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July 17, 2020

Hon. Michelle L. Phillips
Secretary to the Commission
New York State Public Service Commission
Agency Building Three
Albany, NY 12223-1350

Re: Case 20-G-0131 - Proceeding on Motion of the Commission in Regard to Gas Planning Procedures – Supply/Demand Analysis for Vulnerable Locations

Dear Secretary Phillips:

In accordance with the Commission's March 19, 2020, order in the above-referenced proceeding,[1] Consolidated Edison Company of New York, Inc. and Orange and Rockland Utilities, Inc. submit for filing the attached *Supply and Demand Analysis for Regions Vulnerable to Supply Constraints*.

Please contact me if you have any questions regarding this matter.

Respectfully submitted,

/s/ Enver Acevedo

[1] On June 17, 2020, Your Honor granted a request to extend the deadline for this filing to July 17, 2020.

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Proceeding on Motion of the Commission in Regard to Gas Planning Procedures. **Case No. 20-G-0131**

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
ORANGE AND ROCKLAND UTILITIES, INC.
SUPPLY AND DEMAND ANALYSIS FOR
REGIONS VULNERABLE TO SUPPLY CONSTRAINTS

Date: July 17, 2020

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STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Proceeding on Motion of the Commission in Regard to Gas Planning Procedures. **Case No. 20-G-0131**

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC. ORANGE AND ROCKLAND UTILITIES, INC. SUPPLY AND DEMAND ANALYSIS FOR REGIONS VULNERABLE TO SUPPLY CONSTRAINTS

1. Introduction

On March 19, 2020, the State of New York Public Service Commission ("Commission") initiated a proceeding to examine the gas planning processes and procedures of New York's local gas distribution companies ("LDCs") ("March 2020 Order").[1] Ordering Clause No. 3 of the March 2020 Order directed the LDCs, including Consolidated Edison Company of New York, Inc. ("Con Edison") and Orange and Rockland Utilities, Inc. ("Orange and Rockland") (jointly referred to as the "Companies"), to file this report presenting a supply and demand analysis focusing on locations in our service territories "known to be vulnerable to supply constraints" within 90 days. The New York LDCs that are required to file this analysis pursuant to the March

[1] Case 20-G-0131, *Proceeding on Motion of the Commission in Regard to Gas Planning Procedures*, Order Instituting Proceeding (Issued and Effective March 19, 2020) ("Gas Planning Proceeding").

2020 Order, including the Companies, requested and were granted a 30-day extension.[2] This is the first of four gas planning reports to be filed by LDCs within 150 days.[3]

The Companies understand that this proceeding may lead to changes in the way that we perform our gas system planning that respond to the changing energy environment in New York State, including recent challenges in developing new pipeline capacity and ongoing attention to environmental considerations that may impact the way LDCs will continue to serve customers. We welcome the opportunity to engage with Department of Public Service Staff ("Staff") and other stakeholders to review our planning approach to ensure the continued provision of safe, reliable, and affordable service to all natural gas customers.

Section 2, below, provides an overview of our service territory. It generally describes the geographic areas and number of customers we serve, the portfolio of supply sources that we rely on, and a description of how we procure and deliver various supply resources to customers through a combination of infrastructure we own and contracts with third parties.

Section 3 provides an overview of the general approach we have applied to define and identify "vulnerable locations," if any, in our service territory. We have collaborated with the other major investor-owned LDCs in New York State to apply a consistent definition of

[2] Gas Planning Proceeding, Letter from Commission Secretary Michelle L. Phillips (dated June 17, 2020) granting an extension to July 17, 2020 for the report evaluating supply and demand at vulnerable locations. The Commission Secretary also granted a 14-day extension of the filing deadline for a report each LDC will file pursuant to Ordering Clause 4 of the March 2020 Order. This report will extend the supply and demand analysis to each LDC's full service territory.

[3] In addition to supply and demand analyses in vulnerable locations and across each LDC's full service territory, the Commission directed LDCs to file a report within 120 days that will address standards for reliance on peaking services and moratorium management. Finally, each LDC will file a fourth report within 150 days that will address the extent to which LDCs use or contemplate using demand-side measures, electrification, non-pipe alternatives, or other measures to address identified areas of supply/demand imbalances.

"vulnerable locations" and a consistent approach for identifying any such locations.[4] As noted in Section 3, we have defined a "vulnerable location" as a portion of the system where gas may not be able to be delivered safely and reliably within the next five years, however our analysis to identify the "vulnerable locations" is performed for 10 years to ensure we are also considering a longer term outlook.

Section 4 describes our demand forecasting methodology, design criteria, supply portfolio, system-level supply/demand outlook, and specific methodology to identify vulnerable locations. Section 5 describes each vulnerable location in detail, including options that we are considering as part of a plan to resolve each potential supply/demand imbalance.[5,6] Section 6 presents conclusions that are relevant to the broader set of issues that will be addressed in this proceeding.

2. Background

A. Overview of the Companies' Gas Systems

The following are high-level descriptions of each of the Companies' gas systems:

i. Con Edison

Con Edison currently provides natural gas service to more than 1.1 million customers in a service area of approximately 660 square miles in Manhattan, the Bronx, parts of Queens, and

[4] The collaborating LDCs are Consolidated Edison Company of New York, Inc.; The Brooklyn Union Gas Company d/b/a National Grid NY; KeySpan Gas East Corporation d/b/a National Grid, Orange and Rockland Utilities, Inc.; Central Hudson Gas & Electric Corporation; Niagara Mohawk Power Corporation d/b/a National Grid; New York State Electric & Gas Corporation; Rochester Gas and Electric Corporation; and National Fuel Gas Distribution Corporation.

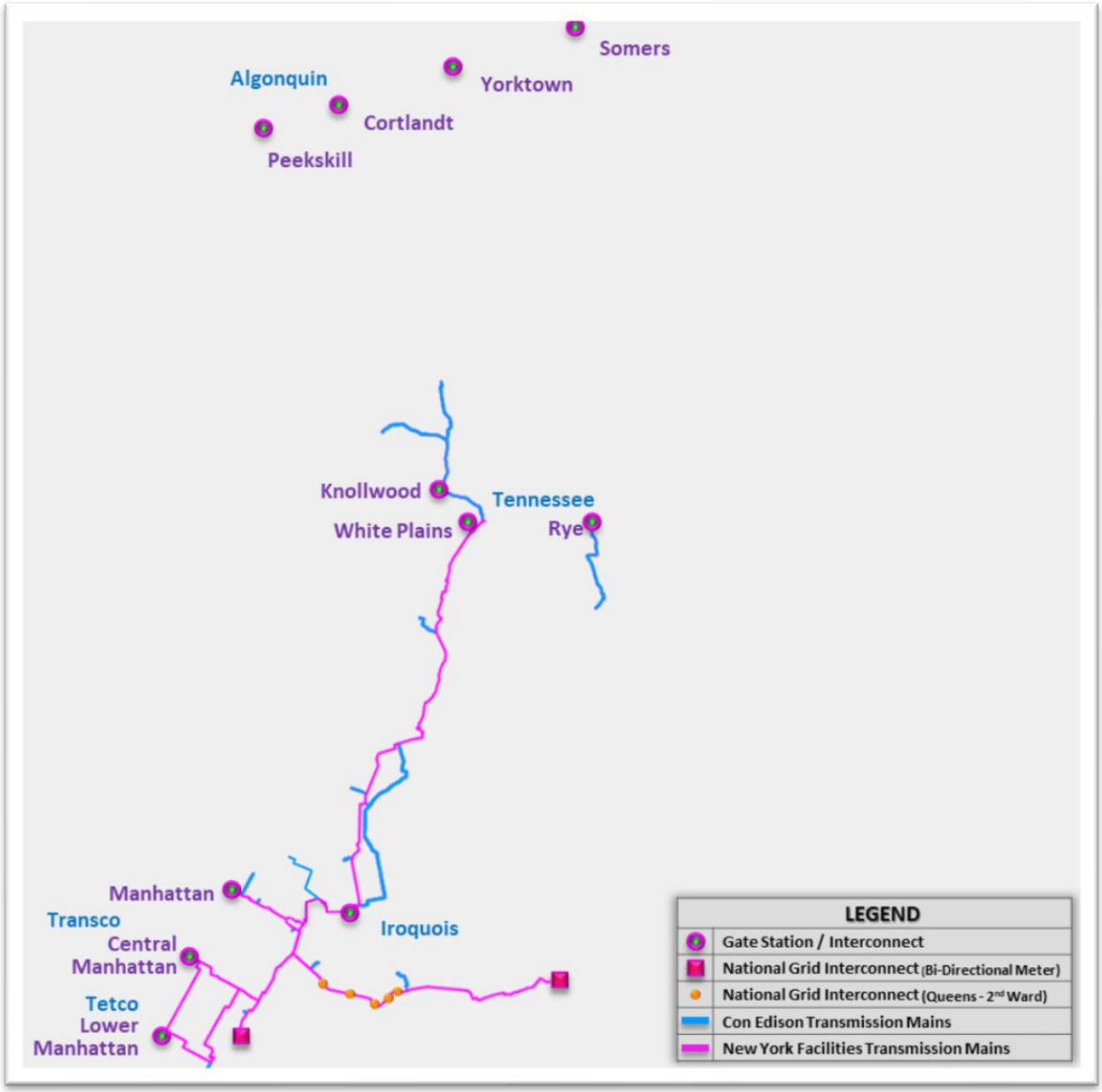
[5] In this context, supply/demand imbalance includes imbalances due to supply limitations, upstream pipeline delivery limitations, distribution infrastructure limitations, and/or any other limitations that result in an inability to serve expected demand.

[6] Certain information in Section 5 is designated as protected for security or commercial reasons.

Westchester County. Con Edison manages a large, complex underground natural gas transmission and distribution system. This system contains approximately 4,400 total miles of gas main with approximately 376,000 service pipes that transport more than 340 million dekatherms of natural gas each year. The approximately 4,400 miles of gas mains consist of 95 miles of mains operating at pressures greater than 125 pounds per square inch gauge ("psig") (41.4 miles is transmission and 53.5 miles is distribution) and 4,300 miles of mains operating at pressures less than 100 psig (all distribution). Approximately 300 miles are large-diameter distribution mains, greater than or equal to 16" that mostly connect the transmission mains to approximately 4,000 miles of smaller-diameter distribution mains.

Con Edison's gas transmission facilities are comprised of 4 to 36-inch diameter mains in Manhattan, Queens, the Bronx, and Westchester County. These mains, most of which were installed between 1947 and 1973, have a maximum allowable operating pressure of either 245 psig or 350 psig. The transmission facilities are supplied by seven gate stations from four pipeline companies. There are approximately 100 regulators supplying gas from the transmission system into the distribution system and 51 remote operated valves ("ROVs"). In addition, most of these facilities are part of a larger regional network called the New York Facilities ("NYF") System, which is jointly operated by Con Edison, National Grid Metro and National Grid Long Island. Con Edison's system is connected to National Grid's system at two bi-directional metering stations, as well as five metered take-off locations in the 2nd Ward of Queens. The NYF System is serviced by four interstate gas pipelines (*i.e.*, Transco, Texas Eastern, Tennessee and Iroquois) allowing for each of the three member utilities to receive gas from all four pipelines and to transfer supplies among the utilities. Typically, those transfers are

from Con Edison to National Grid. In addition, Con Edison's distribution system is connected to the Algonquin pipeline directly, which services Northern Westchester County.



Con Edison's current gas rate plan includes a number of provisions that recognize the evolving natural gas market in New York State.[7] These include eliminating rebate programs encouraging customers to switch to gas; modifying the revenue decoupling mechanism to

[7] Case 19-G-0066, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Gas Service*, Order Adopting Terms of Joint Proposal and Establishing Electric and Gas Rate Plan (issued January 16, 2020).

eliminate utility incentives to switch customers to gas; a commitment to perform a study on the depreciation of assets (including gas assets); an initiative to examine the feasibility of deploying geothermal district energy systems to replace/avoid gas infrastructure; and developing proposals for evaluating and implementing non-pipes alternatives as substitutions for traditional gas infrastructure projects.

