

A portrait of Dr. Ali Morteza Samsam Bakhtiari, a middle-aged man with dark hair, wearing black-rimmed glasses, a light blue striped shirt, and a dark jacket. He is looking directly at the camera with a slight smile. The background is a dark, solid color.

Dr Ali Morteza Samsam Bakhtiari,
the recently retired senior adviser
for the National Iranian Oil Company.
Photograph: Michelle Ward

Peak oil. Two words to strike fear in the heart of our oil-addicted globe. But how real is the risk that oil production is in decline, outstripped by demand and our inability to discover new deposits? Are we on the slippery slope to oil oblivion?

Bruce Madden explores the peak oil phenomenon and its potential implications for the global economy, markets and investors.

A

crude addiction

If you believe a number of growing voices on the subject, our industrialised, oil based global economy teeters precariously on the verge of a spectacular crisis. If you believe the peak oil theorists, 2006 marks the year of peak oil, the global peak of crude oil production.

For the peak oil set, the theory is simple. For six generations, the world has gorged on a ready supply of cheap oil. This fundamental commodity has proven to be in abundant supply – augmented in times of high demand by the seemingly endless supply of sweet light crude pumped effortlessly from the mega oil fields like the Saudi Arabian Ghawar field. Those days are gone, the theory contests. A new era with a different set of rules means there will be nothing like business as usual.

Such views belong to a small but growing league of global oil experts like the Tehran based Dr Ali Morteza Samsam Bakhtiari.

Dr Bakhtiari's analysis paints a bleak shopping list of potentially catastrophic threats and impacts: ageing oil wells; over-estimated reserves; limited new discoveries; growing demand and dwindling supply; soaring prices; underinvestment; poor alternatives; geopolitical tensions; suburbia in turmoil and a disbelieving world watching and waiting rather than reacting and planning.

"We are a couple of hurricanes or some geopolitical problems – or a war – away from having a worse problem

than we have today," says Dr Bakhtiari, the recently retired senior adviser for the National Iranian Oil Company and author of several books and more than 65 papers on the oil and gas industry. His current analysis forecasts periods of high volatility with oil prices rocketing up to \$300 a barrel. Then, once the price explodes, it will become a question of availability – countries may be desperate enough to pay any price, but there will not be any oil.

Certain experts believe the situation is so dire that petrol may hit five dollars a litre within five years. But society's addiction goes beyond the petrol bowser. Computers, televisions, telephones, pens, deodorants, shampoos, razors, toothbrushes and painkillers, to name a few, are all made with oil. As are food-storage systems, farm equipment and pesticides.

According to the experts, aircraft will be the first casualty because, unlike petrol – which has hidden subsidies – the price of jet fuel is directly proportional to increases in crude oil.

Dr Bakhtiari says the decline of global oil production appears irreversible and will occur over a number of transitions, the first of which he labels Transition One (T1) – a benign, barely noticeable gradient of decline which began this year, 2006.

However, in Dr Bakhtiari's peak oil vision it is Transition Two which will deliver a far steeper and more pronounced impact. Worse, neither investment nor new technology will have any significant impact.

During Transition One, mega projects should not be undertaken because they may take up to 25 years and “we do not know exactly where we are going,” he says, citing the 2,600km European freight train line from Barcelona to Kiev. The idea is fine, but simply too late.

“I do not think such a project will ever be finished, because the high oil prices will trigger price rises in prices for all other commodities,” Dr Bakhtiari told the Australian Senate’s rural and regional affairs and transport references committee in July this year.

“...if it goes back to, say, US\$50 per barrel for some reason and for a short period of time, people will think, ‘Ah! So US\$75 was just a spike and now we are back to the good old days and we can begin consuming again. Let’s go and buy that big SUV that we were looking at.’”

“You already see that steel is way above usual prices. Copper has hit between \$7,000 and \$8,000 and it will go much higher than that. Nickel is \$22,000.

“All these commodities and all these metals will go very much higher, because it is the crude oil price which dictates the prices. Sugar is going up, orange juice is going up – everything is going up – because the price of crude oil is going up.”

In other words, as a base commodity, crude oil is a fundamental price input to all other commodity prices, which can reasonably be expected to rise.

The world would never see US\$30 a barrel again unless a bird flu epidemic wiped out millions of people or something hit the planet that disrupted all calculations, Dr Bakhtiari told the committee. He cannot foresee anything below even US\$50 a barrel.

