are to be achieved. Second, are the capital expenditures set aside for future fossil fuel related activities such as further exploration and extraction. Both metrics are based on disclosures published by investees.

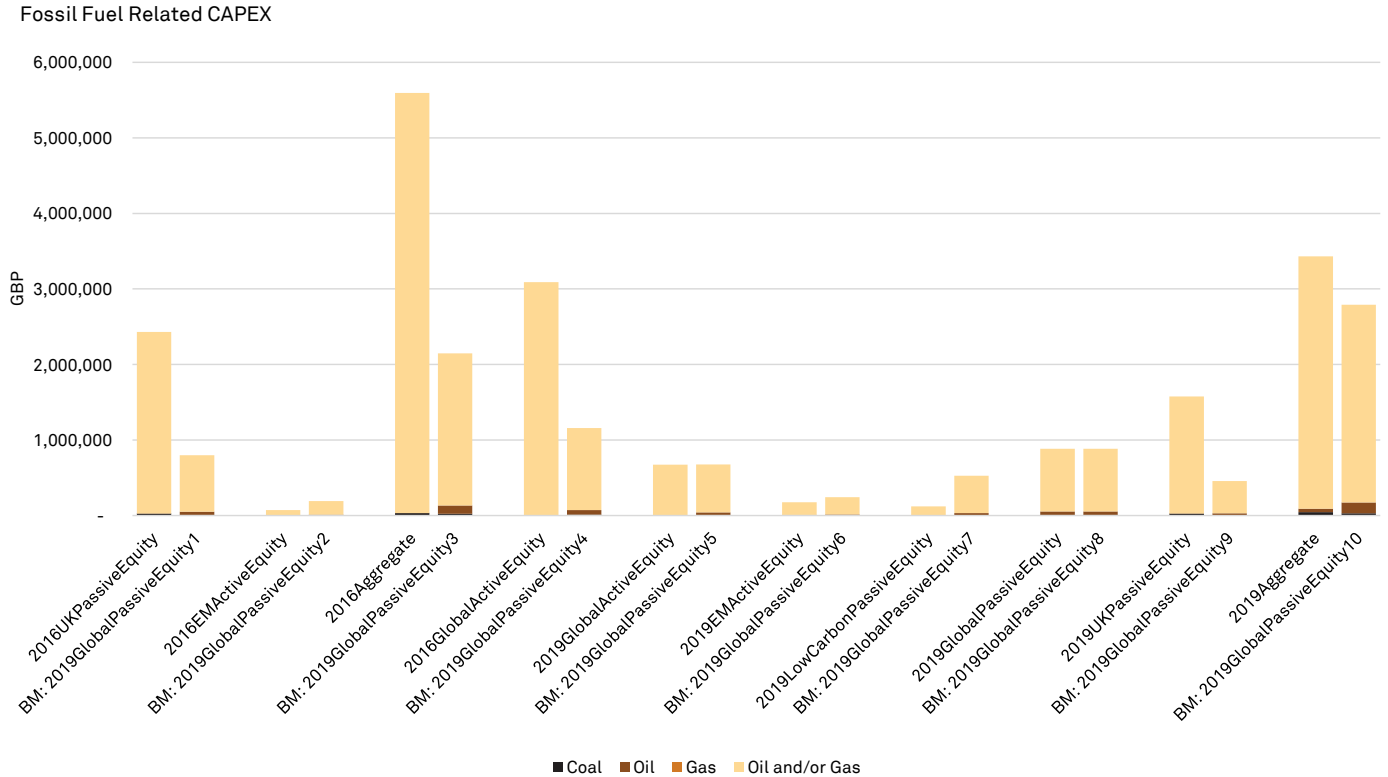
The first chart below shows the total tonnes of apportioned "future" CO₂ from reserves, broken down by reserve type. The second chart shows the total apportioned capital expenditure on fossil fuel related activities, again broken out by reserve type.

Future Emissions from Reserves



FOSSIL FUEL & STRANDED ASSETS EXPOSURE METRICS

Emissions from CAPEX



FOSSIL FUEL & STRANDED ASSETS EXPOSURE METRICS

Watch Lists

The tables below highlight companies within each portfolio that are considered of greatest relevance to the stranded assets analysis.

