Unconventional Petroleum Resources: Current and near Future Energy to the World

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Unconventional petroleum resources, such as shale gas and tight oil reservoirs, have been receiving great attentions due to their large reserves, successful production in North America, and contributions to total world energy. These unconventional energy resources have shown potential to support significantly to world energy supply for decades to come and resolve near future world energy needs, while the world is waiting for the progress being slowly made for sufficient sustainable clear energy resources to be developed. During the past two decades, the oil and gas industry in North America has been successfully evolved into the era of commercially developing unconventional oil and gas plays. In this talk, “unconventional reservoirs” mainly refers to shale gas, tight gas, and tight oil reservoirs and their potential to contribute world energy supply. Currently, about three quarters of the natural gas production and more than one third of the total petroleum liquids produced in the U.S. were contributed by unconventional reservoirs. These numbers are predicted to keep increasing in the next few decades. Meanwhile, great success in North America enables unconventional resources to gain more and more attention in other countries, e.g., China and Argentina. Nonetheless, there are significant challenges to develop these unconventional resources and estimated ultimate recovery (EUR) of unconventional reservoirs is very low, i.e., less than 10% for tight oil and less than 30% for shale gas. The fractured horizontal wells generally decline to 10-20% of their initial production rates in 1-2 years, leaving neither the hydrocarbon recovery nor the investment utilization maximized. Therefore, in the past few years, some traditional and new improved oil recovery (IOR) and enhanced oil recovery (EOR) methods have been studied worldwide. In this talk, we will discuss some of these challenges and future developments.

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