TG21

Stimulation of Low-Permeability Gas Reservoirs in Latin America

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SUMMARY

Gas figures show that Latin America holds only 4.3% of the world's conventional gas reserves. However, consumption has become important in some countries such as Argentina and Brazil. On the other hand, some estimates for unconventional reserves set Latin America with 29% of the world's reserves, which would be comparable with combined US and Canadian reserves.

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Some of the countries showing interest in the development of low-permeability gas reserves—both from unconventional and tight reservoirs—are Argentina, Brazil and Colombia, where the areas with more potential include Argentina's Neuquen Basin, Brazil's Northeast basins and Colombia's Middle Magdalena basin.

Despite its slow start, the growing activity in gas exploitation from low-permeability reservoirs has resulted from improved policies from the governments of some countries promoting these developments. Some examples are recent gas price regulations in Argentina, Brazil and Colombia.

The area with more advances in the learning process is the Neuquen Basin, where several operators are currently producing commercial gas volumes from various areas with low permeability, ranging from shale to tight sands. These operators have succeeded in taking several techniques learned in North America to be customized to fit their specific needs. Tight sandstone and shale gas completions include vertical and horizontal wells, typically stimulated with multistage fractures.

The most used stimulation technique is hybrid fracture treatment, which combines slickwater and viscous crosslinked gels. Proppants used include small to 20/40 lightweight ceramics and ultralight weight proppants, at concentrations from 1 lb/ft² to partial monolayer (0.2 lb/ft²). The most popular staging technique is "plug and perf," although plug and sand jet and conventional frac completions are also used.

Stimulation treatments in northeast Brazil and in Colombia have been in vertical wells, focused to assess the potential of very low-permeability gas sandstones. They have been mostly slickwater treatments using 100 mesh proppant and conventional gel treatments.

Conceptual approaches and learned lessons on these stimulation treatments and are shown in this work.