The **Portfolio Level Fossil Fuel Revenues** table is ranked by the total apportioned fossil fuel revenue contribution to the portfolio. The table also shows the company-level dependency of each investee on fossil fuel revenues, split between 'Energy' and 'Extraction' activities.

The **Environmental Impact From Fossil Fuel Activities** table is ranked by the weighted-average environmental **Impact Ratio** of each company in the portfolio. The impact ratio refers to a company's fossil fuel related direct environmental damage costs divided by its fossil fuel related revenues. Companies burning coal for energy, for example, will have a higher impact ratio than those offering support activities for oil and gas operations.

Portfolio Level Fossil Fuel Revenues

	Name	Company		
		VOH Weight	Company FF Energy Revenue	Company FF Extract Revenue
2016UKPassiveEquity	1 Royal Dutch Shell PLC	8.23%	0%	13%
	2 Scottish & Southern Energy	0.83%	50%	0%
	3 BP	4.14%	0%	9%
	4 Glencore Plc	1.14%	0%	5%
	5 Centrica	0.68%	1%	2%
2016EMActiveEquity	1 Enka Insaat ve Sanayi AS	0.92%	46%	0%
	2 Bukit Asam (Persero) Tbk PT	0.25%	0%	98%
	3 Lukoil PJSC	0.31%	1%	28%
	4 CNOOC Ltd.	0.38%	0%	77%
	5 Petrobras SA	0.32%	20%	18%
2016Aggregate	1 Royal Dutch Shell PLC	3.81%	0%	13%
	2 Scottish & Southern Energy	0.31%	50%	0%
	3 Halliburton Co	0.36%	0%	100%
	4 BP	1.54%	0%	9%
	5 Marathon Oil Corp	0.32%	0%	100%
2016GlobalActive Equity	1 Halliburton Co	0.67%	0%	100%
	2 Marathon Oil Corp	0.59%	0%	100%
	3 Southwestern Energy Co	0.18%	0%	66%
	4 Royal Dutch Shell PLC	1.39%	0%	13%
	5 EOG Resources	1.34%	0%	71%

Environmental Impact From Fossil Fuel Activities

Name	Company	
	Portfolio Weight	Impact Ratio
1 Rio Tinto PLC	1.56%	37%
2 Glencore Plc	1.14%	36%
3 BHP Group Ltd	1.04%	21%
4 Royal Dutch Shell PLC	8.23%	3%
5 Anglo American Plc	0.57%	37%
1 Vale S.A.	0.26%	37%
2 Bukit Asam (Persero) Tbk PT	0.25%	37%
3 China Petroleum & Chemical Corp	0.39%	3%
4 CNOOC Ltd.	0.38%	3%
5 Lukoil PJSC	0.31%	4%
1 Rio Tinto PLC	0.58%	37%
2 Glencore Plc	0.42%	36%
3 Royal Dutch Shell PLC	3.81%	3%
4 BHP Group Ltd	0.39%	21%
5 Anglo American Plc	0.21%	37%
1 Hong Kong and China Gas Co Ltd	0.70%	20%
2 EOG Resources	1.34%	3%
3 Royal Dutch Shell PLC	1.39%	3%
4 Pioneer Natural Resources	1.07%	3%
5 Marathon Oil Corp	0.59%	3%

