A trend toward a more stable and predictable environment is supported by two factors. First, the financial woes of some of the smaller players, combined with a renewed interest in the North American gas agenda, will drive larger, more diversified E&P players to build dominant positions. Second, the need to better manage feedstock risk for demand-side investments will drive the increased adoption of coordinating mechanisms across natural gas value-chain players. In short, continued progress in the North American natural gas agenda is poised to offer great opportunities for incumbents and new entrants alike.

For the past 15 years, the North American natural gas value chain has been plagued by volatility. The main culprits are structural disconnections between players and the appetite for speculative investment. The current situation is no exception, as protracted low gas prices are unlikely to persist. An inevitable supply-side correction will bring the Henry Hub price above $5 per thousand cubic feet (Mcf) by the middle of the decade; meanwhile, liquids-rich plays should continue to boost shale-play economics.

These ups and downs are generating anxiety on the demand side, and they could challenge the economics of some of the $200 billion in anticipated investments planned in the chemicals, power and midstream sectors. Of course, a dramatic change in the price of oil, an accelerated trend toward liquefied natural gas (LNG) exports, or a material carbon tax regime could inject even more volatility and push natural gas prices well above $6 per Mcf.

The future is impossible to predict, but the implications of these market gyrations for the E&P sector are profound.

A structural lack of coordination
Cheap and abundant natural gas has become a game-changer, credited with contributing to the energy security of the country, cushioning the effects of the Great Recession, and enabling the reindustrialization of the U.S.

What started with natural gas has migrated to liquids-rich formations that are now producing both high-margin natural gas condensates in larger quantities and, more recently, source rock-derived crude oil, which has the potential to reduce U.S. imports by 10%. Environmental concerns about the use and potential contamination of water supplies seem to be the only dissonant voice in this success story.

This supply-side revolution is about to be repeated on the demand side. Industries such as midstream, power and chemicals are considering investments of more than $200...
The pricing of key NGL components has evolved, changing economics.

The consequences are dire: While the producers were blazing the trail of unconventional gas with prices appreciating by more than 500% during the first decade of the 21st century, the rest of the industry was hampered by regasification terminals operating at utilization percentages in the single digits, and by natural gas-fired power plants that could not compete with coal.

Will history repeat itself and put at risk the demand-side investments without which shale plays lose their attractiveness? The structure of the North American natural gas industry would point to more pricing volatility (and therefore higher risks for investors) because—unlike for oil—very few companies are playing in more than one segment of the natural gas value chain, and no OPEC-like market dampening mechanism exists. However, a look at the long-term fundamentals of the natural gas value chain offers several reasons to be optimistic.

A brighter, more stable future

The first reason for optimism is that the predominance of NGLs will continue, and their link to oil prices will bring some much-needed stability to shale-play economics. Butane and propane enjoy a strong relationship to oil, largely due to export parity and competitive use with oil-derived products. For these products the future looks bright, as the U.S. turned into a net exporter in 2010, thanks to robust global demand.

Ethan has not rebounded as well since the Great Recession, but is generating quite a bit of interest in the chemicals industry. Cheap and abundant supplies of ethane are putting the U.S. in the unusual position of being one of the cheapest ethylene derivative producers in the world, ahead of Europe and Asia. As a result, U.S.-based ethylene production capacity is on track to grow by nearly 40% by 2020, based on projects that have already been announced. And, the growth could be even larger, because favorable economics could make the U.S. a major exporter of ethane-based ethylene products.

This increased ethane demand will most likely push the price upward when new cracker capacity comes on line, with a ceiling set by the price of competing ethylene production feedstocks, including naphtha, which is linked to oil. In the short term, however, ethane prices could continue to be depressed due to the lag time associated with the ramp-up of cracking capacity.

The second reason for optimism is that methane (dry gas) prices should rebound. Any attempt to provide an accurate forecast of the price of gas is hazardous, but sound economic rationale should drive prices toward an equilibrium of $5 to $6 per Mcf. Speculative prices above $6 per Mcf would actually destroy demand (largely in the power sector, where gas would not be able to compete with coal for either dispatch in the short term or fleet-generation replacement and extension in the longer term). Conversely, excessively low prices would choke supply (as is currently the case).

