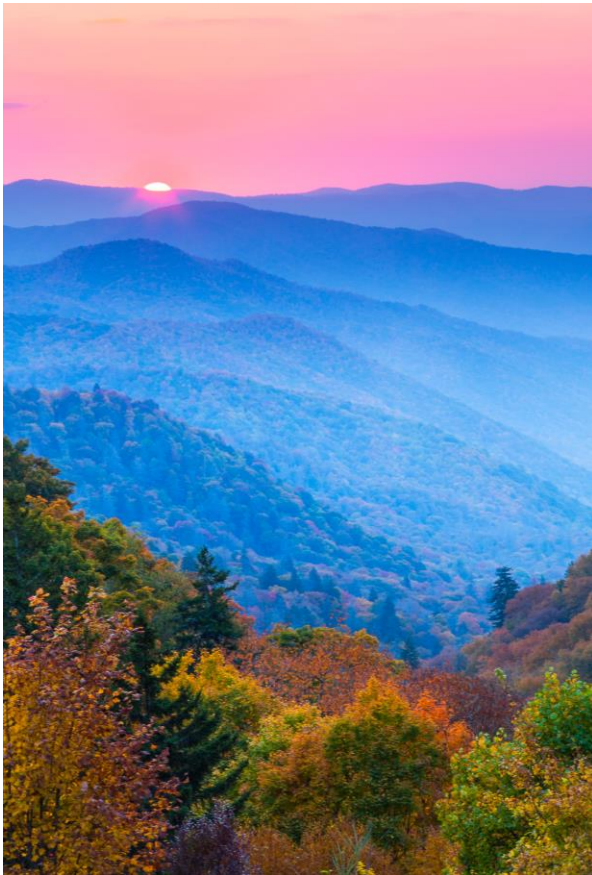


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Back to Zero – Appalachia’s Dwindling Natural Gas Pipeline Takeaway Capacity

What Rising Production and LNG Exports Will Mean for Appalachian Gas Flows & Prices



- Northeast gas producers are again facing the prospect of severe pipeline constraints and basis weakness in the next few years as rising production and downstream LNG export demand lead to record outflows from Appalachia.
- Northeast gas production in 2021 to date has averaged 34 Bcf/d, up 1.4 Bcf/d YOY and is poised to grow in the coming months and years as producers respond to higher gas prices. We estimate volumes will climb another 3 Bcf/d to 37 Bcf/d by 2023.
- Appalachia’s gas outflows have set record highs in each month in 2021 to date and averaged 16 Bcf/d, up ~1 Bcf/d YOY. Total takeaway capacity is now 90% utilized. Based on our supply-demand outlook, outflows will continue to rise and hit the capacity “wall” by October 2023. If the MVP expansion project is delayed or canceled, capacity could be maxed out sooner.
- Without more capacity additions, Appalachian gas prices will become more volatile and weaken dramatically, particularly in the spring and fall months when constraints worsen.

1. Introduction

After a two-year reprieve from nearly a decade of severe pipeline constraints and debilitating prices, Northeast natural gas producers are again headed for a constraint-driven market in the coming years. Absolute gas prices across the U.S., including in the Appalachian basin, are at multi-year highs as strong LNG export demand, stagnating overall production and below-average storage inventories have tightened the Lower 48 gas market compared with recent years. In that sense, this is the most bullish market that Appalachian gas producers have seen in a long time. However, there is trouble lurking in Appalachia, as local gas prices in the supply basin have been

progressively weakening relative to Henry Hub since 2019, signaling the return of pipeline constraints for moving gas out of the production region. This is in large part due to a growing supply surplus in the Northeast, as illustrated in Figure 1.

The U.S. Northeast has been a year-round net gas supply region (i.e., a net exporter of gas to other U.S. regions and Canada) for only about six years now, and it has been sending gas to other regions for longer than that on a seasonal basis. As such, the Northeast market’s ability to balance is highly dependent on its ability to flow any surplus gas — after in-region demand and storage needs are met — to downstream markets in other regions. Production growth has faced a number of hurdles in recent years, including shrinking capital budgets, lower rig counts, a prolonged period of low prices and, last year, also pandemic-related demand destruction and the resulting price-driven shut-ins at the wellhead during the shoulder months. Nevertheless, regional gas production has still managed to climb to new highs.

