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MONDAY, MARCH 15, 2004

Half Empty?

World oil supplies, while not running out now, may plateau sooner than thought

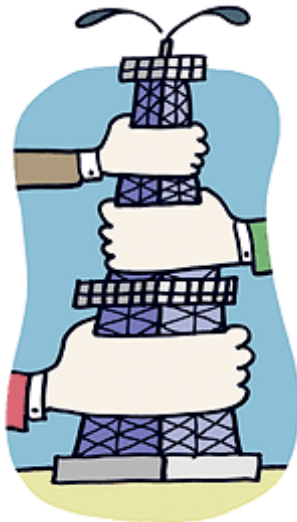
By **JACQUELINE DOHERTY**

OIL PRICES HAVE CLIMBED to levels not seen since the Iraq war -- the first or the second. But the market doesn't believe they can last. The benchmark crude currently fetches about \$35 a barrel, but the futures market thinks the price will retreat below the \$30 barrier next year and will be around \$28 in five years. Industry executives pencil in an even lower price, something in the low-to-mid-\$20 range, when they make their long-term plans.

But this time they and Mr. Market may both be wrong. As the price of crude has moved steadily higher in the past five years, the market had assumed that each increase would be relatively short-lived. Supplies always were ample to meet demand, even as it expanded both in the U.S. and elsewhere around the globe, most recently in China.

That may not continue if, as some experts expect, oil output reaches a peak and subsequently declines in not too many years. The era of cheap, plentiful oil may be coming to a close.

"If you do not include [the Organization of Petroleum Exporting Countries], we are at the peak of oil production. And if OPEC production is included, peak production is pushed out five years or so," says Felix Zulauf, founding partner of Switzerland's Zulauf Asset Management and a member of the *Barron's* Roundtable. "Before the end of the decade is over, we will have \$60 oil," he concludes.



Stuart Goldenberg

An extreme forecast, to be sure, but one consistent with the estimates of Colin Campbell, a 72-year-old retired geologist who believes production will peak around 2010 and the world will ultimately produce a total of 1.8 trillion barrels of oil. "Everybody calls me a pessimist, but I may turn out to be an optimist," says the Brit, who boasts a doctorate in geology from Oxford and did stints at major oil concerns including Texaco, BP and Amoco from 1957 till 1990.


The U.S. Geological Survey and the U.S. Energy Information Administration, the statistical arm of the Department of Energy, disagree, contending that oil production can continue to rise for decades. The EIA forecasts that supplies won't peak until 2037, based on the USGS's estimate that, including what's been pumped and what will be, the world ultimately will have produced three trillion barrels. Indeed, the EIA can envision a scenario where world supplies don't peak until 2047, and the world produces 3.9 trillion barrels.

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"People like Campbell grossly underestimate the resource base," says John Wood, director of the reserves and production division at the EIA.

Apocalyptic forecasts for petroleum are nothing new. In the 1880s, executives of Standard Oil were convinced oil was running out in Pennsylvania and would not be found anywhere else, and sold their shares.

Supply worries arose in the wake of World War I and World War II, and came to a head most recently during the energy crisis of the 1970s, recounts Daniel Yergin, chairman of Cambridge Energy Research Associates. Of course, that was followed by the oil glut of 1980s, when crude prices collapsed below \$10. They fell nearly as low in the 1998 Asian financial crisis. And for American motorists, the real price of gasoline -- that is, adjusted for the inflation in everything else -- even now is near a record low.

But there are signs things may be changing. Quite simply, we're not discovering new sources

of oil fast enough to replace the older, cheaper ones that inevitably will be depleted. That does not mean the neo-Malthusian views of the Club of Rome types will be right. To the contrary; it's bullish for the oil business that prices will remain high, spurring exploration and production and demand for oil-field services.

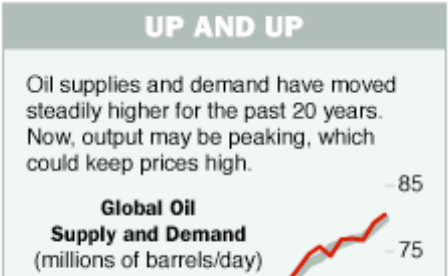
In 2000, oil production was about 77 million barrels a day, estimates Bruce Lanni, a senior analyst at A.G. Edwards & Sons. Given that the average oil field's output declines by about 4.8% a year, those fields will generate only 60 million barrels a day by 2005 and 47 million barrels a day by 2010.

