August 24, 2020

To: New York Independent System Operator
Analysis Group ("AG")
Burns & McDonnell ("B&M")

From: CPV Valley, LLC

Subject: Comments on NYISO Draft Staff Recommendations and Analysis Group Interim Final Report

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CPV Valley, LLC ("CPV") appreciates the opportunity to provide written comments on the NYISO draft staff recommendations ("NYISO Recommendations") and the Analysis Group's interim final demand curve report ("AG Report"). CPV's comments reiterate and build upon the points made in CPV's comments submitted on July 1, 2020 in response to AG's initial draft demand curve report.[1] The following issues continue to be of great concern:

- Zone C gas hub – it is unreasonable to assume TGP Z4 200 Leg for Zone C. As defined in the TGP tariff, this hub delivers into Ohio and Pennsylvania, not New York. The omission of the necessary transportation costs – apart from a mere $0.27/MMBtu – gives rise to the notably weak correlation with Zone C power prices and anomalous, overstated net EAS revenues for the Zone C reference plant. No justification has been provided for changing from the current gas hub assumption of TETCO M3.
- Zone G gas hub – it is unreasonable to assume TETCO M3 for Rockland County. TETCO M3 can only be utilized in combination with interruptible pipeline transportation ("IT"), and the analysis from the MMU suggesting that IT can be used with any degree of certainty is fundamentally flawed and misleading, at best. It is unreasonable to switch the gas hub from Iroquois Z2 to one that is not commercially viable in Rockland County, has worse power price correlation, and lacks support at FERC. Moreover, the recommended change lies in the face of numerous developments in the natural gas industry that point toward increased pipeline constraints and increased difficulty accessing gas going forward.
- Development costs – the assumption of $370,000 for Owner's Project Development is nearly a complete omission of development costs. A developer can reasonably expect to spend $10 to 15 million developing a project, oftentimes much more.[2]
- Pipeline lateral – since the initial draft report, AG increased the cost of the pipeline lateral by $5.6 million to $23.5 million, but this is still substantially lower than what a developer would

[1] CPV (July 1, 2020), "Comments on the Initial Draft Demand Curve Report for Capability Years 2021/2022 through 2024/2025," available online here ("CPV July Comments").

[2] Ibid., pp. 18-19.

reasonably expect to spend. The approximately eight-mile lateral that supplies CPV Valley cost $71 million, and the equivalent estimate for a five-mile lateral would be $51 million.[3]

- Revenue hedge – it is wrong to assume that a merchant power plant in New York could get financed without a revenue hedge. To lend money in the term loan A market, banks will require revenue certainty for a significant portion of the plant's output for a significant portion of the debt term. This has been the case for every gas-fired, merchant power plant for which CPV has obtained financing in NYISO, ISO-NE, and PJM.

The remainder of CPV's comments pertain to the natural gas hub selections for Zone C and Rockland County Zone G. First, these comments apply AG's four selection criteria to explain why it is wrong to change to gas hubs that rank worse across all criteria. Second, the comments explain that the new information from the MMU offers no compelling evidence in support of AG's recommendations. Finally, the comments discuss that, if changes are warranted, they must be in favor of gas hubs that better meet the selection criteria.

Figure 1. Gas Hub Position Summary

	Zone C	**Rockland County Zone G**
Gas Hubs Approved by FERC in 2017 Demand Curve Reset	TETCO M3	Iroquois Z2
AG Recommended Change	TGP Z4 200 Leg	TETCO M3
CPV Position	TETCO M3. If a change from the status quo is warranted, TGP Z6.	Iroquois Z2. If a change from the status quo is warranted, Algonquin City-gates.

1. The Gas Hubs Recommended by the Analysis Group are the Wrong Choices According to the Selection Criteria

As in prior demand curve resets, AG has laid out four selection criteria for determining the most appropriate gas hub for each power location: market dynamics, liquidity, geography, and precedent. The gas hub that best meets these criteria is to be chosen. As this section demonstrates, the gas hubs that AG has recommended are inferior across all criteria than the gas hubs underlying the currently-effective demand curves. AG's recommendations contravene its own criteria in favor of hubs with far less support that defy precedent.

