



Energy market scenarios of oil and gas companies

An analysis of the climate strategies and long-term scenarios of 14 international oil and gas companies

Non-technical summary



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Foreword

A global transformation of society is necessary to deal with climate change. To have a chance of succeeding, robust policies are needed at both national and international level. A large part of the work, however, will need to be done by the business community.

For investors, the transformation of society means both opportunities and risks. During this change some industries will prosper, and others will be disadvantaged. This, in turn, will affect the performance of investor portfolios. The greater risk is that the transition is too slow and insufficient. In this case, the entire global economy will be impacted.

AP7 has concluded that our most important contribution to the transition is as active owners. In the short term, we can persuade companies to increase transparency and thereby the market's ability to price climate risks in an efficient manner. In the longer term, we can increase the adaptation to a new low-carbon economy by engaging in the development of business strategy in critical industries and companies.

This study is an in-depth analysis of some of the largest players in one of the crucial industries in the transition – oil and gas companies. A key aspect of the study, both from a business perspective and from a sustainability perspective, is climate scenarios.

Since the introduction of TCFD's (Task Force on Climate-related Financial Disclosures) framework, scenario analysis has come into focus. If companies analyse and publish climate scenarios that they use in their strategic planning, the market will be able to assess and evaluate the company's climate-related risks more easily. One of the report's conclusions, is that the scenarios can look very different, even though the conditions should be relatively similar. This reduces the value of the scenarios for investors and for companies themselves.

The report proposes a set of metrics that companies can report against in preparing their scenarios. Adopting these criteria would increase the reliability and comparability of companies' business and climate strategies.

We believe this report can make a valuable contribution to the discussion on robust reporting of climate scenarios, and to a speedier transition of companies that play a key role in managing climate change.

Richard Gröttheim, CEO AP7

1. Introduction

This report

This Non-Technical Summary has been prepared by Trove Research for the Swedish National Pension Fund (AP7) to examine the climate strategies of the world's major International Oil and gas Companies (IOCs) and provide recommendations for further climate-focussed engagement for investors.¹ This report summarises the more detailed analysis contained in the longer Technical Report.

The investor community is already actively engaged with the oil & gas sector, both directly and through collective initiatives such as the Climate Action 100 (CA100+), the International Investor Group on Climate Change (IIGCC) and the Taskforce on Climate Related Financial Disclosures (TCFD). Climate research organisations such as the Transition Pathway Initiative (TPI) and Carbon Tracker also assess company climate performance.

In 2019 and early 2020 many of these initiatives focussed on encouraging the IOCs to do more to limit their emissions as none of the companies' emissions were remotely on track with the 1.5°C or even 2°C pathways. However, throughout 2020 a number of IOCs made pledges that are closer to these pathways, expressing their commitments as consistent with Net Zero emissions by 2050.

The purpose of this report is to build on these other investor-led climate initiatives in the light of these recent IOC climate commitments. It considers that company strategy is determined largely by what it considers in its best interests in the long-term, not by a broader responsibility to address climate change. That perspective is formed by its existing assets, culture and opportunities.

The speed with which IOCs make this transition therefore depends not on whether climate change needs addressing, but on how they see the future of the energy system, and in particular the need for oil in that system, in the context of their existing assets and corporate culture. IOCs with less ambitious climate strategies are betting that oil demand and prices will remain robust, even with global efforts to achieve Net Zero by 2050. But a growing number of companies see a different future, one with eventual declining demand for oil, precarious profitability and energy businesses based as much around clean energy as traditional oil & gas.

¹ In this report we use the term IOC (International Oil and Gas Companies) to refer to large oil and gas companies with publicly traded shares. Most, but not all of these have substantial international activities. Suncor and Marathon, for example, are North America-based, and Lukoil and Rosneft Russia-based. The term IOC is used in other reports to refer to Integrated Oil and Gas Companies with upstream and downstream operations.

The thesis examined in this report is that the difference in climate strategies between IOCs is less due to philosophy or culture, but more reflected in the rigour of each company's forecasting process. IOCs with less ambitious climate strategies are more likely to base their strategies on an incomplete understanding of the scale and pace of the energy transition, or at least less willing to disclose their views. These companies also tend to have shorter term outlooks, for example to 2040 rather than 2050. Greater changes in the energy system are likely to occur further into the future.

The analysis in this report compares the different visions of the future as seen by the oil companies themselves, along with the assumptions that go into these forecasts. From this, we highlight the short-comings in the disclosure of the forecasts of oil companies with less ambitious climate strategies. We conclude by setting out specific recommendations for investors to request greater disclosure from IOCs on their future visions of the energy system.

