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BOARD OF PUBLIC UTILITIES
TRENTON, NJ

October 16, 2019

New Jersey Board of Public Utilities
Aida Camacho-Welch, Secretary of the Board
44 South Clinton Avenue
3rd Floor – Suite 314, CN 350
Trenton, NJ 08625

Via Electronic Delivery

Comments from New Jersey Natural Gas Company Pertaining to Docket No. G019070846

New Jersey Natural Gas Company (“NJNG”) appreciates the opportunity to offer comments in response to the New Jersey Board of Public Utilities (“Board” or “BPU”) Notice, dated September 10, 2019, soliciting public comments on DOCKET NO. G019070846 – IN THE MATTER OF THE EXPLORATION OF GAS CAPACITY AND RELATED ISSUES.

NJNG is a lifeline utility provider, responsible for acquiring sufficient gas supply to deliver natural gas service to more than 550,000 customers each day. The vast majority of NJNG’s customers are households and businesses that rely on reliable, cost effective service to meet home and building heating needs. Throughout its service territory, dozens of schools, hospitals, first responders and government buildings rely on NJNG for safe, reliable natural gas service to support their critical operations.

NJNG appreciates the opportunity to address the issues of Gas Distribution Company (“GDC”) Capacity Procurement raised by the BPU in its Notice, and we are encouraged by the dialogue this open docket and attendant public hearing held on October 1, 2019 represents on this critical topic.

We look forward to our continued dialogue on these important matters pertaining to the gas supply necessary to deliver the safe, reliable and affordable service New Jersey customers expect.

Sincerely,

Jayana Shah
Managing Director, Gas Supply
New Jersey Natural Gas

(1a-1d) GDC Capacity Procurement

1a) Does each GDC, (either independently or through a contract with an affiliated company) have sufficient firm capacity secured to meet their current design day forecasts for the next five years?

Capacity to Meet Design Day Needs

New Jersey's natural gas market is constrained, and positioned to become increasingly so in the absence of access to new interstate natural gas pipeline capacity. Notwithstanding the challenge created by these conditions and their implications for system reliability, NJNG can state that we believe we will have sufficient access to supply, today and in the near term, to meet our Design Day forecasts for current and future customers.

If interstate natural gas pipelines operate without curtailment or restriction, NJNG believes we can fulfill our forecasted supply needs through our contracted firm capacity, by securing any incremental firm capacity should it become available, and through spot- and peaking- gas supply contracts.

This represents a challenge that can be managed in the near term. However, it is critical to note that this can be eased by being able to access additional interstate natural gas pipeline capacity into New Jersey.

Reliability Risks Increase in Constrained Market

A complete response to this question must address overall system reliability concerns intensified by a highly constrained New Jersey market for natural gas supply in which the GDCs operate.

As a lifeline service provider, our mandate and goal is to prudently plan for and deploy the resources necessary to ensure 100 percent reliability to the New Jersey residents in our service territory who depend on us for their home heating needs – especially on the coldest days of the year.

In line with that mandate, we are committed to securing as much additional firm capacity as possible; but the reality of the constrained market is that there is little to be had. The interstate natural gas pipelines serving New Jersey are not only running regularly at full capacity – they are also fully subscribed.

As part of our commitment to serve customers and prudently plan, NJNG commissioned Levitan and Associates (“Levitan”), to undertake an independent analyses of interstate natural gas pipeline capacity available to New Jersey.

Levitan's report, entitled “Availability of Natural Gas Capacity To Meet New Jersey LDC Customer Needs”, has been attached here as Exhibit A and is incorporated herein.

In brief, Levitan's in-depth analysis provided this as a key takeaway: to ensure 100 percent reliability for New Jersey GDCs, particularly with an eye on prudent planning for outages or other restrictions on interstate capacity into New Jersey, *additional interstate pipeline capacity is needed.* (emphasis added)

Importantly, this observation by Levitan is not to just support increased demand or customer growth – it is critical to mitigate reliability risks for New Jersey's constrained natural gas market.

Said differently, even without a single additional customer added to NJNG's system, there are reliability risks under Design Day and other high-use cold weather conditions. Should an incident occur under such conditions on an interstate natural gas pipeline that results in supply outages, GDCs could experience a natural gas supply shortage as soon as this coming 2019/2020 winter heating season.

This directly relates to the reality of fully subscribed interstate natural gas pipeline capacity into New Jersey. There is very little buffer for service curtailments or restrictions due to planned maintenance, or an unplanned outage event by the interstate natural gas pipelines.

Of the five interstate natural gas pipeline systems serving New Jersey, just two, Transco and Tetco, provide over 85 percent of firm pipeline capacity to New Jersey utilities. Operational flow orders ("OFOs"), which are restrictions in service, have been steadily increasing on all five pipelines serving New Jersey, because the pipelines are fully utilized. Between 2015 and 2019, OFOs have more than tripled on Tetco and more than doubled on Transco.

Of particular concern for New Jersey GDCs, is that this coming winter, Tetco is implementing capacity reductions to perform safety inspections. This activity may affect service to New Jersey.

At the intersection of these two issues - the constrained market and potential curtailments of interstate natural gas pipeline capacity to New Jersey – there is a very real public safety issue.

For these reasons, New Jersey GDC's access to a diminishing pool of natural gas supply has been an issue of concern to NJNG for more than a year, and we have raised our concerns with the Board – through our public comments and directly with leadership and staff.

To the credit of the Board and its Staff, there has been some recognition of this fact. The BPU has engaged with the GDCs, electric distribution companies and the State's preparedness and response communities to conduct tabletop exercises to better understand the impact to the public of an outage event on the State's constrained natural gas market.

NJNG strongly believes that these facts align behind the need for supply solutions for New Jersey.

These solutions can and should include "behind-the-gate" solutions to continue reducing natural gas demand, including energy efficiency programs and demand response. They should also

include alternative natural gas supplies, such as Renewable Natural Gas and green hydrogen generated from excess solar and wind capacity.

Ultimately, larger scale projects providing meaningful amounts of new interstate natural gas pipeline capacity, like the PennEast pipeline project, should also be part of the solution.

NJNG is a subscriber on the PennEast project, which is a low-cost natural gas supply solution to meet forecasted needs and improve statewide service reliability by shoring up interstate natural gas supply diversity.

Under all of the conditions detailed above, the PennEast project, along with other planned infrastructure projects that have remained stalled, are needed to better ensure that the GDCs future design day commitments will be met. These projects also will provide much-needed natural gas supply diversity, and prudent reserve margin, to better guard against the type of interstate natural gas pipeline capacity interruptions that are being seen with increased frequency.

Given the fact that 75 percent of New Jersey's households rely on natural gas for home heating – ensuring reliable natural gas supply is critical for the more than 6 million people across the state who rely on natural gas to heat their home.

1b) What is the weighted average cost of the transportation and storage capacity each of the GDCs has secured?

The weighted average cost of the transportation and storage capacity that NJNG has secured based on the currently effective tariff rates is \$0.52 per dth for delivery to the city gate.

1c) What assumptions does each GDC make and reflect in its forecasts about the switching of customers to and from TPSs?

NJNG does not assume switching activity in its forecasts. The level of transportation customers at the time of the forecast is included for the current and future period.

1d) How does the switching of customers to and from TPSs affect each GDC's capacity portfolio?

NJNG includes and relies on TPS estimated deliveries as a supply in our Design Day study. NJNG does not hold capacity reserve to cover the full TPS load. The natural gas supply NJNG plans for and acquires is to serve the (i) Design Day load of our Basic Gas Supply Service ("BGSS") sales customers purchasing their supply from NJNG, (ii) incremental load of transportation customers above the TPS delivery and (iii) a prudent reserve amount. The amount NJNG can obtain to hold in reserve is continually shrinking, since no new interstate natural gas pipeline capacity is being placed into service.

Due to this fact, NJNG does not have natural gas capacity to serve TPS customers if a significant number of TPS customers switched to BGSS service; NJNG does not have sufficient excess natural gas capacity under contract to release capacity to TPSs; and, in the context of natural gas supply constraints described earlier, NJNG believes it would be improbable for GDCs to secure additional incremental natural gas capacity for transportation customers, if required by any new mandate to do so.

(2a-2f) TPS Capacity Procurement

Questions 2a through 2f pertain to the natural gas supply planning and operational characteristics of TPSs conducting in business in New Jersey. These questions are not pertinent to NJNG as a GDC.

3) Does sufficient pipeline capacity exist within the New Jersey market to satisfy the total customers' requirements currently served by both TPSs and GDCs? Can additional incremental pipeline capacity be obtained to meet the forecasted customer requirements over the next five years? Would this capacity be more expensive than the current capacity?

New Jersey's natural gas market is constrained, and positioned to become increasingly so in the absence of access to new interstate natural gas pipeline capacity. Notwithstanding the challenge created by these conditions and their implications for system reliability, NJNG can state that we believe we will have sufficient access to supply, today and in the near-term, to meet our Design Day forecasts for current and future customers if service is not interrupted by a planned or unplanned event.

If interstate natural gas pipelines operate without curtailment or restriction, NJNG believes we can fulfill our forecasted supply needs through (i) our contracted firm natural gas capacity, (ii) by securing any incremental firm capacity should it become available, and (iii) through spot- and peaking- natural gas supply contracts.

The timeline is uncertain for additional incremental natural gas pipeline capacity to be placed into service. Under current conditions, pipeline project approvals and permitting is taking much longer than it did historically. This creates an uncertainty for natural gas supply planning to ensure the additional natural gas capacity will be placed into service in the time frame when it is needed for design day supply planning. For example, the PennEast project planning began in the summer of 2014 and it still has not acquired all regulatory and permitting approvals necessary to begin construction.

Based on the rates observed for recent projects, the Company believes the cost of new natural gas capacity would be greater than the Company's weighted cost of its current capacity portfolio.

4) If the GDCs were made responsible for securing the incremental capacity for the transportation customers, what would be the costs involved and how should they be allocated? What would be the impact of those costs on BGSS customers?

NJNG includes and relies on TPS estimated deliveries as a supply in our Design Day study. NJNG does not hold capacity reserve to cover the full TPS load. The gas supply NJNG plans for and acquires is to serve (i) the Design Day load of our BGSS sales customers purchasing their supply from NJNG, (ii) incremental load of transportation customers above the TPS delivery, and (iii) a prudent reserve amount. The amount NJNG can obtain to hold in reserve is continually shrinking, since no new interstate natural gas pipeline capacity is coming online.

As such; NJNG does not have capacity to serve a significant number of TPS customers switching to BGSS service; NJNG does not have sufficient capacity under contract to release capacity to TPSs; and, in the context of supply constraints described earlier, NJNG believes it would be improbable for GDCs to secure additional incremental natural gas capacity for transportation customers, if required by any new mandate to do so.

Setting aside that practical reality, unless the hypothetical costs of any new mandate to secure incremental capacity for transportation customers are directly assigned to the TPSs, costs would be borne by BGSS customers.

5) If some of the TPSs have secured long term capacity for their customers, how would an allocation of capacity costs from the GDCs affect them? Would the GDCs be in a position where they would be buying capacity from the TPSs if the GDCs were required to secure capacity for transportation customers?

Without additional clarity in the underlying assumptions in this question, NJNG respectfully cannot provide a detailed response. However, in general, NJNG would have serious concerns about any proposal in which GDC's would be, directly or indirectly, required to assume TPS capacity contracts, inclusive of their underlying pricing and delivery terms, that have not been negotiated by GDCs themselves, in line with each GDC's overall gas supply and Design Day planning objectives.

6) What rates have the TPSs charged residential customers over the past three years? How does this compare to what these residential customers would have paid for their natural gas supply if they had been served by their GDC? Did these residential customers save money? Should the TPSs be required to report pricing information to the Board and publicly disclose their prices on a monthly basis?

This question is not pertinent to NJNG as a GDC.

Enclosed:

"Availability of Natural Gas Capacity To Meet New Jersey LDC Customer Needs", Report of
Levitan and Associates

Availability of Natural Gas Capacity
To Meet New Jersey LDC Customer Needs

prepared for

New Jersey Natural Gas

July 12, 2019

LEVITAN & ASSOCIATES, INC.

20 CUSTOM HOUSE STREET, SUITE 830

BOSTON, MASSACHUSETTS 02110

TEL (617) 531-2818

FAX (617) 531-2826

Disclosure

This report has been commissioned by New Jersey Natural Gas (NJNG), a subsidiary of New Jersey Resources Corporation. This study has been funded in full by NJNG. Levitan & Associates, Inc. (LAI) has performed an independent assessment of natural gas infrastructure capacity in New Jersey. LAI has relied on the June 1, 2018 Basic Gas Supply Service (BGSS) filings by the four gas local distribution companies (LDCs) operating in New Jersey. Pipeline data regarding capacity, throughput and contract levels are from the pipelines' respective electronic bulletin boards. The methods, findings and recommendations set forth in this report are strictly those of LAI and do not reflect corporate recommendations from NJNG or any affiliates. This analysis is independent of any other work undertaken for the New Jersey Board of Public Utilities.