If we look at average year-to-date volumes (light blue lines in the graph), production has climbed more than 10% in the past two years, from 30.8 Bcf/d in 2019 and 32.6 Bcf/d in 2020 to a new high of 34 Bcf/d in 2021 to date — again, despite the stiff headwinds that producers faced in that period. In that time, local demand has been flat to lower. In 2021 to date, it is averaging 18.6 Bcf/d, compared with 18.4 Bcf/d and 18.8 Bcf/d for the same period in 2020 and 2019. The result is that the supply-demand gap has continued to widen and push increasing amounts of surplus gas out of the region. In addition to the supply push from the Northeast, Appalachian gas is also being pulled south by downstream demand from growing LNG exports along the Gulf Coast, where LNG feedgas deliveries to the terminals have hit record highs in 2021, after recovering from COVID-related cargo cancellations last year.

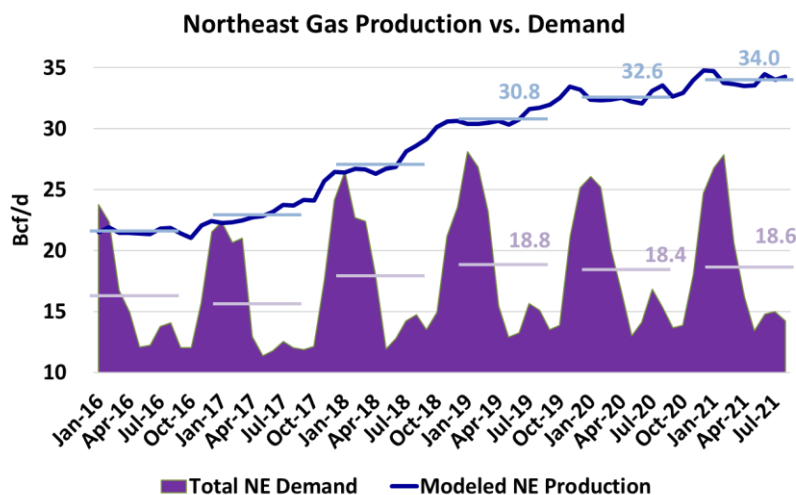


Figure 1 – Northeast Supply-Demand Balance. Source: RBN

The supply-push and demand-pull from higher production and LNG exports has led to record Northeast outflows and high utilization of takeaway capacity out of Appalachia in 2021. Appalachia’s outbound flows this year to date are averaging nearly 16 Bcf/d, or 87% of the total estimated exit capacity of 18.1 Bcf/d currently. That’s almost 1.5 Bcf/d higher than the same period last year. In the injection season (the period between April and October when regional demand is lower and stocks are typically rebuilt), outflow estimates are even more impressive. Outflows peaked in May at a record 16.8 Bcf/d, up 2.4 Bcf/d year-on-year and averaged 16.3 Bcf/d for the injection season to date, up 1.8 year-on-year.

Flows are higher in part due to incremental capacity additions in late 2020 from the completion of the Empire North project and the partial in-service of Transco's Leidy South Expansion project. Texas Eastern Transmission's 30-inch segment (TETCO-30) was also operating at reduced pressure/capacity for much of 2020 but restored full service in December 2020, allowing more volumes to flow out of Northeast. The line's pressure was cut again this year through June and July but has since been restored as well. However, it is not just absolute volumes that are up. Utilization rates are up as well, with outflow volumes suggesting that the utilization of takeaway capacity is now more consistently at or above 90%, levels we have not seen since 2016-17. As Figure 2 illustrates, spare exit capacity from Appalachia (total capacity minus flows) has been on a downward trend since 2019 and is now dwindling.