FOSSIL FUEL & STRANDED ASSETS EXPOSURE METRICS

Watch Lists

Portfolio Level Fossil Fuel Revenues

	Name	Weight	Company	Company
			VOH FF Energy Revenue	FF Extract Revenue
2019GlobalActive Equity	1 EOG Resources	3.82%	0%	71%
	2			
	3			
	4			
	5			
2019EMActiveEquity	1 Lukoil PJSC	0.48%	1%	28%
	2 Enka Insaat ve Sanayi AS	0.75%	46%	0%
	3 Bukit Asam (Persero) Tbk PT	0.27%	0%	98%
	4 Petrobras SA	0.52%	20%	18%
	5 Oil & Natural Gas Corp Ltd	0.39%	0%	58%
2019LowCarbon PassiveEquity	1 Marubeni Corp	0.19%	0%	22%
	2 Schlumberger Ltd	0.33%	0%	100%
	3 Halliburton Co	0.14%	0%	100%
	4 Mitsui & Co	0.38%	0%	21%
	5 TechnipFMC Ltd	0.11%	0%	49%
2019GlobalPassive Equity	1 Royal Dutch Shell PLC	0.66%	0%	13%
	2 Tokyo Electric Power Co. Holding In	0.02%	75%	0%
	3 Chevron Corp	0.57%	0%	27%
	4 Schlumberger Ltd	0.14%	0%	100%
	5 ConocoPhillips	0.16%	0%	100%
2019UKPassiveEquity	1 Royal Dutch Shell PLC	9.57%	0%	13%
	2 BP	5.00%	0%	9%
	3 Scottish & Southern Energy	0.53%	50%	0%
	4 Glencore Plc	1.40%	0%	5%
	5 BHP Group Ltd	1.92%	0%	39%
2019Aggregate	1 Royal Dutch Shell PLC	1.84%	0%	13%
	2 EOG Resources	0.97%	0%	71%
	3 BP	0.93%	0%	9%
	4 Scottish & Southern Energy	0.10%	50%	0%
	5 Schlumberger Ltd	0.11%	0%	100%

Environmental Impact From Fossil Fuel Activities

Name	Portfolio Weight	Company
		Impact Ratio
1 EOG Resources	3.82%	3%
2		
3		
4		
5		
1 Bukit Asam (Persero) Tbk PT	0.27%	37%
2 Reliance Industries Ltd	0.51%	3%
3 CNOOC Ltd.	0.47%	3%
4 Lukoil PJSC	0.48%	4%
5 MOL HUNGARIAN OIL AND GAS N	0.40%	3%
1 Rio Tinto PLC	0.26%	37%
2 Mitsui & Co	0.38%	14%
3 Hong Kong and China Gas Co Ltd	0.08%	20%
4 Wesfarmers Ltd	0.04%	37%
5 Royal Dutch Shell PLC	0.30%	3%
1 Rio Tinto PLC	0.24%	37%
2 BHP Group Ltd	0.34%	21%
3 Glencore Plc	0.09%	36%
4 Anglo American Plc	0.08%	37%
5 Wesfarmers Ltd	0.07%	37%
1 Rio Tinto PLC	2.46%	37%
2 Glencore Plc	1.40%	36%
3 BHP Group Ltd	1.92%	21%
4 Anglo American Plc	1.01%	37%
5 Royal Dutch Shell PLC	9.57%	3%
1 Rio Tinto PLC	0.53%	37%
2 Glencore Plc	0.26%	36%
3 BHP Group Ltd	0.42%	21%
4 Anglo American Plc	0.19%	37%
5 Royal Dutch Shell PLC	1.84%	3%

FOSSIL FUEL & STRANDED ASSETS EXPOSURE METRICS

Key Takeaways

Financial Exposure to Fossil Fuel Related Activities

- Across all the portfolios and the analysis years (2016 and 2019), the UK Passive Equity portfolios have the highest VOH exposure to fossil fuel activities. The exposure has increased by 3% from 21% in 2016 to 24% in 2019. Around 90% of this exposure is attributed to extraction activities across both years.
- The 2019 Global Active Equity portfolio has the lowest VOH exposure to fossil fuel activities across all portfolios analysed with 3.82% exposure coming only from extraction activities.
- Over time, financial exposure to fossil fuel activities can change due to either active or passive reasons. Investors may actively reduce exposure by divesting from companies engaged in fossil fuel related activities. Alternatively, exposure may change passively, for example if valuations of companies engaged in fossil fuel related activities rises or falls relative to other companies in a portfolio.
- Coal power generation is considered one of the most critical sectors to transition away from if global carbon reduction targets are to be achieved.

