

# Carbon Risks in UK Equity Funds

Trucost study of the carbon footprints of portfolios and  
carbon management in pension fund assets



TRUCOST<sup>PLC</sup>

Commissioned by WWF

Includes in-depth analysis  
of Oil & Gas and  
Utilities investments



[wwf.org.uk](http://wwf.org.uk)

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“It is clear that the investment management industry and its clients need to understand the impact of carbon risk on the value and sustainability of their activities. This assessment of carbon risks within portfolios is therefore a timely and valuable tool for pension funds trustees and their fund managers.”

Colin Melvin, Chief Executive Officer, Hermes Equity Ownership Services Ltd

“This is an important piece of work with some significant findings for economists, listed companies, asset managers and pension funds. Clearly carbon management needs to be at the forefront of our thinking both now and in the future.”

Howard Pearce, Head of Environmental Finance and Pension Fund Management, Environment Agency

“Clearly fund managers and analysts are not properly including the potential impact of carbon pricing into their valuations of stocks. Given the likely implementation of carbon pricing by governments of the major economies, this could come as an unpleasant shock for pension fund trustees in the near future. There is now a window of opportunity for trustees to assure themselves on the implications of this for their funds.”

Mike Taylor, Chief Executive, London Pensions Fund Authority

“Unless pension fund trustees and insurance executives motivate their investment managers more effectively on carbon risk management, considerable asset value could be lost. The case studies in this valuable report offer graphic illustrations of the deeply dysfunctional behaviours that most currently encourage. The report shows also that companies need to report better on both their current carbon emissions and their decarbonisation strategies. Investors will increasingly need this information to assess future value.”

Penny Shepherd, Chief Executive, UK Sustainable Investment and Finance Association

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## WWF foreword

The recent downturn in the global economy is a stark reminder of the consequences of living beyond our means. But the consequences of a financial recession pale in comparison to the looming ecological credit crunch.

Demand for resources now exceeds the planet's capacity to replenish its "natural capital" by about 30%. If global consumption continues at the same rate, by the mid-2030s we will need the equivalent of two planets to maintain our lifestyles. The impacts of this over-consumption are being felt now.

WWF's Living Planet Index – an indicator of the state of the planet's ecosystems – has shown a decline of 30% in the past 35 years. Biodiversity underpins the health of the planet. Species and natural habitats provide resources fundamental to life and the economy, such as food, clean water, medicines and commodities.

Addressing climate change is a central issue for WWF. Unless we stop average global temperatures from rising more than 2°C above the level recorded in pre-industrial times, we face a high risk of severe and irreversible changes in the planet's natural systems. To stay below 2°C, global greenhouse gas emissions must peak within the next 10 years and then fall by at least 80% by 2050. This can only be achieved by reducing the world's reliance on fossil fuels and stopping further destruction of tropical rainforests.

We need to change and we have a great opportunity to set change in motion now. Humanity can follow a model of development that respects ecological limits and fosters human wellbeing. As part of this change, WWF seeks to help transform the UK's finance infrastructure so that it is a sustainable system. We are working with organisations including investors, banks and insurers to stimulate collective action and leadership for sustainability.

Finance serves every economic sector with major impacts on our environment. We need to ensure that money is invested in areas that protect the planet's natural capital and push towards a low-carbon future. We want to support the City of London to emerge from the financial crisis as a vibrant and innovative centre for green finance.

By commissioning this report, WWF seeks to demonstrate that there are strong financial incentives for pension funds and other institutional investors to ensure that carbon risk is actively considered as a factor by their fund managers. WWF will also support measures like comprehensive, mandatory company reporting that increase the opportunities for fund managers to manage such risks.

With this in mind, WWF-UK and The Co-operative Bank, Insurance and Investments are campaigning for the introduction of mandatory reporting of current and long-term carbon emissions and their prospective costs, for listed companies in the high-emitting sectors.

We hope that disclosure of carbon liabilities will play an important role in providing better information and creating market incentives for investors to support and drive a successful low-carbon economy, particularly by financing clean, sustainable and renewable energy. It will help encourage companies to work harder to prepare for a low-carbon economy where higher emissions will mean lower profits, and the leaders will be those who grasp new opportunities for sustainable business.



David Nussbaum, CEO, WWF-UK



## Executive summary

Governments in OECD countries are implementing legislation and regulations to introduce or strengthen controls on greenhouse gas emissions through mechanisms such as cap-and-trade schemes. Carbon-intensive companies will incur rising carbon costs under government policies to apply carbon pricing and may lose market share to more efficient and innovative companies that emit less and seek new opportunities. As a consequence, the potential exposure of earnings to carbon costs across portfolios could have a knock-on effect on pension fund returns.

WWF commissioned Trucost and Mercer to analyse the greenhouse gas emissions and potential carbon costs associated with UK-based equity funds. Trucost analysed the greenhouse gas emissions associated with holdings, valued at over £206 billion, in 2,380 companies invested in by 118 equity portfolios. The underlying holdings data represent the holdings from UK-based institutional equity portfolios which are researched by Mercer and in which institutional investors, including pension funds, invest.

The carbon footprints of portfolios provide a comparable measure of emissions associated with holdings and an indicator for related exposure to carbon costs. The analysis includes direct operational greenhouse gas (GHG) emissions as well as those from direct (first-tier) suppliers, such as electricity and logistics providers. Emissions from products in use are excluded from this analysis to limit double-counting. However, they can be a significant source of risk for companies in sectors such as Oil & Gas.

Mercer interviewed the managers of the four investment portfolios with the smallest and largest carbon footprints to find out whether decision-making includes carbon risk factors.

## Overall findings

### Fund exposure to carbon costs

- Trucost's analysis of the combined portfolios shows that the 2,380 companies invested in emit over 10 billion tonnes of greenhouse gases globally each year, measured as their carbon dioxide-equivalent (CO<sub>2</sub>-e) emissions.
- Since the aggregated 118 funds own approximately 1.4% of the total market capitalisation of these companies, they "own" 1.4% of greenhouse gases emitted by them annually, or 134 million tonnes of CO<sub>2</sub>-e. This equates to 22% of total UK GHG emissions.
- Trucost applied two potential carbon prices to the 134 million tonnes of CO<sub>2</sub>-e emissions attributed to the 118 portfolios. Trucost used £12 – the three-month average market price of carbon dioxide permits under the EU Emission Trading Scheme – to identify the funds' short-term global exposure to carbon costs. If the companies paid £12 per tonne for the 134.2 million tonnes of CO<sub>2</sub>-e allocated to holdings, carbon costs of £1.6 billion would equate to 0.7% of revenue from holdings.
- Trucost used the social cost of carbon outlined in the UK Government's Stern Review on the Economics of Climate Change (2006) to demonstrate financial risk from possible future carbon prices. If portfolio companies paid £57 for each tonne of CO<sub>2</sub>-e allocated to holdings, carbon costs of over £7.65 billion would equate to 3.2% of combined revenues.
- The carbon footprint of the combined portfolios analysed is 582 tCO<sub>2</sub>-e per million invested. This is 20% smaller than the carbon footprint of the MSCI World Index. The lower carbon



footprint is largely driven by sector allocation decisions, because the value of portfolio investments in carbon-intensive sectors such as Utilities is underweight compared with the Index. The better carbon performance of the portfolios is also due to stock selection effects. Portfolio holdings are less carbon intensive on average than securities in the Index, notably in the Utilities sector.

### Variation in carbon footprints of portfolios

- The carbon footprints of individual portfolios range from 209 tCO<sub>2</sub>-e/£ million to 1,487 tCO<sub>2</sub>-e/£ million. The significant variation in the carbon footprints of portfolios indicates varied exposure to carbon costs, which is due to both sector allocation and stock selection decisions.

## Fund management

### Fund managers complacent on carbon

- Pension funds cannot assume that their fund managers are actively managing carbon risks in their investments. Indeed, interviews by Mercer found that fund managers are not yet doing so. Findings revealed that managers do not actively consider climate change factors such as greenhouse gas emissions as part of their investment processes mainly due to the expectation that governments will not achieve emissions reduction targets or establish a global carbon price; short-term pressures to generate returns; and the lack of standardised reporting frameworks needed to deliver comparable, accurate data on company emissions.
- Perceived barriers to integrating carbon performance into investment processes are incongruous with emerging greenhouse gas regulations in major economies including Europe and the United States, including cap-and-trade schemes to price emissions; and the fact that current and expected carbon costs are already reducing earnings and valuations for some carbon-intensive portfolio companies.
- In addition, better reporting by companies in carbon-intensive sectors such as Utilities has increased the availability of corporate emissions data measured in line with the Greenhouse Gas Protocol corporate accounting standard.<sup>1</sup> The potential to use available standardised data to calculate relative exposure to carbon costs in financial analysis is demonstrated by this study – Trucost has used corporate greenhouse gas emissions data on at least 85% of holdings by value to assess the carbon intensity and exposure of companies, sectors and portfolios.
- Fund managers' "wait-and-see" approach to company exposure to carbon costs could expose pension funds to future financial risk and result in missed opportunities to position portfolios for a carbon-constrained economy.

<sup>1</sup> Developed by the World Resources Institute (wri.org) and World Business Council for Sustainable Development (wbcscd.org)



### Distribution of portfolio carbon footprints by investment style and region

- The variation in portfolio carbon footprints appears to be unintentionally driven by factors such as investment style and regional bias. However, significant variation in the carbon footprints of portfolios that employ the same investment style or invest in the same region shows potential to reduce exposure to carbon costs through stock selection decisions without changing strategies.

### Sector and stock analysis

#### Top contributors to carbon footprint

- The main contributors to the carbon footprint of the combined portfolios are the Utilities, Basic Resources, Construction & Materials, Oil & Gas and Food & Beverage sectors.
- E.ON AG is less carbon-intensive than the majority of sector peers, but since the largest investment of the aggregated portfolios in the Utilities sector is in E.ON, it is the main contributor to the combined carbon footprint.
- The other four main contributors to the portfolio carbon footprint are RWE AG, International Power Plc, American Electric Power Company, Inc. and BP Plc. If they paid £12 per tonne of their emissions under cap-and-trade schemes, earnings could fall by between 9% for BP and 99% for American Electric Power.

#### Carbon exposure in the Utilities and Oil & Gas sectors

- 4% of the value of aggregated holdings is invested in the Utilities sector, while 13% is invested in the Oil & Gas sector. These sectors are responsible for half of the greenhouse gas emissions attributed to the combined funds.
- Utilities companies are more exposed to carbon costs applied to operational emissions than Oil & Gas companies, which are also exposed to low carbon and fuel efficiency standards applied to products. If the 10 companies in these sectors that contribute most to the carbon footprint were to pay a carbon price of £57/tCO<sub>2</sub>-e, four Utilities companies could face a loss – RWE, International Power, American Electric Power and Reliant Energy. Although they are likely to be able to pass on some carbon costs in higher prices, those that are significantly more carbon intensive than sector peers – notably International Power and American Electric Power – could find it more difficult to do so.
- The carbon intensity of Utilities companies ranges from 52 tCO<sub>2</sub>-e/£ million for a renewable power generator to 79,775 tCO<sub>2</sub>-e/£ million for a coal-fired power generator. Fund managers could therefore invest in companies with lower carbon intensities without changing the weighting of holdings in the Utilities sector.
- Despite several Oil & Gas companies acknowledging financial risk from future carbon constraints, many are investing in carbon-intensive unconventional fossil fuel production from oil shale and tar sands, which will increase their exposure to carbon constraints.



### Carbon intensity within sectors

- Exposure to carbon costs varies widely at a company level in the Oil & Gas, Basic Resources, Construction & Materials, and Food & Beverage sectors. Companies that are carbon-intensive relative to industry peers, that face competition from companies which are not regulated on emissions, and that operate in markets with greater price elasticity of demand, may have limited ability to pass on rising input costs without losing market share.
- The wide variation in the carbon exposure of companies held in carbon-intensive sectors shows that there is significant potential for fund managers to reduce carbon exposure across portfolios through stock selection decisions without altering sector allocations.

### Opportunities to address carbon risks

Pension funds and fund managers can:

- Monitor portfolios on greenhouse gas emissions and related exposure to carbon costs under existing and planned regulatory frameworks.
- Develop processes to proactively manage emissions-related risks and opportunities in portfolios to better protect their beneficiaries' long-term savings.
- Integrate climate change criteria such as carbon performance into financial analysis, stock selection decisions and active ownership practices.
- Use existing carbon data and support robust mandatory emissions reporting requirements for companies to disclose greenhouse gas emissions and related costs to investors.
- Invest in solutions such as renewable energy and energy efficiency technologies.
- Engage with carbon-intensive investee companies to encourage them to report emissions fully, disclose carbon costs, reduce emissions and develop effective strategies to manage climate risks and opportunities.



