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The successful development of shale gas and tight oil resources in North America

The hydrocarbon resources of shale gas and tight oil have made a significant impact on North American energy supplies over the past decade. The production of so-called unconventional natural gas from US and Canadian shale has saturated North American gas markets, boosted Canada's exports and turned the US into a net exporter of natural gas. Tight oil from the Bakken Shale has made North Dakota the second largest oil producing state in the US, trailing only Texas, which maintains first place because of equally prolific liquids production from the eagle ford shale and multiple shale in the Permian basin. Shale development blossomed in the United States between 2005 and 2010, driven by high energy prices, favorable lease positions and the availability of technology that could economically produce commercial quantities of hydrocarbons from these formations. Development in Canada began later and some shale has also been developed in Mexico. It is difficult to overstate the importance of shale gas and oil resources to the US and North American energy economies. Because US unconventional oil and gas achieved dominance in less than a decade, it appears too many people that it came out of nowhere. In reality, researchers and industry went through an intense and protracted technical struggle. Modern attempts to assess and produce these resources began in the late 1970s, but success was elusive for nearly 2 decades until some visionary people hit upon the combination of horizontal drilling and staged hydraulic fracturing that proved to be a successful technology for producing shale gas and tight oil reservoirs. Shale development creates environmental risks to air and water and technology that works on a shale play may not work on another. Other countries are looking to North American for leadership on environmental and developmental challenges as they consider producing their own shale resources.

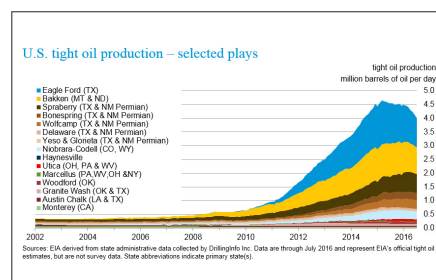


Figure-1: Source: US energy information administration reports and web pages.

Recent Publications

1. Soeder Daniel J and Kent Douglas B (2018) When oil and water mix: Understanding the environmental impacts of shale development. *GSA Today*.
2. Soeder Daniel J (2018) The successful development of gas and oil resources from shales in North America. *Journal of Petroleum Science and Engineering*; 163: 399-420.

Biography

Daniel J Soeder is the Director of the Energy Resources Initiative at South Dakota, School of Mines and Technology in Rapid City, SD, USA. He has joined SD mines with 8 years of experience as a Research Scientist at the Morgantown, WV campus of the US, Department of Energy (DOE), National Energy Technology Laboratory, where he investigated the environmental risks of unconventional oil and gas development. He has worked for 18 years as a Hydrologist with the US Geological Survey (USGS) studying groundwater contamination on the US east coast and nuclear waste isolation in Nevada. Prior to joining the USGS, he had spent a decade with the Gas Technology Institute in Chicago, researching hydrocarbon production from unconventional resources. He has also worked as a DOE Contractor collecting and characterizing eastern gas shale project cores. He holds a BS from Cleveland State University and MS from Bowling Green State University (Ohio), both in Geology.

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