Higher prices might be disappointing news for industries that rely on methane as a feedstock (including power generation, refining and other industrial sectors that benefit from low energy costs), but a number of natural gas producers are now curtailing drilling, for two reasons. First, as smaller producers get into some serious cash-flow issues, revenues from incremental production are simply not sufficient to
maintain a positive cash flow at current prices.

Second, larger companies can easily redirect their investment to more lucrative opportunities within their diversified portfolios and therefore do not need to support active drilling.

Of course, some level of drilling will continue, largely driven by lease requirements, but this level will most likely be insufficient to compensate for the sharp production decline of the most recent shale-gas wells. Overall, methane production is likely to decline by 12% to 18% over the next three years, possibly rebalancing the U.S. supply and demand equation by the middle of the next decade and signaling a different pricing regime for methane.

In short, the need to rationalize capital deployments on the supply side, combined with some sound demand-side economics, should help balance the overall natural gas value chain over the next few years. Natural gas prices, both wet and dry, should achieve some level of stability, albeit at a lower level than the speculative ones reached during the early 2000s.

**External factors**

Relative price stability can only be good for the natural gas industry. However, a number of factors could alter this course of events and reinsert volatility into the system. The potential disruptors are different for NGL products and methane.

On the liquids side, the state of the overall economy and its impact on oil prices matters a great deal, especially for butane and propane. A collapse of oil prices, such as the industry experienced during the Great Recession, would definitively put into question any onshore development. For example, if crude oil prices fell under $45 per barrel, NGL plays in the Marcellus and Barnett would become uneconomic at natural gas prices below $3 per Mcf. Ethane prices also depend on the state of the global economy, as a global recession would most likely challenge the timing of any significant demand-side investment, including the planned incremental cracking capacity.

Methane could be significantly impacted by domestic policy. With significant arbitrage opportunities across the globe, the option for the U.S. to turn into an exporter is clearly on the table. In fact, a number of projects are planned to turn 5- to 7 trillion cubic feet (Tcf) of import capacity into export capacity. However, most of these projects are still waiting for regulatory approval, since significant exports would mean higher domestic prices (possibly in excess of $6 per Mcf).

What would be good for E&Ps would not be good for industrial sectors that benefit from lower energy costs. Similarly, an aggressive carbon tax could give a decisive advantage to gas over coal, and in the process alter the supply/demand picture. For example, a $50-per-ton carbon tax could move the equilibrium gas price above $8 per Mcf.

A number of other factors could impact market dynamics. These include new demand (such as use of compressed gas for transportation, or a scale-up of gas-to-liquids that could create an additional link with oil), the widespread development of indigenous sources of energy around the world (such as shale gas going global), the major scale-up of competing sources of energy (such as aggressive expansion of offshore wind) or significant geopolitical moves (such as major Russian gas exports to China).

**Large players will emerge**

After the wave of mega-mergers of the late-1990s, onshore North American exploitation was mostly left up to the independents with their low-cost structure and rapid decision making. The natural gas story has now clearly caught the attention of some of the largest oil and gas companies in the world. In fact, since the Macondo oil spill, the North American onshore has become very attractive, because its risk of catastrophic accidents is lower and its economics should become more advantageous.

As large, global companies move in, some smaller, weaker players are fighting for survival. Near-term cash-flow challenges are forcing some companies (especially the ones with predominant dry-gas portfolios) to pursue aggressive initiatives to reduce capital and operating costs. Asset divestment efforts are also on the table as a way to survive until more favorable pricing returns.

The situation is ripe for more large players to build solid positions either by controlling interests in other companies or by building land positions in future plays (for example, the Utica shale). Clearly, the wave of joint-venture agreements that started after the Great Recession is now moving into a new phase, with the partners looking to become operators themselves.