## Scope of study

WWF commissioned Trucost and Mercer to analyse the greenhouse gas emissions and potential carbon costs associated with UK-based institutional equity portfolios. The analysis, which uses holdings data provided by Mercer's Investment Consulting business, has important implications for how asset managers address carbon risks in pension fund assets. The study covers 118 portfolios that are actively managed, with holdings valued at over £206 billion based on data as of 31 December 2008.

For each portfolio included in this report, Trucost holds corporate greenhouse gas (GHG) emissions data on at least 85% of the value of holdings. Trucost has analysed GHG emissions associated with portfolio holdings in 2,380 companies.

### The study aims to answer the following questions:

*How exposed are UK pension fund assets to carbon costs under future regulations to constrain greenhouse gas emissions?* Trucost assessed the combined funds on their overall carbon footprint and exposure to carbon costs. Performance attribution analysis, from a carbon perspective, highlights how sector allocation and stock selection decisions influence the carbon footprint relative to the MSCI World Index.

*How significant is the variation between the carbon footprints of each asset manager portfolio, and therefore potential exposure to future carbon costs?* Trucost looks at key drivers of the variation in the carbon footprints of individual portfolios, which use a variety of indices as their benchmarks. To maintain the anonymity of fund managers, portfolios are numbered 1 to 118.

*Are asset managers managing carbon risks and opportunities in their investments?* Mercer has conducted interviews with selected fund managers to examine whether the four portfolios with the smallest and largest carbon footprints incorporate climate change risk factors into their decision-making, and whether investment processes are a driving factor in carbon performance. Trucost outlines steps that pension fund trustees and fund managers can take to address portfolio exposure to carbon costs.

*Do style and region influence carbon exposure?* Trucost examines whether investment style and the geographic location of equities affect carbon exposure. 71 equity portfolios are analysed by five investment styles – Neutral, Growth, Value, Normally Growth and Normally Value. All 118 funds are also analysed according to geography – the UK, Europe, the United States, Asia and Japan, and International equities.

*To what extent do holdings in Utilities and Oil & Gas companies contribute to carbon exposure?* Trucost analyses the carbon performance and exposure to carbon costs of companies in the Utilities and Oil & Gas sectors. Further analysis is provided on portfolio companies in other carbon-intensive sectors – Basic Resources, Construction & Materials and Food & Beverage.





### Trucost methodology to measure carbon performance

Trucost calculated the carbon footprint of each portfolio in this study by measuring each constituent company's greenhouse gas emissions, measured as their carbon dioxide equivalent (CO<sub>2</sub>-e) emissions. The companies analysed are included in Trucost's database of corporate environmental impacts. Trucost has analysed the carbon performance of over 4,500 companies worldwide since 2000 and maintains the world's largest and most comprehensive database of standardised corporate greenhouse gas (GHG) emissions data.

To calculate the carbon performance of companies included in the study, company disclosures on emissions were reviewed. Where necessary, quantities were normalised and standardised in line with the Greenhouse Gas Protocol corporate accounting standard. Where companies only disclosed resource use such as fuel consumption, this information was used to derive emissions data where possible. Where companies do not disclose adequate data, Trucost used its unique methodology based on production data to calculate the likely greenhouse gas emissions resulting from business activities in 464 sectors. This allows for comparisons of all companies, regardless of disclosure levels. Companies are given the opportunity to provide additional information, and to verify Trucost data on their carbon performance.

**Direct and first-tier indirect emissions:** The analysis includes direct emissions from operations and gases emitted by direct (first-tier) suppliers. This enables assessment of potential exposure to direct carbon costs applied to operational emissions, as well as to carbon costs passed on by suppliers of companies held in the portfolios. Emissions from direct (first-tier) suppliers include greenhouse gases released by suppliers of electricity, business air travel and logistics. These emissions are generated from the production of goods and services purchased by a company. Trucost's model uses production data to calculate the supply chain impacts of a company. Most companies are not major emitters of direct GHGs and adopting this method prevents companies effectively outsourcing accountability for emissions. In a number of sectors indirect GHG emissions are greater than their direct emissions.

**Carbon intensity:** To compare the carbon exposure of companies of all sizes and sectors, greenhouse gas emissions are normalised by revenue to identify carbon intensity.

**Carbon footprint:** The carbon footprint of a portfolio is calculated by allocating CO<sub>2</sub>-e emissions from each constituent company to each fund in proportion to ownership. Carbon footprints are expressed as metric tonnes of CO<sub>2</sub>-e allocated to each fund per million pounds of revenue. Using the same approach to assess the carbon footprints of each fund allows for comparison all 118 portfolios, regardless of size. The greenhouse gas emissions and revenues "owned" by each fund are summed up to calculate the total carbon footprints of aggregated holdings in the combined portfolios.

In the calculation of the portfolio carbon footprints, because the indirect emissions of one company could also be the direct emissions of another, the analysis contains some element of double-counting. Nevertheless, this does not affect the comparison of portfolios (or companies), since the same approach is used to calculate their emissions. To limit any issues associated with double-counting, Trucost excluded emissions from wider supply chains and products in use. For companies in sectors such as Oil & Gas and Automobiles & Parts, these can be a greater source of risk under regulations such as emissions performance or fuel efficiency standards.

To find out more about Trucost's methodology, see page 36.



## Regulations implementing carbon costs

Companies in the combined 118 portfolios are exposed to carbon costs incurred through regulations to reduce greenhouse gas emissions, including carbon taxes, cap-and-trade programs, and emissions performance standards. Some companies currently have to pay for their emissions, or actions to reduce them, under regulations implemented in countries that have agreed to carbon reduction targets under the UN Kyoto Protocol international agreement on climate change. Thirty-seven countries agreed to cut GHG emissions by at least 5% from 1990 levels between 2008 and 2012.

UN negotiations towards an agreement to succeed the current phase of the Kyoto Protocol from 2013 onwards will culminate in Copenhagen, Denmark, in December 2009. G8 nations – the United States, UK, Japan, Canada, Germany, France, Italy, and Russia – are working towards an international agreement on a global goal to at least halve emissions by 2050. GHG reductions of at least 80% are needed globally to have a chance of keeping the increase in average global temperature to less than 2°C from pre-industrial levels and so avoiding the most dangerous impacts of climate change.<sup>2</sup> If emissions are not cut adequately, climate change could wipe 5% to 20% off annual world GDP in the long term, according to the UK Government's Stern Review on the Economics of Climate Change (2006).<sup>3</sup> Based on existing technologies and those likely to become available by 2030, carbon prices of up to £54 per metric tonne may be required to help stabilise atmospheric GHG emissions at less risky levels.<sup>4</sup> The longer action is delayed, the higher the costs of abatement.

The EU has an existing target to cut emissions by 20% from 1990 levels by 2020. If a global deal is reached, this could be raised to 30%. To help achieve reductions, the EU Emission Trading Scheme (EU ETS) – the only mandatory multi-sector trading scheme already in place – is currently being strengthened. Many of the portfolio companies are exposed to rising carbon costs under the EU ETS, as well as costs in the United States, where an economy-wide cap-and-trade scheme is likely to be introduced by 2012 to help cut emissions.

Market-based approaches may not be enough to achieve reductions. Other policies and measures being introduced in a range of countries to facilitate cuts in emissions include carbon taxes applied to fossil fuels and emissions performance standards for power plants, vehicles and fuels, as well as financial support for renewable energy provision and uptake.

### Carbon allowances under the EU Emission Trading Scheme

The EU ETS covers more than 10,000 industrial installations which account for around half of total EU CO<sub>2</sub> emissions. Companies with operations under the scheme, including combustion plants, oil refineries, iron and steel plants and cement producers, must surrender an EU Allowance or carbon permit for each tonne of carbon dioxide emitted. The majority of allowances are allocated to installations free of charge, with some 7% of total allowances currently auctioned in the UK under phase II of the scheme. Companies that emit more than the number of permits allocated freely can buy EU Allowances issued through government auctions or purchase project credits issued under the UN Kyoto Protocol. Companies can also reduce emissions or purchase EU Allowances on the carbon market to meet their caps. Companies that emit less than their permits allow can sell excess allowances on the market.

<sup>2</sup> Climate Change 2007: Synthesis Report, Summary for Policymakers, page 20, Intergovernmental Panel on Climate Change, November 2007

<sup>3</sup> [http://www.hm-treasury.gov.uk/sternreview\\_index.htm](http://www.hm-treasury.gov.uk/sternreview_index.htm)

<sup>4</sup> Pathways to a Low-Carbon Economy, Version 2 of the Global Greenhouse Gas Abatement Cost Curve, McKinsey & Company, January 2009; €60, exchange rate 0.89466 as at 15 April 2009 (Oanda), rounded up. See page 12.



## Financial implications of carbon costs

Cap-and-trade schemes aim to encourage a shift to low-carbon, energy-efficient technologies, processes, goods and services. Emissions trading will increase operating costs for companies with business models that rely on fuels and processes that produce high levels of GHG (CO<sub>2</sub>-e) emissions.

The amount of CO<sub>2</sub>-e that a company emits relative to revenue generated indicates its carbon intensity. This shows the extent to which a company – or sector – depends on its ability to emit CO<sub>2</sub>-e to generate income, while externalising associated damage costs. Measuring carbon intensity provides a proxy for exposure to carbon costs.

Companies that reduce emissions through more efficient use of resources such as energy are likely to benefit from lower operating costs. Companies in carbon-intensive sectors that cut their emissions could benefit from lower carbon costs and the shift towards low-carbon purchasing as competitive dynamics change.

Companies that are more carbon-efficient than sector peers, with limited exposure to carbon costs, stand to gain competitive advantage. Carbon pricing and other regulatory controls such as emissions standards will also create opportunities for companies that develop low-carbon “solutions” such as renewable energy and innovative technologies.

Carbon pricing will increasingly change cost structures for industries, with knock-on effects on investment returns. The Stern Review (2006) warned that until credible carbon pricing and supporting regulation is in place worldwide, there is a risk that investments in long-lived, high-carbon assets such as power stations and industrial plants could lock economies into a high-carbon trajectory, making mitigation more expensive in the future.

Pension fund trustees have a fiduciary duty to consider all financially material risks to investment returns over the long-term. Since carbon markets and other regulations to mitigate emissions could affect the performance of companies and economies, considering the financial implications of GHG emissions for investments is in the interests of pension fund beneficiaries. Managing exposure to carbon risks in funds will increasingly form an integral part of investment management as institutional investors recognise the growing importance of corporate carbon emissions as a source of financial risk and opportunity at a fund level.

## Market fails to address carbon risks

This study finds that some of the 118 portfolios analysed are investing in carbon-intensive companies that could face significant financial risk from carbon costs. Institutional investors may be concerned by the potential carbon exposure of some funds, as well as by Mercer’s findings from interviews with a small group of fund managers that carbon considerations have little bearing on investment decisions by portfolio managers. For pension funds and asset owners alike this finding is important as they may currently assume that active fund managers are proactively managing climate change risks and opportunities.

Failure to consider exposure to carbon costs in the short term could reflect wider failures in the financial system to anticipate and address market risks. There are dangerous gaps between investor consideration of portfolio exposure to carbon costs, corporate carbon reduction strategies and government policies to mitigate emissions. Many fund managers have been underestimating the financial significance of current and future carbon costs under regulations to reduce emissions. This is despite some companies in the Utilities sector reporting that carbon costs reduced earnings in 2008 and expectations of growing financial risk from carbon constraints (see page 31).



### Carbon exposure of UK equity funds

Trucost's analysis shows that the 2,380 companies invested in by the 118 equity portfolios emit over 10 billion tonnes of greenhouse gases globally each year, measured as their carbon dioxide-equivalent (CO<sub>2</sub>-e) emissions.<sup>5</sup> This is 16 times the amount of greenhouse gases emitted in the UK in 2008 (623.8 million tonnes of CO<sub>2</sub>-e).

The aggregated funds own approximately 1.4% of the total market capitalisation of the companies. Fund holdings therefore "own" 1.4% of greenhouse gases emitted by the companies, or 134.2 million tonnes of CO<sub>2</sub>-e. This equates to 22% of total UK greenhouse gas (GHG) emissions.

