STRATEGY

In transition

The oil and gas sector faces significant challenges to meet the Paris Agreement goal for greenhouse gas emissions reduction. The industry is adopting a variety of routes to change in accordance with stakeholder, government and regulatory edicts, environmental lobbies, and increasing consumer and investor pressure. *Brian Davis* reports.

The energy transition is not simply an academic exercise in greenwash for the oil and gas sector. Many consider the pace of change needs to accelerate, given the latest scientific reports of global warming. There is little room for laggards, and key players like Equinor recognise that: 'To thrive in the energy transition, we aim to maintain our position as an industry leader in carbon efficient oil and gas production and grow in new energy solutions,' according to Equinor's latest *Sustainability Report*.

The Norwegian oil and gas giant's strategy is based on 'value creation and making us more competitive in the long-term'. Its climate roadmap describes how the company plans to create a low carbon business advantage by reducing carbon emissions, growing new energy solutions and collaborating to increase impact.

The Paris Agreement gave much needed momentum to act on climate change, with 196 state signatories, representing over 87% of global greenhouse (GHG) emissions, ratifying or acceding to the Agreement, including China, the US and India. Five years later, however, the US is still considering withdrawal, subject to the results of the US presidential election in November 2020.

Disappointingly, talks at the COP25 conference in Madrid in 2019 were unable to reach consensus. But today there is a strong sense of urgency to finalise the Paris Agreement rulebook at COP26 in Glasgow in November 2020. By that time, all countries are being asked to submit long-term goals for carbon emissions reduction, along with agreed rules for a carbon market between countries.

In October 2018, the Intergovernmental Panel on Climate Change (IPCC) maintained that to keep global temperature rises below 1.5°C would need a reduction in net carbon emissions to zero by 2050. 'To achieve net zero will require action at national, supranational and corporate level, and quickly,' says Nadine Viel Lamare, Director of the influential Transition Pathway Initiative (TPI). 'At a national level, so far, 15 countries including the UK have agreed to aim for net zero, either by 2050 or sooner.' A number of states and cities have made similar commitments. However, for governments to follow through on this, they will soon have to pass laws and regulation forcing the private sector to slash emissions.

Increasingly, green investors are demanding commitment by companies to a more sustainable future. According to research carried out by the TPI with the Grantham Institute on Climate Change and the Environment at the London School of Economics (LSE) and the Oxford Martin School at the University of Oxford, few oil and gas companies have set a date by which they will reduce their emissions associated with core business activities to net zero by 2050.

But there are signs of progress. According to the World Economic Forum's *Net zero challenge* report produced in partnership with Boston Consulting Group (BCG), 67 countries and eight US states have a net zero carbon ambition. Finland, Denmark and Sweden feature among the best performers when it comes to supporting carbon neutrality, and have ambitions supported by an effective policy framework. However, none of the top emitters

The oil and gas sector faces significant challenges and opportunities in the energy transition

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Nadine Viel Lamare, Director, Transition Pathway Initiative (TPI)

have committed to a net zero goal and even the most committed have not enacted robust-enough policies to achieve the emission reductions required.

Finland plans to be carbon neutral by 2035. Sweden's Climate Act entered into force in January 2018, enacting a strict roadmap with a long-term target of net zero emissions by 2045. Denmark's new climate laws target carbon neutrality by 2050. New Zealand recently passed legislation to commit to the Paris Agreement and aims to achieve net zero CO_2 emissions by 2050. The new UK government under Prime Minister Boris Johnson has yet to announce specific targets for achieving net zero by 2050. In a recent statement, Minister of State for Business, Energy and Clean Growth Kwasi Kwarteng said: 'All parts of our energy system – and our economy – need to adapt if we're to reach our goal of eliminating our contribution to climate change by 2050. Our oil and gas industry is no different.'

From a company perspective, there are encouraging signs that the message is getting across.

New climate ambitions

In January 2020, Equinor announced new climate ambitions to reduce the absolute GHG emissions from its operated offshore fields and onshore plants in Norway by 40% by 2030, 70% by 2040 and near zero by 2050.

'We are launching an unprecedented set of ambitions for forceful industrial action and substantial emission reduction in Norway,' said Eldar Sætre, CEO of Equinor. Nevertheless, he emphasised that the operated fields and plants will continue to create significant value with potential to generate more than NKr3,000bn ($339bn) in income for the Norwegian State towards 2030. 'Equinor plans investments of about NKr50bn [$6bn] together with partners by 2030 to cut emissions,' he said.

Large-scale industrial measures will include improvements to energy efficiency, digitalisation and several electrification projects at key fields and plants, including the Troll, Sleipner, Gudrun and Oseberg offshore fields, and the Hammerfest LNG plant.

Like other major oil and gas company initiatives, Equinor's actions are inspired by the United Nation's Sustainable Development Goals. But it's not simply altruism. Sætre maintains: 'Our aim is to create a low carbon business advantage, being at the forefront of the energy transition as a carbon efficient oil and gas producer, driving innovation and technology development.'