A. The Recommended Hubs have Weaker Price Correlation Which Results in Anomalous, Overstated Net EAS Revenues

The first selection criterion is market dynamics, which AG defined as:

> *"Market Dynamics. The gas index should reflect gas prices consistent with LBMPs, recognizing that other factors such as transmission congestion also influence the frequency and level of spikes in LBMPs. Ideally, the gas index used in peaking plant net EAS revenues calculations would reflect a long-term equilibrium rather than short-run arbitrage opportunities created due to near-term or transitory natural gas system conditions"* (AG Report at p. 91).

[3] Ibid., pp. 17-18 for supporting detail.

To assess market dynamics, AG evaluated the correlation between power and gas prices, characterizing the relationship as high, medium, or low correlation. AG concluded that Zone C power prices had medium correlation with TGP Z4 200 Leg and high correlation with TETCO M3, thus acknowledging the superiority of TETCO M3. This finding is bolstered through a quantitative analysis of correlation. The standard metric is the correlation coefficient. A review of historical data shows that the correlation coefficient of Zone C power prices with TGP Z4 200 Leg gas ranges 0.45 to 0.46 depending on which historical timeframe is used (Figure 2). Correlation coefficients of less than 0.50 suggest weak or, at best, moderate correlation. The TGP Z4 200 Leg correlation with Zone C power prices is no better than that of Henry Hub. In contrast, TETCO M3 has a strong correlation ranging 0.72 to 0.76. More strongly correlated yet are the delivered price gas indices of Iroquois Z2, TGP Z6, and Algonquin City-gates.

Figure 2. Correlation Coefficients of NYISO Day-Ahead Power Prices with Daily Gas Prices

	Henry Hub	TGP Z4 200 Leg	TETCO M3	Iroquois Z2	TGP Z6	Algonquin CG
Zone C		*AG Recommendation*	*Current Hub*			
2013-present	55%	47%	76%	81%	80%	80%
2015-present	44%	46%	72%	74%	75%	76%
Sep16-Aug19	42%	47%	74%	77%	77%	77%
Zone G			*AG Recommendation*	*Current Hub*		
2013-present	52%	48%	77%	86%	87%	88%
2015-present	42%	47%	76%	81%	83%	85%
Sep16-Aug19	44%	49%	75%	79%	82%	83%

The weak correlation of TGP Z4 200 Leg emanates from its geographic disconnect from New York State. In the dispatch model, the Zone C reference plant is effectively assumed to burn gas priced at a Marcellus supply basin price, face no pipeline congestion costs to get that gas into New York, and then deliver power into the Zone C market at LBMPs that reflect pipeline congestion costs. The market impact of this disconnect is a $7.74/kW-year (24%) artificial increase in net EAS revenues if the current gas hub is assumed and a near doubling if the TGP Z6 gas hub is assumed.

To illustrate this result, Figure 3 shows the monthly net EAS revenues earned by the Zone C reference unit dispatched on TGP Z4 200 Leg gas. A disproportionate amount of net EAS revenues are earned during winter months, owing to the disconnect between Zone C power prices that reflect gas pipeline constraints and the TGP Z4 200 Leg gas prices that do not. The most prominent example is during the Bomb Cyclone. The net EAS revenues earned in December 2018 and January 2019 account for 29% of the earnings over the entire 36-month period. This is an anomalous, incorrect outcome that can be attributed to TGP Z4 200 Leg not reflecting pipeline transportation costs. Figure 4 contrasts the monthly net EAS results of TGP Z4 200 Leg with those under TETCO M3 and TGP Z6 gas hubs. Neither of these gas hubs exhibits the erratic winter results that TGP Z4 200 Leg due to the prices being more appropriate reflections of delivered gas costs in New York. Even if the TGP Z4 200 Leg was somehow accessible in Zone C without incurring pipeline congestion costs, these winter results are precisely the arbitrage opportunities that NYISO and AG sought to avoid in past demand curve proceedings.[4]

The recommendation of TETCO M3 for Rockland County is similarly problematic. The correlation of TETCO M3 with Zone G power prices is weaker than that of Iroquois Z2, TGP Z6, and Algonquin City-

[4] FERC (Jan. 17, 2017), "Order Accepting Tariff Filing Subject to Condition," issued in docket ER17-386 at P 121 ("2017 FERC Order"). "These arbitrage opportunities may not reflect natural gas supply pricing under the longer-term equilibrium conditions that are required to be considered in establishing the ICAP Demand Curves."

gates, across all three historical periods analyzed (Figure 2). The weaker correlation of TETCO M3 artificially skews the net EAS revenues higher, because, under the net EAS model logic, the reference plant will experience upside when the power/gas disconnect produces higher spark spreads and limited downside when the disconnect results in lower spark spreads (as the downside result has a floor at zero).

