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The Changing Global Energy Landscape – prospects for Arctic oil and gas

Introduction

Good afternoon ladies and gentlemen and thank you for inviting me to join this seminar today.

The title of this session is 'The changing global energy landscape – prospects for Arctic oil and gas' and I would like to give due weight to both aspects of this topic.

The changing landscape at the global level provides the context for the oil and gas industry in the Arctic. I think it is therefore important to understand that context and how the changes taking place globally may affect the pace and nature of activity in the Arctic itself.

In my remarks, I want to look at the Arctic first in the broad context of the future of energy globally, and then in the somewhat narrower context of future options for exploration, before turning to the industry's record and prospects in the Arctic region.

The future of energy

Let me begin with the future of energy and the characteristics we want it to have. I would suggest we look for three qualities in our energy:

Firstly, sufficiency – is there enough energy to meet demand affordably;

Secondly, security – assurance over the provenance of future energy supplies;

And thirdly, sustainability – or compatibility with the health of the environment.

It is important to hold these three priorities in balance. Coming from India, I have a particular interest in the question of sufficiency. It is easy to take this for granted in the OECD world, but in the emerging countries, hundreds of millions are benefiting from energy in multiple ways – irrigation of fields, lighting for schools, transport to work and new job opportunities. For many in today's world, the end of energy poverty is the beginning of economic liberty.

I always think it is important to remember that the numbers we use in our planning are effectively aggregations of millions of human experiences.

But to turn to those numbers.

In BP, we calculate that demand for energy is likely to increase by around 1.5% on average each year – or around 30% in total – between now and 2030. That is

tantamount to adding two more United States' worth of energy consumption to the global total – except in the future, almost all of the growth will come from the emerging economies of the non-OECD world.

In terms of oil specifically, we expect to see demand driven by the expansion of the global vehicle fleet, offset by progress in creating more efficient vehicles. The net effect of these forces will, we believe, be an increase in demand for oil of around 0.8% per annum. That may not sound a lot but in fact it means that the world will need an additional 16 million barrels of oil per day in 2030. This is more than the current daily production of Saudi Arabia.

Until recently, one of the major debates in the energy sector was whether sufficient energy resources existed to meet such levels of demand – the so-called "peak oil" debate. However, in the last few years it has become clear that sources of supply are burgeoning.

More and more discoveries are being made in deep water. The Canadian and Venezuelan oil sands are looking capable of development with appropriate incentives and regulation.

And, of course, the revolution in shale oil and gas has transformed the American landscape. Last year, US gas production increased 5% - and US production of oil rose by 14%, the highest rise worldwide and the highest in US history.

This increase in US production was also partially driven by another phenomenon, which is the rapid development of techniques for extending the life of mature fields.

For example, BP operates a giant oil and gas field at Prudhoe Bay, around 400 kilometres inside the Arctic Circle – North America's largest oil field. When Prudhoe Bay started up in the 1970s, it was expected to produce around 9.6 billion barrels of the 22 billion barrels that were known to lie beneath its surface. And that would have been a good recovery rate – over 40% compared to an industry average of around 35%. In fact, thanks to techniques such as waterflooding, miscible gas injection and others, Prudhoe Bay is now well past its 12 billionth barrel.

The potential of the Arctic needs to be seen against the wider perspective of these other sources. The International Energy Agency estimates that enhanced oil recovery activity such as we have seen at Prudhoe Bay could release some 300 billion barrels of oil. By comparison, it is believed that the Arctic contains around 90 billion barrels of oil, less than the current proved reserves of Kuwait.

This is not to say the industry will not explore the Arctic, simply that it will only be one part of the mix and there may be shifts in priorities as different approaches prove to have different advantages.

Such developments have eased concerns over energy security as countries have increased their domestic supplies and built robust transnational links to access growing supplies elsewhere.

The most high profile of these concerns for many years was America's dependence on oil imported from the Middle East. In 2006, the US Government's forecasts suggested the country would need to import around 5 billion barrels of oil in 2010. But in fact, as a result of shale, plus the state of the economy and improvements in energy efficiency, it only imported 3 billion barrels.

The shale story has many angles. Not only has it driven down energy prices, it has helped to create thousands of jobs, restore growth and indeed reduce carbon dioxide emissions.

