



A baseline survey of climate disclosures
by fossil fuel companies

RECOGNISING RISK, PERPETUATING UNCERTAINTY



About Carbon Tracker

The Carbon Tracker Initiative is a team of financial specialists making climate risk real in today's financial markets. Our research to date on unburnable carbon and stranded assets has started a new debate on how to align the financial system with the energy transition to a low carbon future.

Background to the research

This latest research aims to provide a baseline survey of the extent to which climate-related risks are being overlooked by listed fossil fuel companies. It goes on to review the depth and reach of the risk disclosures required from listed fossil fuel companies, to enable investors to align themselves with a potential low demand and price future.

Find the report at: www.carbontracker.org/report/climateriskdisclosures

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Executive Summary

Insufficient climate-related risk reporting

The International Organisation of Securities Commissions (IOSCO) outlines the role of capital markets regulators is to “protect investors, maintain fair, efficient and transparent markets and seek to address systemic risk” on those exchanges companies use to raise funds. It is intended that corporate reporting achieves this aim. While some steps have been taken to address increasingly pressing climate-related risks through measures including the US Securities and Exchanges Commission guidance on climate change disclosures, UK mandatory greenhouse gas reporting for listed companies and European Union accounting, transparency and prospectus directives, reporting requirements on the whole remain woefully insufficient. Global regulators are not utilising the potential of capital markets reporting to build ‘climate literate’ capital markets.

Climate-related risks threaten investors

An energy transition is underway as stakeholders increasingly recognise the potential severity of future climate-related constraints. Coal prices are at a perilous low as demand for heavy polluting coal-fired power falters, oil and gas capital expenditures are spiralling to even maintain the status quo of production levels, all the while, simultaneously, the supply cost of renewable energy technologies continues to fall. If the resulting potential downside risks to future fossil fuel demand are not disclosed in company disclosures and regulatory filings, current and prospective investments run the risk of destroying shareholder value or depressing group returns – what Carbon Tracker term wasting capital in stranded assets.

99% of sampled fossil fuel companies recognise it’s risky business...

The sample of 81 coal, oil and gas companies analysed in this report unequivocally display an awareness of climate change as an issue and a belief that it could poses a risk to their business. 86% of companies consider climate change to pose physical risks, while 99% of the sample deem climate-related regulation to be a risk.

...But perpetuate uncertainty with a lack of implementation

In spite of this high level of awareness of climate-related risk, this analysis reveals that companies are failing to connect the dots when it comes to applying this knowledge through risk management measures. 80% of oil and gas companies did not display evidence of running climate scenario analyses of different temperature increases due to climate change, with only 10% of companies going on to stress-test projects against conditions similar to a 2°C future. Approximately the same proportion of coal companies conduct climate scenario analyses, with only one, however, disclosing evidence of stress-testing against a 2°C outcome.

Such low levels of sufficient examination of low demand and price scenarios within a sample that should be considered as ‘best in class’ given they responded to CDP’s climate change questionnaire and Ceres and Carbon Tracker’s investor letters, should make investors question whether initial risk disclosures by fossil fuel companies are merely boilerplate rhetoric without much influence, and should serve as a call to financial regulators for greater scrutiny on climate-related risk integration.

The occurrence of reporting inconsistencies remains a concern

Of particular importance to regulators is their role in ensuring regulatory filings submitted by companies are consistent with those made in other voluntary reporting mechanisms - in essence to ensure what a company says to investors reflects what is being implemented. Our analysis of US listed fossil fuel companies shows that while there appears to be a consensus that climate-related regulatory risks are the most significant,

there is discrepancy in the perception of physical risks in particular between company annual reports and voluntary disclosures. Corporate reports must provide investors with the most accurate information possible.

Investors need to call for more

Through initiatives such as the UN PRI, CDP, SASB, IIRC and Ceres and CTI's Carbon Asset Risk Initiative investors have displayed demand for more meaningful climate-related information flows. This research seeks investors to call for a greater focus from fossil fuel companies on their relative risk and resilience to a carbon-constrained scenario.

Regulating capital market to manage climate-related risks

We recommend:

Companies to disclose, either voluntarily or due to regulatory amendments, in their regulatory filings, preferably under a separate heading:

- A descriptions of their assessment of climate-related risks, including aggregate demand and price impacts;
- The carbon embedded in their coal, oil and gas reserves and resources;
- Details related to resilience in a low price/demand scenario, such as the parameters set out in stress-tests in different price/demand scenarios;
- Relationship of data to corporate capital expenditure strategies and risks to the business model.

Securities regulators and financial report standard setting bodies

- Increase scrutiny of existing regulations and guidance of coal, oil and gas disclosures based on existing authority;
- Scrutiny should include ensuring that fossil fuel companies provide clear descriptions of their assessment of climate-related risks, including aggregate demand and price impacts associated with a low-carbon scenario, and that those assessments are consistent with other company statements on climate risk;
- Issue guidance to interpret existing standards related to carbon asset stranding so that preparers of reports fully consider the viability of coal, oil and gas stocks.
- Require information in annual reports and listing prospectuses on the emissions potential of reserves, and the emissions trajectory assumptions of corporate strategy;
- Require stress-testing of how reduced demand and price could affect the fossil fuel reserves and resources of a company.

Voluntary reporting guideline setters

- Develop technical guidance on reporting the carbon dioxide emissions potential of reserves to provide a forward-looking indicator, ensuring compatibility with financial reporting standard.

Foreword

Just 2 of the 32 coal companies responding to this report's survey accept the 2°C warming limit that Governments are committed to via international climate agreements. Of this sample of coal companies, 25 "*acknowledged climate change*", but only 5 of them went on to "*acknowledge climate change requires emissions reductions*".

The pervading view demonstrated in responses found here is of 'business as usual.' Or rather, 'we're quite happy with things as they are.' However, at a time of extraordinary dislocation in the energy markets, this report asks whether the risk reporting practices by companies is up to the challenge implied by the scale of the energy transition? Part of the explanation of the report findings is down to poor disclosure practices by the companies themselves. Much of it is due, however, to inadequate signaling from policymakers to capital market regulators that these issues are important, or indeed material. Now is the time for guidance and direction to assist companies in preparing new risk disclosures that are fit for purpose.

Some 81 companies are included in this synthesis analysis; 49 oil and gas companies and 32 coal companies producing responses from a target sample of 200. It is important to note these are just the fossil fuel companies with at least some level of climate risk disclosure – a far greater number did not respond. In this regard, the sample is fundamentally skewed towards a more positive level of engagement of fossil fuel companies with climate risk disclosures than is actually occurring.

Our colleagues in the US note that four years after the SEC issued guidance on climate change disclosure through release Nos. 33-9106, 34-61469 and FR-82 Commission Guidance Regarding Disclosure Related to Climate Change, they remain concerned that the guidance has had little effect.

If the potential aggregate downside risk to fossil fuel demand is not disclosed in company disclosures and regulatory filings, current and prospective investments run the risk of destroying shareholder value or depressing group returns – what Carbon Tracker term's wasting capital on stranded assets.

This report contends that the existing corporate reporting framework for fossil fuel companies fails to recognise the warning signs of a low demand and price future. In doing so, current practices fail to provide investors with the material information they need to assess the future impairment of companies' coal oil and gas assets and their business model as a whole.

This report calls for reforms on narrative reporting around climate risk and an increase in transparency around the future quantum of emissions implied by the embedded CO₂ in company fossil fuel reserves/resources. The desired outcome is that investors, regulators and climate policymakers will be able to effectively monitor, in aggregate through corporate disclosures, whether the fossil fuel industry is contracting collective business operations in line with a diminishing 'carbon budget' to 2°C warming.

These last few years, Carbon Tracker has had a constructive dialogue with the Bank of England on climate related risk disclosures. We now look forward to extending this conversation with financial regulators responsible for capital markets transparency.

Mark Campanale

Executive Director and Founder

Carbon Tracker Initiative

1. Introduction

A global energy transition is underway. In 2013 renewable energy produced 22% of the world's electricity according to the IEA², up from approximately 10% in 2000.³ Although the scope and speed of this energy transition remain uncertain, the economic and environmental case for coal, oil and gas is becoming increasingly questionable.

Climate change is an increasingly prominent driver of this transition. Carbon Tracker's research emphasised an energy shift is required initially by revealing that most of the world's coal, oil and gas resources can not be burned if we are to prevent climate change from exceeding the internationally agreed limit of 2° C increased global average temperature. Carbon Tracker's research has also highlighted the vulnerability of current and, in particular, future capital investments of fossil fuel companies to changes in demand, price and emissions scenarios.

For the oil industry alone, there is an estimated \$1.1 trillion of capital expenditure relying on a high oil price that may not materialise in a world undergoing a transition towards lower carbon energy.⁴ By revealing the scale of what is at stake, this research underscores the central importance of assessing the aggregate impact of demand and price impacts associated with an energy transition.

However, neither listed fossil fuel companies nor the regulators of capital markets through which they raise funds, have fully examined the risk disclosures that wider stakeholders require as this transition accelerates. The US Securities and Exchange Commission's (SEC) issuance of Guidance on Disclosure Related to Climate Change was an important step towards the listing requirements and reporting frameworks required to improve climate-related risk disclosures. However, as recent research from the investor group Ceres demonstrated, the SEC did not issue a single comment letter on the adequacy of companies' climate change disclosures in 2013, compared to 49 in 2010 and 2011, despite clear evidence that many climate risks remain unconsidered by fossil fuel companies.⁵

This report analyses disclosures made by listed fossil fuel companies via the CDP 2014 climate change questionnaire and supplementary oil and gas sector module and responses to Ceres' Carbon Asset Risk (CAR) investor letters to outline: i) the extent of the industry's understanding of climate change; ii) the scale of perceived energy transition and climate-related risks posed to their business models; and iii) the degree to which this understanding is being integrated into the decision making of the industry. In doing so, this report is able to examine whether investors are receiving the type of information they need and, in turn, what regulators can do to improve current risk disclosures.

"This is the year to take action on climate change. Financial regulators need to lead. Sooner rather than later they must address the systemic risk associated with carbon-intensive activities in their economies... by enforcing disclosure of climate risk and requiring companies and financial institutions to assess their exposure to climate-related impacts"

Jim Yong Kim, World Bank President,
Jan 2014¹

This paper is part of a larger project to assess the ability of enhanced corporate reporting, accounting, and governance practices to increase transparency and protect investor value related to climate risk. These risks are not trivial. For example US coal company share prices have fallen by up to 75% over the last three years predominantly as a result of the transition to natural gas. This raises two critical questions:

1. Were investors adequately forewarned of the vulnerability of coal, oil and gas sectors to the possibility of a lower-than-expected demand scenario and the resulting value destruction that has resulted in the past, most critically in the global coal sector?
2. Are investors going to be adequately forewarned of the ongoing vulnerabilities of the fossil fuel sector and potential value destruction of future aggregated climate-related demand and price risks?

This report demonstrates that although companies increasingly recognize the importance of climate-related risks, the lack of specific detail raises significant concerns about the ability of investors to understand companies' respective vulnerability to those risks.

2. Background: Energy transition and climate-related risk

The world's energy sector is undergoing a transition away from heavily polluting coal combustion and an oil and gas undergoing spiralling capital expenditure costs, towards an emerging renewable energy sector whose own supply costs are falling all the time – refer Appendix 1 for further details. The energy transition reflects a period of flux that could see a future transpire that differs greatly from the 'business as usual' expectations of some fossil fuel companies and their investors. If these potential downside risks to future fossil fuel demand are not disclosed in company disclosures and regulatory filings, current and prospective investments run the risk of destroying shareholder value or depressing group returns – what Carbon Tracker term wasting capital in stranded assets – refer Appendix 2 for full definition and explanation.

Harnessing capital markets reporting

In order to increase transparency and protect investor value from climate-related risk, corporate reporting needs to provide consistent and comparable information flows in mainstream reports that enables investors to benchmark and gauge progress and risk. This information will most likely come via a mixture of adoption of voluntary frameworks, increased enforcement of existing regulations, and amendments to capital markets regulation.

The International Organisation of Securities Commissions (IOSCO) coordinates the activities of 95% of listing authorities around the world and, as such, is the recognised standard setter for regulation of listed companies. IOSCO members have resolved to:

*'cooperate in developing, implementing and promoting adherence to internationally recognised and consistent standards of regulation, oversight and enforcement in order to **protect investors, maintain fair, efficient and transparent markets and seek to address systemic risks**'.*⁶

The oversight of listed fossil fuel companies to the risks changes in demand and price pose to investors falls directly within the jurisdiction of IOSCO to protect investors and maintain efficient and transparent markets.

