

# Oil Production Curve cause for concern

**One of the world's most respected petroleum geoscientists has told Australian forums that the days of cheap oil are numbered.**

Les Magoon from the US Geological Survey visited Australia in November as a guest of the Petroleum Exploration Society of Australia. His main messages are pretty simple. Firstly, oil production cannot keep up with increasing consumption forever. Secondly, the point at which daily demand passes daily production will lead inevitably to rising prices. And thirdly, it is likely to happen relatively soon and when it happens, it will all happen quite quickly, but we may be unaware of it until after the fact.

Magoon has 35 years of experience around the globe as a petroleum geoscientist. He knows a great deal about the characteristics of the world's major oil fields and provinces and understands how they perform over time as they are drilled and drained. His particular area of expertise is in estimating the amount of recoverable oil there may be left for the world to find and burn. In the process of assessing the world's reserves of fossil fuels, he has come to an inescapable conclusion — the days of abun-

dant cheap oil are rapidly approaching an end.

The exact point at which consumption surpasses production cannot be predicted; however the 'Big Rollover', as he calls it, will be a turning point in history. Many respected experts in this field are predicting that it will happen by 2020 at the latest, and some are suggesting dates much closer — like 2003. The moment in time at which it actually occurs is likely to go completely unnoticed but the ramifications of this event cannot be overstated.

Economists would say that the market will respond to higher prices with faster rates of extraction from existing wells, more efficient recovery techniques and increased expenditure on finding new fields. All of this activity should dampen price increases. This may be so for a short while, but real natural resources do not necessarily behave the way economic models would like them to.

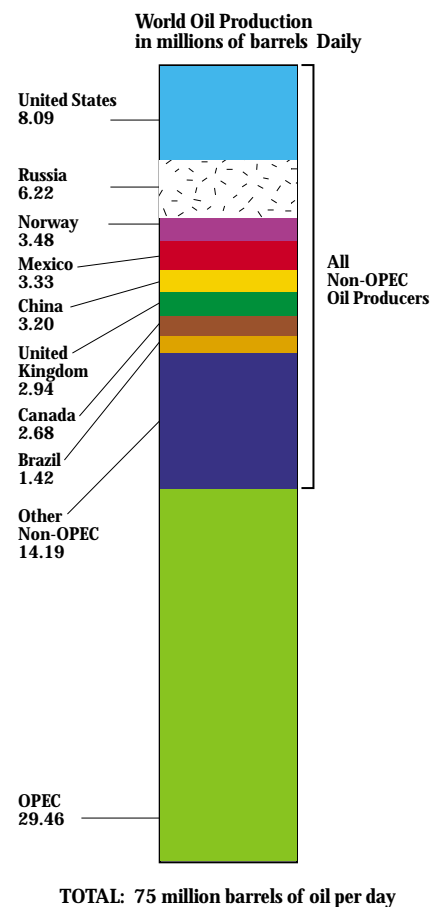
Magoon simply does not believe there is enough oil out there anymore, completely irrespective of the economics. In the end the resource is finite and we are all consuming it at an incredible rate. Magoon points out that even very big discoveries of oil fields with a billion barrels or more, are now only equivalent to a couple of weeks global consumption.

The offshore oil industry is probably the most technologically advanced industry on earth, perhaps second only to the aerospace industry. Yet the rate at which oil is being discovered is not even close to depletion rates, and that is unsustainable.

"Right now the world is producing and consuming 75 million barrels of oil a day," he told a small audience of geologists and policy makers in Canberra. "Last year the world consumed something like 27 billion barrels of oil. In the same year we discovered less than 3 billion, replacing less than one barrel in nine. For the moment both production and consumption are continuing to climb, but production cannot keep up forever."



John Griffiths, (left) General Manager, Petroleum Exploration and Development Branch of ITR talking with Les Magoon from the US Geological Survey



"The point at which it falls behind I call the Big Rollover," he said, "because I wanted some way to get across the idea that we are not going to run out of oil, but that the supply of oil on a daily basis won't be able to keep up with daily demand for oil. At that point we go from essentially an oil buyers market to a sellers market."

"I lack a degree in economics," he said. "But even with much higher prices and new technology, you cannot find more of what is not out there. The days of finding the super giant fields are past."