Specifically, this report addresses the question of *what constitutes robust scenario analysis in the oil and gas sector*. We investigate this by first ranking firms on 14 climate criteria across three main areas: policy disclosure, emissions targets and investments in low carbon technologies. These are used to identify climate "Leaders", "Slip-streamers" and "Laggards". "Slip-streamers" are firms that appear to be moving in the right direction with positive statements, but have yet to reveal detailed plans and make significant financial commitments to low carbon technologies.

We then look at how these climate strategies relate to the completeness and levels of disclosure around each company's scenario analysis. We also examine the extent to which IOC climate strategies are influenced by the cost base of the firm, on the premise that firms with higher costs of extraction might be more inclined to pivot towards low carbon technologies. We conclude by proposing consistent metrics that IOCs should disclose when presenting their scenarios to investors and wider stakeholders.

Recent financial performance of international oil and gas companies

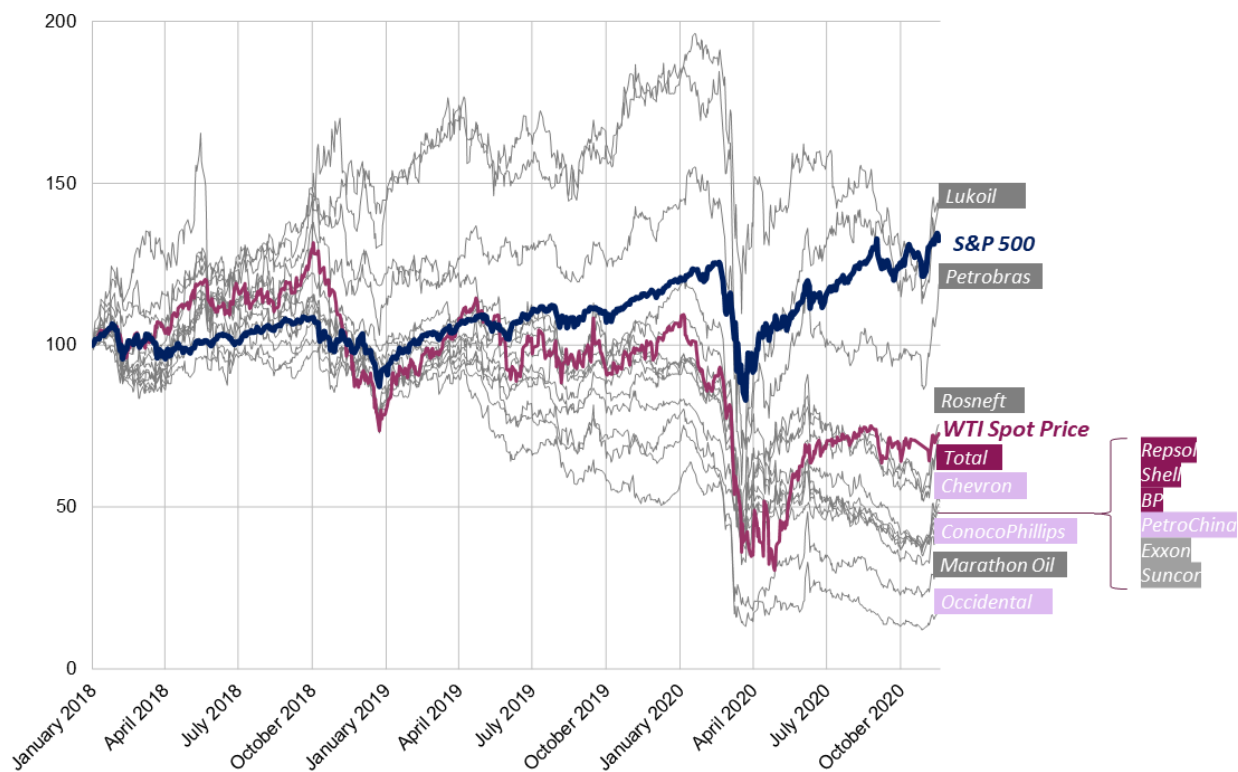
The need for the oil industry to develop climate strategies is not just to support global climate change mitigation efforts. They need to address long standing issues of financial performance. IOCs have underperformed the S&P 500 for several years. Although oil prices have fallen in this period, the majority of IOCs have performed worse than the crude price index (Figure 1).

Since 2018 every IOC, except Lukoil, has underperformed the S&P500 with the median firm losing around 50% of its stock value. Over this period the S&P increased by over 30%. Part of this was due the decline in crude prices, but most IOCs have performed worse than the WTI spot price. Margins have been squeezed as the cost base required to support oil and gas production is still too high.