To identify the funds' potential exposure to carbon costs under government policies to apply carbon pricing worldwide, Trucost applied a carbon price of £12 to the 134.2 million tonnes of CO<sub>2</sub>-e attributed to the portfolios. This price is based on the average market price of carbon dioxide (EU Allowance) contracts for 2012 under the EU ETS over the three months to 15 April 2009.<sup>6</sup> If the companies had to pay £12 per tonne of emissions allocated to combined fund holdings, carbon costs would amount to over £1.6 billion. This equates to approximately 0.7% of revenue allocated to the aggregated portfolios.

In order to identify exposure to future carbon prices, Trucost applied the cost of damages associated with each tonne of GHG emissions – or the social cost of carbon – that is currently largely externalised in financial accounting. Regulations, taxes and emissions trading will increasingly internalise the cost of carbon for companies, bringing it closer to the social cost, which the UK Government's Stern Review on the Economics of Climate Change (2006) calculates as approximately £57 per tonne.<sup>7</sup>

If the companies held in the combined portfolios paid £57 for each tonne of CO<sub>2</sub>-e allocated to holdings, carbon costs would total over £7.65 billion, or 3.2% of revenue allocated to the combined funds.

#### Future carbon prices

Forecasts for the future price of CO<sub>2</sub> under the EU ETS as well as GHGs under global carbon trading vary widely. In the absence of a consensus on a projected market price of carbon, the social cost of carbon outlined in the Stern Review on the Economics of Climate Change is useful to model the potential impacts of the likely trend of rising carbon prices and their growing importance to companies and equity portfolios.

Since the Stern Review was published in 2006, Lord Nicholas Stern has said that assumptions used in the review led to the costs of inaction being underestimated. "Current evidence is now showing that the review was too cautious on the growth of emissions, on the deteriorating absorptive capacity of the planet, and on the pace and severity of the impacts of climate change."<sup>8</sup>

The social cost of carbon used in this study is therefore lower than the likely costs to society of each tonne of CO<sub>2</sub>-e emitted. However, \$85 (£57) is in line with an estimate by McKinsey & Company that technical abatement opportunities can achieve significant greenhouse gas reductions at a cost of up to €60 (£54) per tonne of avoided emissions.<sup>9</sup>

McKinsey's abatement cost curve provides an approach to understanding the level of carbon prices needed to achieve emission reductions, which may be higher or lower depending on factors including technical progress, cost savings and deforestation.

<sup>5</sup> See methodology on page 36

<sup>6</sup> Euros 13.10, exchange rate 0.89466 as at 15 April 2009 (Oanda), rounded up

<sup>7</sup> \$85 [http://www.hm-treasury.gov.uk/d/Executive\\_Summary.pdf](http://www.hm-treasury.gov.uk/d/Executive_Summary.pdf), exchange rate 0.67214 as at 15 April 2009 (Oanda), rounded up.

<sup>8</sup> A Blueprint for a Safer Planet, Nicholas Stern, Page 94, April 2009

<sup>9</sup> Pathways to a Low-Carbon Economy, Version 2 of the Global Greenhouse Gas Abatement Cost Curve, January 2009



## Sector and stock selection effects on carbon exposure

The carbon footprint of the combined 118 portfolios is 582 tonnes of CO<sub>2</sub>-e per million pounds of revenue “owned”. Over 582 tonnes of CO<sub>2</sub>-e are emitted annually for every million pounds of overall revenue. The carbon footprint of the aggregated portfolios is 20% smaller than the carbon footprint of the MSCI World Index (731 tCO<sub>2</sub>-e/£ million). Overall equity holdings may therefore be less exposed to carbon costs than the Index as a whole.

Attribution analysis can be used to identify stock selection and sector allocation effects on portfolio carbon performance against a benchmark index. A positive stock selection effect contributes 5% to the combined portfolios’ better carbon performance than the MSCI World Index. This means that on average, the portfolios select stocks that are less carbon intensive than companies in the Index, which in turn contributes to the portfolios having a smaller carbon footprint. In particular, portfolio companies in the Utilities sector, which emit 4,971 tCO<sub>2</sub>-e/£ million, are less carbon intensive on average than Utilities in the MSCI World Index (5,534 tCO<sub>2</sub>-e/£million). This has the largest positive effect from stock picks on the carbon footprint of the portfolio compared against the Index (+2.3%). Summing up stock selection effects across sectors results in the portfolios having a 5% smaller carbon footprint than the Index overall.

A positive effect (+1%) on carbon performance against the Index from the selection of Oil & Gas companies that are less carbon intensive on average than sector peers in the MSCI World Index offsets a negative effect (-0.2%) from an overweight position of holdings in the sector. Approximately 13.4% of the value of aggregated holdings is invested in Oil & Gas – the largest allocation of assets to any one sector – compared with 11.8% of the value of securities in the MSCI World Index.

However, the overall proportion of assets invested in carbon-intensive sectors in the combined portfolios is lower than the weighting of securities in these sectors in the MSCI World Index. Sector allocation effects therefore drive 15% of the portfolio carbon efficiency against the Index. The most significant positive sector allocation effect comes from an underweight position in the carbon-intensive Utilities sector relative to the benchmark (4.4% of the value of portfolio holdings compared with 5.4% of the value of securities in the Index).

The positive sector allocation effect (+10%) from the underweight position of portfolio holdings in Utilities is three times greater than the next largest sector allocation effect. Given the carbon intensity and regulatory exposure of the sector, this might indicate that in aggregate, investors could be positioning portfolios to reduce exposure to increasing carbon costs, but probably only as a side-effect of other factors. The fact that there is also a positive stock selection effect in the Utilities sector in the aggregated portfolio compared to the benchmark lends support to this hypothesis.

Anecdotal evidence from Mercer (see page 15) does indeed suggest that some fund managers recognise carbon as a risk factor within the Utilities sector. However, the fund managers interviewed regarded carbon risk as relatively unimportant and they are not proactively considering carbon costs within portfolio decisions. Furthermore, Trucost’s analysis of individual portfolios shows that many are invested in companies that are significantly more carbon-intensive than sector peers.



## Variation in carbon footprints of portfolios

Trucost ranked all 118 funds according to the size of their carbon footprints. The carbon footprint of the fund ranked 1<sup>st</sup> is seven times smaller than that of the fund ranked 118th, as shown in Table 1 below. The significant variation in the carbon footprints of individual portfolios indicates varied exposure to carbon costs. If a price of £57 were applied to emissions associated with holdings in the fund with the largest carbon footprint, carbon costs of over £52 million would equate to 8.5% of revenue attributed to holdings. In comparison, carbon costs of some £2.5 million for the fund with the smallest carbon footprint would amount to 1.2% of revenue. The fund with the smaller carbon footprint is therefore less exposed to the risk of future rising carbon costs.

**Table 1: Range in fund carbon footprints**

Funds*	Investment style	Region	Fund value (£ million)	Carbon footprint (tCO <sub>2</sub> -e/ £ mn)	Rank (total = 118)
15	Normally value	UK	332.00	209	1
66	Normally value	International	1.90	246	2
18	Other	UK	311.60	247	3
19	Other	International	803.50	299	4
40	Other	International	1,896.70	310	5
<b>Aggregated fund holdings</b>			<b>205,987</b>	<b>582</b>	
<b>FTSE All-Share</b>				<b>615</b>	
<b>MSCI World</b>				<b>731</b>	
35	Normally growth	UK	304.00	1,005	114
4	Always value	US	2,633.40	1,024	115
72	Other	International	2,372.60	1,041	116
<b>MSCI Asia ex-Japan</b>				<b>1,144</b>	
64	Always value	International	70.20	1,478	117
42	Normally value	International	896.50	1,487	118

\* Benchmark carbon footprints are calculated using free float adjusted holdings only

Both the fund with the smallest carbon footprint (209 tCO<sub>2</sub>-e/£ million) and the fund with the largest carbon footprint (1,487 tCO<sub>2</sub>-e/£ million) employ “Normally Value” investment styles.

One reason for the large carbon footprints of the funds at the bottom of the ranking is the allocation of a higher proportion of assets to carbon-intensive sectors such as Utilities. Another major factor is the selection of carbon-intensive companies for their sectors. In the Oil & Gas, Food & Beverage and Travel & Leisure sectors, the portfolios with larger carbon footprints select significantly more carbon-intensive stocks than those held in the top portfolios. In some cases, stock selection decisions drive the relative carbon performance of individual portfolios more than sector allocations.



## Fund management

### Investment approaches to carbon factors in top and bottom funds

Mercer interviewed the fund managers of the two highest and two lowest ranked carbon footprint portfolios to find out whether managers of carbon-efficient portfolios are incorporating carbon risk factors into their decision-making, or whether lower carbon footprints resulted from “unintended” allocation to lower-carbon sectors or stocks. Results show:

- None of the managers consider climate change as a core part of their investment process and the difference between the high and low carbon footprint portfolios is not driven by a “managed” process but largely by sector exposure where some managers have a natural leaning towards, or away from, high-polluting sectors.
- The managers at the bottom of the ranking are overweight the Utilities sector, and have also invested in Utilities stocks that are more carbon-intensive than the average for Utilities companies in the combined 118 portfolios.
- The top managers have a bias towards less carbon-intensive sectors such as Media and Industrial Goods & Services. These managers have invested in “quality” companies within these sectors, which have achieved economies of scale and gained competitive advantage over time through operational efficiencies.

The following case studies provide further insight into the investment processes of the top and bottom two strategies and their approaches to carbon emissions.

#### Case studies: Highest ranked funds

<p><b>Manager 1</b></p> <p>Carbon footprint 209 tCO<sub>2</sub>-e/£ mn</p>	<p>The manager takes a long-term investment approach – seeking businesses that are expected to remain viable over the next 25 years or longer. The manager realises that large companies operating in multiple countries require access to resources to support their businesses in the longer term. However, the team relies on the experience and knowledge of company management to deal with these issues and does not question management or independently assess how well the company is placed.</p> <p>The fund manager believes that climate change has no relevance for the way the team thinks about companies and is unlikely to be of importance to the fund as it doesn’t own capital-intensive companies. Energy and resource efficiency, including investments in the highly water-intensive Food &amp; Beverage sector, is not an important factor in the stock selection process.</p>
<p><b>Manager 2</b></p> <p>Carbon footprint 246 tCO<sub>2</sub>-e/£ mn</p>	<p>The manager invests in large cap companies with above average cash and earnings growth, quality balance sheets and good management. A characteristic of these companies is that they have control over their own operations and are not exposed to significant regulatory risk. The team tends to shy away from companies with a high exposure to regulated industries (Utilities) and those vulnerable to oil price movements (Oil &amp; Gas). This process naturally steers the manager away from high carbon emitters, although responding to climate change is not an explicit factor or theme driving such decisions.</p> <p>The manager has awareness of companies that are likely to benefit from carbon regulations and new low-carbon technologies such as renewable energy and energy-efficiency, but these companies generally do not fit the investment criteria for the portfolio.</p>



## Case studies: Lowest ranked funds

<p><b>Manager 117</b></p> <p>Carbon footprint 1,478 tCO<sub>2</sub>-e/£ mn</p>	<p>The objective of this strategy is to invest in “quality” companies with above market dividend yield and strong balance sheets. This results in large investments in carbon-intensive sectors such as Utilities and Construction &amp; Materials. The portfolio manager demonstrated a good awareness of climate change issues, including regulatory changes and the carbon-intensive companies within the Utilities and Oil &amp; Gas sectors. However, these factors are not considered relevant for investment decisions over their investment horizon, where outperformance is sought within a one-year time frame.</p> <p>Consequently, the portfolio is overweight carbon-intensive sectors as well as some of the “dirtier” companies within those sectors. The main rationale for this was poor visibility about climate change impacts for the bottom line of the companies they invest in, both from a regulatory change perspective and also in terms of the impact on financial performance.</p>
<p><b>Manager 118</b></p> <p>Carbon footprint 1,487 tCO<sub>2</sub>-e/£ mn</p>	<p>The manager focuses on producing absolute returns with a 2- to 3-year investment horizon and has a concentrated portfolio that is managed in a price disciplined way – when targets are hit the manager will close positions.</p> <p>This approach makes climate change issues challenging to consider as part of the investment process, as the manager felt that these issues were still not having a visible impact on the financial performance of companies. The carbon price for Utilities under the EU ETS is considered too low to impact on the bottom line.</p> <p>The manager therefore considers climate change and carbon risk a low order factor for investment analysis. The manager is open to investments in “risky” stocks that generate excess returns over a relatively short time period, and noted that “environmental damage might be an indication of a better managed company”, meaning that the company may have considered the environmental costs and decided the benefits of pollution (despite possible fines from breaking environmental regulations) outweighed the costs from a financial perspective.</p>

## Perceived barriers to considering carbon emissions

Across the two largest and smallest carbon footprint portfolios, Mercer found that climate change is considered a low order factor in investment decisions. Mercer’s interviews identified three major barriers to fund managers integrating climate change into decision-making (in order of importance): A lack of confidence in government policy, short-term pressures and incentives and lack of comparable and trustworthy data.