TCFD Relevance

- The TCFD identifies emissions per unit of fossil fuel reserve - or 'embedded emissions' - as a climate related metric associated with transition risk.
- Companies deriving significant revenues from fossil fuel related activities, dependent on fossil fuel reserves for their market valuations, or investing heavily in fossil fuel related activities (such as exploration), run the risk of becoming 'stranded assets'.
- In the TCFD's supplemental guidance for the financial sector, there are also recommendations to disclose exposure to 'carbon related assets' (e.g. companies engaged in fossil fuel extraction and power generation) which can be expressed in units of currency, or - as shown in the analysis above - as a percentage of total portfolio value.

2 DEGREE ALIGNMENT: ENERGY TRANSITION

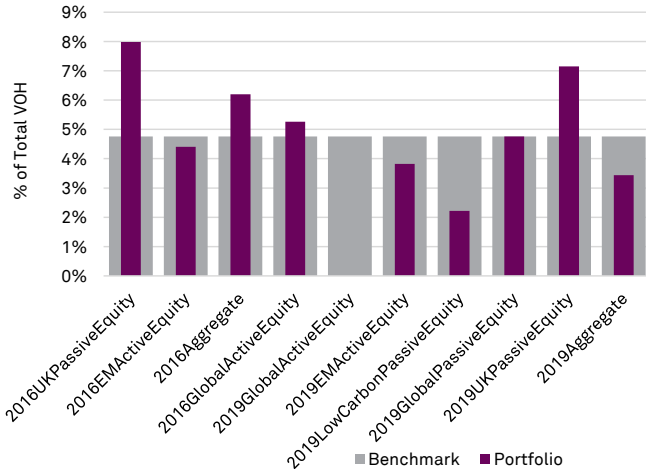
Financial Exposure to Energy Generation & Energy Revenue Breakdown

The energy sector will play a critical role in any strategy geared towards achieving 2 degree alignment targets. Energy generating companies can be considered climate-aggregators (fossil fuels) or climate-mitigators (renewables). The full list of energy types considered is shown below:

- **Fossil Fuels:** coal, petroleum, natural gas
- **Renewables:** solar, wind, wave & tidal, geothermal, hydroelectric, biomass
- **Other:** nuclear, landfill gas, any other unclassified power generation

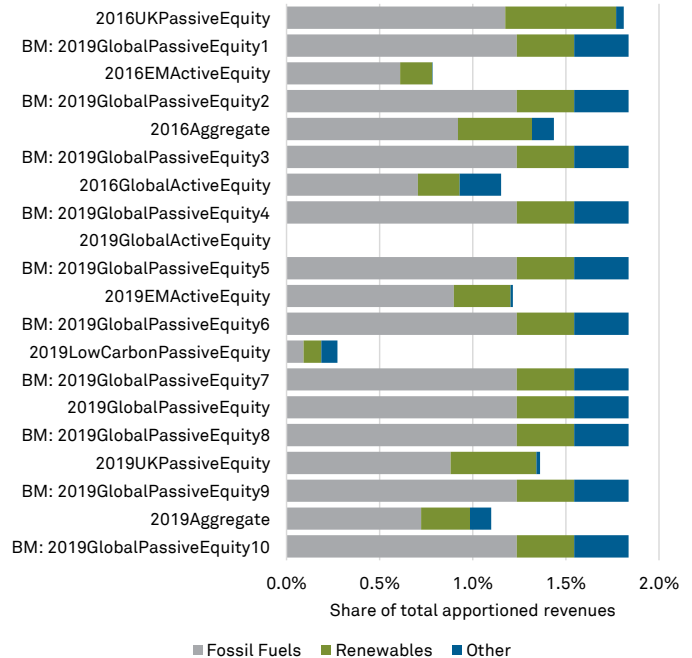
To determine the overall level of exposure each portfolio or benchmark has to energy generation, the chart below shows the percentage share of the total value invested in companies that derive anything above 0% of their total revenues from energy generating activities.

VOH Exposure to Energy Generation Activities



In order to highlight the level of revenue dependency that investees have in energy generating activities, the chart below shows the apportioned energy revenues associated with each portfolio. The revenues are broken out by type - fossil fuel (aggregator), renewable (mitigator), or other.

