

How to assess oil and gas company scenarios

- The targets set by the Paris climate agreement mean the world can't burn all its fossil fuel reserves.
- Oil and gas companies are under pressure from investors to disclose how their business models will be affected by these limits.
- Scenarios modelling future changes in the energy system can help investors understand how oil and gas companies will be affected by changing demand and efforts to limit emissions. But most scenarios published by oil and gas companies do not provide a thorough assessment of how their business will be affected.
- These questions can be used to assess how robust an oil and gas company scenario is and whether it provides a thorough test of how the company's business will be affected:
 1. Does the scenario account for the rapid growth of clean technologies?
 2. What is the probability that the scenario will meet its stated target for global temperature rise?
 3. What assumptions does the scenario make about carbon capture and storage?
 4. What assumptions does the scenario make about carbon dioxide removal?
 5. Does the company consider the long-term impacts of a scenario on its business?
 6. Does the company provide enough information about how it carried out the modelling?

Limiting climate change means most fossil fuels cannot be burned

The Paris Agreement [commits](#) the world to limiting temperature rise "to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C". These targets limit the amount of greenhouse gases that can be released over the next few decades. The world's economically extractable fossil fuel reserves are estimated to contain the equivalent of nearly [2,800 billion tonnes](#) of carbon dioxide. Burning anything more than a small fraction of this will rapidly push temperatures past the Paris targets.¹

It will not be possible to limit global temperature rise unless limits are placed on the amount of oil and gas that is extracted and burnt. This is not just about future investment - it may also mean that oil and gas prospects that are already being developed will need to be scaled back:

- Oil and gas fields already in operation or under construction contain enough carbon to breach the 1.5°C limit, and would take the world two-thirds of the way towards a 2°C limit, according to an [analysis](#) by Oil Change International. Potential emissions from developed fossil fuel reserves are [double](#) of the carbon budget for 1.5°C.
- Achieving a 2°C limit means extracting no further unconventional oil, including Canadian tar sands, and only 18% of unconventional gas reserves, including shale gas, according to a 2015 [study](#).
- 22% of the fossil fuels the oil and gas industry plans to extract in the next two decades cannot be burned if temperature rise is to be limited to 2°C, according to an [analysis](#) by Carbon Tracker. This calls into question up to \$2.3 trillion of oil and gas investment between now and 2025, including \$400 billion from major private companies like Shell and BP. Since 2018, major oil and gas companies [invested](#) \$50 billion in non-Paris compliant oil and gas projects.

Major oil and gas companies are facing [pressure](#) from investors to disclose how their businesses will be affected by climate policy. The Task Force on Climate-related Financial Disclosures (TCFD), an effort to

¹ To have a 50% chance of limiting warming to 1.5°C, global emissions of carbon dioxide [cannot exceed 312 billion tons](#) between 2017 and the end of the century. For a 66% chance of keeping warming to 2°C (which is often taken as the standard for a 2°C target), the limit is 762 billion tons.

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provide a framework for assessing climate risk for investors, [recommends](#) companies test their business models against scenarios in which temperature rise is limited to 2°C. In [May 2017](#) shareholder resolutions at ExxonMobil and Occidental Petroleum gained majority investor support, forcing the companies to publish scenario analysis showing how they would be affected by climate policy. Other companies, including [Chevron](#), avoided similar resolutions by proactively offering to produce the analysis. Oil Search, an oil and gas company listed in Australia, published [analysis](#) on the effects on its business of limiting warming to 1.5°C.

Assessing energy company scenarios: six key questions

Such scenarios should help investors and policymakers understand how oil and gas companies will be affected by changing energy demand and efforts to limit climate change. But the scenarios that have been published by oil and gas companies have so far fallen short of providing a thorough analysis of how they will be affected by a switch to a low-carbon economy.