### Complacency on government policies to introduce carbon costs

*The fund managers’ view:* All of the fund managers interviewed claimed that a lack of visibility about where government regulations were going globally was causing them to put off any serious consideration of climate change. They felt that until they know the regulatory landscape and how it will change, it is impossible for them to evaluate the financial implications for the companies in which they invest.

Most of the fund managers interviewed felt that a global carbon price set up via a cap-and-trade system would be a good outcome as the financial market would have a transparent cost of carbon to factor into their valuation models for companies in different countries and sectors around the world. However, none of the interviewees believe that this would happen, mainly because it is too difficult to achieve the necessary political agreement and co-operation between developed and emerging markets. The probability of a global carbon price during their investment horizons was thought to be so low that it was considered negligible in investment decision-making.





Investor confidence in policy responses to climate change globally was also undermined by their view that cap-and-trade shortcomings such as high emissions caps and a low carbon price have until now led to low carbon costs, resulting in little change in corporate behaviour. In addition, managers had little faith in the general ability of governments to meet national emission reduction targets, against a backdrop of already high government deficits with little room for expenditure on new policy initiatives. One manager questioned the climate change targets set by governments around the world, arguing that “aggressive emission reduction targets will not be met”. From the investor perspective, expectations of weak regulatory demands on companies to truly change their processes and adapt to a lower-carbon economy were seen as yet another reason not to take climate change very seriously in the investment process.

*The counter case:* These perceptions appear somewhat disconnected from the emergence of stronger regulatory frameworks to cut emissions in many OECD countries. Many portfolio companies operate in EU ETS sectors that will need to cut emissions by 21% from 2005 levels by 2020. The scope of the EU ETS will be expanded to include aviation from 2012, followed by more gases and sectors during the third phase from 2013-2020. These will include perfluorocarbons from aluminium smelters and nitrous oxide from nitric and adipic acid production in the chemicals industry.

Over 90% of permits have been allocated to companies free of charge under phase II of the EU ETS from 2008-2012. From 2013, at least 60% of permits will be auctioned and there will be a tighter and declining cap on emissions. Companies will have to purchase a larger proportion of the permits they need from a diminished pool. A tighter supply of permits should result in much higher carbon prices, despite the ability of companies to help meet caps with allowances carried over from Phase II (“banking”) as well as with international carbon credits. Power plants in western Europe will have to purchase 100% of allowances through auction from 2013, and are expected to deliver the majority of abatement under the scheme (over two billion tonnes of CO<sub>2</sub>-e). The EU ETS has begun to reduce emissions from sectors covered in Europe and some companies have begun to adjust their business models to position themselves for a low-carbon economy.

Several portfolio companies will also be covered by the planned cap-and-trade scheme in the United States, which would set a target to cut greenhouse gas emissions by 17% on 2005 levels by 2020, and by 83% by 2050. The programme is likely to cover all six GHGs included under the UN Kyoto Protocol: Carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), sulphur hexafluoride (SF<sub>6</sub>), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs).

The scheme currently being introduced under the draft American Clean Energy and Security Act of 2009 (Waxman-Markey Bill) was approved by the House of Representatives Energy and Commerce Committee in May. At the time of writing, the bill, which would allocate as much as 85% of allowances free of charge<sup>10</sup>, was expected to be approved by the full House in the summer.<sup>11</sup> Electricity providers would have to purchase 70% of allowances from the start of the programme and this is likely to ensure sufficient scarcity to create a credible US carbon price.<sup>12</sup> The US Government plans to use billions in revenues raised by the planned cap-and-trade programme to fund expenditure on policy initiatives such as incentives to develop energy efficiency and renewable energy technologies.

<sup>10</sup> US House panel tackles climate change bill, Carbon Market Community, Thomson Reuters, 18 May 2009

<sup>11</sup> Carbon Market North America, Point Carbon, 22 May 2009

<sup>12</sup> Fact Box – US climate change bill cleared by House panel, Carbon Market Community, Thomson Reuters, 22 May 2009



Countries including the UK and Australia are also implementing cap-and-trade programmes and other measures to help achieve national emission reduction targets. Some 5,000 companies in the UK will be covered by the Carbon Reduction Commitment from 2010. The emissions trading scheme aims to help achieve a statutory target to cut greenhouse gas emissions by at least 34% below 1990 emissions by 2020, and by at least 80% by 2050. This requirement was introduced under the Climate Change Act 2008, which establishes a long-term legal framework to reduce greenhouse gas emissions, providing a firm basis for future mechanisms to encourage business and investors to move towards a low-carbon economy. In addition, there is some expectation that carbon pricing will affect companies in Asia within three years.<sup>13</sup>

### Short-term pressures to produce returns

*The fund managers' view:* All four managers focus to varying degrees on identifying material drivers of financial performance for companies within a one-year period, although they all have a longer horizon in mind when framing the overall strategy and universe of potential companies to invest in. Climate change is a factor on the radar in carbon-intensive sectors, especially Utilities in Europe. However, it is considered a relatively low order factor in terms of potential financial impact in their investment horizons.

One manager highlighted the immediate risk of “getting fired” for poor performance and the market’s focus on quarterly corporate earnings data as reasons for disregarding the long-term issue of climate change.

Another manager claimed that the market itself was naturally short-term and would respond to climate change events when they happen, pointing out that this is how the market has always functioned and there is no reason to expect it to be any different towards climate change. Parallels to the current credit crisis and the market’s lack of interest in looking for future systemic risks were also mentioned by one interviewee to make the point that it is not the job of the “market” – traders and investors in aggregate – to pre-empt such risks, but rather its role is to respond to actual events.

*The counter case:* The focus on historic events may be contributing to the view that carbon costs are not yet a significant consideration, given that the majority of companies under the EU ETS incurred relatively low carbon costs during its first phase. From 2005-07, a surplus of allowances allocated to companies free of charge led to a collapse in carbon prices, although they have subsequently recovered. Some Utilities companies, which passed on notional opportunity costs of carbon despite being allocated the majority of allowances for free, received windfall profits.

However, overall caps on emissions have tightened since phase II of the EU ETS started in January 2008. Power companies have been allocated significantly fewer allowances than they are likely to need,<sup>14</sup> and the price of carbon permits peaked at over €30 (£25) last July. Although the price has since fallen partly as a result of the recession and an over allocation of allowances to some companies, the carbon market has begun to rally to approximately €15 (£13) since February 2009. Tighter caps on emissions under the EU ETS, greater auctioning of allowances and higher oil prices should support higher carbon prices going forwards.

<sup>13</sup> How would carbon pricing impact Asian company earnings? Q-Series®: Asian Structural Themes, UBS Investment Research, April 2009

<sup>14</sup> European Emissions Trading Scheme, A Review By the National Audit Office, March 2009



The case studies suggest that many managers have a “wait-and-see” approach to addressing climate risks in portfolios, which raises parallels with the credit crisis on how systemic risks slip through the cracks. Although some companies continue to benefit from passing on costs while receiving the majority of allowances for free under phase II of the EU ETS,<sup>15</sup> some carbon-intensive power generators that face higher carbon costs than they are able to pass on in electricity prices are beginning to see earnings and valuations reduced as a result.

For instance, Drax Group Plc operates Europe’s largest coal-fired power station and is among the top 10 contributors to the carbon footprint of combined portfolios, accounting for 0.07% of the value of aggregated holdings. The company earns a margin on the “dark green spread” – the difference between the wholesale electricity price and the costs of coal and carbon dioxide emissions permits. Drax states in its 2008 Annual Report & Accounts that improved electricity prices and increased power sales “were offset by an increase in coal prices, the cost of CO<sub>2</sub> emissions allowances and operating expenses”. Drax purchased CO<sub>2</sub> allowances, at an average price of £17.4 per tonne, equivalent to £223 million in 2008. This is up from up £11 million in 2007, when allowance prices averaged £1.5 per tonne.<sup>16</sup> The company includes allowances costs with fuel costs in its financial reporting, and these almost doubled between 2007-08. Earnings before interest, taxes, depreciation and amortisation (EBITDA) fell 10% from £506 million in 2007 to £454 million in 2008.

Wholesale electricity prices have fallen from £90 per megawatt hour (MWh) in 2008 to less than £40/MWh and Drax’s earnings are expected to fall further in 2009.<sup>17</sup> Its share price fell significantly in the year to 5 June 2009. Expectations of increasing carbon costs in 2013, when Drax will have to pay for 100% of carbon allowances under the EU ETS and the price of permits is expected to rise,<sup>18</sup> were central to a decision by Standard & Poor’s to downgrade Drax from investment grade to “junk” status in May 2009.<sup>19</sup>

Credit rating agencies are expected to increasingly consider future carbon costs in ratings of companies in Europe. In the US, asset valuations should take greater account of exposure to carbon costs as soon as cap-and-trade legislation is agreed in 2009.

Utilities and Oil & Gas companies have extremely capital-intensive operations. The reserves, facilities and projects that they are investing in now will, in many cases, be operational for decades to come. This means investors should be looking now at the costs these companies will have to pay for emissions from those operations in the future.

## Comparable carbon data

*The fund managers’ view:* One of the managers interviewed by Mercer raised the need for a standardised reporting framework for company emissions that provides comparable, reliable and externally verified information. All of the managers were aware of the Carbon Disclosure Project, an organisation that collects corporate information on climate change, and other efforts being made to improve corporate reporting. However, they felt that they still couldn’t trust what was included in company reports as they are not necessarily independently verified. Some managers were less concerned about data availability as they did not foresee the inclusion of climate change in their valuation models until it becomes a material driver of company performance.

<sup>15</sup> EU ETS Phase II – The potential and scale of windfall profits in the power sector, Point Carbon Advisory Services report for WWF, March 2008

<sup>16</sup> Drax Group Plc, Annual Report & Accounts 2008

<sup>17</sup> Investment Column: Buyers must avoid Drax’s ‘perfect storm’, The Independent, 29 April 2009

<sup>18</sup> S&P used low carbon price in Drax rating, Point Carbon, 20 May 2009

<sup>19</sup> Drax downgraded to ‘junk’ status by S&P, Financial Times, 15 May 2009



*The counter case:* Existing requirements for companies in energy and carbon-intensive sectors to report plant-level emissions under cap-and-trade schemes are of limited use to investors, since companies only have to disclose emissions at a facility level to authorities, rather than company-wide emissions in financial or environment reports. The Climate Change Act 2008 requires the UK Government to make greenhouse gas emissions reporting mandatory, but not until April 2012.

Pressure is growing on regulators to require companies to provide accurate and comprehensive information on company-wide greenhouse gas emissions, as well as on carbon costs under regulatory controls such as cap-and-trade schemes and carbon taxes on a financial year basis, in Annual Reports & Accounts. Many investors are calling for more robust corporate disclosure of greenhouse gas emissions so that markets can assess which companies are most exposed to carbon costs, and which stand to gain in a low-carbon economy.

In the absence of adequate requirements for companies to provide an accurate statement of their carbon costs, investors must use available quantified data on greenhouse gas emissions to assess carbon exposure. Many companies have improved their reporting on greenhouse gas emissions globally under initiatives such as the Greenhouse Gas Protocol. The level of comprehensive disclosure on emissions is particularly high for carbon-intensive sectors such as Utilities.

Trucost coverage of greenhouse gas emissions data on at least 85% of the value of holdings in the portfolios analysed in this study illustrates the potential to incorporate available data into financial analysis. Some 14% of the 2,380 portfolio companies disclose direct emissions data publicly or provide the information to Trucost during the data verification process. A further 22% disclose data on use of resources such as fuels that can be used to derive direct emissions. Together these companies account for 87% of direct greenhouse gas emissions analysed in the study.

Investors can use available carbon data to compare companies on exposure to carbon costs in their operations and supply chains. In this way, they can understand potential carbon risks and opportunities in equity investments at a portfolio level. The usability of available carbon data is also demonstrated by the development of carbon-efficient products such as the S&P 500 U.S. Carbon Efficient Index and the UBS Europe Carbon Optimized Index (see page 23).



### Opportunities to manage portfolio carbon risks

UK pension fund trustees increasingly recognise the importance for financial performance of environmental issues such as climate change.<sup>20</sup> Forward-thinking pension funds are already developing frameworks to manage carbon exposure in their portfolios. For instance, the Environment Agency Pension Fund (EAPF) and London Pensions Fund Authority (LPFA), are starting to position their portfolios for climate-related trends by including climate change criteria in fund manager selection and investment mandates.

