How High Oil Prices Help to Shift Peak Oil into the Future

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1. Introduction

Some geologists are forecasting the end of the oil age in the next few decades. The optimists, who see oil lasting for at least fifty more years, are mainly those who put their faith in new technology for finding and extracting oil. But the pessimists say that even taking into account the best exploration efforts and the discovery of new fields like the Gulf of Mexico and other finds, sometime between 2010 and 2020 the gush of oil from wells around the world will peak at 95-110 million barrels per day, then begin a steady, inevitable decline.

Reviewing different peak oil hypothesis and using Canadian oil sands as example, this presentation shows how high oil prices are helping to shift peak oil well into an indefinite future. Oil will never run out, not because oil reserves are unlimited but because rising oil prices, the result of scarcities, has a powerful influence on supplies: new technology becomes affordable and increases conventional crude oil reserve production potentials, and also vastly increases commercially viable non-conventional reserves, thus stretching out the total production potential of oil to well into the 21st century.

2. Key Features

The fundamental driver of the 20th century's prosperity has been an abundant supply of cheap oil; but many geologists predict that the world will begin to run out of oil in only ten to twenty years. For example, in 1998 the International Energy Agency reported that the peak of world oil production is in sight and put the date between 2010 and 2020. But more recent predictions have already pushed that date forward in time.

For projections of future oil production, Peak Oil advocates relay on basic common sense and a kind of analysis pioneered by M. King Hubbert (1956). Common sense says that resources in the ground are limited and Hubbert developed a model that forecasted an end to the oil age in American Peak Oil in 1970. Many geologists and some economists agree with these hypotheses, at least in principle. In late 1990s, the declining rate of oil discoveries and slowing production from big, early finds combined to support those arguments. But how much oil geologists can find and engineers can extract at market prices is much in contention.

With high oil prices oil majors spend more on exploration and are able to push frontiers a bit further. At the moment, thanks to new high tech tricks for finding and extracting oil such as 3-D seismic, explorationists are adding to oil reserves. And rising prices make commercially feasible and viable vast quantities of oil sands and oil shale heretofore considered too costly to utilize and produce.

With higher prices making new technology and methods affordable, oil supplies are on the increase. So, many economists who monitor oil resources, see production meeting rising demand until about fifty years from now which is plenty of time for the development of alternatives. Technology might double the yield from an established field, they say. "Technology has managed to offset the increasing cost of finding and retrieving new resources," says economist Douglas Bohi. "The prospect is out there for an amazing increase in the oil reserve base".

Three currently used technologies are helping drive this boost in reserves. Aided by supercomputers, explorationists are using the latest 3-D seismic surveying to identify likely oil-containing geologic structures, yielding a sharp picture of potential oil reservoirs. A second technology involves first drilling down and then sideways, punching horizontally through a reservoir so as to reduce the number of wells needed and therefore the expense, by a factor of 10. Finally, technology that allows wells to be operated on the sea floor is opening up new areas in the Gulf of Mexico, off West Africa and in the North Sea. Also, more expensive fuel sources such as hard-to-extract oil deposits, the tarry sands of Canada, and synfuels from coal are brought on line.

Canada's oil sands are easily the world's most exciting energy story as it turns out that the world's largest oil deposit to date sits in North America, proximate to the largest oil-consuming market in the

world. Canada's oil sands contain about 174 BOE at the minimum. That's enough to satisfy the world's demand for the next century.

In Alberta oil sands energy companies don't drill for oil but dig it up. After excavation, trucks carrying up to 400 tons of oil sands carry it off to a processing plant where the sands are heated in water; the oil comes to the top of the water and the sand drops to the bottom. This oil froth is then sent to an upgrader and eventually to a refiner and it is absolutely as good as it gets. In fact, it even trades at a premium because of high quality.

Presently a million barrels a day are coming out of the oil sands and production is expected to triple within a decade. By that time it will be the single-largest source of foreign oil for the U.S. For decades, these sands weren't even considered part of the world's oil reserves because the oil there wasn't economically extractible at prevailing prices using then-current technology. But resource scarcity drives prices higher, which in turn makes new technologies and methods feasible and commercially viable, thus, increasing supplies.

3. Conclusions

All these new technologies can slow or delay what Hubbert saw as an inevitable production drop. Indeed, such technological achievements have already helped arrest the decline of U.S. oil production during the past few years. Future success will depend on how much of the new technology can be aimed to increase reserves. The next few years should provide answer: if technology can greatly boost reserves, then production curves should stabilize; while if the pessimists are right, it will soon resume its downward slide.

4. References and Bibliography

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Author Biographies

Pawel Nawrocki is Associate Professor of Petroleum Engineering at The Petroleum Institute (PI), Abu Dhabi, UAE. He earned a Master of Science in Civil Engineering from the Technical University of Lodz in Lodz, Poland and a Ph.D. in Applied Mechanics from the Institute of Fundamental Technological Research of the Polish Academy of Sciences. Dr Nawrocki has over 15 years experience in applied rock mechanics research focused on petroleum geomechanics and mining engineering applications. He gained his experience working in Canada, Poland, and the United States. In the 90ties he was associated with the Geomechanics Group at the University of Waterloo in Canada were he was an academic member of the Porous Media Research Institute, a non-profit research organization that works in unison with major oil companies addressing technical problems of the industry through cooperative, joint university-industry research initiatives. Then he spent a few years with the Mining and Mineral Sciences Laboratories of CANMET in Sudbury, Ontario. Dr Nawrocki authored and co-authored over thirty articles in international journals and conferences, supervised and co-supervised students, and delivered invited lectures and short courses at companies and research centers in Canada, Norway, South Africa, China, Korea, France, Poland and the United States. He joined The Petroleum Institute in 2004.

Dalton Garis is Associate Professor of Economics at the PI, where he teaches Petroleum Market Price Analysis and International Economics. He earned a Batchelor of Science in Industrial Engineering and Operations Research from the University of Massachusetts, a Masters of Science in Agricultural Economics from Texas A & M University, and a Ph.D. in Applied Resource Economics from the University of Florida. Dr. Garis has over 20 years experience in commodity price analysis and has been an invited speaker at oil and gas, refinery, and petrochemical conferences in the Gulf region presenting research on cash and futures petroleum market behavior and price formation. Dr Garis has presented research on oil prices and energy alternatives at the American Society of Mechanical Engineers annual conference in Anaheim, California, USA, and the Society of Petroleum Engineers regional conference in Bahrain. He has also acted as a consultant on the use of futures and options markets for wet barrel hedging for Gulf producers. Dr. Garis is a columnist for *Oil and Gas News*, *ADNOC News*, *Oil & Gas Middle East*, and *Zawya* on oil pricing and marketing issues.