The three firms that have performed better than the WTI index are Lukoil, Petrobras and Rosneft. Of those that have underperformed relative to WTI, the US IOCs have, on average, performed worse than their EU counter-parts. Stocks prices of Marathon and Occidental have lost the greatest value.

There are many reasons for individual stock price changes, and it is beyond the scope of this study to assess the reasons behind each firm. Factors affecting performance include: exposure to downstream assets, exposure to regional market prices, differences in the asset base (eg tight oil vs conventional oil), product mix (eg oil, gas, renewables) and levels of debt. However, history and theory show that firms with more diversified revenue models tend to perform better in volatile markets.

Figure 1. Share price performance of oil and gas companies



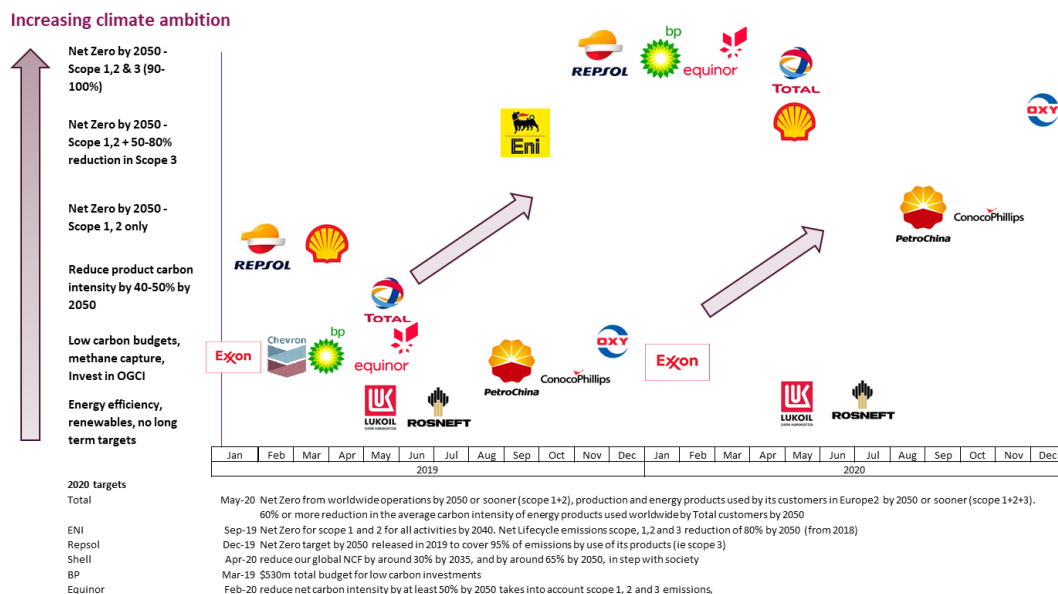
2. IOC climate commitments

Recent changes in oil company climate commitments

IOC climate commitments have changed significantly in 2020, but there remains a significant difference between the leaders and the laggards.

Prior to 2020 oil & gas climate strategies' tended to be limited to three areas: investment in low carbon technologies, methane capture and participation in the Oil & Gas Climate Initiative (OGCI) - although Shell and Total introduced carbon targets with scope 3 in 2018, and Repsol in late 2019. Over the course of 2020 European IOCs started to introduce long term emission reduction targets covering not only scope 1 and 2, but also scope 3. US and Russian firms' positions however, have changed little since 2019. The progression of IOC climate commitments are summarised in Figure 2.

