

The Role of Unconventional Oil and Gas: A New Paradigm for Energy

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For the last 40 years, U.S. energy policy has been predicated on the dual notions of growing demand and resource scarcity, especially in relation to oil and natural gas—which are responsible for roughly two-thirds of U.S. energy consumption. As a consequence, we have looked to imports to balance our supply-demand needs, and in the process, have experienced periods of significant price volatility. In March 2012, President Obama reiterated his pledge for attaining a secure energy future. He promised nothing less than the transformation of our current fossil fuel-based energy system to one that is cleaner, more secure, and sustainable.

Most analysts agree that for a variety of reasons (growing global demand, concentration of resources, limited access and governance challenges, infrastructure needs, balance of payments outflows, changing geopolitical alliances, and security considerations) the current energy system is simply unsustainable. A transformation is already underway. But make no mistake, it will take decades to complete.

Fossil fuels (coal, oil, and natural gas) account for roughly 85 percent of global energy consumption. Renewables and nuclear make up the rest. And while the growth in solar and wind has been enormous, the base is small, and intermittency and infrastructure challenges remain a significant hurdle to widespread adoption. In the wake of the Macondo oil spill in 2010, the Fukushima nuclear incident in 2011, and the shale gas “revolution,” the energy landscape is changing. Higher prices and technology applications at scale are driving the unconventional resource revolution as there are enormous unconventional oil and gas resources both here and abroad. This phenomenon has the potential for creating a new energy reality, one in which the United States once again becomes a global leader in oil and gas production. This, coupled with efficiency improvements and alternative supplements, can substantially reduce U.S. oil imports, achieving a significant reduction in our balance of payments. It can also simultaneously create an engine for economic growth, a platform for technology and innovation, job creation, new tax and royalty revenues, and the revitalization of domestic industries.

Moreover, if properly and prudently managed, the successful development of these resources will give us the “breathing space” to develop and dispatch the next generation of cleaner-burning/lower-carbon fuels that currently do not exist at scale.



Source: U.S. Energy Information Administration based on data from various published studies. Canada and Mexico plays from ARI. Updated: May 9, 2011

THE SHALE GAS REVOLUTION

The growth of shale gas production in the United States over the past decade has been truly remarkable. As a consequence of access (mostly on private lands), higher prices (2007–2008), and the application of hydraulic fracturing (fracking) technology and extended-reach lateral wells, the ability to economically unlock this vast “source rock” resource has elevated the United States to the position of the world’s largest natural gas producer. This is an astounding accomplishment, as only a few years ago it was projected that the United States would become increasingly dependent on pipeline gas from Canada and imports of liquefied natural gas (LNG) from around the world.

Less than a decade ago, shale gas comprised less than 2 percent of domestic output. Today it accounts for almost a third. The enormous success

in shale development has resulted in significantly lower prices, reduced consumers’ electric bills, and stimulated discussion about exports and the revival of a competitive domestic petrochemical industry.

A recent report by the National Petroleum Council (NPC) projects a possible resource base of several thousand trillion cubic feet (TCF), suggesting more than a hundred years’ supply at current consumption rates. As we continue to learn more about the shale resource plays, recent supply forecasts have become more bullish.

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That said, as with all energy sources, there continue to be operational risks and consequences. The practice of fracking is not without controversy. Environmental concerns about water contamination, water use at scale, recycling and proper disposal, land use, property values, noise, haze, methane, and greenhouse gas emissions, seismicity concerns around wastewater disposal, congestion and other local issues will have to be responsibly addressed. But technology, well integrity, operational “best practices,” and community engagement, coupled with proper regulation and enforcement, should make realization of the benefits of this resource achievable.

TIGHT OIL

The application of lateral wells and fracking technology has had a similar impact on tight oil and shale oil development. Development of the Bakken oil shale formation has catapulted North Dakota past California as the nation’s third-largest oil producing state, and similar development is also taking place in the Niobrara, the Monterey, the Utica, Eagle Ford, and other basins around the country.

At the turn of the century, U.S. tight oil production was around 150,000 barrels per day (b/d). Last year it approached nearly 1 million b/d. Current projections estimate that it could approach 2.5 million to 3 million b/d (or more) by 2020. When coupled with increased production from the offshore—including the ultradeep water and lower tertiary formations, oil sands (yes, the United States has oil sands), shale oil, oil shale, natural gas liquids, conventional onshore production, and the Arctic—U.S. production could exceed 10 million b/d, rivaling the current output of Russia and Saudi Arabia.

When alternative fuels and reduced demand due to efficiency improvements (CAFE standards) are factored in, U.S. imports (and our oil imports bill) can inevitably decline.

Not surprisingly, many of the concerns related to shale gas development are also associated with accessing unconventional oil. As is the case with unconventional gas, industry has committed to step up its game with respect to responsible management of both “above” and “below ground” issues, greater transparency, education and community engagement. Smarter, safer, cleaner is now an operational necessity.

CONCLUSION

At this writing, U.S. oil production is at its highest level since 2003. Natural gas has eclipsed the previous output record set back in 1973. Oil imports comprise less than 49 percent of total consumption, and refined product exports are averaging almost 3 million barrels per day, giving the domestic refining sector an enormous “value add.”

As development continues at scale, new issues will undoubtedly arise—including the build-out of new supporting infrastructure, the role of exports, the timing and sequencing of development initiatives, the right mix of federal and state regulation, etc. However, the prospect of sizable new production opportunities in the United States and North America necessitates a reassessment of our decades old tool kit and a serious policy rethink when it comes to mapping out the coming decades as we progress toward a more sustainable energy future. ■