

## World Oil Supply in Transition

The world is not running out of oil, but there is concern about long term supply rate.

Historically, estimates of global oil supply have been based on a combination of resource volume and forecasted demand. The price was driven largely by the giant and super-giant conventional fields and reflected a rough parity of cost between the cheapest and most expensive producer. Today, the relatively low cost oil coming from the biggest conventional fields is no longer sufficient to meet global demand. Consequently, forecasting supply and price has been complicated by the wide range of costs, technological improvements and changes in the market. In an open market scenario the price of oil is determined by the sale of the most expensive oil needed to make up the total supply. However, traders are divided between those that perceive the market being determined by supply and those that see it as being a derivative of the macro-economy. Today, we see an uneasy equilibrium between these two determinants of price, with a probability of increasing price volatility as the character of supply moves from a more homogenous past of rough parity of costs to a lumpier one with disparate project economics. The combination of technology and increased price has added large volumes to the reserve base but much of these additions are high cost oil which is at the highest risk in the event of price declines.

Forecasting oil price is not yet a “settled science,” but our look at the transition includes consideration of:

- *Shut in capacity:* excess production capacity has shrunk from 15 million bopd in the 1980’s, to around 4 to 6 million bopd in the last decade, to perhaps as low as 2 to 3 million bopd today. This means that global oil supply is evolving from one with flexibility to one characterized by “just in time.” The impact on price driven by demand instead of low cost will become more significant as excess supply shrinks and low cost production cannot be expanded.
- *Reserve addition/ increasing production:* The cost to add new production ranges from approximately USD \$25 billion per million bopd to over USD \$50 billion per million bopd. We estimate that the giant and super-giant fields (i.e., the low cost producers) are approximately

50 percent depleted and significant expansion of their production rate is unlikely. Furthermore, even though global reserve volumes have grown, the time and cost to add production has increased significantly.

- *Logistics:* Industry has limitations as to how fast new production can be added, particularly from complex new resources. In addition, high cost oil resources require significant changes in transportation and refining infrastructure.
- *Capital:* the increased cost obviously means one is investing in the higher cost asset, not the lowest. Furthermore, there is increasing risk of political intervention in all areas of production.
- *Politics:* unstable States, sanctity of contract and access to resources are increasingly significant concerns and limitations.
- *Macro-economics:* Exporters of low cost oil are the primary beneficiaries of increased price. An unseen side effect of the transfer of wealth from importers to exporters has been to increase the fragility of the global financial system. The EIA estimates that over USD \$500 billion per year is flowing into the Persian/Arabian Gulf region which, especially when leveraged, can impact the global financial stability. This transfer will continue due to the unabated increase in the demand for work performed by oil and the value of the US dollar.
- *Optimizing oil price:* exporters will seek to maximize their profits but may also cause global economic restrictions thus reducing demand and increasing price volatility.

These changes have become more significant within the last decade and the consequences are beginning to emerge. The most visible is the tightening of excess supply and its vulnerability to interruption. This tightening is not likely to ease, due to the high cost of adding new supply, limitations of low cost production, and lack of incentive for low cost producers to increase production. Nonetheless we have much lower prices today apparently due to increased sensitivity of price to multiple conditions and not just supply and demand. The implication of these trends is a long term upward pressure on the cost of oil supply which can only be supported with appropriate price. ■

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**Biographical Sketches**

**RICHARD S. BISHOP, PH.D.** (r.bishop@rskuklimited.com) is a geologist who has worked the spectrum of research, exploration and production for Unocal (2 years), ExxonMobil (29 years), and as a consultant/ independent (10 years including RSK). During this time he has seen the world, both as an explorationist and as a synthesizer of global exploration opportunities. He has published on mechanics of piercement diapirism, abnormal pressures, mass balance of prospect assessment, giant fields, implications of overcharge to prospect assessment, US production potential from shales, and world oil supply in transition. In addition, he has numerous proprietary reports on assessment methods, guidelines and results for both plays and prospect assessment.



Dick is Past President of the American Association of Petroleum Geologists, the Houston Geological Society and a past chair of

SIPES Houston Chapter. He has been recognized with the AAPG Sproule Award, is a Distinguished Alumnus of the University of Missouri, and an Honorary Member of both the AAPG and HGS. He was also recently named a Legend of the HGS.

Dick earned his Ph.D. from Stanford University, his M.A. from University of Missouri, and B.S. from Texas Christian University. He is currently Executive Director and Chief Geologist of RSK.

**WAYNE L. KELLEY** (w.kelley@rskuklimited.com) is the Managing Director and Chief Executive Officer of RSK [UK] Limited. Prior to co-founding RSK in 2003, he started his career in 1974 with Pennzoil and since that time has worked in E&P in Alaska, Brazil, Canada, Mexico, North Sea and much of Africa. Kelley attended Trinity University and the Colorado School of Mines.

