Under the Microscope: Are companies’ climate scenario analyses meeting investors’ requirements?

Carbon Tracker Initiative

May 2018
INTRODUCTION

• Investors and financial regulators are asking companies for decision-useful disclosure and analysis of 2°C scenarios given the targets of the Paris Agreement. Companies are now producing voluntary reports.

• Carbon Tracker has identified key themes such reports should address to be decision-useful. This paper identifies Carbon Tracker’s approach to analysing companies’ 2°C scenario analyses across a consistent set of themes to ensure they are useful.

• Accompanying sections of this report examine individual company disclosures in detail—specifically, those of the largest oil and gas companies.

• Figure 1 indicates the relative performance of each company across the four themes that we have analysed: 2°C scenario modelling, scenario outputs, market risk and carbon pricing. It reveals that, while some progress is being made in how fossil fuel companies model a 2°C pathway, a large gap remains in their consideration of the potential business impacts.

• We believe any useful scenario analysis by an oil and gas producer would consider the following:
  • Climate change is effectively market risk for fossil fuel companies and scenarios must grapple with this reality.
  • A common reference scenario is needed to make scenario outputs comparable.
  • For the oil and gas sector, the key upstream risks are to investments in new projects and this should be discussed and quantified.
  • Lower demand expectations imply lower price expectations and therefore a focus on project costs is essential.
  • In a carbon budget context, the relative cost position of a company relative to its peers is critical.
  • Price expectations drive corporate reporting, making it necessary to understand a company’s forward price assumptions.

Figure 1 – Summary of companies’ relative performance in their climate scenario analyses

See further below for detailed key.
METHODOLOGY

On September 29, 2015, Bank of England Governor Mark Carney expressed his concern that “the catastrophic impacts of climate change will be felt beyond the traditional horizons of most actors”.\(^1\) Only three months later, as Chair of the Financial Stability Board, Carney established the Task Force on Climate-related Financial Disclosures (TCFD). The TCFD has produced a framework that helps organisations to better consider how they are impacted by climate change. Its recommendations are another critical step to improving market transparency of climate-related risks and opportunities, ultimately enabling capital markets to make better decisions.

This process has been driven in no small part by investor concern that the energy transition will impact the business models of investee companies. The recent success of shareholder resolutions, which continues to gather momentum, has sent a clear message: companies need to consider the risk and demonstrate a plan for addressing it.\(^2\)

Fossil fuel companies, in particular, are responding to this pressure by offering more disclosure and scenario analyses – a welcome acknowledgement of market demand. However, much of this disclosure falls short of being decision-useful because it lacks transparency and comparability. Indeed, many company reports have failed to fully grapple with the fundamental driver of requests for improved transparency; namely, that in a two-degree (2°C) scenario (whether driven by policy, technology, changes in consumer preferences, or anything else), the demand for their key products will be drastically reduced, with potentially unpredictable consequences.

Better disclosure, not more disclosure

Corporate disclosure of climate-related risk factors is not a new subject. Indeed, the fossil fuel industry has long acknowledged\(^3\) the general thesis that addressing climate change may pose risks to its business (though, curiously, many companies now assert in their 2°C scenario analyses that they will be just fine).

Some companies have recognised the need to do more.\(^4\) However, very little disclosure successfully answers questions around which of their potential investments are most exposed or delivers investors with a means of monitoring whether or not capital is being spent on projects that are surplus to a 2°C outcome, much less how companies might adapt to falling demand for their products or compete in such a scenario.

For example, our research suggests that, at least for the larger companies, the greatest concerns for the oil and gas industry pertain to reinvestment of cashflows in the resource base of future project options.\(^5\) Many reports instead choose to focus on the resilience of nearer-term proven reserves. This fails to provide much-needed transparency that can fuel investor engagement. What is needed is better disclosure, not more disclosure.