“That in my opinion would be very bad news because if it goes back to, say, US\$50 per barrel for some reason and for a short period of time, people will think, ‘Ah! So US\$75 was just a spike and now we are back to the good old days and we can begin consuming again. Let’s go and buy that big SUV that we were looking at.’ You then lose two or three years at least. So US\$30 in my opinion is absolutely impossible.” In the future, expect up to \$300 a barrel. Political tension and the threat of terrorist activity in Saudi Arabia, Nigeria, Iraq and Iran will only add to the fragile supply.

Based on his bottom-up analysis of world oil supply over the next 14 years, he believes present global production of 81 million barrels a day will decrease to 79 million by 2009 and to about 55 million barrels a day by 2020.

“Thus, in the face of peak oil and its multiple consequences, which are bound to impact upon almost all aspects of our human standards of life, it seems imperative to get prepared to face all the inevitable shockwaves resulting from that. Preparation should be carried out on individual, familial, societal and national levels as soon as possible. Every preparative step taken today will prove far cheaper than any step taken tomorrow.”

The optimists

Dr Bakhtiari’s estimates vary widely from those of other leading international oil advisers, Cambridge Energy Research Associates (CERA) and the International Energy Agency, which foresee production levels of more than 100 million barrels a day and up to 120 million in 2020-25.

Some of the views on the peak oil theory are blunt – for example a recent report in BusinessWeek quoted a senior CERA executive denouncing the peak oil theory as “garbage”. Robert W Esser, a director of CERA, told BusinessWeek: “peak oil theory is garbage as far as we are concerned.”

BusinessWeek also reported CERA as predicting world oil and natural gas liquids capacity to increase by as much as 25% by 2015.

Dr Bakhtiari says he is stunned by such bullish forward predictions, saying there is no doubt “one of us is totally wrong. I am quite sure of my prediction... because I have added every single oilfield that I believe could come on stream...”

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Most of the super giant oilfields, which supply 40% of world production, are ageing, with some entering terminal decline. The last super giant to be discovered was the Kashagan oilfield in the north Caspian Sea in 1999. The three largest, Saudi Arabia’s Ghawar, Mexico’s Cantarell and Kuwait’s Greater Burgan, are declining steadily.

Dr Bakhtiari was proved right when in August the Kuwait Oil Company declared that the Burgan field was past its peak output (ref: kuwaittimes.net, Thursday, 24 August). The revelation also

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gave credence to claims by energy investment banker Matthew R Simmons, author of the seminal book *Twilight in the Desert*, that the world may have passed peak oil. Simmons asserts that sudden, sharp oil-production declines, especially at ageing Saudi fields, may happen at any time.

Even more disturbing, oilfields such as Ghawar, Cantarell and Samotlor in Russia appear to have been pushed unadvisedly rather than rested. “There is nothing worse for an oilfield than to be pushed,” Dr Bakhtiari adds. If Cantarell collapses, it would be a catastrophe for Mexico, which would lose its income, and also for the United States, “because what they lose from Cantarell, they will have to make up from somewhere else”.

Annual oil finds have plunged to between four and six billion barrels a year and only five major fields started up this year, he says. “There is little hope that this trend will be reversed in the near future because most of the planet’s petroleum provinces have been explored and there is only one last frontier area remaining – that of Antarctica, with its pristine wilderness and its population of some 20 million penguins.”

Environmental issues aside, Antarctica may not be the solution because conditions may simply be too difficult. It is dark for seven months of the year, it is tough to drill in ice and there is an icecap of at least 2,000m before you get to the lower tectonics. But when the price of oil goes to \$300 a barrel, some oil companies may try their hand. “I hope it will not happen. But some governments will have their backs to the wall and in suburbia there will be unrest over petrol.”

Then there is the matter of over-estimation of supply. Dr Bakhtiari has studied oil reserves for the past 40 years and bases his modelling on the reserves of specialist Dr Colin Campbell, who has researched almost all the oil provinces on the planet. “Most reviews of the reserves of the major Middle East countries today, especially the BP Statistical Review of World Energy, mention reserves amounting to between 600 billion and 700 billion barrels,” he told the Senate committee. “These are official figures

– in other words, the countries involved say that they have so much oil reserves available. The Oil and Gas Journal and BP take these reserves at face value.”

In the 1980s, gas reserves were revised upwards. Saudi Arabia, which has reserves of 160 billion barrels, suddenly had 260 billion barrels. “Since 1989, it has kept this number of 260 billion barrels; there has been no change to it up to this day. So, for 17 years, it’s as if they have not produced anything.” He shares Dr Campbell’s view that the reserves of the Middle East are about half of the official figures: 300 billion to 350 billion barrels of oil.