Figure 3. Monthly Net EAS Revenues for the Zone C Reference Plant (TGP Z4 200 Leg Gas)

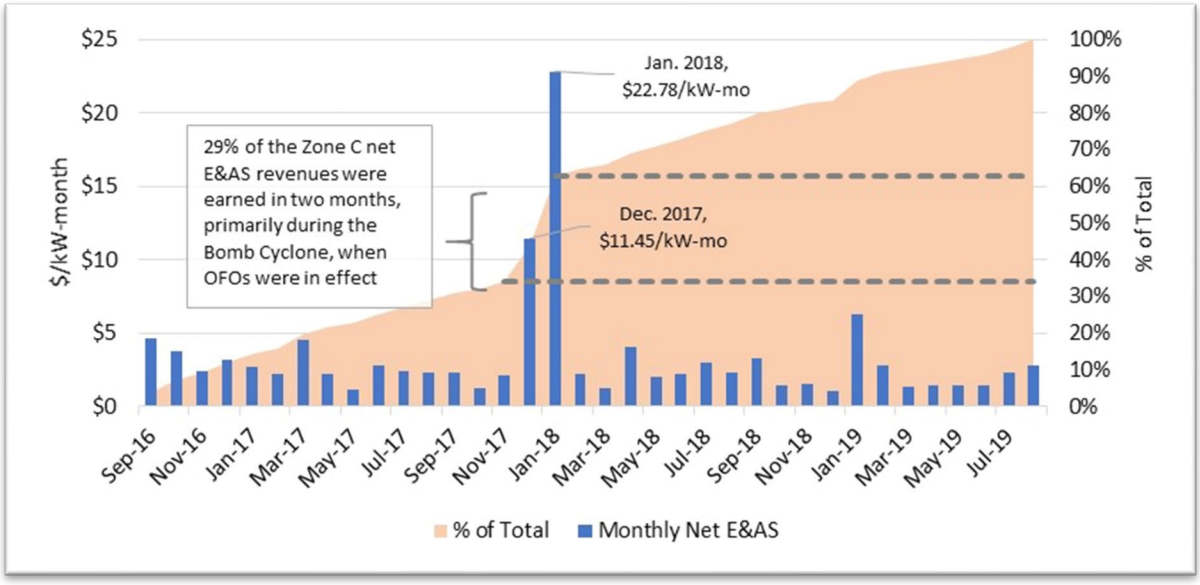
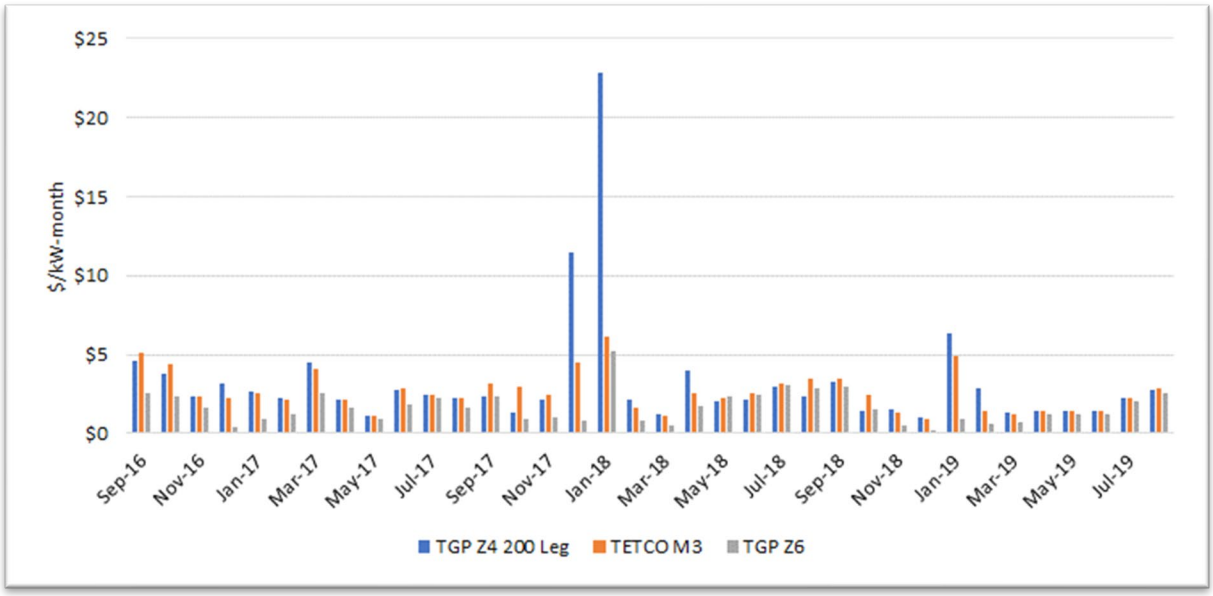


