Beyond Fossil Fuels:
The Investment Case for Fossil Fuel Divestment

Executive Summary

Pressure is building on institutional investors to assess their exposure to companies that extract fossil fuels. As concerns rise about the likely effects on the climate from greenhouse gas emissions, grassroots campaigns calling for fossil fuel divestment are growing. In parallel, financial analysts are increasingly warning investors of the risks that tighter regulations on carbon dioxide emissions and falling demand for fossil fuels could make fossil fuel reserves substantially less valuable, or even 'stranded' and ultimately rendered worthless.

While trustees may be sympathetic to these concerns, and investment officers sceptical of the outcome of looming greenhouse gas regulation, there are legitimate questions about the effects on portfolio risk and returns from the partial or complete divestment of fossil fuel stocks.

So the question becomes: how should a fiduciary compare the risks to portfolios presented by stricter carbon regulations to the risks associated with reducing exposure to fossil fuel stocks?

Analysis of historical data shows that over the past seven years eliminating the fossil fuel sector from a global benchmark index would have actually had a small positive return effect. Furthermore, much of the economic effect of excluding fossil fuel stocks could have been replicated with 'fossil free' energy portfolios consisting of energy efficiency and renewable energy stocks, with limited additional tracking error and improved returns.

Impax believes that investors should consider reorienting their portfolios towards low carbon energy by replacing fossil fuel stocks with energy efficiency and renewable energy investments, thereby retaining exposure to the energy sector while reducing the risks posed by the fossil fuel sector.

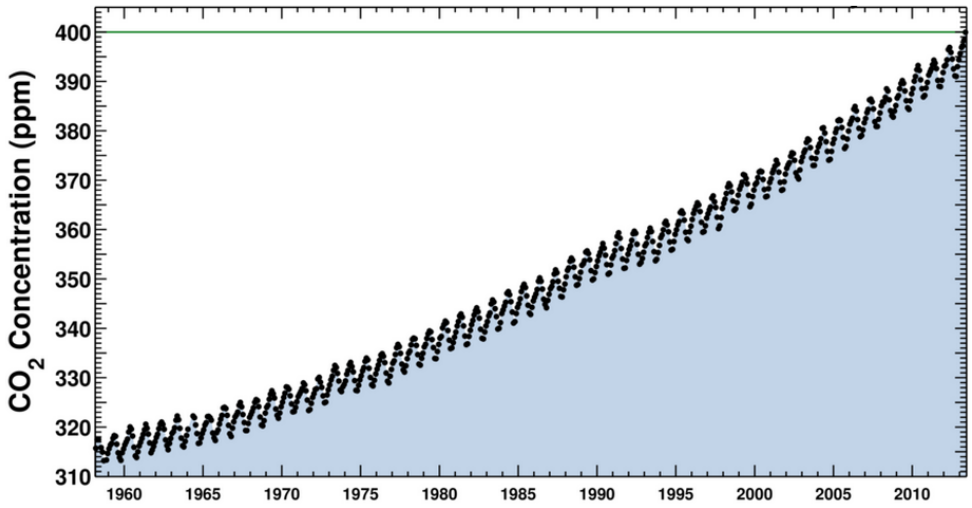
Part 1 - Building pressure to divest

Institutional investors are facing growing pressures from campaigners – and rising concern from analysts

In May 2013, atmospheric concentrations of carbon dioxide (CO_2) passed 400 parts per million (ppm) for the first time in human history – a highly symbolic threshold that has generated a wave of concern from environmental groups (see Figure 1). These concerns are increasingly shared by institutions that are not the traditional bedfellows of the environmental movement, with recent warnings about the risks of climate change from the International Energy Agency[1], the World Bank[2] and the International Monetary Fund.[3]

Such concerns are not new. For some years groups within the institutional investment community have been calling for action on climate risk by governments, regulators and institutional investors themselves.[4] Nonetheless, the crossing of the 400 ppm threshold has served as a clarion call for unity among previously disparate groups.