\(^2\) [https://www.ceres.org/2DSResolutions](https://www.ceres.org/2DSResolutions)


\(^4\) For example, in its recent 2017 report on climate change, Rio Tinto states: “…we recognise that there is still more that needs to be done, and in future reports we will include additional information about our resilience to a 2°C climate change scenario.” See [http://www.riotinto.com/documents/RT_Climate_change_report.pdf](http://www.riotinto.com/documents/RT_Climate_change_report.pdf)

\(^5\) [https://www.carbontracker.org/reports/responding-to-ihs-ipecae-focus-on-oil-gas-capex/](https://www.carbontracker.org/reports/responding-to-ihs-ipecae-focus-on-oil-gas-capex/)
Trust in company planning is not enough; verification is needed

Climate change is a megatrend and addressing it has significant implications for the energy sector. Clearly, we cannot reasonably forecast the future by simply extrapolating the past. Where past is not prologue, financial results may not give a clear picture of how a company’s future performance will evolve. This is where analysis of alternative future states can bridge the gap.

Companies have reiterated that they conduct strategic and scenario analysis to test their portfolios and many have concluded that their business remains resilient even in a low-carbon transition. Yet, few have provided meaningful disclosure of assumptions or useful framing of outcomes to substantiate those conclusions in the context of a scenario consistent with the 2°C outcome. Despite this, the fact that the companies do analyse the long-term indicates both the importance of the work and the possibility that decision-useful disclosure can be produced.

Disclosure is a “means,” not an “end”. Specifically, it is a means of facilitating dialogue between a company and its investors and allowing investors to better assess the quality and prospects of their investments. To meet these ends, that disclosure must provide sufficient detail and assurance to allow investors to “trust, but verify”.

Making scenario analysis decision-useful

The TCFD has made clear that scenario analysis needs to be “decision-useful”. By and large, recent company disclosures have failed to satisfy this objective. We believe this is because many companies have failed to structure the scenario analysis in a way that picks up the central themes of a low-carbon transition or provide scenario outputs that grapple with the areas of greatest concern. This paper aims to improve upon that by:

• Identifying the core themes and issues that we would expect fossil fuel companies to consider;
• Providing a framework that takes a step-by-step approach to analysing key elements to gauge how well companies have engaged with the spirit of the TCFD recommendations;
• Assessing companies’ scenario analyses to provide investors with a snapshot of the key assumptions, uncertainties, omissions, issues and useful data points from each disclosure, all in a context that allows comparison across otherwise disparate disclosures.

Notably, our focus at this time is limited to a company’s scenario analysis with limited cross-checking against figures used in their annual reports.

Over time, we will expand coverage of companies’ disclosures to include company presentations and regulatory filings in order to provide a more complete picture.

We will supplement these views of the disclosure work with Carbon Tracker’s company-level research and analysis. Through this process we aim to build a comprehensive review, succinctly presented, of what companies are saying and how that compares to both what they are doing and where they stand relative to their peers.

In Part One, we discuss the key themes every company should address. Part Two details our approach to analysing those themes. In Part Three, we discuss the key issues that have emerged from our analysis of disclosures by the oil majors. Part Four contains individual company analyses that can be read as stand-alone documents. The first of these, related to disclosures by ExxonMobil, was published on March 27, 2018.

6 See, e.g., Carbon Tracker, Two Degrees of Separation (2017).
7 https://www.carbontracker.org/reports/company-profile-exxon-mobil/
We believe any useful scenario analysis by an oil and gas producer would analyse the following themes:

- Climate change is effectively market risk for fossil fuel companies and scenarios must grapple with this reality.
- A common reference scenario is needed to make scenario outputs comparable.
- For the oil and gas sector, the key upstream risks are to investments in new projects and this should be discussed and quantified.
- Lower demand expectations imply lower price expectations and therefore a focus on project costs is essential.
- In a carbon budget context, the relative cost position of a company relative to its peers is critical.
- Price expectations drive corporate reporting, making it necessary to understand a company’s forward price assumptions.

**Climate change is a market risk for fossil fuel companies**

Transition risks may materialise through multiple channels: policy, reputational, market, and technological risks, for example. In building scenarios to model the challenges facing fossil fuel companies, each channel is really a tributary leading to impact upon demand for oil, gas and coal based on the emissions reductions necessary to achieve a 2°C outcome.

What might demand look like if the climate targets of Paris are met? The International Energy Agency’s (IEA) “Sustainable Development Scenario” (SDS) (formerly, the “450 Scenario”), which is consistent with a 50% probability of limiting global warming to 2°C, indicates a future for coal, oil and gas that is materially different from today. This would be at the very upper end of what could be considered compliance with the Paris Agreement and therefore by no means a robust test of the “well below 2°C” standard that Agreement imposes. By 2040, the SDS contains 30%, 20% and 55% less demand for oil, gas and coal, respectively, than the IEA’s New Policies Scenario, which presents a “business-as-usual” scenario based on committed or announced policies (Figure 2). The emissions associated with meeting that demand form the key link between any climate-outcome focused scenario (i.e., a 2°C scenario), and its related level of fossil fuel consumption.