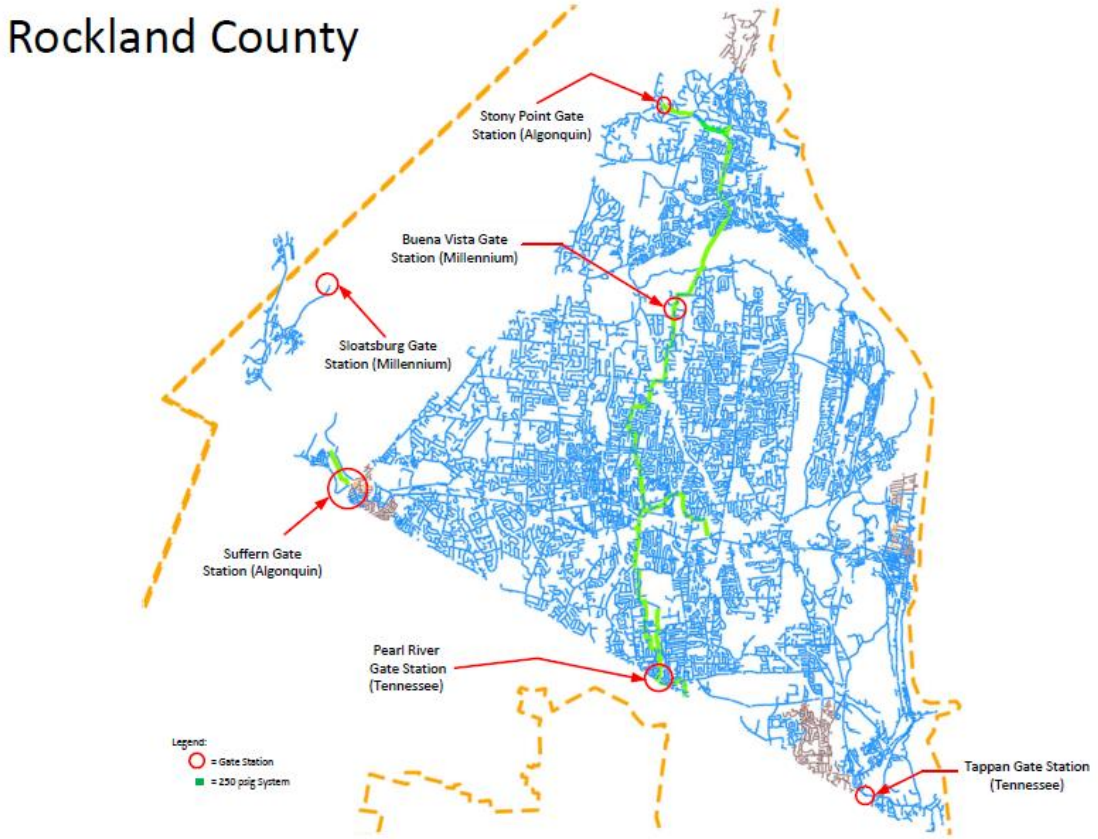
ii. Orange and Rockland

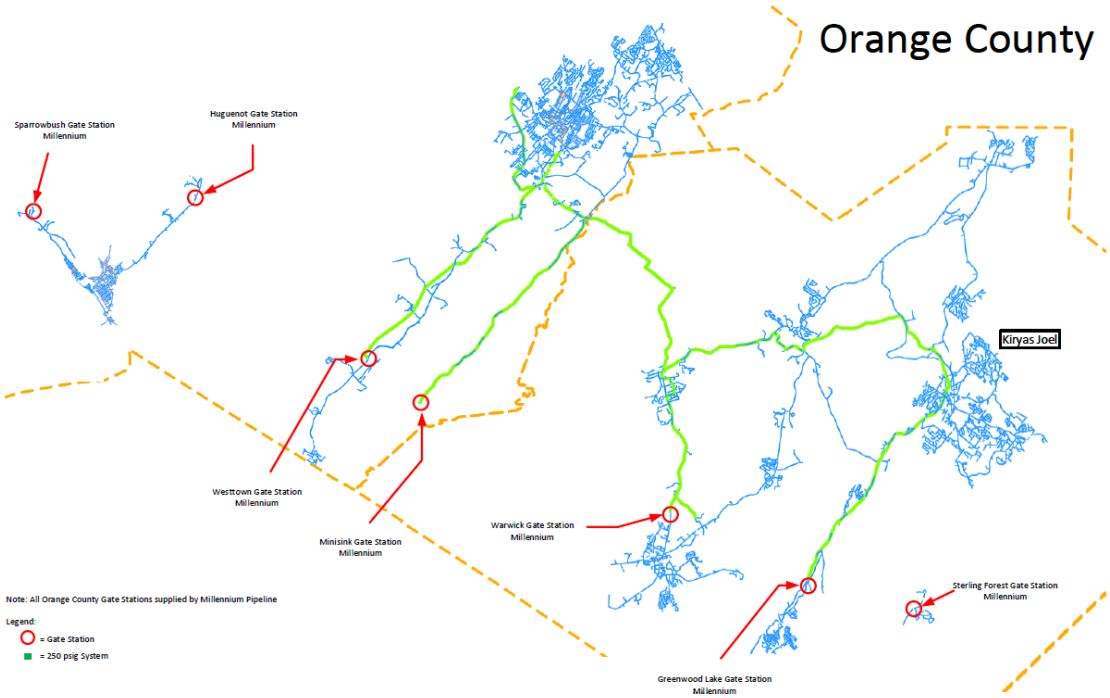
Orange and Rockland serves approximately 138,000 natural gas customers in a service area of 600 square miles, encompassing 66 communities in Orange and Rockland Counties. The area is served by 1,871 miles of gas main ranging in size from 1¼ inch diameter to 20-inch diameter, with 106,197 services to customer meters. Of this total gas main, there is one mile of transmission pipeline and 1,870 miles of distribution main. Orange and Rockland's distribution main is operated at various pressures, including 79 miles operated at extra high pressure (*i.e.*, 125 psig or more) and 1,792 miles of main operated at high pressure.

Except for a few smaller areas, Orange and Rockland operates two separately integrated gas distribution systems, one in Orange County and the other in Rockland County. Orange and Rockland's customers in Orange County are served by Millennium Pipeline Company ("Millennium") and Columbia Gas Transmission ("Columbia") through a series of supply points off the Millennium transmission pipeline that runs from west to east. Orange and Rockland's gas infrastructure in Orange County, which is both rural and mountainous, has largely followed the major highways that cross the county with large and mostly undeveloped areas in between.

In contrast, Rockland County is more densely developed and gas supply for these communities is well established with three different suppliers (*i.e.*, Millennium, Tennessee, and Algonquin), to maximize capability and flexibility to take and distribute gas supply. Both Orange

and Rockland Counties have a networked high-pressure distribution main system with redundancy built among most of the 13 gate stations for flexible operations in the event of an interruption at one of the gate stations or in a feeder line. In addition, Orange and Rockland's systems have several larger district regulating stations, and 17 ROVs.





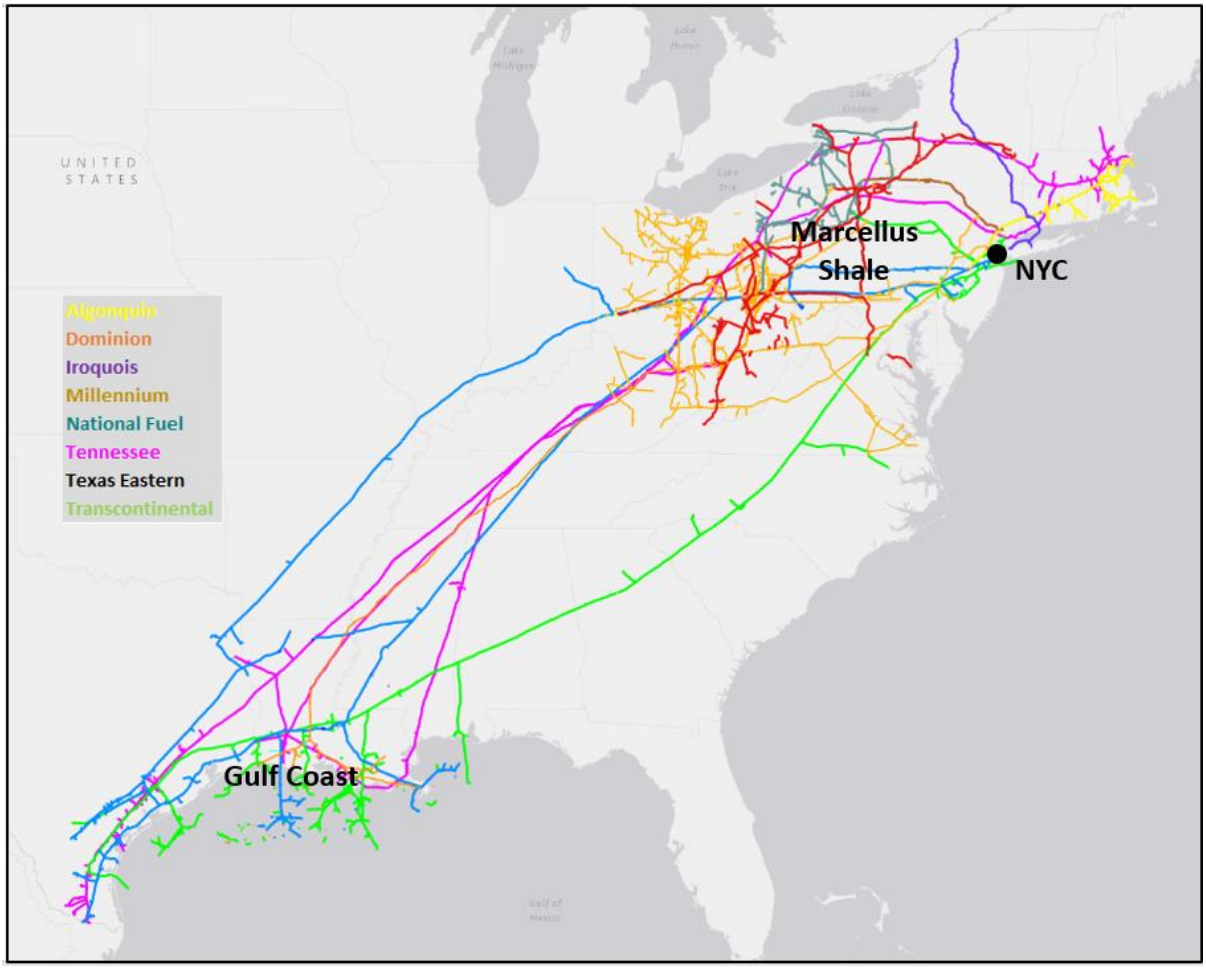
Similar to Con Edison, Orange and Rockland's current gas rate plan includes a number of provisions that recognize the evolving natural gas market in New York State.[8] These include modifying the revenue decoupling mechanism to eliminate utility incentives to switch customers to gas and developing proposals for evaluating and implementing non-pipes alternatives as substitutions for traditional gas infrastructure projects.

B. Joint Gas Portfolio Planning

Con Edison and Orange and Rockland manage a joint gas supply and capacity portfolio that allows for the combined utilization of both Companies' gas supply and interstate pipeline capacity contracts, including storage.[9] The joint portfolio is operated for the benefit of the firm

[8] Case 18-G-0068, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Orange and Rockland Utilities, Inc. for Gas Service*, Order Adopting Terms of Joint Proposal and Establishing Electric and Gas Rate Plan (issued March 14, 2019).
[9] Case 98-M-0961, *Joint Petition of Consolidated Edison, Inc., Consolidated Edison Company of New York, Inc. and Orange and Rockland Utilities, Inc. for Approval of a Certificate of Merger and Stock Acquisition*, Settlement Agreement (filed March 8, 1999), p. 12.

gas customers of the Companies. The Companies evaluate supply and capacity requirements over a ten-year planning horizon and integrate and extend this over a 20-year planning horizon in order to determine the plan to meet the peak demand needs of firm gas customers. The Companies have a total of 76 individual pipeline and storage contracts in service, which provide 1,450 MDt/day of capacity to the gate stations in the Companies' service territories. Con Edison also has one on-system liquefied natural gas ("LNG") facility, which contributes to the supply portfolio as well as provides a reliability backstop in the case of pipeline or on-system events that reduce supply and/or pressure.

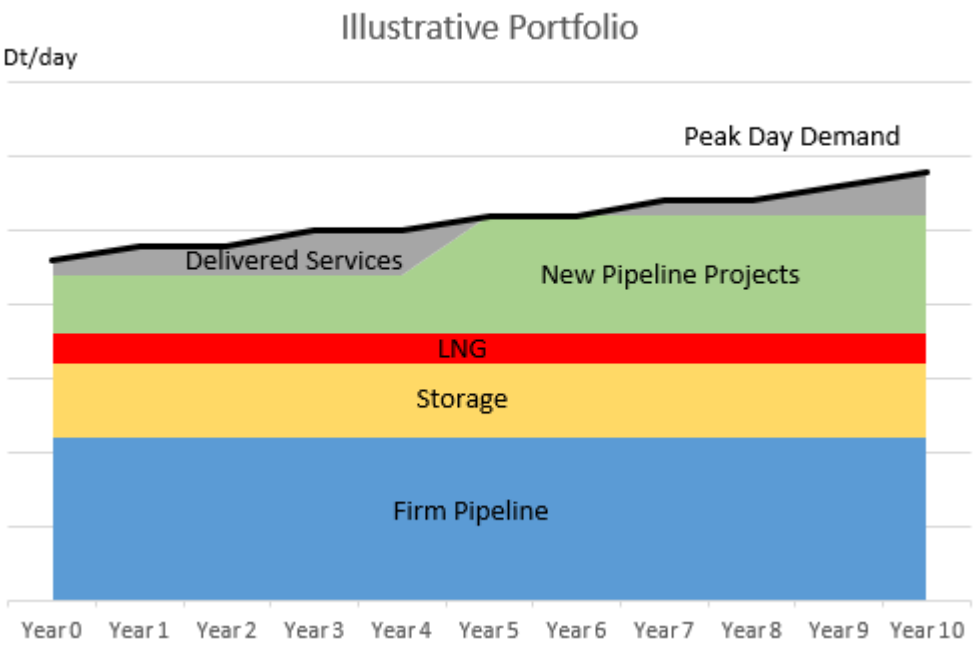


Prior to 2016, the Companies' planning process focused on the establishment of new pipeline capacity contracts to meet growing peak demand. Contracts were chosen based on a variety of factors, including but not limited to locational need, diversity of supply, feasibility and cost to customers. These arrangements typically required new pipeline infrastructure, which resulted in long lead times and the need for considerable contracted volume.

While siting new pipeline infrastructure had always been a complex process, the outlook for successful development and construction of new projects became increasingly challenging in 2016, when required state-issued permits for pipelines began to be frequently denied in the region. Concurrently, Con Edison began receiving feedback from stakeholders that while natural gas was playing a large role in decreasing the use of heavy heating oils (consistent with state and local environmental goals), its role in meeting other state and NYC goals for greenhouse gas reductions was less clear.

As a result, as peak demand continued to grow year over year, the increased growth was met by procuring larger quantities of delivered services, typically in the form of peaking contracts. Delivered services are contracts with counterparties that can prove they have access to the required primary firm pipeline capacity necessary to make supply deliveries reliably to gate stations in the Companies' service territories. Since these supplies were only needed on the coldest days of the year, the contract structure was for a day ahead call for supply to be delivered on up to 15, 30, or 60 days of the winter period. The Companies paid a demand charge for the right to call on the supply, and a market price for the commodity when used. In the past, as the volumetric need for these contracts grew, the Companies ultimately replaced them with a pipeline contract and the Companies' portfolio re-balanced between pipeline capacity and peak

demand. The Illustrative Portfolios shown below demonstrate how the Companies manage their gas portfolio to meet peak demand.



In addition to an increased reliance on delivered services, the Companies also began to explore and implement alternative demand-side and alternative supply-side solutions to meeting customers' energy needs. During 2017, Con Edison held a collaborative on gas peak demand reduction during which the potential demand reduction capability of a variety of technologies was studied.[10] An important result of this collaborative was the comprehensive additions Con Edison made to its planning process. This was most notably demonstrated by the development of Con Edison's Smart Solutions for Natural Gas Customers program and the related requests for Commission approval to implement these solutions starting in September 2017. This program has multiple components, including doubling the size of Con Edison's gas energy efficiency

[10] Case 16-G-0061, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Gas Service*, Con Edison Gas Peak Demand Reduction Collaborative Report (filed December 22, 2017).

programs, developing a gas demand response pilot, and issuing a non-pipeline solution request for proposals seeking new solution types from the marketplace.[11]

The Smart Solutions filing also stressed the near-term need to continue pursuing new pipeline capacity infrastructure in parallel with other initiatives, given that the supply portfolio already contained a high level of delivered services. This was due to rapid peak demand growth, resulting from the combination of falling gas commodity prices and legislative action limiting the use of heavy heating oils, which had been only partially offset by the most recent pipeline infrastructure addition into Manhattan in late 2013. As the level of delivered services in the portfolio increases, the risk of maintaining a portfolio capable of meeting the growing peak demand of customers also grows. This is because a finite amount of pipeline capacity exists to the New York City area and unlike pipeline capacity procured directly from an interstate pipeline, delivered services do not have associated renewal rights. In fact, the counterparties who own the capacity have no obligation to continue making it available for sale or even keep it dedicated to New York customers. Con Edison described the risk associated with high reliance on delivered services in both the Smart Solutions filing as well as in its most recent rate case.[12] The Company also repeatedly warned that moratoriums on new firm gas customers could be required if the efforts described in the Smart Solutions filing did not sufficiently bridge the gap between supply and demand.

[11] Case 17-G-0606, *Petition of Consolidated Edison Company of New York, Inc. for Approval of the Smart Solutions for Natural Gas Customers Program* (filed September 29, 2017).
[12] Case 19-G-0066, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Gas Service*, Direct Testimony of Con Edison Gas Infrastructure, Operations and Supply Panel, pp. 151-153.

Orange and Rockland has also begun to implement programs similar to Smart Solutions as a result of its most recent gas rate agreement, including the development of a gas demand response pilot and significantly increasing the size of its gas energy efficiency programs.