The availability of large volumes of gas has driven down gas prices and prompted many American power generators to switch from coal to gas as their preferred feedstock.
Combined with increasing energy efficiency in vehicles, industry and the residential sector, this has brought the US's CO2 emissions back down to pre-1995 levels.

Meanwhile, in Europe, gas prices remained around twice as high than those in the US last year. As a result, coal consumption and CO2 emissions went up for the first time in many years in the UK, Germany and several other major European countries.

What do we take from this experience?

Our conclusion is simply that market forces are the most powerful lever to drive innovation and cut carbon emissions. In both the case of energy efficiency and gas-for-coal substitution, the lower carbon option has also been the lower cost option. Renewables, by contrast, have required government support to be competitive and that has limited their deployment – and arguably the pace of their development.

Looking ahead, our view is that energy efficiency and gas for coal provide the most powerful potential routes to limit carbon in the short to medium term. Meanwhile, temporary support for renewables should continue in order to help them towards competitiveness longer term.

The goal in terms of sustainability needs to be a future energy mix that exhibits efficient consumption and the right blend of constituents in terms of fossil and non-fossil fuels to produce sufficient energy with an acceptable level of emissions.

The future of exploration
Having looked at the Arctic in the broad context of energy, let me narrow the focus and look at this topic in the particular context of exploration.

For the next few years at least, our industry's activity in the Arctic – other than established fields - will be largely confined to exploration and this raises the question of where the Arctic is positioned within the industry's global exploration priorities.

To look at the big picture, over its 100 year history, the oil industry has discovered some 4.5 trillion barrels of oil and gas. Around one trillion has been consumed and a

further 1.6 trillion – enough for around 50 years of consumption at today's levels - now sits in what we call proved reserves. These are reserves that we have reasonable certainty of recovering. That leaves roughly two trillion barrels that we cannot be certain of recovering. And on top of the 4.5 trillion barrels, we estimate there is roughly a further trillion barrels that is yet to find.

Those trillion barrels lie largely in three categories of basin – deepwater, onshore and the Arctic. It is difficult to estimate the possible volumes – but as mentioned earlier the US Geological Survey estimates that the Arctic might contain nearly 90 billion barrels of oil, so about a tenth of that total.
It could also contain as much as 300 billion barrels of oil equivalent in natural gas – 1670 trillion cubic feet – but gas is less transportable than oil which probably means that oil will remain the major focus for the near term.

The major focus of the exploration world at the moment remains non-Arctic deepwater. Explorers have been probing deepwater for around 40 years and there are many more opportunities to investigate. How long the deepwater phase will continue is subject to a number of variables that include geological, technological and commercial factors. It is important to note that the seismic technology used to find new fields at depths of 10 miles or more is improving all the time. Discoveries are being made at greater depths and pressures.

BP and partners are developing equipment to enable us to go beyond today's technical limit of 15,000 pounds per square inch and up to 20,000, with risk management being the top priority in that process.

Onshore, we see a similar story – new technology creating new opportunities. Some of these are unexplored areas where exploration has been hindered by environmental, security or political factors, such as the Congo Basin in Africa.

Others are opportunities to go – as we put it – where man has gone before. Take the US shale basins as an example. If you look at the wells drilled somewhere such as East Texas, the vast majority extend no further than 14,000 feet. Yet the Jurassic source rock lies up to 30,000 feet below the surface. So there is potentially a vast unexplored volume of rock between the source and the reservoir – and what is more, the cost of onshore seismic surveys is falling all the time.

I think you will understand the overall message.

The Arctic is not the only option. Much depends on economic, technological and political factors – but the relative attractions of these different categories shift all the time.

The future of the Arctic
However, the Arctic will certainly be the focus of a good deal of attention and therefore I want to finish by looking at the way the industry is approaching the situation.

The way in which the Arctic is developing is no different to the way the industry as a whole has developed. Onshore exploration and production is followed by tentative steps offshore and then by bolder moves into deeper water.

In the Arctic today, many companies have long-standing onshore operations. Leases have been awarded for offshore exploration and some operators are starting to take those first steps into the ocean.

I should add that for BP's part, our interests in the offshore Arctic are mainly by way of investments rather than operations. We do, of course, have a long history of operating in Alaska.
We have a shareholding of nearly 20% in Rosneft which has joint venture activity with other companies in the Arctic. We have interests in a number of exploration blocks in the Canadian Beaufort Sea, some of them owned in a joint venture operated by Imperial. We also have some unexplored acreage in the Norwegian Barents Sea.