Executive Summary

Levitan & Associates (LAI) has been retained by New Jersey Natural Gas (NJNG) to conduct an independent assessment of the pipeline capacity available to the four New Jersey local distribution companies' (LDCs'). The goal of the assessment is to determine whether there is sufficient capacity available to meet forecasted Basic Gas Supply Service (BGSS) customer requirements under design day criteria. The design day is the basis for planning gas capacity requirements, and therefore reflects the highest gas demand an LDC will be obligated to serve on an extremely cold winter day. Each of the New Jersey LDCs uses its own specific criteria to define the design day. An LDC's primary responsibility is delivering gas to its customers. The design day planning structure ensures that an LDC is able to serve its customers under harsh temperature conditions when the demand for space heating is highest. Based on the design day demand forecast, the LDCs build and manage their portfolios of gas supply, pipeline transportation capacity and storage resources to meet reliability objectives.

In conducting this assessment, LAI has undertaken a detailed review of the pipeline capacity in New Jersey. The deliverability of pipeline capacity to a particular location is based on the primary delivery points associated with each firm transportation contract. These contractual primary delivery points form a sharp delineation between capacity deliverable to New Jersey versus downstream markets in New York and New England. Primary delivery to a New Jersey end-user (LDC, industrial or generator) meter represents firm capacity allocable to New Jersey. Primary delivery to a point in New York or New England, or to a pipeline interconnection linking to capacity with downstream delivery, represents capacity not allocable to New Jersey. Like the New Jersey LDCs, downstream customers have contractual rights to their pipeline capacity that reserve the capacity to its primary delivery points in the downstream markets. Therefore, while an initial high-level review might indicate that there is more than enough gas flowing through New Jersey to meet the collective needs of the four LDCs, this is in fact not the case. Even though the gas associated with downstream customer contracts passes through New Jersey, it is not available to New Jersey customers. When capacity associated with contracts held by downstream customers is removed from the equation, the NJ LDCs are able to meet their current obligations with only a tight margin, and will soon face deficits.

Pipeline capacity within and through New Jersey is nearly fully subscribed. Under FERC tariff doctrine, pipeline entitlement holders have the right of first refusal (ROFR) to renew expiring capacity contracts. Due to the scarcity and value of capacity in the region, ROFR is almost always exercised by contract holders. Robust demand for natural gas makes it highly unlikely that existing pipeline capacity will be decontracted and become available to the New Jersey LDCs on a primary basis. In light of these factors, reliability may be at risk unless sufficient new capacity is added to meet future needs.

In conducting this assessment, LAI determined the maximum level of New Jersey firm customer send out supported by existing pipeline and storage (including LNG) capacity deliverable in New Jersey. We then compared this send out level to the aggregated demand forecast of the four

New Jersey LDCs. Finally, we identified the supply surplus or shortfall for the five annual design days included in the 2018 BGSS filings. LAI’s principal findings are:

- There is a small surplus in 2018-19 and 2019-20, which becomes an increasing shortfall in 2020-21 through 2022-23, as shown in Figure ES1 and Table ES1. The consolidated demand forecast does not include a reserve margin as a contingency for supply loss. Inclusion of a 6% reserve margin would lead to a shortfall in all years.

Figure ES1. Supply/Demand Comparison for New Jersey LDCs

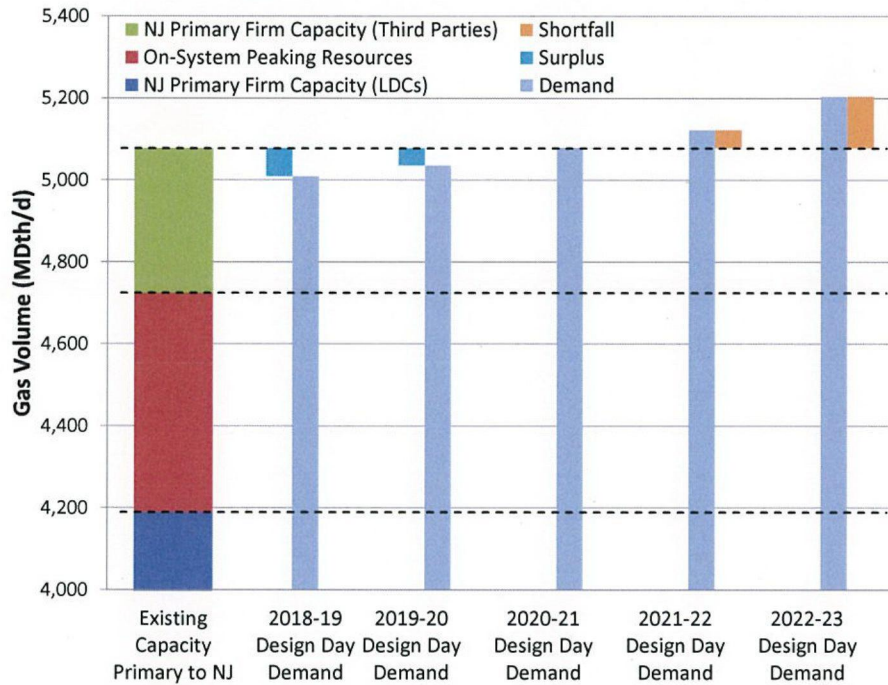


Table ES1. Supply Surplus / Shortfall to Meet Forecasted Demand

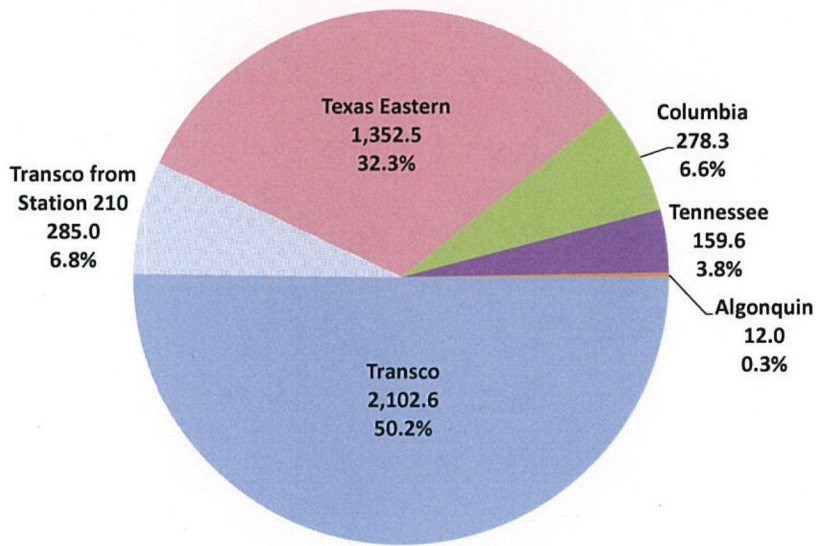
(MDth/d)	2018-19	2019-20	2020-21	2021-22	2022-23
Surplus	68.3	42.1	--	--	--
Shortfall	--	--	1.8	45.1	127.0

- For purposes of this analysis, third party firm transportation capacity with primary delivery points in New Jersey is assumed to be available to New Jersey customers in the form of peaking deals or other arrangements because it is not deliverable to other markets on a primary firm basis. LDCs may, however, have to compete with other New Jersey customers, such as gas-fired generators, to make arrangements with third parties. Shippers in other states that are within a contract’s path, e.g., Pennsylvania, could also make arrangements with third parties for capacity that would otherwise be deliverable to New Jersey. PJM’s recent and ongoing wholesale electric market design incentives oriented around fuel security may increase generators’ willingness to pay for firm supply. Capacity with primary delivery points in New York or New England is not

available to New Jersey customers on a firm basis unless the LDCs compete with other market participants, including downstream LDCs, for third party supply deals. Generators in New York and New England may also be competing for firm supply due to reliability and fuel security objectives in their respective markets. In the final analysis, third party marketers' ability to arbitrage price spreads in neighboring markets renders uncertain the ability of New Jersey LDCs to obtain firm supplies regardless of willingness to pay.

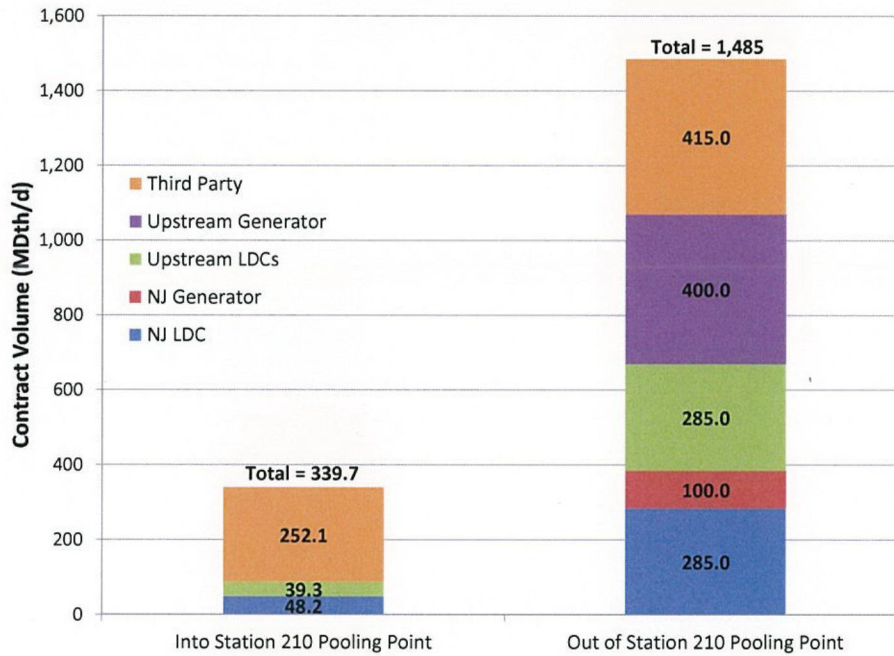
- This supply analysis assumes the absence of any supply disruptions at the wellhead, from storage, or in the form of pipeline capacity decrements. All contracted capacity is assumed to be fully available under design day conditions. While New Jersey is served by five pipelines, the LDCs are dependent primarily on Transco and Texas Eastern for their contracted capacity, as shown in Figure ES2. A pipeline contingency, such as a reduction in compressor station capacity, or, in the worst case, a pipeline rupture, would likely be disruptive to New Jersey, depending on the degree and timing of the outage.

Figure ES2. New Jersey LDCs' Portfolio of Contracted Pipeline Capacity



- Capacity sourced from Transco Station 210 is broken out separately in Figure ES2 because it is dependent on deliveries to the Station 210 pool. As shown in Figure ES3, there is significant competition for supply at the Station 210 pool, including with LDCs and generators in upstream markets on Transco’s mainline in the southeastern U.S., because there are many more contracts taking gas away than there are contracts delivering gas. The need to compete for supply from the pool means that there is a risk that sufficient supplies will not be able to be arranged.

Figure ES3. Transco Station 210 Pooling Point Contracts



- In conclusion, given the current state of the market and the NJ LDCs’ current and future need for natural gas to serve customer demands, support for new interstate pipeline and LDC infrastructure is necessary to ensure that reliability goals are met.

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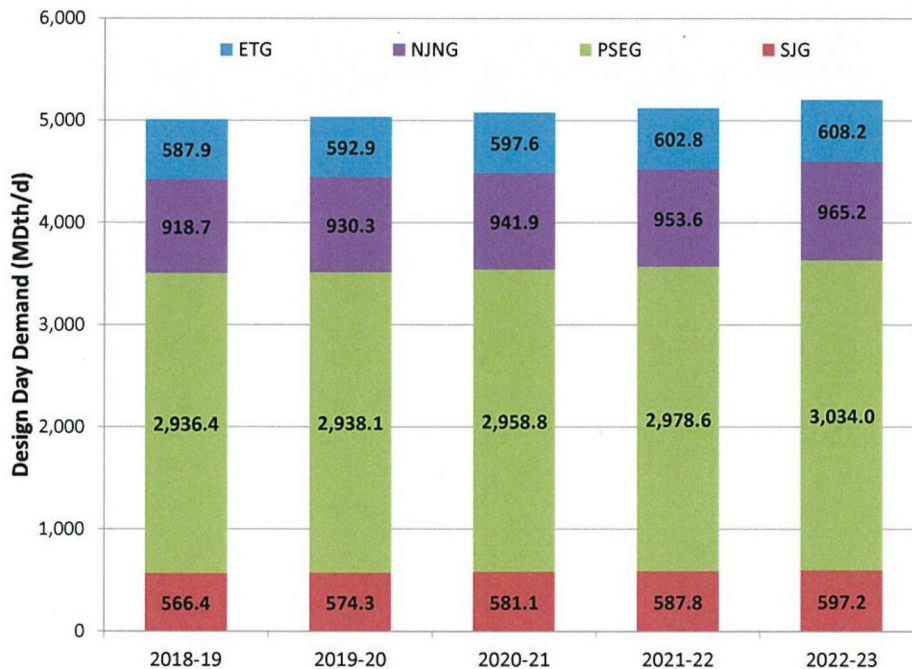
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1 New Jersey's Demand for Natural Gas is Growing

The purpose of this section is to aggregate the design day gas demand forecasts of the four New Jersey LDCs in order to determine the state's total utility gas load. This calculation is based on the LDCs' Basic Gas Supply Service (BGSS) filings for June 1, 2018.¹ The design day is the basis for planning gas capacity requirements, and therefore reflects the highest gas demand an LDC will be obligated to serve on an extremely cold winter day. Each of the New Jersey LDCs uses its own specific criteria to define the design day.² Weather conditions may not reach the design day temperature in a given year, but planning to the design day criteria ensures that there will be sufficient capacity to meet customer needs. Planning to a milder temperature condition could result in failure to serve customers during the coldest period of the winter. An LDC's obligation to serve renders local reliability on an extremely cold winter day paramount. Rolling the dice on a smaller portfolio sized around a milder temperature is not acceptable.