C. Recent History of Supply Constraints

As stated earlier, the level of delivered services in the Companies' portfolio was increasing in 2016. Moreover, absent the changes in pipeline permitting described above, the Companies were on track to execute agreements for multiple pipeline infrastructure projects before the end of 2016. Those projects were designed to enter service during 2019/2020 and would have once again re-balanced pipeline capacity and peak demand and reduced the Companies' reliance on delivered services.

Ideally, Con Edison's Smart Solutions programs would have been enough to replace the need for new pipeline infrastructure in the short term. Unfortunately, despite assembling a portfolio of solutions that provided customers with additional options to meet energy needs, Con Edison was unable to fully address its growing need for gas in certain portions of its service territory.[13] Con Edison also notes that the solutions presented their own set of challenges related to feasibility and community impact. In late 2018, the Company projected peak demand to begin exceeding supply in most of Westchester County by the winter 2020/2021, despite the program's forecasted achievements. At the same time, the Companies continued negotiations for increased pipeline capacity contracts created through incremental compression on existing pipelines (as opposed to new pipeline infrastructure). However, the expected in-service date for this capacity was November 2023.

[13] Case 17-G-0606, *Petition of Consolidated Edison Company of New York, Inc. for Approval of the Smart Solutions for Natural Gas Customers Program,* Request For Approval Of Non-Pipeline Solutions Portfolio In The Smart Solutions For Natural Gas Customers Program (filed September 28, 2018).

As a result, in order to maintain reliable service to existing firm gas customers, Con Edison announced in January 2019 a temporary moratorium on new firm customers in most of Westchester County that would commence on March 15, 2019.[14] Anticipating the negative impact on potential customers who were already planning for gas service, Con Edison made this announcement and continued to accept applications during this 60-day notice period to provide customers with the opportunity to apply for gas service. Con Edison will continue to connect customers that applied during the notice period into 2021. To meet the resulting incremental peak demand associated with customer applications received during the 60-day notice period, the Company is planning to contract with companies to provide temporary trucked compressed natural gas ("CNG") facilities at locations in Westchester County. The Company plans to use these facilities until either Tennessee pipeline's 300L East project for which it entered a precedent agreement in April 2019[15] enters service or peak demand is reduced through efficiency and other demand side reductions to a level that would enable the Company to lift the moratorium, rendering the CNG unnecessary. The Tennessee project was specifically designed to increase pipeline capacity to Westchester County through the expansion of compression facilities only on the existing pipeline.

Also, early in 2019, the likelihood of a Williams pipeline project, the Northeast Supply Enhancement Project ("NESE"), receiving permits from either the New York State Department of Environmental Conservation or the New Jersey Department of Environmental Protection became increasingly uncertain (the project has now been cancelled after being twice denied both

[14] Case 19-G-0080, *In the Matter of Staff Investigation into a Moratorium on New Natural Gas Services in the Consolidated Edison Company of New York, Inc. Service Territory*, Notice of Temporary Moratorium (filed January 17, 2019).
[15] https://www.coned.com/en/about-us/media-center/news/20190424/con-edison-seeks-expanded-natural-gas-capacity

state permits). While the Companies were not contracted to be shippers for the proposed pipeline capacity, the NESE project would have an impact on Con Edison given its partnership with the downstate National Grid companies that were contracted shippers. As part of the NYF agreement, Con Edison and National Grid conduct a joint planning process that allocates the gas receipt capability from each pipeline and confirms available supply capabilities to the city gates. We also maintain a joint hydraulic model of the system to confirm overall ability to meet the peak demand needs of all the firm gas customers served by the three LDCs (Con Edison and National Grid Metro and Long Island). NESE would have provided National Grid with 400 MDt per day of pipeline capacity. Without it, National Grid will also need to continue procuring increasingly large volumes of delivered services. This NYF planning process confirmed that without NESE, the total availability of delivered services would be insufficient to meet the combined needs of the three LDCs beginning with winter 2020-2021.

In order to avoid a moratorium on new firm gas services in portions of its service territory in NYC, Con Edison proposed in its most recent gas rate case two gas capital projects: the Queens Transmission Upgrade project and the Manhattan Transmission Upgrade project.[16] Both are designed to allow for increased gas receipts at the Lower Manhattan citygate connection with Enbridge's Texas Eastern pipeline. Texas Eastern was the only pipeline serving the NYC area determined to have enough capacity available for procurement of incremental delivered services to meet the future gap created without NESE. Funding mechanisms for both projects were included in the Joint Proposal the Commission adopted establishing Con Edison's current Gas Rate Plan.[17]

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[16] Case 19-G-0066, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Gas Service*, Update and Rebuttal Testimony of Company Gas Infrastructure, Operations and Supply Panel (filed June 14, 2019).
[17] *Id.*, Joint Proposal (filed October 16, 2019), p. 94.

Also, in May 2019, the Companies entered into a precedent agreement for new firm transportation on Iroquois pipeline to increase deliveries to the Hunt Point interconnect in the Bronx. This project will also increase pipeline capacity, by only increasing compression on the existing Iroquois pipeline. While initially sized at 125 MDt/day, during the mandatory FERC open season process, the Companies portion was reduced to 62.5 MDt/day. This capacity will allow the Companies to continue meeting the needs of NYC customers safely and reliably by decreasing reliance on delivered services.

3. General Approach for Identifying Vulnerable Locations

The Commission provided direction regarding the approach the LDCs are to take to identify vulnerable locations in the March 2020 Order:

> Each utility must report its analysis of supply and demand balance, current and projected, for each municipality or borough within its territory, including any projects to address imbalance that are planned or underway.[18]

The Commission correctly observed that a local service vulnerability could be caused by a shortage of pipeline capacity serving the area, a distribution infrastructure issue, or a combination of these and "other factors." The "other factors" can include (1) customer interest in switching from their current fuel to natural gas; (2) the prospect of large economic development projects during the forecast period in a particular location; and (3) the varying degree of reliability of supply from specific sources, including CNG delivered by truck and short-term contracts to rely on pipeline deliveries using capacity that is held by marketers and other third parties.

[18] March 2020 Order, p. 5

The Commission noted that in an LDC's role of maintaining adequate pressures during periods of high demand, its ability to distribute natural gas to a specific location depends on how the distribution system is designed and how natural gas flows during peak periods (*e.g.*, sustained several day cold snaps), days (coldest days), and hours (peak hour demand on the coldest days). This is influenced by both customer demand at particular times and where gas supplies are delivered to the distribution system (*e.g.*, the city-gate stations) or, in the case of CNG and LNG, where the gas is injected, plus the system's ability to transport gas from that point to the associated demand safely and reliably.

As noted in Section 1, we are defining "vulnerable location" as a portion of the system where gas may not be able to be delivered safely and reliably within the next five years. In general, this requires an assessment of projected demand by location as compared to the supply that can be delivered to that location, as well as distribution flow capabilities within the location. Our analysis focuses on the winter peak period.

The Companies, after collaborating with the other major LDCs, is applying three high-level assumptions:

- A 10-year analysis and reporting time period is sufficient to identify vulnerable locations within five years as well as to provide insight regarding expected future demand in the later years and adequate time to identify and implement actions to resolve potential issues;
- The New York Climate Leadership and Community Protection Act ("CLCPA") and similar local efforts are relevant factors when addressing the future gas system planning process. However, given that we are in the early stages of design and implementation of these requirements, the potential for considerable differences between forecasted and actual impacts must be recognized; and
- The distribution system is designed to serve loads without regard to municipality or borough boundaries – we organize the analysis by city gates and then identify the boroughs, municipalities or neighborhoods that may be affected.

The following paragraphs briefly address each element of the analysis and identify additional assumptions that we have made in performing the analyses.

A. Demand Forecast

The winter peak demand forecast is the starting point for any gas system planning analysis. Demand is higher during the winter and highest on the coldest days due to the reliance in New York on natural gas as a heating fuel. As such, the consequences of a supply/demand imbalance that leads to an outage can be severe and even life-threatening, which is a dominant factor in gas system planning. An unplanned natural gas outage is a major event with restoration requiring multiple visits to each home and business affected for shutoff, inspection, and relighting. Recovery from such events is a labor-intensive, time-consuming process that can last weeks. Therefore, maintaining deliveries during several day cold snaps, the coldest day, and the highest use peak hours is critical. LDCs address this requirement by developing design planning criteria to meet demand on a "design day," *i.e.*, an extremely cold day. The specific methodology that we use to define and apply design day criteria is discussed in Section 4.

B. Supply Portfolio

After assessing expected demand, the next step is to identify the portfolio of supply resources that are available to serve a particular location. Most of these resources are planned for and contracted to meet demand downstream from a particular city gate. However, there are supplies that are "local," including any near-by local natural production or storage, LNG facilities, and CNG facilities. Trucked CNG is an option that can be injected close to a locational need, but this resource comes with siting hurdles and delivery risk that must be assessed, particularly if it does not have on-site storage and is essential to meet design-day needs.

Our analysis assumes that the existing supply portfolio is available to serve customers at contracted volumes, prices, receipt/delivery locations, days of availability, expiration dates, etc. Any pipeline contract levels that are planned with sufficient confidence to change in the future are also incorporated into the analysis. In addition, any future pipeline project or supply resource that has a strong likelihood of development is also included in the analysis. It is difficult to predict whether planned projects will ultimately be completed. Therefore, it is inappropriate to rely on projected resources unless we are confident regarding their availability to deliver the expected volumes. Relevant new resources that we are pursuing but are not yet at the stage where we believe they have a strong likelihood of development are included in the descriptions of each Vulnerable Location in Section 5.

C. Transmission and Distribution System Configurations

We use hydraulic modeling to evaluate the delivery of supplies throughout our transmission and distribution system. Our hydraulic modeling assumes existing operational capabilities and configurations of our utility assets, consistent with the approach taken for supply assets. Once again, we only consider infrastructure development or changes to existing distribution assets that have a strong likelihood of completion. Relevant new infrastructure projects that we are reviewing but are not yet at the stage where we believe they have a strong likelihood of completion are included in the descriptions of each Vulnerable Location in Section 5.

D. Potential Solutions

A range of solutions are evaluated to resolve vulnerable locations. Depending on the LDC and its tariff approved programs, these may include transmission and distribution infrastructure solutions, as well as targeted energy efficiency programs and demand response,

and electrification of building heating systems and other natural gas end-uses. Proposed infrastructure solutions may be compared to a non-pipe alternative ("NPA") if they meet suitability criteria. Some LDCs may also consider a combination of the potential solutions noted.

4. Methodology Used for Analysis

The goal of the supply-demand analysis presented herein is to identify areas of the Con Edison and Orange and Rockland service territories that are vulnerable to supply constraints. The Companies used a 10-year forward projection of both expected peak demand and existing supply capabilities, applied to hydraulic flow models of the Companies' gas systems to predict future supply-demand gaps. Gaps identified fall into two categories: 1) those caused by inadequate levels of interstate pipeline capacity; and 2) those created by the inability of the existing distribution system to deliver the available supplies to the location of the new demand.

The Companies finalized the peak demand forecast in June 2020 as part of our annual update process, as described in further detail below. We developed the existing supply capability outlook by reviewing publicly available pipeline contract information from all pipelines servicing the Companies' service territories. We then used this data to predict the market potential for procurement of incremental delivered services.

Also, where we have already identified solution(s) to the supply-demand gaps, we describe the solutions and present their impacts as part of the hydraulic flow model results.

A. Firm Gas Peak Demand Forecast

The Companies' peak demand forecast is developed by its Commodity Forecasting Department, comprised of Forecasting Services, Gas & Steam Forecasting, and Electric Forecasting Sections. The department and its sections are responsible for the peak demand,

volume and revenue, and daily forecasts for both Con Edison and Orange and Rockland. The different forecasts developed are integrated across one another and across electric, gas, and steam commodities. The firm gas peak demand forecasting process is normally completed during the spring of each year. This process has two major steps: analyzing the Weather Adjusted Peak ("WAP") at design weather in the form of Temperature Variable ("TV"), currently a TV of 0^0F, for the previous winter experience, and estimating the net incremental growth going forward.

The primary inputs for the weather adjustment process are the daily service area firm demand and the weather. Con Edison and Orange and Rockland use the TV as a reference point in the weather adjustment process. The TV is used in calculating and forecasting future system peak demands, taking into account extreme winter weather conditions (*i.e.*, sustained low temperatures over two Gas-Day periods). The gas day average ("GDA") temperature is a 24-hour arithmetic average starting at 10 AM using the Central Park National Weather Station dry bulb temperature for Con Edison, and the Spring Valley National Weather Station for Orange and Rockland. The formula for calculating the system TV on a daily basis incorporates two days' worth of GDAs. For Con Edison, the current day's TV is weighted at 70% of the current day's GDA and 30% of the previous day's GDA. For Orange and Rockland, the current day's TV is weighted at 80% of the current day's GDA and 20% of the previous day's GDA. Con Edison and Orange and Rockland use a weather reference of 0°F TV for design conditions. Con Edison and Orange and Rockland also consider average Wind Speed ("WS") as a variable in their weather adjustment processes.

Using TV and WS as reference points, regression analyses are performed to determine the weather adjusted system firm peak demand. Typically, a pooled linear regression is developed using up to five years of peak-day demand TV and WS data for the winter season

(typically November 1 to March 31). The Companies will determine whether to consider a single winter's data or a pooling of several winters' data and whether to apply a linear or polynomial regression based on how well the statistical modeling aligns with actual observations. High TV cutoffs can be made for weather and load data that occurred during the winter period where no heating was utilized by customers. Multiple regression views are performed to narrow the range of estimated demand to the design criteria. It is important to note that regression results alone do not dictate the final determination of the weather adjusted load process. In the absence of TV data across the spectrum or under circumstances of load forecast uncertainty, other models/software/methods/analytical tools will be used for the WAP analysis. There will be a range of outcomes and an expected mathematical tolerance associated with the recommended WAP.

The forecast is performed annually in the spring of each year and projects firm gas peak demand at design weather for the next 20-years for the gas service area system and associated regulator stations. The areas that contribute to load growth are:

- Large New Construction - captures the impact of new building construction on the natural gas firm peak demand and reflects the growth in the commercial and multifamily residential sector of the business with a demand generally greater than 3,000 CFH.
- Small Residential Construction - captures the impact of new building construction on the natural gas peak demand and reflects the growth in the residential sector of the business with a demand generally less than 3,000 CFH. This covers small new construction, typically for 1-4 family dwellings.
- Net Transfers (Interruptible to Firm and Firm to Interruptible) - projects the impact of transfers between interruptible and firm services (and vice versa).
- Oil-to-Gas Conversions - calculates and applies a peak load factor per building to the projected services for the next 20 years for large #2, #4, and #6 oil-to-gas

conversion buildings. Conversions for small buildings (typically 1-4 family) are also projected.