“Every institution gives its own numbers, and we can only compare theirs to ours. You can see that the reserves given by the USGS (United States Geological Survey) for the world of over 3,200 billion barrels of reserves, is much higher than the numbers we are using, of only 1,900 billion. Of course, we cannot accept such reserves as realistic, as we cannot accept the projections of certain institutions like the International Energy Agency in Paris, which predicts that the world will be consuming 118 million barrels per day in the year 2030 as realistic because I cannot see how the world can get over 81 or 82 [m/bd] per day right now, let alone in the future.” At the 25th CERA energy conference in Houston earlier this year, it was revealed that virtually all oil basins in the world had gone through one round of exploration and were delivering fewer reserves than in the past. From 1999-2002, Russia contributed 47% of world oil production growth. In 2003, it was 14%; in 2004, 13%; and in 2005, a modest 2.4%. The conference was also told that a lost generation of petroleum engineers needed to be filled. Only 300 petroleum engineers, compared with 44,000 law graduates, graduated in the US last year.

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Asia offers further challenges. Experts agree that the most dramatic event in post-peak oil will be when the effects hit China, the second-largest consumer (after the US) of oil. In the past ten years, China’s gross domestic product has tripled. India is also entering a serious growth phase. Jane Henderson, portfolio manager, North America, Walter Scott & Partners, says if history repeats itself, consumption for China and India is headed one way as individuals seek to better their livelihoods and discard bikes for cars.

Are there alternatives?

Shale oil is touted as a saviour. But while it may be plentiful, it is a messy, difficult industry, Dr Bakhtiari says. In Canada, about 1.1 million barrels a day of synthetic crude oil is produced; 3 million will be the limit.

"About two tonnes of shale oil is needed to make one barrel of synthetic crude oil, which takes its toll on the environment. Already, Canadian rivers are so polluted that fish are dying and it will soon be impossible to clean all the rivers. There is heavy oil in Venezuela, with 600,000 barrels of capacity and potential for up to about 1.2 million, but the difficulty is in transforming its potential into production," Dr Bakhtiari says.

In Dr Bakhtiari's opinion, there is no panacea, no alternative to crude oil. Gas to liquid (GTL) is not a consideration because capacity is just 85,000 barrels a day, a drop in the ocean. Coal to liquid (CTL) is messy and inefficient energy-wise. The world's only CTL plant in Secunda, South Africa, produces 150,000 barrels a day. China is trying to produce up to one million barrels a day of CTL, a target it will take time to achieve.

Ethanol and biodiesel are simply not sustainable. For every litre of ethanol, between three and four litres of water is needed to produce it. Sugar cane is the best option. "That is what the Brazilians are doing today. With sugar cane, you need one square kilometre of cane to produce 3,800 barrels of ethanol a year. It is not easy and it is inefficient."

Solar power will have a small role to play, especially in Australia where there is plenty of sun and land to develop it. Ditto for wind power. But their roles will amount to 2-4% of oil consumption over the next 15 to 20 years.

Gas is another option but peak gas is not too far away, based on Dr Bakhtiari's prediction for 2008-09. Peak gas and peak oil are two totally different things because oil is such a special commodity. For example, you cannot just put gas in a ship. "You either have to consume it locally, pipe it to some other country or put it in a LNG tanker."

Australia's huge reserves of gas will be a bonus. "I think that Russia does not have much gas anymore, although it is the

largest producer in the world. I am worried for the Europeans... if this winter is harsh, you will have thousands of people dying because the Russians simply do not have enough gas to provide to Europe. According to my statistics, at least 900 people in eastern European countries froze to death last year. This year it is going to be double or triple that amount. When there is a real crisis, how are they going to react?

"For one week in March this year, the British did not have enough gas and the price of gas shot up to \$258 per barrel oil equivalent. And we are in a very normal situation now; we are not at peak yet. So you can imagine how it is going to be when it is at peak, with the panic in all those countries because of the winter months."

Still time to act

Not everyone shares Dr Bakhtiari's view. CERA's Peter Jackson said in *The Economist* in April (20 April 2006) the price signals that would foreshadow any 'peak' would encourage efficiency, promote discovery and speed investment in alternatives. The metaphor of peak was therefore misleading. "The right picture is of an undulating plateau," he said.