Figure 2. Development of IOC climate commitments 2019-2021



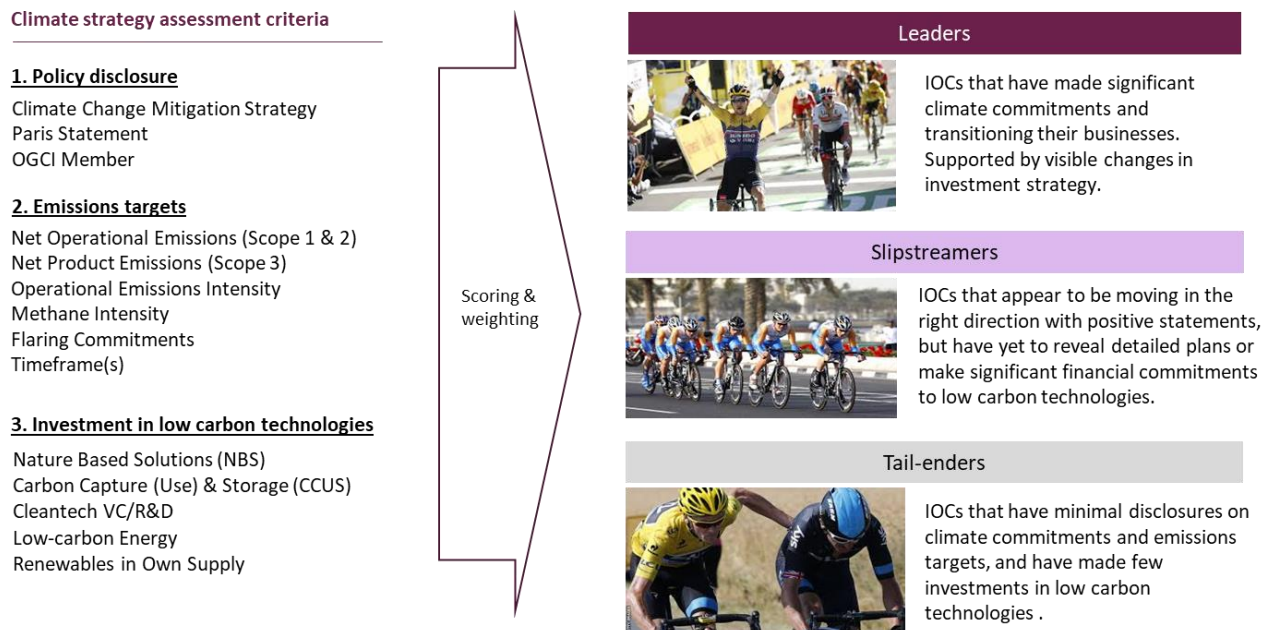
Comparing IOC climate commitments

We have compared the climate strategies of 14 International Oil Companies. These have been selected to give a coverage across Europe, North America, Brazil, Russia and China. We have not included state owned oil companies as these stocks are not held by institutional investors. The companies we include in the assessment are: BP, Shell, Repsol, Total, Marathon, Chevron, Conoco, Exxon, Occidental, Suncor, Rosneft, Lukoil, Petrobras and Petrochina.

We then assess each company’s approach to climate change and the energy transition in three areas: Policy Disclosure, Emissions Targets and Investments in Low Carbon Technologies. Each area is broken down into individual criteria as shown below, using 14 criteria in total. Scores have been made against each criteria and weighted to provide overall climate strategy rankings.

Finally we categorise each company into a “Climate Leaders”, “Slip streamers” and “Tail-enders”. These categories reflect the degree of ambition in reducing emissions and changing their business models. The methodology is explained in more detail in the Technical Report accompanying this report. The criteria are summarised in Figure 3.

Figure 3. Defining climate leaders, slip streamers and tailer-enders



The categorisation is shown in Figure 4. We position the four main European companies as leaders on the broad basis of their commitments and investments in low carbon businesses. Petrochina, Chevron, ConocoPhillips and Occidental are ranked as “slip streamers”. Chevron, Occidental and ConocoPhillips have started to differentiate themselves from other US IOCs due to more ambitious operational emission targets, and in Occidental’s those from end-use, alongside greater investments in low carbon technologies.. But they remain significantly behind the EU companies in stringency and actionability of emissions targets. Petrochina is also included as a “slip streamer” as has set a Net Zero target for 2050, but has set few other climate targets.

3. Scenario disclosures

As noted above our contention is that differences in climate strategy between IOCs is influenced by the rigour of each company’s forecasting process.

Figure 5 shows the information disclosed by each IOC on their energy system forecasts for their “2 degree” scenarios, with the companies’ colour coded to show climate strategy ranking. We have chosen 10 key features of the energy system that are important in understanding the scale and timing of the energy transition. These start with the global demand for energy and oil, but more importantly include the drivers of those forecasts such as the share of electricity in final energy consumption and the future costs (referred to as the levelised cost) of renewable energy and electric vehicles. Unless IOCs understand how the decline in the costs of these alternative technologies are likely to evolve, it is difficult to forecast any substantial change in the demand for oil.