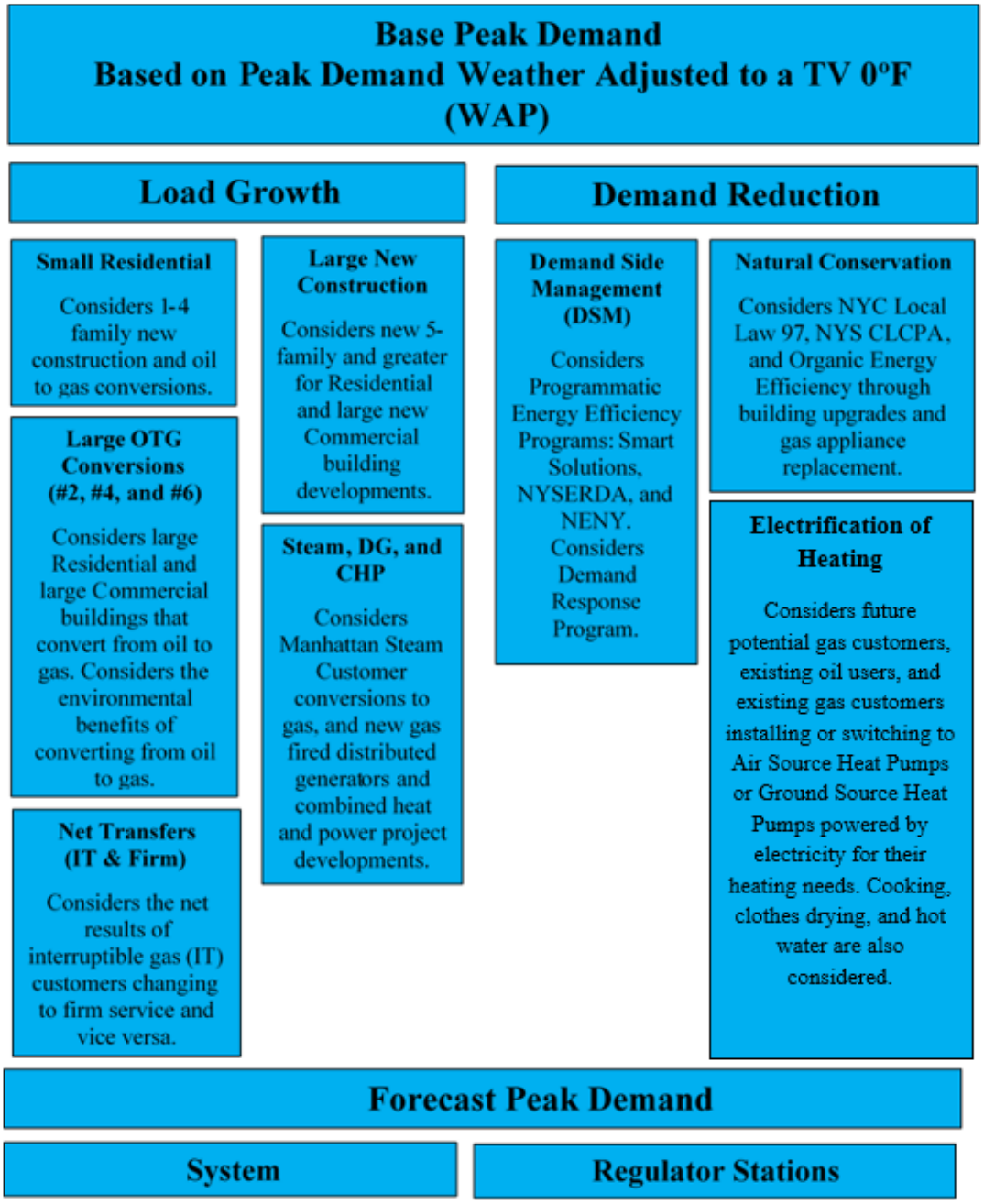
- Steam to Gas Conversions, DG, and/CHP – analyzes the potential impact of Con Edison Manhattan steam customers converting to gas boilers or gas DG/CHP, and new construction gas DG/CHP within the gas service territory.

Some areas that contribute to load reduction are:

- Demand Side Management – analyzes the potential impact of the Companies' Energy Efficiency programs and NYSERDA's Energy Efficiency programs ("EE") on the natural gas peak demand. These outlooks include:
  - Company Programmatic EE (Including Smarts Solutions)
  - NYSERDA EE
  - New Energy Efficiency New York (NENY)
  - Gas Demand Response
- Organic EE/Natural Conservation - accounts for residential and commercial customer heating equipment turnover, building renovations/upgrades, as well as actions customers take in response to State clean energy objectives as reflected in local and state laws (*e.g.*, Local Law 97 and the CLCPA) that govern GHG reduction.
- Electrification of heating is factored in based on Non-Pipe Solutions programs and State clean energy policy policies as reflected in laws such as Local Law 97 and the CLCPA. Potential future and existing gas customers as well as current users of oil for heating may opt for Air Source Heat Pumps or Ground Source Heat Pumps powered by electricity for heat and hot water as well as electric stove tops and electric dryers.

The figure below illustrates the overall process for developing the firm gas peak demand forecast.

Con Edison and Orange and Rockland Firm Gas Peak Demand Forecast Overview



The net incremental growth in peak day natural gas demand (Load Growth less Demand Reduction) includes components that are considered significant to the gas peak demand. Customer applications for gas service, consumer behavior, and key economic metrics such as Gross Metro Product, private non-manufacturing employment, and disposable income are some of the key inputs considered in developing the forecast.

It is important to note that there is a Load Forecast Uncertainty ("LFU") associated with Con Edison and Orange and Rockland Firm Gas Peak Demand Forecasts. This is due to weather and customer behavior error implicit in the WAP. Reliability, customer bill impacts, free ridership, ease of applying new or emerging technologies, customer disruption and high first costs, and the speed at which the electric grid is powered by renewables are all factors that can and will impact the LFU. Our current forecasts for the Companies have the highest LFU and lowest confidence level ever due to the uncertain policy outlooks. This year's forecasts project less new business and much more EE and Electrification than has actually materialized in prior years, resulting in a significant downward trend. Ultimately, actual results over time will assess the accuracy of these forecasts, and adjustments will be made each year to continually refine our forecasting process and safeguard our customers.

B. Design Criteria

The Companies design and plan the Con Edison and Orange and Rockland natural gas systems to a 0°F TV for firm service. The foregoing section described the technical details regarding TV. The TV is calculated using portions of two consecutive days of extreme cold weather conditions. This is more effective in providing safety and reliability to our gas customers than relying on data from just a single day because the percent weightings on the two consecutive gas days provides the best correlation of temperature to customer load.

While the probability of experiencing such a design weather day may be low, recent trends indicate that the chances of experiencing a design weather day may be increasing. Climate change may impact average temperatures, but it will not negate the potential for cold weather extremes, such as polar vortex events, which drive gas peak demand. Recent record cold snaps occurred during the 2013/2014 and 2017/2018 winters in the New York Metropolitan Region. These extreme conditions were linked to weakened "polar vortex" events, when cold air normally confined to the Arctic was released to continental United States. Recent research suggests that climate change may cause more frequent and persistent weak polar vortex events and, in turn, cold weather extremes.[19] There is evidence that suggests Arctic warming and sea ice decreases can weaken the polar vortex and drive more frequent extreme cold weather outbreaks in the northern United States.[20] However, these relationships are only characterized by recent observations and their future behavior remains uncertain.

We are likely to see fewer Heating Degree Days over future winters, and as such, less delivered gas volume over a year; however, this only affects delivered gas volume over the course of a year, but not the amount of firm gas used on the design firm gas peak day. The Con Edison gas service area has experienced weather conditions close to design multiple times in the past, with the most severe conditions in the last 30-years occurring in 1994 with a TV of 5ºF. The chance of Design Weather occurring continues to apply to the Companies' forecast time horizon (20-years). It is important to note that under current reliability standards, the Gas Systems are

[19] Kretschmer, M., Coumou, D., Agel, L., Barlow, M., Tziperman, E., & Cohen, J. (2018). More-persistent weak stratospheric polar vortex states linked to cold extremes. *Bulletin of the American Meteorological Society*, *99*(1), 49-60.

[20] Zhang, P., Wu, Y., Simpson, I. R., Smith, K. L., Zhang, X., De, B., & Callaghan, P. (2018). A stratospheric pathway linking a colder Siberia to Barents-Kara Sea ice loss. *Science advances*, *4*(7), eaat6025; Overland, J., Francis, J. A., Hall, R., Hanna, E., Kim, S. J., & Vihma, T. (2015). The melting Arctic and midlatitude weather patterns: Are they connected? *Journal of Climate*, *28*(20), 7917-7932; Kim, B., Son S., Min, S., Jeong J., Kim, S., Zhang, X., Shim, T., & Yoon, J. (2014). Weakening of the stratospheric polar vortex by Arctic sea-ice loss. *Nature Communications*, *5*(4646).

designed and planned without reserves, as opposed to the Electric System that currently uses a reserve margin of approximately 19%. This standard, in combination with the health impact and challenges of performing a 'relight' in the case of a large outage of natural gas customers, requires a conservative approach to planning for the Companies' firm peak day gas supply needs. Even though a Design Weather event has not occurred in many years, the Companies should continue to plan for such events, especially when the potential adverse impacts can be significant and severe. Following the experience with Superstorm Sandy, Con Edison hardened its facilities in NYC to the FEMA 100-year (a 1% annual chance of occurrence) flood plus 3' (1' sea level rise and 2' freeboard). For the same safety and reliability reasons, the Companies should plan in a similar fashion for their gas systems. To do otherwise would expose the Companies' customers to a higher risk of a loss of gas on the coldest days of the year, which could be life threatening from a public safety perspective in subfreezing conditions, especially given the time-intensive efforts required to restore gas customers following a loss of gas as compared to electric customers.

The design basis for Con Edison and Orange and Rockland Gas Systems are N-0,[21] not N-1, from a reliability/operational security design, do not have any loss of load expectation, do not include reserve margins to accommodate any loss of supply due to equipment issues on a peak day, cannot operate safely with diminished system operating pressures, and rely on transportation from distant supply sources not under the Companies' direct control. In summary, in contrast to the electric system which maintains a 19% reserve margin, 100% of gas supply resources are assumed to be available in order to meet peak design day customer demand requirements. The

[21] N-0 = System State or the number of elements that can fail. N-1 means the system can meet demand even with loss of its largest supply unit. Under this analogy, a gas interstate pipeline, compressor station, and gate station are likened to an electric generator or transmissions feeder.

loss of a gas interstate pipeline, compressor station, or a gate station could result in a loss of gas supply to firm gas customers on a design winter day.

If Con Edison and Orange and Rockland were to relax its Gas Design Weather Criteria to a 1-in-3 design weather peak probability, as currently exists for their Electric Systems, an installed reserve margin in a manner similar to the Electric Systems, currently 18.9%, would need to be applied and maintained. For Con Edison, a 1-in-3 weather event would equate to a TV of about 13°F. The most recent Con Edison regression curve for TV vs Firm Peak Demand would yield a firm gas peak of ~1,358 MDt/day instead of ~1,634 MDt/day at a 0°F TV. For O&R, a 1-in-3 weather event would equate to a TV of ~ 9°F. The most recent O&R regression curve for TV vs Firm Peak Demand would yield a peak of ~200 MDt/day vs. ~230 MDt/day at a 0°F TV.

The total for a 1-in-3 for combining Con Edison and Orange and Rockland is about 1,558 MDt/day for both companies. Considering an installed reserve margin similar to what the NYISO and other ISO's use, applying an 18.9% installed reserve margin adds ~ 295 MDt/day. A total of 1,853 MDt/day is very close to our recommended 2019/2020 WAP at 0°F TV (1,634 + 230) of 1,864 MDt/day. Notably, applying an equivalent NYISO installed reserve margin used for reliable electric system planning produces a firm gas system forecasted peak equivalent to the firm gas system forecasted peak for a zero contingency 0°F TV design standard.

Based on the foregoing, both Con Edison and Orange and Rockland's Design Weather Criteria are essential and prudent for providing safe and reliable service to gas customers on the coldest days of the year. If the Companies were to relax their existing Design Weather Criteria, the risk that supply will not meet demand would increase and the Companies could be forced to

shed load by cutting gas to firm customers. The consequences of such an action in subfreezing conditions would be life threatening and restoring service to several thousand gas customers would potentially take several weeks. The safety precautions that must be taken when restoring gas customers following a Gas System outage are unique and are materially different than the Electric System, whereby sections can be restored from outage much more rapidly.

Given the Gas System design is based on 100% of all supply resources being available to meet peak demand requirements, *i.e.*, an N-0 design basis, relaxing the Gas Weather Design Criteria for CECONY and O&R would be imprudent. As previously discussed, the probability of extreme weather variations associated with climate change, including very cold temperatures due to fluctuations in polar vortexes may increase moving forward. In addition, due to the unique and significant public safety consequences of a gas system outage, relaxing the existing design criteria would represent an unacceptable risk for customers and public safety.

5. Supply Demand Analysis Results – Vulnerable Areas

To determine which areas may be subject to supply constraints due to insufficient pipeline capacity servicing the region, the Companies' analyzed their service territories based on which pipeline(s) and/or specific citygate(s) provide the supply to a specific region. The maximum supply available from the pipelines serving each region or combined regions was compared to the flow required to meet the peak demand in the region or combined regions, as determined by the hydraulic flow models.

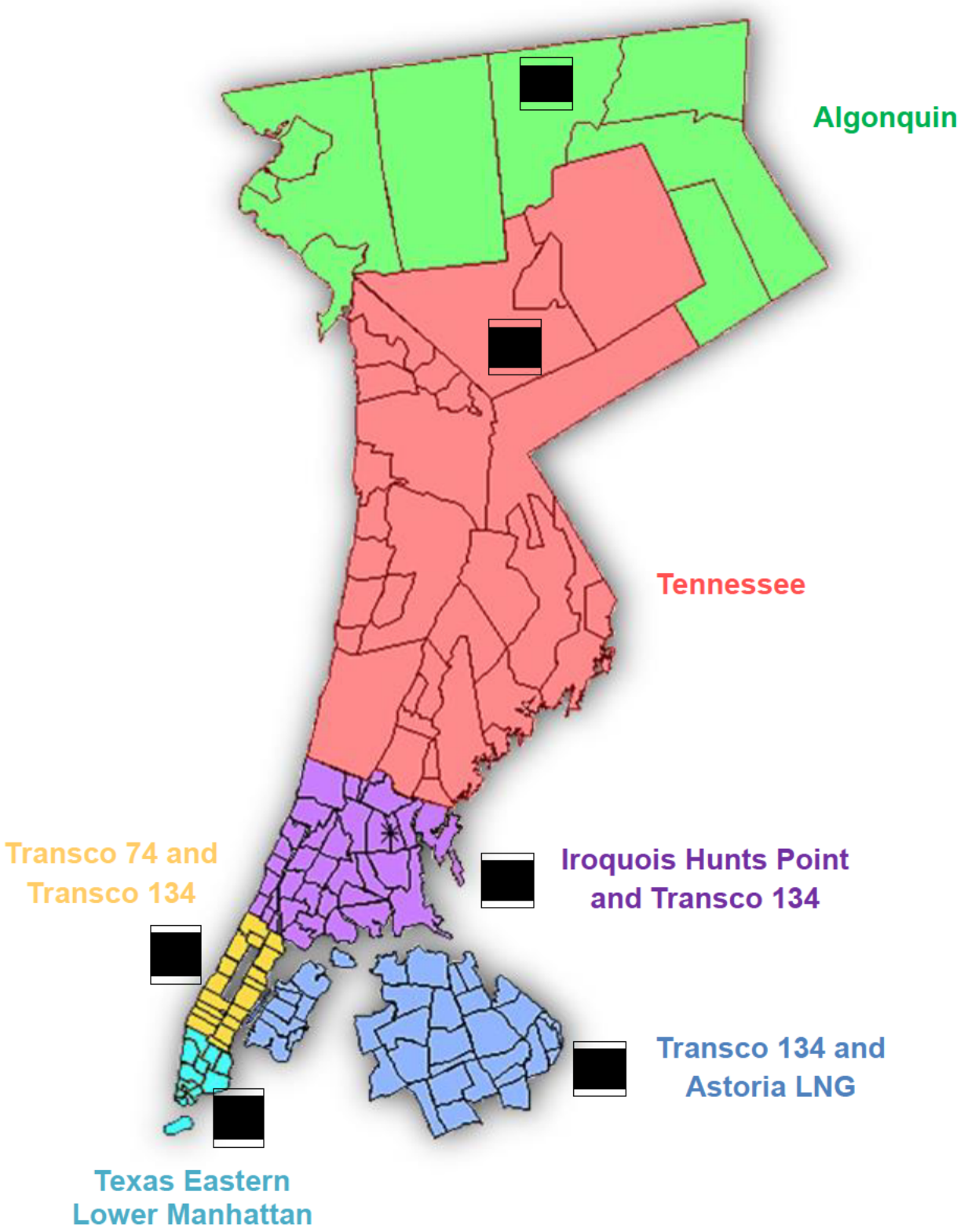
The results of this analysis represent a specific point in time of a very dynamic gas planning process. Virtually all the inputs into this analysis, impacting both the peak demand and supply components, are estimated to some degree and will change over time as more up-to-date

information becomes available. The Companies must consider the risks associated with these potential changes and be prepared to modify their plan as necessary to continue meeting the needs of our firm gas customers safely and reliably. As such, in addition to presenting the most current plan for balancing supply and demand, we also discuss the risks associated with the various elements of this plan, as well as what actions the Companies' would take in case of significant changes to key inputs.

