

University Of Texas Study Puts Bakken Shale Under A Microscope

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Scott W. Tinker, bureau director of the University of Texas Bureau of Economic Geology, presented a comprehensive new study on the Bakken Shale at Hart Energy's 2017 DUG Bakken & Niobrara conference.

DENVER—A comprehensive new study on the Bakken Shale completed by the University of Texas Bureau of Economic Geology was presented at Hart Energy's 2017 DUG Bakken & Niobrara conference the week of March 13, and it was all good news in spite of lower oil prices, according to bureau director Scott W. Tinker.

Beginning with a look at the overall economy and the effect of oil and gas prices, Tinker told the audience that there has always been a tight link between the price of oil and the economy. During spikes in oil and gas prices, the economy starts heading into a recession and unemployment rises and spending falls.

"Currently, the demand for oil is strong in the U.S. and in Europe," Tinker said. "In the past year, China made more cars than the U.S., and India is doubling the number of cars on the road every seven years now. In two years it will surpass the U.S. in the number of cars."

In India, most of the automobiles are diesel, leading Tinker to ask, “And, where is the fuel for all these cars going to come from?”

There were about 1.5 trillion barrels of oil sold in in the past year, but there are still a lot of reserves out there.

“Since 2007, North American production has gone from about 5 million barrels per day to about 10 million barrels per day. Nobody thought that would happen, including that 50% of U.S. production is from shale,” Tinker said.

“At \$100 per barrel, we were going after a lot of oil and gas in the shale and unconventional products. But when the price falls to \$30, a lot of it seemingly goes off the table. Then you hear in the media that the shale movement is dead,” he continued.

“But we all know that when price comes down, we also see oilfield costs come down and we see this dynamic between price, cost, technology, demand and policy. And the policies have certainly changed since November. But for the Bakken, our study looked at what is economically and technically recoverable and what are the long-term production scenarios.”

Svetlana Ikonnikova, a research scientist at the Bureau of Economic Geology, described the variables used for the research study. According to Ikonnikova, the upper, middle and lower Bakken, as well as the Three Forks region, were examined. The study included a 3-D look at the heterogeneity from the top of the Bakken to the bottom of the Three Forks.



Svetlana Ikonnikova, a research scientist at the Bureau of Economic Geology, described the variables used for the research study at DUG Bakken & Niobrara in Denver. (Source: Hart Energy)

“In trying to estimate the in-place resource, we try to look at the estimated oil and estimated gas in place,” she said. “We take the key components, including thickness,

water, porosity, to determine the 'hydrocarbon core volume.' It is combined with the temperature and pressure data and we combined it with other 3-D maps to estimate the resource in place for every square mile and vertical horizon."

Their mapping showed that the Bakken has about 220 billion barrels of oil equivalent in place.

"Most of the production is from the middle Bakken but is also sourced from the upper and lower Bakken. The upper and middle Three Forks look smaller than the Bakken, although it is still a considerable resource," Ikonnikova said.

Once they had determined the geological setup, they still needed to know where the wells land in which layer of the Bakken.

The study examined predictions of what the production would be from every single well, and examined production during a 12-month period.

Once productivity is determined, operators can look at the model and know where the most productive areas are, and where technology can help them produce even more.

"We see this map as a dynamically changing and that is because the technology at-hand is changing," Ikonnikova said. "And because the technology is changing, we think that there are still more than 100,000 locations that still have about 15 billion barrels of technically recoverable oil, with current technology."

A well economics model was also developed using well spacing, lateral lengths and oil prices—as prices go up or down, the model can show the expected profitability of a well or series of wells in a play area. Gas and water production volumes were also included, and depending on the price of each, the model can also show profits or, for the changing environmental regulations, costs required to either sell the gas or water or dispose or transport these volumes.

"With the model, we are trying to be more cautious than optimistic, largely because of the changing and usually improving methods of available technology to get products out of the ground," Ikonnikova said. "And maybe in the future, we should be more daring and look at the technology more aggressively."

According to Tinker, the university plans to make the 3-D models available to operators for a nominal fee for the six basin models they have developed. The next model to be developed will be for the Permian and the Delaware basins and is being developed with the [Tight Oil Resource Assessment \(TORA\)](#) program at the university.

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