

Mamdouh G. Salameh

CONVENTIONAL & UNCONVENTIONAL OIL RESOURCES SHOULDN'T BE CLASSIFIED EQUALLY AS CRUDE RESERVES

Oil Market Consultancy Service, UK / World Bank, Washington DC,
Phone: +44 1428 644137, E-mail: mgsalameh@btconnect.com

OVERVIEW

Unconventional oil resources such as Canada's tar sands oil, Venezuela's extra-heavy oil and Shale oil have been promoted as a major source of energy that could offset the decline in conventional oil production and reduce dependence on Middle East oil. Others by contrast see unconventional oil as an expensive and extremely pollutant oil source whose production consumes voracious amounts of energy.

Conventional crude oil is defined as a free-flowing liquid mixture of hydrocarbons that exists in a liquid form in natural underground reservoirs and remains liquid at atmospheric pressure after passing through separating facilities. The term crude oil is restricted to liquid mixtures of hydrocarbons and related compounds, which are capable of flowing up a well-pipe, either under pressure existing in the reservoir, or with the mechanical assistance of bottom-hole pumps, or gas lift. Excluded from this definition is oil extracted from shale or from the highly-viscous, semi-solid deposits found in Canada's bituminous tar sands oil and Venezuela's extra-heavy deposits oil.

Unconventional oil has an API ranging from 7%-8%. This compares with 22.3% or less for heavy oil and 22.3%-31.1% for medium oil and 31.1%-45% for light or sweet oil. This means that on the basis of API, 3 barrels of unconventional oil will equate with one barrel of conventional heavy oil, or 4 barrels with a barrel of conventional medium oil or 5 barrels with a barrel of conventional sweet or light oil. So when Canada claims that it has proven reserves of 173 billion barrels (bb) of crude oil, this should not be taken to mean as 173 bb of Iraqi or Saudi reserves but should only equate to 58 bb of conventional heavy oil or 43 bb of medium oil or 29 bb of light oil.

There is another major difference. The recovery factor (RF) for unconventional oil ranges from 5%-10%, while conventional oil reserves have a global average RF of 34%. Only 9 bb -17 bb barrels of oil could be recovered from Canada's claimed 173 bb of unconventional oil reserves compared with 59 bb of oil recovered from similar reserve base of conventional oil. Therefore, it is ludicrous and illogical to treat unconventional oil reserves equally as conventional oil reserves. And when it comes to productivity, unconventional oil lags hugely behind conventional oil. The real problem is the slow extraction rate. It is estimated that only 5-10 barrels a day (b/d) can be extracted from a single producing well of extra heavy oil compared to 10,000 b/d from a conventional oil well of similar reserve size.

Anywhere in the world, of course, it takes energy to produce energy. But tar sand oil and extra-heavy oil are especially voracious consumers of energy, consuming about 1000 cubic feet of natural gas to convert a barrel of bitumen into light crude that refiners want. In 2008 Canada produced 1.20 million barrels a day (mbd) of tar sand oil consuming in the process an estimated 1.2 billion cubic feet (bcf) of natural gas a day, equivalent to 7% of Canada's daily production of natural gas.

And to add to their woes, the extraction and upgrading of one barrel of unconventional oil releases 75 kg (165 lb) of GHG emissions. This is 15% higher, on average, than GHG emissions from conventional oil production. Tar sand development is the single largest contributor to the increase in climate change in Canada emitting currently 40 million tones of CO₂ per year and this is projected to rise to 80 million tones by 2011. In addition to this, oil sands operations cause deforestation and pollute water resources with toxic chemicals.

METHODS

The author will use his own research and collate it with research from other credible sources in order to present a well-balanced analysis on why unconventional oil resources can't qualify as crude oil and therefore can't be classified as proven crude oil reserves like conventional oil.

RESULTS

The paper will argue that on the basis of API, recovery rate, environmental and productivity factors as well as the energy input needed to produce them, unconventional oil reserves should not be classified equally with conventional oil as crude oil reserves.

Conclusions

The paper will conclude that in no way could unconventional oil resources qualify as crude oil nor could they be classified as proven crude oil reserves like conventional oil reserves. It will also confirm that Canada's claimed 173 bb of tar sands oil reserves are not the equivalent of 173 bb of Iraqi and Saudi reserves ,for instance, in terms of quality, productivity, cost and adversity to the environment. The paper will reach the conclusion that any benefits to the Canadian economy from the production of tar sands oil are outweighed by the adverse impact on the environment in terms of deforestation, degradation of land and water resources and voracious consumption of natural gas.

* Dr Mamdouh G. Salameh is an international oil economist, a consultant to the World Bank in Washington DC on oil & energy and a technical expert of the United Nations Industrial Development Organization (UNIDO) in Vienna. Dr Salameh is Director of the Oil Market Consultancy Service in the UK and a member of both the International Institute for Strategic Studies (IISS) in London and the Royal Institute of International Affairs. He is also a member of the Energy Institute in London.

REFERENCES

1. BP Statistical Review of World Energy, June 2009.
2. Canada's Energy Review (2007). National Energy Board of Canada.
3. Canada's Oil Sands: Opportunities & Challenges to 2015: An Update (2006). National Energy Board of Canada.
4. The Facts about the Alberta tar sands climateandcapitalism.com. Retrieved 2008-03-07.
5. Salameh, Mamdouh G. (2009). Saudi Crude Oil Reserves: The Myth & the Reality Revisited (a paper given at the 10th IAEE European Energy Conference, Vienna, Austria).
6. Strahan, David (2010). Petroleum Review, February 2010.