The analysis determined that there were no regions within the Orange and Rockland service territory vulnerable to supply constraints due to insufficient pipeline capacity. The detail associated with this analysis will be provided and discussed in the upcoming July 31 filing, which will provide the supply demand analysis of non-vulnerable regions.

For the Con Edison service territory, we found two areas to be vulnerable to supply constraints that could occur as a result of insufficient pipeline capacity. The detail of that analysis follows.

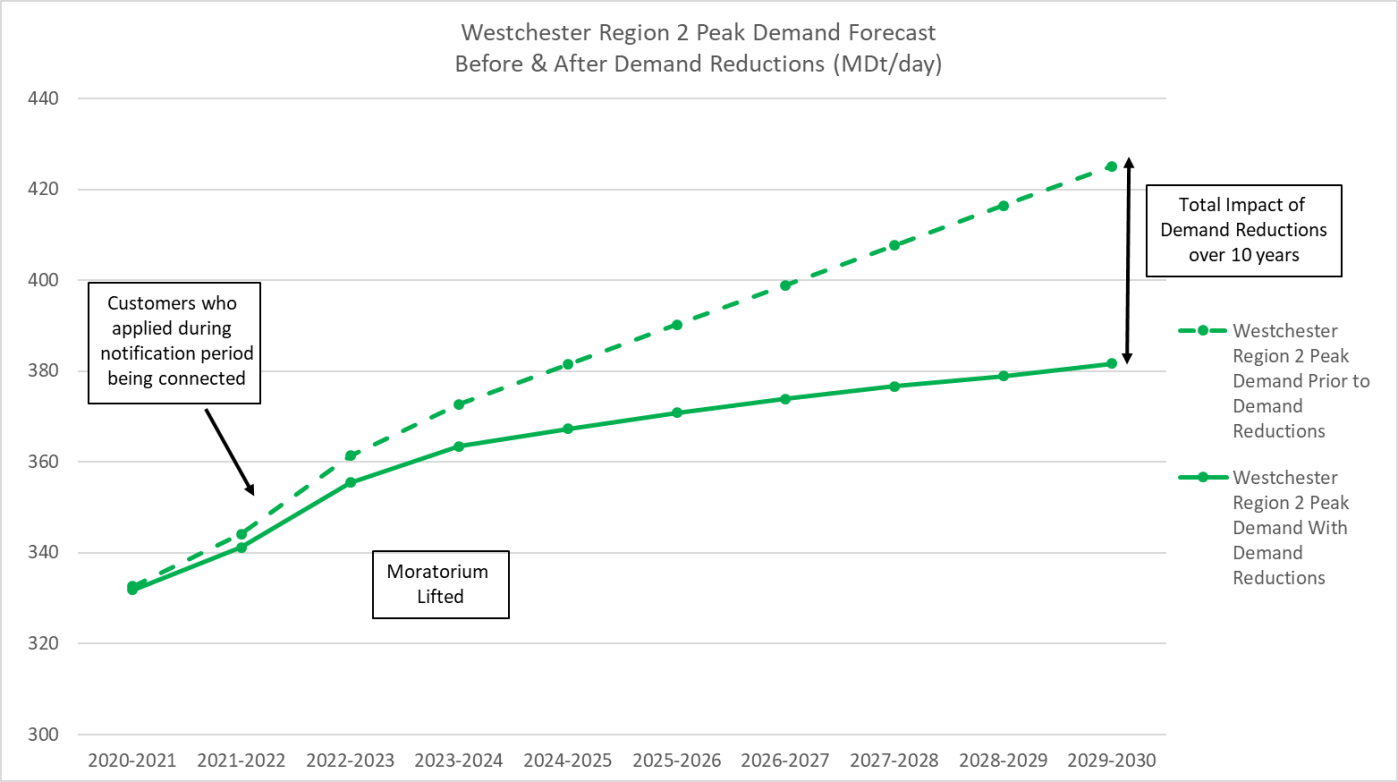
Pipeline Areas of Influence (Design Day Model)



The above map is a representation of the Con Edison territory divided into regions based on the interstate pipelines supplying them. We developed this map using the hydraulic flow model of the Con Edison system as it exists today under peak demand conditions. It should be noted that the borders of these regions would change under non-peak conditions and with changes to on-system infrastructure. The Companies determined that the regions subject to supply constraints driven by the potential for pipeline capacity shortfalls are the regions designated on the map as 2, 3, 4, and 5. Region 2, which is currently subject to a temporary moratorium, is serviced directly by only one interstate pipeline, Tennessee, and we studied it independently. Since regions 3, 4, and 5, are all serviced partially by the Transco 134th Street citygate, it was necessary to study these regions collectively.

Con Edison Region 2 – Central & Southern Westchester County

As described earlier, the peak demand forecast incorporates a variety of inputs that result in a reduction in peak demand. The inputs that are the main drivers resulting in this reduction can be broken down into three major categories; demand-side management programs, natural conservation, and electrification of heating. These categories reflect the impact on firm gas peak demand of the State's clean energy objectives as reflected in NENY, REV and the CLCPA. The combined incremental impact to the peak demand forecasted for Region 2 over the 10-year study period, for of all these categories is shown in the graph below.



The demand reduction included in the firm peak demand forecast, which are based on the best available information, are incremental to what is already in place and assumed to be maintained. The magnitudes of these negative load modifiers can and will change over time as new information becomes available and those forecasts are updated annually to capture the dynamics of policy and regulations. Therefore, it is important that the planning process considers that these reductions may materialize at a rate slower or faster than incorporated in our forecast at this time.

Demand-Side Management Programs: These reductions are forecasted based on the expected outcomes of existing programmatic Energy Efficiency and Demand Response for demand reduction, whether offered by Con Edison or NYSERDA. Near-term confidence in forecasted

reductions is high for existing defined programs, but this can change significantly over time for a variety of reasons, *e.g.*, if programs are added or phased out.

Natural Conservation: These reductions are estimates of actions that customers will take on their own (residential and commercial customer heating equipment turnover and building renovations/upgrades) as well as to respond to the movement toward clean energy as reflected in State laws and policies such as the CLCPA. The absence of defined programs and the current lack of clarity associated with the CLCPA results in a lower confidence in how this category will ultimately compare to actual reductions over time.

Electrification of Heating and other Gas Use: The Companies are tracking this category separately from Energy Efficiency, not only for the gas peak demand forecasts but also for alignment with electric forecasts. Currently, many factors impact the customer decision to electrify, such as economics, user disruption, and minimal GHG reduction due to the current and near term electric grid emissions ratings, and customers are not compelled to electrify. How quickly and to what extent we begin to see this transition occur is currently at a low confidence level. The Company recognizes, however, there are customers who will take action in response to State and local clean energy objectives, as reflected in laws like the CLCPA and New York City Local Law 97.

In addition to the demand reductions, there are three other inputs to the Region 2 firm peak demand forecast that are being monitored closely for changes. These include:

Cancellation Rate of Customers: The driver of the steep slope in peak demand growth through winter 2023-2024, is the expected connection of customers who submitted applications prior to the implementation of the moratorium. Many more applications than normal were received

during this 60-day notice period and the accuracy of the assumed cancellation rate remains to be seen.

In-Service date of the Tennessee 300L East Project: It is expected that when the increased pipeline capacity achieved through expansion of compression enters service, the moratorium on new firm gas customers will be lifted. For the peak demand forecast, this is assumed to be in November 2023. Con Edison has worked with the project developer, Kinder Morgan, to accelerate the previously proposed schedule in order to achieve an in-service date of November 2022. This was reflected in Kinder Morgan's FERC certificate filing submitted on June 30, 2020.[22] However, given the number of pipeline projects experiencing delays in recent years, the Companies are assuming the later November 2023 in-service date for the purpose of this analysis. If the earlier in-service date is achieved, the forecast will be affected by an earlier return of new business growth and if it should enter service later than November 2023, peak demand will remain flat to slightly decreasing (due to demand reductions) once customers in the existing queue have been connected.

COVID-19: Due to the measures implemented to contain the spread of coronavirus in New York State, near-term natural gas usage is down and the forecasted economic impact in both the near and longer term has resulted in some decrease in the peak demand forecast. Differences between the economic recovery timeline assumed in this forecast and the actual recovery over the coming months and even years, will be reflected in future forecast updates.

[22] *Application for a Certificate of Public Convenience and Necessity for the East 300 Upgrade Project of Tennessee Gas Pipeline Company, L.L.C.*, FERC Docket No. CP20-493, (filed June 30, 2020).

[redacted]

The above chart shows all the sources of supply that are planned to meet the peak demand in Region 2 over the next 10 years. Many of these supply sources also have a level of uncertainty associated with them that must be considered as part of the planning process.

Distribution System Supply Flowing North or South between Region 2 and 3: This category of supply represents the capability of the distribution system to allow gas to flow north from Region 3 into Region 2, and vice versa. In the hydraulic flow model results from previous years, the capability to flow north was small, limited to approximately 10 MDt/day. However, now that the peak demand forecast for NYC is lower, due to both COVID-19 impacts and increased demand reductions in all three categories described earlier, it may be possible to increase this capability. Con Edison has determined that by accelerating planned work at one of its regulator stations, GR-110, increased flow north to Region 2 from Region 3 can offset some of the need to install trucked CNG facilities to meet the peak demand need of the customers who applied for

service during the 60-day notice period. Also, once the Tennessee 300L East compression project has entered service and the moratorium has been lifted, there is now projected to be some availability of supply in Region 2 that can be flowed south to Region 3 and used to contribute to meeting the peak demand needs of NYC customers. However, the volume available will decrease over time, as peak demand in Region 2 is projected to continue to grow despite the impact of demand reductions. While this is a beneficial change in the supply outlook, it is also dependent on the expected reduction in peak demand in New York City materializing as forecasted. Consequently, the Companies will carefully monitor this situation and, if necessary, the Companies will revert to installing additional trucked CNG facilities.

FT and Storage: The Companies have an existing portfolio of firm transportation and associated upstream storage contracts directly with Tennessee pipeline which provide firm primary point delivery to Region 2.

FT acquired through Asset Management Agreement (AMA): Given the high level of reliance on delivered services to Region 2, the Companies have sought to lower the re-contracting risk by entering into an Asset Management Agreement with one of the third parties which controls primary firm capacity to the Region. In AMAs the Companies agree to pay an AMA fee in exchange for the pipeline capacity. The AMA also offers a renewal option.

New FT – Tenn 300 East: This project is critical to Region 2. Once it has entered service, the moratorium on new firm gas customers will be lifted, operation of trucked CNG facilities in the region will be discontinued and reliance on delivered services will be greatly reduced. If the project should encounter permitting challenges or construction delays, the moratorium will remain in place and trucked CNG will be required, flows of gas north between Region 3 and

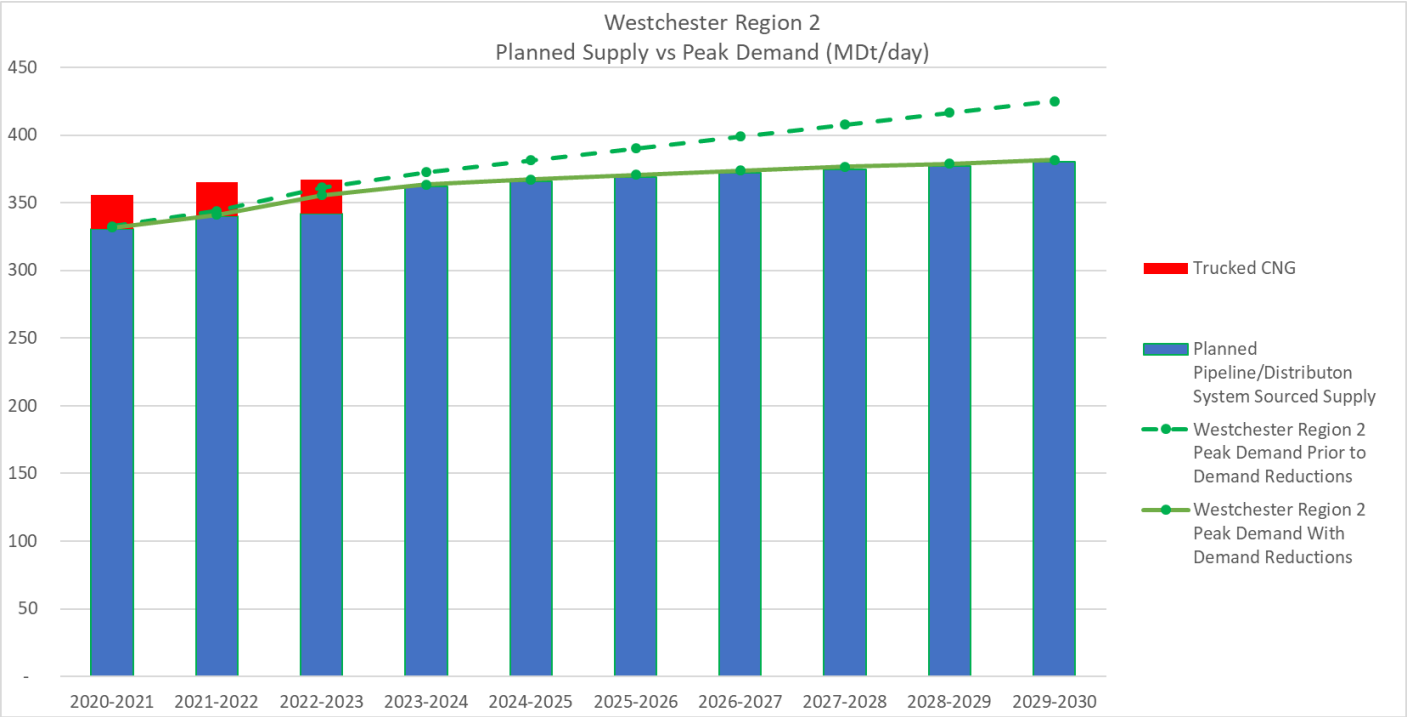
Region 2 will be utilized, to the extent possible, and the Companies' continued heavy reliance on delivered services in the region will be unavoidable.

