Crucial industry challenges

- Rapidly rising demand for oil and gas
- Supply constraints
- Political uncertainty
- The impact of action on global warming

Pressure points

John W McDonald, vice-president, strategic planning, at the Chevron Corporation believes the stakes are high for the oil and gas industry, as it comes to grips with an unprecedented number of difficult challenges.

We're at a unique point in the oil and gas industry. Chevron chairman and CEO Dave O'Reilly has called it a 'new energy equation'. By that, he means that we are facing a number of new challenges: rapidly rising demand (especially from emerging giants such as China and India), constrained supplies, an uncertain geopolitical environment and shifting societal attitudes about the environmental impact of energy.

Each of these challenges, taken alone, may not be entirely new. But I can't recall a time when we have seen challenges of this magnitude all converging on the industry at the same time. Three fundamental challenges will shape our industry over the next decade. These are challenges that affect all of us, independent and international oil companies (IOCs) alike – as well as suppliers.

The access challenge

IOCs control roughly 6% of the world's proven reserves. The vast majority of reserves are controlled by sovereign states and their national oil companies (NOCs). The two big players, by a wide margin, are Saudi Arabia and Iran. The next group of large owners, in the 100–160 billion-barrel range, are Qatar, the United Arab Emirates, Iraq, Russia, Kuwait and Venezuela.

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It isn't until you get to the 20–25 billion barrel range that we encounter the IOCs: ExxonMobil, Lukoil, BP, Chevron, Shell, Total, ConocoPhillips and ENI. The implications of this are obvious. Access to oil and gas reserves is not a given, particularly as we are encountering a new wave of resource nationalism in some large producing countries and entrenched barriers in resource countries such as Mexico, where the constitution continues to prohibit foreign investment in the oil sector. Chevron, of course, is proud of the partnerships it has with several major producing countries, such as Saudi Arabia, Nigeria, Angola, Indonesia and others. And producing countries such as Libya and Qatar are showing continued interest in foreign upstream investment. But there is clearly a higher barrier to access in the major producing countries, and fewer and more qualified investment opportunities. Access barriers aren't just limited to NOCs. We also see it in the US. While exploration and production (E&P) continues to be robust in the western Gulf of Mexico, discussion of E&P in 85% of the Outer Continental Shelf (OCS) in the US continues to be a politically awkward subject. Chevron has been trying to move the political discussion about domestic resources to be more open and fact-based. The company believes a case can be made for selective access to promising OCS areas. Because most OCS resource data are decades old, Chevron has suggested that the government conduct a targeted 2D seismic survey of prospective areas in the OCS to get contemporary data on the resource potential. Based on that data, the company believes it could have a more productive and informed discussion about access to US resources.

The Jack project Chevron worked on with Devon, Schlumberger and other partners is a case in point. When the private sector is allowed to collaborate and invest in a promising resource basin, good things happen. We find the resource and develop ways to produce it economically and responsibly. And global energy markets are better for it.

Rising costs

The second challenge the industry faces is the rising cost of doing business. A primary driver of higher costs is the sustained global economic boom we have experienced over the past five years. As the economy expands, so, generally, do commodity prices. The cost of raw materials, equipment, drill ships, fabrication yards, even talent, are all up. Project costs are up 64% on average in the upstream sector, just over the past 30 months. The same general trend is also true in downstream, shipping, LNG facilities, pretty much across the value chain. The implications here are also very clear. Investment decisions are never easy, but they are even more complex today.

Is this the right time to invest? When does the cost of capital make a project uneconomic? Should you wait for the global economy to cool off and prices to soften before making an investment? Capital stewardship becomes much more challenging in the kind of environment we are in today. For example, major IOCs and independents are expected to account for over 50% (38% and 15%, respectively) of the expected cumulative investment of $3.5 trillion in the oil and gas industry from 2000 to 2010. And both IOCs

and independents are expected to have more than doubled their investments in oil and gas during the decade 2000 to 2010. Chevron is bullish on capital investment right now. The company will deploy almost $20 billion in capital expenditures this year worldwide, almost three-quarters of which will be for upstream projects. Chevron is committing this level of capital because it has the opportunities to do so – a robust queue of capital projects that will significantly contribute to the company's production volumes. These are investments with long time horizons, so Chevron has conducted very thorough due diligence and it is confident in the returns it will get over the long term.