Demand -- if it continues to rise at about a 1.5% annual rate -- would climb from 77 million barrels a day in 2000 to 80 million barrels in 2005 and 86 million barrels in 2010. As a result, the world needs to generate 20 million barrels of new daily production capacity by next year; by 2010 the number rises to 39 million barrels a day. "I would argue that we have not hit peak production, but it's right around the corner," says Lanni, somewhere between 2010 and 2020.

With oil again at \$35, much writing on this subject has hit bookshelves. But the idea of a peaking of production actually dates back to the 1950s, when it was first introduced by Marion King Hubbert. A geologist who lived from 1903 to 1989, Hubbert over the years worked at Columbia University, Shell Oil and the U.S. Geological Survey. Hubbert thought the life of any mine or oil well resembles a bell-shaped curve: Production increases to a peak by the time half of the mineral is mined or the oil is pumped, and then inexorably declines.

Applying this theory, in 1956 Hubbert forecast oil production in the lower 48 U.S. states would peak between 1966 and 1971. Those forecasts proved remarkably prescient. Despite access to capital and world-class technology, oil production in the lower 48 peaked in 1970, at 9.4 million barrels a day, and has declined steadily to 4.8 million barrels a day. (That doesn't include output from Alaska's North Slope, one of the major finds in the 'Sixties.) Since then, U.S. oil imports have increased to nine million barrels a day, up from 1.3 million in 1970. Imports are forecast to account for 70% of U.S. supplies in 2025, up from 53% last year.

Hubbert's curve has been less successful when a spanner is thrown in the market's machinery -- one tossed by OPEC.



Members of the cartel produce more than a third of the world's oil and have production quotas. While those limits are adhered to in varying degrees, OPEC produces at about 90% of capacity, while the rest of the world pumps at full throttle.

The cartel's ability to restrict supply boosted prices in the 'Seventies, which in turn curbed demand (in part by pushing the world economy into recession). Back then, OPEC's quotas played hob with Hubbert's 1974 forecast that output

U.S. dollars 3/12

Exxon Mobil Corp. (XOM)

PRICE 42.03
CHANGE 0.68
U.S. dollars 3/12

Baker Hughes Inc. (BHI)

PRICE 35.41
CHANGE 0.27
U.S. dollars 3/12

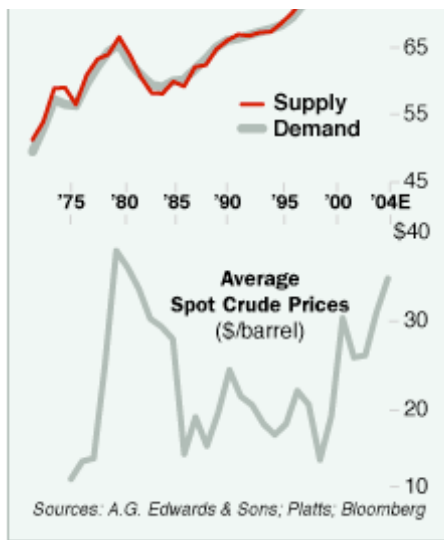
Transocean Inc. (RIG)

PRICE 28.68
CHANGE 0.89
U.S. dollars 3/12

Schlumberger Ltd. (SLB)

PRICE 62.50
CHANGE 0.34
U.S. dollars 3/12

* At Market Close



would peak in 2000. Indeed, any projection that production will fall short should take into account the market's function: to ration demand. In the process, Hubbert's bell curve gets flattened and extended.

The amount of oil that can ultimately be recovered -- and what oil should be included in that count -- are major points of contention in this debate. In 1992, Campbell estimated world oil supplies, both in the ground and yet to be found, at 1.65 trillion barrels and peak production in 2000 based on the published reserve data from companies and other oil producers around the world.

He believes his initial target was off because oil companies use a conservative definition of reserves, required by the Securities and Exchange Commission. To be considered a reserve, oil needs to have been found and able to brought to market. That's merely an educated guess and leaves room for varied interpretations, as the reduction in reserves

announced by Royal Dutch/Shell and other energy concerns recently show.

In the mid-1990s Campbell repeated the exercise using data from Petroconsultants, which had figures on reported reserves plus oil that had been found but not yet developed. The subtle difference boosted Campbell's reserve estimate to 1.8 trillion barrels and pushed out the peak production date to 2009. His numbers represent oil that's cheaply accessed. It does not include heavy oil, oil from tar sands or shale, oil found under water deeper than about 1,500 feet, polar oil or gas liquids found in gas fields.