Given the use of only a 50% chance of limiting warming to 2°C, users may prefer more stringent limits such as the IEA’s “Beyond Two Degrees Scenario” (B2DS), which offers a 50% chance of limiting warming to 1.75°C. The choice of scenario is important and has real implications for company investments, but as some companies have not even taken the 2°C demand-pathways as their starting point, we believe it important to note that any 2°C scenario analysis must begin with a 2°C-compliant climate outcome that then models related demand for fossil fuels. We view this as a baseline requirement and would suggest that companies also consider more stretching scenarios (as some already have).

Focusing on the impact of diminishing demand for fossil fuel commodities is the lynchpin of any useful scenario analysis. Scenarios that model taxes on carbon or other local policies may, or may not, relate to a specific climate outcome. Sensitivities to various elements of the energy transition, such as

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8 Our usage of this term includes oil, gas, coal, mining and utilities companies, but here we focus principally on upstream oil and gas companies.

9 450 parts per million (ppm) is the quantity of carbon dioxide in the atmosphere that provides an even chance of limiting average temperature increase to 2-degrees Celsius above pre-industrial levels.

electric vehicle adoption rates, may yield useful insights on that area but will not encapsulate the full range of risks — for this a focus on demand trajectories associated with the well-below 2°C objective is essential.

**Figure 2 – Comparison of IEA scenarios for fossil fuel demand**

To be sure, one can envision a number of different fossil fuel demand pathways that might be 2°C-compliant. Like any future assessment, there are inherent uncertainties and it is impossible to prove today which scenario will unfold tomorrow. But the purpose of the exercise is not to predict the future.

For the purposes of disclosure where investors are endeavouring to assess a single risk across seemingly similarly situated competitors, one important objective is to understand how companies compare. This requires use of a similar yardstick, or at least one reference scenario.

This is not to the exclusion of running other scenarios (for internal planning purposes or disclosure) or reconsideration of scenario choice in the future, provided they are sufficiently detailed. Similarly, it does not supplant supplemental financial analysis by analysts and intermediaries.

We are already seeing a number of companies report against the IEA’s demand scenarios (though some have focused on IEA price decks, which may not be sufficiently robust as we explain elsewhere). This is welcome, and we have principally used the IEA’s 2°C-compliant scenarios for our analysis of the fossil fuel sector. This is not because we deem them the most plausible – or even the most aggressive – downside cases. Rather, IEA scenarios have credibility within the industry, are widely used, represent plausible views of the future and can at least be an intermediary step to bringing comparability to the exercise.

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11 For example, the 450 Scenario (pre-2017), the SDS (which has now subsumed the 450 Scenario), the 2°C Scenario and the Beyond 2°C Scenario. The two former scenarios are included in the IEA’s World Energy Outlook publication; the latter two scenarios are included in the IEA’s Energy Technology Perspectives publication. Both publications are updated annually and these scenarios may change over time.
For oil and gas, the key upstream risks are to reinvestments in new projects

Many upstream energy companies have noted that already producing wells have some built-in resilience to declining demand. This is due principally to sunk costs — those assets will continue to produce if revenues exceed operational costs — even if those projects ultimately fail to recover capital. Natural decline rates also improve the competitive position of those projects. If production naturally declines at 4% p.a., any demand loss would have to be greater than 4% p.a. to force rationalisation of the already producing assets.

The greatest potential risks are to the deployment of capital on new projects that are not otherwise needed in a low-carbon scenario. This is where company judgment will be critical — how are companies reinvesting, or not, the proceeds from current production, particularly in exploration and development stage projects? The risk of “stranding” for these projects may lie in the future, but the capital is being sunk now, locking in those projects for the long-term.

Most oil and gas companies tout their long-term planning and risk management procedures as a reason that they will not waste shareholder capital through over-investment. As we have discussed previously, the track records indicate a different story. Against this background, and given the commonly held belief among fossil fuel companies that the Paris Agreement targets will not be achieved, questioning companies’ preparedness is a reasonable response from an investment fiduciary.

