

## **How Should We Anticipate the Future of Unconventional Oil Resources?**

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On April 30, the International Energy Agency sponsored a workshop on the future of unconventional oil resources in Paris. The IEA plans to focus on prospects for the oil market as a key topic in its World Energy Outlook 2013 (WEO 2013) to be released in November this year. In preparation for working out the WEO 2013, the IEA gathered experts from throughout the world for the workshop titled “the Future of the Tight Liquid Revolution.”

About 80 experts, industry representatives and policymakers participated in the workshop and vigorously discussed a wide range of topics from shale oil (tight oil) resources, development, production and other issues for the upstream unconventional oil and gas sector to midstream and downstream issues such as pipelines, refining and petrochemicals, and how unconventional oil development would impact the international oil market. In the following, I would like to take up impressive points for me at the workshop.

First, participants in the workshop reaffirmed that great expectations are placed on shale and other unconventional oil resources development. Regarding U.S. shale oil (tight oil) that has attracted global attention with its rapid production expansion over recent years, industry stakeholders undertaking actual unconventional oil development and production as well as expert and industry organizations have provided considerably accurate assessments of resources including proven deposits in the US. Various proven deposit estimates were given at the workshop, confirming that there are abundant resources sufficient to support future production growth.

For other countries than the United States, various efforts are ongoing to assess unconventional oil resources. But such efforts have just started, lagging far behind those already made in the U.S. In this sense, both expectations and uncertainties are great on non-U.S. unconventional resources. At the workshop, Russia, China and Venezuela among others were cited as those rich with unconventional oil resources. Various estimates of global shale oil (technically recoverable) resources were given, including the maximum of some 1 trillion barrels. These estimates must be subjected to future strict screening/assessment. One workshop participant pointed out that while the abundant resource potential is important, above ground factors are actually even more important. They include tax and other fiscal systems for developing resources, environmental and other regulations, the availability of relevant infrastructure including drilling rigs, pipelines and railways, oil and service industry arrangements, and human resources.

Second, workshop participants discussed details of the present situation and future prospects for shale oil (tight oil) production and development in the United States and other major countries. Regarding the United States, discussions covered break-even cost analyses and future production projections based on actual data at major production locations including Bakken, Eagle Ford and others. Given that industry efforts are ongoing to reduce production costs, workshop participants roughly agreed that present oil prices would allow shale oil production to continue increasing over a medium to long term. Interestingly, however, these experts differed widely over production growth in the more distant future beyond 2020.

Mainstream forecasts at the workshop said U.S. shale oil (tight oil) output would increase to around 3 million barrels per day around 2020 and level off or fall slightly later. But a bullish forecast said production would rise even further to 5 million bpd by 2030. Even in the United States that has gone ahead of others in developing shale oil resource development, future prospects are very uncertain. Therefore, it is very difficult to forecast shale oil output in other countries than the United States. Workshop participants took up Russia and China as major non-U.S. countries rich with shale oil resources. But they pointed out that these countries have just launched shale oil development efforts and that considerations should be given to whether these countries have infrastructures, oil industry structures and resources ownership conditions that are similar to those that have supported the rapid production growth in the United States. As for China, they also cited the impact of water resources constraints (water availability constraints). For the entire world, shale and other unconventional oil production is certain to increase. But future production conditions including oil price movement which is expected to impacts shale oil development are still uncertain.

Third, workshop participants discussed a wide range of impacts that expanding shale oil output will exert on the international oil market. Impacts cited on the downstream sector (refining and petrochemical sector) included the effects that enhanced competitiveness and expanded exports from the U.S. oil refining and petrochemical industries would have on international markets. Some participants paid attention to how U.S. shale oil (light tight oil) production growth would affect global oil flows. One participant pointed out that these changes should be understood as “a basic current” of market fundamentals and that resisting or neglecting these changes would cost much. A more macro view was that substantial increase in shale oil production could develop into a rival to the Organization of Petroleum Exporting Countries as the shale oil output growth greatly affects the supply-demand balance in the international oil market. In this respect, one workshop participant said that the trend of shale and other unconventional oil production growth may lead to create “a ceiling” of future oil prices at around \$90 per barrel.

As noted above, great uncertainties exist about the future of shale and other unconventional oil production in the world as well as in the United States. Since the impacts and significance of such uncertainties are very great for all the stakeholders related to international oil market supply and demand, crude oil prices, and upstream and downstream supply chains, industry people are growingly required to timely and accurately analyze information on the future of shale oil development.

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