Appalachia Infrastructure & Marcellus Basin Study Summary – April 29, 2014

What are these Pieces?

This is the third in a series of basin and infrastructure studies (following the Permian and Eagle Ford) in which we take a bottoms up look at the most relevant onshore U.S. resource plays, relying on comprehensive production data and detailed infrastructure analysis to guide conclusions.

Given the breadth of activity in the Appalachian Basin and timing of data releases, our E&P analysis focuses specifically on the Marcellus Shale in Pennsylvania. Look for follow-on pieces detailing West Virginia Marcellus and Ohio Utica Shales. Similar to our initial studies, we analyzed production history from every well drilled in the Marcellus to date. We sliced and diced the data in this report, including detailed EUR analysis by operator/area, as well as deep-dives for each of the major counties with comprehensive maps and economic analysis.

Surging Appalachia production is completely altering U.S. gas flow/pricing dynamics, and the future impact is one of the hottest debates in the energy sector right now. So our Appalachia Infrastructure piece is largely focused on gas pipeline dynamics. We also lay out our take on the need for additional regional fractionation, NGL pipelines and processing.

Summary: Appalachia Infrastructure

- ***Why Appalachia?*** It's the biggest, baddest basin there is when it comes to gas production and the gift that keeps on giving, even in a $4 gas environment. At ~14.5 bcf/d, Appalachia accounts for ~19% of U.S. gas production. Assuming that overall U.S. gas production grows at ~2%/yr, we see Appalachia accounting for 31% by 2020.
- ***Northeast Now a Net Exporter…:*** Local NE gas production now exceeds average annual demand. By 2015, we look for regional production to exceed average demand for all but the 3 peaking months of the year.
- ***…Driving the Reversal of Every Major Pipeline:*** To move gas out of the NE, pipelines have on the drawing board or under way almost 15 bcf/d of new projects. On top of that the industry is working on >9 bcf/d of new projects to either alleviate regional bottlenecks or find ways to get this gas to incremental markets.
- ***Gas Pipeline Nirvana:*** Pipes are in the driver's seat for the first time in almost a decade. Not only are they filling up capacity on under-utilized long-haul pipelines via back-haul and reversal projects, but also for a while, some of the pipes will earn for both north and southbound flows.
- ***Basis Under Pressure Until 2017:*** There is a slug of projects (3.5 bcf/d out of the SW and 1.7 bcf/d out of the NE) that come online by early '16 that should take away some of the pressure. However, with current excess gas in the region, the lag time to bring some of projects online, and continued growth in production, we think basis will remain under pressure until 2017.

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- ***Costs to Exit the NE Moving Higher:*** As for costs, a year ago, backhaul rates to the Gulf Coast were ~40c/mcf with 8-year terms. New rates to the Gulf Coast are now going for ~60-70c with 15+ year terms. We are even hearing about some contracts signed for 60-year terms.
- ***NGL Supply Growing More Rapidly than Gas Production:*** We see NGL supply growing at a 32.3% CAGR vs. 8.9% for gas as: 1) we begin to produce ethane driven by blending limitations and by completion of de-ethanizers and ATEX; and 2) incremental wet-gas drilling.
- ***Bucking Up Against Limitations – Ethane:*** We have reached pipeline spec limitations on blending ethane, and just in time, de-ethanizers have come online and the ATEX ethane line was completed. We think there will be excess de-ethanization capacity until mid '16. After that, additional capacity will be needed to supply the proposed Mariner East 2 and Utopia projects (assuming ATEX is expanded), or the ethane will be shipped south on a new y-grade pipeline.
- ***Bucking Up Against Limitations – Propane:*** It is no coincidence that the amount of C3 frac capacity that has been announced almost exactly equals the amount of local demand plus expected exports. For now, there is still enough local demand to soak up all the local production. By Q2'15, however, local propane production will exceed both average local demand and C3 frac capacity.
- ***Need for a Y-Grade Pipeline:*** While we don't have a strong opinion on which of the two major proposed y-grade pipelines will get built (WPZ/BWP Bluegrass or KMP/MWE EMG UMTP), we do see a need for a raw NGL pipeline by mid-'16.
- ***Need for Additional Processing:*** With the rapid ramp-up in wet gas production in WV, SW PA and the Utica, the region is going to need additional processing capacity post 2015. Following completion of the 7.9 bcf/d of planned plants by mid-'16, we see the need for another ~3.2 bcf/d of processing capacity by 2020.

Summary: Marcellus Basin Study

While takeaway has dominated the conversation of a late, we can't lose sight of underlying trends in well productivity, which will ultimately drive differentiation in economic returns. The following were the biggest incremental takeaways for us:

- ***Economics Still Best in the Biz:*** We estimate wider basis/higher transportation costs have increased Marcellus break-evens by $0.30-$0.50/mcf over the past year. That said, we still see over ~6,500 remaining locations in PA alone representing ~70 Tcf of gross resource that can breakeven at $3 gas or below and would generate 50% IRRs or higher at the current strip. Moving the economic threshold up to $4 gas increases remaining economic inventory to ~10,000 wells representing 90+ Tcf of resource. So the bottom line is even with higher costs, the Marcellus will still be the driving force of U.S. gas supply for many years to come.
- ***Ranking the Counties:*** Based on our in-house type curves, we estimate the top spot for average EUR for '13 wells was a tie between Wyoming and Susquehanna Counties at 9.9 Bcf, respectively. Greene County was very close behind at 9.6 Bcf, followed by another tie between Allegheny and Sullivan Counties at 7.1 Bcf.