Figure 1. Aggregated Design Day Gas Demand Forecast



¹ Elizabethtown Gas (ETG): <https://www.elizabethtowngas.com/Elizabethtown/media/PDF/2018-BGSS-P-Filing-5-31-18.pdf>

New Jersey Natural Gas (NJNG): <https://www.njng.com/regulatory/pdf/NJNG-BGSS-CIP-Annual-Review-For-2019-05-29-2018.pdf>

Public Service Electric and Gas (PSEG): <https://nj.pseg.com/aboutpseg/regulatorypage/-/media/10869C88D94A4564B0B3729977B78399.ashx>

South Jersey Gas (SJG): https://southjerseygas.com/SJG/media/pdf/2018-2019-BGSS_CIP-Petition.pdf

² See BGSS filings referenced in footnote 1 for more information on each LDC's design day criteria.

Each of the LDCs offers and promotes energy efficiency and conservation programs, as described in more detail in their filings. Growth, however, continues due to new customer connections as a result of fuel switching from oil to gas and new construction.

2 New Jersey's LDCs Already Hold Most of the Capacity with Primary Firm Delivery Points in New Jersey

There are five interstate pipelines operating in New Jersey, their locations relative to each of the four New Jersey LDCs' service territories are shown in Figure 2, and the pipelines that deliver gas to each LDC are summarized in Table 1.

Figure 2. Natural Gas Pipelines and LDCs in New Jersey

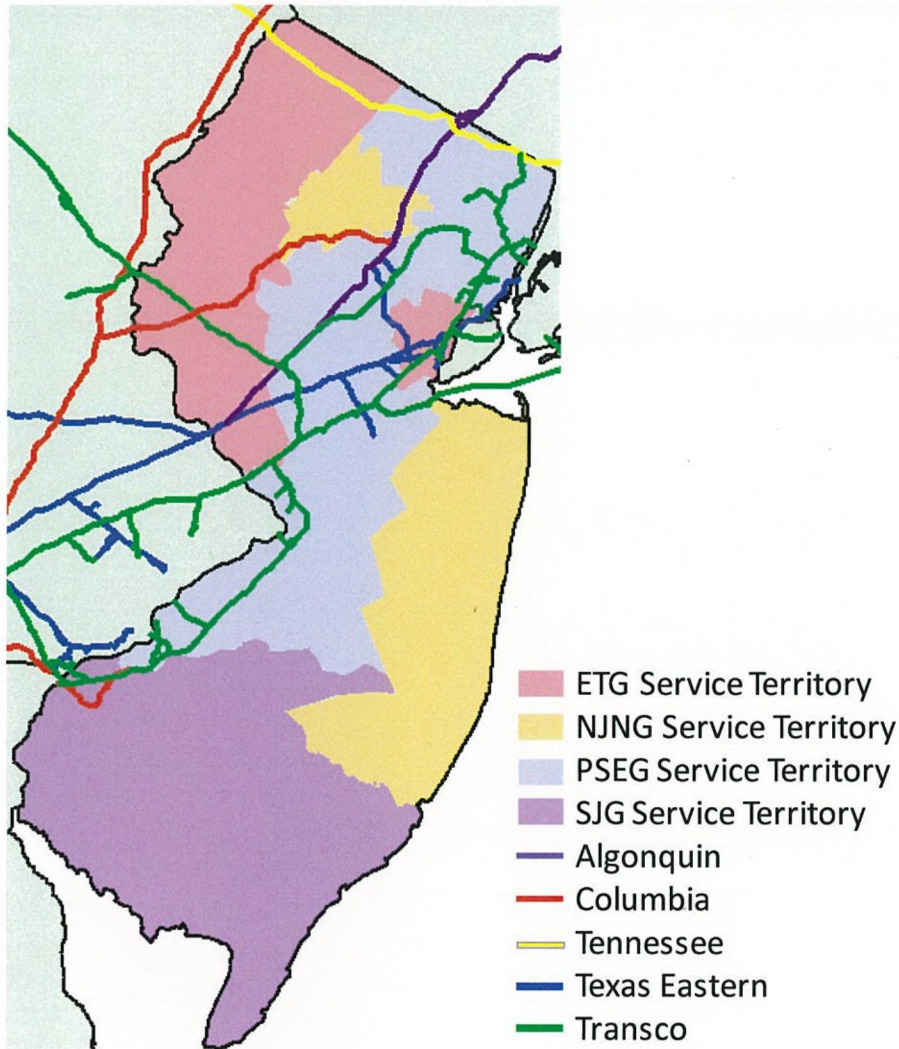


Table 1. Pipeline-LDC Connections in New Jersey

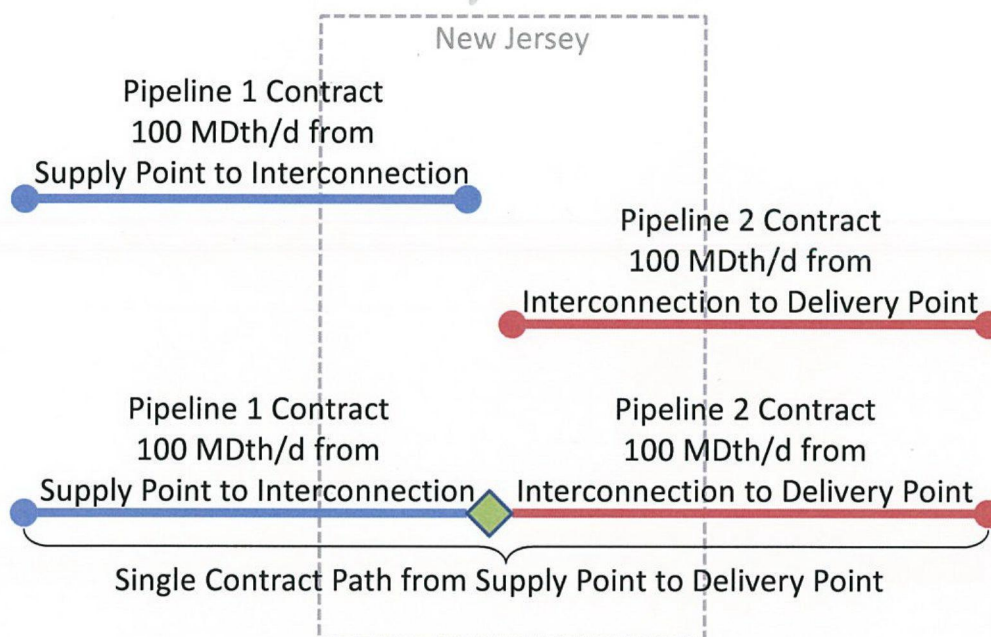
	Algonquin	Columbia	Tennessee	Texas Eastern	Transco
ETG		X	X	X	X
NJNG	X	X	X	X	X
PSEG	X	X	X	X	X
SJG		X			X

The LDCs design their gas supply portfolios to meet the design day requirements discussed in section 1. It is necessary for supply arrangements to be in place prior to a given winter because there is competition for supply on high demand days during the winter, and the LDCs cannot risk having inadequate supply to meet customer needs. The full supply portfolio is not needed year-round, and many of the portfolio components, such as LNG from LDC storage facilities, are not available year-round. However, pipelines are sized to meet contract demands, without excess capacity. Moreover, peak heating demand typically occurs on a coincident basis across the northeast – when it is cold in New Jersey, it is cold in New York and New England as well.

Our analysis of pipeline capacity available to New Jersey relies on each pipeline's Index of Customers as of January 1, 2019. The Index of Customers lists the entities holding rights to firm transportation on the pipeline. Pipeline capacity contracts are based on a customer agreeing to purchase a specific amount of transportation capacity between certain receipt and delivery points, known as primary points, for an agreed term length. The contract, along with the shippers' associated payments to the pipeline, reserves the firm shipper's right to use this capacity at the pipeline's highest scheduling priority. The majority of the LDCs' supply portfolios are comprised of firm contracts with primary delivery points at LDC citygate meters. Pipeline capacity contracts are listed with end dates in the customer indices, but that does not mean the capacity will be available to other shippers after the end date, because the customer holding the contract has a right of first refusal (ROFR), typically associated with a one-year contract extension. This means that the contract holder has the opportunity to automatically extend the contract when it ends before the capacity is offered to other shippers. When a shipper does not exercise its ROFR and capacity does become available, it is offered up for bid. Pipelines can't award capacity at a price higher than the maximum tariff rate, therefore the offered term lengths are typically the determining factor when the pipeline selects winning bidders.

Capacity that has a primary firm delivery point at a pipeline interconnection in New Jersey typically has its ultimate primary firm delivery at a point on the connecting pipeline (or a further downstream pipeline). The capacity on both pipelines therefore represents a single contract path, even though it is composed of multiple contracts (one on each pipeline). This path consolidation avoids double counting capacity, as illustrated in Figure 3, and the upstream contract (Pipeline 1) with a delivery point at an interconnection in New Jersey is not counted as capacity available to New Jersey customers on a firm basis. If the upstream pipeline's delivery capacity to the New Jersey interconnection was to be considered deliverable to New Jersey, even though it is held by a New England shipper, for example, that also has a contract on the downstream pipeline, then the New England shipper would not be able to use its capacity. This is because there is no supply source at the interconnection other than the upstream contract. Even without a corresponding downstream contract, LDC delivery points are not available on a primary firm basis for capacity with contractual delivery to an interconnection. LDCs therefore cannot rely on this capacity unless a deal has specifically been made with the capacity holder, subject to confirmed scheduling of the lower-priority secondary transportation right by the pipeline on a given day.

Figure 3. Path Consolidation Across Pipelines



In many cases, contracts have multiple delivery points. Examples of how such contracts were treated in the analysis are illustrated in the following tables. The total of the point-specific delivery quantities can be greater than the contract quantity, indicating that the shipper has optionality on where to deliver gas on a primary basis. For purposes of this assessment, we have allocated the contract capacity first to the contract holder’s own delivery points. For example, if an LDC (in New Jersey or elsewhere) can deliver gas on a primary basis either to its own citygate meters or a pipeline interconnection, the citygate meters are assumed to be primary, in order to avoid double counting of capacity, as shown in Table 2.

Table 2. Example: LDC Contract with Multiple Delivery Point Options

Shipper:	New Jersey LDC		
Point Type	Point Location	Point Volume (MDth/d)	Considered Primary for Analysis?
Receipt	Pennsylvania Storage Field	50	Yes
Delivery	LDC Citygate in New Jersey	50	Yes
Delivery	Pipeline Interconnection in New Jersey	50	No

In cases where a third party has a contract with primary firm delivery in either New Jersey or New York, the deliverability has been allocated to New York, as shown in Table 3, because New Jersey cannot rely on that capacity unless a New Jersey customer has confirmed its ability to use it subject to a negotiated deal with the third party. Absent such an arrangement, the third party holding the capacity has the prerogative to move gas to the highest and best use on any given day, which is potentially not in New Jersey. Making such deals requires competing and negotiating for the capacity in the third-party market. The capacity therefore cannot be

guaranteed to be available to New Jersey simply because there is a primary delivery point in New Jersey. Flexible primary delivery points provide third parties with the opportunity to arbitrage price spreads.

Table 3. Example: Third-Party Contract with Multiple Delivery Point Options

Shipper:	Marketer		
Point Type	Point Location	Point Volume (MDth/d)	Considered Primary for Analysis?
Receipt	Pennsylvania Production Field	50	Yes
Delivery	LDC Citygate in New Jersey	25	No
Delivery	LDC Citygate in New York	50	Yes
Delivery	Pipeline Interconnection in New Jersey	25	No

Finally, if a contract has multiple points with delivery rights that equal the total deliverability of the contract, the point-specific delivery rights are allocated to their respective locations, as shown in Table 4.