It costs about \$2 a barrel to drill for oil in the Middle East, about \$13 to drill in older Texas wells and about \$10 to extract oil from the tar sands in Canada. The production of more expensively produced oil may ameliorate the decline in oil production, but it won't push off the peak, he argues. "All the time, I try to get better numbers," says Campbell, who's currently revising his reserve numbers. "I'd like to consider it progress." His critics, however, say he has been, and is, wrong.

The USGS takes a different approach. It adds up the 710 billion barrels of oil that have already been produced to the 891 barrels that they predict are in reserves, which totals about 1.6 trillion barrels. Then the USGS adds an additional 688 billion barrels from what it calls reserve growth.

When U.S. companies report their reserves, they include only reserves that are coming to market and not other oil known to be in the ground but untapped. As oil is brought to market, an oil company's oil count "grows." The USGS believes that the reserve growth that U.S. companies have experienced will occur around the world and it boosts the world's total reserves to 2.3 trillion barrels.

"It would have been a catastrophic mistake not to consider reserve growth," explains Thomas Ahlbrandt, world-energy project chief at the USGS. Critics counter that companies and governments around the world aren't nearly as conservative as those reporting to the SEC and using the U.S. experience of reserve growth inflates the numbers.

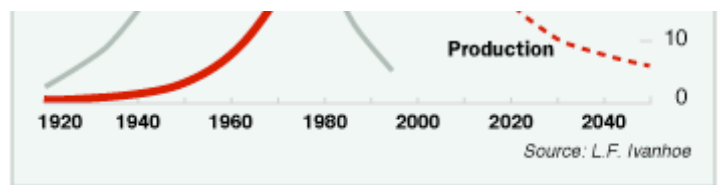
The USGS also adds in undiscovered oil, a number it arrives at by looking at different countries and assigning a probability that oil will be found and uses the mean estimate. Critics believe it's a flawed approach that gives countries like Greenland credit for having 47 billion barrels of oil -- which is almost three-quarters of the oil in the North Sea -- yet an oil company has never set up shop in Greenland.

"I think [the USGS] is just wildly optimistic," says Michael R. Smith, technical director at EnergyFiles, a U.K.-based consulting group, who estimates peak world energy production in 2016 and 2.3 trillion barrels of total world supplies.

Another major brouhaha surrounds OPEC reserves estimates. The debate is important because OPEC holds more



than half of the world's proved oil reserves and provides more than a third of the world's oil. In the 1980s, reserves for some of the OPEC nations increased abruptly, and since then reserves have stayed constant despite the pumping that has occurred over the past 10 years. Iraq's reserves jumped from 47 billion in 1987 to 100 billion barrels the following year. Kuwait's reserves grew from 64 billion in 1984 to 90 billion in 1985 and Saudi Arabia's jumped from 170 billion in 1989 to 258 billion in 1990, according to the Oil & Gas Journal.



Naysayers believe the jump was artificial and induced by production quotas, which are based on a country's reserves. "The longer the changed numbers stayed in the public domain the more people started to believe them," says Matthew Simmons of Simmons & Co., the Houston-based energy-investment-banking firm, who's finishing a book on Saudi Arabian oil.

"I am comfortable that there will be at least as much oil production from Saudi Arabia as they claim they have in proven reserves," counters Wood of the EIA. The USGS's Ahlbrandt says he's had access to information that also makes him comfortable with OPEC's reported numbers.

Simmons also believes that Saudi Arabia, the largest OPEC producer and the world's largest exporter, will face declines in its production in the next five to 10 years. His view calls into question some forecasts that call for the nation to almost double its output in the next decade and in future years to meet global demand. Executives from Aramco, the government-owned oil company, dismissed Simmons' concerns and claim the country plans to maintain capacity at 10 million barrels a day through 2009, but could boost output to 12 million to 15 million barrels a day in a decade and continue to produce that amount for 50 years.

Additional capacity could also come from war-plagued Iraq. The country produces about 2.2 million barrels of oil a day, down from 2.8 million before the U.S. invaded, estimates Ann-Louise Hittle, head of macro oils at Wood Mackenzie, an energy consulting firm in Edinburgh. If the situation stabilizes, Iraq should produce 2.8 million barrels a day in 2005, she estimates. It could produce five million barrels a day in five years -- but only with the investment of billions and political stability.

The peaks in production inevitably follow peaks in discoveries. The peak in discoveries in the U.S. was 1932 and the production peak was 1970. In the North Sea, the height of discoveries was in 1973 and production peaked in 1999. World oil discoveries peaked four decades ago, in 1964; some of the largest finds are 70 years old.