Figure 5. Comparison of disclosed information on energy system forecasts from IOCs (2°C scenarios)

Metric	Region	Europe				North America					Other				
	Company	BP	Shell	Repsol	Total	Marathon Oil	Chevron	ConocoPhillips	Exxon	Occidental	Suncor	Rosneft	Lukoil	Petrobras	PetroChina
	Scenario	Rapid	Sky 1.5	SDS	Rupture			Global Carbon Price	EMF-27	SDS					
	Source	Own scenarios	Own scenarios	IEA WEO 2017	Own scenarios	None published	IEA WEO 2020	Own scenarios	Third-party	IEA WEO 2019	None published	None published	None published	None published	China Outlook 2019
Year	2030	✓	✓	*✓	✓		*✓	✓	✓	*✓					
	2040	✓	✓	*✓	✓		*✓	✓	✓	*✓					
	2050	✓	✓		✓			✓							
1. Global energy demand	✓	✓		(✓)			(✓)	✓							
2. Total oil demand	✓	✓		(✓)			(✓)	(✓)							
3. Total gas demand	✓	✓		(✓)			(✓)	(✓)							
4. Liquid fuel demand in transport	✓	✓		(✓)			(✓)	✓							
5. Oil demand in petrochemicals	✓			(✓)											
6. Electricity share of total final energy consumption	✓	✓		(✓)											
7. Renewable share of total primary energy	✓	✓					(✓)	✓							
8. Levelised cost of electricity for wind, solar	✓														
9. Levelised cost of vehicle ownership: EV vs ICE	(✓)														
10. EV share of transport fleet	✓			✓			(✓)								

(✓) indicates metric is reported but only final-year value is given

*✓ indicates external/third-party scenario used

Figure 5 shows that firms that disclose more information on what is driving their forecasts of the future energy system, tend to have more ambitious climate strategies. The relationship is not perfect but there is sufficient link to draw a general conclusion between the disclosure of a company’s forecasts and associated assumptions, and the ambition of its climate strategy.

Repsol for example, has not published complete energy forecasts, but has adopted ambitious climate plans being the first IOC to adopt Nero Zero pledge by 2050, and wrote down \$5.3bn of asset value on the basis of changes to its long term energy market forecasts. Similarly, ConocoPhillips and Exxon provide some degree of disclosure on their future energy scenarios, but the information is not as complete as for BP and Shell, who are in the climate leaders group.

At the lower end of the climate spectrum Marathon, Suncor, Rosneft, Lukoil and Petrobras provide virtually no information to shareholders on how they see the future of the energy market. For these companies investors are likely to conclude that the companies have little or no understanding of how their key market is going to change over the next 30 years.

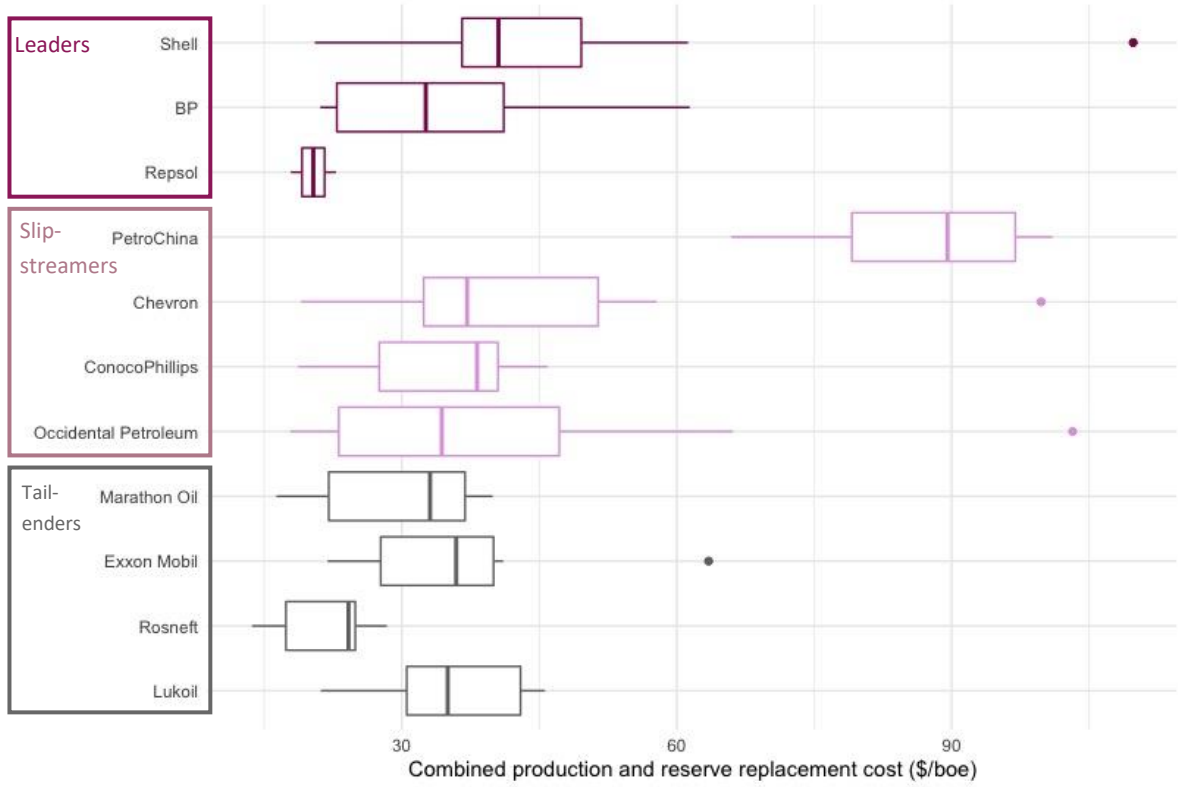
Do IOC climate strategies depend on the firm's cost base ?