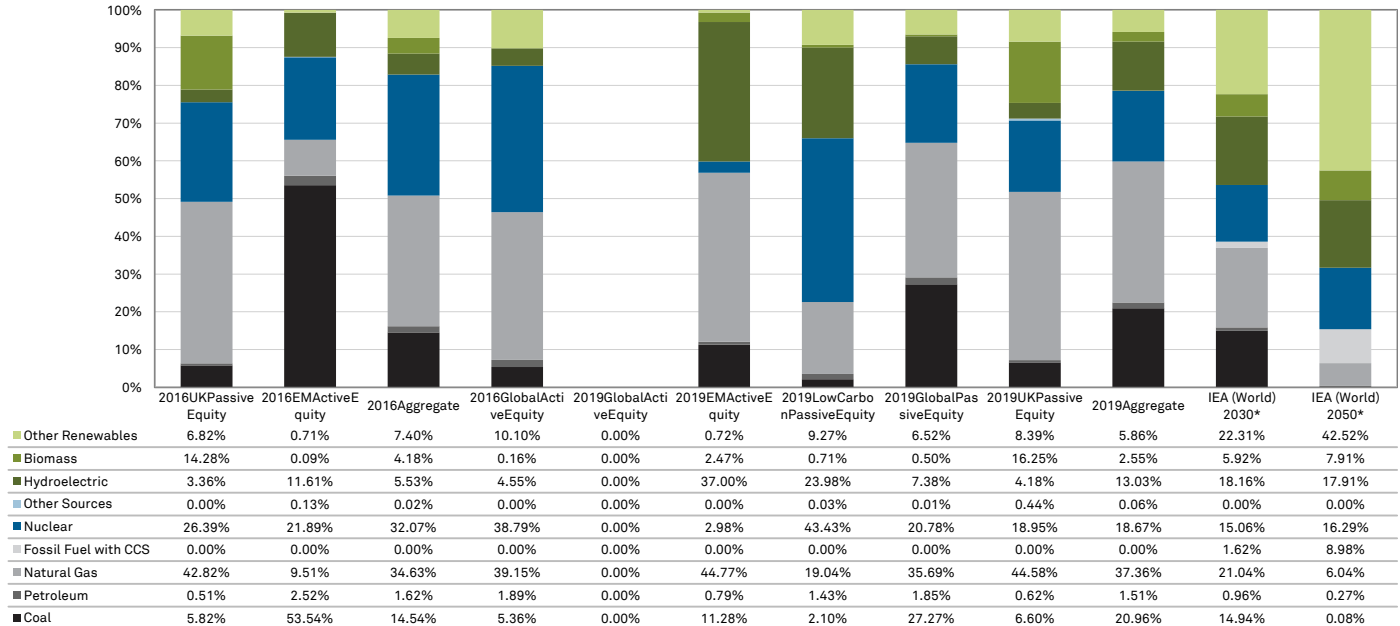
Energy Revenue Share



2 DEGREE ALIGNMENT: ENERGY TRANSITION

Energy Generation Mix

In addition to energy revenue analysis, Trucost collects disclosed information relating to the amount of physical units of power (GWh) generated by companies in a portfolio. Understanding a portfolio's energy mix allows it to be compared not just against benchmarks that reflect the economy of today, but also against forward looking benchmarks that - as suggested by the International Energy Agency - are what is required for the low-carbon economy of tomorrow.



* The content within the table above was prepared by S&P Trucost Limited, with data derived from the 2 Degree Scenarios developed by the International Energy Agency. ©OECD IEA 2017. The content within the table above does not necessarily reflect the views of the International Energy Agency.

2 DEGREE ALIGNMENT: ENERGY TRANSITION

Key Takeaways

Financial Exposure to Energy Generation

- As a percentage of VOH, the UK Passive Equity portfolio is the most exposed to energy generation related revenues, standing at 7% in 2019 from 8% in 2016..
- The exposure of all other portfolios ranges from 2-6% of their total VOH, with the 2019 Low Carbon portfolio having the lowest exposure at 2%.