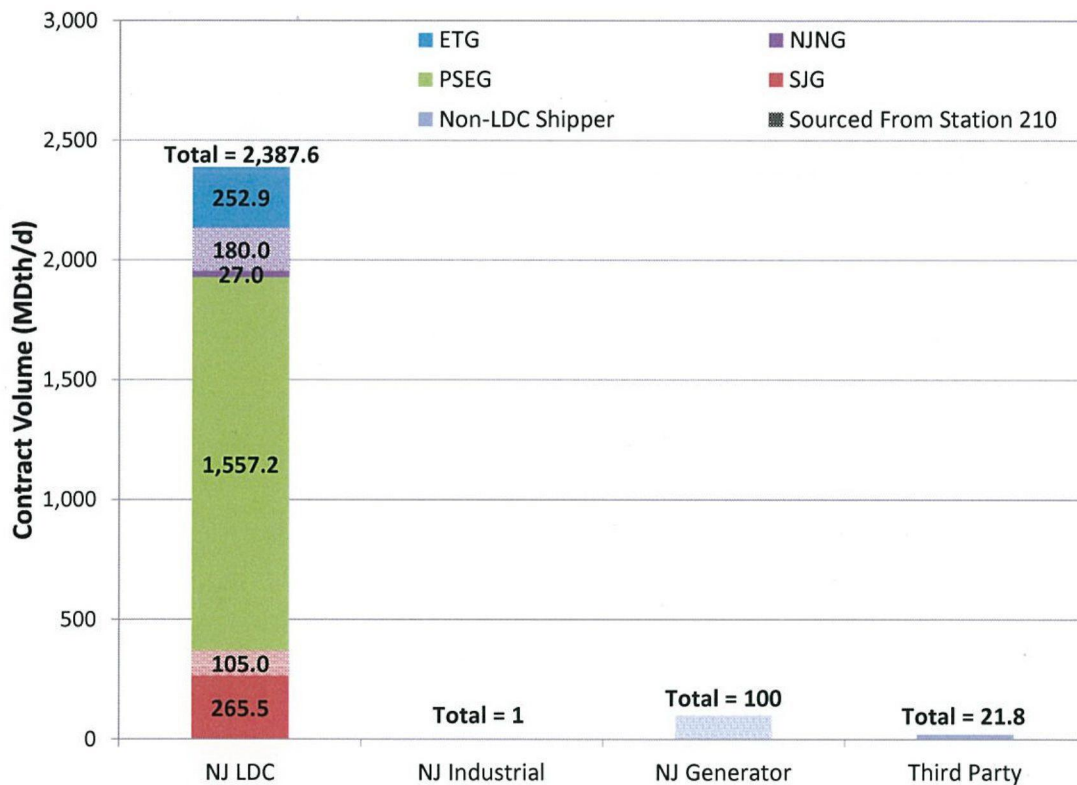
Table 4. Example: Contract with Discrete Capacity to Multiple Delivery Points

Shipper:	Marketer		
Point Type	Point Location	Point Volume (MDth/d)	Considered Primary for Analysis?
Receipt	Pennsylvania Production Field	50	Yes
Delivery	LDC Citygate in New Jersey	20	Yes
Delivery	LDC Citygate in New York	20	Yes
Delivery	Pipeline Interconnection in New Jersey	10	Yes

2.1 Transco

Transco delivers the most primary firm capacity to New Jersey out of the five pipelines operating in the state, a total of 2,510 MDth/d, or approximately 2.5 Bcf/d. This does not include capacity delivered to Station 210. New Jersey's LDCs hold 95% of this capacity, as shown in Figure 4. ETG, PSEG and SJG hold bundled storage and transportation contracts from Transco's 2-Bcf LNG storage facility in Carlstadt, NJ, which are included in the "NJ LDC" category in Figure 4.³ The "Third Party" category represents capacity held by marketers and producers, who can sell their capacity to other shippers through capacity releases, or sell delivered gas that bundles supply and transportation.

Figure 4. Transco Contracts with Primary Firm Delivery in New Jersey



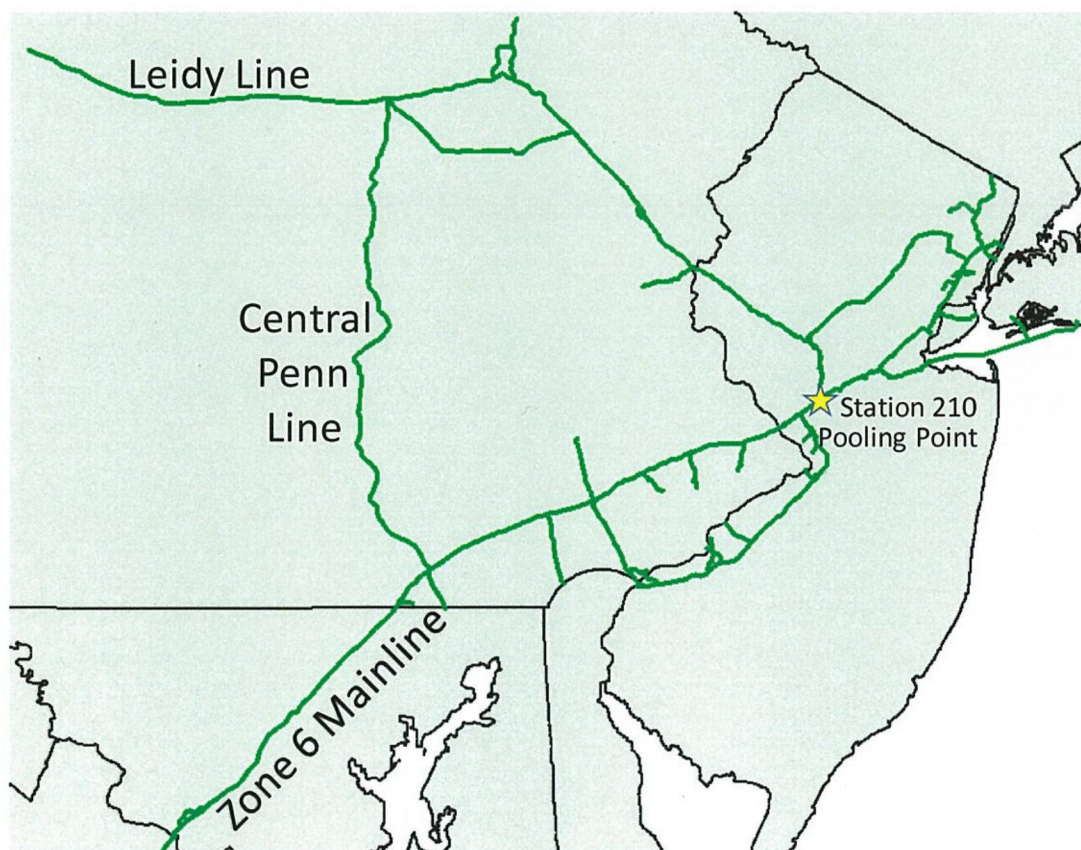
In addition to the capacity shown in Figure 4 above, Transco shippers hold 69 MDth/d of capacity deliverable to its interconnection with Algonquin in Centerville, NJ. Algonquin shippers hold 67 MDth/d of corresponding capacity sourced from Centerville, fully accounting for these delivered supplies. Transco shippers also hold 535 MDth/d of lateral-only capacity deliverable to New Jersey generators. Lateral-only capacity is accounted for separately because it represents capacity on a short segment of the pipeline and does not include access to gas

³ Contracts held by ETG, PSEG and SJG represent 330 MDth/d of transportation capacity from the Carlstadt facility to delivery meters in New Jersey. Non-NJ LDCs hold an additional 69 MDth/d of bundled capacity deliverable from Carlstadt.

supply. These contracts therefore do not represent incremental deliverability. Rather, lateral-only contracts are the funding mechanism for new pipeline laterals to be built.

Access to gas supply is also an important consideration for capacity sourced from Transco's Station 210 pooling point, which includes all of the NJ Generator capacity and 285 MDth/d of the NJ LDC capacity in Figure 4. The Station 210 pooling point is located at the intersection of Transco's Leidy Line from storage fields and production in western Pennsylvania and the Zone 6 mainline between Maryland and New York City, as shown in Figure 5. The Central Penn Line was placed into service in October 2018 as part of Transco's Atlantic Sunrise Expansion Project.

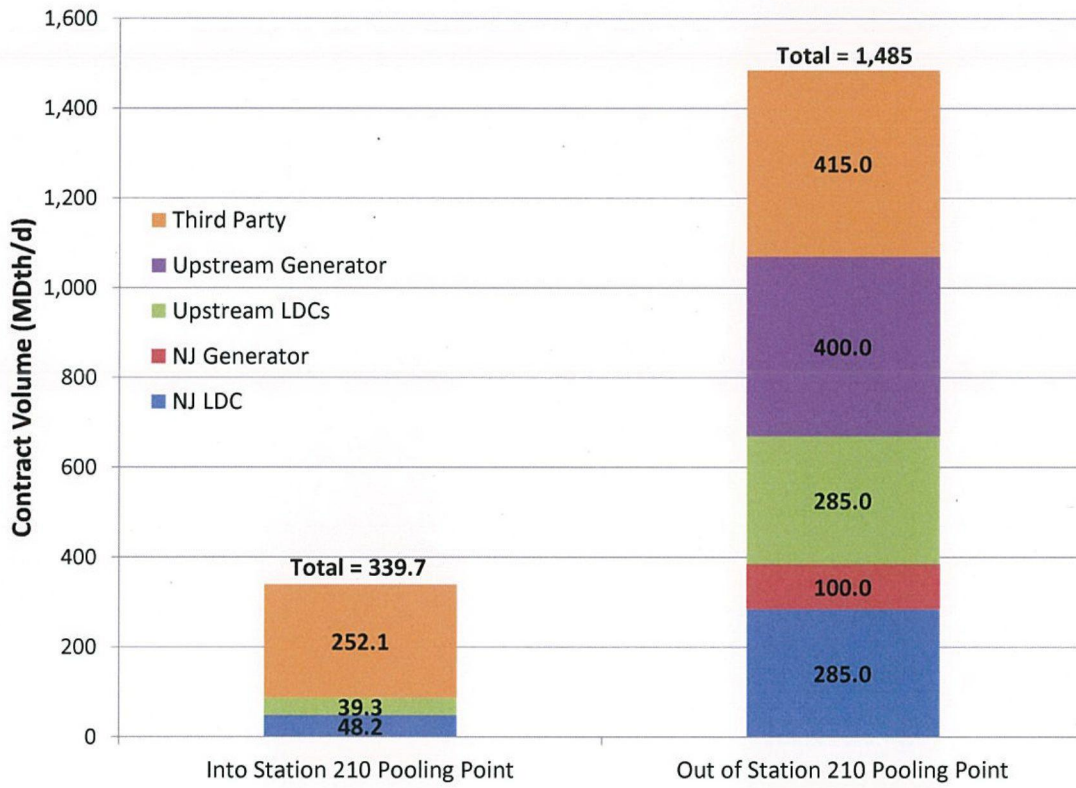
Figure 5. Transco Zone 6 System Configuration



Pooling points on the Transco system represent locations gas is aggregated and disaggregated between shippers. Several Transco contracts have a portion of their paths pass through New Jersey to deliver gas to or receive gas from the Station 210 pooling point. Because there is no production or other local supply associated with the pooling point, all gas contractually received at Station 210 must be transported from elsewhere on the Transco system before being aggregated in the pool. As shown in Figure 6, however, there are far more contracts receiving gas from the pool than delivering gas to the pool. There are sufficient contractual deliveries to the pool to support the New Jersey LDC contracts receiving gas at the pool, but

there is high demand for these resources. This means that in order to access this gas flowing through the state and aggregated in the pool, New Jersey's LDCs would have to compete with other shippers, including LDCs in upstream markets on Transco's mainline in the southeastern U.S.

