

U.S. Shale Production Proves Resilient to Price Collapse

By LOUISE S. DURHAM, EXPLORER Correspondent

Given the high profile of U.S. shale production, it's easy to forget this phenomenon kicked off a mere decade ago, give or take.

As the number of shale oil and gas plays proliferated, so did the naysayers.

The negative predictions focused on the well-known rapid decline in production that occurs once these wells go online.

Instead of an early death, the ensuing boom upset the world order in oil production.

A number of the shale-intensive operators have ended up in bankruptcy or closed their doors, but some of the stalwarts cut costs and even increased production by investing only in core



CHARLEZ

Philippe Charlez, unconventional resources development director at Total, and Pierre Delfiner, president of PetroDecisions will present, "Resilience of the U.S. Shale Production to the Collapse of Oil and Gas Prices" next month at the Unconventional Resources Technology Conference (URTeC) in San Antonio, Aug. 1-3.



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assets with the best return.

This resilience, a clear refutation of the early doubters, has been the focus of a scientific study detailed by Philippe Charlez, unconventional resources development director at Total, and Pierre Delfiner, president of PetroDecisions.

"In spite of a strong decrease in the number of rigs operating in gas plays after the price collapse in early 2012, the aggregated production of the three major gas plays – Barnett, Haynesville, Marcellus – continued to grow steadily and even at a higher rate," Charlez said. "In 2015, a rig

(was shown) to bring between five and 10 times more instantaneous production than it did in 2008."

Persistent Production Increase

The average production of these plays hasn't ceased to increase since 2005.

"Over the past two years and with three times fewer operating rigs, the growth has been even more significant than that registered before the collapse of gas prices," Delfiner said.

That shale production is highly resistant to declining activity will likely surprise some industry players.

To highlight and better understand resilience factors of an unconventional play, Total developed a model dubbed Unconventional Factory Development simulator (UFDsim).

Charlez explained that the model simulates the factory development of a core area by calculating the required development schedule.

In other words, it calculates the number of wells to be drilled, fractured and connected to reach and maintain a production potential.

Besides the three gas plays, the software model was used to simulate the production history of the Bakken and Eagle Ford for oil.

Charlez outlined the resilience factors:

- ▶ Size of well portfolio: the rig numbers required to maintain a production plateau decreases significantly with time and the number of wells put on stream. The UFDsim model highlights that a large portfolio of wells drilled at different maturities acts as a "shock absorber."

- ▶ Improvements in operational performance: apart from the number of wells, drill and complete time/performance appears to be a factor.

- ▶ Improvement in production performance and EUR: this entails geological expertise that leads to identification of high potential areas, "sweet spots," along with completion design.

Improvement in EUR and production performance rank as the most efficient of the three resilience factors.

Play-to-Play Comparison

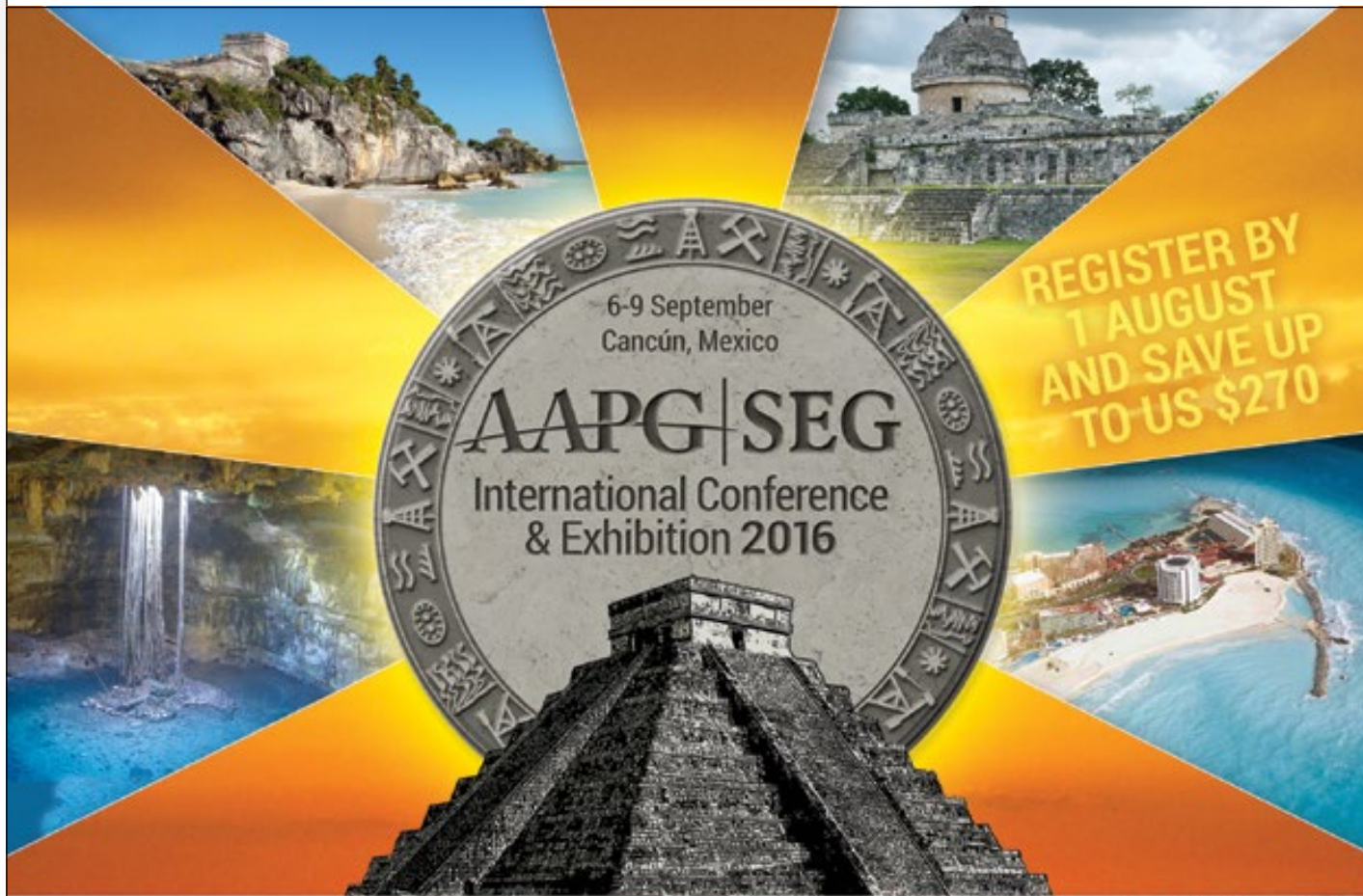
Play-by-play analysis shows highly significant heterogeneity between the mature Barnett, the insufficiently developed Haynesville and the immature Marcellus. To strengthen the gas resilience of the U.S. portfolio, Delfiner said development should focus on the Haynesville and Marcellus.

Regarding oil plays, the Bakken is far more resilient than the Eagle Ford. Absent any new activity, Bakken production only decreases 50 percent in 10 years while the Eagle Ford declines 70 percent.

Charlez offered some sage advice:

"When hydrocarbon prices are high, the unconventional resources should be developed at a very fast pace in order to fill as much as possible a well portfolio that will be paid through a very fast return on investment," he said. "In case of a sharp decrease in prices, this 'well fitted' portfolio would then allow (operators) to rest on a declining strategy that generates significant profits."

"Owing to the flexibility of the rapid mobilization and demobilization of rigs with unconventional, the development can be resumed as soon as prices recover."



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