Furthermore, pressure is growing from a number of institutions who are recognising the significance of these risks including from the Climate Disclosure Standards Board (CDSB), the Sustainability Accounting Standards Board (SASB), the International Integrated Reporting Council (IIRC) and the Sustainable Stock Exchanges Initiative (SSEI). Investors are also demanding improvements with regards to climate-related information flows – CDP make requests on behalf of 767 investors with some US\$92 trillion in assets and the UN PRI, SASB and IIRC initiatives collectively represent over \$45trn in assets both of whom are committed to improving sustainability disclosures by corporations,⁷ while the Ceres and Carbon Tracker Carbon Asset Risk (CAR) Initiative saw 70 global investors managing more than \$3.5trn in collective assets spur the 45 top oil and gas, coal and utilities to assess the financial risks that climate change poses to their business plans.⁸

A wide variety of regulations exist to help investors understand the economic viability of fossil fuel companies' assets and the implications of demand changes, but certain gaps remain. The following list includes a mixture of long-standing rules and relatively new developments, some mandatory but others still voluntary:

- *US Securities and Exchanges Commission (SEC) guidance regarding disclosure related to climate change*⁹: This guidance provides many guideposts for how companies should assess obligations to disclose climate-related risks in narrative disclosure. For example, the SEC states that the obligation to discuss known trends and uncertainties could include changes in demand, price and costs associated with climate policy or competition from alternative energy technologies.
- *Mandatory greenhouse gas emissions reporting guidance for UK listed companies*: In 2013, all business listed on the Main Market of the London Stock Exchange were mandated to report their levels of greenhouse gas emissions in their annual report.¹⁰
- *IAS 36*: The International Accounting Standards Board introduced IAS 36 – Impairment of Assets – to ensure that assets are carried at no more than their recoverable amount. Currently, defining the recoverable amount is based on reasonable assumptions; what constitutes 'reasonable' is up for debate.
- *FASB 932*: The SEC requires US listed oil and gas companies to disclose values of proven reserves in line with US standard FASB 932 in their financial reports.
- *European Union Accounting, Transparency and Prospectus Directives*.
- *King III*: In 2010 the Johannesburg Stock Exchange codified the King III report on corporate governance that requires companies to prepare an integrated report documenting how the company "has both positively and negatively impact the economic life of the community" and how it plans "to enhance those positive aspects".¹¹ This reporting, however, like most energy transition and climate-related information, is on an "apply or explain" basis, meaning companies can continue to inadequately assess and disclose considerations of aggregate demand and price risk because they do not consider it to be 'material'.

3. Analysis: The state and integration of energy transition and climate risks in the fossil fuel industry

Section 2 outlined the risks posed by an energy transition that is already underway and the potential within the capital markets to mitigate this risk. This section analyses disclosures made by listed fossil fuel companies to gauge awareness of these risks in these corporations and the extent to which they factor into their investment decision-making processes and business models as a whole.

The data and methodology

This report analyses disclosures from a sample of listed fossil fuel companies that were selected by cross-referencing: i) Carbon Tracker's list of the top 200 coal, oil and gas companies by reserves as of the 2013 Wasted Capital and Stranded Assets report¹²; ii) those companies that responded to the CDP climate change questionnaire and oil and gas module by 24th July 2014; and iii) the 20 companies that responded to the CERES CAR investor letters.¹³ Applying this approach, meant 81 companies were included in this synthesis analysis; 49 oil and gas companies and 32 coal companiesⁱ. This is used as a sample reflecting the fossil fuel industry, but it is important to note these are just the fossil fuel companies with at least some level of climate risk disclosure – a far greater number did not respond to the various parties (see below). The methodology and resources used to examine each question posed can be accessed at www.carbontracker.org/report/climateriskdisclosures.

Less than a quarter of fossil fuel companies responded to CDP on climate change

It is important to underpin the analysis of the disclosures from those that *did* respond to CDP's climate change questionnaire and fit within our sample criteria, with an understanding of how many fossil fuel companies did not respond to the questionnaire.

Looking at the last three years reveals engagement from coal, oil and gas companies with CDP on climate change issues has fallen. In fact, 2014 was the lowest response rate of the three with only 24% of companies who received the CDP climate change questionnaire issuing a response, compared to 38% for 2012 and 2013.ⁱⁱ This is both a concerning downward trend and a worryingly low response rate for 2014, which reflects those companies at the heart of the climate change problem rejecting the opportunity to provide additional information on the issue to investors.

This analysis serves to highlight the significant proportion of companies within our sample of 81 who are failing to adequately build resilience against possible low demand and price futures despite an evident awareness of the risks at hand – from this point onwards, conclusions of this risky approach should be placed within the context that this sample represents just the 25% of fossil fuel companies that are engaged on the issue, i.e. there are at least an additional 75% of companies that receive the CDP climate change questionnaire but choose not respond; beyond this, there are thousands of fossil fuel companies who are not CDP members who, it is defensible to suggest, are likely to apply even more risky and neglectful strategies compared to our 'best in class' sample.

ⁱ BHP Billiton and Rio Tinto have both coal and oil operations, but have been classified in this sample as coal companies because this is their primary exposure to fossil fuels.

ⁱⁱ This analysis focused on those companies under GICS classification 'Oil, gas and consumable fuels'.

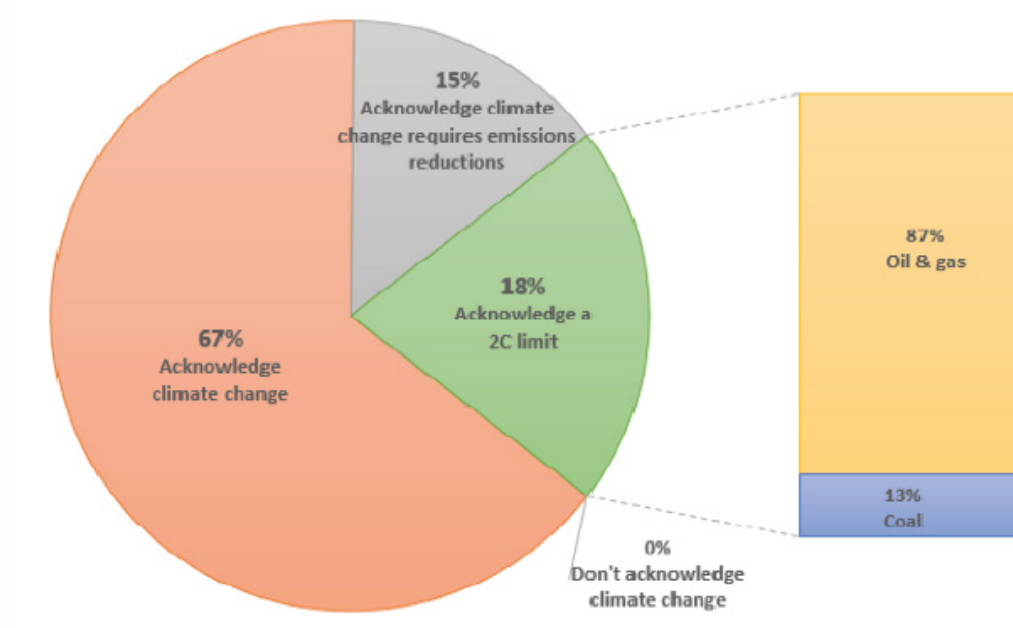
Climate change and carbon constraints

Climate science research tells us that the world is warming at an alarming rate. In 2010, international governments agreed at the 16th Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) to limit emissions of greenhouse gases so that the rise in average global temperatures is kept to less than 2°C above pre-industrial levels. The 2° C limit was set because the scientific evidence indicates the risks to economic, societal and environmental systems reach unacceptable levels at higher temperatures.

Our current trajectory is leading us towards a 4°C-6°C warmer world – the United Nations Intergovernmental Panel on Climate Change (IPCC) warns that at these higher average global temperatures there is a risk of substantial species extinction, risks to global and regional food security as well as human health and possible conflict over resources.¹⁴

If the capital markets are to facilitate a realignment of our global climatic trajectory, the future can not replicate the past. This could have severe ramifications for assumptions around the viability and value of coal, oil and gas reserves and, as such, climate change poses a significant risk to fossil fuel companies.

Figure 1. Do respondents acknowledge climate change and to what extent?



Source: CDP, Ceres; CTI analysis 2014

	Total		Oil & gas		Coal	
	No. of companies	% of total	No. of companies	% of O&G	No. of companies	% of coal
Don't acknowledge climate change	0	0%	0	0%	0	0%
Acknowledge climate change	54	67%	29	59%	25	78%
Acknowledge climate change requires emissions reduction	12	15%	7	14%	5	16%
Acknowledge a 2°C limit	15	18%	13	27%	2	6%

- All 81 fossil fuel companies in the sample acknowledge climate change to a degree. While this does not necessarily mean these companies accept it is happening and agree with the science, it demonstrates that these 81 companies are at least aware of climate change as an issue.

October 2014

- 33% demonstrate an understanding that greenhouse gas emissions must be reduced because of an understanding that higher temperature increases bring greater risks. For example;

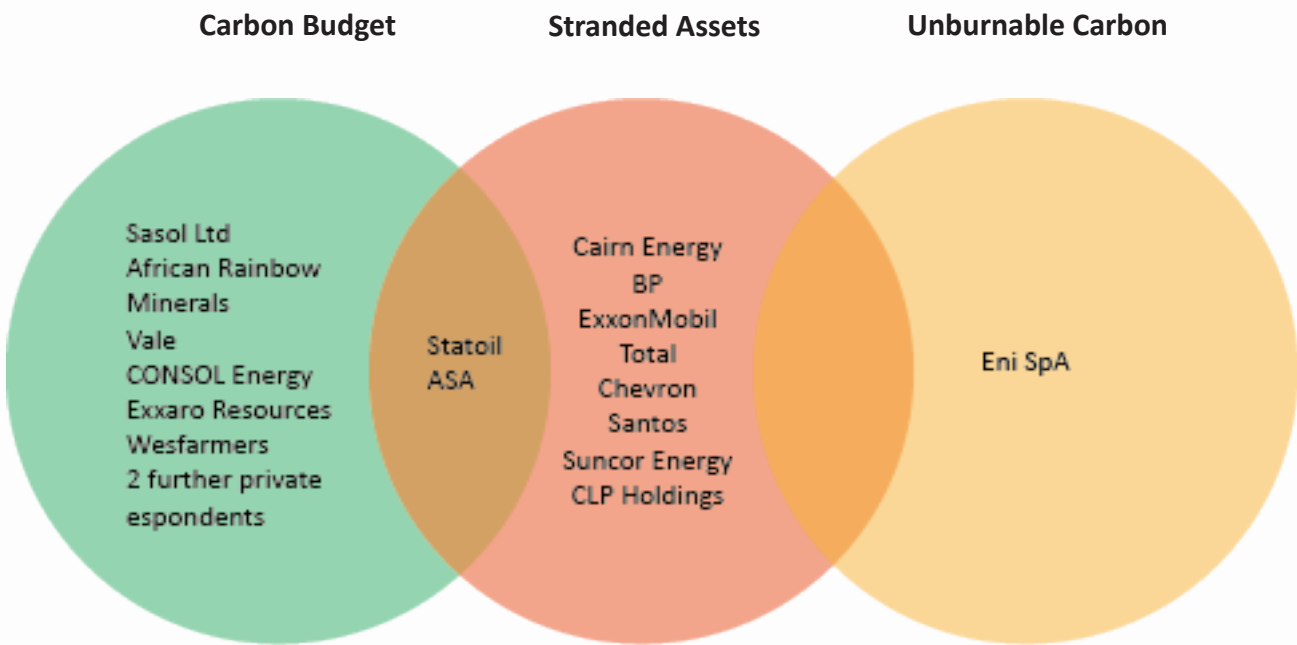
“Climate change poses a significant risk for our business, both in meeting anticipated legislative and policy requirements...emissions reductions represent one of the greatest challenges of our generation” – Sasol

- However, less than one fifth of the sample disclose an understanding of the scientific significance of the 2°C limit agreed by the world’s governments.
- The oil and gas sector discloses a higher level of understanding of climate change than the coal sector; as the graph illustrates 87% of the 15 companies that acknowledge a 2°C limit are oil and gas companies.

Coal, oil and gas companies display a universal awareness of climate change as an issue but disclose a patchy awareness of the importance of temperature increase thresholds – whether this reflects a deeper lack of understanding is unclear.

An acknowledgement by companies of a carbon budget and its potential impact on stranding fossil fuel assets due to limits on carbon emissions (unburnable carbon) would build on the disclosures made in Figure 1 to include an awareness of the potential trade-offs between current coal, oil and gas stocks and measures driving the energy transition. Figure 2 reveals those companies who used the carbon budget, stranded assets and/or unburnable carbon terms in their disclosures.