The following questions can be used to assess whether scenarios provide a thorough test of how changing patterns of energy use will affect oil and gas companies:

1. Does the scenario account for the rapid growth of clean technologies?

- Clean technologies have grown at an exponential rate in recent years - [much faster than](#) most previous scenarios projected. Since 2002, the International Energy Agency (IEA) has increased its projections of renewable power generation in 2030 by [an average of 9% a year](#).
- Despite this, recent scenarios, including the main IEA scenario, [continue to project](#) that renewable power will only grow at a linear rate, despite recent trends.
- Different scenarios from respected organisations give a spread of projections for growth in clean technologies. Underestimating the future growth of renewables may mean overestimating demand for fossil fuels. For example, the IEA's New Policies Scenario (NPS) [suggests](#) fossil fuels meet 49% of electricity demand in 2040, with renewables providing 41%. In comparison, Bloomberg New Energy Finance (BNEF) [projects](#) a reduced share for fossil fuels of 37%, with renewables meeting 54%.
- Oil and gas company scenarios may also underestimate the growth of electric vehicles and so overestimate future oil demand. For example, ExxonMobil [projects](#) there will be 160 million electric vehicles (EVs) on the road by 2040. BNEF [projects](#) the figure will be 500 million passenger EVs and 40 million commercial EVs.

2. What is the probability that the scenario will meet its temperature target?

- Scientists [define](#) a “likely” chance of meeting a particular temperature target as a more than 66% chance, and “very likely” as 90%. An emissions scenario arguably fails to comply with the Paris Agreement if it only gives a 50% chance of limiting temperature rise to 2°C or 1.5°C.

3. What assumptions does the scenario make about carbon dioxide removal?

- Meeting the Paris climate targets is likely to require measures to actively remove carbon dioxide from the air. These measures could include planting more trees or combining bioenergy with carbon capture and storage (BECCS).
- While these measures have the potential to reduce warming, they come with significant demands on land and energy, and limits to how much carbon dioxide they might realistically absorb. For example - using BECCS to absorb a large amount of carbon dioxide emissions [might require](#) a significant proportion of the world's arable land. Some scenarios may maintain a bigger role for fossil fuels for longer, but use potentially unrealistic levels of carbon dioxide removal later this century.
- Some scenarios, including [Chevron's](#), follow the IEA's Sustainable Development Scenario (SDS). The IEA suggests this scenario is compliant with the Paris Agreement, but others disagree. In principle it [would be possible](#) to follow the SDS to 2040 and still have a 50% chance of limiting

temperature rise in 2100 to 1.5°C, but it would require a level of carbon dioxide removal that [may be beyond](#) what is possible.

4. What assumptions does the scenario make about carbon capture and storage?

- Fitting carbon capture and storage (CCS) to power plants [could increase](#) the amount of fossil fuels that could be burnt while remaining within climate limits. CCS is central to most oil and gas scenarios - ExxonMobil's scenario assumes CCS will be used for [about](#) 20% of electricity by 2040.
- CCS will add significant costs to electricity generation. To date, efforts to use CCS in the power sector have largely failed. At least 32 coal power plants with carbon capture [have been](#) cancelled or put on hold, while only [two](#) commercial CCS power stations are currently operating.

5. Does the company consider the long-term impacts of a scenario on its business?

- Scenarios should show the long-term impact of measures to limit climate change, [including](#) the impact on a company's revenues, operating costs, supply chain, earnings and financial risk.
- TCFD [recommends](#) companies model the impact of 2°C or 1.5°C temperature limits on their business, and that company reporting is standardised to help investors assess the risks.
- Some scenarios assume sharp emission cuts, but do not show the long-term impact on the business. For example, Chevron produced a [scenario](#) showing its assets would not become stranded due to climate policy. ("Stranded" is a term for fossil fuel assets that do not recover the initial investment because of falling demand or lower prices.) But the scenario [only considered](#) a narrow definition of impact on the business, limiting its scope to proven reserves rather than all assets, and avoiding the issue of whether assets would fail to make a profit on the original investment.

6. Is the company transparent about how it carried out the modelling?

- Assumptions behind modelling in scenarios are important, for example about prices for commodities and for different forms of power generation. If a company does not publish the methodology and assumptions behind its scenario, it's hard to judge the reliability of the conclusions.
- For example, Chevron's [scenario](#) draws on an IEA scenario, but also relies on internal analysis which Chevron has not published. This [makes it difficult](#) for investors to assess how the company would be affected by different oil and gas prices.