NGRID Supply – NY Facilities: As described earlier, the NYF system is jointly operated by Con Edison and NGRID. Each company maintains firm transportation contracts and delivers gas supply to some of the other's city gates, and the net amount is transferred from one to the other at several system interconnections. As part of this agreement, NGRID delivers supply to Region 2 via Tennessee pipeline.

Delivered Services – Contracted / Not Yet Contracted: As described earlier, reliance on delivered services introduces risks to the supply portfolio, including the ability to re-contract. Approximately 85 MDt/day of primary firm capacity to the region is controlled by third parties. The Companies have already secured up to 40 MDt/day as an AMA procurement. The supply plan for Region 2 continues to rely on additional delivered services in varying amounts, both prior to and after the Tennessee project enters service. In the near term, should the Companies be unable to secure the remaining volumes, the use of trucked CNG will be increased. In the later years, the risk to procure will be low after the Tennessee project enters service, given the need for delivered services will be small when compared to the total amount of capacity controlled by third parties. However, in the unlikely case that the Company cannot procure all the planned volumes, it would decrease flows south to NYC.

Trucked CNG - Contracted: As stated earlier, the Companies are planning to use trucked CNG in Region 2 to meet the needs of customers who submitted applications during the 60- day notice period before the commencement of the moratorium. Currently, the Companies are moving forward with one CNG location. We have chosen and contracted with the vendor and

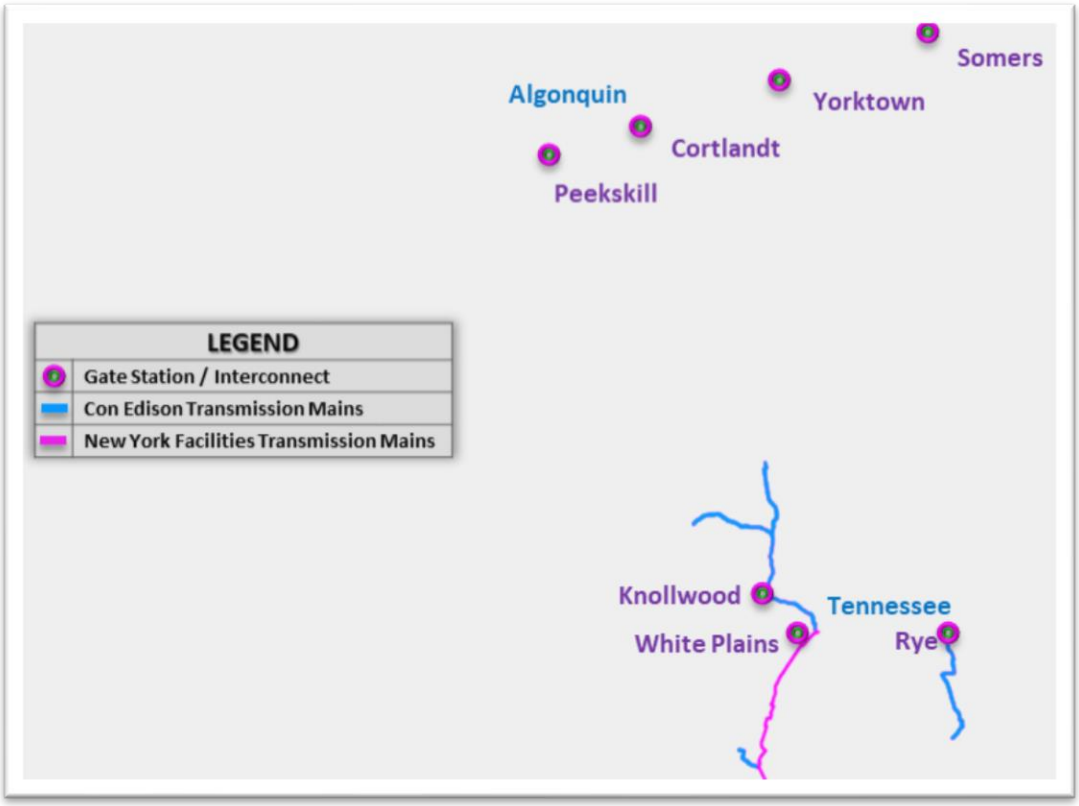
obtained approval from the local planning board. The planning board approval is contingent on removing the facility when the moratorium on new firm gas customers in the region is lifted. The Companies plan to remove the facility when the Tennessee 300L East project enters service and allows the moratorium on new firm gas customers to be lifted. The need for additional CNG facilities will be closely monitored as changes occur to both the peak demand forecast and availability of other supply sources and the Companies will add sites as necessary, recognizing the estimated 18-month lead time to permit, develop and place these facilities in-service.



As can be seen in the chart above, while Region 2 is an area vulnerable to supply constraints, the current supply plan will meet the forecasted peak demand through the 10-year analysis timeframe. While this plan is not without risk, Con Edison will closely monitor those risks and make adjustments as new information becomes available and/or circumstances change.

In addition to the 10-year forward supply demand analysis of Region 2, it is important to explain why the distribution system could not provide additional supplies from Region 1 to Region 2 in order to avoid or lift the moratorium that was implemented in March of 2019.

<u>Distribution Constraints delivering from Region 1 to Region 2:</u>



As can be seen on the above map, the Algonquin pipeline is not connected to the NYF system. Instead, it is connected directly to distribution pipes that operate at a much lower pressure. That distribution piping is predominantly small in diameter and was designed only to serve the demand in northern Westchester, not to distribute supplies south.

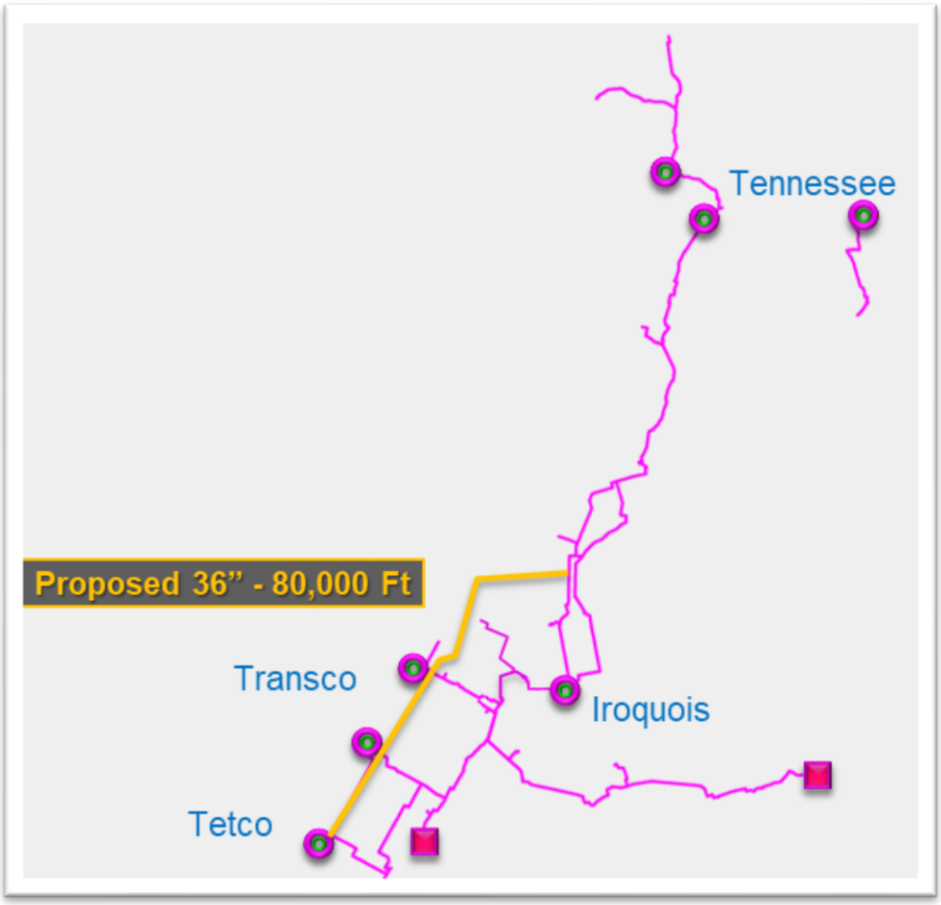
The Companies considered an on-system project to deliver supplies south to Region 2 from Algonquin (see below).

We determined this project was not viable because: the challenges of the route (*e.g.*, impact to communities and park land); the high cost of the project, which was estimated at $860,000,000; and the limited third-party capacity on Algonquin for the procurement of delivered services. Moreover, even if constructed, this project alone could not relieve the supply constraints in Region 2 and would have created a combined Region 1 and 2 that was supply constrained.

<u>Distribution Constraints delivering from Region 3 to Region 2:</u>

Con Edison also considered the feasibility of an on-system project to increase deliveries from Region 3 north to Region 2. However, as stated earlier and to be described in detail later, Region 3 is part of a combined Region 3, 4, 5, which is also vulnerable to supply constraints due

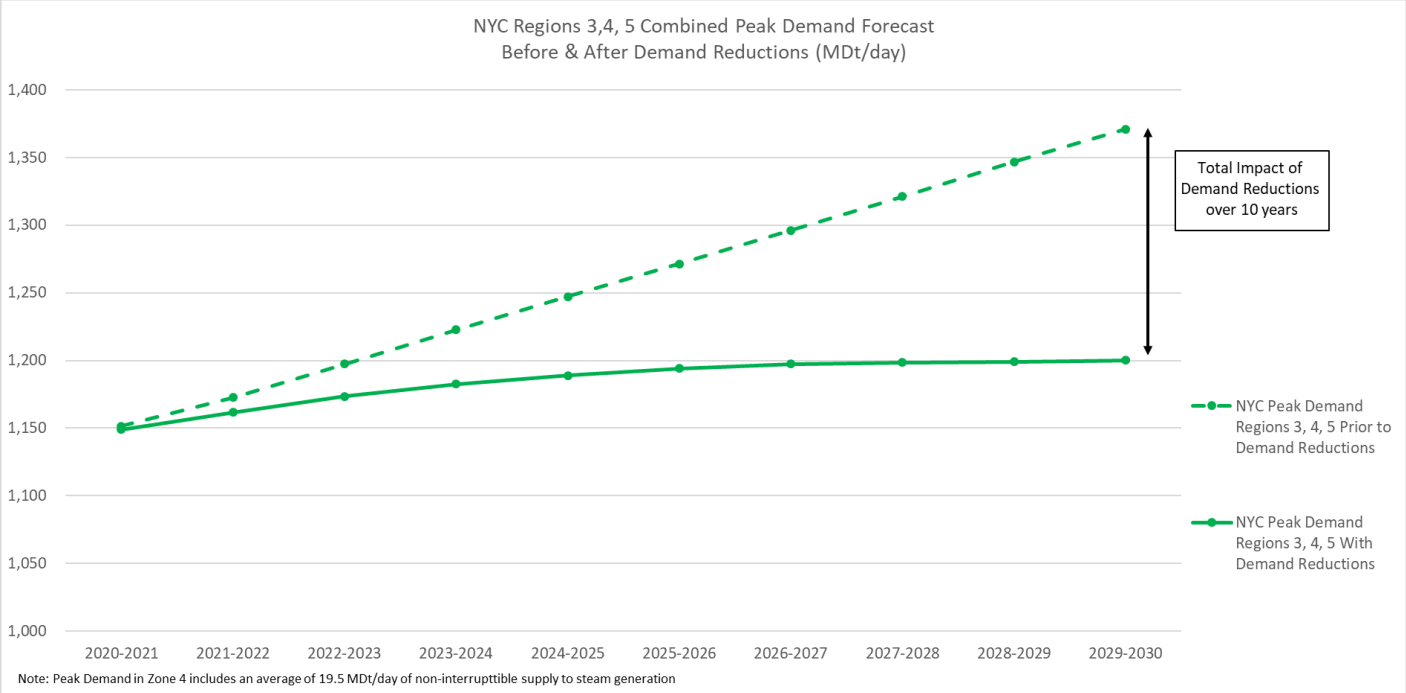
to insufficient pipeline capacity. As a result, Con Edison instead had to consider if a project from Region 6 to Region 2 was feasible, as shown below.



We determined this project not viable solution due to its high cost ($1,230,000,000) and challenging route up the west side of Manhattan and through the Bronx.

<u>Con Edison Combined Regions 3, 4, and 5 – The Bronx, mid-upper Manhattan & Queens</u>

The combined impact to the peak demand forecasted for Regions 3, 4, 5 over the 10-year study period, for all demand reduction categories, is shown in the graph below.



The description and uncertainties associated with the demand reductions for this region are consistent with those described earlier for Region 2 (Central/Southern Westchester), except that NYC has passed Local Law 97, which is intended to place buildings on a path to meet the City's goal to reduce greenhouse gas emissions. The specifc rules and programs associated with this law are still in development and, as a result, the confidence level in the associated demand reduction included in the forecast is low.

[redacted]

The above chart shows all the sources of supply that are planned to meet the peak demand in Region 3, 4, 5 over the next 10-years. Many of these supply sources also have a level of uncertainty associated with them that considers as part of the planning process.

Distribution System Supply Flowing North between Region 6 and 4: Region 6 is served by Texas Eastern Pipeline. Con Edison has moved forward with the Queens Transmission Project, approved as part of its most recent rate plan. As a result, the ability to receive supply from Lower Manhattan with deliveries from Texas Eastern and flow it north into Region 4 is increasing. This allows the Companies to procure a higher amount of delivered services in Region 6, where the risk of procurement is low due to a higher level of existing primary firm transportation versus the supply need. The complete supply demand analysis for Region 6 will be included in the Companies' July 31 filing related to non-vulnerable regions. Based on this current supply demand analysis, Con Edison does not expect to move forward with the Manhattan Transmission Project at this time, which, under its rate plan, Con Edison was authorized to build if there was a need.

Distribution System Supply Flowing North or South between Region 2 and 3: As detailed in the discussion of Region 2 (Central/Southern Westchester), this category of supply represents the capability of the distribution system to allow gas to flow north from Region 3 into Region 2, and vice versa. It is highly dependent on the expected reduction in peak demand in New York City materializing as forecasted through 2023 to effectuate the flows north. From 2023, the flow south is dependent on the Tennessee 300L East compression project entering service.

FT and Storage: The Companies have an existing portfolio of firm transportation and associated upstream storage contracts directly with Transco and Iroquois pipelines, which provide firm primary point delivery to the Combined Region 3, 4, 5.