Figure 2. Do respondents acknowledge there is a limit to the amount of greenhouse gases that can be acceptably emitted?



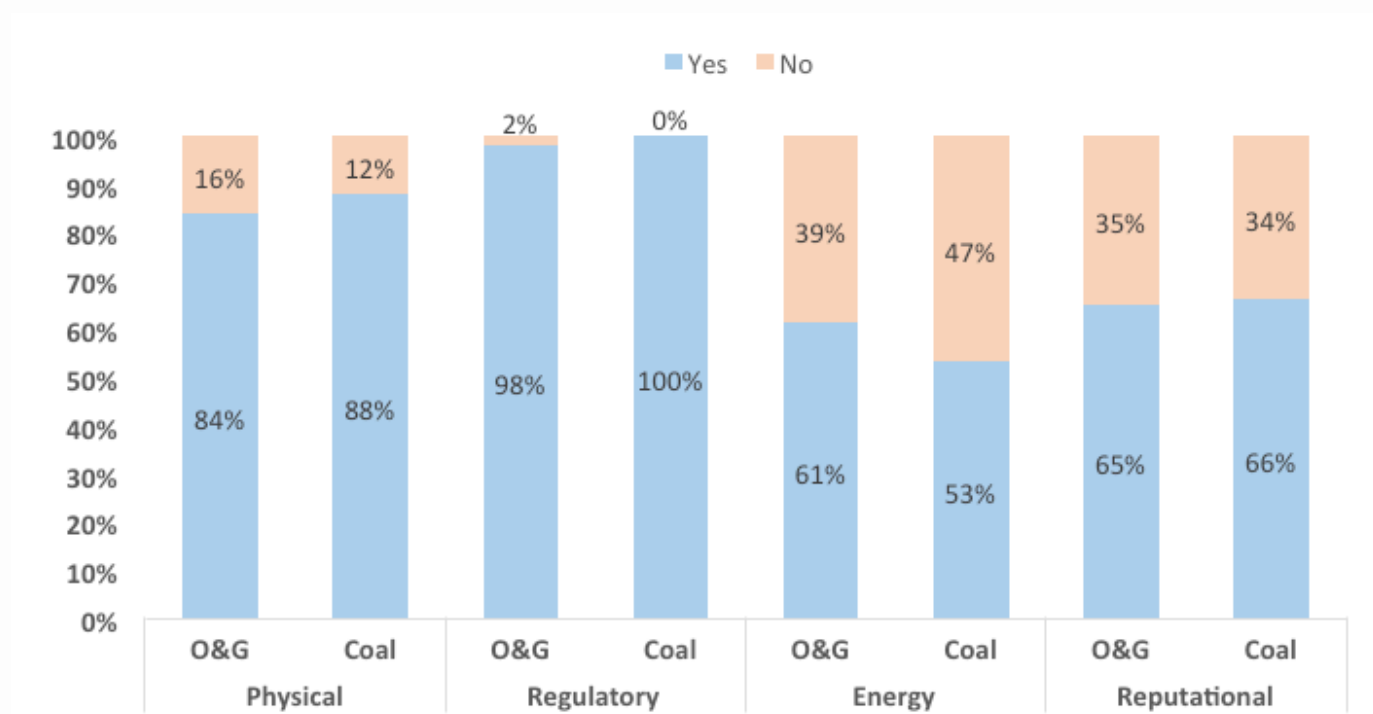
Source: CDP, Ceres; CTI analysis 2014

Statoil were the only company who linked limits imposed by carbon budgets with potential stranded fossil fuel assets. Statoil represents an advanced level of understanding, but in total only 18 (22%) fossil fuel companies referred to at least one of the concepts in question.

Climate risks

Building on the previous section on companies' awareness of climate change, this section seeks to understand if fossil fuel companies disclose a perception of physical, regulatory, energy and reputational risks associated with climate change. Figure 3 reveals what percentage of respondents considered at least one factor within each risk category to be a risk to their business. Each risk category is then assessed in further detail in turn.

Figure 3. Do respondents consider climate change a risk to their business?ⁱⁱⁱ



Source: CDP, Ceres; CTI analysis 2014

Physical risks

Figure 3 reveals over 80% (69 of 81) of coal, oil and gas companies considered the physical impacts of climate change to be a risk. The following graph shows the number of companies that perceived specified physical impacts to be a risk from a predetermined list in the CDP questionnaire.

ⁱⁱⁱ All 81 companies rated whether each category is a risk

Figure 4. Do respondents consider the following physical impacts a risk?

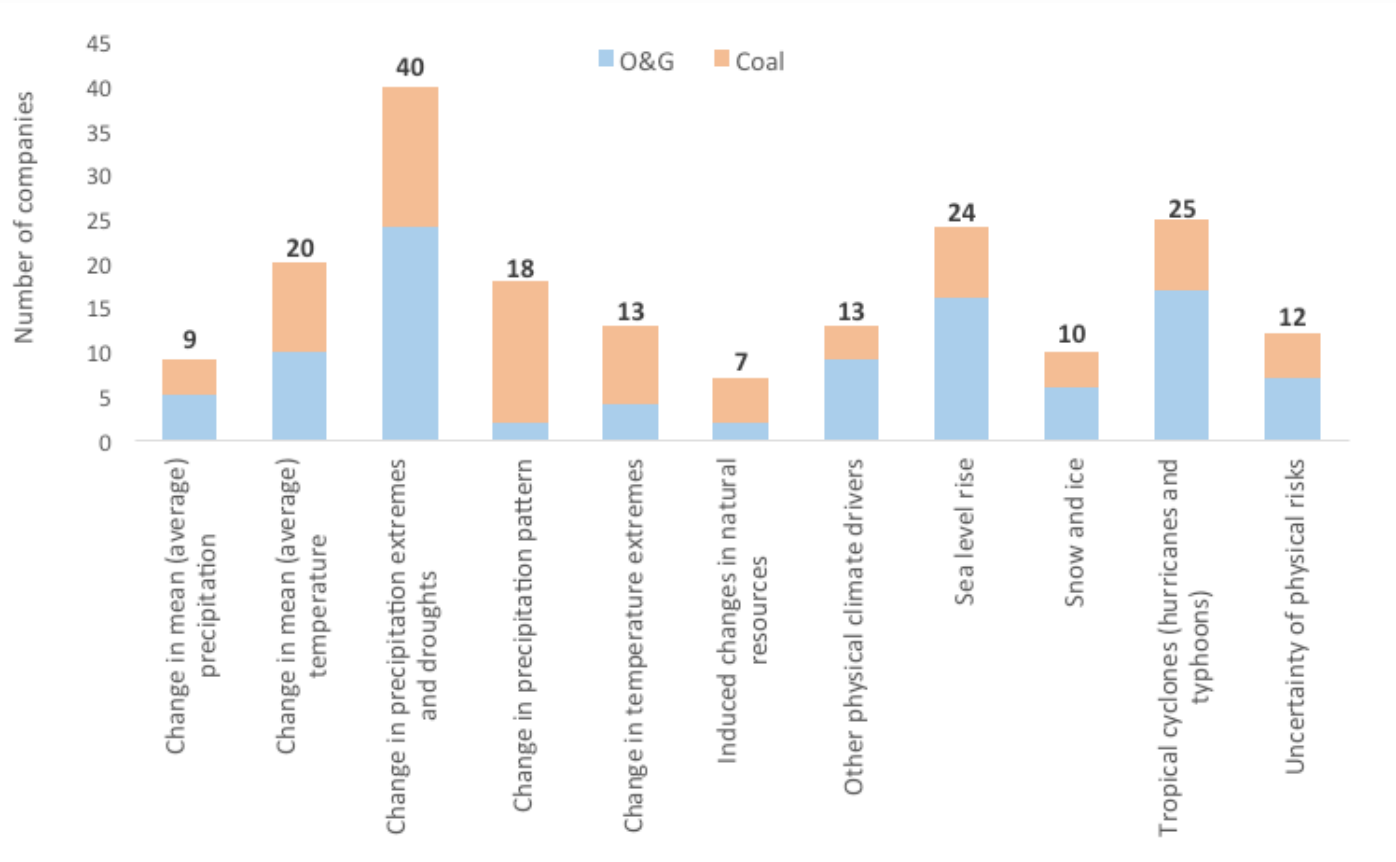


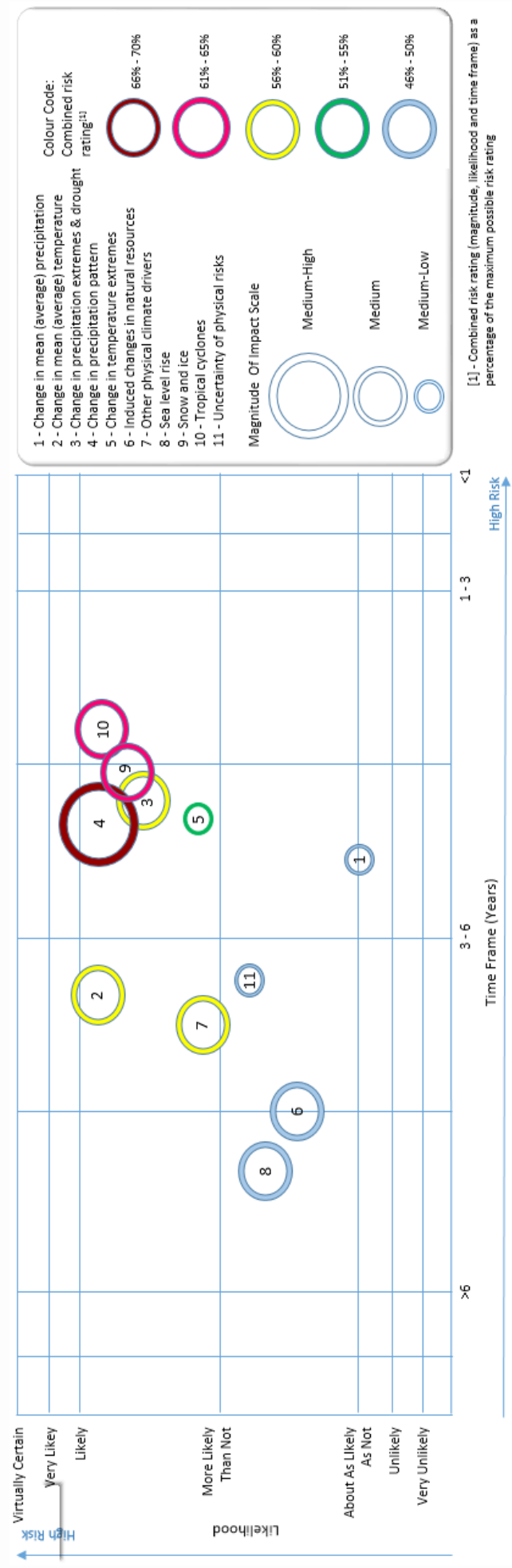
Figure 4 suggests changes in precipitation extremes and droughts is considered the biggest physical risk to the fossil fuel industry, by the industry. This risk (offered as a pre-determined option in the CDP climate change questionnaire) is closely related to the second greatest physical risk, tropical cyclones. These factors were identified as a risk relatively evenly between the oil and gas and coal industries. CLP Holdings Ltd typify sector-level concern by asserting,

“if the effects of climate change include typhoons that are stronger relative to those experienced historically, our assets (generation, transmission and distribution) may not be built to sustain them” – CLP Holdings Ltd.

Companies were also asked to rate the severity of each factor they consider a risk. These results portray a different perspective on these physical risks – refer to Figure 5 overleaf. For instance, a change in precipitation patterns was seen as the most severe risk in the matrix. Clearly, therefore, this impact is considered a high risk by the 18 companies who considered it a risk in the graph above, a disproportionate 16 of which (89%) are from the coal sector making it the most sector specific risk of all the physical impacts.

The risk matrix overleaf integrates respondents’ ratings of the likelihood, time frame and magnitude of risks associated with each physical risk of climate change. The methodology underpinning this analysis is documented in detail in the methodology available at: www.carbontracker.org/report/climateriskdisclosures.

Figure 5. How do respondents rate the likelihood, timeframe and magnitude of the following physical risks of climate change?