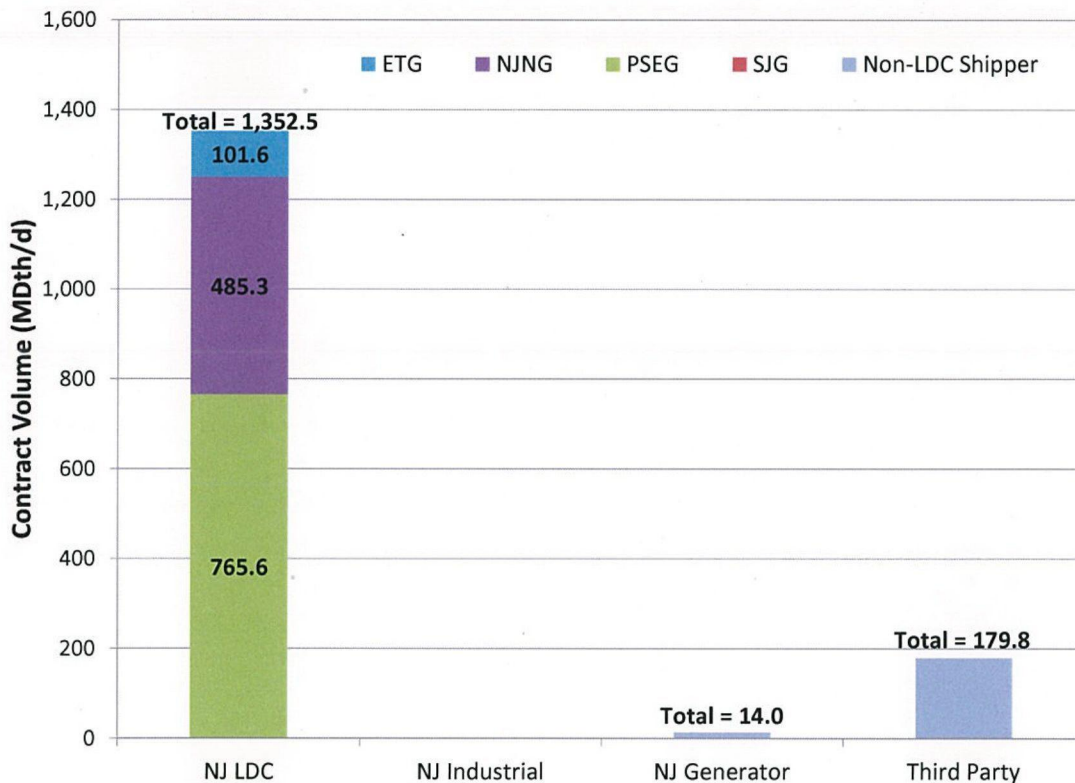
Figure 6. Transco Station 210 Pooling Point Contracts



2.2 Texas Eastern

Texas Eastern likewise represents a significant portion of New Jersey’s gas supply portfolio, transporting 1,546 MDth/d, or approximately 1.6 Bcf/d, of primary firm capacity to delivery points in New Jersey. The New Jersey LDCs hold 87% of this capacity, as shown in Figure 7.

Figure 7. Texas Eastern Contracts with Primary Firm Delivery in New Jersey

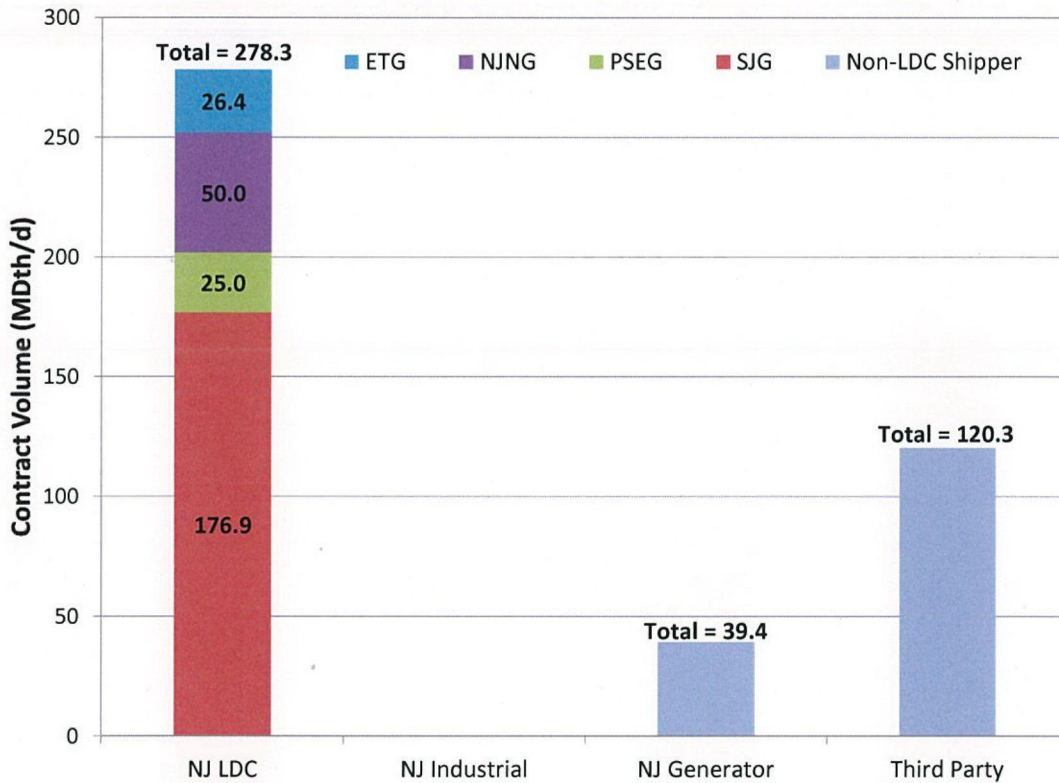


In addition to the capacity shown in Figure 7, Texas Eastern shippers hold 1,314 MDth/d of capacity deliverable to its Lambertville, NJ, and Hanover, NJ, interconnections with Algonquin; 137 MDth/d of capacity deliverable to its Linden, NJ, interconnection with Transco; and 892 MDth/d of lateral-only capacity held by New Jersey LDCs, industrials and generators. Algonquin shippers hold 1,024 MDth/d of capacity sourced from Lambertville and/or Hanover, and 176 MDth/d of the Texas Eastern capacity deliverable to Algonquin has one or more additional primary delivery points. The remaining Algonquin-deliverable capacity is potentially deliverable to New Jersey on a secondary basis, but competing upstream markets are also in the capacity path. The capacity deliverable to Linden is sourced from a Transco interconnection and held by Transco, and because of its rate schedule type is not deliverable to any other points. Finally, as with Transco, the lateral-only capacity does not include upstream transportation capacity or access to gas supply and therefore does not represent incremental deliverability.

2.3 Columbia

Columbia only has two laterals that deliver gas into New Jersey, and as a result it has significantly less capacity with primary firm delivery points in the state, as shown in Figure 8. New Jersey's LDCs hold 64% of this capacity.

Figure 8. Columbia Contracts with Primary Firm Delivery in New Jersey

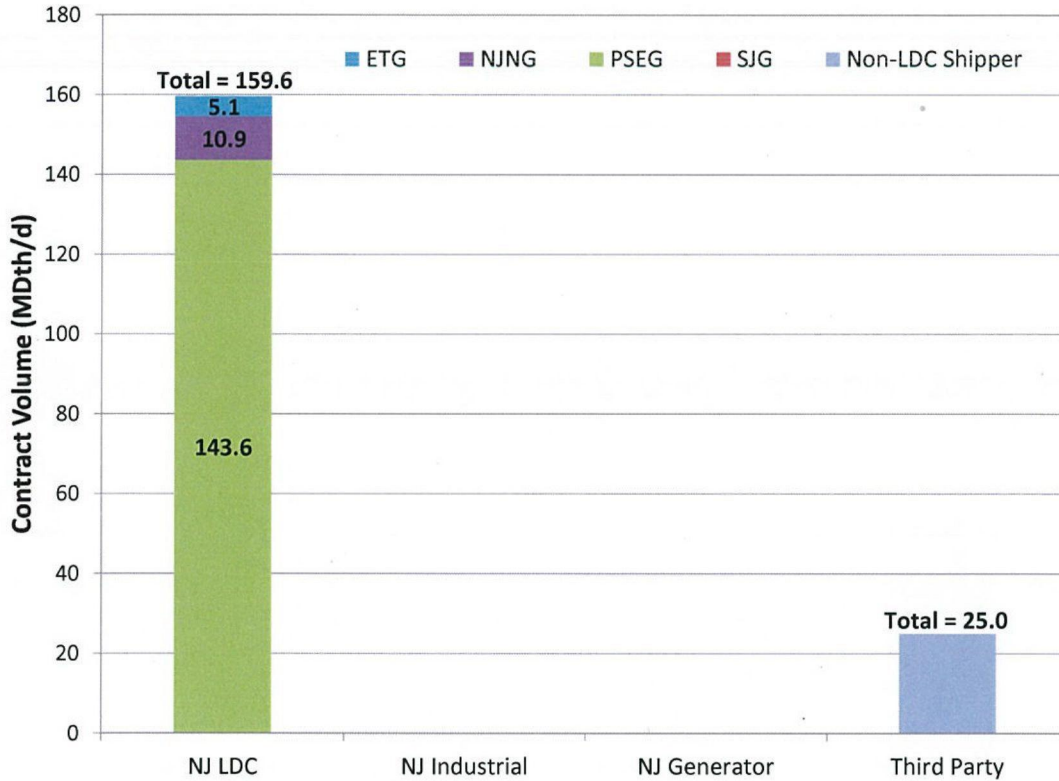


Columbia's shippers additionally hold 74 MDth/d of contracted capacity with firm delivery to its interconnection with Algonquin in Hanover, NJ. Algonquin shippers hold 73 MDth/d of corresponding capacity sourced from the Hanover interconnection with Columbia to downstream delivery points in New York and New England.

2.4 Tennessee

New Jersey's LDCs hold 78% of the Tennessee capacity with primary firm delivery points in New Jersey, as shown in Figure 9.

Figure 9. Tennessee Contracts with Primary Firm Delivery in New Jersey



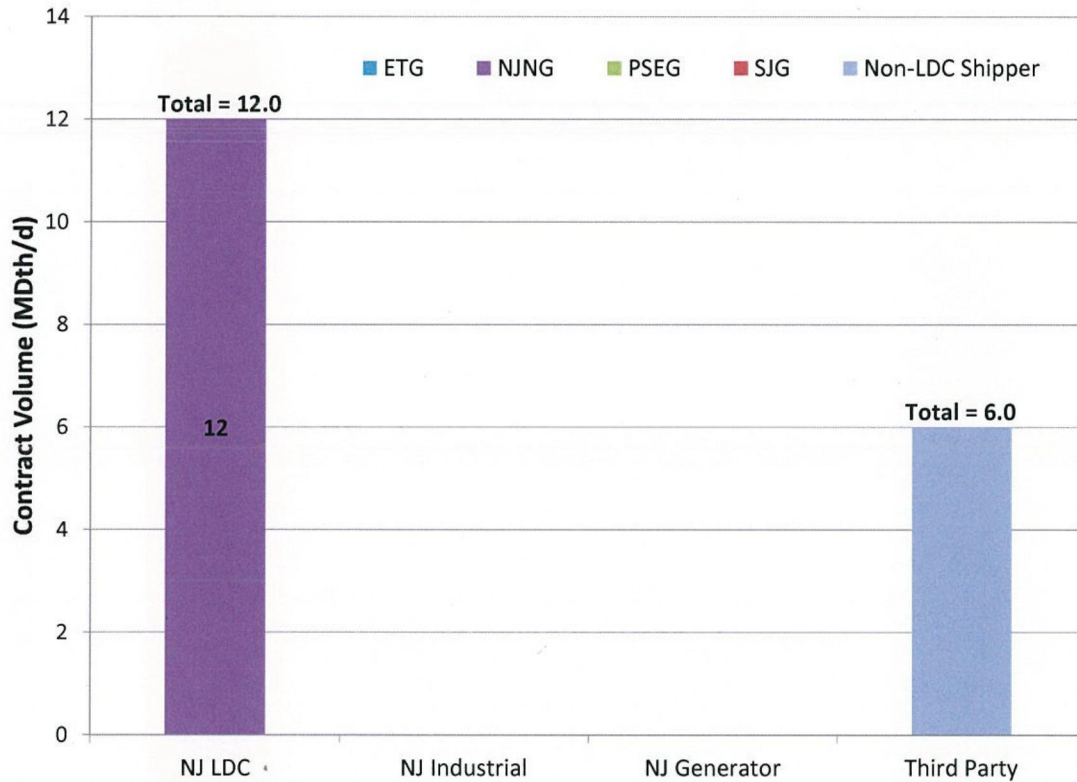
Tennessee shippers additionally hold 905 MDth/d of contracted capacity with firm delivery to Algonquin at Mahwah and 156 MDth/d of capacity with firm delivery to Transco at Rivervale. The corresponding contractual receipts at these interconnections are 766 MDth/d and 72 MDth/d, respectively. All the capacity deliverable to Algonquin has Mahwah as its only primary delivery point, and nearly all is sourced from upstream points in Pennsylvania or Louisiana, resulting in a variety of available secondary delivery points. For the capacity deliverable to Transco, 41 MDth/d of it is sourced from LNG or a pipeline interconnection in New England, and is therefore deliverable on a secondary basis to New England, New York, or New Jersey. An additional 15 MDth/d is sourced from a New York/New Jersey pooling point, with secondary delivery in New York or New Jersey.

2.5 Algonquin

Algonquin's primary usage is to transport gas from pipeline interconnections in New Jersey to downstream markets in New York and New England. There are only two contracts on Algonquin

with a primary firm delivery point in New Jersey other than an interconnection, one held by NJNG and one held by a third-party marketer, as shown in Figure 10.