"Twenty years ago there were 15 oil fields capable of producing one million barrels a day or more. Today there are only 4. It really starts to blow your mind when confronted

with the fact that 90 per cent of the oil being consumed today is being produced from fields found more than 20 years ago.”

“Discovery rate process modelling shows us that in every province the large fields are found first and the smaller ones come later. Most of the big discoveries in the world occurred in the 60s and from there it has been downhill ever since.”

“Technology in the oil industry has allowed us to find more smaller fields and drain them more economically and more rapidly,” Magoon said. “So technology has helped us at the small end of the curve but it does not create more fields.”

Production patterns are the same for oil fields, oil provinces and countries. They start out with a very rapid rise in production reaching peak output very soon after they are commissioned. After a while production levels off and then there is a long period of declining production.

This profile of production can be seen in many countries around the world already. North America, including the huge Alaskan and Mexican fields, peaked in 1984, the former Soviet Union peaked in 1987, Europe peaks this year 2001,

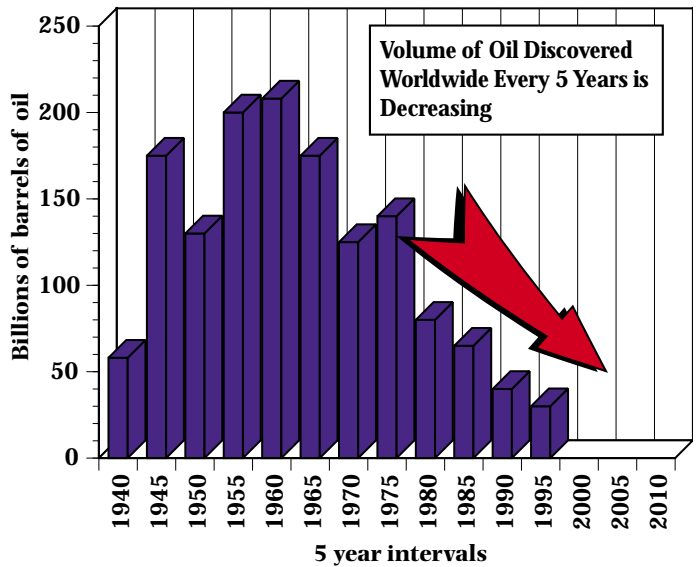
Africa 2001, fields in the Asia Pacific region will peak in 2003, South and Central America, 2005, the Middle East in 2010. If you put all this together with increasing rates of consumption one pair of well respected industry watchers, Richard Duncan and Walter Youngquist, say the rollover will be in 2006 or 2007.

But irrespective of the exact date, in the lead up to the global rollover there is a period where consumption will continue to increase, non-OPEC oil producing countries are all in decline and the OPEC countries output will still be increasing. That is the period during which the sustained increases in oil prices will begin, Magoon suggests.

The behaviour of the big oil companies is another indicator, according to Magoon, that the increasing prices will not result in a corresponding surge in exploration expenditure and possible new discoveries.

“When I was with Shell in 1968 they had a research vessel that was cruising the world doing seismic lines. In the 60s there was a lot of good science coming out of oil companies, there was lots of research underway and plenty of jobs in this area.

**Discovered Oil — Billions of barrels**



**Year of The Big Rollover**

**Forecaster**

2003	Campbell, 1998
2004	Bartlett, 2000
2007	Duncan and Youngquist, 1999
2019	Bartlett, 2000
2020	Edwards, 1997
2010-2020	International Energy Agency, 1998

“Then in the 80’s things began to change, R&D expenditure dropped off rapidly. We have been drilling the ocean bottoms for more than 30 years now. There are a whole wall of publications about the ocean bottoms. We now know an awful lot about the earth that even 10 years ago we simply did not have a clue about and that is why oil companies are no longer spending money on R&D — because there are no surprises out there that will change this picture.”