Figure 4. Comparison of Monthly Net EAS Revenues for Zone C vs. Gas Hubs



B. Liquidity

The second selection criterion is liquidity, which AG defined as:

> *"Liquidity. The natural gas index should have a reasonable depth of historical data available, representing trades occurring at sufficient volumes over a reasonable period of time"* (AG Report at p. 91).

This definition of liquidity does not help set apart well-established gas indices that are typically fairly liquid. If depth of historical data and trade volumes are the sole determinants of liquidity, then Henry Hub should be highest-ranked. For the gas hubs AG has recommended, there is liquidity to purchase index gas in the tariff-specified regions, but there is not liquidity to purchase gas at those prices in New York. This is an important distinction; with transportation, liquidity of the gas index is irrelevant. Ignoring transportation is equivalent to assuming that the reference plant can burn Henry Hub gas. With Henry Hub, the disconnect is obvious, but AG has made the same error in characterizing gas hubs as liquid even though they are not liquid at that price in New York.

As FERC has stated, whether alternative gas hubs have more or less liquidity is not dispositive as to whether their use is reasonable in estimating net EAS revenues, but lack of liquidity is an important factor.[5] For liquidity to be relevant to the net EAS revenues of a peaking facility, it must encompass what is necessary to deliver gas to the reference plant. From this standpoint, the gas hubs that AG has recommended fail to meet the liquidity criterion. TGP Z4 200 Leg gas cannot be delivered to Zone C without incurring pipeline congestion costs, and neither can TETCO M3 to Rockland County.[6]

C. Geography

The third selection criterion is geography, defined as:

> *"Geography. The natural gas index (which typically reflects average trading prices over a broad geographic area) should represent trades across pipelines that have an appropriate geographic relationship to potential peaking plant locations going forward, or otherwise have a logical nexus to prices at relevant delivery points"* (AG Report at p. 91).

The gas hubs recommended by AG for Zone C and Rockland County do not have appropriate geographic relationships to the reference plant locations. In both cases, the assumed gas hubs provide for deliveries upstream from where the gas is needed at the plant, and no reliable means of transporting gas has been incorporated. Thus, AG has ignored the geographic reality that gas delivered in Pennsylvania or New Jersey is not gas in New York.

Zone C

The Tennessee Gas Pipeline defines the TGP Z4 200 Leg as "deliveries into TGP at all points of receipt on the 200 line in the states of Pennsylvania and Ohio as well as transactions at Tennessee's station 219 pool."[7] This section of TGP sources highly-discounted gas from Marcellus production where the price spread between the production pool and delivered markets is exacerbated, especially in the winter. To get into New York, transportation must be purchased from Station 219 to flow gas north along the 200 line or northeast along the 300 line. Firm transportation along these paths is fully subscribed according to TGP's

[5] 2017 FERC Order at P 155.

[6] See CPV July Comments at pp. 3-12 for detailed explanations of the pipeline geography in New York and an assessment of which options are commercially available in each region.

[7] S&P Global Platts (May 2020), "Methodology and Specifications Guide, US and Canada Natural Gas," at p. 11, available online here.

Electronic Bulletin Board.[8] Interruptible transportation is seldom available in winter months due to high utilization of points downstream of TGP Station 219 and the frequent occurrence of operational flow orders.

The cost of this congestion is well in excess of the flat $0.27/MMBtu adder that AG has assumed. Over the past four winters (Dec-Feb), TETCO M3 averaged a $1.35/MMBtu premium to TGP Z4 200 Leg (Figure 5). TGP Z6 300 averaged a $3.68/MMBtu premium to TGP Z4 200 Leg over the same time period.

