

Darwin, dinosaurs and dollars: evolutionary lessons for a stressed marketplace

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“It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is the most adaptable to change.” Charles Darwin.

Evolutionary theory is not just applicable to life on Earth – throughout the last decade the Oil and Gas industry has proven itself to be a very successful species, seeking to colonize economic niches and actively responding to changing conditions in a dynamic market environment.

In response to increased demand and limited increases in domestic supply, North American natural gas prices peaked at over \$13/mcf in 2008. These market conditions stimulated industry to rapidly transition from the exploitation of conventional to unconventional natural gas reservoirs.

Key to this shift was the initiation and refinement of long-reach, multi-stage horizontal wells and their application to large scale development drilling. In hindsight, many would say that industry is now feeling the negative impact of these earlier successful adaptations which were designed to exploit this positive pricing environment, especially when these exploitation strategies were refined and applied to the tremendous dry gas resources trapped in organic rich shales and mudstones. The unlocking of vast reserves of tight gas and shale gas has dramatically increased domestic North American natural gas production. Unfortunately this increase occurred at the same time as the global economic recession which suppressed demand. Increased supply coupled with reduced demand has created a fundamental gas market imbalance resulting in the almost catastrophic collapse of domestic gas prices.

In order to avoid this precipitous decrease in North American gas prices from triggering a mass extinction event in our industry, comparable to that which occurred at the Cretaceous/Tertiary boundary when approximately 75% or more of all species on earth vanished, we have been forced to evolve once again: this time from unconventional dry gas to tight oil and natural gas liquids.

The defining factor in determining which companies will thrive and which will merely survive under stressed market conditions is to focus on improving netbacks – either through the drilling of higher priced liquids, or through the reduction of overall cost structures. Both of these strategies have been employed very successfully in our basin and in the Montney Formation in particular with great success.

“Ignorance more frequently begets confidence than does knowledge: it is those who know little, and not those who know much, who so positively assert that this or that problem will never be solved by science.” Charles Darwin.

‘Traditional’ tight gas wisdom steered early unconventional exploration and development to the deeper, hotter portions of basins, where overmature source rocks had generated dry gas. These same industry models told us that hydrocarbon liquids and oil could not be commercially produced from the shallower, lower maturity regions because of poor relative permeability, increased risk of mobile water and lack of overpressure.

“We must become the change we want to see” Charles Darwin

Driven by historic differentials between gas and oil prices, industry has been forced to overcome these reservoir issues (real or perceived) and has responded through the dramatic evolution of completion technology, in particular the application of large slickwater and hybrid fracs. Although not universally successful (we still cannot ‘create’ a reservoir) these recent advances in both geotechnical understanding and frac technology have unlocked significant oil and liquids reserves in reservoirs which were until recently considered to have too low permeability to deliver commercial production levels.

Perhaps the clearest expression of this successful adaptation is the growth in US oil production over the last 2 years: with 2012 annual US oil production hitting a 15 year high, primarily due to tight oil growth from the Bakken, Eagleford and Permian Basin. This explosive production growth, fueled by exploitation of unconventional reservoirs has reversed the declines experienced over the last forty years with some analysts and commentators suggesting that the United States could become a net exporter of oil by 2030 (ExxonMobil Outlook for Energy: a view to 2040).

One final thought on corporate intelligence and natural selection however lingers: despite the significant decline in natural gas prices which heralded the much publicized transition from tight gas to tight oil and liquids, the production of North American dry gas continues to rise at a phenomenal rate: from 2009 to 2012 US natural gas production from all sources increased by 13% to reach an all time high of approximately 81 Bcf/d. Although the major shift to improved economics may have begun, it seems we are never quite as smart as we would like to think.

To quote Charles Darwin one last time:

“Intelligence is based on how efficient a species became at doing the things they need to survive.”