Figure 10. Algonquin Contracts with Primary Firm Delivery in New Jersey

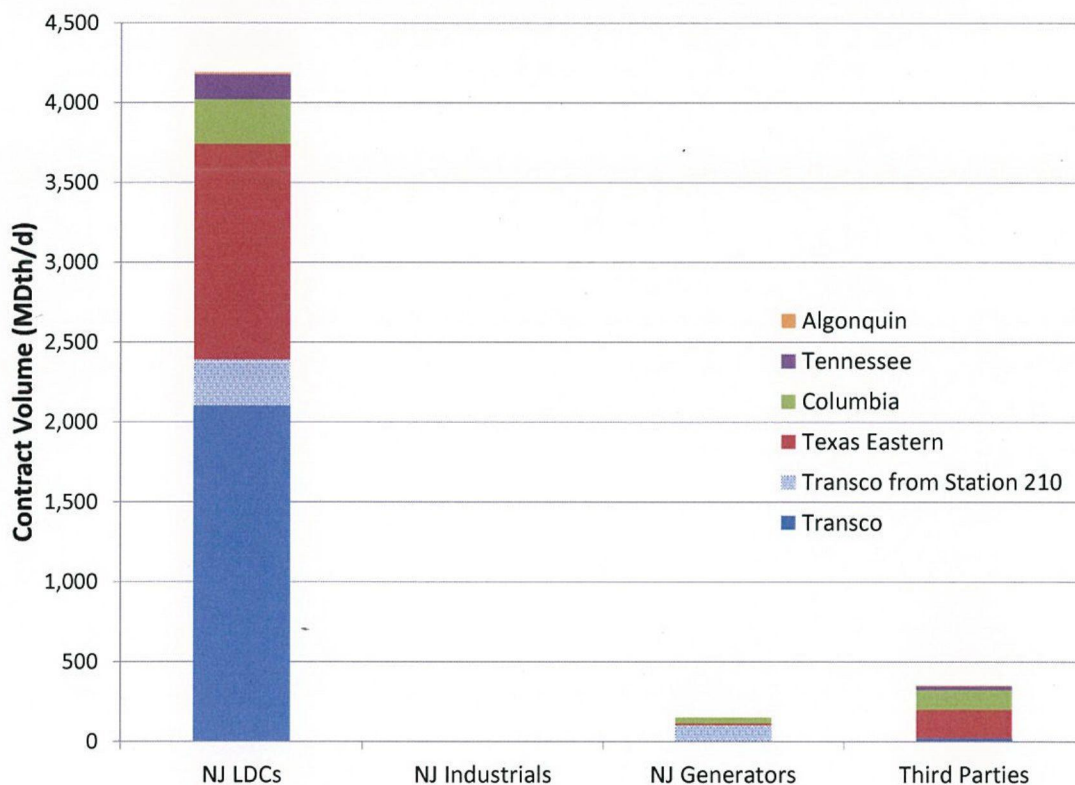


Algonquin shippers additionally hold 242 MDth/d of capacity deliverable to interconnections: 12.5 MDth/d to Columbia in Hanover, NJ, and 229 MDth/d to Texas Eastern in Lambertville, NJ. Columbia shippers hold 12.5 MDth/d of capacity sourced from the Hanover interconnection, fully receiving the capacity delivered to the interconnection. Texas Eastern shippers hold 161 MDth/d of capacity sourced from Lambertville. The Algonquin capacity delivered to Lambertville is sourced from LNG facilities at the east end of the Algonquin system, which means that New England is within the capacity path, and a more likely secondary destination for the capacity than New Jersey, given that LDCs in New Jersey have limited receipt capacity from Algonquin.

2.6 Summary of Primary Firm Delivery Capacity in New Jersey

Figure 11 consolidates the capacity contracted by each type of shipper to primary firm delivery points in New Jersey. Of the 4,697 MDth/d, or approximately 4.7 Bcf/d, of capacity with primary firm delivery in New Jersey, 4,190 MDth/d, or 89%, is held by New Jersey’s LDCs. The capacity held by New Jersey industrials and generators that are directly connected to the pipelines, a total of 154 MDth/d, is deliverable to those shippers’ specific delivery points, and not available on a primary firm basis to New Jersey’s LDCs. Regardless of delivery point classification, those shippers are highly likely to be using their capacity fully on peak days. The availability of the third-party capacity to the LDCs is addressed in the following section.

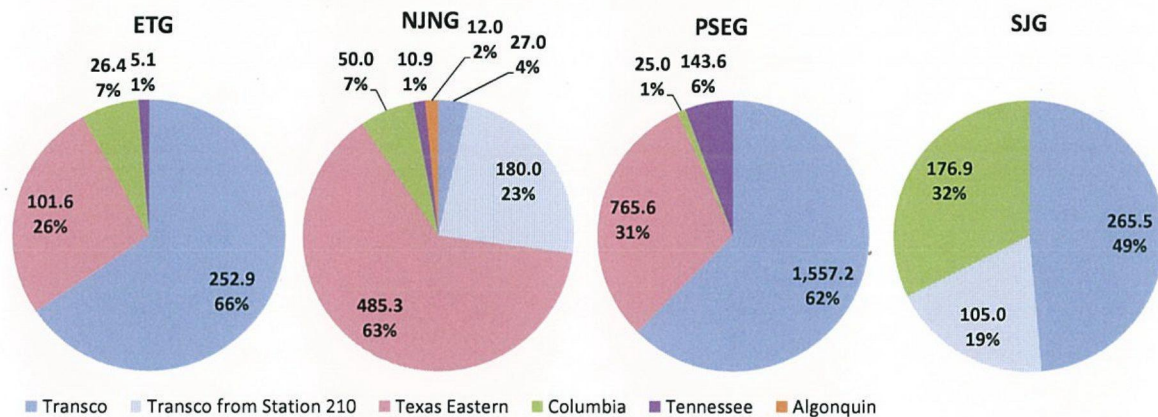
Figure 11. Total Contracts with Primary Firm Delivery in New Jersey



While there are five interstate pipelines that serve New Jersey, the locations of the pipelines relative to the LDC service territories result in each LDC having at least two-thirds of its capacity portfolio linked to a single pipeline – either Transco or Texas Eastern – as shown in Figure 12. All LDCs except SJG are dependent on Texas Eastern and Transco combined for more than 90% of their total contracted capacity. The total portfolio across all four LDCs is in a similar position, as shown in Figure 13. This dependence means that the LDCs are potentially susceptible to a pipeline *force majeure* event that reduces system capacity. The most extreme example of this is the rupture on Texas Eastern near Delmont, PA in April 2016 that was not fully repaired until

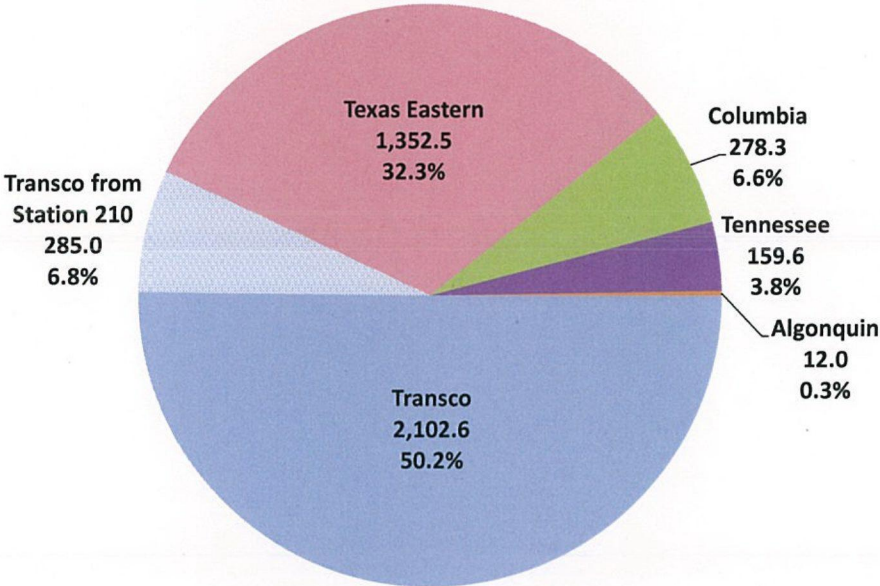
early November 2016.⁴ Compressor station *force majeure* events occur more frequently than pipe ruptures, but are less impactful. For example, Texas Eastern experienced unplanned outages on April 1, 2019 at the Armagh, PA, and Heidlersburg, PA, compressor stations that reduced throughput capacity from 2,986 MDth/d to 2,741 MDth/d and 1,897 MDth/d to 1,762 MDth/d, respectively. The Heidlersburg outage was repaired within one day but the Armagh outage has not been reported to be resolved as of the date of this report. While these particular compressor outages were not significantly disruptive due to the time of year, outages can and do occur throughout the year, and loss of capacity during peak demand periods can be much more impactful. A loss of capacity on the scale of the Delmont rupture during the winter could have been catastrophic.

Figure 12. LDC Portfolios of Contracted Pipeline Capacity



⁴ A detailed discussion of the Delmont rupture and outage can be found in PHMSA’s Technical Root Cause Analysis: <https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/docs/foia/57946/technical-root-cause-spectra-20161014.pdf>.

Figure 13. New Jersey LDCs' Portfolio of Contracted Pipeline Capacity



3 New Jersey's LDCs Supplement Firm Pipeline Capacity to Meet Customer Needs

3.1 New Jersey's LDCs Utilize On-System Peaking Resources to Supplement Contracted Pipeline Capacity

Each of the four New Jersey LDCs operates one or more on-system peaking facilities to support meeting supply needs on peak days. These facilities are listed in Table 5, along with their maximum daily sendout capabilities.

Table 5. New Jersey LDC On-System Peaking Facilities

LDC	Facility	Facility Type	Daily Sendout Capability (MDth/d)
ETG	Erie Street	LNG	25
NJNG	Howell	LNG	150
NJNG	Stafford	LNG	20
PSEG	Burlington	LNG	67.4
PSEG	Camden	LPG	197.4
PSEG	Central	LPG	
PSEG	Harrison	LPG	
PSEG	Linden	LPG	
SJG	McKee City	LNG	75 ⁵
Total			534.8

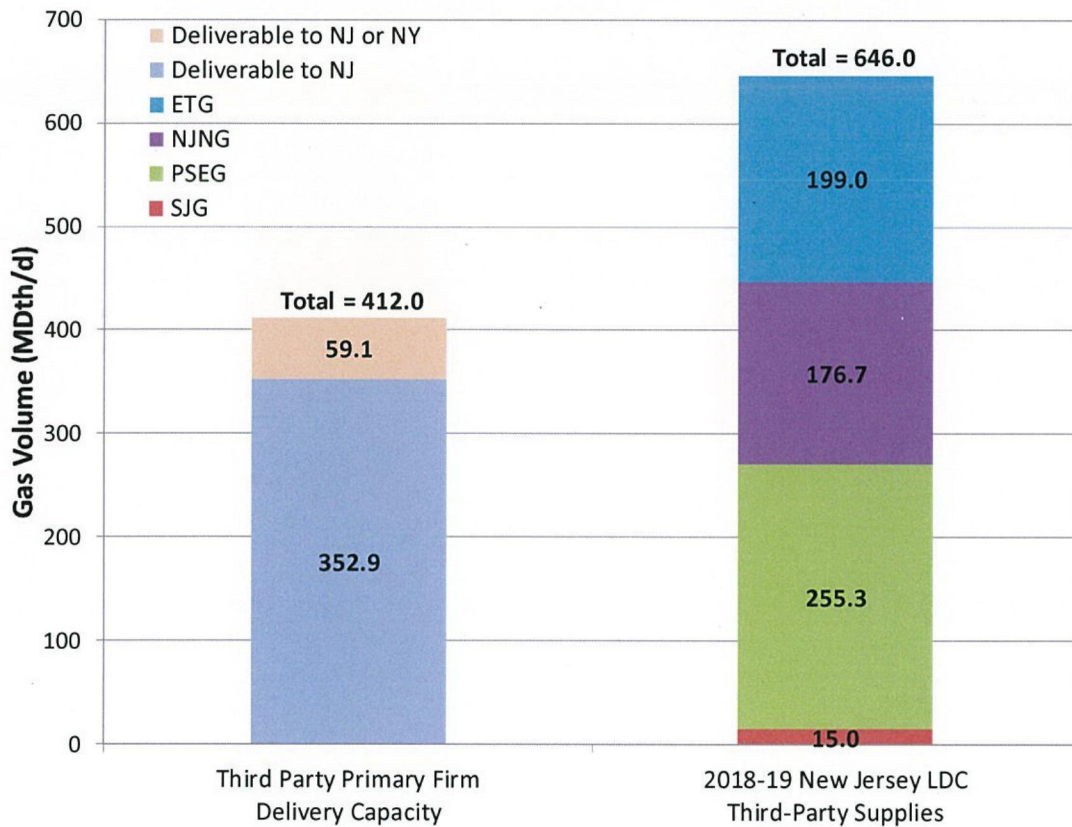
3.2 New Jersey's LDCs Utilize Third-Party Supplies to Supplement Contracted Pipeline Capacity

In addition to capacity directly held by the LDCs, they also arrange for supplies that are delivered to the LDCs' citygates by third parties in order to meet forecasted customer demand levels. The third-party supply components listed in each LDC's BGSS filing for the 2018-19 design day are shown in Figure 14 relative to the capacity held by third parties with primary firm delivery points in New Jersey, including those with alternative primary points in New York. The LDC third-party supplies include arrangements made directly by the LDCs and arrangements made by LDC customers relying on third party supplies delivered to the citygate. The delta between the capacity held by third parties with primary firm delivery in New Jersey and the 2018-19 LDC third party supplies is the result of arrangements for capacity which has primary delivery rights outside of New Jersey and is deliverable to New Jersey on a secondary basis. Secondary capacity has a lower scheduling priority than primary capacity, and is differentiated by whether it is in-the-path (between the primary receipt and delivery points) or out-of-the-path of the associated contract. The LDCs are not the only entities participating in the market for these supplies. Even within New Jersey, there is competition from other entities for the capacity with primary New Jersey delivery points. As was shown in Figure 11 on page 14, generators in New Jersey hold limited firm transportation capacity, and are therefore

⁵ Corresponds to 110 MMcf/d prorated to 20 hours of sendout.

dependent on third parties to meet their supply needs.⁶ Price spikes, such as those that are seen in New Jersey, New York and New England during cold weather or other periods of constrained supply, are indicative of a competitive market. LDCs, generators and other end users may scramble for discretionary tranches to support an LDC's obligation to serve or to help shield a generator in PJM or ISO-NE, in particular, from costly penalties under Capacity Performance or Pay-for-Performance, respectively. There are other incentives promulgated by NYISO that can induce gas use for power generation during cold snaps or electric outage contingencies when oil replenishment in New York City or Long Island is problematic. Robust competition among market participants requires the New Jersey LDCs to likewise compete for third party supplies, either within New Jersey or with downstream shippers. Simply put, the LDCs cannot rely on the capacity unless and until a deal has been struck. The outcome of such competition cannot be known *a priori* regardless of willingness to pay.

