Peak oil conference in Cork, Ireland

Sleepwalking into a problem

By Rembrandt Koppelaar

'The debate on peak oil is over, the peakists have won… We are facing and have already started going through a substantial transition as we move from our reliance on oil. This transition will reflect the fact that we can no longer depend on crude oil production — something which has fuelled economic growth for centuries.' Thus spoke former US energy secretary James Schlesinger to a 400 strong audience in the city hall of Cork, Ireland.

It is September 17, and it is the first day of the sixth annual conference of the Association for the Study of Peak Oil & Gas (ASPO), where experts from all over the world have gathered to discuss energy trends and the implications this has on the world's future. What Schlesinger meant to say is that more and more people from both inside and outside the oil industry are agreeing that it will be impossible to meet future oil demand and that a period of sustained high oil prices is upon us. He pointed out that even the conservative United States National Petroleum Council, a group of 150 executives from the oil industry, for the first time since its institution is now bringing a message that conventional oil production will start to decline by 2020, and that the world needs to develop policies for oil conservation and implement renewable energy strategies.

Schlesinger's opening address posed two questions that were discussed intensely in the following two days. One, is the oil situation really that dire? Two, if so, how can the challenge of diminishing oil supply be met?

Big challenge

Two years ago, the world was startled by the message from the International Energy Agency (IEA) that the expected demand for energy would grow by 50% in the coming decades. This development in demand was addressed by Herman Franssen, former Chief Economist of the International Energy Agency.

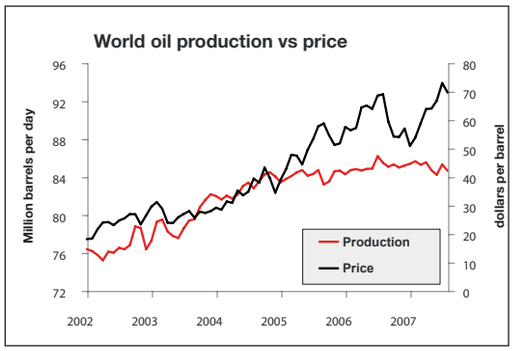
Franssen remarked that the IEA figures imply that the world needs to increase its present total oil production of 85 million barrels per day to 120 million barrels per day by 2030. The oil industry in general refers to this as "the big challenge ahead"; some have called it an impossibility.

Why is this such a challenge? There are three reasons. First, less and less oil is being found each year. Second, as the large established oil fields near the end of their lifetimes, the amount of oil supply that needs to be replaced increases. The decline rate of current production is estimated by the industry at 4.5%, which amounts to 4 million barrels per day that need to be put on-stream each year just to keep production steady. The oil industry seems to have great difficulties in doing this, given that world production has already been nearly flat for two and a half years in the face of continued demand growth. Third, western oil companies have limited access to the remaining conventional and unconventional oil plays as a result of resource nationalisation.

The potential from the oil patch to meet demand was addressed by Ray Leonard, Vice-President of Kuwait Energy Company and Mike Rodgers, Partner of consultants PFC Energy. Their message was that we are slowly headed for a time when oil production will be at a maximum capacity of around 95 to 100 million barrels per day. This will take place in the middle of the coming decade. Capacity will remain there for up to a decade and then head down.

The implication of this is: a sustained high oil price environment, indeed, much higher than today. Leonard presented to the audience the outcome of the Hedberg conference held in the USA last November. He had been invited there with 75 other participants because of his expertise on Former Soviet Union oil & gas reserves which he had acquired from his time spent running the exploration department of Yukos. The goal of the Hedberg conference, organised by the American Association of Petroleum Geologists (AAPG), was to gather the leading experts in oil reserves, who were to collectively reach conclusions on how much extractable oil is remaining and what potential there is for future production increases. To allow all participants, who included representatives from Opec, governments and oil companies including BP, Shell and Total, to speak freely, the conference was closed to the press. It was further agreed that only the general message and no specific details would be spread beyond the conference rooms.

The general industry consensus arising from Hedberg was that the decline in oil discovery that began in the 1960s will continue. Around 250 billion barrels of oil are yet to be found, spread out over several decades. This consensus was in stark contrast to the expected reversal of the declining discovery trend found by the United States Geological Survey (USGS) in their World Petroleum Assessment 2000. In this study the USGS estimated a yet undiscovered potential of 700 billion barrels of oil. As the International Energy Agency bases their annual World Energy Outlook on the figures from the USGS study, this difference is very significant for energy policy makers. Both of these estimates need to be understood in the context that the world is currently only discovering 1 barrel of oil for every 3 that are consumed, leaving little potential for discoveries to push the date of peak oil forward. Leonard showed several graphs from Western Siberia where the trend was obvious: 'the big fields are discovered first'.