Figure 1: Carbon dioxide concentration at Mauna Loa Observatory



Source: Scripps Institution of Oceanography, UC San Diego. May 2013

A changing climate for investors

Investors are increasingly finding themselves the target of fossil fuel divestment campaigns that originated from within US universities, similar to the calls for divestment of stocks of companies that supported apartheid in the 1980s.

There is a growing call to action spreading from campuses to city halls and beyond

Students, faculty and elected officials are asking college endowments and municipal and state pension funds to limit or divest their holdings in fossil fuel companies in response to rising concerns about global warming. The Fossil Free campaign maintains that it is "morally wrong to profit by investing in companies that are causing the climate crisis". It is calling for "educational and religious institutions, city and state governments, and other institutions that serve the public good to divest from fossil fuels, specifically the equity or debt issued by the 200 largest oil and gas companies (which have a combined market capitalisation in excess of $4 trillion)."[5]

Analysts raise the alarm

Within the mainstream financial community, energy-focused professionals are raising concerns about the financial risks posed to investment portfolios by climate change. Mainstream analysts[6] are now building on research from the Carbon Tracker Initiative, http://www.carbontracker.org (a London-based NGO that has carried out ground-breaking work linking climate science and the potential value at risk in the world's listed fossil fuel companies from efforts to tackle climate change). Carbon Tracker has warned that regulations to limit carbon emissions could significantly impact the market value of fossil energy companies as it becomes uneconomic to extract their fossil fuel reserves.

Fossil fuel companies' reserves cannot be extracted and burned without risking dangerous climate change

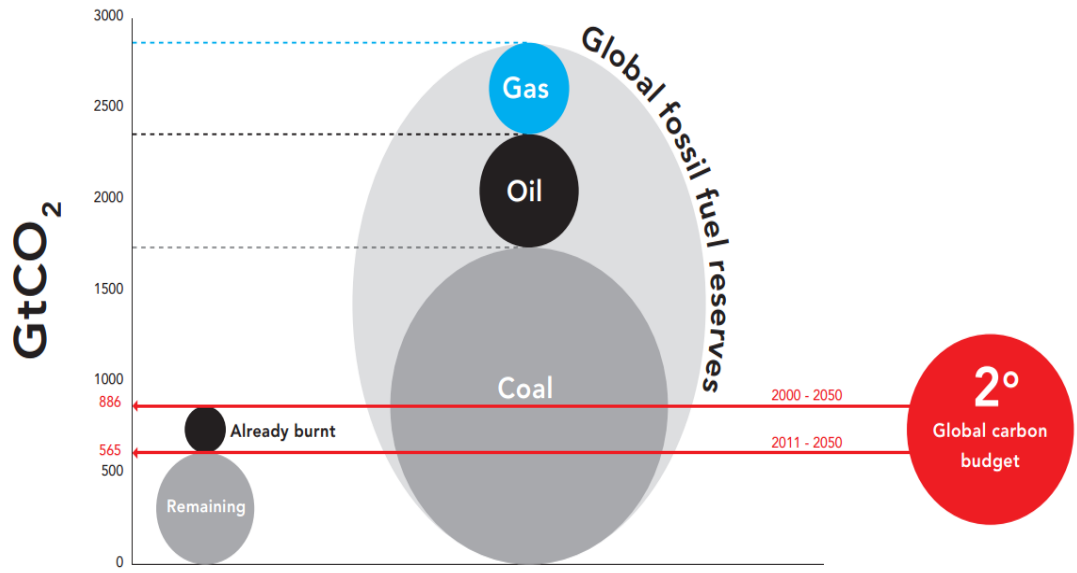
Carbon Tracker has also calculated that 80% of the world's proven fossil fuel reserves cannot be consumed without exceeding the international target to keep global warming to within 2°C above pre-industrial levels.[7] **This implies that the world's listed fossil fuel companies, whose share prices are partly based on their proven reserves, are grossly overvalued.**