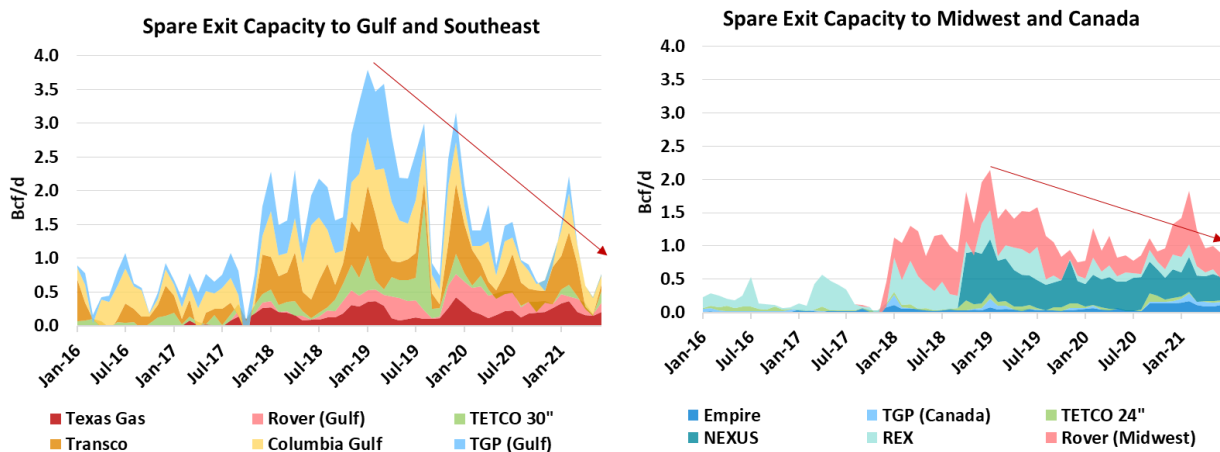


Figure 2 – Spare Exit Capacity from Appalachia. Source: RBN

If we tally up the spare takeaway capacity across all four outbound pipeline corridors — to the Gulf, Southeast, Midwest and Canada — it aggregates to an average of just 1.7 Bcf/d in 2021 to date, less than half of the average in 2019, which was at nearly 4 Bcf/d and approaching the tighter levels seen pre-2018. In other words, Appalachian gas producers are in one sense right back to where they were before all that takeaway capacity was built in the past five years: facing the prospect of increasing takeaway constraints and weakening prices, with the potential for severe congestion and basis meltdowns in the spring and fall when Northeast demand is lowest and the regional surplus peaks.

Prices at Eastern Gas South (EGS; formerly Dominion South), the representative Marcellus/Utica supply hub, is already reflecting the tighter egress. As the light purple line Figure 3 shows, EGS cash basis (the difference between the absolute price at EGS and Henry Hub) was extremely weak through 2016 and 2017, averaging at about minus \$1/MMBtu and minus \$0.80/MMBtu behind Henry in those years, respectively. In both years, basis also plummeted to as much as a \$2/MMBtu discount to Henry (dashed red ovals) in the fall when storage was full, demand was low and takeaway constraints were the worst. Things improved in 2018-19 as a slew of pipeline projects were completed, adding more outbound pipeline capacity and easing constraints (dashed green rectangle). However, as the right side of the graph shows, constraint-driven prices emerged again in 2020. Basis averaged minus \$0.60/MMBtu last year and fell to a discount of as much as negative \$1.49/MMBtu in November 2020. In 2021, even if we ignore the anomalies of the Deep Freeze in February that led to \$1,000/MMBtu prices in parts of the country and steeper discounts in the Northeast (dashed blue oval), basis has continued to weaken and reflect a reversion to the levels seen in the 2016-17 timeframe in most months.