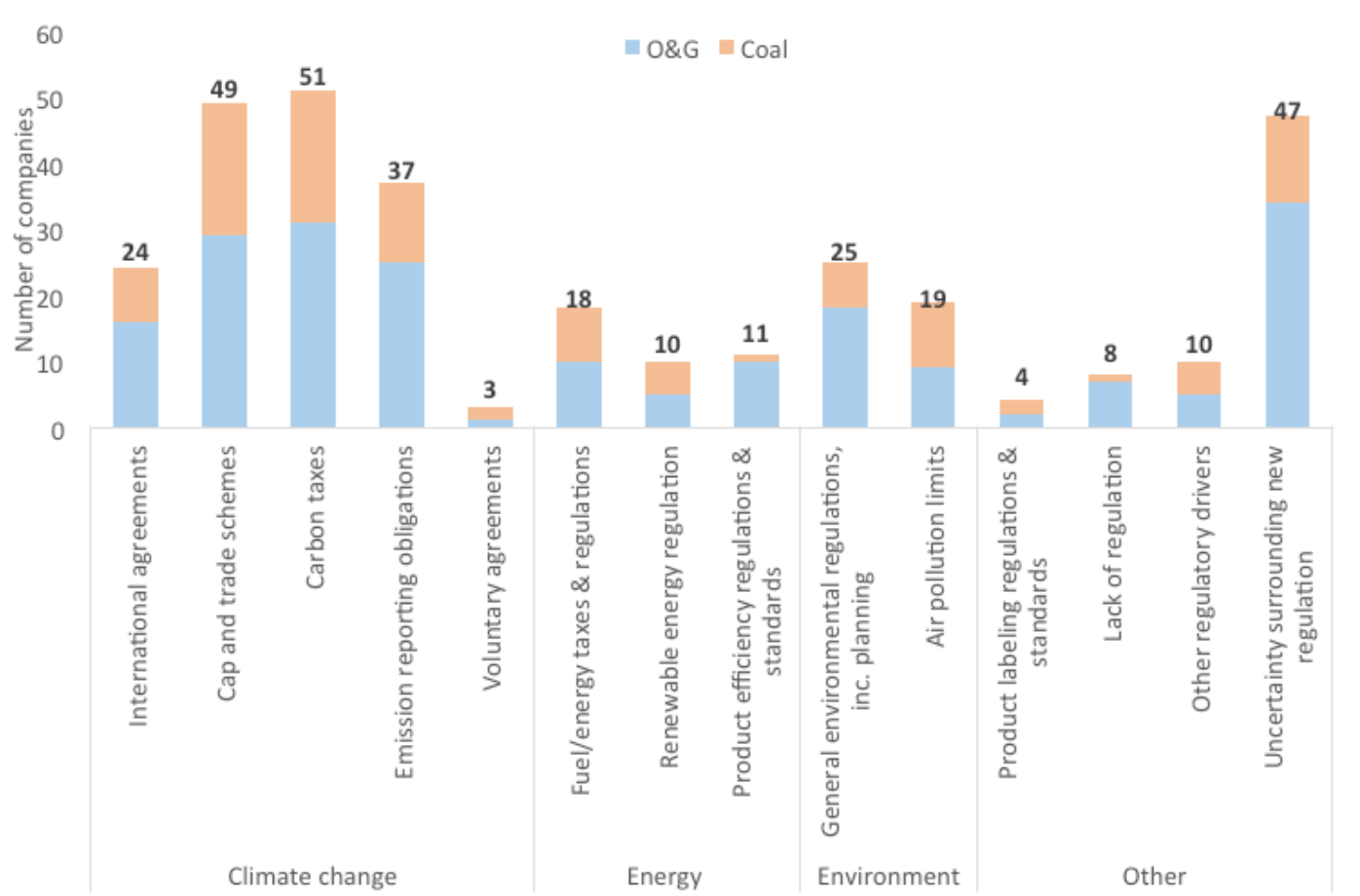


- On the whole, this risk matrix shows that there is a wide range in the perceived risk from the physical impacts of climate change. Of those issues that are considered a high risk, changes in precipitation patterns (number 4) is the most prominent.
- Contrast this to the fact greater variation in average precipitation (1) is not considered a driver that poses much of a risk and this suggests that it is the increased regularity and intensity of 'one-off' weather events that resonates with fossil fuel companies more than incremental shifts; such as changes in precipitation extremes and drought (3) which features as a relatively high risk on the matrix.
- Other physical drivers of high risk include increasing severity of snow and ice (9) and tropical cyclone (10) episodes.

Regulatory risks

Responses in Figure 3 show that climate, energy and/or environmental regulation is seen as the biggest risk to the coal, oil and gas industries with 80 out of 81 companies flagging it as a risk. This appears justified in light of recent research that indicated over 500 climate laws have been passed in 66 countries that together capture 88% of global anthropogenic greenhouse gases.¹⁵ Gazprom has not reporting climate change regulation as a risk in the materials reviewed for this paper. This section seeks to analyse more closely which regulations are deemed to be the greatest risk.

Figure 6. Do respondents consider the following regulations a risk?



The graph above suggests that economic approaches such as carbon taxes and cap and trade schemes are deemed the greatest regulatory risk by coal, oil and gas companies and that climate change regulations in general are the greatest area of concern according to 89% of the sample (72 of 81), e.g:

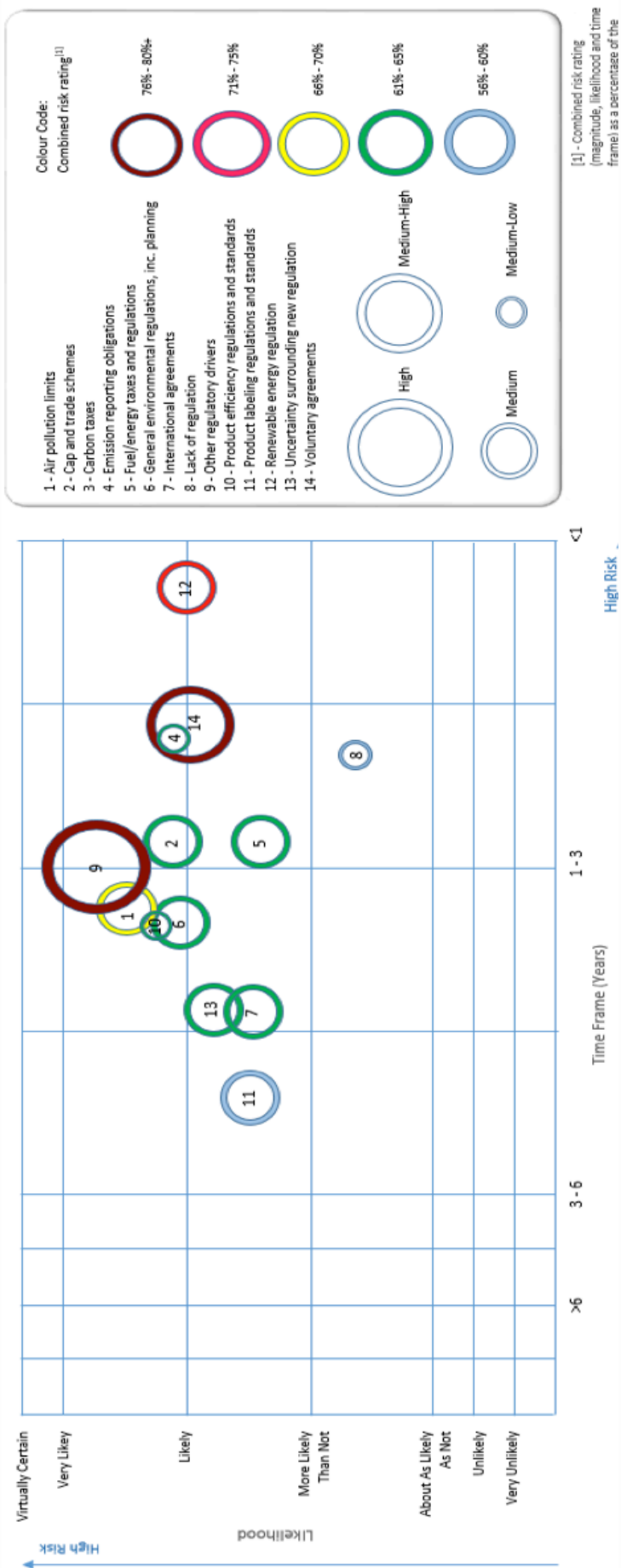
“The impact that international or US climate policy might have on commodity prices and ultimate demand for our resources is a risk. For example, a low-carbon fuel standard or a significant carbon tax affecting consumer fuel cost...could impact US demand for Canadian oil.” – Baytex Energy

Regulatory uncertainty and international climate agreements also emerge as a significant risk. Examining this data further reveals the following companies to consider multiple regulatory risks:

- Six companies deem 4/5 climate regulations as a risk – Anadarko, Chevron, ExxonMobil, Imperial Oil, Lundin Petroleum, Petrobras - with no one company flagging all five;
- Chevron, ExxonMobil, Imperial Oil and Petrobras all highlighted 2/3 energy regulations as potential risks also;
- Petrobras go on to perceive 3/3 environmental regulations as risks.

The risk matrix portrays a slightly different picture on these regulatory risks.

Figure 7. How do respondents rate the likelihood, timeframe and magnitude of the following regulatory risks?



- Overall the matrix shows regulatory risks are considered greater than the physical risks previously assessed. It shows that coal, oil and gas companies only consider international climate agreements (7) a low-moderate risk across the three criteria. Interestingly, fossil fuel companies expect voluntary agreements (14) to play an important role in the future.
- The most immediate regulatory risk was adjudged to be renewable energy regulation (12) – this demonstrates that companies are taking heed of the potential for product substitution to lower demand for coal, oil and gas, but also do not rate the magnitude of this risk to be high. Given the scale of support from numerous governments behind renewable energy and the speed of supply cost reductions, this stance could be risky.
- Finally, air pollution (1) is the only other regulatory driver assigned medium or higher overall risk. This demonstrates that it is not solely climate or energy-related regulation associated with the energy transition that pose a risk to the fossil fuel company business models. Understanding the full scope of climate-related regulatory risks is critical to effectively enhance disclosure requirements and will be examined further below.

Energy Risks

The changing physical climatic environment and regulatory landscape as a result of climate change will have significant knock-on effects on the market conditions within which fossil fuel companies operate. However, energy-related risks such as rising production costs, demand substitution by other energy sources and energy efficiency improvements can fluctuate independently of external physical or regulatory influence to threaten fossil fuel companies with a weaker demand and price future. This section seeks to explore these energy factors and the extent to which coal, oil and gas companies perceive them to be a risk.

Increasing costs

Since 2000, upstream costs in the oil industry have risen threefold¹⁶, while global coal prices have halved since 2011 and show few signs of growth¹⁷ – for both industries, any future increase in costs will squeeze profit margins, unless prices recover due to higher demand. Climate change could be one factor that breaches this inflection point.

The analysis above, demonstrated that responding coal, oil and gas corporations consider there to be numerous and in some cases severe physical risks associated with climate change. These will likely to lead to rising operational costs. Few companies explicitly make this connection in their disclosures - only 7 companies – 4 oil and gas and 3 coal - stated that increasing costs resulting directly or indirectly from climate change would constitute a risk to their business when a search of exact and relevant terms was conducted. However, the following statement from Enerplus summarises the relationship between the physical impacts of climate change and fossil fuel companies well;

“Increasing costs related to the mitigation or adaptation of climate change could impact consumer demand for petroleum products. This is a risk to Enerplus as we may need to adapt our natural gas and oil relative ratio production amounts to reflect changing consumer demand” – Enerplus.

Product substitution

Lower demand for coal, oil and gas in the future is also threatened by its decreasing competitiveness relative to/the increasing competitiveness of substitute technologies. Substitution risk can take a number of forms depending on the fossil fuel in question, e.g. oil demand at risk from electric vehicles coupled with renewable energy technologies and gas, and coal demand at risk from renewable energy, nuclear and gas.