This analysis will undoubtedly lead to scepticism amongst rational investors. What modern government, faced with adhering to an international, co-operative target and the realities of powerful energy lobbies, the economics of "cheap" energy and the demands for job creation, would not turn a blind eye to the international target? Nevertheless, a global movement is building momentum, and long-term investors are taking note. In June 2013 President Obama reiterated his

inaugural pledge to respond to the threat of climate change in the White House's Climate Action Program. A key element is a directive for the Environmental Protection Agency (EPA) to regulate emissions from existing coal fired plants as well another round of fuel efficiency standards, new efforts at carbon capture and incentives for alternative energy.

Carbon Tracker's report, *Unburnable Carbon, http://www.carbontracker.org/unburnable-carbon*, is based on academic research that estimates that from (the year) 2000 the world can emit no more than 886 gigatons (Gt) of CO_2 if it is to have a 50% chance of limiting atmospheric warming to 2°C (See Figure 2). By 2011 over one third of that 'carbon budget' had been consumed and global carbon dioxide emissions are still rising.[8]

Figure 2: Comparison of the global 2°C carbon budget with fossil fuel reserves' $C0_2$ emissions potential



Source: Carbon Tracker Initiative, April 2013

So, if Carbon Tracker's calculations are an indication of what the future holds, a rational investor might also consider the authors' warning, that a 'carbon bubble' is inflating over the world's stock exchanges. The 200 largest listed fossil fuel companies had a market value of some $4 trillion at the end of 2012, but the models used to make those valuations do not take into account how credible action to address climate change might slash the value of their fossil fuel reserves.

'Carbon bubbles' are inflating over the world's stock exchanges, Carbon Tracker warns

As a point of reference, Carbon Tracker's work is gaining traction within the 'mainstream' of the financial world and has been developed further by a number of financial institutions and rating agencies, including HSBC, Citi, MSCI, and Standard & Poor's.[9]

For example, a recent report by HSBC's oil and gas analysts examined the effects on the sector of falling oil and gas demand in a 'low-carbon world'. It warned that European energy companies could see their market capitalisation fall 40-60% if oil prices (net of any carbon tax or cost of pollution permits) were to drop to US$50/barrel.

Part 2 – The investment response

There are a number of responses to climate change that avoid fossil fuel divestment. For example, investors can practice shareholder advocacy and engagement. The key areas for investor campaigns to bring about change are to encourage fossil fuel companies to:

1. Stop investment in further fossil fuel exploration; and/or
2. Modify their business models towards one with a lower emissions-intensity, and/or to invest aggressively in renewables.

A possible consequence of these campaigns could be the distribution of increased dividends to shareholders in the future by reducing exploration expenses.

Dispelling the myths of divestment

Although a growing body of robust, credible investment-orientated research is increasingly highlighting the un-priced risks that are accumulating in the fossil fuel sector, many investors are concerned that divestment from fossil fuel stocks would introduce other types of risk into their portfolios. Foremost among their concerns is that excluding components of an index will increase volatility and tracking error – and potentially lead to underperformance.

Analysis of the likely effects of climate change and future carbon regulations on investment portfolios necessarily involves a series of assumptions about how the future will look. It will typically assume a cost of carbon, the substitution of competing low-carbon technologies, and/or falling fossil fuel demand, among other risks.

It is instructive to look at how investment portfolios would have actually performed in recent years without exposure to the fossil fuel extraction and production sector, with that exposure replaced with alternative fossil free portfolios.