Climate change

A third challenge that we will all face, either directly or indirectly, is a growing worldwide consensus about the need to manage climate change. If we plot a top line on a graph showing the projected growth of carbon emissions under a business-as-usual scenario and a bottom line representing a flat-path scenario in which carbon releases are stabilised, the difference between the two curves is about seven billion tons of carbon.

Fossil fuels are a source of carbon, and reducing carbon emissions by 7 billion tons a year is the equivalent to reducing oil consumption by some 140mb/d of oil a day. So until we reach some consensus about how the world is going to manage its carbon output, the gap between these two lines represents a lot of uncertainty and potential risk for the oil industry. If, for example, political policy in the developed world takes the form of mandates to significantly increase production of renewable fuels, what does that mean for our business? How would it affect investment decisions, either in upstream or downstream?

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We are already starting to grapple with these questions in California, which is in the process of implementing some major new low-carbon regulations. Will we be facing new tax schemes intended to reduce emissions and force low-carbon alternatives into the marketplace, or will we develop true market-based solutions? No one knows right now, but we can be certain that whatever the outcomes, they will have an impact on our business.

Chevron believes that the best way to address climate change policies is through national frameworks that stress global engagement, transparency, efficiency, accelerated technology and other fundamental market-oriented principles. The company also believes that the global economy can't make a wholesale shift to non-carbon energy sources. Sustained economic growth means that we will require all the energy we can develop, a portfolio of energy, if you will, of conventional, unconventional and next-generation sources. There are other challenges facing our industry, of course, but these three – access, rising costs and the environment – are the dominant ones.

Oil and gas recovery – latest research effort

Don Paul, Chevron

Chevron has announced it has formed a research alliance with The University of Texas at Austin to develop new technologies to increase the amount of oil recovered from mature and challenging reservoirs. Under the alliance, Chevron Energy Technology Company, a Chevron subsidiary, will provide up to $5 million over the next five years to The University of Texas at Austin's Center for Petroleum and Geosystems Engineering.

The joint research initiative will focus on non-thermal enhanced oil recovery (EOR) technologies, including surfactants and polymers that target oil trapped and bypassed by conventional recovery methods, and numerical models that accurately simulate enhanced oil recovery processes.

'Conventional production methods have typically recovered about one-third of the oil in place from light oil reservoirs, so applying advanced technologies to increase recovery factors can be an important source of reserve and production growth from existing fields,' said Don Paul, vice-president and chief technology officer, Chevron Corporation. 'This alliance will bring together Chevron's historical leadership in EOR and the world-class petroleum research capabilities of The University of Texas to create the next generation of enhanced recovery technologies and open up new opportunities to add reserves and production.'

Dr Larry W Lake, chairman of the department of petroleum and geosystems engineering in the university's college of engineering, said: 'Most oil in existing fields cannot be recovered using conventional technology, yet the volume of this oil is greater than all the conventional oil reserves known to exist globally.'

Dr Gary A Pope, director of the Centre for Petroleum and Geosystems Engineering, which has the leading national academic research programme on enhanced oil recovery, said: 'This funding will allow the centre to greatly expand its oil recovery research and play an important role in helping to meet global energy needs.' Dr Jairam Kamath, Chevron team leader of well performance and recovery mechanisms, said that, through the alliance, Chevron is providing the university with long-term research and development funding, increasing its access to economically important challenges and expanding the US's future workforce.

Chevron is one of the world's leading integrated energy companies. The company has about 56,000 employees, and Chevron's subsidiaries conduct business in more than 180 countries. Chevron operates across the entire energy spectrum: exploring for, producing and transporting crude oil and natural gas; refining, marketing and distributing fuels and other energy products and services; generating power; designing and marketing large-scale energy efficiency solutions; and commercialising the energy resources of the future, including biofuels and other renewables.