Moreover, we recognise that the best laid plans of mice and men often go awry. While companies may plan strategically around long-term supply and demand considerations, Figure 3 suggests that actual capex decisions correlate with fluctuations in the oil price, which is subject to many other influences (e.g. producer behaviours and geopolitical tensions). Will reinvestments soar above a climate-secure level should commodity prices rise? This is a key question for investors. To get a company-level picture of this, investors need to understand which projects are likely resilient, which are likely only economic in higher-demand environment, and how much of each the company is investing in.

**Figure 3 – Upstream capex and Brent oil price, 2000-2016**

Source: Rystad Energy; Carbon Tracker analysis

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12 Carbon Tracker and LAPFF, Engaging for a Low Carbon Transition (July 2016).
Lower demand expectations imply lower price expectations and therefore a focus on costs

Given both industry forecasts/scenarios predicting more fossil fuel demand than is consistent with a 2°C outcome and the observed tendency for the industry to invest in line with short-term oil price fluctuations, understanding the impact of climate mitigation upon future prices would be a critical element of scenario analysis. Weak or falling demand for any commodity increases pressure on prices. We see echoes of this in recent industry mantras “lower for longer” and “lower forever” and in presentations from companies indicating a laser focus on keeping the cost basis low.\(^\text{13}\) This lies in contrast to heady predictions (and associated project sanctioning) of high-cost projects in the 2011-2014 period, only a few years earlier.

At least one company has considered the impact of lower future prices on its asset base.\(^\text{14}\) We believe this emphasis is a tacit recognition that in a carbon-constrained world, markets will sort winners and losers based on costs. Indeed, Exxon explicitly states as much. This means that any 2°C scenario analysis should aim to address how a company’s management believes its projects rank, relative to peers, in that competition.

In a carbon budget context, the relative cost position of a company’s assets compared to its peers is important information

One discrete way of utilizing future prices in the service of scenario analysis is to lay the costs of potential supply globally against a future demand curve consistent with a 2°C outcome. The intersection between the supply curve and the demand line for any given scenario gives an equilibrium cost of supply, the theoretical price required to satisfy demand for the last marginal barrel. A higher demand scenario necessitates supply from projects higher up the cost curve. This approach enables the company to consider which projects are, from a supply/demand standpoint, within the carbon budget, and which are not.

As we have noted previously,\(^\text{15}\) the purpose of the exercise is not to derive a price forecast from the equilibrium costs, since the curve is in aggregate and therefore does not give the timing of the marginal supply unit and hence the point at which this price would need to be met. Second, such analysis is only a snapshot, since it is based on present-day knowledge and assumptions that can move significantly.

Accordingly, we do not place significant emphasis on the precise value of the marginal cost. For the purposes of this exercise it merely signifies the dividing point between projects that are within or outside of a given carbon budget. This delineation is quite useful, however, as it serves as the building block for assessing both the range of likely resilient projects a company has available and a means of delineating which projects are more or less at risk. Here, companies also need to demonstrate some internal consistency — testing against a 2°C scenario should involve prices that are lower than the base case (not the same or higher as some have done), as the base cases appear nearly universally to assume higher demand than in a 2°C scenario.

\(^{13}\) ConocoPhillips’ announcement it would no longer sanction projects with break-evens greater than $50/bbl. See, e.g., https://www.ft.com/content/e313e1f6-cd47-11e7-b781-794ce08b24dc


\(^{15}\) Carbon Tracker, Mind the Gap report. See https://www.carbontracker.org/reports/mind-the-gap/
Though perhaps not the intended purpose of the graphic, the logic of the approach can be seen in a hypothetical example provided by Chevron in its scenario report (Figure 4). There, Chevron reassures investors that “those high-cost assets for which a final investment decision has yet to be made would not find a place in our investment portfolio given our risk management processes.” That is important but not enough, as Chevron itself concedes they have sanctioned projects that would fail this test. Investors need to understand the magnitude of the risk; that is to say, how much of the company’s potential supply sits above the “reduced demand” intersect line and further, when the company has decided to sanction a project above that line.