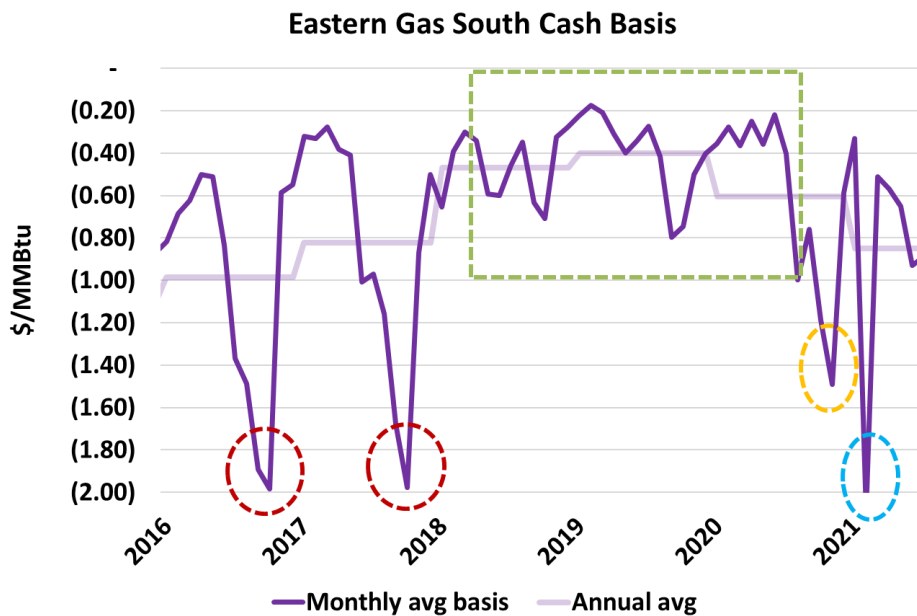


Figure 3 – Eastern Gas South Cash Basis. Source: NGI

The big question now is, when will the Northeast run out of exit capacity and how bad could constraints get?

Even as basis weakens, higher absolute prices are signaling more upside to production in the years to come. There is more downstream demand from LNG exports on the way in the coming months that will attract more supply to the Gulf Coast. Unlike in 2016-17, however, there are only a few expansion projects currently in development that could help alleviate constraints. Moreover, among those, there is great uncertainty regarding the timing of completion, or whether the projects will be completed at all.

This Drill Down report brings together our latest analysis on Northeast production trends, gas takeaway capacity and flows to identify the challenges facing regional producers and midstreamers and provide an outlook for how takeaway constraints and basis weakness could unfold in the coming years based on current assumptions.

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The Table of Contents for “Back to Zero – Appalachia’s Dwindling Natural Gas Pipeline Takeaway Capacity” is included on the following page.

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Table of Contents

- 1. Introduction..... - 1 -**
- 2. Northeast Natural Gas Production Trends..... - 7 -**
 - 2.1 Production by Appalachia Sub-Region..... - 9 -
 - 2.1.1 Northeastern Pennsylvania (NE-PA)..... - 10 -
 - 2.1.2 Southwestern Pennsylvania (SW-PA)..... - 12 -
 - 2.1.3 Ohio..... - 13 -
 - 2.1.4 West Virginia..... - 13 -
- 3. Northeast Takeaway Capacity & Flows - 14 -**
 - 3.1 Takeaway Pipelines to the Southeast and Gulf Coast - 15 -
 - 3.1.1 Transco Pipeline..... - 16 -
 - 3.1.2 Texas Eastern Transmission 30-Inch (TETCO-30) - 17 -
 - 3.1.3 Tennessee Gas Pipeline (TGP)..... - 18 -
 - 3.1.4 Texas Gas Transmission (TGT) - 19 -
 - 3.1.5 Columbia Gulf Transmission (CGT) - 20 -
 - 3.1.6 Rover Pipeline to the Gulf Coast - 21 -
 - 3.2 Takeaway Pipelines to the Midwest and Canada..... - 23 -
 - 3.2.1 Rockies Express (REX)..... - 24 -
 - 3.2.2 Texas Eastern Transmission 24-Inch (TETCO-24) - 25 -
 - 3.2.3 Rover Pipeline to the Midwest..... - 26 -
 - 3.2.4 NEXUS..... - 28 -
 - 3.3 Takeaway Pipelines to Canada..... - 29 -
 - 3.3.1 Tennessee Gas Pipeline (TGP)..... - 29 -
 - 3.3.2 Empire Pipeline - 30 -
 - 3.4 Total Northeast Takeaway Capacity and Utilization - 32 -
- 4. Basis Impacts of Tighter Takeaway Capacity..... - 34 -**
- 5. Recent and Potential Appalachia Takeaway Capacity Expansions - 35 -**

5.1 Williams' Transco Leidy South Expansion	- 36 -
5.2 Mountain Valley Pipeline (MVP)	- 36 -
5.3 PennEast Pipeline	- 39 -
6. Northeast Gas Market Outlook.....	- 41 -
6.1 Northeast Supply-Demand	- 41 -
6.2 Appalachia Takeaway Capacity vs. Outflows.....	- 42 -
6.3 Eastern Gas South Basis Forecast	- 44 -
7. Conclusions	- 44 -