A decline in the Saudi Arabian field Ghawar may not be sudden and sharp but gentle and prolonged, allowing the Saudis to develop new fields. Saudi Arabia's oil minister, Ali Naimi, outlined in the same issue of *The Economist* (20 April 2006) an unexplored area on the Iraqi-Saudi border the size of California.

Even Dr Bakhtiari believes there is time to be prepared, to avoid costly panic, because the world is not too far down the T1 slope. Free public transport, improved rail, and steering committees packed with bright young things to set up priorities for the use of petrol are crucial. In this arena, Western Australia has been at the forefront, with Perth's free rounding bus transport system carrying people from their homes to train stations. Its light rail services about 140km of coastline, linking all suburbs.

But he warned the Senate committee: "Get prepared for any eventuality. Have a special committee for that now... so that when the crisis really hits, you have something to fall back on; you have a team that is already prepared and who has thought these problems through."

Best addresses

www.samsambakhtiari.com

www.simmonsco-intl.com

www.suncor.com

www.hubbertpeak.com

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Verdict:

The equity investor

One way financial advisers can prepare clients for the arrival (or not) of peak oil is to stay close to fund managers that scrutinise the interplay between commodity supply and markets.

Managers like Jane Henderson, portfolio manager with Edinburgh based Walter Scott & Partners.

For the first time, she says, the opportunity to continue to supply cheap oil to meet demand is being questioned.

“We’ve assumed that Saudi Arabia can turn the taps on and be the swing producer and use this light, sweet crude at five dollars a barrel in infinite supply, and clearly that’s not the case anymore,” she says.

“I personally don’t think we’re going to run out of oil. However, I think the days of cheap and easy access are being challenged.”

One of the biggest problems has been low investment in the oil industry for the past 30 years and the resultant side-effects are being experienced today. “Countries cannot start imposing heavy taxation on this system. If you look back at the history and times when countries have imposed windfall taxes on the industry, it just does one thing: it stifles investment.”

Volatility is another factor. If the world was calm, Iran, Iraq and Nigeria could be relied on to be pumping at full capacity, easing the tight excess supply situation. While the geopolitical perspective adds another dimension to investments, underpinning the Walter Scott & Partners Limited investment rationale has to be a good, solid, well-managed company with great growth assets that have strong production profiles or that have the necessary technology to improve profitability.

A recent addition to the portfolio is Suncor, the Canadian company outfitting the Athabasca Tar Sands. “There actually isn’t any exploration risk in the Athabasca Tar Sands,” Henderson says. “The stuff is there. It’s difficult to quantify the exact amount, but many people have it at multiples of Saudi Arabia in terms of total potential supply. I believe the Chinese are constantly in Calgary, trying to work out some deals with the current incumbents to get just that regular and consistent source of supply.”

The commodities investor

For Robert Holroyd, Director of Commodity Strategies Limited, the notion of peak oil is problematic. In simple terms, nothing is certain. He says there will always be claim and counter-claim regarding world energy resources.

His job, running CSL investment management strategy, is to keep an eye out for immediate market risk and to respond accordingly.

Thus, one thing he does know is that commodity prices have fallen, with the exception of metals, in recent times by some 20%. For financial advisers, this may provide a brief period of reflection to look at the totality of commodities which, in Holroyd’s words, have “come off the boil”.

“And they’ll be saying, ‘okay, well, it looks like this bull run’s over, we can relax a little bit.’”

“And what we’ve seen is basically quite a lot of speculative money coming into this market, and some people have had their fingers burnt. The volatility of these markets has been pretty high, and there have been a number of commodity funds that have actually closed down because of the volatility that we’ve seen in the last few months,” Holroyd says.

Holroyd’s fund has remained overweight cash (just 26% exposure to markets, September 2006) during this period of market volatility, a position he regards as prudent for the times.

On oil, he regards pricing risk as erring on the upside due to supply/demand imbalances.

Is peak oil really a threat? “The first thing you must do as an investor is to look at the probability factor: can this peak oil theory eventuate?”

“I guess there are a number of things at play. One is that the argument is that the bulk of the readily available oil that has been found in the world has basically been found, and there isn’t a great deal more of it that’s easily or readily accessible. So that’s the first issue.

“And then the second one is, when we’ve got the easily accessible oilfields out there that are producing currently enough oil to be able to supply the world – what is the chance that these things are going to start running out and creating a real problem?”

“The other thing we do know though is, that if the oil price starts to go up, various different oilfields that have previously been uneconomic to extract oil out of, all of a sudden become economic again.”