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- ***Which Counties Improved the Most?:*** On a percentage basis, we saw the greatest y/y improvement in per well productivity from Greene County, with average EUR increasing 24% y/y in '13. Allegheny, Tioga and Washington also saw material improvement in per well EUR at +18%, +13% and +13%, respectively.
- ***Operator Awards:*** Below we hand out awards to PA Marcellus operators based on our observations of well productivity:
  - ***Heavyweight Champion:*** COG – Hands down the best-lateral normalized productivity in the play, with average EURs of nearly 16 Bcf in '13. No denying southern Susquehanna County can go toe-to-toe with any gas resource play in North America.
  - ***Heavyweight Contender:*** RICE – New on the public scene, but already making a splash, nipping on COG's heals for the heavyweight title. Average EUR came in at ~12.5 Bcf in '13, second best in the trend as the company held on to prior year's already robust productivity performance.
  - ***Gym Time Paying Off:*** EQT – Average EURs jumped ~23% y/y to 10.8 Bcf, the biggest gain of any operator by our calculation. Company reaping the rewards of RCS completions, as well as high-grading of activity toward core Greene County position.
  - ***Underdog Surprise:*** NFG – Not generally thrown around in the upper echelon of well productivity, but '13 performance surprised us with ~9.0 Bcf average EUR ranking in the fourth spot of public operators. Crushing it in Lycoming County with a strong constituency of 15+ Bcf EURs.
  - ***Biggest Room For Improvement:*** CNX – Overall average EUR sub-par, but showing potential for greatness with several wells pushing 10 Bcf EURs. Core acreage in Washington/Greene Counties surrounded by monster wells, so rock looks capable of delivering as execution improves.

For more information or a copy of the full reports, please contact Becca Followill (bfollowill@uscallc.com), Cameron Horwitz (chorwitz@uscall.com) or Barry Guinn (bguinn@uscallc.com).

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Opinion Key:

USCA uses a Buy, Overweight, Hold, Underweight and Sell rating system.

BUY - The stock has among the best combination of risk/reward and positive company specific catalysts within the sector. Stock is expected to trade higher on an absolute basis and be a top performer relative to peer stocks over the next 12 months.

OVERWEIGHT - The stock has above average risk/reward and is expected to outperform peer stocks over the next 12 months.

HOLD - The stock has average risk/reward and is expected to perform in line with peer stocks over the next 12 months.

UNDERWEIGHT - The stock has below average risk/reward and is expected to underperform peer stocks over the next 12 months.

SELL - The stock's risk/reward is skewed to the downside with possible negative company specific catalysts or excessive valuation. The stock is expected to trade lower on an absolute basis and be among the worst performers relative to peer stocks over the next 12 months.

Risks that may impede achievement of price target(s):

Industry wide risks include but are not limited to environmental and regulatory for both pipeline and E&P, aging infrastructure and availability of midstream infrastructure to accommodate new production. Competition for and availability of service crews and drilling rigs. Commodity prices, the economic outlook, access to capital markets. Interest rates. Asset recontracting. Cost overruns.

Price Target Methodology:

For C-Corps, our price targets are, generally, based on a traditional sum of the parts analysis. For traditional pipes and midstream assets, we value at 8-12x EBITDA multiples (usually forward year unless it doesn't represent a good run rate). LP units are marked to current market. GP values are determined using a discounted cash flow of projected distributions and then tax effected.

For MLPs, we average three different valuations as we have yet to find one pure way to value MLPs that captures the many nuances – current yield, growth, GP IDRs, equity to fund growth, etc. For all three methods, we start with six-year projections of LP distributions and assume a terminal growth rate. The three valuation methods – Traditional CAPM, Growth Adjusted Cash Yield, and GP Adjusted Distribution Discount Model – each yield a different cost of equity, which is then used as the discount rate against the projected distributions and terminal growth rates. Traditional CAPM is a straight forward traditional use of the Capital Asset Pricing Model. Growth Adjusted Cash Yield uses projected yield plus an adjustment for expected long-term distribution growth. GP Adjusted Distribution Discount Model uses average annual forecasted distributions for both the GP and LP for the next three years divided by the average number of forecasted LP units over the next three years divided by the current LP unit price. In our view, this method helps account for the higher cost of capital associated with GP IDRs.

For E&Ps, our price targets are based on a Net Asset Value calculation that uses discounted cash flow analysis to assess the value of producing out a company's proved developed producing reserves. We then assign value to proved undeveloped, probable and possible reserves using acreage, spacing assumptions, current and projected rig counts, EURs and decline curves. Additionally, for companies with material, non-E&P assets, we apply a comparable multiple to our forward EBITDA estimate for the non-E&P segment. We then net against projected out-year debt, working capital deficit/surplus and the present value of future G&A expense to arrive at our price target.

Distribution of Ratings (as of April 29, 2014):

Recommendation	Count	Percent	Investment Banking Relationship	Count	Percent
Overweight/Buy	27	44%	Overweight/Buy	6	22%
Hold	34	56%	Hold	1	3%
Underweight/Sell	0	0%	Underweight/Sell	0	0%

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