News
Texas is a major oil producer, yet prices remain high

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Oil may be in the ground, but it's also in headlines amid political turmoil, rising prices and earthshaking news.

Two Texas Tech University professors explained oil, the economics of it, and why gas prices are so high when the Lone Star state is a major provider of black gold.

Here's what Marshall Watson, Roy Butler Chair/Department Chair in the Bob L. Herd Department of Petroleum Engineering, and Nikki Kantelis, associate professor of practice in Energy Commerce in the Rawls College of Business, said on the topic of the oil industry.

What happens

to Texas oil?

There are two types in Texas – traditional (conventional) crude and shale (tight). Shale is a lighter crude oil, less dense and thick than conventional crudes, though conventional can also be light in color. The other difference comes from the rock layers.

"We use the term 'tight', meaning that the oil has a hard time moving through the rock," Watson said. "It doesn't move very fast in this rock, and it doesn't move very far. That's why we have to drill the wells horizontally and fracture them to get them to the well bore."

The tight oil shale are reservoirs that cannot be economically produced with conventional vertical wells.

Watson said most of the oil goes to refineries on the Gulf Coast. There are refineries in Big Spring and Borger that take some of the crude oil. These refineries on the Gulf Coast are not equipped to process the light shale crude from Texas sites including the Permian Basin.

"They're mostly equipped to handle the Mexican and Venezuelan crude imports," Watson said. "A lot of the import-export happens because we're set up to handle this kind of crude, so let's import the crude that makes our refinery the most efficient. And export the crude that works for other refiners."

Watson said that the refinery industry is taking bigger, efficient refineries and expanding them, versus building new ones. Part of this could be due to permitting restrictions. Brownsville is an exception with the recent America First Refining project set to become the first new refinery in 50 years.

Why is oil, gasoline

so expensive?

That short question has an expansive answer. Even though oil is found in the U.S., the prices of oil are determined by a global market. Gasoline is a type of oil product, primarily known as C6 and C7 due to their carbon molecules.

"We're exporting our additional volumes," Watson said. "But the problem is, the crude oil price is not set by a closed U.S. market. It's a world market. As far as oil goes, it's a perception of what is going to happen. So as soon as we start dropping bombs on Iran, the perception immediately is that's going to close the Strait of Hormuz and we're not going to have any more oil again."

The crude is sold to a refinery, which refines and separates it into products including gas and butane. For gas, companies such as Valero will get the product, put their additives in, then put it at their gas station pumps.

"The oil and gas industry is a global commodity business," Kantelis said. "The Texas oil industry does not operate in a vacuum, it operates as part of a global commodity market. The retail price of gasoline, regardless of who owns the convenience store or gas station, is part of the global marketplace adjusted for local supply and demand conditions. Most Convenience store and retail gasoline outlets are owned by individuals or small operators in a 'franchise agreement' arrangement with the major oil companies and therefore make their own independent pricing and operating decisions."

On top of that, oil, when it is out of the ground, is taxed by the state with severance taxes. For every dollar, Texas gets 4.6%. It also pays local property and income taxes. The property tax is based off of what's under the ground and the surface equipment.

With that said, Watson said more domestic production can equate to lower consumer prices, to an extent. The main component to that equation is transportation costs.

"To some extent, yes, because obviously there's a major cost if you buy the crude oil from Venezuela or Brazil or West Africa, there's a cost to transport that oil here," Watson said. "But where it gets complicated is that our refineries are built to process that type of crude oil. So, at the end of the day, it may be cheaper to buy the crude oil, especially a lesser grade of crude oil that commands a much lesser price than the crude oil produced out of the Permian Basin. The only key that could play in there is the transportation cost."

Do fracking, fracture wells cause earthquakes?

Horizontal fracture wells pump a water-sand mixture into the rock, which creates fractures that allow the oil to be harvested. Watson said this does cause micro-seismic events, but those are not felt on land.

"Most people think, when we talk about hydraulic fracturing, it's blowing the rock up, which is totally not true," Watson said. "What causes these earthquakes is not the hydraulic fracturing. It's dealing with this water we're producing back from the wells, and then we inject it in saltwater disposal wells."

Watson explained that the fluid that is injected into disposal wells go into the Ellenburger Formation, at least 20,000 feet below the surface in West Texas and other portions of the U.S. Sometimes, the wastewater finds its way into a fault, which becomes pressurized and slips.

The **Bureau of Economic Geology** in Austin has looked into the issue and made reports detailing where these deeper faults are.

"That's what gives you an earthquake," Watson said. "So (the bureau) helps the operators place the wells where they're not close to faults."

What happens when an injection

well causes an earthquake?

Permitting for injection wells begins with looking for seismic activity in the area over the past 20 years. If there has been activity, permits are rejected, according to Watson. When an injection well is determined to have caused an earthquake, it is shut down by the Railroad Commission, which oversees the industry in Texas.

"The earthquakes caused are not by hydraulic fracturing," Watson said. "They're caused by injecting water, and the commission is on top of that. They're curtailing or even shutting down water injectors that cause it, and they're doing it immediately."

What happens to the water used

by the oil and gas industry?

For one barrel of oil in the Permian Basin, Watson said it produces two to five barrels of water. Watson said the industry's wells use about 60% of the water it produces in the drilling process for fracture treatments.

The industry's produced water needs to be disposed of, which leads to the question: What can be done with it? The Texas Produced Water Consortium, based at Texas Tech, has worked to answer that question since 2021. The consortium tests the produced water for hundreds of things in the water, along with using filtration systems. One of the potential solutions it is studying is for agricultural uses.

"We're over in the greenhouses right now across Marsha Sharp (Freeway), and we're actually growing crops using produced water that has been cleaned," Watson said. "When I say clean, I mean it is cleaner than drinking water."

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