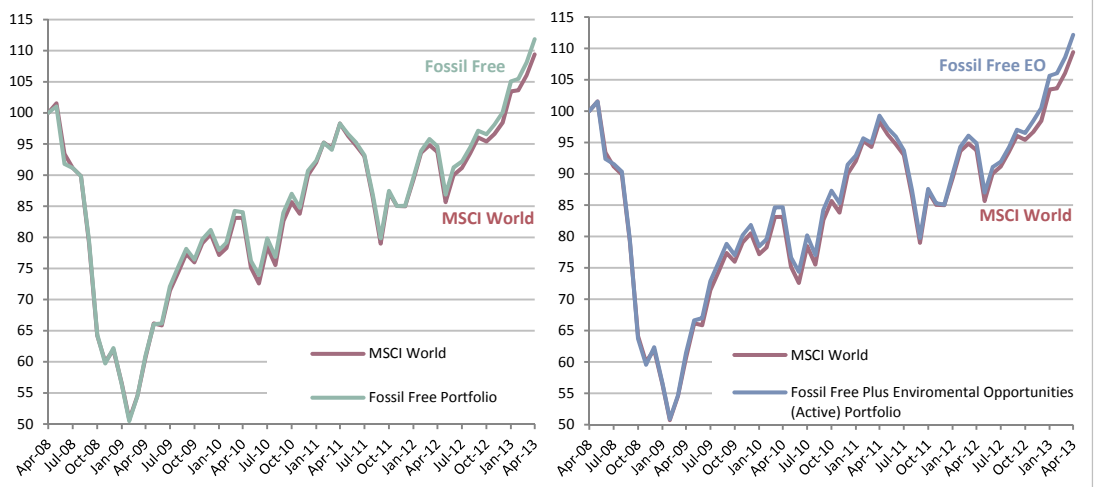
To do so, Impax examined various alternative approaches to portfolio construction:

1. The MSCI World Index without the fossil fuel energy sector (the ***"Fossil Free Portfolio"***).
2. Replacing the fossil fuel stocks of the MSCI World Index with a passive allocation to an investable universe of renewable energy and energy efficiency stocks (the "***Fossil Free Plus Alternative Energy (Passive) Portfolio***")
3. Replacing the fossil fuel stocks of the MSCI World Index with an actively managed portfolio of renewable energy and energy efficiency stocks (the "***Fossil Free Plus Alternative Energy (Active) Portfolio***")
4. Replacing the fossil fuel stocks of the MSCI World Index with an actively managed allocation of stocks selected from a wider range of resource optimisation and environmental investment opportunities (the ***"Fossil Free Plus Environmental Opportunities (Active) Portfolio***").

Removing the fossil fuel sector in its entirety and replacing it with low carbon energy would have had a positive effect on returns

The returns over five years were analysed. The results show that removing the fossil fuel sector in its entirety and replacing it with 'fossil free' portfolios of energy efficiency, renewable energy, and other alternative energy stocks, either on a passively managed or actively managed basis would have improved returns with limited tracking error. (See Figures 3 and 4 below.)

Figure 3: Five year cumulative returns for two alternatives to portfolio construction



Source: FactSet, WM Reuters. Data as of April 30, 2013

Figure 4: Global Equity Return and Risk Comparison for MSCI World and Fossil Free Portfolios.

	Annualised Return	Annualised Volatility	Information Ratio	Tracking Error
MSCI World	1.8%	20.5%	--	--
Fossil Free Portfolio	2.3%	20.5%	0.28	1.6%
Fossil Free Plus Alternative Energy (Passive) Portfolio	1.9%	21.1%	0.00	1.8%
Fossil Free Plus Alternative Energy (Active) Portfolio	2.2%	21.3%	0.21	2.0%
Fossil Free Plus Environmental Opportunities (Active) Portfolio	2.3%	20.8%	0.31	1.6%

Source: FactSet, WM Reuters. 5 year data to 30 April 2013 in USD, Returns are based on USD data. The impact of foreign exchange variations between the USD and other currencies are not considered, Past returns are not a reliable indicator of future returns.