Figure 14. New Jersey LDC Third-Party Supply Portfolio



⁶ PJM's Capacity Performance (CP) attributes that are part of the Base Residual Auction pricing framework covering capacity resources can induce generators in New Jersey to incur a price premium to foster eligibility under CP.

4 New Jersey LDCs Cannot Utilize Capacity that is Contracted to Downstream Markets

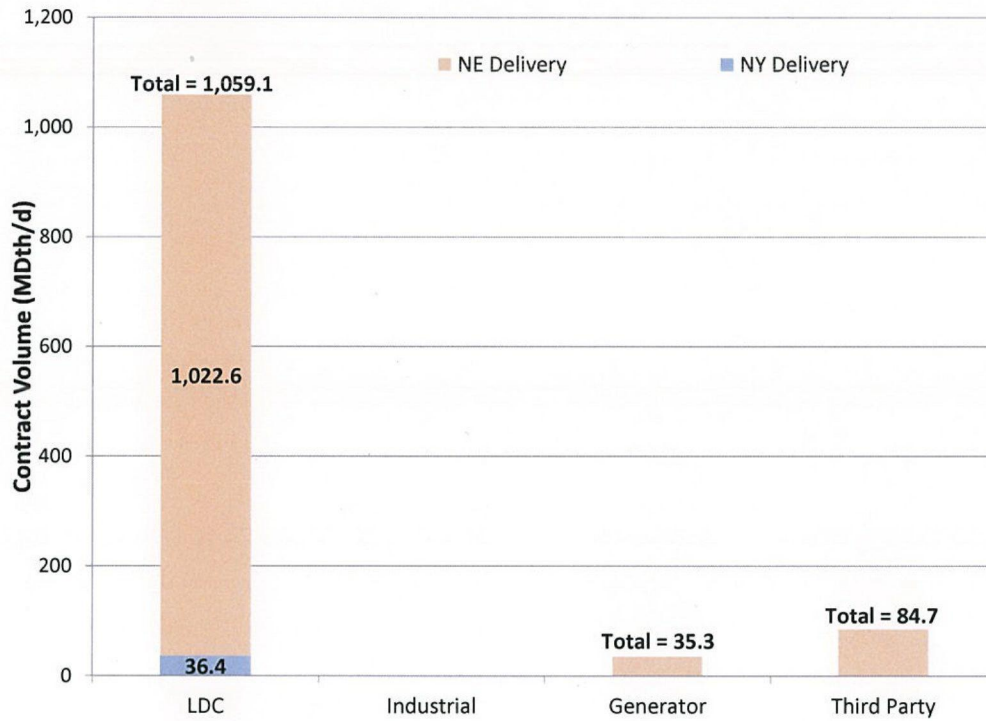
Just as capacity contracted by industrials and generators in New Jersey is not available to New Jersey LDCs on a primary firm basis, capacity contracted to delivery points downstream of New Jersey cannot be relied upon by New Jersey's LDCs because it is held by other parties. In the case of third-party contracts, New Jersey shippers would need to compete for the capacity in the broader market of parties in the contract path. Like New Jersey LDCs, downstream LDCs in New York and New England have the same requirements to build a supply portfolio sufficient to meet design day demand. To varying extents, these LDCs also rely on third-party peaking deals deliverable to their service territories, as do downstream generators. FERC inspired wholesale electric price incentives oriented around fuel security heighten generators' willingness to pay for the delivery of natural gas. To ensure that entitlement holders get what is theirs, pipelines do not allow shippers to take gas beyond their scheduled quantities. Doing so would otherwise denigrate the pipeline's ability to deliver scheduled volumes to downstream customers in accord with their transportation entitlements and service priorities. Much of the pipeline capacity passing through New Jersey is earmarked for the LDCs, generators, and third parties that have primary firm delivery points in downstream markets. Just as New Jersey's entitlements are unavailable to LDCs and generators in Pennsylvania and other upstream markets, this capacity for downstream markets is unavailable to New Jersey when downstream shippers are using it, even though the gas must flow through the Garden State to reach its destination.

While there are cases where third party capacity may not be fully utilized in the downstream markets where the contract holder has primary delivery rights, the New Jersey LDCs represent only a subset of the potential secondary delivery points for the capacity. The playing field in the tri-state market is large. The "invisible hand of the market" sustains market efficiency principles, that is, gas flows to the highest and best use day in, day out. Competitive market phenomena render uncertain and therefore unsafe any anticipated reliance by New Jersey LDCs on third party capacity absent a confirmed supply arrangement.

4.1 Algonquin

Capacity held by Algonquin shippers with receipt points in New Jersey and primary firm delivery points in New York and New England is shown in Figure 15. LDCs hold 90% of this capacity.

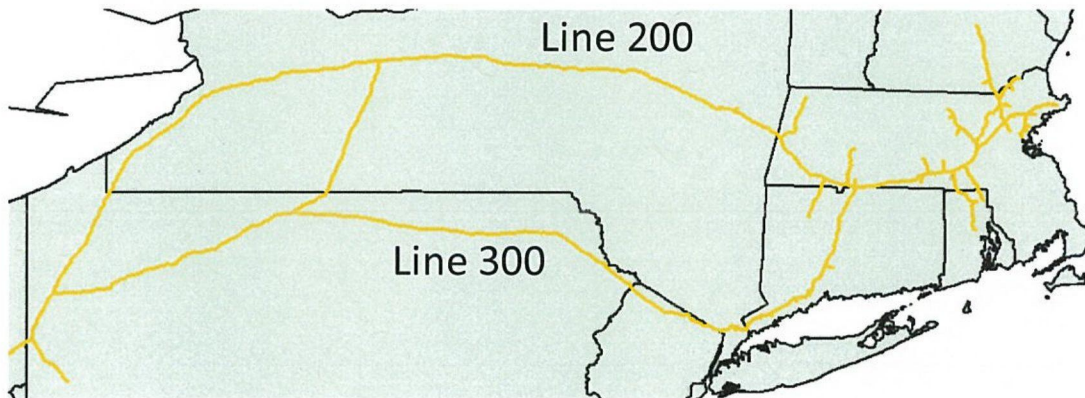
Figure 15. Algonquin Contracts with Primary Firm Delivery in New York or New England



4.2 Tennessee

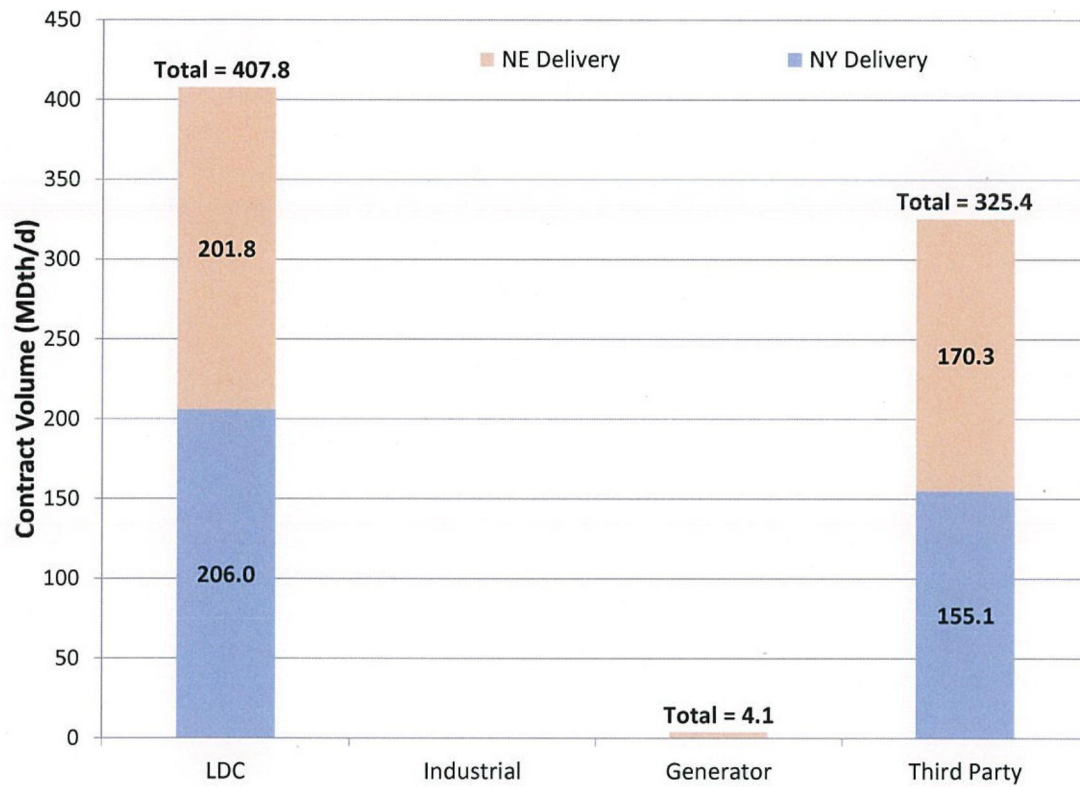
Tennessee has two west-to-east paths transporting gas between western Pennsylvania and New England, as shown in Figure 16. The northern path through upstate New York is known as Line 200, and the southern path through Pennsylvania, New Jersey and downstate New York is known as Line 300. The path associated with a particular contract is based on the locations of the receipt and delivery points. With the exception of contracts sourced on Line 300 in eastern Pennsylvania, New Jersey, New York, or Connecticut, deliveries to Massachusetts, Rhode Island and New Hampshire are via Line 200, and do not pass through New Jersey.

Figure 16. Tennessee Paths Between Western Pennsylvania and New England



Capacity held by Tennessee shippers that uses the Line 300 path through New Jersey based on the pipeline's pathing rules and has primary firm delivery points in New York and/or New England is shown in Figure 17. LDCs in New York and New England hold 63% of this capacity.