Safety and managing environmental impact is a priority. And management of sustainability and climate-related risk is embedded in its enterprise risk management process. Equinor expects about 15–20% of its investments will be directed towards new energy solutions 'assuming we can access and mature profitable projects', according to Sætre. Up to 25% of research funds will be directed towards new energy solutions during this period (to 2030).

Equinor is also developing offshore wind farms, including Hywind Scotland, the world's first floating windfarm, providing renewable energy to 750,000 UK households. The company is also exploring solar power opportunities in Brazil and Argentina.

The company pioneered work on carbon capture and storage (CCS) at the Mongstad technology centre in Norway. Together with Shell and Total, Equinor is carrying out studies to develop full-scale CCS in Norway under the Northern Lights project. Equinor also contributed to Northern Gas Networks H21 North of England report, looking at conversion of 3.7mn homes and 40,000 businesses currently heated by natural gas to hydrogen by 2034.

Methane emission reduction is also a priority. The new Johan Sverdrup platform is claimed to be the most environmentally friendly offshore platform in operation today. Flaring intensity is generally around 0.2% for Equinor, compared with an industry average of 1.2%. The company is also investing in protection of tropical forest as a natural carbon sink.

More diversified business model

French oil major Total has the ambition to become 'the responsible energy major', says Mathieu Soulas, Senior Vice President Strategy and Climate, at Total. 'To do that we are integrating the climate challenge into our strategy and operations. This is not just an environmental challenge, it impacts business and strategy as well.'

He admits: 'There are risks ahead because climate change calls for a more diversified business model, but it is also a fantastic source of opportunity.'

Total's energy transition initiatives are guided by four strategic areas of focus:

- *Natural gas:* To expand its presence across the entire natural gas chain, reducing methane emissions and making LNG production more energy efficient.
- *Petroleum products:* To 'avoid expensive oil', reduce emissions at facilities and promote sparing use of oil and sustainable biofuels.
- *Low-carbon electricity:* To expand operations in the non-regulated portion of the value chain (ie excluding power transmission), using renewable power generation and natural gas sales to end customers and energy storage (ie batteries and hydrogen).
- *Carbon neutrality:* Developing businesses that will help achieve carbon neutrality through the provision of energy efficiency services to customers, investment in natural carbon sinks and carbon capture, use and storage (CCUS).

As part of its new transition, Total is investing $1.5–2bn annually in low carbon electricity. Soulas maintains: 'This figure is unmatched by any other major.' He suggests the cumulative impact of this scale of investment is inherently more lasting than that of an oil or gas project. Low carbon electricity projects could account for 15–20% of Total's energy mix by 2040; and its Gas, Renewables and Power branch currently has 12,000 dedicated employees.

Research and development (R&D) is also paramount. Total allocates over a third of its annual R&D budget to low carbon technology, including gas and LNG technology, solar and wind power, hybrid energy management systems, battery technology, CCUS, biofuels and biopolymers, and recycling. R&D also prioritises digital technologies, safety, operating efficiency and new businesses and products, including smart power grids and the development of multi-purpose materials and new fluids for electric and hybrid vehicles.

In February 2019, Total set a goal to reduce GHG emissions at its operated oil and gas facilities from 46mn tonnes CO_2 equivalent to less than 40mn tCO_2 eq in 2025, including compensating for new projects that will be started in the interim.

The need for a global price for carbon is seen as a key priority, in order to encourage emissions reduction and costly low carbon

Decarbonisation impacts every part of the global oil and gas value chain
Photo: Oleksiy Mark/Shutterstock

technology initiatives like CCUS, heavy industry applications, and new developments for sea and air transport. 'For more than a decade, Total has been calling for the adoption of a global price on carbon. We advocate balanced, phased-in international agreement that does not distort industrial or regional markets. We encourage the adoption of a global price per tonne of carbon emitted that also ensures fair treatment for sectors subject to carbon leakage,' says Soulas.

Total also considers that CCUS technologies are vital to achieving carbon neutrality in the second half of the century. 'It opens the door to low carbon electricity from natural gas and could thereby help to offset the inherently intermittent nature of renewable energy,' Soulas remarks. About 10% of Total's R&D budget is devoted to CCUS technology in a bid to help develop the first industrial hubs for commercial CCUS.

The company also recognises the importance of natural carbon sinks as a means of capturing CO_2. In June 2019, it created a new Nature-based Solutions business unit, with a budget of $100mn/y to fund, develop and manage operations for sequestering carbon or preventing carbon emissions.

In fact, Total no longer sees itself as a petroleum company. 'We are an energy company and will still be one in 2040, by which time our sales mix – depending on consumer behaviour – could be 45–55% natural gas, 30–40% oil (including biofuels) and 15–20% low carbon electricity,' says Soulas.