FT acquired through AMA: Given the high level of reliance on delivered services to the Combined Region 3, 4, 5 the Companies have sought to lower the re-contracting risk by entering into an Asset Management Agreements with two of the parties which control primary firm capacity to the Combined Region. In the AMAs, the Companies agree to pay an AMA fee in exchange for the pipeline capacity. The AMA also offers a renewal option

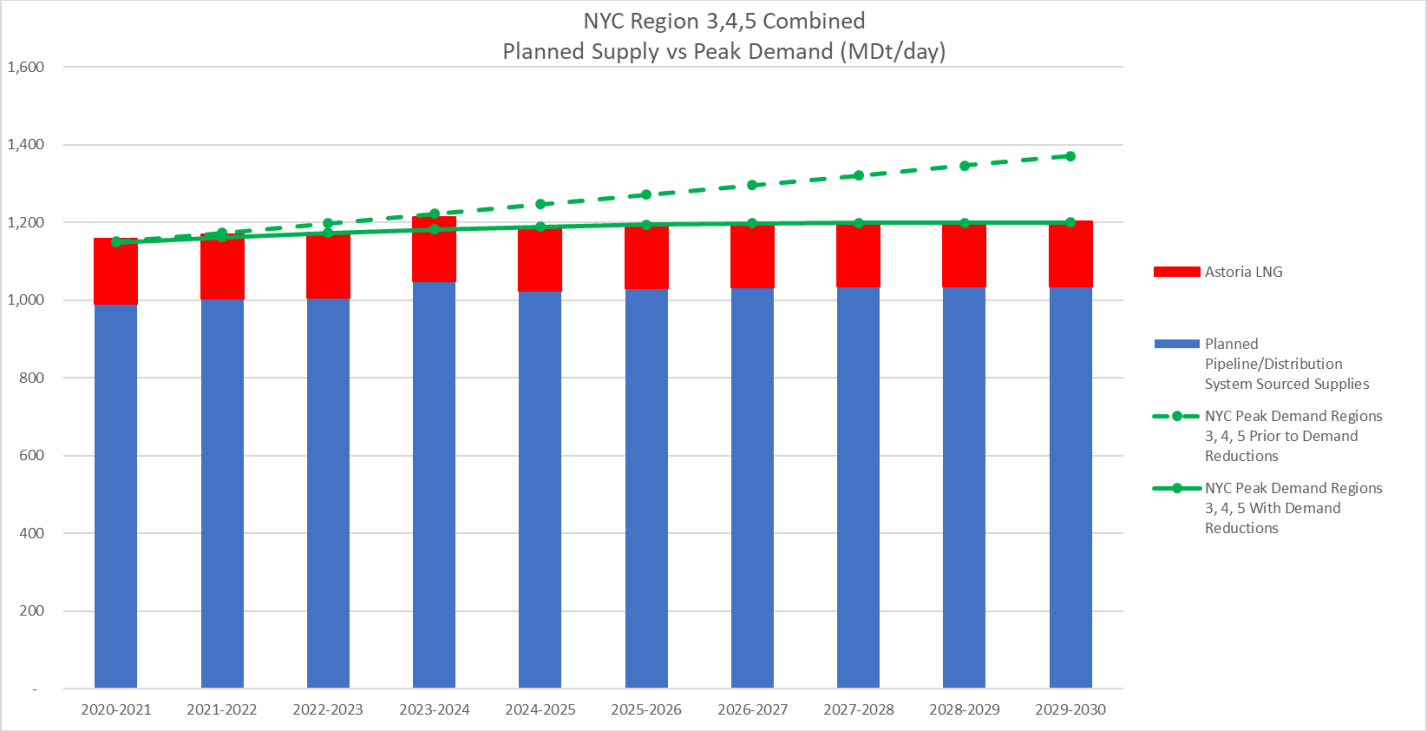
New FT – Iroquois ExC: When the project enters service as planned in November 2023, the Companies' reliance on delivered services procured in the Combined Region 3, 4, 5 will be reduced. If this project should encounter permitting challenges or construction delays, The Companies may not be able to procure sufficient delivered services at the Iroquois Hunts Point city gate. [redacted] This will result in the NYF-member LDCs competing with one another to procure the same supplies. If this should occur, the Companies would evaluate several alternative

options or combination of options depending on the shortfall in supply projected. First, a regionally focused Non-Pipeline Solutions RFP would be conducted Second, the Companies would consider increasing the contribution to the supply plan from the Astoria LNG facility, which is currently undergoing modernization approved as part of the most recent Con Edison rate plan. Third, if the Tennessee 300L East compression project has entered service, the Companies would evaluate the feasibility of procuring additional delivered services above what is already planned in Region 2 for flow south to NYC. Fourth, the Companies would pursue temporary trucked CNG options located in either the Bronx or Queens. Finally, the Companies would move the Manhattan Transmission Upgrade Project forward to allow for even further increased flow of supply north from Region 6 to Region 4.

NGRID Supply – NY Facilities: As described earlier, the NYF system is jointly operated by Con Edison and NGRID. Each company maintains firm transportation contracts and delivers gas supply to some of the other's city gates, and the net amount is transferred from one to the other at several system interconnections. As part of this agreement, NGRID delivers supply to the Combined Region 3, 4, 5 via Transco and Iroquois pipelines.

Delivered Services – Contracted / Not Yet Contracted: The reliance on delivered services introduces risks to the supply portfolio, including ability to re-contract. The supply plan for Region 3, 4, 5 continues to rely on additional delivered services in varying amounts, both prior to and to a much lesser extent after the Iroquois ExC project enters service. In the near term, the Companies will look to continue contracting forward for up to three winters when possible to minimize the re-contracting risk.

Astoria LNG: This existing facility is a critical asset that contributes to the supply plan to meet peak demand and provides reliability in the case of an on-system or upstream event that causes an unexpected loss of pressure or supply. It is expected to continue to be an integral part of the plan for the foreseeable future and is undergoing modernization upgrades approved as part of the most recent Con Edison rate plan.[23]



As can be seen in the chart above, while the combined Region 3, 4, 5 is an area vulnerable to supply constraints, the current supply plan will meet the forecasted peak demand through the 10-year analysis timeframe. While this plan is not without risk, the Companies closely monitor those risks and make adjustments as new information becomes available and/or circumstances change.

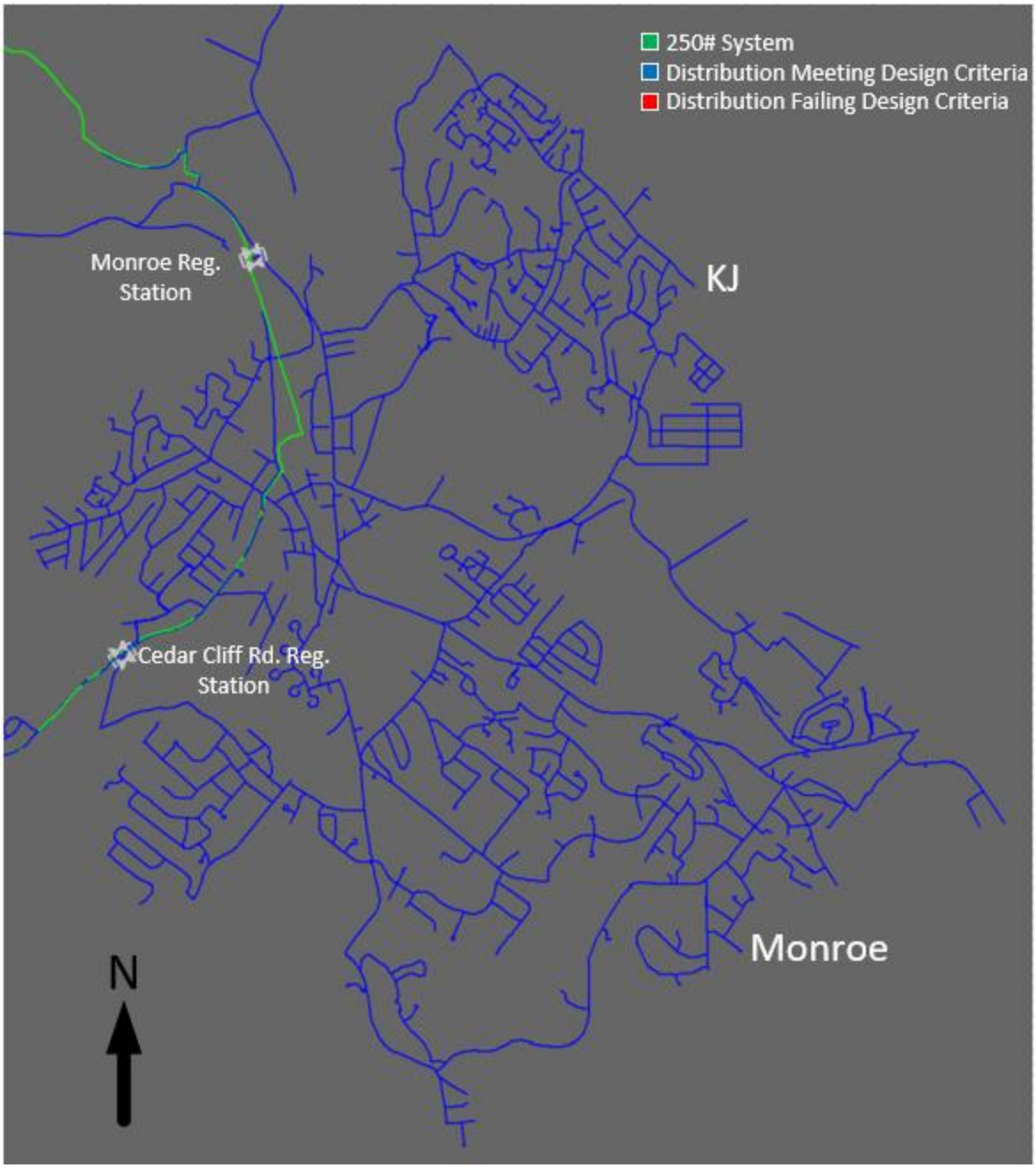
[23] Case 19-G-0066, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Gas Service*, Order Adopting Terms of Joint Proposal and Establishing Electric and Gas Rate Plan (issued January 16, 2020).

The Companies have also identified one region that is vulnerable to supply constraints due to a lack of distribution infrastructure. That region is in Orange County and has been experiencing significant growth due to recent residential development, with more planned in the near term. In addition, the Companies have identified one region in Rockland County, which while not vulnerable at this time is being closely monitored. There is a risk that some potential new business requests could drive a distribution system or a pipeline capacity constraint in the area.

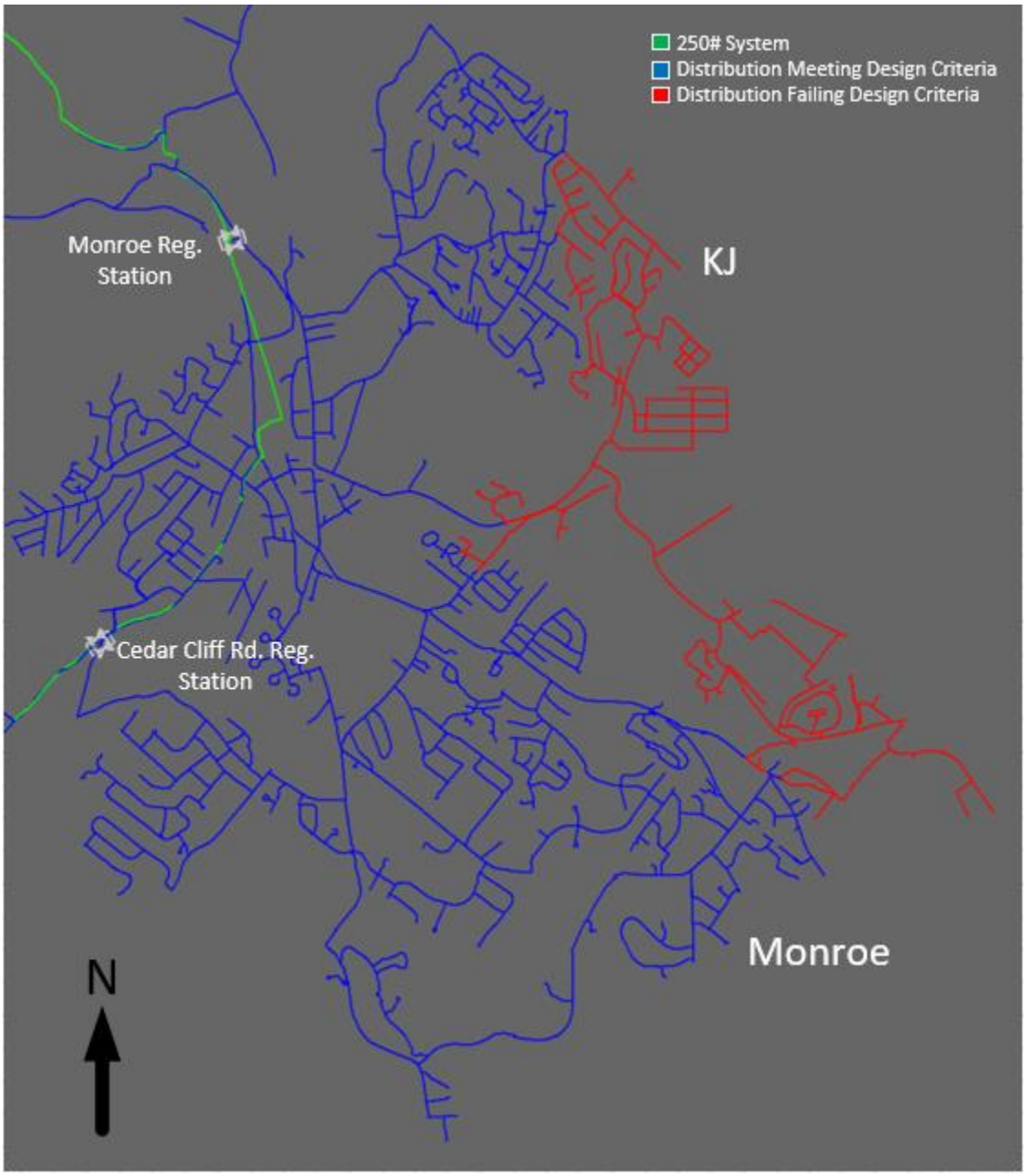
O&R – Monroe, Kiryas Joel, and Palm Tree Area

While sufficient pipeline capacity exists on the Millennium pipeline, which serves the Monroe, Kiryas Joel, and Palm Tree region, to meet the forecasted peak demand, the distribution system is not capable of delivering that supply without falling below minimum design pressure requirements and/or exceeding existing equipment flow specifications. To meet the forecasted demand and reliability needs of this Region, O&R plans to install approximately 8,000 feet of 12" plastic high pressure main and an increase in flow capacity of one of the two district regulator stations supplying this area. The estimated cost of this reinforcement work is approximately $3,280,000.