It is possible that an oil company's climate strategy is partly influenced by its costs base. A firm with high exploration and production costs would want to pivot to alternative businesses sooner than those with access to cheaper resources. To assess this compared the capital and operating costs of production for each IOCs. We did this by combining calculations of Reserve Replacement Costs (RRC) and Average Production Costs:

- **Reserve replacement costs (RRC).** This proxies for the capital costs of oil and gas production by calculating how much it costs a company to replace the existing reserves it uses in production, on a barrel of oil equivalent basis.
- **Average production cost.** This is a measure of the operating expenses of an IOC, calculating the barrel of oil equivalent cost of production and taxes associated with a firm's level of output.

The results are shown in Figure 6. Not all firms are shown due to the lack of data. Our conclusion that there is little correlation between the production costs and reserve replacement costs and IOC climate change commitments. This suggests that the climate leaders in the oil and gas industry are driven by their views on the future of the oil market rather than increasingly high costs of extraction and production.

Figure 6. Capital and operating cost comparison for IOCs (\$/boe average 2010-2020)



4. IOCs and the Taskforce on Climate Related Financial Disclosure

The Taskforce for Climate-Related Financial Disclosure (TCFD) has developed recommendations for scenario analysis to assess climate change impacts on firms' financial and strategic planning. We have assessed the compliance with the TCFD recommendations for each IOC reviewed in this study. Only four companies comply with the recommendations and these are climate leaders. The remaining firms have limited compliance and need to improve their disclosure considerably.

TCFD Recommendations

The TCFD sets out a number of recommendations of how companies should report on their potential exposure to climate transition risks. These fall into three categories: (i) Scenarios (ii) Disclosure, and (iii) Applications.

(i) Scenarios

Companies should consider a set of scenarios, both favourable and unfavourable in their future outcomes to business operations, not just singular scenarios. The set should include a transition scenario, such as a 2°C or below scenario, as well as at least one other reference scenario which is jurisdictionally-relevant, e.g. one which targets NDC/some mitigation outcome, or a suite of scenarios such as the IPCC's RCPs.

(ii) Disclosure

Companies should disclose key assumptions and pathways so the analytical approach and limitations of forecasts can be understood. In particular this should include:

- Input parameters/assumptions, such as technological response, timings and potential costs, variation in parameters across geography, markets and time.
- Timeframes of climate risks and their materiality to operations under different scenarios.
- Resilience of the company's finances and strategy under various scenarios, including transition scenarios.

(iii) Application

The more material and significant a company's exposure to climate risks, the more rigorous analysis should be. Comprehensive, including quantitative, if relevant, scenarios should be developed, particularly considering key drivers which affect the business. External scenarios may be used where

IOCs and the Taskforce on Climate Related Financial Disclosure

in-house modelling capacities are not yet fully developed, and quantitative approaches are first developed, though, particularly in the case of IOCs, these should be the most current iterations.

Figure 7 summarises the alignment of IOCs scenario disclosures with the TCFD recommendations. Climate leaders are generally compliant with TCFD disclosure recommendations (BP, Shell, Repsol, Total), whilst tail-enders are the least compliant (eg Marathon, Suncor, Rosneft, Lukoil, Petrobras).

However, compliance with TCFD does not mean an IOC will adopt an ambitious climate strategy. For example, Chevron and Conoco publish 2°C scenarios but conclude that even under these scenarios oil demand will be little affected by 2040, and that a pivot to lower carbon forms of energy is not needed. This highlights that investors looking to engage with IOCs on climate related issues need to encourage the oil companies to understand that the long term interests of shareholders are served by better management of these downside risks.