Seeking solutions

So what are the appropriate responses on our part to these issues? On the issue of access, we need to make the case that the US – indeed, the world – needs all the energy it can develop, including US energy sources such as oil, gas and coal, renewed investment in nuclear and the sensible, economic development of alternatives and

renewables. Alternatives are important, but we have to put them in perspective and educate the public and policymakers about their practical limitations, as well as their potential. For example, Chevron is a major investor in a biodiesel plant that has just come on line in Galveston, Texas. At its peak, the plant will produce about 100 million gallons of soybean-based diesel fuel each year – that's about the same amount of transportation fuel that Chevron's Pascagoula refinery produces in a little over a week and a half.

Biofuels will play an increasingly important role in the transportation fuel portfolio. But conventional hydrocarbons will continue to be the leading source of fuels for decades to come, because they are so economic and efficient, and because of the enormous investment that has already been made in the infrastructure needed to refine, transport and market these fuels. In the near term, one of the biggest steps we can take towards energy security would be wider access to US oil and gas supplies, as well as access to oil and gas in producing countries. The industry can help make that happen by continuing to demonstrate technological leadership – exploring and producing oil and gas safely, efficiently and responsibly.

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Doing so can help remove a major psychological barrier to federal and state government sanctions to expand acreage in the Gulf and in promising areas of the OCS: the lingering perception that oil and gas production is damaging to the environment. As we know, it is not oil production per se that is damaging, but the way production is carried out. Fortunately the technology we have in hand today, and which continues to develop, has reduced our environmental impact tremendously. By way of example, since 2003, Chevron's shipping fleet has transported more than 650 million barrels of oil and petroleum products worldwide.

In that time, less than 25 gallons have been spilled. When hurricanes Rita and Katrina ripped through the Gulf of Mexico two years ago, they caused major damage to drilling platforms. But due to advanced technology such as subsurface shutoff systems, there were no major offshore oil spills. When Chevron and its partners drilled the Jack well test in the Gulf, it set a half-dozen records for pressure, depth and duration in deepwater. And it did so without a single environmental or operating failure. The oil industry has greatly elevated its ability to recover resources without adverse environmental impacts, due to continual advancements in technology. And demonstrating technological leadership and innovation also creates a powerful value proposition for potential business partners. At the same time, it is incumbent on the US Government to create the right kind of investment climate to maintain adequate production of oil and gas, in the US and abroad. Several political proposals now under consideration would do the opposite. Windfall profit taxes, unrealistic mandates to increase ethanol production and other measures would discourage investments all along the energy value chain. Chevron is working with Capitol Hill – individually and with the American Petroleum Institute – to raise the issue of access to create pragmatic solutions. At the same time, it is fighting legislation it regards as punitive and politically driven to protect its franchise and its ability to deliver affordable, reliable energy supplies to the marketplace on an economic basis.

Emissions targets

Finally, let me offer some thoughts on the issue of climate change. It's an issue that has the potential to affect everyone in the oil and gas industry, regardless of size. The science on climate change is still developing. But to a great extent, popular opinion and political sentiment is pretty much set on the need to take action to mitigate human activities that create harmful carbon emissions. Chevron's home state of California has exported a lot of things to the rest of the country – fashion, technology, entertainment. If California's climate change regulations follow the same path, we may be in for some disruptive change. California recently passed a comprehensive global warming bill, AB 32, that will require greenhouse gas emissions in California to be rolled back to 1990 levels by the year 2020. To reach that goal, the state is authorised to adopt market-based compliance mechanisms, such as cap and trade, or to execute specific mandates, such as a 10% reduction in the carbon content of all passenger vehicle fuel sold in the state.

The potential impact of these regulations on the oil business is significant. Chevron is working closely with the governor and his administration to make sure this legislation is implemented in a rational, cost-effective and equitable way. IT is also attempting to shape ongoing political discussions about climate change to ensure we take a rational path forward that balances economic and environmental needs. I've outlined several significant challenges facing our industry. While they can seem overwhelming, I'm always encouraged when I look back on our history and realise that no matter how big the challenge was, our industry has not just endured; we have prevailed. So despite all the challenges, I'm optimistic about the future and confident that, with the right policies in place, our industry has the capability to provide affordable energy to a world that needs it, and to do so safely and reliably.

This article is adapted from a speech given by John W McDonald at the Independent Petroleum Association of America on 12 June 2007.

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