**Figure 4** – Chevron’s analysis of price impact from demand changes.

![Hypothetical supply stack showing impact of reduced demand on asset competitiveness](https://www.chevron.com/-/media/shared-media/documents/climate-risk-perspective.pdf)

*Source: “Managing Climate Change Risks”, Chevron Corp., 2017*

**Price expectations drive corporate reporting**

Forecasting oil prices is complex. We would partly agree with ConocoPhillips’ Matt Fox, EVP for strategy, exploration and technology, when he says that, “predicting price is useless but scenario planning is priceless.” However, the fact is that future price expectations (whether used for planning or not and whether disclosed or not), undergird a number of tests central to financial reporting — including impairment testing, reserves estimation, fair value estimation, asset retirement obligations/decommissioning provisions, and useful life calculations — making it important to understand both the company’s underlying price assumptions and how they would be impacted in a 2°C scenario — a “prospective accounting” to borrow a phrase.

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There are certainly instances where changed demand expectations have impacted price expectations thus leading to impairments, demonstrating the rough linkage between supply/demand balance and price. Indeed, in the recently oversupplied market, billions in impairments were registered.\textsuperscript{18} If these impairments can be triggered by moments of oversupply, it is possible that significant revisions to management’s demand expectations in line with a 2°C outcome could lead to similar results.\textsuperscript{19}

For investors, the key question is whether those assumptions would change if company management decide that the 2°C scenario was, in fact, the most likely outcome?

To date, we are unaware of any companies who have explicitly addressed this issue, but some have given indications of the price parameters used in impairments (something we believe all companies should do, but many do not). In those instances where that information is available, it is important to consider how estimates under a carbon-constrained scenario compare to those that form the basis for the company’s financial statements — this is the case even though current reporting standards would not necessarily require companies to use the carbon prices derived from 2°C scenarios in their accounting estimates.

Having identified what, in our view are the “central elements” and the “key factors that will drive future developments,”\textsuperscript{20} we now turn to what we would expect from voluntary company reports.

PART TWO: WHAT TYPE OF SCENARIO ANALYSIS CAN DELIVER INSIGHTS ON THE MARKET RISKS FROM A LOW-CARBON TRANSITION?

The TCFD recommends the application of a 2°C reference scenario but does not specify either a single scenario or methodology.\textsuperscript{21} The recommendations further note the critical importance of delivering information that is comparable and suggests that the outputs should focus on the impact that the scenario modeling has on key operational measures (i.e., input/operating costs, revenues, cash flow timing).\textsuperscript{22}

In light of the TCFD guidance and considering the central elements discussed above, we believe that compliance with the TCFD recommendations, and consistent with the demands shareholders have made upon companies, should be structured around these basic elements:

1. A reference scenario;
2. Built upon a 2°C-compliant demand pathway;
3. Compared to a sector-wide, project level view of supply.

\textsuperscript{19} For examples of such impairments, see, Chevron 2015 10-K at FS-18 (Feb. 25, 2016) (“The company reported impairments for certain oil and gas properties during 2015 primarily as a result of downward revisions in the company’s longer-term crude oil price outlook.”); see also Royal Dutch Shell 2015 Annual Report, at 131 (“Following the revisions to Shell’s long-term oil and gas price outlook in 2015, relevant assets were identified for an impairment review resulting in impairment charges in 2015 of $4.4 billion, principally related to Upstream North American shale properties”).
\textsuperscript{20} See, FSB Task Force, Technical Supplement: The Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities (Dec. 14, 2016), at 2 ("Scenarios are not intended to represent a full description of the future, but rather to highlight central elements of a possible future and to draw attention to the key factors that will drive future developments.").
\textsuperscript{21} Id., at p.3
\textsuperscript{22} Technical Supplement: The Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities at 6 (June 2017).
We have characterised this approach in greater detail elsewhere.\textsuperscript{23} We offer this simplified view to focus on the key elements. The crux of this approach is a comparison of the 2°C demand pathway with a forward-looking view of supply. Assuming the lowest cost supply will be consumed first, the issuer can build a picture of those projects that are needed to meet 2°C demand and those that are surplus (see Figure 5). Early returns from several company analyses clearly indicate that companies can and, in some cases, are taking a similar approach.