Technology

The second topic discussed at Hedberg was the potential for technology to enhance production, normally called reserve growth in oil industry terms. It was suggested that reserve growth including tertiary recovery can add 600 to 1000 billion barrels to ultimate production. However, this will come at a price. Leonard noted that enhanced oil recovery and tertiary recovery will be 4.7 times as high as the base cost. For deep offshore fields, for instance, with a base cost of 20 dollars per barrel, tertiary recovery costs will be 95 dollars per barrel.

While there was great optimism regarding reserve growth, the Hedberg participants were rather more pessimistic about the possibilities of unconventional oil, anticipating production of only about 2.5 million barrels per day from the Canadian oil sands by 2015. This is due to limitations in the number of available personnel, water availability and the issue of carbon dioxide emissions. According to Leonard, optimistic scenarios tend to ignore these issues, implicitly expecting, for instance, a 100% redirection of water flowing away from local agriculture and other industries to oil sands production. For shale oil, he thought it unlikely that environmental permits would be issued on the scale needed if production ever proved to be viable. He thought that Venezuela could keep current Orinoco oil sand production steady (around 800,000 b/d), but the country does not have the political ability to increase production. So in a nutshell for unconventional oil, while there are massive amounts of oil in terms of the tank underground, the tap is simply not large enough to keep sustained high flows going.

Mike Rodgers completed the picture by presenting PFC Energy's production forecasts per region. His company's expectation based on their oil field database was that by 2010, non-Opec production will have peaked. The potential growth of Opec would be towards 50 million barrels per day, mainly from heavy oil and natural gas liquids. Together this is going to lead to a short production plateau around 2014, slightly below 100 million barrels per day, after which the decline sets in. The most interesting part of his presentation was the notion that 90% of western oil companies' portfolios are in regions which will decline from 30 to 20 million

Former US Energy Secretary James Schlesinger at the ASPO conference in Ireland

barrels per day in the next ten years. Their limited access to regions that are still on the upslope of oil production will have a significant effect on the future of the western oil industry. Today we are already seeing this happening. Traditional oil companies are producing more natural gas than crude oil because their oil production base is declining.

No wonder that the fourth speaker of the day, Professor Pierre-René Bauquis, who used to work as a petroleum engineer for Total, suggested oil companies might again embrace nuclear energy in the future to help with producing heavy oil and hydrogen which Bauquis sees as more viable closer to 2020. By that time he thought oil prices would be heading towards 200 dollars per barrel.

The effect of the tightening of oil supplies on consumer countries was discussed by Jeff Rubin. He showed that the second biggest consumer in the world is no longer Europe after the United States, but the oil producing countries themselves (Opec, Russia and Mexico). 'Oil producing countries are the oiliest of all countries in terms of GDP', said Rubin.
In these countries, oil is cheap and demand is burgeoning. In Kuwait growth in the past five years has averaged 7%, in Saudi Arabia 5%, and in Iran 4.5%. Opec, Russia and Mexico collectively consumed 12.6 million barrels per day in 2006 and their growth is going to continue, leading to a cannibalisation of exports. Because of this high rate of growth, world oil exports will fall by 1 million barrels per day over the next four years, leading to triple digit oil prices, according to Rubin. Subsequently demand will be further reduced in the OECD, but the high oil prices will have no effect on consumption in the production group, where price is not affected thanks to regulated internal markets. This in turn will lead to further export reductions.

Shell Chairman

On the second day of the conference, risk management and solutions for oil dependency were discussed. The kick-off came in the form of a unique speech by former UK Shell Chairman Lord Ron Oxburgh.