Examining product substitution risk revealed that 13 companies articulated this risk in their qualitative responses. Within the responses from oil and gas companies, agreement does not appear to exist regarding the severity of this risk. Some appear to perceive great risk from changing consumer demand;

“Renewable energy sources and alternative fuels are likely to become more prevalent and compete with Chevron’s products, particularly natural gas” – Chevron

“Reducing demand for transport fuels could lead to reduced revenue and net profits. The annual financial impact of those trends could be in the \$100mlns category” – Shell

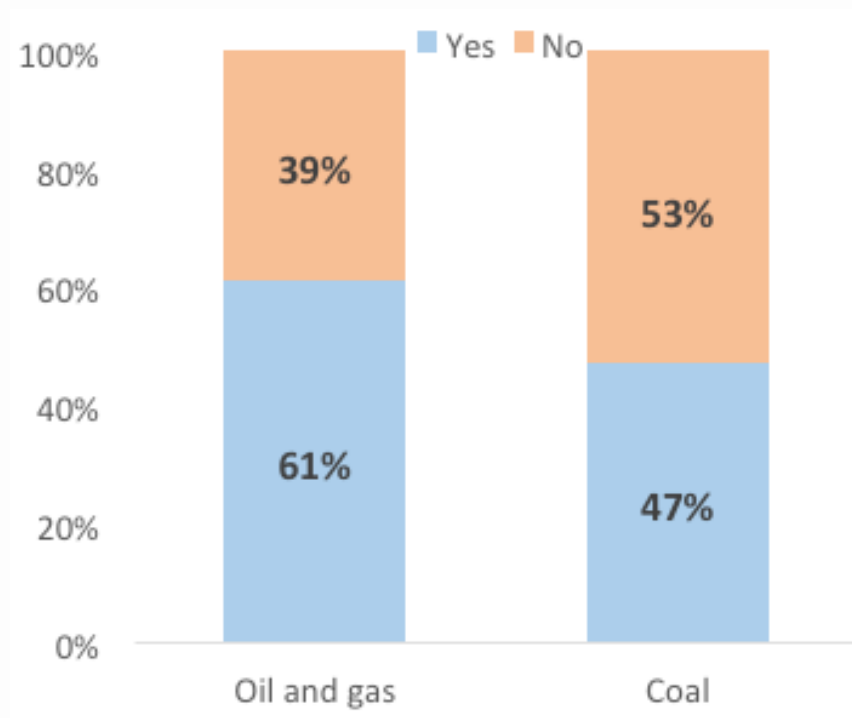
While Chevron consider the rising prevalence of alternatives as ‘likely’, Anadarko Petroleum Corp have a converse perception of this risk;

“While highly unlikely in the foreseeable future, if consumer preferences were to shift away from the use of fossil fuels to much more expensive alternatives in response to climate change, the demand for petroleum products may decline, thereby causing a decrease in revenues from Anadarko’s crude oil production” – Anadarko Petroleum Corp.

This analysis was expanded to include those responses selected from available, pre-determined answers in the CDP climate change questionnaire that are most synonymous with product substitution risk, i.e. changing consumer behaviour, induced changes in human and cultural environment and fluctuating socio-economic conditions, much in keeping with the significant role consumer choice could play recognised by Statoil;

“Statoil recognise a number of climate related factors that could significantly affect our operations and markets...including climate inspired shift in demand in our product or new competing energy sources or new energy supply models, driven by consumer choice” – Statoil

Figure 8. Companies recognising product substitution risk



In this expanded analysis, the list of companies that consider a risk of lower demand increases to 32 – 20 oil and gas companies and 12 coal companies. Figure 8 shows the proportion of coal and oil and gas companies that perceive product substitution as a risk, when calculated using the two research approaches.

Energy efficiency improvements

Energy efficiency improvements in fossil fuel combustion can occur due to technological advancement from innovation or regulatory interventions and are a risk to coal, oil and gas companies because consuming less fuel per unit of energy produced can serve to reduce total energy demand, as highlighted by Statoil;

“Low Carbon Fuel Standard in California and other states in the US and the Fuel Quality Directive in the EU for example could have some important market for the fuel markets and reduce the demand for some of our products” - Statoil

Energy efficiency can also change cost structures, often incurring higher costs to meet targeted standards that require retro-fitting existing infrastructure. This can often be the approach taken to try and alleviate air pollution problems, for example, of which fossil fuel combustion is one of the primary sources of hazardous particulates;

“Various national, regional and state based low carbon fuel directives and targets mean that new fuels must be developed and brought to market in order to comply with a variety of programmes. This may change the cost structure of the business against uncertainty in fuel prices”

– Royal Dutch Shell

In total, only 10 of the 81 companies (12%) considered energy efficiency improvements to be a risk to their business model despite the increasing number of energy efficiency targets emerging in key fossil fuel demand markets around the world.

Interestingly, no coal companies flagged energy efficiency as a risk. This seems perilously neglectful of these companies, and perhaps the sector as a whole, given coal's role as the most polluting of the three conventional fossil fuels and the efficiency regulation specifically directed at coal combustion. For example, the EU's Large Combustion Plant/Industrial Emissions Directive and the recently announced Clean Power Plan in the US, which targets a 30% reduction in carbon dioxide emissions from existing coal-fired power plants by 2030¹⁸, and builds on strict regulation for new coal-fired power plants in the US.

4. Connecting the dots: Building resilience to low-demand scenarios

This study has demonstrated that: i) all responding coal, oil and gas companies acknowledge climate change as an issue, with a number also understanding the limits in temperature increases it imposes; and that ii) the vast proportion of companies consider climate change to pose significant physical, regulatory and market risks to their business. Therefore, one can conclude that the fossil fuel industry's knowledge and understanding of climate change is relatively informed.

However, this raises another, more critical question: are companies integrating these risks into their corporate strategies to reduce their exposure to lower demand in a carbon constrained future? Carbon Tracker's recent research evaluating financial risk to oil capital expenditures suggests companies may not be bridging this divide – there is an estimated \$1.1trillion of capex earmarked for high cost oil projects to 2025, predominantly oil sands, arctic and deepwater oil, that requires a market oil price over \$95/bbl¹⁹ - the oil price in the month of this report's publication was less than \$93/bbl.

This analysis examines the extent to which companies have adopted two specific pathways that help convey 'resilience' to low-demand scenarios to investors; firstly, the stress-testing of carbon assets and capital investments against a low carbon scenario, and/or secondly, making changes to company decision-making and business models to reflect climate-related risks.

If fossil fuel companies are failing to connect the dots between climate risks and the scale of potential value destruction at stake, and failing to disclose their approach, investors will be unable to tell whether or not their investments will be led down a risky path operating in direct conflict to the understanding clearly demonstrated thus far.

3.1 Stress-testing: Oil and gas companies dwindle on the detail

Our analysis found that only 10 companies (20%) run scenario analyses of different temperature increases due to climate change. Within these companies, the number that use these scenarios to stress-test prospective investment decisions, and to what degree, varies. The most common approach to stress-testing was through an internal carbon price. Internalising a carbon price acts as a planning tool to help identify business opportunities and risks from climate change. Our analysis found that 8 of the 10 companies running climate scenarios report to stress-test all prospective investments with a 'high' internal carbon price. This is a necessary first step to ensuring oil and gas portfolios are resilient to a low carbon future, of which a cost on carbon is likely to play a role. However, an internal cost on carbon does not provide sufficient resilience by itself seeing that it is often only applied to the companies' upstream operational emissions, excluding therefore the bulk of emissions from the consumption of the fossil fuel and the reduction in demand that would result assuming those emissions were also subject to a cost on carbon.

Therefore, additional levels of stress-testing are required to build resilience against a low demand, carbon constrained future. Only five companies^{iv} - BG Group, Eni SpA, Santos, Statoil and Suncor - revealed the use of 2°C stress-testing in addition to that of an internal price on carbon. This approach is essential to:

“test the resilience of our capital expenditure plans to a range of scenarios consistent with the 2°C goal” – BG Group.

^{iv} Eni SpA say they do conduct scenario analysis based on a 2°C trajectory but fail to provide any details of what that entails; Santos use an internal carbon price to reflect a 2°C budget but do not disclose any other form of stress-testing.

However, Imperial Oil categorically state that it does not run a 2°C scenario;

“In assessing the economic viability of proved reserves, we do not believe a scenario consistent with reducing GHG emissions by 80 percent by 2050, as suggested by the ‘low carbon scenario’, lies within the “reasonably likely to occur” range of planning assumptions since we consider the scenario highly unlikely” – Imperial Oil

These five companies running 2°C scenarios are leading the way in terms of integrating knowledge of climate change and the risks it poses to fossil fuel companies and their investors, into their stress-testing of potential project investments. However, this means that just five of 49 fossil fuel companies are effectively bridging the gap between knowledge and strategic integration – a statistic which raises significant concerns that a vast proportion of the oil and gas sector could be exposed of climate-related risks.

Diversified miners lead the way on coal company stress-testing

Our analysis found that 7 of the 32 responding coal companies showed evidence of conducting climate scenario analysis – at 22% this is roughly the same proportion of coal companies as it was for oil and gas companies;

“Aquila’s integration of full climate change costs into project modelling and evaluation enables more informed decisions to be made with respect to projects” - Aquila

However, the analysis also suggests that diversified mining companies are running climate scenarios more readily than other coal companies, with 40% (4 of 10) of responding diversified miners analysing alternative climate scenarios against 14% (3 of 22) of other participating coal companies.

As was evident with the oil and gas companies, the use of an internal carbon price was the most common mechanism for attempting to anticipate potentially emerging climate risks. Six of the seven companies running climate scenario analyses applied a carbon price. As Aquila show, a carbon price can increase costs materially such that a project’s viability is brought into question;

“The impact of a carbon price has been included in all financial modelling. The climate specific findings of project studies are now considered when evaluating the project, particularly with regard to the overall viability of the project” - Aquila

Of these six companies that stress-tested their investments against carbon prices aligned with different climate scenarios, only one company disclosed evidence of running a scenario aligned with a low carbon, 2°C world. This was BHP Billiton;

“We work with a broad range of scenarios to assess and stress-test our portfolio...including scenarios with similar outcomes as the low-carbon scenario” – BHP Billiton

Needless to say, this demonstrates a very low consideration of the likelihood of a low carbon future and numerous risks, as highlighted by the companies themselves, this poses to their business models. Such a disparity calls for greater scrutiny from financial regulators.

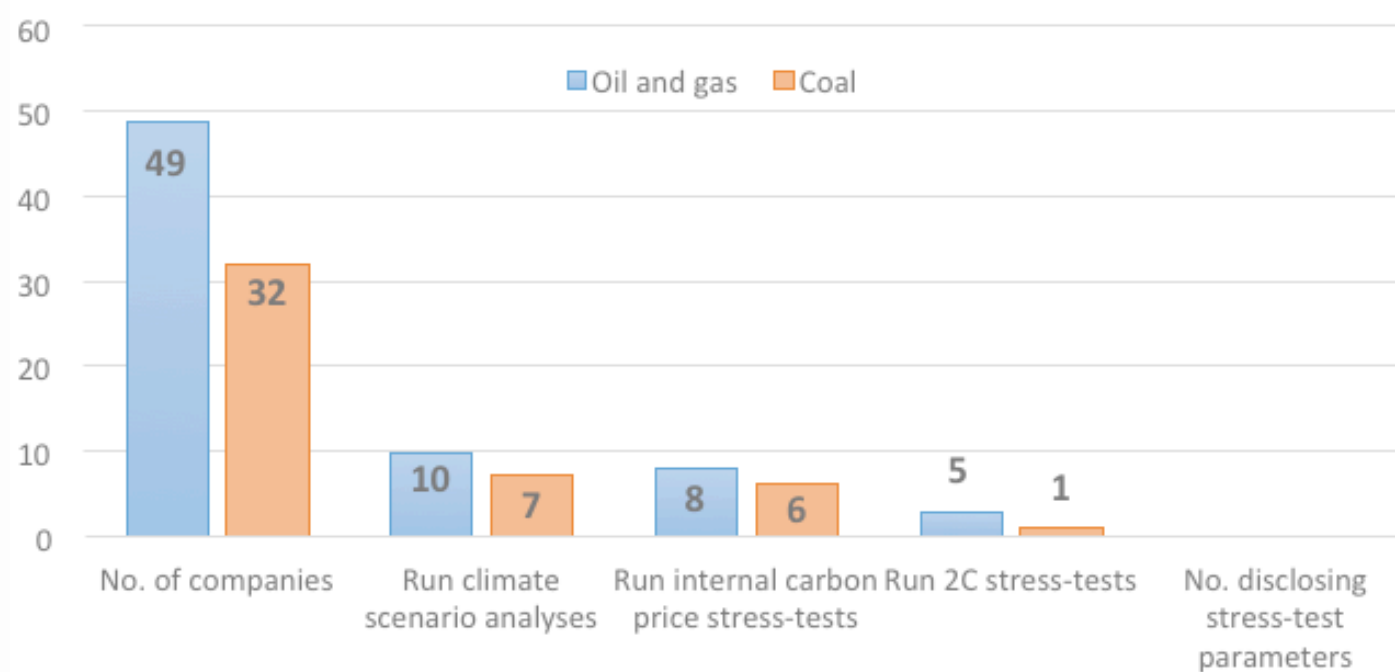
Demonstrating application through disclosure

Stress-testing against 2°C by so few coal, oil and gas companies does not adequately protect the interests of investors, the markets on which they list and the public as a whole. Broader stress-testing of different futures is more commonplace. However, in any case, the question remains; to what extent is the information supplied by this process influential in altering project and capital decision-making?