Both the EAPF and the LPFA use carbon footprints to help implement the UN Principles for Responsible Investment (UN PRI). Asset owner signatories to the UN PRI have committed, as part of their fiduciary duty, to apply six principles based around environmental, social and governance (ESG) issues (see box on page 22). The EAPF uses carbon footprints to track external fund manager performance against climate change criteria, while the LPFA uses them to raise issues with managers and demonstrate to stakeholders that it is serious about ESG issues. Mike Taylor, Chief Executive of the LPFA, said carbon footprints of portfolios were useful to “judge how serious fund managers are about ESG issues such as carbon mitigation, and to challenge holdings at stock level.” He added that this had led to LPFA portfolio managers developing an approach on how to address carbon risks in future.

Pension funds can position investment frameworks to address short and long-term climate change risks. Trustees can encourage fund managers to integrate climate change into investment processes by taking steps including:

- Incorporating climate change criteria into Statements of Investment Principles and active ownership activities such as proxy voting and engagement.
- Monitoring that fund managers have adequate resources to exercise ownership rights on climate-related issues and reviewing the outcomes of these activities.
- Conducting research to understand exposure to carbon costs.
- Developing controls and strategies to ensure investment decisions take account of relevant climate-related risks.
- Including a requirement in Requests for Proposals for investment managers, consultants and advisors to measure GHG emissions at a portfolio level to identify potential carbon risks and opportunities to protect the long-term value of the fund.
- Incorporating climate change criteria into performance monitoring frameworks and evaluation of investment managers and consultants.
- Linking reward structures to long-term investment management performance.
- Requiring fund managers to report on how they are managing climate change risks in the pension fund.

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<sup>20</sup> Responsible Pensions? UK Occupational Pension Schemes' Responsible Investment Performance 2009, FairPensions, April 2009



### UN Principles for Responsible Investment

- 1 We will incorporate ESG issues into investment analysis and decision-making processes.
- 2 We will be active owners and incorporate ESG issues into our ownership policies and practices.
- 3 We will seek appropriate disclosure on ESG issues by the entities in which we invest.
- 4 We will promote acceptance and implementation of the Principles within the investment industry.
- 5 We will work together to enhance our effectiveness in implementing the Principles.
- 6 We will each report on our activities and progress towards implementing the Principles.

### Questions trustees can ask fund managers

Trustees can find out how asset managers are addressing carbon risks, if at all, by asking the following questions:

- What are fund managers' climate change policies and how are these implemented?
- How do asset managers analyse the financial implications of greenhouse gas emissions for portfolio returns?
- How do they measure greenhouse gas emissions and exposure to carbon costs in their portfolios against benchmark indices and over what time horizons?
- What processes do fund managers have to manage greenhouse gas emissions associated with equity holdings?
- How do they assess the potential materiality of corporate carbon performance in stock selection decisions?
- How is climate change considered in voting and engagement policies, practices and procedures?



## Fund manager responses to carbon risks and opportunities

Asset owners will expect fund managers to identify carbon profiles and manage exposure to carbon costs, in both actively and passively managed portfolios. The significant variation in the carbon intensity of companies within sectors shows that there are opportunities for fund managers to reduce portfolio carbon exposure without changing sector allocations. For instance, International Power is over 12 times more carbon intensive than Scottish & Southern Energy.<sup>21</sup> By shifting some of the assets invested in International Power Plc to Scottish & Southern, which is expanding its renewable power capacity, the fund manager could reduce portfolio exposure to carbon costs without altering the asset allocation to the Utilities sector.

By overweighting companies that are carbon-efficient relative to industry peers, and underweighting those that are more carbon intensive, managers can rebalance holdings within each sector to carbon optimise portfolios. Rebalancing holdings based on carbon efficiency enables investors to reduce carbon risk while maintaining sector allocations, diversification and benchmark financial performance. Institutional investors including major pension funds are increasingly investing in carbon optimised products.

### Fund managers can encourage companies to:

- Report greenhouse gas emissions in line with the Greenhouse Gas Protocol.
- Identify how the business is being positioned for a low-carbon economy to address related risks and opportunities.
- Clearly identify carbon costs in Annual Reports & Accounts.
- Support robust mandatory requirements for companies to report greenhouse gas emissions and costs.

Such products include the S&P 500 U.S. Carbon Efficient Index, the UBS Europe Carbon Optimized Index, Deutsche Bank's CROCI Carbon Alpha, and the BNP Paribas EasyETF Low Carbon 100 Europe, which tracks NYSE Euronext's Low Carbon 100 Europe Index.<sup>22</sup> In these strategies, the aim is to track the returns of underlying indices but with measurably less exposure to carbon. Trucost research has consistently shown that carbon savings of between 25% and 45% are achievable against most of the major benchmark indices through stock selection alone – without introducing any sector allocation biases.

These strategies would be expected to outperform should carbon prices rise. Funds that invest in resource-efficient, low-carbon companies will be less exposed to the impacts of escalating carbon costs. By favouring less carbon-intensive companies across all sectors, investors can reduce carbon exposure and position their portfolios for the shift to a low-carbon economy.

Investors are also increasingly using proxy voting activities and engagement programmes to address portfolio carbon risks. Active ownership practices can be used to target companies that are more carbon-intensive than sector peers and exposed to regulatory controls on emissions. Through engagement, fund managers can encourage companies to improve disclosure on carbon emissions and risks; to establish board oversight of climate change considerations in operational and capital-planning decisions; and to implement effective emission reduction strategies.

Fund managers may also invest in companies that provide “solutions” such as energy efficiency and clean technologies and renewable energy supplies. Such investment opportunities are currently limited and likely only to account for a share of asset allocations in pension funds because of their high volatility. However, these sectors are set to grow significantly in the future. Products that invest specifically in companies that provide solutions include the DWS Invest Climate Change LC, HSBC Climate Change Index, Jupiter Climate Change Solutions and F&C Global Climate Opportunities Fund.

<sup>21</sup> When comparing emissions per kilowatt hour of electricity generated, Scottish & Southern was 40% more carbon efficient than International Power in 2008 (0.496kg CO<sub>2</sub>/kWh vs. 0.636 CO<sub>2</sub>/kWh).

<sup>22</sup> Trucost would be compensated by financial houses that create products based on these indices.

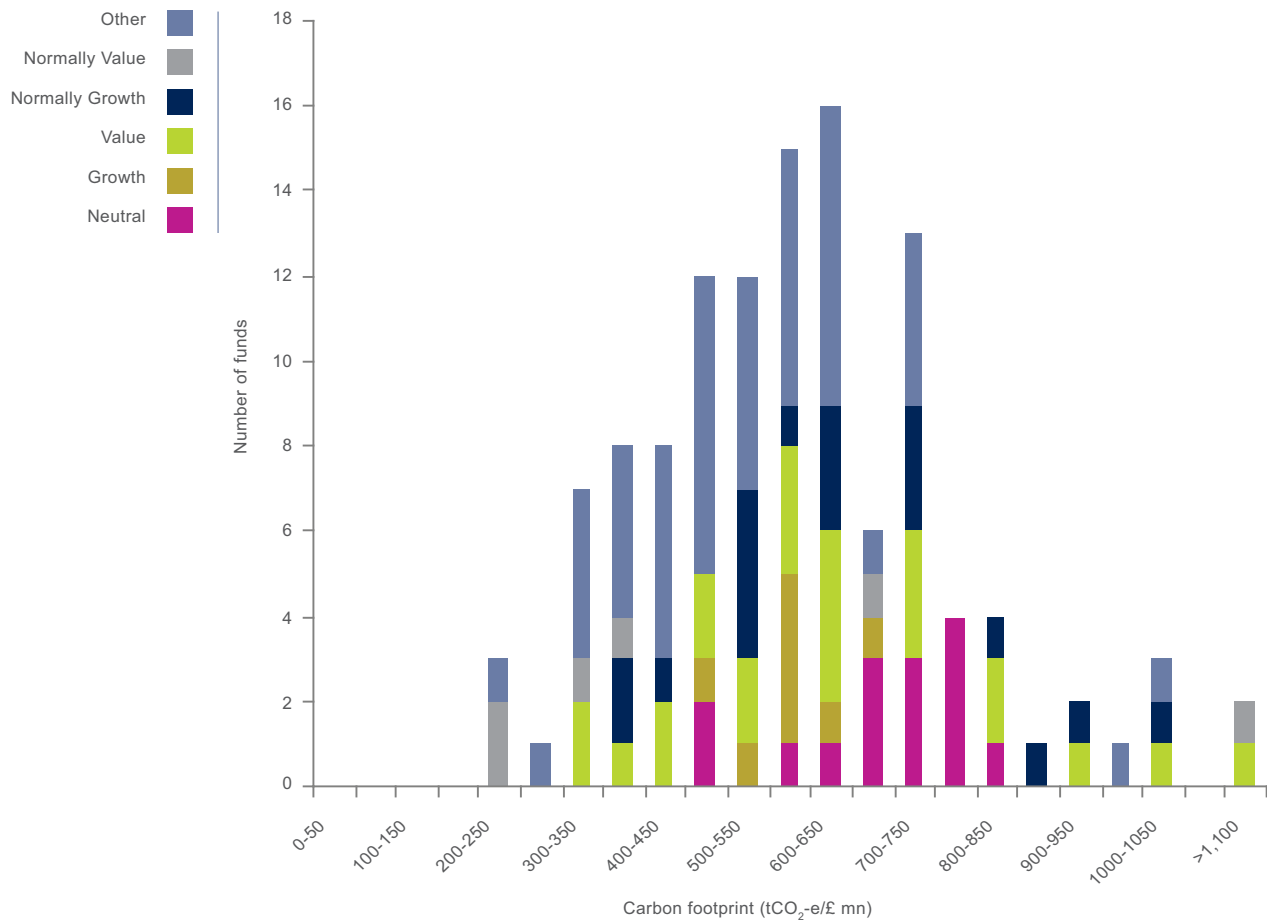


## Distribution of fund carbon footprints by style and region

The size of the carbon footprints of portfolios appears to be an unintended side-effect of stock selection decisions and sector weighting based on factors such as investment styles and regional bias, rather than integration of climate change considerations into investment processes.

Analysis of all 118 portfolios shows that 55 have a larger carbon footprint than the aggregated holdings. The distribution of portfolios is therefore slightly skewed towards carbon footprints lower than the 582 tCO<sub>2</sub>-e/£ million average for the combined portfolios, as shown in Chart 1. Trucost analysed 71 funds categorised according to five investment styles – Growth, Normally Growth, Value, Normally Value and Neutral. These funds represent 66% of total assets in this study. The remaining funds classified as “Other” have a range of investment styles.

**Chart 1: Distribution of fund carbon footprints**







- As shown in Chart 1 on page 24, several funds with carbon footprints under 400 tCO<sub>2</sub>-e/£ million and over 1,000 tCO<sub>2</sub>-e/£ million employ Normally Value or Value investment strategies.
- Funds with Growth or Normally Growth investment styles are mainly clustered around medium-sized carbon footprints.
- Funds that usually employ Neutral investment strategies tend to have higher than average carbon footprints. The funds categorised as “Other” are biased towards small-medium carbon footprints.

Carbon footprints of the 71 portfolios aggregated by investment style vary by up to 23%. Carbon footprints are smallest for aggregated Growth portfolios, and largest for Neutral funds (see Table 2). Only the aggregated Growth funds, which represent 2.6% of all holdings analysed, are less carbon-intensive than the aggregated 118 portfolios.

**Table 2: Carbon footprint ranking of fund management styles**

Style	Number of funds	Aggregated value of holdings (£ mn)	Range in portfolio carbon footprints within investment style		Aggregated carbon footprint (tCO <sub>2</sub> -e/£ mn)
			Top	Bottom	
Growth	8	5,326	462	684	572
Total combined holdings	118	205,987			582
Value	24	87,598	312	1,478	589
Normally Value	6	3,167	209	1,487	638
Normally Growth	18	18,440	351	1,005	677
Neutral	15	21,392	460	845	707

**Growth and Normally Growth funds:** Eight funds analysed have an investment style that favours stocks with rapid earnings growth. Growth funds typically select recovery stocks and smaller companies in sectors such as Technology and Pharmaceuticals which are likely to present greater potential risks and rewards over the medium to long term. The aggregated Growth funds have the smallest carbon footprint (572 tCO<sub>2</sub>-e/£ million). The carbon footprint of the aggregated 18 funds that normally employ a Growth strategy is 18% larger (677 tCO<sub>2</sub>-e/£ million).