**Figure 5 – Example supply-demand cost curve to compare supply**

![Source: Carbon Tracker Initiative](https://www.carbontracker.org/reports/carbon-trackers-submission-to-the-fsb-task-force-on-climate-related-financial-disclosures/)

### A framework for analysing disclosure of climate risks in company reports

Our approach here focuses on one stage-setting set of questions followed by five substantive areas, described below. We employ a “decision-tree” logic to each section, identifying what companies have done, how they have done it, whether it appears reasonably in line with a low carbon transition and what gaps and omissions exist in their disclosure.

Where relevant and available, we have collected the details on their assumptions, methodology, and outputs, which we have used as inputs to a qualitative analysis of the disclosures. Ultimately, our objective is to provide useful information to shareholders as they evaluate the quality of each company’s scenario analysis disclosure and, further, whether it has improved over time.

Our focus here is on what companies have disclosed regarding their processes — that means that companies which have conducted other portfolio testing but not disclosed those results will fare poorly compared to those that have. We believe this is reasonable, as it is well within company control to offer more robust disclosure.

We begin by asking some basic questions about the company’s current position to establish a baseline that we can evaluate year over year. This can help investors determine whether the company has followed through on key themes.

Here, we examine the company’s approach to scenario analysis, including the following issues:

a. Whether they have modeled at least one 2°C scenario and whether they have used a publicly available or internally generated scenario;
b. If using a proprietary scenario, whether the assumptions and drivers that underpin its modelling are clear and how it compares with other reference scenarios;
c. Whether the company has modified the scenario used and how;
d. Whether it has identified the internal logic of the scenario and key drivers of results;
e. What is the demand profile for fossil fuels consumed over the lifetime of the scenario is; and
f. Whether the scenario is incorporated into company strategic planning.

Our focus is on understanding the overall logic of the scenario and whether the results it yields can be compared to results from other companies.

This section examines the company’s outputs of the scenarios that may relate to operational or financial terms. Companies may choose to express results in any of a number of ways (i.e., VaR, NPVs, sensitivities, production profiles) at the portfolio level. Results may also be expressed at the project level (i.e., differences in project sanction protocols or examples of projects that would or would not proceed). We will also examine whether the scenario analysis has impacted the company investment decision/project sanction process and how. As with the scenario modeling component, we seek to glean what is available from the disclosures to understand the overarching logic and coherence of the analysis.

As noted above, we believe that a critical step is translating these risks into long-term price expectations, not for purposes of forecasting but instead in assessing the quality and resilience of the underlying assets and comparing those price conclusions to the ones used in the company’s financial statements. This section therefore examines any insight the company’s scenario analysis has provided with respect to price assumptions and compares that to the prices assumptions, where disclosed, in the financial reporting process. Here, we will look outside of the scenario analysis produced by the company for any price reporting or guidance they have offered, whether for planning purposes, impairment testing, or other uses and whether found in regulatory filings or other reports.

Special module: Carbon Pricing. Though we do not believe the use of carbon prices is the best way to effect the TCFD recommendations, we recognise that many companies have used the carbon pricing model as a way of framing the problem and for use in internal sensitivity checks. Here, we are therefore examining whether the information disclosed on carbon pricing is consistent with a robust practice, or not. As discussed in Box 1, below, there are a number of questions that investors should ask.

In Part III we discuss some of the early considerations of how the scenario analyses of ExxonMobil, Royal Dutch Shell, BP, Chevron, Total, ENI, ConocoPhillips and Statoil fare through this lens.
BOX 1. A Note on Scenarios Built on Carbon Prices

Many companies have used carbon prices in a variety of ways to prepare for transitioning existing and planned operations. This has evolved from internal emissions trading schemes to participating in carbon markets. For scenario modelling, this takes the form of a price per tonne/CO\textsubscript{2} (or CO\textsubscript{2}e) that serves as a proxy for a range of potential future policy outcomes. This is a simple but easily misused tool for modelling an energy transition and investors should be wary of this. A number of questions need to be asked:

1. If an “internal” carbon price is applied by a company, what scope of emissions is it applied to and how does it affect capital deployment?