Rio Tinto, for example, demonstrate in their disclosure that their stress-testing has led to capital expenditure being redirected away from coal – they state that greenhouse gas regulation risk was behind their decision to dispose of their US coal assets, a coal-based aluminium smelter in the US, another in the UK and to sell mines in Queensland Australia. More broadly, there is little to no evidence that high-cost and/or high-carbon projects have been deemed unviable or uneconomic by stress-testing – the fact that the three most advanced oil and gas companies in terms of climate risk stress-tests also disclose increasing CAPEX levels suggests that these tests may not be adequate.

Only by disclosing the parameters of the assessments made in stress-testing potential projects would investors and other financial stakeholders be able to objectively assess the adequacy of these resilience tests – no oil and gas or coal company achieve this level of disclosure^v. Consequently, regulators are left uncertain whether companies are conducting analyses consistent with their disclosed risk warnings and investors as to the extent those running stress-tests are taking heed of these risk assessments.

Figure 9. Graphical summary of the assessment of climate risks in fossil fuel companies



Source: CDP, Ceres; CTI analysis 2014

3.2 Building resilience: From oil to gas?

Conducting stress-tests is not the only pathway for a company to build resilience to a low demand future. Disinvestment is another strategy. One action oil and gas companies have cited to demonstrate resilience to a low demand future has been a shift in investments away from oil towards natural gas. Natural gas is the least carbon-intensive of the three conventional fossil fuel types and can replace coal in power generation and oil in many forms of transportation. Furthermore, the financial case for oil has been increasingly questioned amid rising capital expenditure costs, fall production and falling prices.

^v We acknowledge additional, and potentially equivalent details to stress-test disclosures, such as assumed carbon price and break-even oil prices, were disclosed by some companies.

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As Enerplus purport, these risks could mean companies:

“need to adapt our natural gas and oil relative ratio production amounts to reflect changing consumer demand” – Enerplus.

Eight (16%) of the 49 oil and gas respondents demonstrate they are currently attempting to realign their business operations more towards gas and away from oil in their disclosures. Many of these companies acknowledge the impact climate risks are having on the global energy sector and consequently predict demand for natural gas to increase in the future.

“Total also strives (mainly through acquisitions and divestments) to improve the balance of its oil & gas portfolio between conventional and unconventional oil and gas, and LNG, in order to reduce our carbon intensity and have an overall better carbon ratio than our competitors” - Total

“The increasing share of natural gas in production and reserve portfolio copes with Eni’s view on natural gas as key means for reducing emissions in the power business and in the transportation, where LNG (Liquefied Natural Gas) can generate significant opportunities” – Eni SpA

16% of companies deeming the risks posed by climate change to warrant a realignment of business operations is not a significant number. The reasons given by those companies maintaining their current focus reveals a number of misconceptions that could pose a risk in a low demand future.

Eni SpA’s disclosure alludes to the point that increasing production of natural gas as many companies purport to do, does not inherently constitute increased resilience to a carbon constrained future for two reasons.

Firstly, a number of oil and gas companies appear to misinterpret natural gas as a ‘clean’ energy source. While producing and consuming natural gas incurs fewer greenhouse gas emissions than coal and oil, its contribution remains significant. Therefore, it is only a lower carbon option if it directly displaces coal or oil and therefore grows its share of a company’s production portfolio –increasing natural gas production alone is not consistent with a low carbon future if oil is growing rapidly. This makes the following statements questionable;

“Climate policy must encourage – not discourage – clean, abundant and affordable natural gas as a foundation of an energy future” – Devon Energy Corp.

Natural gas is “the quickest and most economical pathway to reducing carbon dioxide emissions from power generation” - ConocoPhillips

Some companies explained that the weighting of their operations did not need to be altered because the current configuration represented high resilience to a low demand future. However, this varied between companies. For example, Devon Energy Corp consider their production mix of 60% natural gas and 40% natural gas liquids to adequately build shareholder value. Whereas Eni SpA echo this statement for their portfolio of 50% natural gas, 45% conventional oil and 5% unconventional oil, while Apache Corp described their portfolio of 54% liquid hydrocarbon and 46% natural gas as:

“Shielding the company from price volatility and also places it in a strong position to benefit from a potential future world transition to a low-carbon economy” – Apache Corp.

To a degree these statements are mutually exclusive – each portfolio can not provide an adequate level of resilience when they vary quite considerably. Investors, regulators and other financial stakeholders need guidance as to what constitutes a resilient reserves portfolio in a low demand scenario, i.e. who accounts for the burnable portion of the carbon budget, and who are inaccurately claiming resilience.

Overall, a minority of oil and gas are demonstrating actions to build resilience to a low demand future, the effectiveness of which is difficult to determine. A more common approach for oil and gas companies to communicate resilience is to highlight the higher level of exposure and vulnerability of coal companies to climate risks than themselves. 28 (57%) companies point out the potential for greenhouse gas emissions saving by displacing coal for natural gas in power generation. While the extent to which natural gas consumption is less carbon-intense than coal is fiercely debated, there is general agreement that savings are possible if the highest standards of gas burning are implemented. This means there is even greater need for coal companies to demonstrate their resilience to a low carbon future.

Diversified miners build resilience by shifting away from thermal coal

Interestingly, CONSOL energy said they did not carry out any form of climate scenario analysis because in 2013 they divested one billion tons of coal reserves due to carbon reductions and the risk of fuel switching, leaving them with metallurgical coal reserves that is less easily substituted from steel and coking industries rendering their portfolio “appropriately balanced for the next ten years”.

This belief of diversified mining companies that they are better positioned to deal with the changing dynamics under an energy transition is significant because it goes some way to explaining why they are close to monopolising climate risk stress-testing and why only 5 of 14 coal companies responded to the Ceres letters (only one of which was a pure coal company) and 32 responded of 140 coal companies that received the CDP climate change questionnaire.

Global coal prices are at multi-year lows. Thermal coal in particular is enduring a crisis period as the global market becoming increasingly oversupplied as structural changes slow coal demand growth - many, including the IEA, attribute this to thermal coal being the most exposed to the energy and environmental regulatory risks associated with the global energy transition. This market environment is supporting the belief of BHP Billiton and others that:

“portfolio diversification...brings great strength and resilience...[because] other products such as copper and potash may benefit significantly through the uptake of renewables” – BHP Billiton

This diversity allows companies to build resilience to lower demand sectors by moving capital from assets that are at the high end of the cost curve to more competitive operations, a priority highlighted by Anglo American. Pure coal companies do not have the flexibility to do this and so their poor response rate and low level of climate risk stress-testing could be perceived to be connected to the challenges being posed to them by the energy transition.

5. Case Study: Are US-listed fossil fuel disclosures consistent with regulatory filings?

“The SEC requires public companies to disclose meaningful financial and other information to the public... Only through the steady flow of timely comprehensive, and accurate information can people make sound investment decisions” – US SEC²⁰

The regulator of US stock exchanges and the companies listed there is the US Securities and Exchange Commission (SEC). Their role is to protect investors, maintain market integrity and facilitate capital formation. Of particular importance is their role in ensuring disclosures made by companies in their regulatory filings are consistent with those made in other voluntary disclosures – in essence, a measure to try and ensure what a company says to investors is really what they think. In the case that a companies’ disclosures are inconsistent and unclear, investors are receiving mixed messages can not make ‘sound investment decisions’ as the SEC state and there is a strong case for tighter regulation.

This analysis focuses on those US listed fossil fuel companies in the sample of 81 companies and examines the level of consistency between risk disclosures made in annual report/10K filings, with the help of Ceres’ SEC Climate Disclosure Search Tool²¹, and the CDP questionnaire responses and CAR investor letters.

Different degrees of risk

Research from Ceres found that voluntary disclosures through channels such as CDP’s questionnaire tended to elicit more detailed information than through the SEC’s disclosure regime. Given companies’ recognition of the importance of climate-related risk in their CDP responses, it is logical that these disclosures are made in SEC filings as well.

Figure X below focuses on which risk types are considered the most significant. The sample consists of the 14 coal, oil and gas companies within the original sample that are listed in the US and compares:

- i) the average breakdown of total risk disclosures made in company 10Ks by type as determined by the Ceres SEC Climate Disclosures Search tool (left-hand side y-axis); with
- ii) the percentage of this sample of 14 that consider each risk type to be a risk as disclosed in response to CDP Question CC5.1.

Figure 10 displays these two data sets, as well as a bar showing the range of total risk disclosure breakdowns of these 14 companies, to give an indication of the level of agreement within each category.

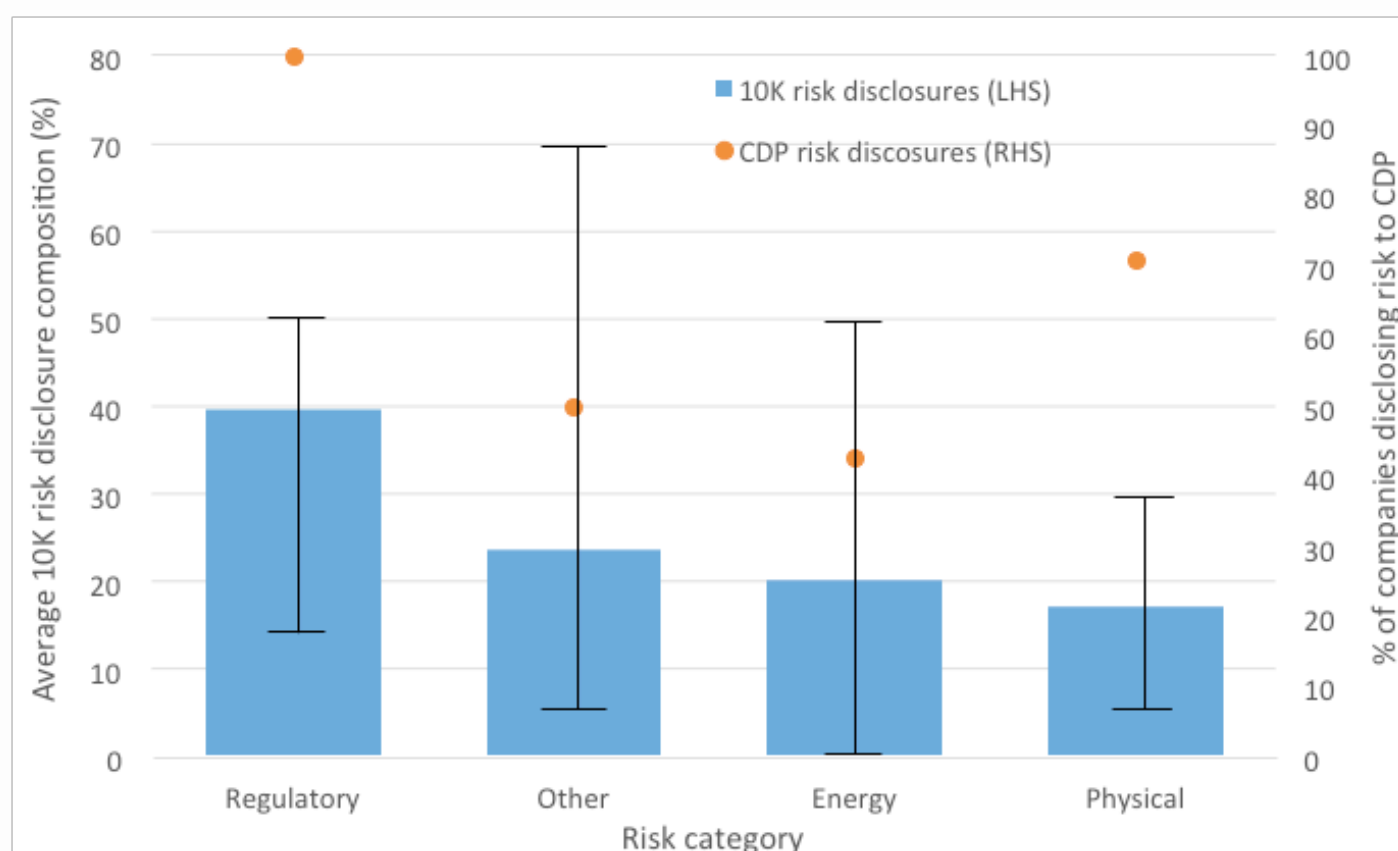


Figure 10: Judging the consistency of risk disclosures in US listed fossil fuel companies

- Regulatory risks are considered the most significant in both US listed fossil fuel companies' 10Ks and CDP questionnaires. This confirms a consensus that the industry is concerned about forthcoming energy transition and climate-related regulations.
- There is a noteworthy inconsistency in the perception of risk that physical factors of climate change pose to fossil fuel companies, however. Furthermore, the range of proportions physical risk disclosures made up in the sample's 10Ks is narrow, signalling that there is a good level of agreement across companies that physical risks are the least significant risk type.
- This will be influenced to a degree by different compositions of each sample between oil and gas and coal companies, but this remains an issue potentially worth examining more closely by investors and regulators.