We started by identifying and removing the fossil fuel energy stocks[10] from the MSCI World Index (the largest constituents of which are listed in Appendix 1 on page 9).

Excluding the fossil energy stocks from the MSCI World Index over the last five years to the end of April 2013 which excludes the dramatic run up in energy prices ahead of the 2008 financial crash, excluding the fossil energy sector would have improved returns by almost 0.5 percentage points annually, to 2.3% a year from 1.8%. Again, tracking error is low at 1.6%.

This result mirrors recent research carried out by MSCI and the Aperio Group. MSCI has analysed the impact of removing 247 companies owning fossil fuel reserves from its All-Country World Index Investable Market Index. In a back-testing exercise from January 2008 to March 2013, the MSCI ACWI index minus these constituents outperformed by an annualised 1.2%, with a tracking error of 1.9%.[11]

Investors could have substituted clean energy stocks for fossil fuel stocks without any negative impact on performance

Aperio has also examined the effects of removing from the Russell 3000 index the 13 listed members of the 'Filthy 15' group of US coal companies singled out by divestment campaign groups as most harmful to the climate. Aperio's analysts then used a multi-factor model to create a portfolio as close to the Russell 3000 as possible, but with the 'Filthy 15' excluded. It found it generated tracking error of 0.14% and an increase in risk of just 0.0006%, a statistically irrelevant percentage. Excluding the entire oil, gas and consumable fuels sector increased the tracking error by 0.60%, and risk by 0.01%.[12]

Investors may be understandably concerned that excluding an entire industry sector such as fossil energy and reallocating this portion across the other sectors may introduce tracking error into portfolio returns, and raises the possibility that an investor may miss out on the sector's future outperformance.

So, as a replacement for MSCI Energy, we modelled the performance of the MSCI World index with the fossil energy sector replaced with FTSE's Environmental Opportunities (EO) Energy universe, which currently comprises 243 energy efficiency and renewable energy stocks. (The index's largest constituents are listed in Appendix 2 on page 9).

The key outcome is that, over seven years, there would have been no impact on performance and for the five year period, no material impact on performance. As might be expected, the substitution of MSCI Energy with FTSE EO Energy does introduce some tracking error – but just 1.6% per year.

Fossil Free Plus Alternative Energy (Active) Portfolio

The picture is further improved if Impax's actively managed portfolio of renewable energy and energy efficiency stocks is used in place of the passive FTSE's Environmental Opportunities (EO) Energy universe. A passive allocation to the renewable energy sector, in particular, has produced several difficult years, as this sector corrected sharply from over-inflated levels in 2008 and 2009.

Since 2008, Impax has been actively selecting and weighting stocks from the FTSE EO Energy universe, typically picking 25 names. This enhanced Energy strategy has been managed defensively in recent years and has successfully avoided most of the poorer performing companies in the FTSE EO Energy sector.

Over five years, had the MSCI Energy allocation been substituted with the Impax enhanced EO Energy strategy, it would have delivered 2.2% in annualised returns, an incremental return of 41 basis points per annum compared with the MSCI World benchmark – with a tracking error of 2.0% and an Information Ratio of 0.2.

Fossil Free Plus Environmental Opportunities (Active) Portfolio

The enhanced Impax EO Energy strategy does add some concentration risk to the portfolio, given its smaller number of constituents and partial overlap with MSCI World. An alternative, more diversified approach would be to substitute the MSCI Energy with Impax's Leaders strategy. Leaders is a global all-cap equity strategy, investing both in large diversified companies that are expanding their activity in resource optimisation markets, as well as in small and mid-cap environmental services and technology companies. It includes some 45% exposure to energy, but also captures water, waste management and recycling, and other resource optimisation themes.

Over the five year period, this more diversified approach would have delivered the highest annualised returns of the four approaches analysed at 2.3%, the highest information ratio (0.31), and with lower tracking error (1.6%) than the Impax enhanced EO Energy approach.