Among the 8 Growth portfolios, there is a more significant variation in the size of portfolio carbon footprints. This shows that portfolios that employ the same style can vary widely on carbon exposure. Among the 18 Normally Growth portfolios, the largest portfolio carbon footprint is significantly bigger than the smallest.



**Value and Normally Value funds:** The aggregated Value portfolios have a slightly larger carbon footprint than the Growth portfolios. The Value portfolios generally invest in more carbon-intensive stocks than Growth portfolios in 13 sectors, including Food & Beverage, Travel & Leisure, Oil & Gas and Utilities. Value funds usually select stocks that are traditionally high-yielding and have stable rather than rapid earnings growth, such as Insurance companies.

The 24 Value portfolios account for the largest share of assets (42%) analysed by investment style. There is little variation between the carbon footprints of the combined Value and the combined Normally Value funds. However, individual portfolios that employ these styles have the greatest divergence in carbon exposure, with up to a seven-fold difference between the smallest and largest portfolio carbon footprints.

**Neutral:** The aggregated Neutral portfolios, which have no bias towards factors such as earnings growth compared with their benchmarks, have the largest carbon footprint of all investment styles analysed. The 15 Neutral portfolios in this study account for over 10% of the value of holdings examined. They select relatively carbon-intensive stocks in the Utilities, Basic Resources, Chemicals and Technology sectors. The carbon footprints of the 15 portfolios that employ a Neutral investment style vary widely (460-845 tCO<sub>2</sub>-e/£ million).

### Regional variation

The portfolios were also analysed according to equity investments in different geographies – Asia and Japan, Europe, International, UK and US. There is a 35% difference between the smallest and largest aggregated carbon footprints, as shown in Table 3 below. This suggests that the location of portfolio companies has implications for carbon exposure under global carbon pricing. Multinational companies may be exposed to carbon costs under regulatory controls in various countries.

**Table 3: Carbon footprint ranking of funds by region**

Region	Number of funds	Aggregated value of holdings (£ mn)	Range in portfolio carbon footprints (tCO <sub>2</sub> -e/£ mn)		Aggregated carbon footprint (tCO <sub>2</sub> -e/£ mn)
			Top	Bottom	
Asia and Japan	8	6,317	387	642	462
Europe	14	14,090	397	845	581
UK	35	34,592	209	1,005	558
International	55	114,158	246	1,487	583
US	6	36,831	473	1,024	626

\* Some of the portfolios invest in companies outside of their designated geography.



The carbon footprints of portfolios aggregated by region range from 462 tCO<sub>2</sub>-e/£ million (Asia and Japan) to 626 tCO<sub>2</sub>-e/£ million (US). UK equity portfolios have a carbon footprint 11% smaller than that of the US portfolios, and could therefore be less exposed to carbon costs.

The range in portfolio carbon footprints between investment styles and regions suggests that approaches to portfolio management and geographic location may influence fund carbon exposure. However, the more significant variation in the carbon footprints of portfolios within each category shows that the relative carbon intensity of stocks held is a more important driver of carbon exposure. There are therefore opportunities for fund managers to reduce portfolio exposure to carbon costs without changing investment style or regional bias.

**Asia and Japan equities:** The carbon footprint of the aggregated Asia and Japan equities is almost 2.5 times smaller than that of the MSCI Asia ex-Japan Index (1,144 tCO<sub>2</sub>-e/£ million). On average, companies held in the Oil & Gas and Travel & Leisure sectors are less carbon intensive than sector peers in the other portfolio regions. The largest carbon footprint of the eight portfolios that invest in equities in Asia and Japan is 66% bigger than the smallest.

**Europe equities:** European portfolios are overweight the Banks and Insurance sectors compared with the other regions analysed. These sectors have low direct and first-tier supplier emissions. The average carbon footprint of the European Utilities stocks (3,022 tCO<sub>2</sub>-e/£ million) is lower than in the other regions. The carbon footprints of the 14 portfolios invested in European equities vary significantly.

**UK equities:** The 35 UK equity portfolios, comprised of 17% of total assets, are overweight in the Oil & Gas sector compared with all other portfolio regions. UK equities invest over £7.15 billion – over 20% of the value of holdings – in Oil & Gas, compared with 2% in the aggregated Asia and Japan portfolios. Many of the Oil & Gas companies held have largely international exploration and production operations, including BG Group, Royal Dutch Shell Plc and BP Plc. The eight Utilities companies held are generally more carbon intensive than sector peers in other regions, apart from the US. There is almost a five-fold difference between the smallest and largest carbon footprints of individual portfolios invested in UK equities.

**International equities:** Portfolios representing over 55% of the overall value of holdings are invested in International equities, which together have a slightly larger carbon footprint than the aggregated UK portfolios. Holdings in the Utilities, Basic Resources and Construction & Materials sectors contribute most to the carbon footprint of the international portfolios. Many of the companies held in these sectors operate in regions where cap-and-trade is in place or planned, including the US and Europe. The 55 portfolios invested in International equities have the greatest range in carbon footprints (246-1,487 tCO<sub>2</sub>-e/£ million).

**US equities:** US equities represent almost 18% of the value of holdings and have the largest carbon footprint by region (626 tCO<sub>2</sub>-e/£ million). The Utilities sector has a higher average carbon intensity (7,375 tCO<sub>2</sub>-e/£ million) than peers in the other regional portfolios and may be relatively exposed to carbon costs under cap-and-trade. Almost 17% of the value of holdings (over £6.2 billion) is invested in the Oil & Gas sector, and 19 stocks selected in the sector are more carbon intensive on average than sector peers elsewhere. Among the six portfolios invested in US equities, the largest carbon footprint is 116% bigger than the smallest.



## Stock and sector analysis

### Top contributors to carbon footprint

The main contributors to the carbon footprint of the aggregated 118 portfolios are the Utilities, Basic Resources, Construction & Materials, Oil & Gas and Food & Beverage sectors. The Utilities companies E.ON AG, RWE AG, International Power Plc, American Electric Power Company, Inc and Oil & Gas company BP Plc contribute the most to the carbon footprint. The other five companies with the greatest negative effect on the combined carbon footprint of the portfolios are Reliant Energy Retail Services, LLC, CLP Holdings Ltd, Drax Group Plc (Utilities), Royal Dutch Shell Plc (Oil & Gas) and Holcim Ltd (Construction & Materials). If the portfolios did not invest in E.ON, RWE and International Power, the carbon footprint of the combined portfolios would fall by 8% from 582 tCO<sub>2</sub>-e/£ million to 533 tCO<sub>2</sub>-e/£ million.

The contribution of the 10 companies to the carbon footprint is as much a function of the size of investment in them as it is their carbon intensity. The combined portfolios invest in some of the most carbon-intensive companies in the Utilities sector. Some 0.1% of the value of holdings is invested in both International Power (25,076 tCO<sub>2</sub>-e/£ million) and American Electric Power (24,707 tCO<sub>2</sub>-e/£ million). However, the main contributors to the portfolio carbon footprint are not all among the most carbon-intensive companies in their sectors.

For instance, E.ON and RWE are ranked 44th and 58th on carbon intensity respectively out of 105 companies in the portfolio Utilities sector. E.ON, which has a carbon footprint of 3,047 tCO<sub>2</sub>-e/£ million, accounts for some 0.87% of the value of holdings – the largest proportion of holdings invested in any one Utilities company. The next largest Utilities investment (0.39% of the value of holdings) is in RWE AG (5,772 tCO<sub>2</sub>-e/£ million). They are the two main contributors to the portfolio carbon footprint partly because a larger share of assets is invested in them than in more carbon-intensive sector peers. Since the combined portfolios invest less (0.01% of the value of holdings) in China Resources Power Holdings Company Ltd, the most carbon-intensive portfolio company, it is not among the top 10 contributors to the carbon footprint.

### Exposure to carbon costs

E.ON and International Power, together with American Electric Power, are likely to have to pay for emissions under a planned national cap-and-trade scheme in the US (see page 17). Utilities companies in the US may currently be exposed to carbon costs under a trading scheme implemented in 11 states – the Regional Greenhouse Gas Initiative, which aims to stabilise and reduce emissions in the sector.<sup>23</sup>

RWE, E.ON, International Power and BP are directly exposed to carbon costs under the EU ETS. Together with American Electric Power, these companies account for almost 4% of the value of holdings, and contribute 16% of greenhouse gas emissions attributed to the aggregated portfolio. Their combined total global emissions amount to 445 million tonnes of CO<sub>2</sub>-e – the equivalent of 71% of annual UK emissions (see page 12).

Trucost applied carbon prices to the GHGs emitted globally by E.ON, RWE, International Power, American Electric Power and BP to identify their potential exposure to carbon costs. Carbon exposure is examined using two scenarios – the historic £12 market price of CO<sub>2</sub> under the EU ETS, and the £57 social cost of carbon to identify future risk (see page 12). Applying a

<sup>23</sup> The scheme covers Utilities in Connecticut, Delaware, Maine, New Hampshire, New Jersey, New York, Vermont, Massachusetts, Maryland and Rhode Island



carbon price of £12 to their combined emissions could see carbon costs totaling £8.6 billion. Carbon costs at a carbon price of £57 would amount to £40.9 billion.

Since the ability to absorb carbon costs varies for each company, Trucost calculated the potential effects of carbon costs on earnings before interest, taxes, depreciation and amortisation (EBITDA). This measure of profit risk can be used to identify which companies could pose the greatest financial risk to returns. Table 4 below indicates the potential risk to earnings for each of the five companies.

**Table 4: Potential carbon exposure of the top five contributors to the portfolio carbon footprint\***

Company	Rank on carbon intensity in portfolio sector	Carbon price £12/tCO <sub>2</sub> -e		Carbon price £57/tCO <sub>2</sub> -e	
		Carbon costs (£ mn)	Change in EBITDA after carbon costs	Carbon costs (£ mn)	Change in EBITDA after carbon costs
E.ON AG	44/105	1,838	-18%	8,729	-85%
RWE AG	58/105	2,153	-32%	10,227	-155%
International Power Plc	99/105	811	-83%	3,852	-392%
American Electric Power Co, Inc.	98/105	1,987	-99%	9,439	-471%
BP Plc	103/151	1,826	-9%	8,673	-44%

\* Data reported for 2007 were the latest available at the time of analysis.

At £12 per tonne of CO<sub>2</sub>-e, earnings could fall by 9% at BP, depending on its ability to pass on carbon costs. For comparison with a sector peer, if Royal Dutch Shell paid £12 per tonne for its global emissions, the company's EBITDA could fall by almost 8%. Since both companies have operations in Europe that are covered by the EU ETS, there may be an element of double-counting of carbon costs in this analysis, although they are likely to have been allocated sufficient allowances for free in the early phases of the scheme. Neither disclose financial expenditure or gains from EU Allowances under the scheme in their 2008 Annual Reports & Accounts.

Among the four Utilities, earnings could fall by between 18% for E.ON and 99% at American Electric Power, which has comparatively low earnings and carbon-intensive, coal-dependent power generation. Under a carbon price of £57 per tonne, RWE, International Power and American Electric Power could make a significant loss, unless they are able to pass the majority of carbon costs on to customers. Even if this is the case, they are likely to have to absorb more significant carbon costs than relatively carbon-efficient sector peers.

Utilities companies that compete against less carbon-intensive power suppliers with lower exposure to carbon costs could find it more difficult to pass on carbon costs without losing market share. Performance standards that limit the carbon-intensity of new plants, as introduced in California<sup>24</sup>, will lead to increased competition from lower-carbon sources over time.

Carbon-intensive power companies with long-term supply contracts and limited ability to raise prices will have to absorb some carbon costs. However, power generators stand to gain from innovation in decentralised, low-carbon energy supplies and a transition in the transportation sector from dependence on internal combustion engines to electric vehicles.

<sup>24</sup> Senate Bill 1368, The California Energy Commission



### Oil & Gas and Utilities carbon exposure

The Utilities and Oil & Gas sectors are responsible for half of the greenhouse gas emissions attributed to the combined funds. Several companies in both sectors, including American Electric Power, RWE, Royal Dutch Shell and ConocoPhillips Company, highlight future exposure to financial risk from carbon constraints in their 2008 Annual Reports & Accounts.

However, there is little transparency on the carbon costs they – and their investors – will face as governments around the world gear up to apply stronger emissions controls. Asset managers need information on corporate carbon performance, carbon reduction strategies and currently off-balance sheet carbon costs to identify which companies present the greatest climate-related risks to portfolio values and returns.