2 Degree Alignment of Energy Mix

- All portfolios (except the 2019 Low Carbon Passive Equity portfolio) have higher share of fossil fuel power and lower share of renewable power in their energy mix than the IEA's 2030 and 2050 2 degree aligned world energy mix.
- All portfolios have a sizable dependency on power generated from fossil fuel, ranging from approximately 55-65% of GWh generated (with the exception of the 2019 Low Carbon Passive Equity portfolio). There has been an increase in this dependency from 50% in 2016 Aggregate portfolio to 60% in 2019 Aggregate portfolio.
- The Low Carbon Passive Equity portfolio appears less dependent on fossil fuel power, with 44% of energy share coming from nuclear power. This is due to presence of utilities like Iberdrola SA, Duke Energy Corp, which have high nuclear power generation activities.
- The 2019 Global Active Equity portfolio has no values in the 2 Degree Alignment: Energy Transition section as it does not include any utility companies that disclose information on the units of energy produced.

TCFD Relevance

- The TCFD identifies energy generation mix as a type of transition risk metric. The 2 degree alignment of a portfolio's energy generation mix can thus be used to highlight the level of exposure to potential policy action aimed at transitioning to a low-carbon economy over different time horizons.

APPENDIX

1. TCFD Recommended Disclosures and Supplementary Guidance for Asset Owners and Managers

	Governance	Strategy	Risk Management	Metrics & Targets
Recommended Disclosures for All Sectors	<ul style="list-style-type: none"> a) Describe the board's oversight of climate-related risks and opportunities. b) Describe management's role in assessing and managing climate-related risks and opportunities. 	<ul style="list-style-type: none"> a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term. b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning. c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario. 	<ul style="list-style-type: none"> a) Describe the organization's processes for identifying and assessing climate-related risks. b) Describe the organization's processes for managing climate-related risks. c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management 	<ul style="list-style-type: none"> a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process. b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks. c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.
Supplemental Guidance for Asset Owners / Asset Managers		<p>Asset owners should describe how climate-related risks and opportunities are factored into relevant investment strategies. This could be described from the perspective of the total fund or investment strategy or individual investment strategies for various asset classes. Asset managers should describe how climate-related risks and opportunities are factored into relevant products or investment strategies. Asset managers should also describe how each product or investment strategy might be affected by the transition to a lower-carbon economy.</p> <p>Asset owners that perform scenario analysis should consider providing a discussion of how climate-related scenarios are used, such as to inform investments in specific assets.</p>	<p>Asset owners / managers should describe, where appropriate, engagement activity with investee companies to encourage better disclosure and practices related to climate-related risks to improve data availability and asset owners' / managers' ability to assess climate-related risks.</p> <p>Asset owners should describe how they consider the positioning of their total portfolio with respect to the transition to a lower-carbon energy supply, production, and use. This could include explaining how asset owners actively manage their portfolios' positioning in relation to this transition. Asset managers should describe how they manage material climate-related risks for each product or investment strategy.</p>	<p>Asset owners / managers should describe metrics used to assess climate-related risks and opportunities in each fund / product or investment strategy. Where relevant, asset owners / managers should also describe how these metrics have changed over time. Where appropriate, asset owners / managers should provide metrics considered in investment decisions and monitoring.</p> <p>Asset owners / managers should provide the weighted average carbon intensity, where data are available or can be reasonably estimated, for each fund / product or investment strategy. In addition, asset owners / managers should provide other metrics they believe are useful for decision making along with a description of the methodology used.</p> <p style="text-align: right;">Source:TCFD</p>

APPENDIX

2. Apportioning

Many of the exposure metrics calculated by Trucost rely on the apportioning of company owned resources/pollutants to the port folio or benchmark. Apportioning, as an approach, is built on the principle of ownership. That is, if an investor owns - or in the case of debt holdings, finances - 1% of a company, then they also 'own' 1% of the company's resources/pollutants.

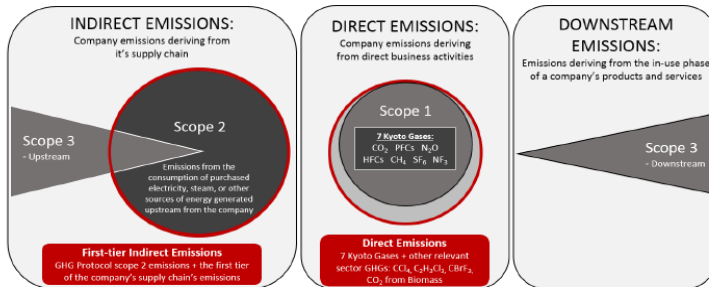
For equity only portfolios the apportioning factor is usually obtained by dividing the value of holding by the company's mark et capitalisation on the date of analysis. For debt only, or mixed portfolios, the larger of enterprise value and market capitalization on the date of holding is used as the denominator. This approach is used to minimize the risk of apportioning 'spikes' when an enterprise value approaches zero (or is negative).