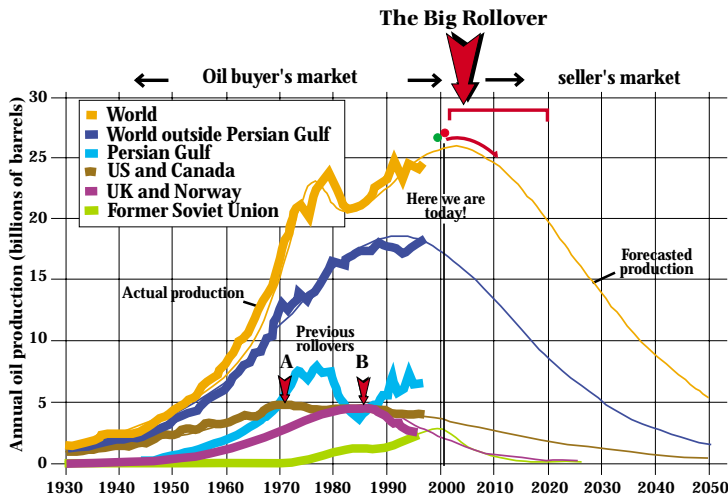
“Now in the last few years BP has picked up Amoco and Arco. Elf Aquitaine, FINA and Total have merged, Chevron and Texaco are merging. I think the only major oil company that has not merged is Shell. So if you

look at the market capitalisation of the oil industry from 1980 to today, it is shrinking.

“There is a perception on the part of the major oil companies that we are headed for a different era. They know enough to know that we are headed for a different era beyond oil and gas. Even though production and consumption is going up, R&D on oil and gas is going down.

In reply to questions about improvements in fuel efficiency of cars or substitution of fuels with ethanol or natural gas, Magoon was not up beat.

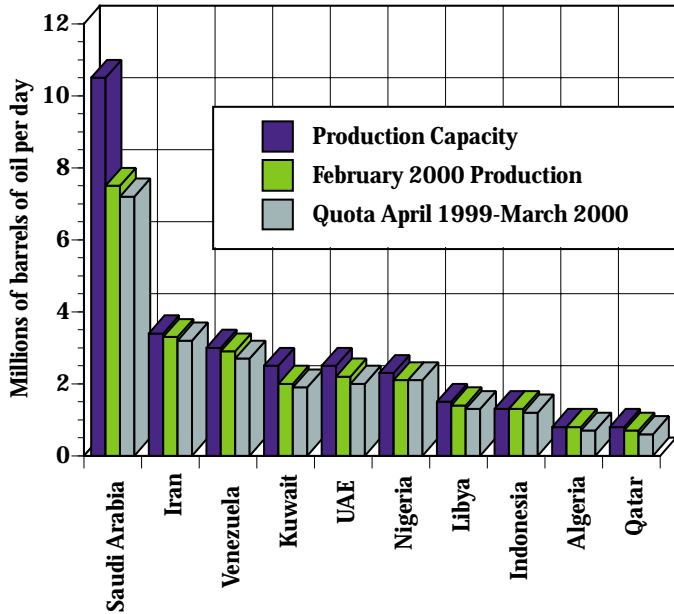
Improvements in fuel efficiency have not reduced demand for oil, they have merely got more cars on the road using slightly less fossil fuel per vehicle. One startling statis-



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**OPEC  
Production capacity and quotas  
in millions of barrels per day**



tic Magoon trotted out is that a car is produced every second. Car numbers are increasing five times faster than humans.

The Big Rollover is variously forecast to occur by 2020 at the latest and as soon as 2003. While there are many variables that might delay the transition a few years, or bring the date rapidly closer, the real point is that the time to prepare for this event is now — before it happens.

“We know that 75 million barrels of oil are being produced and consumed every day of which OPEC produces about 30 per cent,” Magoon said.

“The Persian Gulf countries are what we call the swing producers and they really do control the price of oil,” Magoon said. “Most other major producing regions are already on the downturn, so to ensure that production keeps pace with con-

sumption the extra oil has to be drained from fields in the Middle East and this is where there is still some surplus capacity.”

“Where is that capacity? Well Saudi Arabia is meant to have about 3 million barrels of surplus capacity a day. Kuwait, UAE maybe a million barrels a day each. These are old numbers though. Saudi Arabia has been producing for a long time and maybe they don’t have that sort of margin anymore. I suppose it’s not a surprise that there isn’t anybody who can get good numbers out of the Persian Gulf in terms of the amount of oil they have left. That is of course a state secret.”

Les Magoon’s visit to Australia was sponsored by an interesting array of supporters including the Australian Bicycle Federation, Oil Search, Woodside and Santos. ■

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