Figure 5. Winter Gas Price Difference between Status Quo and AG Hubs ($/MMBtu)

	Zone C			*Rockland County*		
Winter	TETCO M3 (Status Quo)	TGP Z4 200 Leg (AG)	Difference from Status Quo	Iroquois Z2 (Status Quo)	TETCO M3 (AG)	Difference from Status Quo
2016/2017	$3.22	$2.96	-$0.25	$4.46	$3.22	-$1.24
2017/2018	$7.09	$2.86	-$4.24	$8.28	$7.09	-$1.18
2018/2019	$3.70	$3.08	-$0.62	$5.03	$3.70	-$1.33
2019/2020	$2.13	$1.84	-$0.28	$2.95	$2.13	-$0.83
Winter Average	$4.03	$2.69	**-$1.35**	$5.18	$4.03	**-$1.15**
Assumed Transportation Cost		$0.27			$0.27	

Rockland County

The geography issue is similar for Rockland County. The TETCO M3 delivery points end in northern New Jersey before reaching Rockland County. Pipeline transportation would be needed to get gas into New York. The firm transportation on Algonquin is fully subscribed and is held by long-term firm shippers (primarily gas LDCs) that consume the gas downstream. It may be possible in some parts of the year to flow gas on an interruptible basis, however, there is significant risk in attempting to do so. Even in summer months, Algonquin has issued highly-constraining operational flow orders.[9] This is uniquely impactful to power plant operators whose hourly takes are not necessarily ratable. (See Section 2 below for a further critique of the notion that IT can be relied upon in Rockland County.)

The geographic disconnect is why TETCO M3 is priced lower than the downstream hubs of Iroquois Z2 and Algonquin City-gates. These hubs are viable options for Rockland County because they provide for delivery at or downstream of Rockland County and thus encompass the necessary pipeline transportation costs. Over the past four winters (Dec-Feb), Iroquois Z2 averaged a $1.15/MMBtu premium to TETCO M3, and Algonquin City-gates averaged a $2.01/MMBtu premium to TETCO M3. These premiums are far more costly than the $0.27/MMBtu that has been modeled.

D. A Departure from Precedent is Not Supported

The fourth selection criterion is precedent, which AG defined as:

[8] Tennessee Gas Pipeline Company, L.L.C (accessed August 2020), "Segment Capacity," available online here, click capacity available, click unsubscribed, click segment capacity. Capacity is not available to flow forward from Station 219 to central New York (that is, in the "TD1" direction).

[9] For example, see the August 17, 2020, notice from the Algonquin Gas Transmission Pipeline extending the summer OFO, "The System wide OFO effective August 14, 2020 will remain in effect until further notice. AGT requests that customers/point operators on AGT be aware of the impact non-ratable hourly takes from the system may have in causing delivery pressures reaching lower than desired levels… If customers/point operators don't manage hourly takes from the system, 1) delivery pressures will be impacted and /or 2) AGT may be required to impose further restrictions or courses of action in order to maintain the operational integrity of the system."

"Precedent/Continuity. The natural gas index selected should reflect and be supported by information collected from multiple sources and should take into account what is used for other NYISO planning and market evaluation purposes. While the appropriate choice of gas index can vary in accordance with the purpose and objectives of the study, consistency and continuity should be considered when other factors do not clearly indicate an alternative" (AG Report at p. 91, emphasis added).

The FERC proceeding supports the continued use of TETCO M3 for Zone C and Iroquois Z2 for Rockland County. These hubs were proposed by NYISO and AG in the 2017 demand curve reset, argued before FERC, and ultimately accepted after much debate. AG is now proposing to modify the gas hubs even though the hubs are inferior to the current hubs across all four selection criteria.

In the prior reset, NYISO argued that the first of the four criteria – electricity market dynamics and correlation – was of particular importance. "A weak relationship with LBMPs for a location indicates that a candidate gas hub pricing point is not likely reflective of marginal fuel supply costs in the electricity market. This relationship is especially important during periods of gas price spikes that cause coincident spikes in LBMPs."[10] The NYISO continued that the use of such gas hubs may significantly overstate the net EAS revenues of the reference plant, and the NYISO quantified this impact in its answer. On this basis, the NYISO recommended TETCO M3 for Zone C and Iroquois Z2 for Zone G, in favor of alternatives that had poorer correlation that would overstate net EAS revenues.