The company level resources/pollutants are then multiplied by the apportioning factor to arrive at resource/pollutant quantities specific to each holding. The portfolio level resources/pollutants is the sum of all of these quantities.

3. Scopes

The right scope of emissions to include in footprint calculations is dependent on the breadth of view that the analyst wishes to take. Restricting the scope to direct operational emissions only (scope 1) removes the risk of double counting carbon, but also limits the level of insight provided as much of what can be considered exposure to 'carbon risks' may exist in the supply chain of investees. Trucost recommends widening the scope of analysis to uncover more of these potential risks. The full list of scopes available is shown below:

- **Direct (Scope 1)** = CO₂e emissions based on the Kyoto Protocol greenhouse gases generated by direct company operations.
- **Direct (Other)** = Additional direct emissions, including those from CCl₄, C₂H₂Cl₃, CBrF₃, and CO₂ from Biomass.
- **Purchased Electricity (Scope 2)** = CO₂e emissions generated by purchased electricity, heat or steam.
- **Non-Electricity First Tier Supply Chain (Scope 3)** = CO₂e emissions generated by companies providing goods and services in the first tier of the supply chain.
- **Other Supply Chain (Scope 3)** = CO₂e emissions generated by companies providing goods and services in the second to final tier of the supply chain.
- **Downstream (Scope 3)** = CO₂e emissions generated by the distribution, processing and use of the goods and services provided by a company.



APPENDIX

4. Data Collection

Trucost's unique approach to environmental data collection and modelling enables near complete coverage of most investment universes, despite often low levels of reporting among investees. A four step process is used as part of our data gathering exercise.

1. **Analyse Financial and Sector Data** - A company's financials are analysed, collecting consolidated revenues for all companies and specifying their reporting scopes and operational boundaries.
2. **Map Activities to Trucost's Environmentally Extended Input-Output (EE-IO) Model** - Trucost's EE-IO model uses 450+ business activities (broadly aligned to the NAICS, with some additional sectors included to distinguish key activities with materially different physical impacts) to model a company's environmental impacts by assigning portions of each company's revenues to one or more of these activities. The EE-IO model then estimates the pollutant emissions and resource use associated with each business activity, both directly (for a company's own operations) and across the supply chain, using the revenue sector breakdown.
3. **Incorporate Disclosures and Public Registry Data** - Trucost searches all publically disclosed data sources of companies to find usable environmental data that will be used to overwrite Trucost's modelled estimates. Trucost ensures the scope and time horizon of any environmental data found matches that of its financials.
4. **Company Engagement and Data Verification** - Trucost analysts quality check the entire research process internally, then share the results with each company directly via a secure online portal. Companies are given one month to respond to Trucost to verify its data or directly engage to provide either refined, additional or non-public information. If appropriate and applicable data is provided, Trucost will integrate this into its analysis before publishing the data to our subscribers.

All data collected as part of the process described above will be assigned a 'disclosure flag', indicating the source of each specific data-point. These flags will fall into one of three possible 'disclosure categories', Full Disclosure, Partial Disclosure or Modelled.

- **Full Disclosure** - Trucost has used data disclosed by a company in an un-edited form as it matches the reporting scope and accuracy required by the research process.
- **Partial Disclosure** - Trucost has used data disclosed by a company but has made adjustments to match the reporting scope required by its research process (e.g. where a company discloses its emissions deriving from 85% of its operational sites, this data is used to model 100% of its emissions). Values may also be derived from a previous year's disclosed data using changes in business activities and consolidated revenues.
- **Modelled** - In the absence of usable disclosures, the data has been modelled using Trucost's EE-IO model.

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