And from our perspective, there are really just two key points to make.

First, the industry has a long history of existing Arctic oil and gas operations – mainly onshore - which give some basis for reassurance – though it is recognised that the offshore brings new challenges.

Second, the industry is proceeding with enormous care in approaching the challenges of future exploration, which I would identify as safety and the environment, engineering and the interests of local communities.

In terms of our existing footprint, I have already mentioned BP's Prudhoe Bay complex, which is part of the Alaskan North Slope province where we operate several other fields. It is a spectacular landscape and over the years we have learned how to minimise our footprint on this corner of the world.

For example, instead of drilling multiple wells from different places, we use central well pads from which we drill many wells using the technique of extended reach directional drilling.

A related development is Northstar, an artificial island in the Beaufort Sea from which 15 producing wells have been drilled along with 6 that inject gas to maintain pressure – one of the enhanced oil recovery techniques I mentioned earlier. Northstar has achieved 11 years of safe production.

We have also sought to demonstrate responsibility in our early steps offshore. For example, in 2009 we acquired the industry's highest latitude 3D seismic survey 180 kilometres offshore Canada, just along the edge of the migrating ice cap.

We used an ultramodern vessel that was able to acquire the maximum amount of data in the shortest timeframe. This was necessary as we had to respond to

constant satellite data feeds predicting ice movement.

The underlying point here is that the industry already has a significant footprint in the Arctic-Littoral environment; and has already stepped offshore in exploration. In doing this we have made a responsible start; but clearly there is a long journey of learning ahead.

The challenges are created by the environment. There is single year ice in some places, multi-year ice in others. Darkness prevails for much of the year. Temperatures drop to 50 degrees below freezing.

In terms of safety, our top priority is to prevent an accident or a spill - but we also have to demonstrate that we have understood and addressed the potential impact of one occurring. And in the Arctic this clearly involves addressing the distinctive risks presented by the possibility of a spill occuring under ice or in broken ice. The industry recognises that we need to invest in new capability and technology to tackle these challenges.

This is why there is so much work taking place in joint industry programmes – or 'JIPs' – many of them concerned specifically with oil spill response. These include the Alaska Clean Seas (ACS) and the Norwegian Clean Seas Association for Operating Companies (NOFO). These are spill response organisations with equipment such as barges, skimmers, boom, and heavy equipment, as well as trained personnel.

In order to help develop even more effective technology, we have also joined the JIP on Arctic Oil Spill Response Technology, led by the International Association of Oil & Gas Producers. This is the largest industry R&D programme of its kind.

While prevention and response are the leading priorities, work is also in train on the engineering challenges. Scientific vessels such as seismic survey ships that venture into the ice typically need to be escorted and protected by ice breakers and use sophisticated systems to overcome interference from that process and from the ice itself.

Such challenges mean that the oil and gas industry will not undertake Arctic exploration lightly.

Conclusion

Let me conclude by widening the lens once again, this time not to look at the energy industry but at society as whole.

And from society, our industry faces mixed messages. While some raise legitimate concerns over Arctic development, the global community as a whole continues to demand more energy and the continuation of progress centred on heat, light and mobility. And for the foreseeable future, the energy mix that delivers that progress is set to be grounded in oil and gas, requiring the energy industry to maximise existing sources of production and discover new ones, such as those of the Arctic.

It is also true that the Arctic is special. It presents challenges for safety and engineering. It has unique biodiversity.

However, deepwater activity and deeper onshore exploration have their challenges too. And it may be that the Arctic will represent a material option to provide the oil we need to run our economies in the future. Our industry understands that a unique challenge demands a unique response. Every step we take will be scrutinised. That is why we are proceeding with great care.

The Arctic represents as great a challenge as any geological or engineering task – but I am confident that our industry can step up to it, and earn a licence to operate, not only from Governments, but from society at large.

Overcoming such challenges is in the nature of our business. It is a business based upon finding solutions to complex problems.

Winston Churchill said: "A pessimist sees the difficulty in every opportunity; an optimist sees the opportunity in every difficulty."

And when it comes to our industry's capacity to overcome difficulties and supply the energy that the world needs for its growth and development, whether from the Arctic or elsewhere, I am very much an optimist.

Thank you