The same arguments are true in the ongoing reset. The alternatives proposed by AG have weaker correlation with power prices and overstate net EAS revenues. The use of TGP Z4 200 Leg increases the Zone C net EAS revenues by $7.74/kW-year (24%), and the use of TETCO M3 increases the Zone G net EAS revenues by $12.23/kW-year (37%). These overstatements are attributable to selecting inferior gas hubs that have weaker market correlation.

2. The MMU's Analysis is Flawed and Provides No Support for the Recommended Gas Hubs

The NYISO Recommendations included an accompanying memorandum from the MMU ("MMU Comments"). The MMU Comments included an analysis indicating that it would be possible to buy gas for the Rockland County reference plant at a TETCO M3 delivery point such as Lambertville, New Jersey, and forward-haul the gas to Rockland County on interruptible transportation at the current tariff rate of $0.2421/MMBtu.

There are numerous problems with this assertion. First, this commercial proposition is extremely speculative. Relying on Algonquin IT provides no guarantee of gas access to the power plant. The Algonquin pipeline is frequently constrained, subject to operational forced outages, and most of the transportation is held by gas LDCs that are reluctant to release it in winter months. Even if there is a small segment of pipeline that appears unconstrained after-the-fact, it is unreasonable to assume that the opportunity to exploit this discount could be commercially executed or would persist for any appreciable time. Accordingly, it is very unlikely that an equity investor or lender invest in a project that cannot reliably get gas to the burner tip, particularly without an energy hedge.

Second, the MMU's analysis is flawed in several respects. The MMU has assumed that every last MMBtu of pipeline capacity can be used right up to the limit. For example, if the historical data shows that 5

[10] NYISO (Dec. 22, 2016), "Request for Leave to Answer and Answer of the NYISO, Inc.," at p. 26.

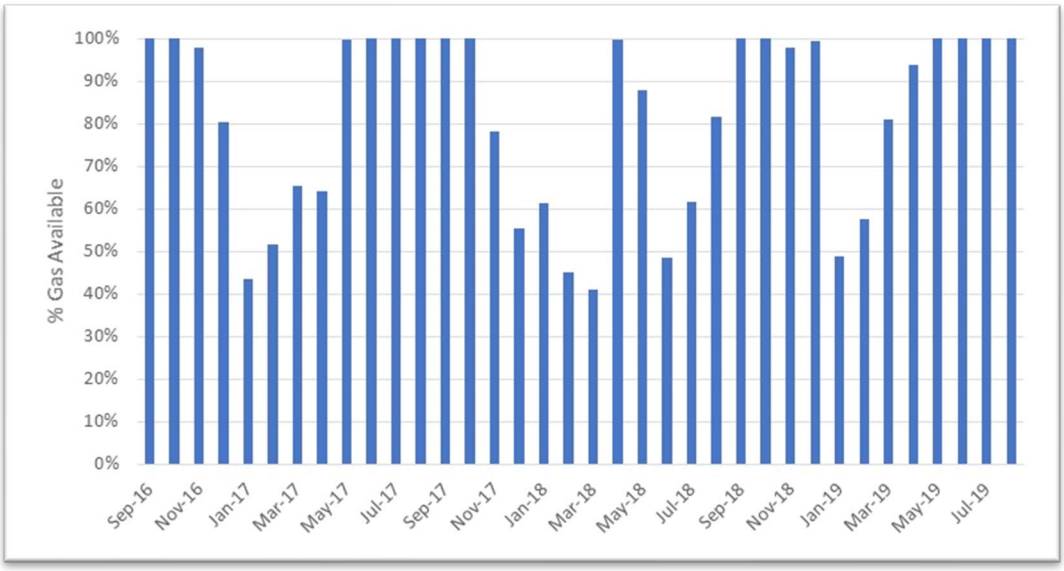
percent of pipeline capacity was not subscribed, and this equates to 75,000 MMBtu/day, the MMU's analysis would find that reference plant can get gas on that day. In reality, pipeline congestion occurs before the pipeline is 100 percent utilized, and IT is not available well in advance of that threshold. The pipeline may keep some tolerance for variability in withdrawals and anticipation of demands from no-notice service customers. Additionally, there could be pipeline capacity but no molecules of gas available to reach the flow point. This could occur during high demand periods when upstream gas LDCs or power plants consume the available supply. So while pipeline capacity may be listed as available, it is not practically usable because there is no upstream supply.