The North Sea peaked more quickly than the U.S. because it was developed later and newer technologies were employed to access the oil more quickly. "When you get top-of-the-line technology you deplete the oil quicker. It's an important irony," says Campbell.

Conversely, others believe technology will postpone the day of reckoning. Yergin's organization studied the impact of increasing technology used in the discovery, development and production of oil. Among many benefits, technology could increase the amount of oil recovered from wells and reduce their costs, making profitable wells that are uneconomical now. "The digital oil fields of the future could add up to 125 billion barrels of reserves that are not now economical," says Yergin. "That's more than the proven reserves of Iraq."

Near term, oil prices could remain high because inventories have been relatively tight and because OPEC's market share has risen, increasing its ability to influence prices. Saudi Arabia, the world's largest oil producer, has excess capacity of about one million barrels a day, the most in the world but well below the average 5.5 million to 6.5 million barrels of spare capacity of the past five to 10 years, says Lanni of A.G. Edwards. Also, demand from the emerging-market countries has soared. China's oil consumption has more than doubled from 2.7 million barrels a day in 1992 to six million barrels in January. In addition, there has been concern about the stability of supplies coming from Venezuela, the world's-fifth largest oil exporter.

OPEC has targeted oil prices in the \$22- to-\$28 range. Yet despite oil in the low 30s, the cartel opted to cut production quotas at its last meeting in February. Analysts believe the group is attempting to offset the impact of the U.S. dollar's decline. Oil is bought and sold around the world in dollars, and the decline in the greenback over the past year has depressed revenues of oil-producing countries, while their expenses, which generally are in their local currencies, have tended to increase.

Right now investors and industry professionals seem to expect oil prices will revert back to the 20s.

They're banking on new discoveries in West Africa, the former Soviet republics and deep under the world's oceans. Indeed, memories linger of \$14 oil in 1998 when Asian economies fell off a cliff and demand for oil fell as well. Well aware that oil prices can be volatile, oil companies are developing projects based upon an assumed oil price of \$22 over the next 10-20 years, says Lanni. That up from about \$18 three years ago, but still implies oil companies are skeptical today's prices can last.

But if the market begins to adjust to eventual declines in output in future years, oil-related stocks could get a fillip. Energy stocks represent only 6% of the companies in the S&P 500, way down from their peak of 27% in 1980, points out Wayne Nordberg, chairman of Hollow Brook Associates based in Gladstone, N.J. For those who believe in reversion to the mean, the time for the energy sector may have indeed arrived.

"As an investor you want to own the stuff in the ground," advises Zulauf of Zulauf Asset Management. For those who don't want to buy oil directly in the commodity markets, he suggests buying shares of European energy companies and holdings in second- and third-tier oil companies, like [Anadarko Petroleum](#), [Apache](#) and [Devon Energy](#), with the expectation that they'll be purchased by larger oil companies looking to bolster reserves. If oil rises, investors will pay more for oil companies because their reserves will be worth more.

Right now, however, the major and secondary oil producers trade at below-market multiples, in part, because analysts still believe oil prices will decline next year and earnings will come in below 2004's results. [ExxonMobil](#), for example, is expected to earn \$2.40 a share this year and only \$2.24 in 2005. If analysts begin to assume higher oil prices for the long run, earnings forecasts will likely rise and price-earnings multiples ought to expand. Many of these stocks also offer nice dividends, which have gained favor in the rocky market of late.

Oil-service companies should also benefit if finding and drilling for oil becomes increasingly difficult and more wells are put in service. Spending on exploration and production, excluding acquisitions, has almost doubled from \$27 billion in 1994 to \$51 billion in 2003, according to Lanni at A.G. Edwards. "It's becoming more difficult to find new oil and gas reserves so people have to spend more," he says. (The risk, of course, is that the costs from exploration and production rises quicker than oil prices, eating into the major oil companies' profits.)

Operations at companies such as [Baker Hughes](#), [Transocean](#) and [Schlumberger](#) should fare well, though they trade at above-market earnings multiples and have moved up nicely in the past year. Leigh Goehring, manager of the Jennison Natural Resources Fund, owns mid-cap names in the sector, including [BJ Services](#), [Weatherford International](#) and [Smith International](#). These companies should increase earnings by 20% annually between now and the end of the decade, justifying their multiples.

And, if we are at the peak of Hubbert's curve, alternatives to oil-related equities may be a new pair of sneakers or perhaps a bicycle.

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