Disclosure of greenhouse gas emissions is better among companies in the carbon-intensive Utilities sector than among Oil & Gas companies, perhaps reflecting greater direct exposure to carbon costs through their operational emissions. In addition, Oil & Gas companies tend to operate across different geographies that are in various stages of developing regulatory controls on carbon.

Trucost looked at how earnings of portfolio companies in the Oil & Gas and Utilities sectors could be affected if they have to pay for their global emissions. Two scenarios were examined – applying £12 and £57 to each tonne of the total annual greenhouse gases emitted by the companies – regardless of the level of emissions “owned” or attributed to the portfolios (see Table 5). This indicates potential risks to profits generated by the companies overall.

**Table 5: Potential effect of carbon costs on combined EBITDA**

Portfolios ICB sector	Total CO <sub>2</sub> -e emissions (tonnes)	Carbon costs (£ mn)		Fall in combined EBITDA after carbon costs	
		£12/tCO <sub>2</sub> -e	£57/tCO <sub>2</sub> -e	£12/tCO <sub>2</sub> -e	£57/tCO <sub>2</sub> -e
<b>Oil &amp; Gas*</b>	1,963,953,342	23,567	111,945	-6.5%	-31%
<b>Utilities</b>	3,416,194,361	40,994	194,723	-26.7%	-127%

\* Excluding two Oil & Gas companies where earnings data were not available.

Results show that the combined EBITDA generated by the companies could fall by between 6.5% and 31% in the Oil & Gas sector, and by between 27% and 127% in the Utilities sector. Carbon exposure would vary at a company level and fund carbon risk would be influenced by the value of holdings in companies with the greatest exposure to carbon costs. Both the size of investment in a company and its carbon intensity drives its contribution to portfolio carbon exposure.

For the 10 Utilities and Oil & Gas companies with the greatest impact on the carbon footprint of aggregated portfolio holdings, Trucost examined carbon intensity relative to the average for sector peers in the MSCI World Index, as well as potential risks to earnings (see Table 6 on page 31).



Table 6: Potential exposure of Utilities and Oil &amp; Gas companies

Company	Percentage difference in carbon intensity vs. MSCI World sector average*	EBITDA before carbon costs (£ mn)	EBITDA after carbon costs (£ mn)	
			£12/tCO <sub>2</sub> -e	£57/tCO <sub>2</sub> -e
<b>Utilities</b>				
E.ON AG	-45%	10,249	8,412	1,520
RWE AG	+4%	6,598	4,445	-3,628
International Power Plc	+353%	983	172	-2,869
American Electric Power Co, Inc	+346%	2,000	13	-7,439
Reliant Energy Retail Services, LLC	+14%	634	209	-1,383
<b>Oil &amp; Gas</b>				
BP Plc	-8%	19,831	18,005	11,158
Royal Dutch Shell Plc	+1%	31,730	29,260	19,997
Total S.A.	-6%	24,049	22,550	16,930
ConocoPhillips Company	+5%	13,977	12,733	8,069
Eni SpA	+34%	23,313	22,140	17,741

\* Figures are rounded up. Data reported for 2007 were the latest available at the time of analysis. There may be an element of double-counting where carbon costs have already been internalised under the EU ETS.

RWE, International Power, American Electric Power and Reliant Energy could make a loss if they had to pay £57 for each tonne of greenhouse gases they emit globally, unless they are able to pass on combined costs totalling almost £5.4 billion. These companies are 4%-353% more carbon intensive than the Utilities sector average in the MSCI World Index. In contrast, E.ON is 45% less carbon-intensive and would remain profitable if it incurred carbon costs at £57/tCO<sub>2</sub>-e, although its earnings could be reduced by more than 80%.

While the data available at the time of analysis was for 2007, some of the companies have since reported carbon costs incurred in 2008 in their Annual Reports & Accounts. E.ON saw overall earnings rise in 2008, but reported that its Central Europe West Non-regulated business saw adjusted earnings before interest and taxes (EBIT) fall by €210 million to €3.36 billion in 2008 – “positive price effects in the electricity business were mitigated by higher expenditures for fuel and CO<sub>2</sub> emission allowances...”<sup>25</sup> However, the company does not specifically identify carbon costs incurred in the reporting period.

RWE Group reported an increase in earnings in 2008 “despite the negative effects of the emissions trading scheme”. The earnings trend at RWE Power, Germany’s biggest power producer, was “marked by negative effects” from €1.12 billion in costs for purchasing emission certificates, up from €160 million in 2007. RWE outlined the “substantial risk” from a significant share of its power generation coming from lignite and hard coal power plants, and expects the cost of purchasing CO<sub>2</sub> allowances to be “much higher” when phase III of the EU ETS starts in 2013.

<sup>25</sup> Page 24, Annual Report Part III/II, 2008 Financial Report, E.ON



Companies in the Oil & Gas sector are less exposed to carbon costs. Eni SpA, ConocoPhillips and Royal Dutch Shell are more carbon intensive than the MSCI World sector average. Total and BP are less carbon-intensive than sector peers in the Index. Eni reported that it received a surplus of EU Allowances under the EU ETS in 2008. Since ConocoPhillips has the lowest EBITDA, combined with a relatively high carbon intensity, it would be hardest hit by the internalisation of carbon costs.

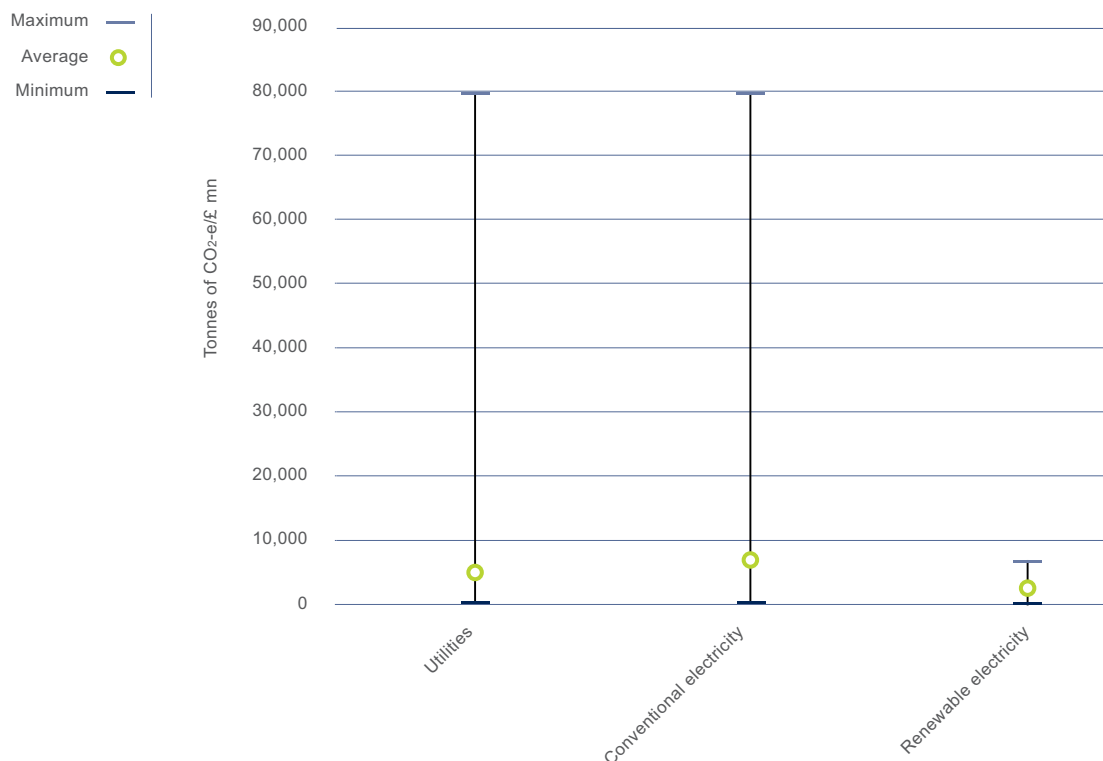
## Carbon intensity of conventional and renewable power generators

Portfolio companies in the Utilities sector have the greatest variation in carbon intensity. The 51 Utilities companies that are more carbon-intensive than the sector average (4,971 tCO<sub>2</sub>-e/£ million) may find it more difficult to fully pass on carbon costs.

Trucost compared the carbon intensity of power generators that produce electricity from conventional sources – including coal, petroleum, natural gas and nuclear energy (excluding companies that only distribute electricity) – with those that produce energy from renewable sources such as solar, water, wind and geothermal. The average carbon intensity of companies that mainly generate electricity from conventional sources is almost three times higher than the average carbon intensity of companies that generate electricity mainly from renewable sources (see Chart 2).

The range in the carbon intensities of companies within these sub-sectors is particularly marked among conventional electricity generators. Some of the companies classed as conventional power generators also produce some electricity from renewable sources. For example, around 10% of electricity produced by E.ON is generated from renewable sources.

**Chart 2: Carbon intensity of Utilities sector, conventional and renewable power generators**







As shown on Chart 2 on page 32:

- The average carbon intensity of conventional electricity producers is 6,977 tCO<sub>2</sub>-e/£ million, compared with an average of 2,600 tCO<sub>2</sub>-e/£ million for renewable power generators.
- The lowest-carbon conventional power generator, AEM SpA (now A2A SpA), which largely generates electricity from gas, emits 657 tCO<sub>2</sub>-e/£ million. The most carbon-intensive company is China Resources Power Holdings Company Ltd, which generates power from coal and emits 79,775 tCO<sub>2</sub>-e/£ million. It is 121 times more carbon intensive than AEM.
- The least carbon-efficient renewable power generator (Tractebel Energia S.A.) is more carbon-intensive than the conventional power generator with the lowest carbon intensity (6,747 tCO<sub>2</sub>-e/£ million vs 657 tCO<sub>2</sub>-e/£ million). This is because although Tractebel mainly produces electricity from hydropower, it also generates power from coal and gas. The lowest-carbon renewable power generator is Iberdrola Renovables S.A.. Some 0.03% of the value of holdings is invested in Iberdrola.

### Carbon intensity of Oil & Gas companies set to rise

Unlike most Utilities, the global operations of oil companies such as BP and Royal Dutch Shell are more exposed to climate policies worldwide, as well as to competition from producers that operate in regions that allow them to continue to externalise carbon costs.

Emissions analysed in the Oil & Gas sector (excluding those from products in use) are largely direct from operations, but emissions from electricity use and other upstream outsourced activities, such as shipping and well drilling, are also significant. Carbon-intensive companies in the sector could therefore be exposed to direct carbon costs as well as those passed on in higher input prices.

Although carbon exposure assessed in this study only applies to operational and direct (first-tier) supplier emissions, Oil & Gas companies are also exposed to carbon constraints on the downstream emissions of their fuels. For instance, the world's first Low Carbon Fuel Standard, approved in the state of California in April 2009, will require transportation fuel providers to cut the carbon intensity of fuels by 10% on 2011 levels by 2020, including greenhouse gases emitted during fuel production.<sup>26</sup> Based on this, US President Obama plans to introduce a National Low Carbon Fuel Standard.<sup>27</sup>

Companies that expand production from unconventional fossil fuels such as tar sands and oil shales will be increasingly exposed to standards such as these. Processes used in tar sands extraction are very energy intensive and up to three times more carbon intensive than conventional extraction, while oil shale extraction emits up to eight times as much greenhouse gases.<sup>28</sup> Despite their exposure to regulations to mitigate GHG emissions, several portfolio companies in the sector, including ConocoPhillips, BP and Shell, are expanding production from unconventional sources and their oil and gas production activities are therefore set to become more carbon intensive in future.