The MMU's findings are quickly undermined if a pipeline tolerance assumption is applied to the analysis. Figure 7 below is a variant of the chart produced by the MMU that shows the result of applying a 10 percent reduction to daily pipeline capacity values. This shows that the reference plant would not be able to flow interruptible gas on the majority of winter days over the three year historical period, September 2016 to August 2019.

A second criticism is that the MMU has focused on the average pipeline availability over the month. Such a quantification obfuscates the impact on the reference plant by implying that all days in the month are of equal value. In actuality, the backcast attributes much higher daily net EAS value to days that IT is less likely to be available. Omitting these days from the analysis has a disproportionate impact on the net EAS results, particularly in winter months.

Due to these shortcomings, the MMU's analysis offers little if any support for TETCO M3 for Rockland County. It is unreasonable to assume that an investor would base its investment decision off an interruptible gas supply on the notoriously-constrained Algonquin Pipeline. Instead, an investor would account for the generally-understood cost of getting gas to the burner tip, which includes pipeline transportation costs.

Figure 6. Percent Gas Available for 75,000 MMBtu/Day Peaker (10% Tolerance)



3. Were a Change Warranted, It Must be in Favor of a Gas Hub that Better Meets the Selection Criteria

According to the four selection criteria, the selection of gas hubs should favor precedent and continuity. There is an expectation that deviations from the prevailing assumptions should be justified. However, AG and NYISO have not put forth any compelling reasons for why changes are necessary or appropriate.

If one considers the facts and circumstances potentially warranting a change, it is immediately apparent that the events over the past four years point toward higher gas costs, increased pipeline constraints, and increased difficulty accessing gas in New York State. Figure 8 enumerates such events. Yet, AG's recommended hubs lower the average cost of gas by 12% for Zone C and 22% for Rockland County, over the three-year historical period beginning September 2016. The price decline is attributable to choosing hubs that fail to reflect pipeline constraints into New York – pipeline constraints that are known to be prevalent and are showing no signs of abating going forward.

Figure 7. Recent Developments in New York State Impacting Natural Gas Access and Costs

2016-2018	Millennium lateral challenges and litigation result in substantial cost overruns resulting in the project costing $71 million (whereas AG has assumed a fraction of the cost).
2017	Atlantic Bridge enters service after facing delays.
2019	Con Edison issues natural gas moratorium on Westchester County customers, citing, "the demand for gas is outpacing supply due to… constraints on interstate pipelines that bring natural gas to customers in Westchester County."[11]
2019	National Grid issues natural gas moratorium on NYC and Long Island customers that was subsequently suspended after reaching an agreement with the state.
2020	Williams' Constitution Pipeline was cancelled after eight years held up in courts.
2020	Williams' Northeast Supply Enhancement was cancelled after it failed to get its water quality certification from the NY DEC.
2020	Iroquois faces opposition for its proposed compression increase at the Brookfield compressor station.
2020-2021	The retirement of the 2 GW Indian Point is expected to further constrain downstate gas supplies as the nuclear generation is largely replaced by gas-fired facilities in downstate New York.

If a change is warranted, it would have to be in favor of a gas hub that better meets the selection criteria. The gas hub should be a better reflection of market dynamics (through correlation), have consistent liquidity both of the gas index and for delivery to the burner tip, have a geography that enables delivery to the plant without considerable transportation risk, and ideally keeps with precedent as to avoid gyrating assumptions between demand curve resets.

[11] Con Edison (2019), "About the Westchester Natural Gas Moratorium," available online here.

The gas hubs underlying the currently-effective demand curves adequately meet this set of criteria. However, if weight was not given to precedent, improvements could be made by switching to the gas hubs of TGP Z6 for Zone C and Algonquin City-gates for Rockland County. For Zone C, TGP Z6 delivers downstream of Zone C, so this gas can be taken in path in Zone C with limited transportation risk. The Tennessee Gas Pipeline transects Zone C, and TGP Z6 is also better correlated with Zone C power prices than both TGP Z6 200 Leg and TETCO M3. TGP Z5 is not viable because it is not traded, and, if it was, it would price at TGP Z6. (Zone 5 demand competes with zone 6 demand because there are not typically constraints between zones 5 and 6.) For Rockland County, Algonquin City-gates better captures power and gas market dynamics, has a slightly stronger correlation with power prices than Iroquois Z2 and TETCO M3, and the Algonquin pipeline transects the county so there is no need to backhaul gas as with sourcing gas from Iroquois Z2.

This concludes CPV's comments.