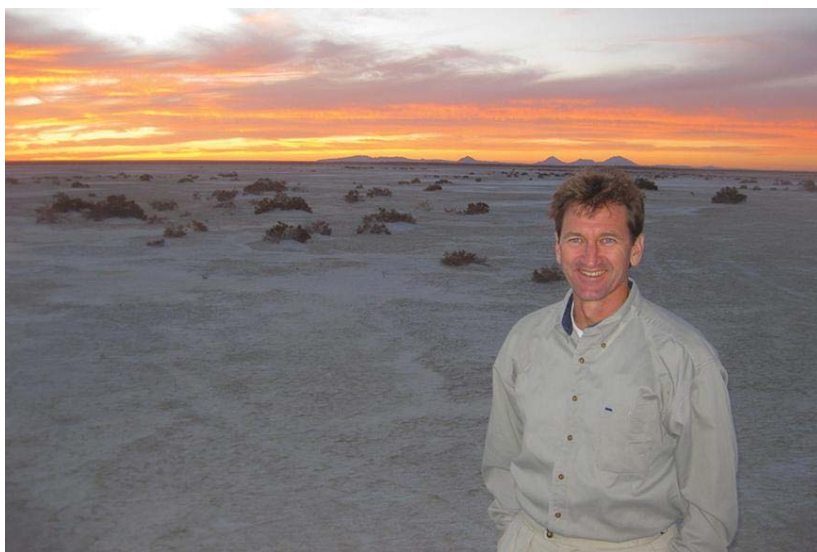


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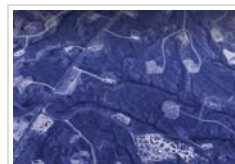


Solving the Riddle of Shale

July 2018 | Barry Friedman, Explorer Correspondent

In his documentary "Switch," Scott Tinker, Texas state geologist and director of the Bureau of Economic Geology at the University of Texas, along with filmmaker Harry Lynch, set out to make a film about energy's inexorable transition into the 21st century. The year was 2009. His goal, Tinker said at the

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time, was not to pick one form of “new” energy over any other, but to talk, in fact, about the inevitability (and predicted benefits) of all that was out there.

It was an unapologetically upbeat look at the future.

Before you can change an industry, though, you need to change the conversation – a conversation that continues today.

At this year’s Unconventional Resources Technology Conference July 23-25, in Houston specifically during the opening plenary session, “The Shale Revolution – Getting Down to Business,” Tinker will continue the dialogue, discussing, specifically, the elephant in the unconventional resources room, in a session called “Enigmatic Shale.”

Vast Potential

So if production from shale reservoirs has changed the economy and energy landscape of the United States – which it has – is it really still an enigma?

In shale’s case, yes, because time hasn’t always meant understanding.

“Shale has been drilled since drilling began, with oil and gas shows well known in shale cores and cuttings. But it is just in the last two decades that natural gas production from shale began, and the last decade for shale oil. Understanding of shale reservoir rock fluid systems is thus in the early stages,” he said.

This much, however, is known: largely because of shale, the United States is poised to dethrone Russia and Saudi Arabia as the world’s lead oil producer.

The potential is literally and figuratively enormous.

“Conventional oil and gas production is the oil and gas that has leaked off from the source rocks,” said Tinker. “Where you have conventional oil and gas production, you have mature source rocks. Thus, global shale gas and shale oil resources are vast.”

How vast?

Studies show that ultimately recoverable resources of shale are massive, yet ultimate production from shale given current technology represents less than 10 percent of the resource in place.

A Many-sided Riddle

No doubt that has changed the country’s energy future, but converting those resources to reserves and production is where the challenge lies.

And one such challenge – surprising no one – is environmental.

“Environmental impacts from all oil and gas activities are real, shale or otherwise. Unconventional shale reservoir impacts are broader than conventional reservoirs because of the extensive nature of shale deposits, and the volume of injected, produced and disposed fluids that have to be handled in hydraulic fracturing operations,” said Tinker.

Those disposed fluids are, in many cases, the third rail of hydraulic fracturing



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and Tinker, while aware of the problems, sees progress.

"The industry is improving every year," he said.

Tinker references lower surface impacts at multi-well pads, to lower water use per unit of production, to use of brackish instead of fresh water for fracturing, to produced fluid recycle and reuse, to improved disposal of fluids and earthquake mitigation, and much more.

But it remains a large-scale industrial operation.

Tinker – who is chairman of the Switch Energy Alliance, which creates free, non-partisan, film-based resources to help students learn about energy – said there is a two-way street on which shale, the country's energy prospects, its economic outlook and politics all travel.

"Politics, especially regulation and trade agreements, play a role for sure," he said, especially because the United States has led the world in shale.

"Too much regulation and heavy tariffs drive costs up. Too little regulation risks environmental impacts," Tinker added.

That story is well known. This one perhaps not as much.

"But the shale story is global, and other major oil and gas regions – the Middle East, Russia, South America – are now beginning to quietly examine their unconventional reservoirs," he said.

Benefits of Shale

Tinker is convinced, as one might expect, that the benefits of shale – perhaps the most conventional of the unconventional – outweigh the negatives.

"Natural gas from frac'ing is replacing coal for power generation, thus lowering CO₂, sulphur, nitrogen, particulate and mercury emissions. It is also used in the power plants to backup intermittent wind and solar power generation," he noted.

He said the data on fracturing – economic, security and environmental – of oil and natural gas are all generally positive.

"Affordable, available and reliable oil and natural gas underpin healthy economies allowing for environmental investment; are needed to lift emerging economies from poverty; and provide energy security to many developed and developing nations," he said.

That topic – energy poverty – is the subject of Tinker's next film, "Switch On."

There's no panacea out there, Tinker reminds us. There never has been. In the industry, there have always been trade-offs on environmental, energy and economic matters, depending, in part, on whether you're talking about

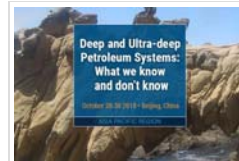


Water tanks preparing for a hydraulic fracturing job. Photo by Joshua Doubek.



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governments, NGOs or industries.

Who's in? Who's out?

"As with all things, those that have the resource are mostly in, and those who aren't, don't. But on top of that we layer politics. Development of oil and gas, and coal, tends to be resisted more by 'progressives,'" (and he said that politicians have to follow the wishes of their voter base), "and by non-oil and gas industries who compete for market share, like electric vehicles, biofuels, geothermal, solar and wind," Tinker explained.

It is a resistance he said that has many layers.

"This resistance is often couched in environmental terms, mostly climate change, but runs deeper philosophically for some," he added.

The dynamic going forward is, in a sense, as its always been.

"The future for oil and gas is mostly a technology and demand story. Will technology keep the cost of oil down so that gasoline, diesel and jet fuel can compete in the transportation markets? And keep the price of natural gas down so that it can compete in the power generation, and potentially transportation (CNG, LNG, fuel cells) markets?" Tinker pondered.

As exciting as the time is for unconventional energy sources, including shale, there is still the reality.

Let's call it maturity.

"And a little told story is the coming environmental impacts of large scale wind, solar and battery development: from mining, to manufacturing, to transmission, to disposal. Nothing in energy, at scale, comes without environmental cost," he added.



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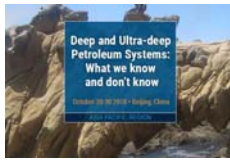
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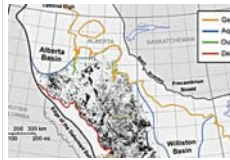
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