ConocoPhillips, in its first quarterly report for 2009, acknowledged that regulations and obligations that create a GHG emissions trading scheme or GHG reduction policies generally could “significantly increase costs or reduce demand for fossil energy derived products”.<sup>29</sup>

<sup>26</sup> <http://www.arb.ca.gov/fuels/lcfs/>

<sup>27</sup> [http://my.barackobama.com/page/content/newenergy\\_more](http://my.barackobama.com/page/content/newenergy_more)

<sup>28</sup> Executive summary, Unconventional Oil, Scraping the bottom of the barrel?, The Co-operative Group and WWF

<sup>29</sup> Form 10-K, ConocoPhillips, April 2009

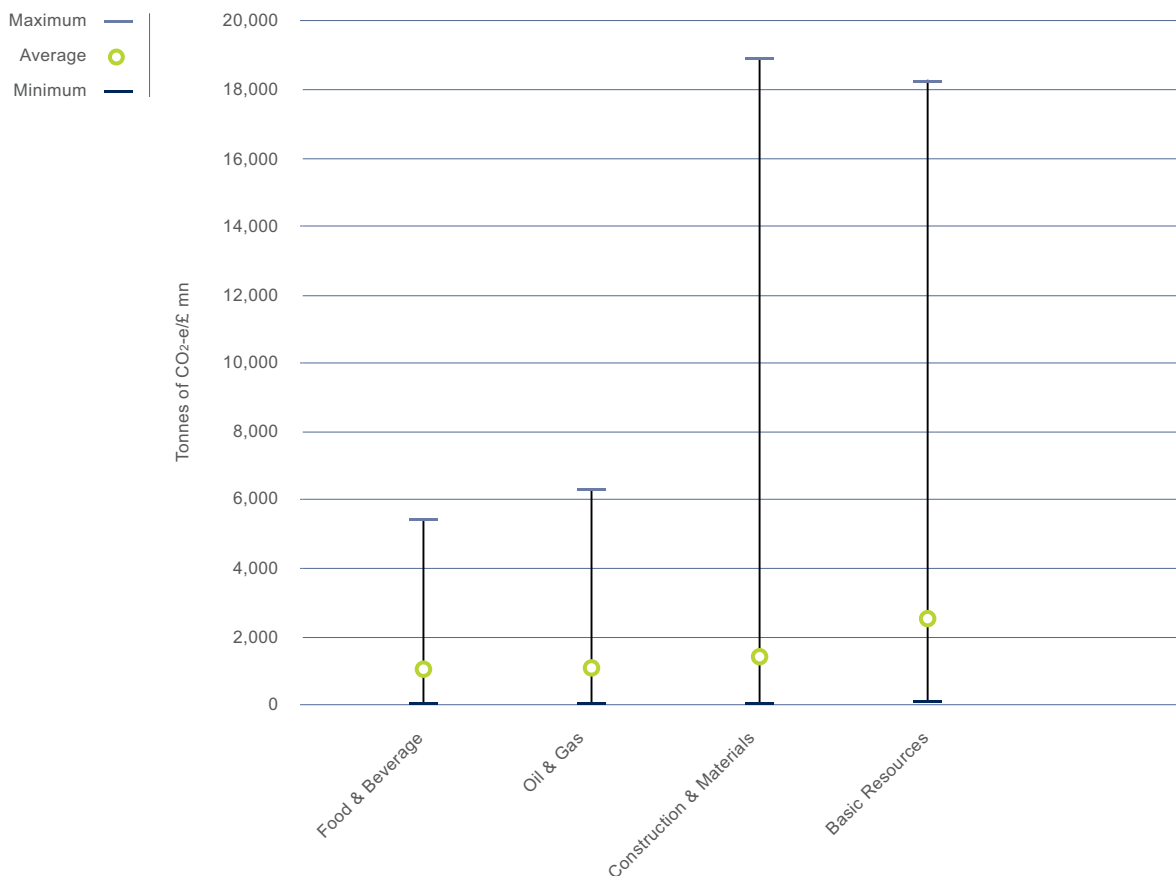


## Varied exposure within carbon-intensive sectors

As energy suppliers try to pass on the majority of rising carbon costs in higher electricity and oil prices, input costs will rise for energy-intensive industries. Many companies in the carbon-intensive Basic Resources, Construction & Materials, Oil & Gas and Food & Beverage sectors are exposed to carbon costs under the EU ETS. High emitters at risk of losing business to competitors outside of the EU where emissions are not regulated – exposed to “carbon leakage” – are likely to continue to receive the majority of carbon allowances free of charge until carbon constraints are implemented in more countries. However, they will remain exposed to indirect carbon costs passed on by electricity providers.

Companies that are carbon-intensive relative to sector peers and operate in markets with greater price elasticity of demand could find it difficult to pass carbon costs on in higher prices without losing market share. Fund managers should therefore assess exposure to carbon costs among portfolio companies in these sectors. Significant variation in the carbon intensity of companies held in these sectors shows that carbon exposure varies widely at a company level (see Chart 3). This indicates potential to reduce portfolio carbon exposure without changing sector allocations.

**Chart 3: Range in carbon intensity of portfolio companies in high-carbon sectors**





As shown on Chart 3 on page 34:

- Of the four sectors, Basic Resources has the greatest average exposure to carbon costs (2,523 tCO<sub>2</sub>-e/million). The sector has the second-largest variation in carbon intensity at a company level (116-18,250 tCO<sub>2</sub>-e/million). Energy-intensive companies such as aluminium producers, whose carbon intensity is largely driven by emissions from electricity use, may be more exposed to carbon costs passed on by electricity suppliers than those incurred from direct operational emissions.
- The greatest variation in carbon intensity is in the Construction & Materials sector (58-18,921 tCO<sub>2</sub>-e/million). Companies that rely heavily on purchasing building products produced using carbon-intensive processes, such as cement, could be most exposed to carbon costs passed on by suppliers.
- The lowest-carbon company in the Oil & Gas sector (54 tCO<sub>2</sub>-e/£ million) provides data and support services to the industry. The carbon intensity of companies involved in exploration and production in the sector ranges from 163-6,298 tCO<sub>2</sub>-e/£ million.
- The Food & Beverage sector is relatively carbon intensive (1,042 tCO<sub>2</sub>-e/million). Carbon intensity at a company level ranges from 108-5,420 tCO<sub>2</sub>-e/million. Demand could fall for products from carbon-intensive companies that try to pass on higher carbon costs.
- The range in carbon intensity at a company level within these sectors highlights the importance of stock selection decisions in determining portfolio carbon exposure.



## Appendices

### Appendix 1: Trucost methodology

Portfolio attribution analysis is conducted in this study using the Industry Classification Benchmark (ICB) 20 super sectors. The currency used throughout the report is UK pounds sterling, unless stated otherwise. Trucost's extensive database provides analysis on over 720 different environmental impacts.

To calculate the carbon intensity of companies included in the study, Trucost reviewed company annual reports and accounts, environmental/sustainability reports, public disclosures and corporate websites. Where a company only provides data for part of its business activities or previous years, Trucost normalises quantities in order to calculate emissions from entire operations. Trucost's environmental profiling system, overseen by an academic advisory panel, calculates the greenhouse gas emissions resulting from activities in 464 sectors. Companies are given the opportunity to provide additional information not disclosed in the public domain, and to verify Trucost data.

#### Carbon dioxide-equivalent emissions

Nine greenhouse gases (GHGs) are included in the analysis, including six defined by the UN Kyoto Protocol. The GHGs have been calculated for each company and converted into metric tonnes of carbon dioxide-equivalent (CO<sub>2</sub>-e) based on the appropriate Global Warming Potential factors. The Global Warming Potential (GWP) index published by the Intergovernmental Panel on Climate Change (IPCC) assesses the effect of the emissions of different gases over a 100-year time period relative to the emission of an equal mass of CO<sub>2</sub>. For example, one metric tonne of the man-made greenhouse gas sulphur hexafluoride (SF<sub>6</sub>) has a global warming potential equivalent to 23,900 metric tonnes of CO<sub>2</sub> (tCO<sub>2</sub>-e).

#### Absolute greenhouse gas emissions

Trucost analyses the quantities of overall greenhouse gases emitted by each company. Where companies do not disclose data adequately, corporate emissions are standardised in line with the Greenhouse Gas Protocol international corporate accounting standard. The GHG Protocol categorises emissions into Scopes 1, 2 and 3.

**Scope 1:** Direct GHG emissions caused by a company's fuel combustion or emitted through industrial processes owned or controlled by a company.

**Scope 2:** Indirect GHG emissions from purchased electricity.

**Scope 3:** Indirect emissions from other sources not owned or controlled by the company, such as suppliers and products in use.



## Appendix 2: About WWF, Trucost and Mercer

### WWF

WWF believes in a future where people and nature thrive. As the world's leading conservation body, we've seen how wildlife, the environment and human activity are interlinked.

Recent financial and ecological crises provide an opportunity to commit to doing things differently. It is clear we cannot continue on our present path, and this liberates us to think about new ways of living, to ask ourselves how to create a society where all people flourish within a vibrant natural world, and to chart a new course that can achieve this.

Finance serves every economic sector with major impacts on our environment, including energy production, fishing, agriculture and logging. We need to ensure that money is only invested in areas that protect the planet and push towards a low-carbon future. Therefore, WWF UK seeks to influence the transformation of the UK's finance sector into a sustainable, green and fair system.

WWF is forming a new One Planet Finance change network where we will work with multiple partners to innovate shared new solutions that demonstrate how a financial system can better serve the long-term interests of society and the environment.

### Trucost

Trucost Plc helps organisations measure and reduce the carbon and environmental impacts of their operations, supply chains, investments, products and services.

#### Services for investors

With the largest and most comprehensive database of corporate environmental impacts covering the world's major indices, Trucost enables investors to understand how environmental issues could affect companies' future earnings. Institutional investors and fund managers use Trucost's company and fund data to:

- Measure the carbon or environmental footprints of investments and funds.
- Understand the financial risk to investments from potential environmental costs.
- Engage with companies to improve their environmental performance.
- Optimise investment strategies by rebalancing holdings to favour companies with greater carbon or environmental efficiency relative to sector peers, while maintaining financial returns and diversification.
- Create new products – Trucost's data underpins funds including the S&P U.S. Carbon Efficient Index, Deutsche Bank's CROCI Carbon 100 and Carbon Alpha, GLG Partners' GLG Environment Fund, Virgin Money's Virgin Climate Change Fund, Merrill Lynch's Carbon Leaders Europe Index, UBS's Europe Carbon Optimized Index and NYSE Euronext's Low Carbon 100 Europe Index.



## Mercer's Investment Consulting business

Mercer's Investment Consulting business is a leading global provider of investment consulting services, and offers customised guidance at every stage of the investment decision, risk management, and investment monitoring process. It has been dedicated to meeting the needs of clients for more than 30 years, and works with the fiduciaries of pension funds, foundations, endowments, and other investors in some 35 countries.

Mercer's Investment Consulting business has a global business unit dedicated to developing intellectual capital related to responsible investment and the integration of environmental, social, and corporate governance factors into investment processes. Led by Jane Ambachtsheer, this unit partners with investment consulting teams to provide integrated solutions to interested clients.

Throughout most of the world, Mercer's Investment Consulting business is an autonomous unit within Mercer LLC, a wholly owned subsidiary of Marsh & McLennan Companies, Inc. (MMC). MMC lists its stock (ticker symbol: MMC) on the New York, Chicago, Pacific, and London stock exchanges.

In the US, the investment consulting business is operated through Mercer Investment Consulting, Inc., a wholly owned subsidiary of Mercer Inc., the US operating unit of Mercer LLC.

**For further information, please contact [jane.ambachtsheer@mercer.com](mailto:jane.ambachtsheer@mercer.com) or visit [mercer.com](http://mercer.com)**

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“In spite of the global downturn, the momentum behind tightening climate regulations has continued, and we expect this to be sustained through Copenhagen and beyond. Already we are seeing evidence that government ‘green stimulus’ plans are having a real impact in driving low carbon investments.”

Nick Robins, Head of Climate Change Centre, HSBC Bank Plc UK

“This welcome study commissioned by WWF makes a useful contribution to the debate on climate change and investment. As a global investment firm we believe the full costs of carbon will increasingly appear on company balance sheets, so we ask companies to disclose their emissions and their management approach. Despite a significant effort by a number of institutions, corporate reporting remains sporadic and of a highly mixed quality. We would therefore like the UK Government to make greenhouse gas emissions reporting mandatory before 2012.”

Steve Waygood, Head of Sustainability Research and Investment, Aviva Investors

“This report is an important contribution to the understanding and transparency of the exposure of equity portfolios to long-term carbon liabilities and makes the case for a change in the reporting model. It provides vital evidence for that change. The silo approach to sustainability reporting adopted by companies and used by investors does not allow carbon liabilities to be seen in the overall strategy of the business in question. From a reporting viewpoint the key outcome from the research is the inadequacy of the current reporting regime.”

Paul Druckman, Chair, HRH Prince of Wales’ Accounting for Sustainability Project

“This extremely valuable report should wake pension funds up to an important truth: That the carbon exposure of products which fund managers offer them may vary by up to 700%. This will have a direct impact on investment performance as carbon prices rise. Pension funds need to consider carbon exposure when appointing and instructing fund managers; fund managers need to anticipate clients’ need to minimise exposure; and companies need investor support to implement exposure-reduction strategies before carbon prices hit profits.”

Duncan Exley, Director of Campaigns, FairPensions

## Commissioned by WWF-UK

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