Does this mean the era of the small North American independent is over? Certainly not, since these companies have grown far past the point of being considered start-ups and have plenty of means to compete, even with the largest companies in the world.

On the other hand, global companies clearly benefit from far stronger financial backing and diversified portfolios, which allow them to What would be good for E&Ps would not be good for industrial sectors that benefit from lower energy costs.

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**Natural Gas Supply/Demand 2020**

Source: A.T. Kearney

Speculative prices above $6 per Mcf would actually destroy demand, largely in the power sector where gas would not be able to compete with coal for either dispatch in the short term or fleet-generation replacement and extension in the longer term.
Long-term supply contracts... are starting to look very attractive, and should draw increased attention.  

...weather temporary bad times. They also tend to have more extensive internal capabilities on the commercial and trading sides to understand (and take advantage of) value-chain dynamics and trends. The future dominant players of U.S. shale-gas plays will combine great operatorship, effective application of technology, and commercial savvy.

The large, diversified players will undoubtedly reduce the level of speculative investment on the supply side and will definitely play a large role in bringing natural gas prices back into a zone that makes economic sense for producers. However, demand-side investments can’t support volatile prices. Thus, the creation of coordination mechanisms among downstream players to mitigate feedstock risks will become necessary.

Increased complexity

The natural-gas-value chain as a whole might be heading for difficult times if demand-side investments get into trouble. Their success is critical to the long-term relevance of U.S. onshore gas. For example, what would be the impact on the power sector if methane prices jump above $6 per Mcf due to LNG exports?

The reality is that the natural gas value chain is very complex. Pricing mechanisms depend on the behavior of players who have not traditionally interacted. For example, the chemicals sector’s projected demand for ethane has an impact on the supply level of methane as a byproduct of NGL production, and therefore on the competitiveness of natural gas-fired plants versus coal-fired ones. This complexity becomes an issue when players have misaligned incentives: demand-side investments look great at current prices, but supply-side producers can’t survive and are thus doing everything they can to reduce supply so as to increase those prices.

Clearly, coordination would go a long way toward achieving a win-win scenario where both supply and demand sides could thrive. Given the poor track record of the industry players at working well together, do the only hopes for coordination lie in radical solutions, such as the regulations of the 1980s (or the monopolistic approach of Standard Oil)? We should hope not, as such solutions would certainly curtail the entrepreneurial and fast-mov-

ing spirits that have made natural gas such a success to date. Other coordination instruments are more likely to develop. For example, some level of backward and forward integration is already happening. Yet, integration is likely to be limited in scope, because large players are asserting dominant positions at different points along the value chain, making vertical integration expensive and potentially challenging from a regulatory standpoint.

Thus, the most prevalent coordination mechanisms will involve supply contracts. These are already very common between end users and midstream players. For example, 95% of the Sabine Pass LNG export capacity is already under long-term contract before commissioning, with buyers taking on most of the market pricing risk.

In contrast, E&P producers so far have been protecting themselves mostly by using hedges, but these are becoming less attractive because natural gas prices are likely to remain low for a few years. Long-term supply contracts in which midstream players or end users would agree to share part of the pricing risk with producers, in exchange for a commitment to meet certain levels of production, are starting to look very attractive, and should draw increased attention.

Tremendous opportunities for all

In summary, market fundamentals point toward a bright future for natural gas in North America. The reserves are here, the industry knows how to exploit them, and end users are getting ready to commit significant capital to take advantage of this reasonably clean, affordable, and plentiful source of domestic energy.

Existing players have a way to go to build a more stable and resilient value chain. As for new entrants and other investors, the time is most certainly right to enter an industry that is transforming itself and becoming critical to the largest economy in the world. However, challenges surrounding technical, operational and commercial know-how could shape the entry strategy and the associated capabilities required to become a relevant player.

If anything can be learned from recent experience, it is that North American shale gas has moved an entire sector of the energy industry in a direction that even the most sophisticated companies in the world did not predict—and it has done so very quickly. This leaves very little room for late entrants as the natural gas story unfolds.

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