For the first time in his life, Oxburgh outlined in public his vision of the future from a peak oil perspective. Contrary to many of his former colleagues at Shell, he agrees with the basic premise that we need to get away from fossil fuels rapidly. He even went as far as to accuse some in the industry of having their heads 'almost in the sand' about oil depletion, concluding that "we may be sleepwalking into a problem which is actually going to be very serious and it may be too late to do anything about it by the time we are fully aware... we're never going to run out of oil, it's simply going to become too expensive to use as we traditionally have...the boat is sinking and we have to do everything to stop it from sinking". From this perspective, as well as from the perspective of climate change, Lord Oxburgh thinks that the world needs to look at every solution there is to solve its future energy woes, and to start to invest far more than it has done until now.
Oxburgh saw two possible ways of replacing crude oil. First a shift towards bio fuels combined with energy-efficient lightweight cars. He came out against so-called first generation bio fuels based on foodstuffs. Instead, he advocated developing the second generation of bio fuels, made from agricultural waste products or by-products of our food production chain, oil crops grown on marginal lands not suited for agricultural products such as elephant grass and jatropha curcas and the organic component of urban garbage.
The second route Oxburgh proposed was electric propulsion. Shifting from the Internal Combustion Engine (ICE) to electric motors would be the most energy-sensible thing to do. According to Oxburgh, the economics of hydrogen as a fuel source make it unviable in relation to direct electric propulsion.
To produce the necessary electricity for electric propulsion of cars on a global scale, Lord Oxburgh added that we will probably need to use the remaining existing fossil fuels. Therefore, to create sufficient breathing space from the perspective of climate change, it is of tremendous importance, he argued, to develop carbon capture and sequestration (CCS). This was an issue

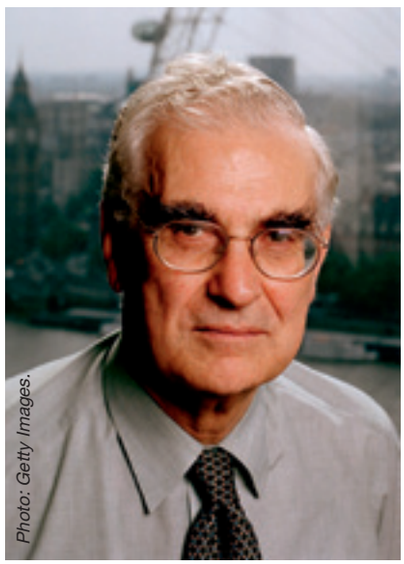
that was also addressed by Jeremy Leggett, geologist and ceo of Solarcentury, in his presentation. Leggett referred to what he sees as the complacency threat of carbon dioxide capture and storage (CCS). While in agreement with Lord Oxburgh that CCS is a necessary route to take, he fears that it will come at the cost of the development of renewable alternatives, because policy makers might view it as a panacea for the energy solution.

Risk management

Another important theme at the conference was risk management. Several speakers said that companies and policy makers in Europe do not realise that the present high oil prices are just the beginning. The continuation of higher oil prices will lead to a huge shift in the economic viability of alternatives and the potential to further optimise oil production. Since many companies are unaware of this, they fail to realise that the time for investment in alternative technologies is now.

Gareth Roberts, ceo of Denbury Resources, mentioned an example. Denbury is the leading oil company worldwide in CO_2 injection in old oil fields to revitalise production. Roberts said that, when they are looking at the possibilities of CO_2-injection, many other oil companies are putting the expected future oil price bar much too low, around 35 to 40 dollars per barrel. Eventually, Roberts expects that there is potential for 2 million barrels per day of extra oil production thanks to CO_2 injection in old oil fields in the coming decades. However, the necessary investment is not taking place because of conservative oil price projections and, specifically for the North Sea, unclear policies.

In the renewable energy sector similar problems occur. Eddie O'Connor, ceo of the Irish wind energy company Airtricity, spoke about their efforts to increase the amount of wind power generation in Ireland. While there is sufficient energy available, they have a problem with obtaining permission to install overhead power lines to substantially upgrade the grid for a larger penetration of wind power. It is not uncommon for a licensing period to take ten years. From the perspective of risk management, putting the permit time above the viability of the economy is not a sensible thing to do. Second, because the intermittence of wind makes it difficult to deliver a very high share of electricity, O'Connor feels that there is significant potential to solve this problem by forming a grid with several nations in Europe. However, it will take 7 years just to get this started. The first step is a European off-shore super grid. The high up-front investment costs are easily justified in view of the sustained high oil prices, especially given that this would allow removal of the most expensive power stations from the grid, O'Connor argued.
The conference was concluded with an address by the recently appointed Irish Minister for Communications, Energy & Natural Resources, Eamon Ryan, who told the audience that Ireland should aim to become oil-free by 2050. ■



Lord Oxburgh, former non-executive chairman of Royal Dutch Shell

Different views on the future of oil supply

In the long-standing discussion about the future of oil supply, there are roughly three groups: those who expect production to decline within 10 years with a short plateau (ASPO, Uppsala Hydrocarbon Study Group), those who expect the decline between 10 to 20 years from now with a somewhat longer plateau (World Energy Council, oil company Total) and those who think that oil production will peak beyond 2030 (International Energy Agency & US Energy Information Administration).
Projections include unconventional crude oil (heavy to extra heavy oil and oil sands), natural gas liquids and lease condensates.