Energy in conversation

For a thought-provoking commentary on the energy transition, readers are recommended to listen to the latest EI 'Energy in Conversation' podcast (Episode 5) where EI CEO Louise Kingham discusses the issue with Maarten Wetselaar, Integrated Gas and New Energies Director of Shell, and Bob Ward, Policy and Communications Director at the LSE's Grantham Research Institute on Climate Change and the Environment; and discussion with ex-EI Chair Malcolm Brinded in Episode 6, which are due out this month at **www.energy-inst.org/podcast**

'We have a very small margin of opportunity if we aim for 1.5°C,' remarks Ward. 'We will need to limit CO_2 emissions to zero by 2050 and all other GHGs by 2070 and for a significant part of the second half of the century we need to have negative emissions... It is very difficult to see oil and gas companies continuing on beyond the middle of the century as they currently are. There simply won't be demand for the products. Oil in particular has no real future because you can't really find the technological solution to reduce emissions for land-based transport where oil is used at the moment. However, gas might continue as a source of power for generating hydrogen or other forms of transport energy. It could continue with CCS. So, oil and gas companies will have to envisage a future where they are not based on the same business model as they are now.'

Shell's Wetselaar makes the point that: 'There is no way we can meet the Paris targets if we simply scale up the system as we know it today. The oil and gas companies will really need to become energy companies. By the middle of the century, the largest way that energy will be met will be clean electricity – with up to maybe 60% electrification of the total world energy system. So, if large oil and gas companies want to continue to be relevant, they will need to be part of that solution and they don't play in a material way in that sector yet.'

High ambitions

Shell has set itself targets for the near-term and ambitions for the longer term to reduce its net carbon intensity of the energy products it sells by 50% in line with the Paris Agreement, and is actively pursuing low carbon business models to reach them. 'The alternative is for oil and gas companies to become very niche players,' says Westelaar. He recognises: 'There will certainly be a need for oil by 2050, as there are segments of energy consumption that are very hard to decarbonise, and there is a definite role for CCS.'

It's a high ambition and EI Chief Executive Kingham emphasises: 'European oil and gas companies spent only 1% of their annual budgets [on average] on clean energy in 2018.' This figure is even lower for US and Asian operations. So the important question is: 'How can leaders from industry bridge this gap?'

Shell CEO Ben van Beurden considers that the advances the EU has made with its Emissions Trading System (and the promise of the New Green Deal) are very encouraging. 'But the world needs greater international cooperation. And the progress made to establish a global emissions trading system, as described by Article 6 of the Paris Agreement, has simply not been enough,' he notes.

Shell sees a few ways to make progress. First, improve energy

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>
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Louise Kingham, Chief Executive, Energy Institute

efficiency. Second, turn to lower carbon energy products. Third, offset or store emissions that can't be avoided using CCUS. And last, but not least, the world must address consumption patterns.

To tackle climate change, the energy major is accelerating investment in a low carbon future but clearly recognises the need for continued investment in oil and gas. Van Beurden believes that investment in low carbon initiatives must be on a vast scale. 'But the world will only achieve a sustainable future if the investments made are sustainable themselves, with sustainable business models leading to attractive returns,' he remarks.

Shell launched its New Energies initiative in 2016 and has invested $1.6bn in power and new fuels. It acquired First Utility in the UK, which was rebranded Shell Energy, and acquired retailers like MP2 in the US. Shell explored the joint acquisition of Eneco, a Dutch sustainable energy provider, but was beaten to the post by a Mitsubishi-led consortium. Shell also invested in sonnen, a leader in smart battery storage, and jointly in Ionity, which provides electric charging along major European highways, as well as acquiring New Motion and Greenlots for electric vehicle (EV) charging in Europe and the US.

Shell has onshore wind power generation operations and is expanding through Borselle in the Netherlands, and has secured acreage in the US. On the solar side, the company has acquired an interest in Silicon Ranch in the US and Cleantech Solar in Asia.

Investment in power cash capex is forecast to average $2–3bn/y from 2021–2025, with the aim of making the power business self-funding by 2030. The anticipated return on investment of the integrated power business will be in the 8–12% range, according to a Shell analyst meeting held last June. 'Our aim is to grow a profitable, low carbon business. And we are determined to be a leader in that process,' said Westelaar at the time.

Shell's ambition is to reduce the net carbon footprint of the energy products it sells by around 20% by 2035 and about 50% by 2050. The net carbon footprint ambition calls for a greater role for gas, replacing higher-carbon fuels while lowering GHG emissions by 45–55%. Shell's LNG Canada project was sanctioned in 2018 and is designed to achieve the lowest carbon intensity of any LNG project worldwide.

The company has also set a target to maintain methane emissions in operated assets below 0.2% by 2025, and leads a growing coalition – The Oil and Gas Methane Partnership, a global voluntary methane reduction programme under the Climate Clean Air Coalition. Shell is also one of the world's largest blenders and distributors of biofuels through its Raízen joint venture in Brazil; and also has hydrogen initiatives in its portfolio.

Global energy demand is growing. And the energy transition means working closely with society. Under its 'Sky' scenario, Shell believes the transition pathway will be 'possible, but challenging' to achieve the goals of the Paris Agreement. It recognises that deep electrification is required and most of the growth in power generation will come from renewables. Significant clean power investments will be needed over the next decades. Hopefully, with strong governmental support worldwide for the energy transition. ●

Part 2 of this energy transition article will be published in the March 2020 issue of *Petroleum Review*, with insight to strategies by other industry players including BP, ADNOC and Repsol.