This comparison illustrates that inconsistencies appear to exist between the level of risk companies attribute to each type in different disclosure types. With such vast sums of capital relying on sound investment assessments, investors need to be receiving the most accurate information possible on which to base their decisions.

6. Conclusions

If global capital markets are to effectively protect and facilitate future investments in a world undergoing an energy transition, regulators, investors and the fossil fuel companies themselves need to become more aware and resilient to the climate risks highlighted in this report. More specifically, this research has shown:

- **The energy transition and climate constraints are risky business:** A large proportion of coal, oil and gas companies are aware of and perceive climate change to pose significant risks to their business. Regulatory risks in particular were seen to be the greatest risk consistently across disclosure types, with 99% of the sample flagging risks from regulation in their CDP response. **Given this broad consensus, those judging there to be little or no risk from energy transition or climate-related regulations are industry outliers.**
- **Few bridge the awareness-implementation divide:** A fraction of these companies are actively disclosing steps to assess the potential implications of these risks in driving a low fossil fuel demand and price future for their business model or strategic adjustments. **This raises the possibility that these risk disclosures are boilerplate responses to superficially satisfy potential and current investors but do not materially influence decision-making within these corporations.**
- **Leading through resilience building:** Those who have bridged the divide and are implementing measures to assess alternative demand and price futures as a result of energy transition and climate risk factors, primarily used stress-testing and sensitivity analyses to gauge their exposure. For example, some corporations qualitatively explain that they are shifting investments from oil to gas, or away from thermal coal, to demonstrate resilience to low-demand scenarios. The few companies that are applying their awareness and knowledge in this way are leading the way in preparing for a low demand and price future and are providing information flows that more closely reflect those demanded by investors. **Virtually no companies, however, disclosed the parameters used in these stress-tests or gave indication of the results, meaning a significant dearth remains in terms of investors receiving quantitative data to objectively benchmark and gauge the state of play across companies.**
- **Future research to focus on risk and resilience.** Future research and dialogue should focus on whether corporate reports and responses are sufficient to allow investors to assess and track company exposure to climate-related risks. This will include an emphasis on those metrics required to assess companies' relative resilience in a low-carbon scenario.
- **Reporting inconsistencies should cause suspicion among investors and concern among regulators:** The discrepancy between the CDP disclosures and 10k disclosures raises concerns that investors are receiving inconsistent information flows on energy transition and climate-related issues. Naturally, this means investors should, and will, ask questions about whether statements reflect the genuine corporate concern or are just boilerplate remarks. Continued or pervasive discrepancies and uncertainties will underscore the need for tighter capital markets regulation and scrutiny.
- **Areas for future research; investor attention**

With these conclusions in mind, it is clear that investors need to be increasingly aware of the future risks posed by the ongoing energy transition and challenge fossil fuel companies and regulators on the limitations of existing reporting to capture the risks and assess company preparedness for such a shift.

7. Recommendations: What aren't companies disclosing and why is this risky?

“Do our financial regulators need to start thinking about protecting them [investments] and us from the ‘too big to fail syndrome’? Track the carbon exposure of your investment and don’t be misled by audited accounts which may be in the black when in reality your company or investment, five to 10 years down the line may be sitting on stranded assets”

Achim Steiner, UNEP Executive Director, January 2014²²

Companies to disclose, either voluntarily or by the regulatory amendments suggested above, in their regulatory filings, preferably under a separate heading:

- A descriptions of their assessment of climate-related risks, including aggregate demand and price impacts;
- The carbon embedded in their coal, oil and gas reserves and resources;
- Details related to resilience in a low price/demand scenario, such as the parameters set out in stress-tests in different price/demand scenarios;
- Relationship of data to corporate capital expenditure strategies and risks to the business model.
- In the absence of the regulatory requirements above, companies must continue and improve disclosures of risk through CDP's climate change questionnaire such that investors remain informed and pressure for mandatory changes grows.

Securities regulators and financial report standard setting bodies

- Increase scrutiny of existing regulations and guidance of coal, oil and gas disclosures based on existing authority;
- Scrutiny should include ensuring that fossil fuel companies provide clear descriptions of their assessment of energy transition and climate-related risks, including aggregate demand and price impacts, and that those assessments are consistent with other company statements on climate risk;
- Issue guidance to interpret existing standards related to carbon asset stranding so that preparers of reports fully consider the viability of coal, oil and gas stocks.
- Require information in annual reports and listing prospectuses on the emissions potential of reserves, and the emissions trajectory assumptions of corporate strategy;
- Require stress-testing of how reduced demand and price could affect the fossil fuel reserves and resources of a company.

Voluntary reporting guideline setters

- Develop technical guidance on reporting the carbon dioxide emissions potential of reserves to provide a forward-looking indicator, ensuring compatibility with financial reporting standard.

Appendix 1: Background

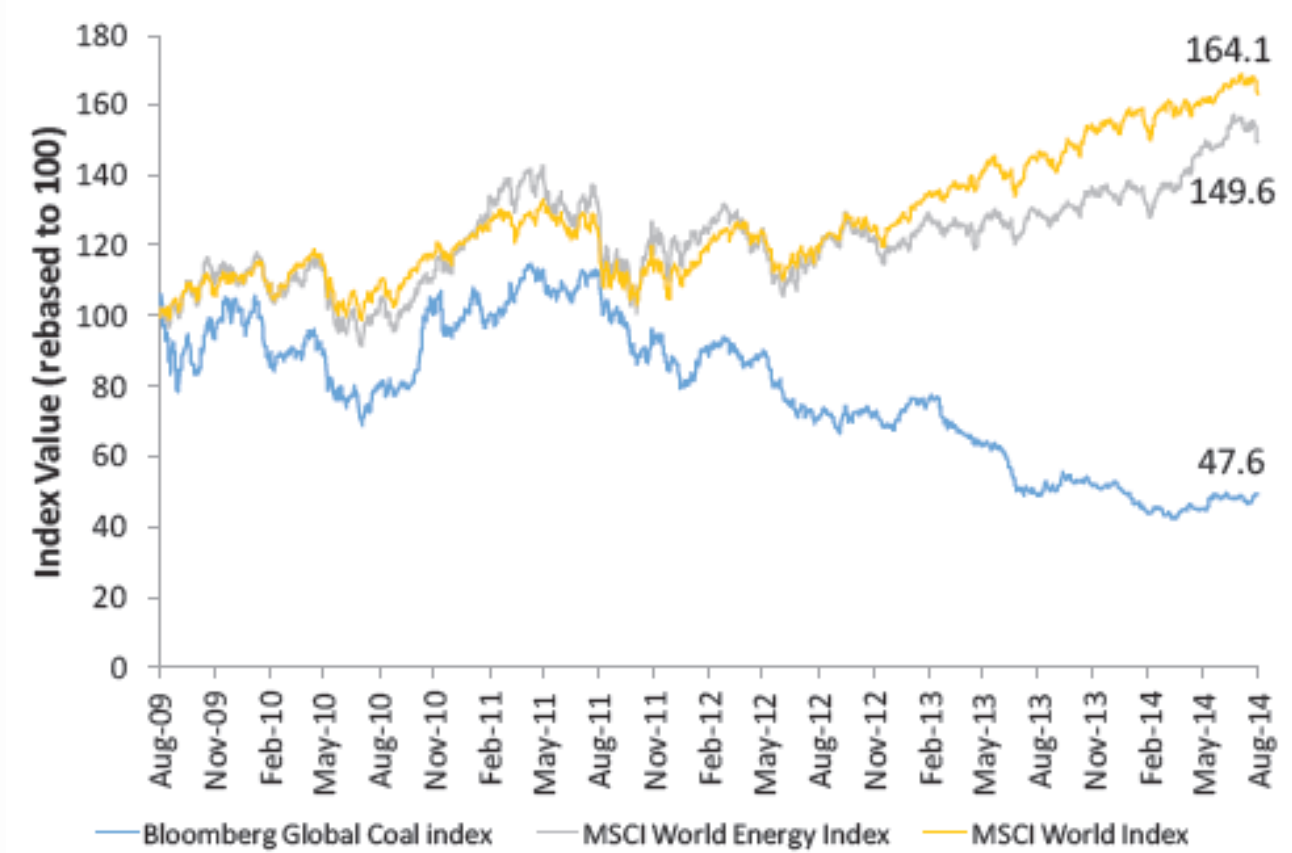
Carbon constraints and the energy transition

Research has shown that 60-80% of global fossil fuel reserves can not be burnt if we are to keep global warming within the internationally agreed target of 2°C.²³ Such climate constraints pose a challenge for companies and investors to identify which coal, oil and gas possesses the requisite characteristics to be selected within the 2°C carbon budget – and draws into question the long-term value of such the ‘unburnable carbon’ that does not. Carbon constraints, however, are just one discrete risk posed to fossil fuel companies by the ongoing energy transition – a number of other factors are in fact being internalised by the markets that are causing conventional fossil fuel sectors to falter even in the absence of an international agreement on climate change.

Coal entering structural decline

The coal sector is undergoing changes that could see it enter its structural decline. Coal prices are down 40% since 2011 as a result of lower-than-expected demand, as a result of energy efficiency gains, competition from other power sources and regulations, and surging supply in response to high prices a few years ago. This has meant a number of up to two-thirds of production capacity for the seaborne export market are currently producing at a loss. As the graph below demonstrates, this has meant the value of publically traded coal companies (Bloomberg Global Coal Index) has declined by over 50% over the past 5 years, while the MSCI World Index (a broad market benchmark) has increased significantly.

Figure 11: Comparing coal and world indices



Source: Bloomberg, CTI analysis 2014

A global forecast released in September 2014 by the Institute of Energy Economics and Financial Analysis shows there are few signs these trends will reverse in the medium-term future. Based on the latest policy announcements and market trends this forecast foresees thermal coal demand reducing 2% between 2013 and 2035 – in this forecast global demand peaks in 2016.

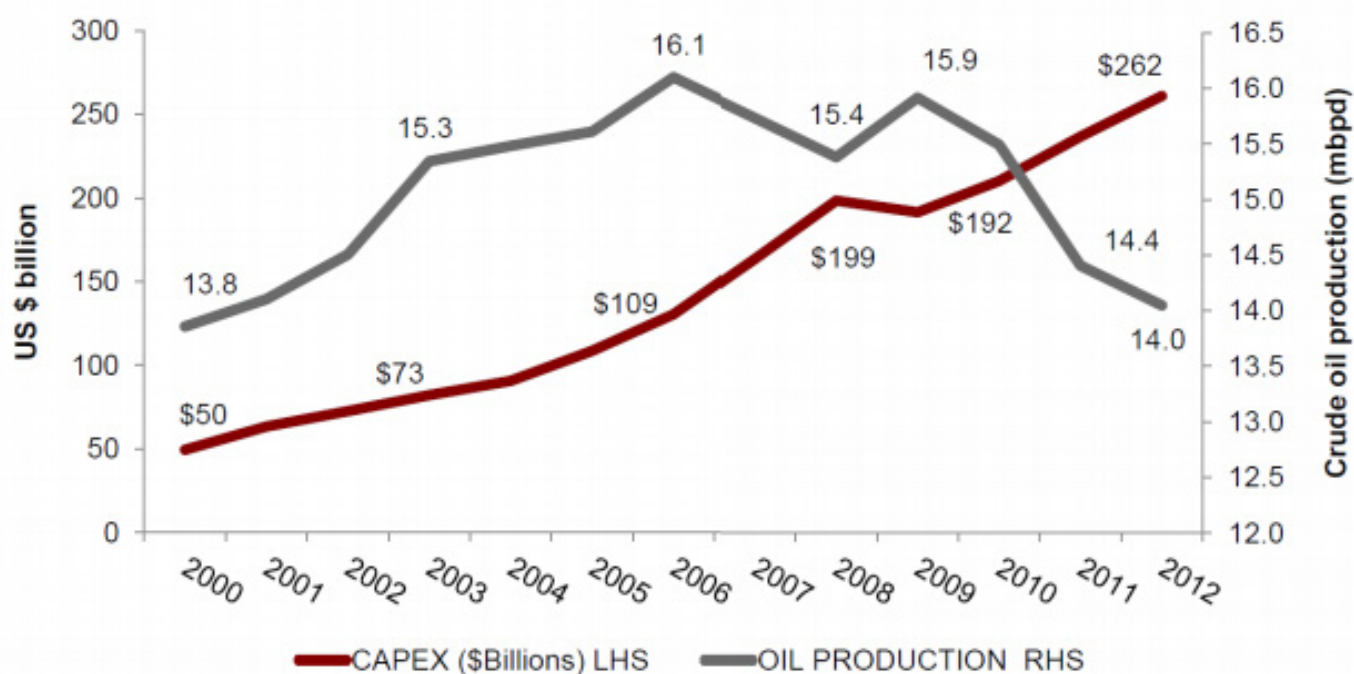
This peak year coincides with thermal coal demand peaking in 2016 in China who currently consume half of the world's thermal coal. This forecast is underpinned by China's efforts to grow its power supply by almost every option but coal, its economic transition from consumption-based heavy industries towards a service-based economy and energy efficiency improvements. There are signs this peaking could arise even sooner with recent announcements of a ban on low-quality exports to China and higher coal-fired power plant combustion standards contributing to falling coal production and imports in the first half of 2014.