Figure 7. Alignment of IOCs Scenario Disclosures with TCFD Recommendations

	TCFD recommendations							
	Scenarios Analysis	Transition (2C) Pathway	Assumptions Disclosed	Material Timeframes	Scenario Resilience Assessment	Key Business Drivers Analysed	Up-to-date Scenarios	Compliant with TCFD recomm's
BP	✓	✓	✓	✓	✓	✓	✓	✓
Shell	✓	✓	✓	✓	✓	✓	✓	✓
Repsol	✓	✓			✓	✓		✓
Total	✓	✓	✓	✓	✓	✓	✓	✓
Marathon								
Chevron	(✓)	✓			✓	(✓)	✓	(✓)
Conoco Phillips	✓	(✓)	(✓)	✓			✓	(✓)
Exxon	✓	✓	✓			✓	✓	(✓)
Occidental	(✓)	✓			✓	(✓)	(✓)	(✓)
Suncor								
Rosneft								
Lukoil								
Petrobras								
PetroChina	(✓)	(✓)		(✓)		(✓)	(✓)	(✓)

(✓) indicates partial compliance with criteria – either limited in scope or incomplete information

5. Observations & Recommendations

Observations

In this project we have compared the climate strategies of the world's major oil and gas companies and assessed the reasons for their different approaches to the energy transition based on the disclosure of scenarios and each firm's cost base. From this analysis we draw five main conclusions:

1. ***IOCs that embrace the energy transition and set ambitious climate strategies also have forecasts of the oil market that indicate this to be a logical, long-term strategy.***
2. ***Climate leading IOCs see greater potential for oil demand to be eroded and prices to remain low, than the laggards do.*** They see this being caused by a combination of climate policies and the continued downward pressure on the cost of low carbon technologies.
3. ***Climate leading IOCs have marginally higher extraction costs than the laggards, but not sufficiently high to explain their greater pivot to low carbon energy technologies.*** Climate leading IOCs have adopted more rapid energy transition strategies because of their view of risks to the oil market, not because they have significantly different cost bases.
4. ***IOC climate laggards*** tend not to look as far into the future as the climate leaders (projections can stop at 2040 rather than 2050) and compliance with the Paris Agreement can be interpreted as a 2°C warming goal, rather than 1.5°C goal. Both these factors can have material outcomes for projecting global oil demand.
5. ***IOCs differ significantly in their compliance with the Taskforce on Climate Related Disclosures (TCFD).*** Climate leaders are generally compliant with TCFD disclosure recommendations (BP, Shell, Repsol, Total), whilst tail-enders are least compliant (eg Marathon, Occidental, Suncor, Rosneft, Lukoil, Petrobras).

Recommendations for investors seeking to engage with oil and gas firms on climate strategies

Pension funds with investments in the oil and gas sector need to ensure their capital is safe and productive over a time period consistent with their liabilities. For pension funds this can mean time horizons of over 30 years.

Capital-intensive sectors, such as the oil and gas industry, need to convince investors that they have sound business strategies over these long time horizons. Whilst the future is always uncertain, an increasing number of IOCs are starting to agree that the goal of 2°C warming is looking achievable and setting Net Zero targets (aligned with a 1.5°C warming) will provide benefits for the business and

shareholders. These views are being driven the increasing momentum towards decarbonisation, supported by more ambitious government and corporate climate policies, and declining costs of clean technologies. Whilst the impact of the former may be variable, the latter is a more certain trend. This sets up positive feedback, with lower costs supporting more ambitious climate policies which further lowers costs etc. As the costs of electric vehicles come down, governments are more confident in putting in place aggressive policies such as bans on the sale of internal combustion vehicles.

The central recommendation from this analysis is that IOCs need to reveal their projections of the energy system on a consistent basis and disclose the assumptions they use. In many respects this means ensuring compliance with the TCFD. However, compliance with the TCFD is not sufficient to encourage IOCs to adopt more ambitious climate strategies. The TCFD scenarios allow investors to understand the risks faced by companies under future climate mitigation actions, but may not necessarily lead to a change in company strategy.

For IOCs to change their strategies they need to create meaningful, long term, low emission scenarios *and believe that they are likely to occur*. Asking an IOC to assess their business against an extreme emissions scenario that the firm believes has little chance of happening is unlikely to alter the firm's business strategy. IOCs with less ambitious climate strategies, need to believe there is a significant chance that demand for oil will decline. This comes from a deeper understanding of the factors driving changes in the energy markets.

