50 Ways to Leave the Marcellus:

The Race to Increase Gas Take-Away Capacity

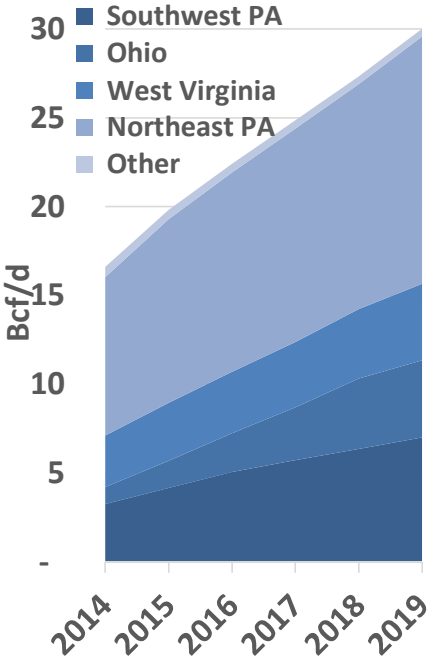

Figure 1 – Marcellus Region Natural Gas Production; Source: RBN

- **Natural gas production in the Appalachia region has risen to 18 Bcf/d, and is expected to grow to 30 Bcf/d by 2019.**
- **Gas production economics in the Marcellus/Utica are very favorable, suggesting that the projected gas production growth is very likely to occur.**
- **The pipeline network developed to deliver gas from the Gulf Coast, Midcontinent, Rockies and Canada to the Northeast needs major reworking as the Northeast flips from net gas consumer to net gas supplier.**
- **More than 50 pipeline projects are under development within and near the Marcellus/Utica, 41 of which will increase the pipeline network's take-away capacity by 28 Bcf/d.**
- **Assuming all the pipeline projects are built, the aggregate capacity of pipelines out of the region could exceed regional production levels as soon as 2018.**

Extraordinary growth in natural gas production in the "dry" Marcellus region in northeastern Pennsylvania and in the "wet" Marcellus and Utica regions in southwestern Pennsylvania, northern West Virginia and eastern Ohio is having a transformative effect on the nation's gas delivery infrastructure.

Historically, the US Northeast was the recipient of large volumes of natural gas delivered by mainline pipes from the Gulf Coast, Midcontinent, Rockies and Canada. Now, with favorable economics for gas producers in the Marcellus/Utica, production in the region—already at more than 18 Bcf/d in late 2014—is expected to grow to at least 30 Bcf/d by 2020. Confidence in this fast pace of production growth is well-founded; reported initial production rates and other factors suggest that the break-even gas price for many dry Marcellus producers is only about $2.50/MMBTU, and that—thanks to supplemental returns on natural gas liquids (NGLs) and, in some cases, condensates—the break-even gas price for many wet Marcellus/Utica producers is

even lower: about $2/MMBTU. In some cases the effective natural gas breakeven price gets all the way to zero, with fortunate producers achieving breakeven returns from the sale of NGLs and condensates. As a result, the rates of return likely to be enjoyed by gas producers in the Marcellus and Utica (once new pipeline capacity relieves current constraints) are higher than those for most other US gas plays. All this suggests that if gas prices remain low—or even fall somewhat from their current levels—production in the Marcellus/Utica will continue rising.

With Marcellus/Utica production on a steep, steady increase, there is a scramble on among midstream companies to rework their pipeline networks to reflect the Northeast's fast-paced change-over from net consumer of gas to net supplier, and to handle the increasing volumes of gas that will need to flow out of the region. This reworking involves a variety of projects, some to handle increasing flows within the Marcellus/Utica, others to add bi-directionality to what had been one-way trunk lines into the Northeast market region, and still others to augment existing lines with needed incremental capacity. All in all, some $30 billion in pipeline projects are planned. The current shortfall of take-away capacity, which has been negatively affecting the gas price basis, will remain largely unchanged in 2015. But relief—in the form of 50 to 60 pipeline projects, 41 of which increase take-away capacity out of the Marcellus/Utica—will come gradually over the following three years.

As take-away constraints are relieved, the basis differential between Marcellus/Utica gas and the benchmark price set at Henry Hub, LA – which traded at $2-$3/MMBTU discount during most of 2014 - is expected to shrink to the point that it primarily reflects variable transportation costs. Still to be determined, however, are how quickly gas demand will grow in markets targeted by Marcellus/Utica producers, and how the coming ability to deliver vast quantities of Marcellus/Utica gas to other regions—especially the Gulf Coast—will affect production in other gas-producing regions with higher break-even prices.

In this Drill Down report, RBN Energy assesses the impact of additional natural gas take-away capacity organized into five transportation corridors as shown in the map below: Northeast to the New England market (purple), Northeast into Canada (blue), Midwest via Ohio (green), the Gulf Coast via Ohio (red), and the Southeast along the Atlantic Coast (orange). The report then examines supply and demand trends, regional price behavior and key pipeline projects.

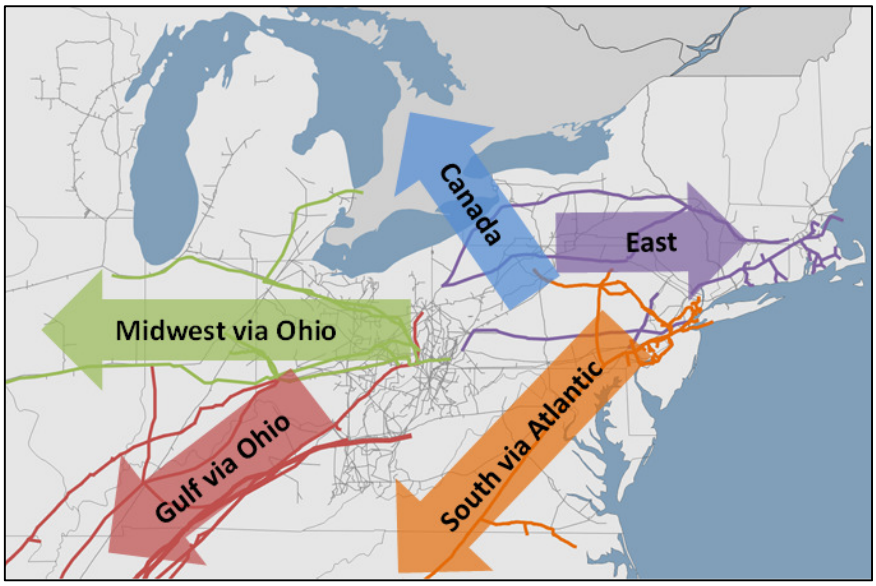

Figure 2 – Northeast Take-away Capacity Corridors; Source: RBN

Note that competition for market share in downstream markets is discussed in detail in a new, joint report by RBN and BTU called "The Battle for Henry Hub." See information below.

Battle for Henry Hub

This report examines the impact of huge surpluses of natural gas bearing down on the Henry Hub in South Louisiana from Marcellus/Utica in the east and supplies from the west sourced from high-BTU and associated gas from plays in TX, NM, OK and ND.

More information about this report is available at https://rbnenergy.com/reports/battle-for-henry-hub

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