Overall, therefore, the immediate future shows very few signs of upside support for coal demand and price to suggest these trends could be structural rather than cyclical.

Oil and gas struggles to maintain the status quo

The oil and gas sector are undergoing a similar existential crisis but, in this case, centred on spiralling capital expenditure costs. From 2000-2013, worldwide capex related to oil and gas production increased from \$250bn in 2000 to nearly \$700bn (both figures in 2012 dollars). However, this rising investment has been yielding progressively smaller increases in global oil supply; from 1999-2013 exploration and production capex per barrel increased at a compound annual growth rate of 10.9% - roughly 10 times faster than the previous 14 years. Figure 12 below demonstrates these trends for selected oil and gas majors.

Figure 12: Combined CAPEX data for selected oil companies^{vi}



Source: Bloomberg via Philbro Trading LLC

^{vi} Companies include BP, ConocoPhillips, Chevron, ENI, Royal Dutch Shell, Total, ExxonMobil, Petrobras, Statoil, BG Group and Occidental Petroleum

This divergence between capex and production reflects the increasingly incompatible and technologically challenging environments companies are having to explore for oil and gas—as such, the laws of thermodynamics state these trends are unlikely to reverse.

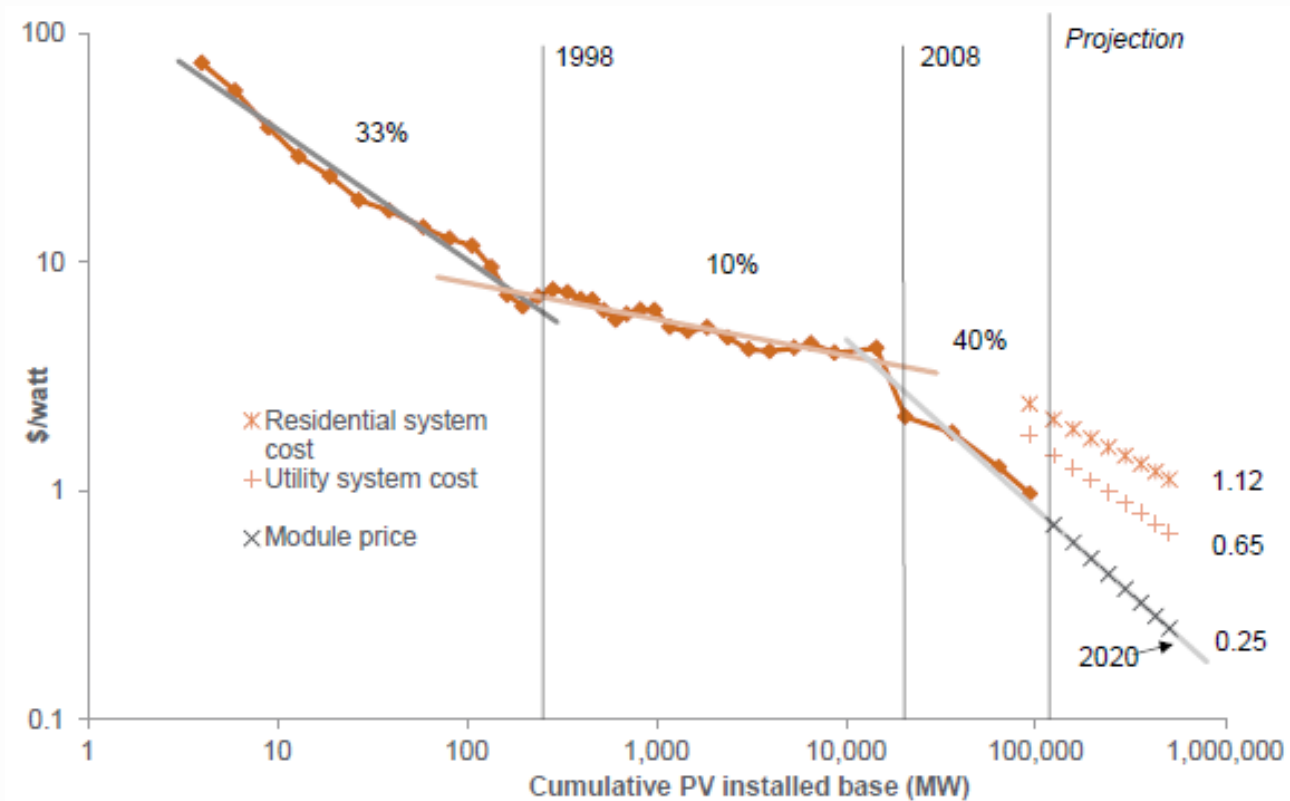
This means profit margins are being squeezed to levels that leave little room to navigate lower prices in the future. However, at the time of writing, the Brent crude oil price (the international oil benchmark) was at a 28 month low below \$90 a barrel in spite of the rampant cost inflation displayed above, conflicts in the middle east and the threat posed to European gas supply by political disputes in the Ukraine.²⁴ Furthermore, there are reasons to believe that global oil demand could provide little price support in the future. Key downside risks to future oil demand, and therefore price, include lower-than-expected economic growth in Asia, rapid deployment of fuel-efficient cars and electric vehicles, substitutions of natural gas for oil and curtailment of oil consumption subsidies.

Renewable energy is an increasingly viable alternative

While the coal and oil and gas sectors encounter significant obstacles to maintain current levels of competitiveness, renewable energy technologies are simultaneously becoming increasingly competitive against conventional energy types.

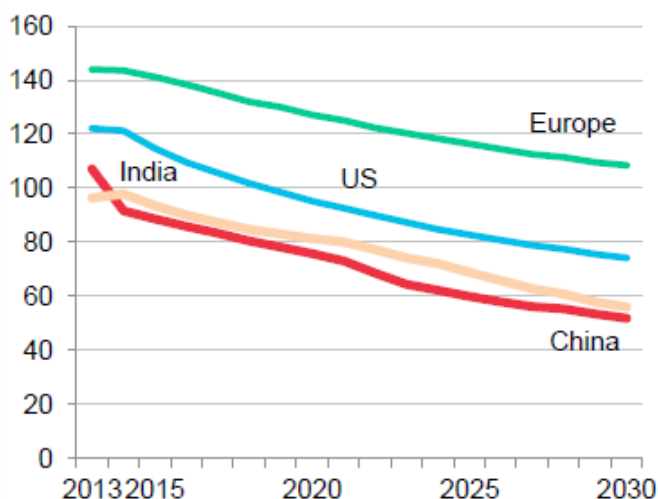
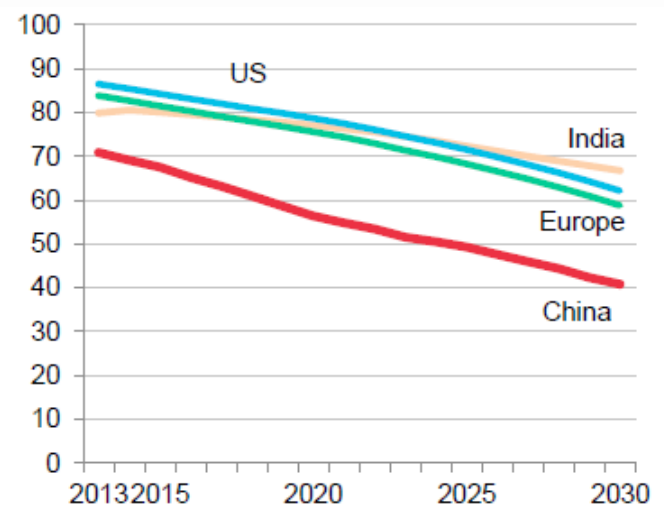
A record amount of power was generated from renewable energy sources in 2013 led by China and the US.²⁵ While renewable energy technologies are more accessible and established in developed countries, there is evidence that emerging countries are learning from the development trajectories of those before them by increasingly recognising the advantages of renewable energy – for example, India has announced it will invest \$100bn in renewable energy in the next five years such that solar capacity additions are expected to exceed previous targets by fourfold.²⁶

Citigroup analysts calculate that for every doubling of installed solar PV capacity since 1972, average solar PV module costs have fallen by 22% on a \$/watt basis. This trend appears to have accelerated; since 2008, for every doubling of installed capacity, solar PV module costs have fallen by 40%. The average cost of a solar panel has come down by 75% in the last four years. As Figure 13 reveals, Citigroup anticipate this cost reduction to continue to 2020.

Figure 13: Projected solar module price declines²⁷

Source: Citi 2013

For a broader selection of renewable energy technologies, future cost projections display a similar downward trend.

**Figure 14: Solar PV LCOE projections (\$/MWh)****Figure 15: Onshore wind LCOE projections (\$/MWh)²⁸**

Source: Bloomberg New Energy Finance 2014

As one would expect, there is uncertainty as to the rate and extent of the trends occurring in the coal, oil and gas and renewable energy sectors, and as such the energy transition as a whole. However, forecasts made by a number of the companies included in this study's data sample vary widely, pointing to the fact that large scale risk is present for those that misestimate from reality the most. For example, ExxonMobil predict that

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renewable energy will be restricted by high costs such that it only makes up 5% of the global energy mix by 2040; the IEA has recently announced their forecast that states solar energy alone could make up over 25% of the global energy mix by 2050.²⁹ This illustration of the wide deviation in perspectives highlights the need for companies and investors to fully understand and assess the risks presented by energy transition and climate-related risks.

Aggregate impact on demand and price

Although no global climate regulatory mechanism is in place to limit global emissions within any carbon budget, the sectoral trends presented above reflect markets internalising a much broader array of forces, including economic trends, resource constraints, technology developments, changes in industry cost structures and various forms of regulations, which are currently, and could continue to, collectively drive down demand and price for coal, oil and gas.

The demand and supply interaction of fossil fuel markets in setting commodity prices will help determine the viability of fossil fuels right down to the project or asset level – in essence, the market will play a key role in allocating the carbon budget. The recognition of potential upper emissions limits, in turn, reveals insights about potential demand and price impacts that cannot be captured by an examination of individual policy mechanisms and technology risks on an itemised basis.

This reveals a potential disconnect. Assessed individually, specific policy mechanisms or technology risks may appear relatively minor or immaterial. However, the synergy between all measures has the potential to significantly constrain demand and price. Energy companies aggregating readily foreseeable threats recognise they have the potential to limit demand, but do not perceive them to fundamentally alter their growth trend. Investors, on the other hand, continue to be concerned about business implications of demand and price impacts consistent with a 2°C scenario. Unless assessed clearly, this aggregate downside risk is unlikely to be captured in company strategies and public statements meaning companies fail to react, adapt and build resilience.

Appendix 2: Stranded assets

Stranded assets is a term to indicate the potential for investments to become uneconomic due to changes in market and regulatory conditions. This core idea is generally agreed upon – for example, in the upstream oil sector, the IEA defines stranded assets as;

“those investments which are made but which, at some point prior to the end of their economic life (as assumed at the investment decision point), are no longer able to earn an economic return, as a result of changes in the market and regulatory environment”.³⁰

In other words, once the capital investment is made to develop an oil project, production may continue to be cash flow positive in a low price environment, i.e. oil price is above the operational production cost per barrel. However, if the overall lifetime returns from the project are less than the cost of capital used to develop it, then the project has lost value for shareholders. Therefore, the term stranded assets stands for;

“economic returns at a level that is unacceptably low to corporations and to their shareholders – in effect, ‘value destruction’.”

Any form of reserves and resources could see their value destroyed due to changes in policy, cost overruns, delays, tax changes or price pressures. Undeveloped reserves and resources (and related infrastructure) have the greatest potential to become low-return and even fully “stranded”. But changes in the external environment can affect proven reserves – carrying a ‘proven’ label does not make reserves immune to market forces. Costs related to developed proven assets are likely to be on the balance sheet as fixed assets while recent discoveries can have little to no value on the balance sheet but still significantly impact shareholder value.

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For further information about the Carbon Tracker Initiative
please visit our website:
www.carbontracker.org