(Please see Figure 4 on page 5 for a summary of the performance of the divestment strategy approaches.)

A portfolio replacing fossil stocks with a diversified environmental technology and resource optimisation strategy would have delivered the highest returns and information ratio

A Wealth of New Opportunity

This outperformance of low carbon energy investments over fossil fuel stocks has been delivered in an economic climate that is far from conducive to large-scale renewable energy uptake or wider investment in environmental protection. It is not unreasonable to assume that a combination of factors will see demand for low carbon energy, products, and services accelerate in the coming years, creating enormous demand for capital and many opportunities for investors.

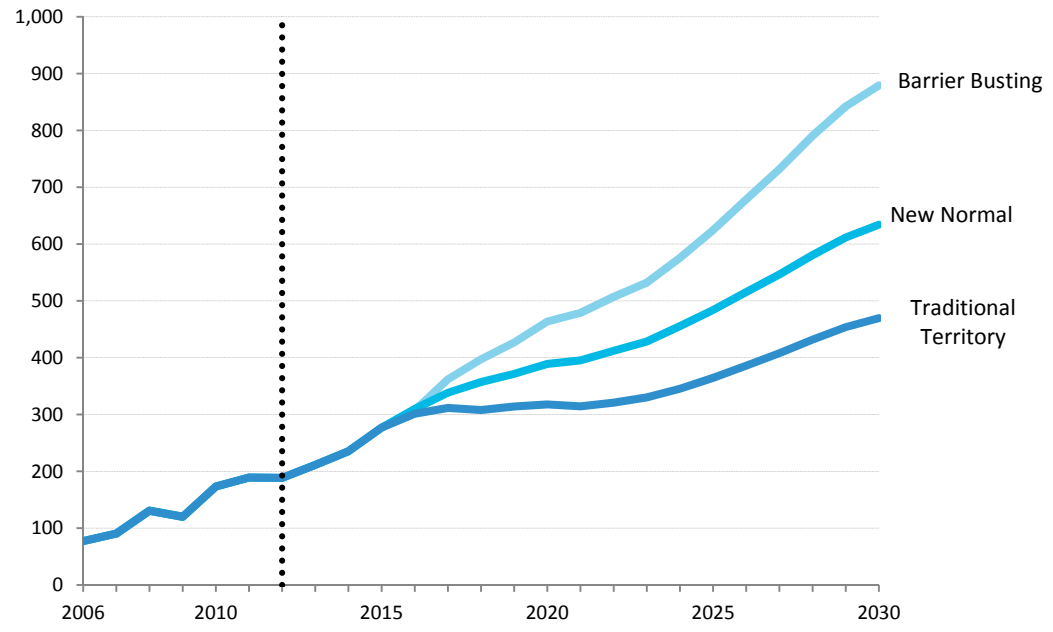
In addition to constraints on greenhouse gas emissions, these factors include: growing pressure on a range of natural resources; continuing scientific and engineering advances that reduce the cost of low carbon substitutes and environmental technologies; and likely a more favourable macro-economic environment.

The International Energy Agency estimates that more than half of the new investment required per year to 2030 to meet the climate challenge is needed for energy efficiency in the buildings and industrial sectors, 28% is needed for low-carbon transport and 21% is needed for low carbon energy including renewable energy power generation.

The renewable energy sector itself is likely to demonstrate a substantial thirst for capital, providing investors with a wealth of new opportunities as these factors play out. For example, as illustrated in Figure 5, Bloomberg New Energy Finance predicts that annual investment across all renewable energy generation will increase from US$189 billion in 2012 to US$630 billion in 2030. This is the median scenario. Its more aggressive scenario puts that figure at US$880 billion per annum.[13]

Investment levels in renewables of up to $880 billion are forecast by 2030

Figure 5: Renewable Energy Capital Requirements (Nominal US$ billion per annum)