Many companies use a carbon price at the project’s planning stage to evaluate the impact of the potential direct emissions and test its resilience across a range of future scenarios, rather than impose an internal carbon cost. For upstream projects this likely does not change the economic considerations for a project’s final investment decision, due to operational emissions only accounting for around 10-15% of total lifecycle emissions. For a large number of projects, a carbon price of $40/tCO\textsubscript{2} would translate to an approximate carbon cost of $1 to $2 per barrel at the upstream level and will fall well within the price volatility against which the projects are likely already tested. Where regulators are already starting to apply or propose upstream carbon taxes, such as in Norway or Canada, this has not had any discernible impact on capital deployment decisions, especially if taxes are revenue neutral and can be offset against other liabilities. When only applied to upstream emissions, the implications are unlikely to be significant compared to commodity price volatility. This was confirmed by the 2017 Wood Mackenzie study,\textsuperscript{24} which concluded that the value at risk for upstream operations due to carbon prices is just 2% overall (with greater impacts on selected projects).

2. How does the carbon price affect different fuels?

The carbon price assumed relative to commodity and technology prices is especially important for gas. There could be scenarios where gas gains an advantage over coal but is not displaced by renewables for example. Or gas could be leapfrogged by renewables and storage at higher carbon prices. However, for transport fuels, studies in Europe have shown that a carbon price of over EUR200 would be needed to deliver the equivalent changes in consumption seen as a result of changes to vehicle efficiency standards\textsuperscript{25}. For example, in the UK, adding a CO\textsubscript{2} price of $40/tCO\textsubscript{2} would only add $0.05-$0.10 to the current retail price of ~$1.70 per litre (which already contains ~$1.10 tax), should it be passed through to the consumer.

3. Is the carbon price used dynamically to model its impacts on demand and substitution effects?

Unless the carbon price is applied throughout the value chain, the potential knock-on impacts on demand may not be incorporated. One key component of Integrated Assessment Models (IAMs) is to identify key tipping points; that is, inflection points in the relative costs different sources of energy supply where switching en masse, for economic reasons, may occur. Depending on the model, such tipping points may be market specific. Does the company use the carbon price to model fuel demand impacts? Similarly, does the company use the carbon price as a proxy for a price needed to result in a 2°C demand profile?


CARBON TRACKER’S APPROACH TO SCORING

Our aim is to provide investors with clarity on the substantive climate-related disclosure issues for each of the companies assessed. While we have scored the disclosures, one should not be misled by the ordinal rankings but instead should focus on the substance of what companies have said. Our individual company-level reports, drawn from the results of these analyses, therefore focus more on the principal issues in the reports rather than the overall quantitative ranking.

In accordance with Carbon Tracker’s decision tree logic and approach for assessing climate-related disclosure (see Part One), we apply a scoring framework across each of the identified areas of focus. Table 1 provides a high-level representation and broad description of the criteria we consider in our scoring framework and the weight we apply to each area of disclosure.

Table 1 – High level representation of Carbon Tracker’s scoring framework

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<thead>
<tr>
<th>Area</th>
<th>Objective</th>
<th>Weighting (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario Modelling</td>
<td>To what extent is the company clear on the assumptions, drivers and parameters used in its scenario modelling and how it uses its scenarios internally.</td>
<td>40%</td>
</tr>
<tr>
<td>Scenario Outputs</td>
<td>What methods are used (and what level of detail is provided) to assess the impact of the company in a 2C scenario and to what outcomes are disclosed in such an analysis.</td>
<td>40%</td>
</tr>
<tr>
<td>Market/Price risk</td>
<td>To what extent does the company disclose and evaluate future market and price assumptions in its reporting.</td>
<td>20%</td>
</tr>
<tr>
<td>Carbon Pricing (scored separately)</td>
<td>How does the company use carbon pricing internally and what is the level of detail provided.</td>
<td>10% (additional)</td>
</tr>
</tbody>
</table>

Table 2 – Key for grading of companies’ disclosure performance

<table>
<thead>
<tr>
<th>Possible Score</th>
<th>Poor</th>
<th>Moderate</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario Modelling</td>
<td>40%</td>
<td>0.9%</td>
<td>10.24%</td>
</tr>
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<td>40%</td>
<td>0.9%</td>
<td>10.24%</td>
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<tr>
<td>Market/Price Risk</td>
<td>20%</td>
<td>0.4%</td>
<td>5.9%</td>
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<tr>
<td>Carbon Pricing</td>
<td>10%</td>
<td>0.2%</td>
<td>3.6%</td>
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About Carbon Tracker
Carbon Tracker is an independent financial think tank that carries out in-depth analysis on the impact of the energy transition on capital markets and the potential investment in high-cost, carbon-intensive fossil fuels.

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