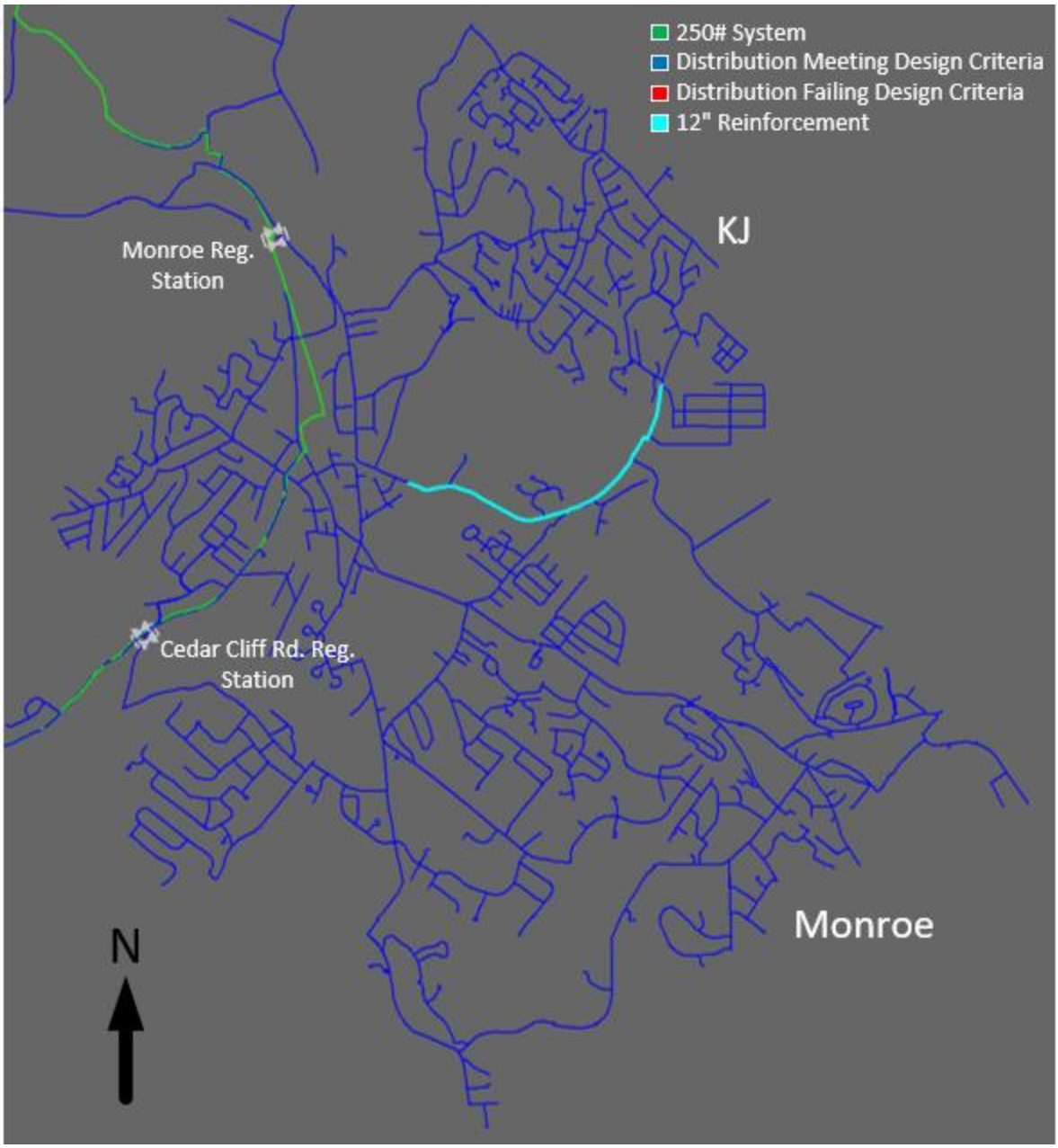
The diagram below, from O&R's network analysis model, shows the region before any new load is added. All pressures (blue and green) are above our design criteria minimum pressure requirements.



The second diagram depicts the system pressures in Winter 2025/2026 after the new forecasted peak demand is added. The area in red indicates pressures that are below our design minimum pressure criteria.



The final diagram, below, depicts system pressures after the 12” main (highlighted in light blue) reinforcement project is added. All pressures are now above our design minimum criteria.



Orange and Rockland has extensive experience with education and outreach for alternative energy solutions through the Company's Energy Efficiency, Non-Wires Alternatives, and other programs. With respect to this region, Orange and Rockland met with the largest developers in this area in 2019 to discuss rebates and electrification options available through the

Company. Specifically, the cross functional team – New Business, Distribution Planning, Customer Energy Solutions, and others – discussed the option of using heat pumps for both heating and cooling needs. At this time, Orange and Rockland cannot accurately predict, in this region, the impact of these ongoing efforts on the reduction of natural gas consumption, but will continue to work on proposing NPAs to its customers and developers. Therefore, Orange and Rockland is currently planning to advance the proposed reinforcement project to maintain adequate gas system pressures and improve reliability.

O&R Region – Sloatsburg

While not currently classified as a vulnerable location, we are closely monitoring the Sloatsburg area because of two applications submitted for firm gas service. Orange and Rockland has been planning work for the first application, however customer progress has stalled. The second customer who submitted an application has not yet provided definitive data that would allow for accurate estimates of incremental peak demand to be added to the system or when it would occur. Orange and Rockland has provided both customers with information related to alternatives to natural gas (*e.g.*, solar, battery storage, heat pumps) for consideration as they determine design options for their new developments.

Orange and Rockland will continue to monitor the status of both potential customers and perform appropriate analysis to determine the impact to the pipeline supply-demand balance as well as the distribution system in the Sloatsburg area should either or both projects advance. As additional vulnerable areas are identified, Orange and Rockland will continue to leverage the Company's education and outreach experience, relationships with developers and municipalities,

and position as a trusted energy advisor to explore alternative solutions to meet forecasted increases in gas demand.

6. Summary and Conclusions

New York State is on the path to a clean energy future. The use of natural gas in the service territories of both Con Edison and Orange and Rockland is in transition. The Companies will manage this transition in such a way as to continue providing safe and reliable service at a reasonable cost to customers, by maintaining an appropriate gas supply-demand balance throughout the transition to a Clean Energy Future.

It is expected that natural gas will continue to be the preferred choice for customers in the near term, causing continued peak demand growth, before a plateau and downturn occurs as they move to greener solutions to meet their needs. Uncertainty exists around when that turning point will occur.

This report describes several regions of the Companies' service territories where that supply-demand balance is vulnerable to experiencing shortfalls due to that uncertainty. In each case, the Companies have described the current supply-demand outlook for the region and the planned solutions to address anticipated supply gaps. These solutions are designed to consider potential changes to the supply-demand outlook as the path toward the clean energy future becomes more defined.

It is important to note that the information included in this report is part of a dynamic process and represents a point in time. Forecasts for peak demand and solutions for managing the supply-demand balance will continue to be adapted to changing conditions, as appropriate.

APPENDICES

Appendix 1 - List of Municipalities located in a Vulnerable Region

County	Township	Communities
Orange	Monroe	Harriman, Monroe
	Palm Tree	Kiryas Joel
Rockland	Ramapo	Sloatsburg
Westchester	Bedford, Mt Kisco, North Castle, New Castle Ossining, Ossining Village, Briarcliff Manor, Pleasantville, Mount Pleasant, Sleepy Hollow, Tarrytown, Elmsford, White Plains, Harrison, Rye Brook, Port Chester, Irvington, Greenburgh, Dobb Ferry, Ardsley, Scarsdale, Rye, Hastings on Hudson, Eastchester, Mamaroneck, Mamaroneck Village, Yonkers, Tuckahoe, Bronxville, New Rochelle, Larchmonth, Pelham, Mt Vernon, Pelham Manor	All
Bronx	All	All
Queens	1st ward, 3rd ward	All
Manhattan[1]	All areas north of 23rd Street	All areas north of 23rd Street

[1] This location will move north over time as the Queens Transmission Project allows for more gas to move north

Appendix 2 - List of Pipeline/Delivered Supply Contracts

Pipeline Company Name	Rate Schedule	Daily Quantity (DT)	Winter Quantity (MDT)	Expiration Date
Flowing Gas To Citygate				
Algonquin	AFT-11	5,470	826	10/31/2021
Algonquin	AFT-14	246	37	10/31/2021
Algonquin	AFT-1Z	225	34	10/31/2021
Algonquin	T-1	5,292	799	8/1/2021
Algonquin	AFT-1	20,000	3,020	10/31/2021
Columbia Transmission	FTS	51,294	7,745	3/31/2025
Iroquois	RTS	20,234	3,055	11/1/2023
Iroquois	RTS	20,000	3,020	11/1/2024
Millennium	FT-1	10,000	1,510	3/31/2034
Millennium	FT-1	5,500	831	3/31/2022
Tennessee	FT-A	5,035	760	10/31/2023
Tennessee	FT-A	31,212	4,713	10/31/2023
Tennessee	FT-A	25,000	3,775	10/31/2023
Tennessee	FT-A	30,625	3,869	10/31/2023
Texas Eastern	CDS	55,238	8,341	10/31/2021
Texas Eastern	FT-1	14,770	2,230	10/31/2022
Texas Eastern	FTS	3,075	464	10/31/2022
Texas Eastern	FT-1	10,000	1,510	10/31/2021
Texas Eastern	FT-1	130,000	19,630	6/25/2027
Texas Eastern	FT-1	14,000	2,114	10/31/2033
Texas Eastern	FT-1	3,500	529	10/31/2033
Transco	FT	2,084	315	8/31/2020
Transco	FT	3,800	574	4/1/2022
Transco	FT	4,500	680	11/1/2021
Transco	FT	30,344	4,582	10/31/2021
Transco	FT	235,880	35,618	10/31/2024
Transco (Dec - Feb)	FT	10,143	923	3/31/2024
National Fuel/Millenium/Algonquin/Iroquois	FT	61,129	9,230	12/31/2023
Tennessee Release	FT	7,500	1,140	10/31/2026
Transco	FT	50,000	7,600	3/31/2025
Transco	FT	30,000	4,560	10/31/2028
Upstream Pipeline				
Dominion	FT	7,575	1,144	10/31/2021
National Fuel	FT-3	31,212	4,713	10/31/2021
Tennessee	FT-A	12,440	1,878	10/31/2023
Tennessee	FT-A	10,000	1,510	4/2/2022
Texas Eastern	CDS	12,047	1,819	10/31/2022
Texas Eastern	CDS	384	58	10/31/2025
Texas Eastern	FT-1	10,836	1,636	10/31/2025
Texas Eastern	CDS	507	77	10/31/2025

Millenium	FT-1	125,000	18,875	12/31/2023
Algonquin	AFT-1RM	100,000	15,100	10/31/2023
National Fuel	FT	75,000	11,325	10/31/2021
Union Gas	FT	20,686	3,124	10/31/2021
TransCanada	FT	20,429	3,085	10/31/2026
North-South Lateral (Stagecoach)	FWS	105,000	15,855	3/31/2023
Marc I (Stagecoach to Transco)	FTS-2	37,500	5,663	3/31/2023
Deliveries from Storage				
Transco	WSS/ESS	100,000	15,100	10/31/2023
Transco	SS-2	19,355	2,923	3/31/2028
Transco	GSS	10,040	1,516	3/31/2023
Dominion/Texas Eastern	FT-1	23,115	3,490	10/31/2022
Texas Eastern	SS-1	69,150	10,442	4/30/2026
Texas Eastern /Algonquin	SS-1	1,140	172	4/30/2026
Texas Eastern /Algonquin	CDS	507	77	10/31/2021
Tennessee Gas	FT-A	31,212	4,713	10/31/2023
Tennessee Gas	FT-A	9,318	1,407	10/31/2023
Tennessee Gas/Columbia	FT-A	12,440	1,878	3/31/2025
Tennessee Gas	FT-A	31,825	4,806	10/31/2023
Honeoye/Tennessee	FT-A	6,834	1,032	10/31/2022
Stagecoach/Tennessee	FT-A	65,000	9,815	10/31/2023
Stagecoach/Millenium/Buena-Vista	FT	55,000	8,305	12/31/2023
Stagecoach/Millenium/Algonquin	FT	9,340	1,410	12/31/2023
Stagecoach/Millenium/Algonquin/Iroquois	FT	40,660	6,140	3/31/2025
Columbia	SST	20,000	3,020	3/31/2025
National Fuel/Millenium/Algonquin/Iroquois	FT	7,871	1,189	3/31/2023
Winter Peaking Service				
Iroquois		8,000	720,000	2/28/2022
Iroquois		30,000	900,000	3/31/2022
Iroquois		30,000	900,000	3/31/2022
Texas Eastern		30,000	2,700,000	2/28/2021
Texas Eastern		20,000	600,000	3/31/2021
Transco		16,000	480,000	3/31/2021
Transco		10,000	300,000	3/31/2021
Tennessee Gas		11,000	990,000	2/28/2022
Tennessee Gas		30,000	2,700,000	2/28/2021
Tennessee Gas		10,000	900,000	2/28/2021
Tennessee Gas		10,000	900,000	2/28/2021
Tennessee Gas		3,000	270,000	2/28/2023
Tennessee Gas		10,500	315,000	3/31/2023
Tennessee Gas		3,111	93,330	3/31/2022

1) Capacity used to deliver gas to pipelines that deliver to the citygate.

Appendix 3 - Descriptions of Projects

Temporary CNG Project

Con Edison began working with three suppliers of trucked CNG identified as a result of its first Non-Pipeline Request for Proposals in 2018. The Companies have evaluated the suitability of over 150 potential locations in Westchester County for the CNG receiving stations. The Commission addressed the rate treatment of CNG facilities in Case No. 17-G-0606 and 19-G-0066. Following is a brief description of the CNG facility being implemented:

A contractor has been engaged to install facilities capable of receiving deliveries of up to 25,000 dekatherms per day of CNG by truck. The CNG receiving station will be located at company-owned property in southern Westchester County proximate to Con Edison's gas transmission and distribution system. The project has received a conditional approval from local authorities and is in the final stages of design. It is expected to be operational by November 2020.

Iroquois' Enhancement by Compression Project

The proposed Project is a compression only enhancement of Iroquois' existing system to receive an additional 125 thousand dekatherms per day of natural gas at Iroquois' interconnect with the TC Energy Canadian mainline in Waddington, NY for redelivery to the New York utilities existing point at Hunts Point. The Project involves the addition of compression and associated gas cooling at existing Iroquois compressor station sites only with no new pipeline. All new facilities will be constructed entirely within Iroquois' existing compressor station properties. The target in service date for the Project is November 1, 2023.

https://www.iroquois.com/operations/projects/exc-project/

Tennessee's East 300 Upgrade Project

The proposed Project will increase compression capability along the existing Tennessee pipeline in Pennsylvania and New Jersey in order to effectuate additional gas deliveries from Stations 313, a purchasing pool, for delivery to Con Edison's existing points at Knollwood and Rye, NY, interconnects with the CECONY gas distribution system and White Plains, NY, an interconnect with the New York Facilities System within the CECONY service territory. The Project involves the addition of additional compression only at existing stations in New Jersey and Pennsylvania as well as a new proposed station in New Jersey. The target in service date for the Project is November 1, 2022.

GR-110 Upgrades

The scope of work is the installation of approximately 2,500 feet of 16-inch, 245 psig transmission main that will parallel the existing 12-inch, 245 psig transmission main, supplying gas to two (2) transmission pressure to high pressure regulators. The project includes the installation of valves as required by the NYCRR Part 255.

This will allow additional flows from NYC that are available due to the reduction of peak demand as projected in the latest forecast to flow north via the regulator, GR-199, at Hunts Point in the Bronx while maintaining a minimum pressure of 150 psig to the inlet of regulator GR-110 in the Bronx. The additional flow north will decrease the amount of CNG required in the moratorium area.