Graph shows three scenarios that have been created to show a range of possible outcomes for the clean energy market. New Normal, Barrier Busting and Traditional Territory. These scenarios represent three different views of how the world's energy system will evolve based on a range of assumptions around technology costs, economic prosperity, policy ambition and investment in grid infrastructure.
Source: Bloomberg New Energy Finance, Global Renewable Energy Market Outlook 2013

The future looks different indeed

Given the growing consensus around climate change science, it is rational for investors to expect much tighter carbon regulation - with profound economic effects - in many regions of the world in the not too distant future. These regulations are likely to be incremental, and they are only moving in one direction – towards a lower carbon world.

While many investors may be confident that they can anticipate such regulation and will be able to exit high-carbon investments before their value is significantly eroded, there is considerable uncertainty around the timing and nature of future carbon regulation. Recent history of financial markets suggests that few investors will be able to successfully anticipate any sudden re-pricing and/or stranding of fossil fuel assets that result. Additional considerations should include the falling demand for fossil fuels from the substitution of competing low carbon energy generation such as wind and solar, and from energy efficiency and other technologies, particularly in the industrial, commercial and transportation sectors.

Few investors will successfully anticipate the likely bursting of the carbon bubble

In this context and as the above evidence strengthens still further, it is likely that many investors will face growing pressure from their beneficiaries to divest from oil, gas and coal companies for ethical and environmental reasons. As discussed above, investors may be overstating the risks involved in entirely screening out companies involved in oil, gas and coal extraction and production and for some, divestment is worth considering.

However, for the majority of investors for whom full divestment is not an immediate option, there are a number of intermediate responses. Investors could pursue a 'carbon-tilting' strategy, where they retain their exposure to the energy sector but overweight less carbon-intensive companies and underweight those with the greatest carbon exposure, for example those with the highest levels of reserves relative to market capitalisation.

Alternatively, or in combination, they could pursue thematic strategies to supplement broader market investments and offer a hedge to fossil fuel exposure – for example, by investing in portfolios of 'climate solutions' providers, or in forestry assets in regions that are not exposed to significant climate change risk. These could be developed progressively, building a low carbon portfolio funded by incremental allocations from their fossil fuel holdings.

While forward-looking analysis is speculative by its nature, an analysis of the historical data shows that the financial risks involved in fossil-fuel divestment are minimal, and can be largely offset by substituting oil, gas and coal stocks with portfolios of more environmentally attractive alternatives. That these more environmentally attractive alternatives can also mitigate the large and growing financial risks of fossil fuel energy is the compelling win-win most investors seek in discharging their fiduciary duties

Contact Information

Ian Simm, Chief Executive | +44 (0) 207 434 1122 | i.simm@impaxam.com

clientservices@impaxam.com | +44 (0) 207 434 1122 | www.impaxam.com

Norfolk House, 31 St James's Square, London, SW1Y 4JR

Appendices

Appendix 1: Current top 10 constituents of the MSCI Energy Sector

Company	Weight in Sector	Sub Industry	Region
Exxon Mobil Corp.	14.7%	Integrated Oil & Gas	North America
Chevron Corp.	8.7%	Integrated Oil & Gas	North America
BP PLC	5.0%	Integrated Oil & Gas	Europe
Royal Dutch Shell PLC (CL A)	4.6%	Integrated Oil & Gas	Europe
Total S.A.	3.9%	Integrated Oil & Gas	Europe
Schlumberger Ltd.	3.6%	Oil & Gas Equipment & Services	North America
Royal Dutch Shell PLC (CL B)	3.3%	Integrated Oil & Gas	Europe
Occidental Petroleum Corp.	2.6%	Integrated Oil & Gas	North America
ConocoPhillips	2.5%	Oil & Gas Exploration & Production	North America
ENI S.p.A.	2.2%	Integrated Oil & Gas	Europe