More comprehensive disclosure around companies' understanding of the future energy system will help inform investors the risks companies face, but will also help companies learn from each other. Specifically we recommend that IOCs expand their disclosures beyond the minimum guidance provided by the TCFD:

1. **All projections are made at least to 2050.** Currently some projections only extend as far as 2040.
2. **Projections need to include three scenarios:**
 - (i) *Business as Usual* – Also sometimes referred to as a Reference scenario, or Stated Policies (IEA). This shows how energy and oil demand will change without any further policy interventions or step changes in technology.
 - (ii) *The central scenario the company strategy is based on* – This is likely to be the “base case” for business planning purposes, incorporating the company's central view on oil demand and prices, where this can be disclosed.
 - (iii) *A 1.5°C trajectory* – this is the most extreme impact scenario and arguably the least likely. However, it provides a worst-case scenario for IOCs in terms of oil demand.

3. **For the three scenarios IOCs should provide disclosures against the following 12 metrics.**

These metrics will allow more direct comparison of oil company visions of the future and how their businesses will be affected by future changes in the world energy system.

The most important metrics are highlighted in **colour**. This list may seem onerous, but the details are helpful in understanding how companies come to different views of the future. The breakdowns should be readily produced from energy forecasting and scenario models.

Figure 8. Scenario metrics to be provided for 2020, 2030, 2040, 2050

Metric	Sector	Comments
1. Energy demand (mtoe)	Total primary energy demand	Firms should make clear how they treat traditional biomass and measure the primary equivalent of nuclear, hydro and electricity from renewable sources.
2. Oil demand (Mbpd and mboe/yr)	Total oil demand	Include all forms of oil use, splits by fuel type to be provided separately (see below). Provide industry reference metric of mbpd and mtoe/yr
3. Oil demand by fuel type (Mbpd and mboe/yr)	Fossil oil	Fossil oil demand (includes crude from conventional and tight oil, NGLs, GTLs and coal to liquids).
	Biofuels	Future demand for biofuels used for combustion, ie exclude bio-products used in plastics.
4. Oil demand by use (Mbpd and mboe/yr)	Power	Split by fossil and biofuels
	Industry	Split by fossil and biofuels
	Buildings	Split by fossil and biofuels
	Non-combusted	Amount of oil used in plastics – split by fossil and biofuels where necessary. Show where cumulative plastics end up. Quantity of plastics (i) recycled (ii) thermal destroyed (with/without energy recovery) (iii) landfill (iv) uncollected on land or in sea.
	Transport	Split by cars/trucks and fossil/biofuels
	Transport - aviation	Split by fossil and biofuels
	Transport – sea & rail	Split by fossil and biofuels
5. Gas demand (MMbtu or mboe/yr)	Total gas demand	Total gas demand for all uses
	Power	Reciprocating engines, OCGT and CCGT
	Industry	All forms of gas used in industry
	Buildings	Gas used for heating
	Transport	CNG and related vehicle gas use
	Non-combusted	For use a feedstock
	Hydrogen	In use for combustion purposes but not as a chemical feedstock

6. Electricity use	Total electricity demand (EJ)	Electricity generated from all sources as delivered energy
	Electricity share of total final energy demand (%)	This shows how rapidly the world is moving towards electrification. Note final energy demand, not primary energy demand.
7. Renewable energy	Total renewable energy output (EJ)	Measured as delivered energy.
	Wind and solar output (EJ)	Measured as delivered energy
	Biomass (EJ)	Biomass and biofuels. NB: excludes traditional biomass.
	Geothermal (EJ)	Measured as delivered energy
	Renewable as % final energy demand (%)	Final energy demand measured as EJ
8. Costs	LCOE of wind power (\$/MWh)	<ul style="list-style-type: none"> Onshore wind - Standardise calculations for 30% load factor Offshore wind – standardise calculations for 50% load factor
	LCOE of solar PV power (\$/MWh)	Standard calculations for 10%, 20% and 30% load factor
	Cost of vehicle ownership (\$ per km driven)	Also show cost of vehicle purchase. Standardise assumptions for mid-size family car – 10,000 miles/yr, 10 year life time, price of electricity \$50/MWh.
	Battery price (\$/MWh)	Price of battery packs for vehicle use and power storage.
9. Electric vehicles	Number of EV Sales / % of total new vehicle sales	Include number of “light vehicles” and “e-motorcycles”.
	% of car fleet	% of light vehicles and e-motorcycles in operation
10. CCUS	Volume of CCUS capacity in place (MtCO ₂ /yr)	Separate out EOR and new CCS
	LCOE of CCUS (\$/tCO ₂)	
11. Nature based sequestration (MtCO ₂ /yr)	REDD+, restoration, soil & Other	Show annual carbon sequestration rates for land use categories
12. GHG emissions (MtCO ₂ e/yr)	CO ₂ , methane.	Total annual CO ₂ e emissions from fuel combustion and methane emissions. Separate methane emissions from oil & gas and other sources.

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