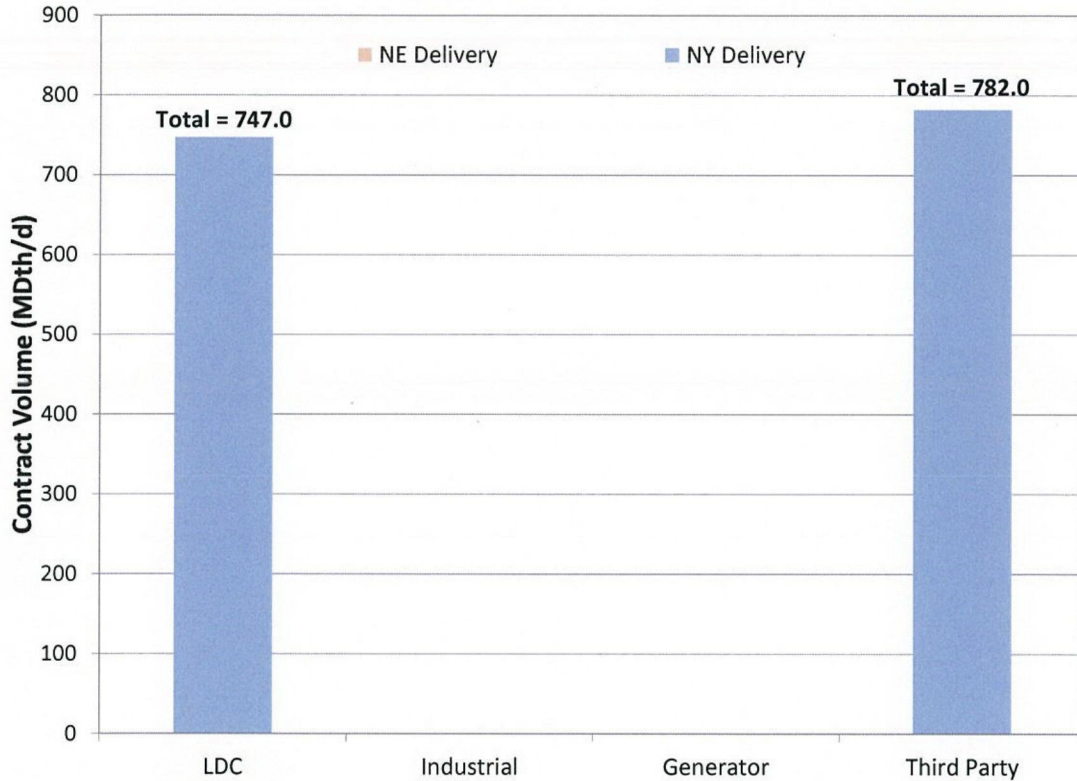
Figure 17. Tennessee Line 300 Contracts with Primary Firm Delivery in New York or New England



4.3 Texas Eastern

Capacity held by Texas Eastern shippers with primary firm delivery points in New York is shown in Figure 18. New York LDCs hold just under 50% of this downstream capacity.

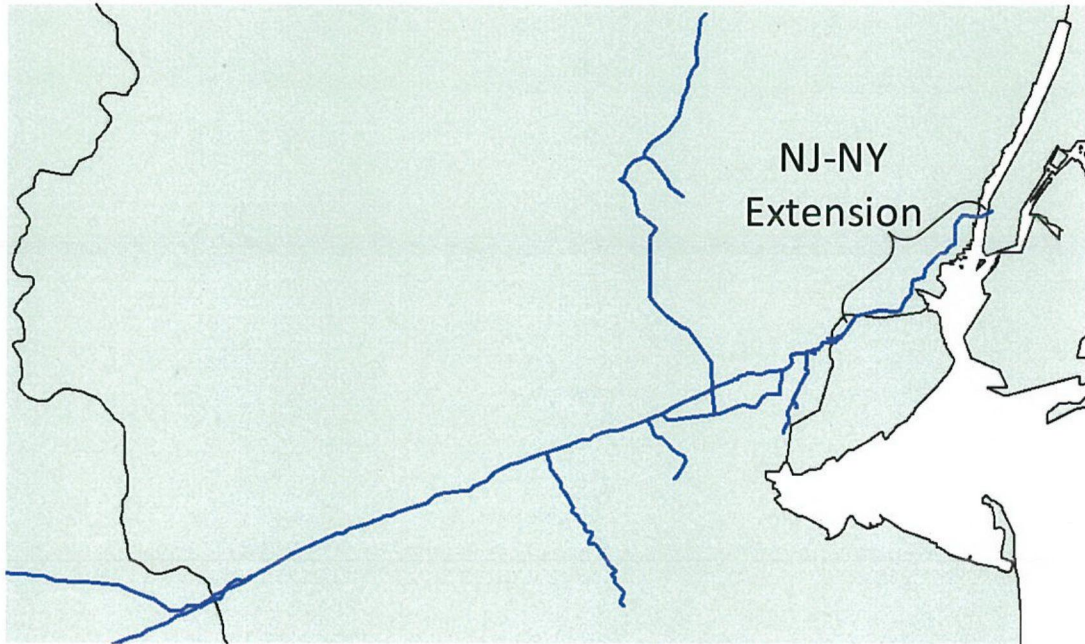
Figure 18. Texas Eastern Contracts with Primary Firm Delivery in New York



The bulk of the capacity held by third parties – 630 MDth/d of 782 MDth/d – is associated with the New Jersey-New York Expansion Project, which was placed into service in November 2013 to deliver 800 MDth/d into a new delivery point in Manhattan, shown in Figure 19.⁷ The Manhattan delivery point is currently underutilized due to limited receipt capacity at the Con Edison side of the delivery meter. However, flow volumes on the expansion facilities will increase in the years ahead as both Con Edison and National Grid expand the New York Facilities System to meet New York City’s ambitious oil-to-gas conversion goal.

⁷ Less than one-quarter of the total delivery capacity to Manhattan is held by Con Edison. The remaining 79% is held by prominent producers in Marcellus who enter into asset management agreements with marketers to manage the scheduling of daily gas volumes across the supply chain from Pennsylvania, West Virginia and Ohio to New Jersey and New York.

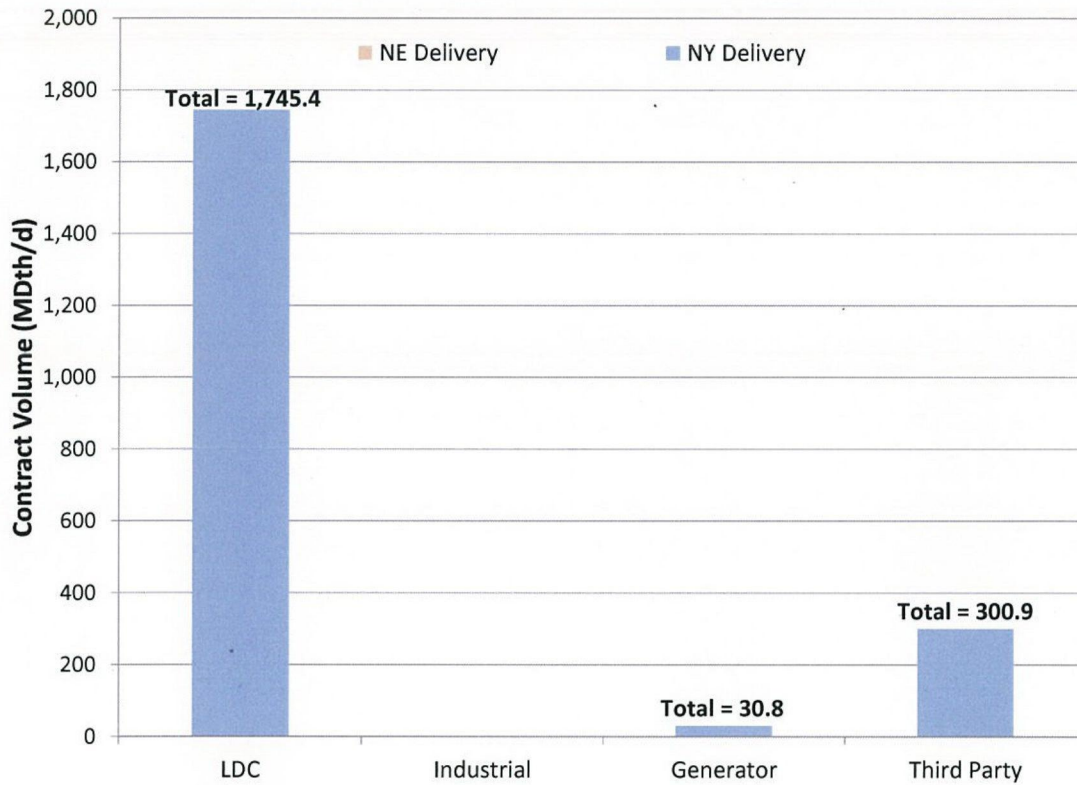
Figure 19. Texas Eastern Footprint in New Jersey and New York



4.4 Transco

Capacity held by Transco shippers with primary firm delivery points in New York is shown in Figure 20. New York LDCs hold 84% of this downstream capacity, and have also contracted for additional capacity into Long Island on Transco's Northeast Supply Enhancement Project.

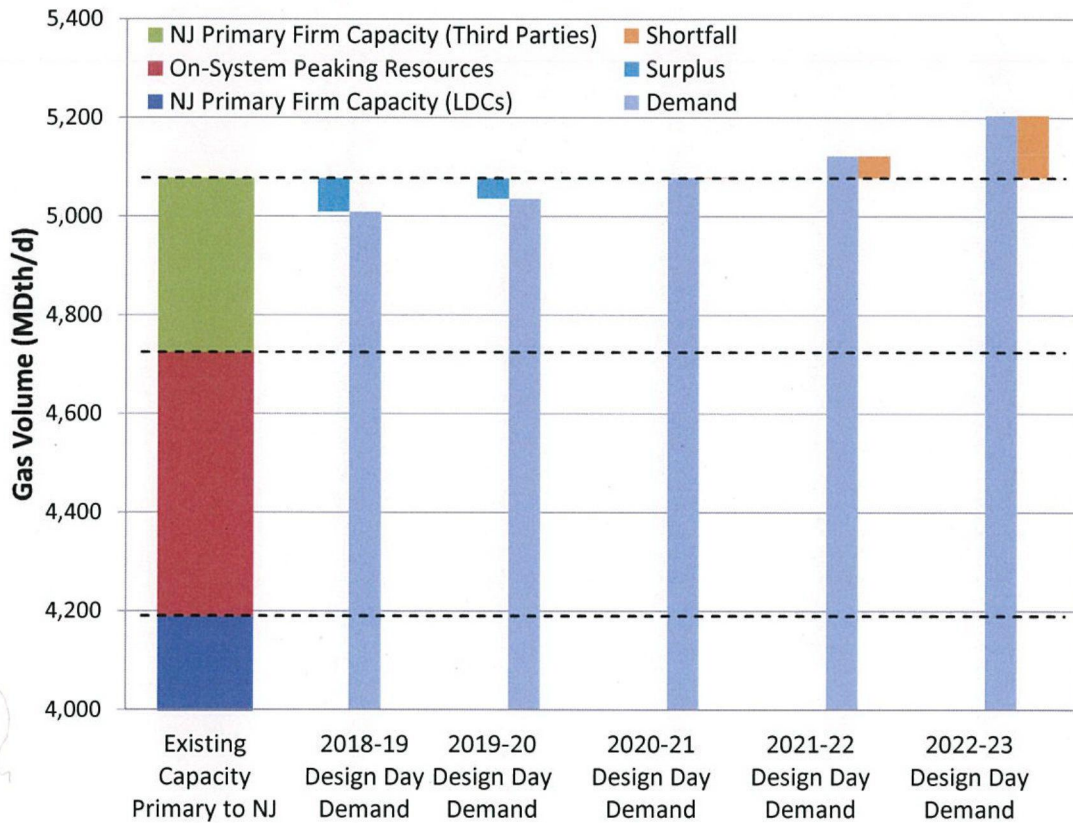
Figure 20. Transco Contracts with Primary Firm Delivery in New York



5 Existing Pipeline Capacity Deliverable to New Jersey is Insufficient to Meet Forecasted Gas Demand

As illustrated in section 4, not all pipeline capacity passing through New Jersey is earmarked for New Jersey LDCs. A substantial portion of total pipeline capacity in the state is not available to New Jersey’s LDCs to serve customers on peak days because it is contracted by other end users. To build a supply portfolio sufficient to meet design day demand, the LDCs are therefore reliant on their own contracted capacity, on-system peaking sources, and third party supply arrangements, as described in sections 2 and 3. Figure 21 shows the existing capacity held by LDCs and third parties with primary firm delivery in New Jersey relative to the aggregated peak day demand forecast.⁸ The horizontal dashed lines compare the 2018-19 design day supply stack to the design day demand forecast. Each design day’s surplus or shortfall relative to existing capacity is shown in Table 6.

Figure 21. Supply/Demand Comparison for New Jersey LDCs



⁸ The third party primary firm capacity, shown in green, is the amount of capacity held by third parties with primary delivery points only in New Jersey. It does not include capacity which is alternatively deliverable to New York, or capacity without primary delivery points in New Jersey that has been reserved by the LDCs (and LDC customers) through negotiation with third party suppliers.

Table 6. Supply Surplus / Shortfall to Meet Forecasted Demand

(MDth/d)	2018-19	2019-20	2020-21	2021-22	2022-23
Surplus	68.3	42.1	--	--	--
Shortfall	--	--	1.8	45.1	127.0

These values assume that all third party capacity with primary firm delivery in New Jersey is available to LDCs, and that supply can be procured to support all LDC-held transportation capacity, including that sourced from the Transco Station 210 pooling point. If either of these assumptions does not hold, the capacity shortfall would increase accordingly.

Not included in the shortfall calculations is a design day demand adder to represent a reserve margin in the event of a supply loss contingency. A 6% adder across the total demand of all four LDCs would represent an incremental shortfall of 321 MDth/d in 2022-23, on top of the shortfall shown in Table 6.

These capacity shortfall results, in conjunction with the unavailability of incremental existing capacity described throughout this report, indicate that new natural gas infrastructure will be needed in the near term if the LDCs are to meet their reliability goals.