Source: FactSet, WM Reuters. Data as of April 30, 2013 in USD

Appendix 2: Current top 10 constituents of the FTSE EO Energy Universe

Company	Weight in Sector	Sub Sector	Region
Siemens AG	8.9%	Diversified Energy Efficiency	Europe
Honeywell International	5.9%	Diversified Energy Efficiency	North America
ABB Ltd.	5.4%	Power Network Efficiency	Europe
Emerson Electric Co.	4.2%	Power Network Efficiency	North America
Schneider Electric S.A.	4.1%	Power Network Efficiency	Europe
Fanuc Corp.	3.0%	Industrial Energy Efficiency	Asia Pacific
Eaton Corporation PLC	2.9%	Power Network Efficiency	North America
Royal Philips NV	2.7%	Buildings Energy Efficiency	Europe
Enel S.p.A.	2.6%	Renewable Energy Developers & IPPs	Europe
Johnson Controls Inc.	2.4%	Buildings Energy Efficiency	North America

Source: FactSet, WM Reuters. Data as of April 30, 2013 in USD

Sources

[1] *IEA Press Release, 'Progress towards clean energy has stalled', April 17, 2013*
http://www.iea.org/newsroomandevents/pressreleases/2013/april/name,36789,en.html

[2] *The World Bank, Turn Down the Heat – Why a 4°C Warmer World Must Be Avoided, November 2012*
http://climatechange.worldbank.org/sites/default/files/Turn_Down_the_heat_Why_a_4_degree_centrigrade_warmer_world_must_be_avoided.pdf

[3] *Reuters, 'Davos strives to make climate talk more than hot air', January 25, 2013*
http://www.reuters.com/article/2013/01/25/us-davos-climate-idUSBRE90O0LB20130125

[4] *www.iigcc.org*

[5] *http://gofossilfree.org/about/*

[6] *Carbon Tracker's work has been picked up and developed by a number of financial institutions and rating agencies, including:*

- *HSBC, whose oil and gas analysts warned that European energy companies could see their market capitalisation fall 40-60% if oil prices drop to $50/barrel, as a consequence of climate policies commensurate with the 2°C goal6.*
- *Citi, which examined the value at risk from climate policies among Australian extractive companies within the ASX200 index.6*
- *Standard & Poor's, which predicted that smaller oil companies – especially those heavily exposed to high-cost unconventional oil production – could face credit downgrades within a few years under its 'stressed' carbon reduction scenario.6*
- *Aviva Investors, Bunge, Climate Change Capital and HSBC, which are funding research at Oxford University's Smith School of Enterprise & Environment into risks posed to investors by high-carbon stranded assets.*

[7] *This is the target agreed by the international community in the 2009 Copenhagen Accord, and subsequently.*

[8] *Carbon Tracker has calculated that, if the proven reserves of fossil fuels owned by private and public companies and governments are extracted and consumed, another 2,795 Gt of CO2 will be emitted. That is five times more than the remaining carbon budget and, even under the International Energy Agency's ("IEA") most optimistic assumptions about the effectiveness of carbon capture and storage, that technology barely alters the equation.*

[9] *HSBC, Oil & Carbon Revisited – Value at risk from 'unburnable reserves', January 25, 2013,*
Citi Investment Research, 'Unburnable Carbon' – A Catalyst for Debate, April 8, 2013

[10] *The Fossil Energy stocks represent the companies within the MSCI World Index whose businesses are dominated by either of the following activities: 1) The construction or provision of oil rigs, drilling equipment and other energy related service and equipment and/or 2) the exploration, production, marketing, refining and/or transportation of oil and gas products, coal and other consumable fuels.*

[11] *MSCI ESG Research, 'Responding to the Call for Fossil-fuel Free Portfolios', June 2013*

[12] *This is based on the Global Classification Standards developed by MSCI and Standard & Poor's*
http://www.aperiogroup.com/system/files/documents/building_a_carbon_free_portfolio.pd